Appendix A

This document contains the dataset used in the research toget  **n the results obtained, along with some plots of the results from the study that could not be presented in the body of the work because of their large nature but were mentioned in the body of the work.**

The tables are titled A1 to A67 while the figures are titled A1 to A8.

The units of the tables' headings on Tables A1 to A65 are presented on Table A68.

Table A1. Cowpea Biomass Growth with Stress Values for Makurdi 1990

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.75	28.3	69.2000	44	399	0.0027	0.9391	1.0000	0.5251	0.3382	0.3220	0.0000	0.0609	0.4749
2	22.01	26.51	101.1000	59	399	0.0031	0.8913	1.0000	0.5187	0.5341	0.5084	0.0000	0.1087	0.4813
3	22.41	28.28	102.8000	55	399	0.0037	0.9591	1.0000	0.5201	0.6827	0.6499	0.0000	0.0409	0.4799
4	21.85	25.77	94.4000	44	399	0.0042	0.8631	1.0000	0.5251	0.6536	0.6223	0.0000	0.1369	0.4749
5	22.21	28.99	76.4000	49	399	0.0049	0.9750	1.0000	0.5225	0.6945	0.6612	0.0000	0.0250	0.4775
6	21.7	30.38	126.1000	30	399	0.0058	0.9940	0.9525	0.5368	1.4082	1.3406	0.0475	0.0060	0.4632
7	22.84	28.43	95.1000	38	399	0.0067	0.9772	1.0000	0.5291	1.2019	1.1442	0.0000	0.0228	0.4709
8	21.73	29.62	99.5000	43	399	0.0079	0.9797	1.0000	0.5257	1.4635	1.3932	0.0000	0.0203	0.4743
9	22.39	29.4	82.8000	37	399	0.0092	0.9934	1.0000	0.5298	1.4571	1.3871	0.0000	0.0066	0.4702
10	21.83	30.55	114.5000	27	399	0.0108	0.9715	0.9313	0.5409	2.3610	2.2477	0.0688	0.0285	0.4591
11	22.87	28.48	96.8000	33	399	0.0126	0.9797	1.0000	0.5335	2.3176	2.2064	0.0000	0.0203	0.4665
12	22.97	27.94	15.9000	49	399	0.0147	0.9659	1.0000	0.5225	0.4281	0.4076	0.0000	0.0341	0.4775
13	22.75	27.16	91.7000	47	399	0.0170	0.9347	1.0000	0.5235	2.7730	2.6399	0.0000	0.0653	0.4765
14	21.77	29.8	122.0000	35	399	0.0199	0.9866	1.0000	0.5315	4.6159	4.3943	0.0000	0.0134	0.4685
15	22.71	29.06	95.4000	24	399	0.0232	0.9928	1.0000	0.5460	4.3578	4.1486	0.0000	0.0072	0.4540
16	22.64	26.43	54.8000	39	399	0.0267	0.9084	1.0000	0.5283	2.5532	2.4307	0.0000	0.0916	0.4717
17	22.79	27.37	131.2000	40	399	0.0309	0.9425	1.0000	0.5276	7.3308	6.9790	0.0000	0.0575	0.4724
18	22.38	27.21	98.3000	30	399	0.0357	0.9247	1.0000	0.5368	6.3241	6.0206	0.0000	0.0753	0.4632
19	21.7	28.66	52.0000	36	399	0.0413	0.9488	1.0000	0.5307	3.9253	3.7369	0.0000	0.0513	0.4693
20	22.38	27.86	78.8000	49	399	0.0477	0.9450	1.0000	0.5225	6.7385	6.4151	0.0000	0.0550	0.4775
21	22.44	28.04	115.5000	46	399	0.0551	0.9525	1.0000	0.5240	11.5315	10.9780	0.0000	0.0475	0.4760
22	22.21	28.98	119.1000	27	399	0.0637	0.9747	1.0000	0.5409	14.5376	13.8398	0.0000	0.0253	0.4591
23	22.38	26.52	109.4000	30	399	0.0729	0.9031	1.0000	0.5368	14.0422	13.3682	0.0000	0.0969	0.4632
24	21.97	27.25	86.8000	49	399	0.0833	0.9131	1.0000	0.5225	12.5389	11.9370	0.0000	0.0869	0.4775
25	22.84	27.17	82.8000	34	399	0.0955	0.9378	1.0000	0.5325	14.3411	13.6527	0.0000	0.0622	0.4675
26	21.93	28.97	84.2000	42	399	0.1096	0.9656	1.0000	0.5263	17.0352	16.2175	0.0000	0.0344	0.4737
27	22.54	26.2	115.5000	42	399	0.1243	0.8981	1.0000	0.5263	24.6535	23.4702	0.0000	0.1019	0.4737
28	22.09	29.15	110.4000	45	399	0.1422	0.9762	1.0000	0.5245	29.1995	27.7980	0.0000	0.0238	0.4755
29	22.6	26.82	78.3000	19	399	0.1609	0.9194	1.0000	0.5581	23.4827	22.3555	0.0000	0.0806	0.4419
30	21.83	29.73	77.8000	38	399	0.1831	0.9863	1.0000	0.5291	27.0010	25.7050	0.0000	0.0137	0.4709
31	22.56	26.98	114.4000	39	399	0.2059	0.9231	1.0000	0.5283	41.7359	39.7326	0.0000	0.0769	0.4717

Table A1 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1990

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.15	28.99	87.7000	41	399	0.2321	0.9731	1.0000	0.5269	37.9225	36.1022	0.0000	0.0269	0.4731
33	22.09	29.29	95.0000	38	399	0.2608	0.9806	1.0000	0.5291	46.6853	44.4444	0.0000	0.0194	0.4709
34	22.86	29.27	107.6000	40	399	0.2922	0.9903	1.0000	0.5276	59.6751	56.8107	0.0000	0.0097	0.4724
35	22	29.03	93.9000	39	399	0.3245	0.9697	1.0000	0.5283	56.7068	53.9849	0.0000	0.0303	0.4717
36	21.82	29.89	76.4000	53	399	0.3592	0.9909	1.0000	0.5208	51.4489	48.9793	0.0000	0.0091	0.4792
37	22.88	26.62	89.2000	28	399	0.3927	0.9219	1.0000	0.5394	63.2741	60.2369	0.0000	0.0781	0.4606
38	22.19	28.97	113.5000	45	399	0.4290	0.9737	1.0000	0.5245	90.3395	86.0032	0.0000	0.0263	0.4755
39	21.95	30.05	99.3000	47	399	0.4668	1.0000	0.9938	0.5235	88.1547	83.9232	0.0063	0.0000	0.4765
40	22.14	29.27	30.0000	53	399	0.5041	0.9816	1.0000	0.5208	28.0850	26.7369	0.0000	0.0184	0.4792
41	22.64	27.13	110.4000	35	399	0.5391	0.9303	1.0000	0.5315	106.9111	101.7794	0.0000	0.0697	0.4685
42	22.58	29.55	113.1000	44	399	0.5761	0.9903	1.0000	0.5251	123.0670	117.1598	0.0000	0.0097	0.4749
43	22.37	29.36	93.2000	28	399	0.6114	0.9916	1.0000	0.5394	110.7134	105.3992	0.0000	0.0084	0.4606
44	22.19	27.78	117.2000	43	399	0.6433	0.9366	1.0000	0.5257	134.8362	128.3641	0.0000	0.0634	0.4743
45	22.04	28.32	105.9000	31	399	0.6739	0.9488	1.0000	0.5356	131.7452	125.4214	0.0000	0.0513	0.4644
46	21.53	29.37	109.3000	19	399	0.7032	0.9656	1.0000	0.5581	150.4645	143.2422	0.0000	0.0344	0.4419
47	20.29	28.56	66.9000	35	399	0.7286	0.9016	1.0000	0.5315	84.8549	80.7818	0.0000	0.0984	0.4685
48	21.9	26.93	126.0000	50	399	0.7521	0.9009	1.0000	0.5221	161.9280	154.1554	0.0000	0.0991	0.4779
49	21.35	31.09	125.5000	32	399	0.7764	0.9670	0.8638	0.5345	182.9347	174.1538	0.1363	0.0330	0.4655
50	22.99	29.07	128.0000	33	399	0.7980	0.9955	1.0000	0.5335	197.0363	187.5786	0.0000	0.0045	0.4665
51	22.8	28.89	119.4000	44	399	0.8171	0.9903	1.0000	0.5251	184.2957	175.4495	0.0000	0.0097	0.4749
52	22.91	26.97	118.2000	54	399	0.8333	0.9337	1.0000	0.5204	173.8759	165.5299	0.0000	0.0663	0.4796
53	22.32	28.76	83.9000	31	399	0.8483	0.9713	1.0000	0.5356	134.4957	128.0399	0.0000	0.0288	0.4644
54	22.87	27.03	64.2000	29	399	0.8611	0.9344	1.0000	0.5381	100.9633	96.1170	0.0000	0.0656	0.4619
55	22.11	30	67.8000	28	399	0.8732	0.9918	1.0000	0.5394	115.0550	109.5324	0.0000	0.0082	0.4606
56	22.76	30.64	112.2000	44	399	0.8842	0.8950	0.9200	0.5251	169.3646	161.2351	0.0800	0.1050	0.4749
57	22.73	30.67	114.7000	31	399	0.8937	0.8950	0.9163	0.5356	178.5091	169.9406	0.0838	0.1050	0.4644
58	22.74	30.04	123.4000	53	399	0.9018	0.9415	0.9950	0.5208	198.2261	188.7113	0.0050	0.0585	0.4792
59	23.64	27.73	116.5000	57	399	0.9085	0.9803	1.0000	0.5194	195.7517	186.3557	0.0000	0.0197	0.4806
60	22.82	29.04	108.5000	47	399	0.9144	0.9956	1.0000	0.5235	187.8349	178.8188	0.0000	0.0044	0.4765
61	22.89	26.72	84.8000	37	399	0.9191	0.9253	1.0000	0.5298	138.8088	132.1460	0.0000	0.0747	0.4702
62	21.43	25.39	87.0000	49	399	0.9229	0.8381	1.0000	0.5225	127.7335	121.6023	0.0000	0.1619	0.4775

Table A2. Cowpea Biomass Growth with Stress Values for Makurdi 1991

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.69	26.88	116.4000	44	400	0.0027	0.9241	1.0000	0.5251	0.5673	0.5401	0.0000	0.0759	0.4749
2	22.55	27.64	77.0000	59	400	0.0032	0.9434	1.0000	0.5187	0.4400	0.4189	0.0000	0.0566	0.4813
3	21.88	26.26	85.1000	55	400	0.0036	0.8794	1.0000	0.5201	0.5228	0.4977	0.0000	0.1206	0.4799
4	21.34	28.63	98.6000	44	400	0.0042	0.9366	1.0000	0.5251	0.7562	0.7199	0.0000	0.0634	0.4749
5	22.27	26.97	100.8000	49	400	0.0049	0.9137	1.0000	0.5225	0.8681	0.8265	0.0000	0.0863	0.4775
6	21.52	28.36	94.8000	30	400	0.0057	0.9337	1.0000	0.5368	0.9944	0.9467	0.0000	0.0663	0.4632
7	22.07	25.49	105.5000	38	400	0.0065	0.8613	1.0000	0.5291	1.1536	1.0982	0.0000	0.1387	0.4709
8	21.43	28.96	117.4000	43	400	0.0076	0.9497	1.0000	0.5257	1.6355	1.5570	0.0000	0.0503	0.4743
9	22.43	28.62	117.4000	37	400	0.0088	0.9703	1.0000	0.5298	1.9645	1.8702	0.0000	0.0297	0.4702
10	21.98	28.42	114.8000	27	400	0.0103	0.9500	1.0000	0.5409	2.2318	2.1246	0.0000	0.0500	0.4591
11	21.93	27.37	89.9000	33	400	0.0119	0.9156	1.0000	0.5335	1.9201	1.8280	0.0000	0.0844	0.4665
12	21.68	27.56	84.9000	49	400	0.0137	0.9137	1.0000	0.5225	2.0476	1.9493	0.0000	0.0863	0.4775
13	21.72	29.21	96.4000	47	400	0.0159	0.9666	1.0000	0.5235	2.8690	2.7313	0.0000	0.0334	0.4765
14	22.57	26.03	67.6000	35	400	0.0183	0.8938	1.0000	0.5315	2.1737	2.0694	0.0000	0.1062	0.4685
15	21.88	28.45	80.7000	24	400	0.0213	0.9478	1.0000	0.5460	3.2793	3.1219	0.0000	0.0522	0.4540
16	22.19	28.71	104.7000	39	400	0.0247	0.9656	1.0000	0.5283	4.8765	4.6425	0.0000	0.0344	0.4717
17	22.92	27.64	112.6000	40	400	0.0287	0.9550	1.0000	0.5276	6.0092	5.7207	0.0000	0.0450	0.4724
18	22.28	28.11	111.8000	30	400	0.0332	0.9497	1.0000	0.5368	6.9927	6.6570	0.0000	0.0503	0.4632
19	21.76	28.81	129.1000	36	400	0.0385	0.9553	1.0000	0.5307	9.3021	8.8556	0.0000	0.0447	0.4693
20	21.91	29.39	122.6000	49	400	0.0447	0.9781	1.0000	0.5225	10.3438	9.8473	0.0000	0.0219	0.4775
21	22.26	29.43	62.9000	46	400	0.0520	0.9903	1.0000	0.5240	6.2626	5.9620	0.0000	0.0097	0.4760
22	22.59	25.76	76.6000	27	400	0.0594	0.8859	1.0000	0.5409	8.0481	7.6618	0.0000	0.1141	0.4591
23	21.79	28.17	64.9000	30	400	0.0683	0.9363	1.0000	0.5368	8.2242	7.8295	0.0000	0.0637	0.4632
24	21.9	28.18	111.8000	49	400	0.0785	0.9400	1.0000	0.5225	15.9076	15.1440	0.0000	0.0600	0.4775
25	22.63	29.41	116.9000	34	400	0.0908	0.9970	1.0000	0.5325	20.8023	19.8038	0.0000	0.0030	0.4675
26	22.47	30.15	129.8000	42	400	0.1052	0.9535	0.9813	0.5263	25.2732	24.0601	0.0188	0.0465	0.4737
27	22.19	29.65	97.1000	42	400	0.1210	0.9950	1.0000	0.5263	22.7002	21.6106	0.0000	0.0050	0.4737
28	22.89	28.04	114.4000	45	400	0.1383	0.9666	1.0000	0.5245	29.5941	28.1736	0.0000	0.0334	0.4755
29	22.68	28.23	110.8000	19	400	0.1576	0.9659	1.0000	0.5581	34.7267	33.0598	0.0000	0.0341	0.4419
30	22.22	26.48	96.7000	38	400	0.1773	0.8969	1.0000	0.5291	30.0236	28.5824	0.0000	0.1031	0.4709
31	21.26	29.51	114.4000	39	400	0.2006	0.9616	1.0000	0.5283	43.0164	40.9516	0.0000	0.0384	0.4717

Table A2 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1991

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.2	29.96	100.7000	41	400	0.2272	0.9880	1.0000	0.5269	43.9547	41.8449	0.0000	0.0120	0.4731
33	22.56	29.13	96.4000	38	400	0.2557	0.9903	1.0000	0.5291	47.6598	45.3722	0.0000	0.0097	0.4709
34	22.49	26.11	69.8000	40	400	0.2833	0.8937	1.0000	0.5276	34.4092	32.7576	0.0000	0.1063	0.4724
35	21.27	29.9	125.0000	39	400	0.3152	0.9741	1.0000	0.5283	74.8265	71.2348	0.0000	0.0259	0.4717
36	22.29	29.19	119.2000	53	400	0.3492	0.9838	1.0000	0.5208	78.7028	74.9250	0.0000	0.0162	0.4792
37	22.58	28.71	109.1000	28	400	0.3844	0.9778	1.0000	0.5394	81.6326	77.7142	0.0000	0.0222	0.4606
38	22.65	29.63	34.3000	45	400	0.4219	0.9790	1.0000	0.5245	27.4191	26.1030	0.0000	0.0210	0.4755
39	22.95	29.08	99.3000	47	400	0.4597	0.9977	1.0000	0.5235	87.9766	83.7537	0.0000	0.0023	0.4765
40	22.42	29.7	108.5000	53	400	0.4978	0.9910	1.0000	0.5208	102.8694	97.9317	0.0000	0.0090	0.4792
41	22.81	29.04	103.0000	35	400	0.5353	0.9953	1.0000	0.5315	107.6399	102.4732	0.0000	0.0047	0.4685
42	22.45	30.19	96.8000	44	400	0.5730	0.9520	0.9763	0.5251	102.3086	97.3978	0.0238	0.0480	0.4749
43	22.73	30.12	91.6000	28	400	0.6096	0.9362	0.9850	0.5394	104.0665	99.0713	0.0150	0.0638	0.4606
44	22.23	30.45	113.1000	43	400	0.6444	0.9490	0.9438	0.5257	134.1682	127.7281	0.0563	0.0510	0.4743
45	23.06	28.46	96.6000	31	400	0.6761	0.9850	1.0000	0.5356	127.1538	121.0505	0.0000	0.0150	0.4644
46	22.83	28.6	45.2000	19	400	0.7057	0.9822	1.0000	0.5581	64.5228	61.4257	0.0000	0.0178	0.4419
47	23	29.57	110.8000	35	400	0.7341	0.9572	1.0000	0.5315	152.7151	145.3848	0.0000	0.0428	0.4685
48	23.24	28.3	112.1000	50	400	0.7593	0.9856	1.0000	0.5221	161.6133	153.8559	0.0000	0.0144	0.4779
49	23.02	27.19	76.2000	32	400	0.7813	0.9441	1.0000	0.5345	110.8474	105.5267	0.0000	0.0559	0.4655
50	22.23	25.31	27.3000	33	400	0.7995	0.8606	1.0000	0.5335	36.9772	35.2023	0.0000	0.1394	0.4665
51	21.15	29.48	119.3000	44	400	0.8179	0.9572	1.0000	0.5251	180.9722	172.2855	0.0000	0.0428	0.4749
52	22.66	28.26	121.5000	54	400	0.8345	0.9663	1.0000	0.5204	188.1551	179.1236	0.0000	0.0337	0.4796
53	22.54	27.64	101.3000	31	400	0.8490	0.9431	1.0000	0.5356	160.3105	152.6156	0.0000	0.0569	0.4644
54	22.24	26.77	34.5000	29	400	0.8614	0.9066	1.0000	0.5381	53.4893	50.9218	0.0000	0.0934	0.4619
55	21.94	28.7	69.5000	28	400	0.8729	0.9575	1.0000	0.5394	115.6282	110.0780	0.0000	0.0425	0.4606
56	22.3	28.31	110.8000	44	400	0.8831	0.9566	1.0000	0.5251	181.3521	172.6472	0.0000	0.0434	0.4749
57	22.06	28.92	113.5000	31	400	0.8921	0.9681	1.0000	0.5356	193.7423	184.4427	0.0000	0.0319	0.4644
58	22.13	29.54	109.4000	53	400	0.9001	0.9897	1.0000	0.5208	187.3056	178.3149	0.0000	0.0103	0.4792
59	21.71	29.68	111.3000	57	400	0.9071	0.9809	1.0000	0.5194	189.7904	180.6805	0.0000	0.0191	0.4806
60	21.98	29.53	110.4000	47	400	0.9131	0.9847	1.0000	0.5235	191.7381	182.5347	0.0000	0.0153	0.4765
61	22.16	29.08	114.7000	37	400	0.9182	0.9762	1.0000	0.5298	201.0243	191.3751	0.0000	0.0238	0.4702
62	22.55	26	124.9000	49	400	0.9223	0.8922	1.0000	0.5225	198.1743	188.6620	0.0000	0.1078	0.4775

Table A3. Cowpea Biomass Growth with Stress Values for Makurdi 1992

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.51	28.84	92.5000	44	401	0.0027	0.9484	1.0000	0.5251	0.4718	0.4491	0.0000	0.0516	0.4749
2	21.69	28.37	107.1000	59	401	0.0032	0.9394	1.0000	0.5187	0.6208	0.5910	0.0000	0.0606	0.4813
3	21.75	27.24	82.8000	55	401	0.0037	0.9059	1.0000	0.5201	0.5362	0.5105	0.0000	0.0941	0.4799
4	21.58	28	98.3000	44	401	0.0042	0.9244	1.0000	0.5251	0.7599	0.7234	0.0000	0.0756	0.4749
5	21.94	26.98	100.6000	49	401	0.0049	0.9038	1.0000	0.5225	0.8737	0.8318	0.0000	0.0962	0.4775
6	21.39	28.48	49.6000	30	401	0.0057	0.9334	1.0000	0.5368	0.5302	0.5048	0.0000	0.0666	0.4632
7	21.82	27.45	92.4000	38	401	0.0066	0.9147	1.0000	0.5291	1.1033	1.0503	0.0000	0.0853	0.4709
8	21.08	28.86	115.2000	43	401	0.0076	0.9356	1.0000	0.5257	1.6220	1.5441	0.0000	0.0644	0.4743
9	21.97	29.49	115.9000	37	401	0.0089	0.9831	1.0000	0.5298	2.0199	1.9230	0.0000	0.0169	0.4702
10	22.27	27.11	112.9000	27	401	0.0103	0.9181	1.0000	0.5409	2.1695	2.0653	0.0000	0.0819	0.4591
11	21.6	25.52	93.6000	33	401	0.0118	0.8475	1.0000	0.5335	1.8723	1.7824	0.0000	0.1525	0.4665
12	21.11	28.51	106.0000	49	401	0.0137	0.9256	1.0000	0.5225	2.6252	2.4992	0.0000	0.0744	0.4775
13	21.04	28.45	98.6000	47	401	0.0158	0.9216	1.0000	0.5235	2.8162	2.6810	0.0000	0.0784	0.4765
14	20.76	26.87	99.8000	35	401	0.0181	0.8634	1.0000	0.5315	3.1059	2.9568	0.0000	0.1366	0.4685
15	21.28	28.45	114.2000	24	401	0.0209	0.9291	1.0000	0.5460	4.5439	4.3257	0.0000	0.0709	0.4540
16	21.13	24.25	113.4000	39	401	0.0237	0.7931	1.0000	0.5283	4.2187	4.0162	0.0000	0.2069	0.4717
17	21.38	27.17	117.9000	40	401	0.0272	0.8922	1.0000	0.5276	5.6618	5.3900	0.0000	0.1078	0.4724
18	22.17	28.71	90.2000	30	401	0.0316	0.9650	1.0000	0.5368	5.5361	5.2704	0.0000	0.0350	0.4632
19	21.45	28.35	114.4000	36	401	0.0365	0.9312	1.0000	0.5307	7.7333	7.3621	0.0000	0.0688	0.4693
20	21.86	26.67	112.6000	49	401	0.0419	0.8916	1.0000	0.5225	8.2273	7.8324	0.0000	0.1084	0.4775
21	21.8	28.33	47.4000	46	401	0.0483	0.9416	1.0000	0.5240	4.2339	4.0307	0.0000	0.0584	0.4760
22	21.51	26.29	53.2000	27	401	0.0551	0.8687	1.0000	0.5409	5.1616	4.9138	0.0000	0.1313	0.4591
23	21.08	28.23	83.3000	30	401	0.0632	0.9159	1.0000	0.5368	9.7024	9.2367	0.0000	0.0841	0.4632
24	21.76	28.07	110.1000	49	401	0.0726	0.9322	1.0000	0.5225	14.5918	13.8914	0.0000	0.0678	0.4775
25	22.02	26.15	126.4000	34	401	0.0826	0.8803	1.0000	0.5325	18.3470	17.4663	0.0000	0.1197	0.4675
26	21.48	28.24	124.5000	42	401	0.0946	0.9288	1.0000	0.5263	21.5626	20.5276	0.0000	0.0713	0.4737
27	21.74	26.06	95.2000	42	401	0.1071	0.8687	1.0000	0.5263	17.4635	16.6253	0.0000	0.1313	0.4737
28	21.62	27.62	109.0000	45	401	0.1218	0.9138	1.0000	0.5245	23.8376	22.6934	0.0000	0.0862	0.4755
29	22.4	25.55	89.2000	19	401	0.1374	0.8734	1.0000	0.5581	22.3857	21.3112	0.0000	0.1266	0.4419
30	21.98	26.68	107.8000	38	401	0.1551	0.8956	1.0000	0.5291	29.6870	28.2620	0.0000	0.1044	0.4709
31	21.95	25.46	114.0000	39	401	0.1737	0.8566	1.0000	0.5283	33.5816	31.9697	0.0000	0.1434	0.4717

Table A3 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1992

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.93	27.02	109.5000	41	401	0.1952	0.9047	1.0000	0.5269	38.1841	36.3513	0.0000	0.0953	0.4731
33	21.92	26.94	95.6000	38	401	0.2185	0.9019	1.0000	0.5291	37.3556	35.5625	0.0000	0.0981	0.4709
34	21.98	25.95	131.0000	40	401	0.2429	0.8728	1.0000	0.5276	54.9134	52.2775	0.0000	0.1272	0.4724
35	20.95	28.39	108.3000	39	401	0.2704	0.9169	1.0000	0.5283	53.1516	50.6003	0.0000	0.0831	0.4717
36	22.37	25.19	100.1000	53	401	0.2978	0.8613	1.0000	0.5208	50.1081	47.7029	0.0000	0.1387	0.4792
37	21.84	26.8	70.5000	28	401	0.3278	0.8950	1.0000	0.5394	41.8134	39.8064	0.0000	0.1050	0.4606
38	21.73	25.95	128.5000	45	401	0.3581	0.8650	1.0000	0.5245	78.2482	74.4923	0.0000	0.1350	0.4755
39	21.27	27.7	125.6000	47	401	0.3910	0.9053	1.0000	0.5235	87.2144	83.0281	0.0000	0.0947	0.4765
40	21.91	28.21	115.7000	53	401	0.4260	0.9413	1.0000	0.5208	90.5546	86.2080	0.0000	0.0587	0.4792
41	22.17	27.22	134.9000	35	401	0.4608	0.9184	1.0000	0.5315	113.7131	108.2549	0.0000	0.0816	0.4685
42	21.47	30.66	112.1000	44	401	0.4989	0.9903	0.9175	0.5251	108.9746	103.7438	0.0825	0.0097	0.4749
43	22.5	29.09	87.5000	28	401	0.5361	0.9872	1.0000	0.5394	93.6071	89.1139	0.0000	0.0128	0.4606
44	22.58	29.42	106.4000	43	401	0.5730	1.0000	1.0000	0.5257	120.1005	114.3357	0.0000	0.0000	0.4743
45	22.86	27.83	120.1000	31	401	0.6073	0.9591	1.0000	0.5356	140.3989	133.6598	0.0000	0.0409	0.4644
46	21.9	27.55	93.1000	19	401	0.6388	0.9203	1.0000	0.5581	114.4784	108.9835	0.0000	0.0797	0.4419
47	21.72	27.58	105.3000	35	401	0.6687	0.9156	1.0000	0.5315	128.4214	122.2572	0.0000	0.0844	0.4685
48	21.75	29.08	119.3000	50	401	0.6982	0.9634	1.0000	0.5221	157.0095	149.4730	0.0000	0.0366	0.4779
49	21.34	28.61	112.9000	32	401	0.7249	0.9359	1.0000	0.5345	153.4347	146.0698	0.0000	0.0641	0.4655
50	20.44	29.67	115.5000	33	401	0.7498	0.9409	1.0000	0.5335	162.8915	155.0727	0.0000	0.0591	0.4665
51	21.39	29.7	95.4000	44	401	0.7732	0.9716	1.0000	0.5251	141.0244	134.2552	0.0000	0.0284	0.4749
52	21.68	28.77	110.8000	54	401	0.7941	0.9516	1.0000	0.5204	163.2891	155.4512	0.0000	0.0484	0.4796
53	22.43	29.3	112.5000	31	401	0.8137	0.9916	1.0000	0.5356	182.1851	173.4402	0.0000	0.0084	0.4644
54	23.12	28.74	103.4000	29	401	0.8313	0.9956	1.0000	0.5381	172.5513	164.2688	0.0000	0.0044	0.4619
55	22.2	27.39	115.4000	28	401	0.8458	0.9247	1.0000	0.5394	182.4438	173.6865	0.0000	0.0753	0.4606
56	21.54	27.71	109.4000	44	401	0.8586	0.9141	1.0000	0.5251	168.9478	160.8383	0.0000	0.0859	0.4749
57	22.24	28.29	26.1000	31	401	0.8705	0.9541	1.0000	0.5356	43.5059	41.4177	0.0000	0.0459	0.4644
58	22.73	27.3	120.9000	53	401	0.8807	0.9384	1.0000	0.5208	195.0326	185.6711	0.0000	0.0616	0.4792
59	21.86	26.68	61.4000	57	401	0.8894	0.8919	1.0000	0.5194	94.7891	90.2392	0.0000	0.1081	0.4806
60	21.01	30.02	125.2000	47	401	0.8976	0.9697	0.9975	0.5235	213.7748	203.5136	0.0025	0.0303	0.4765
61	21.64	28.23	109.2000	37	401	0.9045	0.9334	1.0000	0.5298	183.0625	174.2755	0.0000	0.0666	0.4702
62	22.48	28.92	113.8000	49	401	0.9109	0.9813	1.0000	0.5225	199.1653	189.6054	0.0000	0.0187	0.4775

Table A4. Cowpea Biomass Growth with Stress Values for Makurdi 1993

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.05	28.02	90.9000	44	402	0.0027	0.9397	1.0000	0.5251	0.4657	0.4434	0.0000	0.0603	0.4749
2	22.17	29.24	53.5000	59	402	0.0032	0.9816	1.0000	0.5187	0.3308	0.3149	0.0000	0.0184	0.4813
3	22.25	28.55	103.3000	55	402	0.0037	0.9625	1.0000	0.5201	0.7320	0.6969	0.0000	0.0375	0.4799
4	22.39	27.65	107.2000	44	402	0.0043	0.9388	1.0000	0.5251	0.8688	0.8271	0.0000	0.0613	0.4749
5	22.22	26.89	85.6000	49	402	0.0050	0.9097	1.0000	0.5225	0.7732	0.7361	0.0000	0.0903	0.4775
6	22.13	27.9	101.0000	30	402	0.0058	0.9384	1.0000	0.5368	1.1225	1.0687	0.0000	0.0616	0.4632
7	21.88	25.95	100.1000	38	402	0.0067	0.8697	1.0000	0.5291	1.1668	1.1108	0.0000	0.1303	0.4709
8	21.23	27.9	107.7000	43	402	0.0077	0.9103	1.0000	0.5257	1.5087	1.4363	0.0000	0.0897	0.4743
9	22.67	25.66	53.5000	37	402	0.0089	0.8853	1.0000	0.5298	0.8454	0.8048	0.0000	0.1147	0.4702
10	22.21	27.56	97.4000	27	402	0.0103	0.9303	1.0000	0.5409	1.9132	1.8213	0.0000	0.0697	0.4591
11	21.94	27.08	101.9000	33	402	0.0118	0.9069	1.0000	0.5335	2.2211	2.1145	0.0000	0.0931	0.4665
12	21.78	28.99	104.9000	49	402	0.0138	0.9616	1.0000	0.5225	2.7639	2.6312	0.0000	0.0384	0.4775
13	22.1	28.52	97.5000	47	402	0.0160	0.9569	1.0000	0.5235	2.9777	2.8347	0.0000	0.0431	0.4765
14	21.89	27.87	103.2000	35	402	0.0185	0.9300	1.0000	0.5315	3.5996	3.4269	0.0000	0.0700	0.4685
15	22.11	28.38	93.3000	24	402	0.0215	0.9528	1.0000	0.5460	3.9761	3.7852	0.0000	0.0472	0.4540
16	22.4	25.45	80.6000	39	402	0.0247	0.8703	1.0000	0.5283	3.4776	3.3107	0.0000	0.1297	0.4717
17	21.91	26.84	93.5000	40	402	0.0284	0.8984	1.0000	0.5276	4.7827	4.5531	0.0000	0.1016	0.4724
18	21.73	26.48	86.2000	30	402	0.0325	0.8816	1.0000	0.5368	5.0459	4.8037	0.0000	0.1184	0.4632
19	20.91	27.18	114.5000	36	402	0.0372	0.8778	1.0000	0.5307	7.5537	7.1911	0.0000	0.1222	0.4693
20	21.54	29.24	111.5000	49	402	0.0431	0.9619	1.0000	0.5225	9.1971	8.7556	0.0000	0.0381	0.4775
21	22.01	29.15	86.2000	46	402	0.0500	0.9737	1.0000	0.5240	8.3711	7.9693	0.0000	0.0263	0.4760
22	22.07	28.11	112.2000	27	402	0.0577	0.9431	1.0000	0.5409	12.5601	11.9572	0.0000	0.0569	0.4591
23	22.21	26.45	92.8000	30	402	0.0659	0.8956	1.0000	0.5368	11.1944	10.6570	0.0000	0.1044	0.4632
24	21.8	29.84	119.8000	49	402	0.0763	0.9888	1.0000	0.5225	17.9778	17.1149	0.0000	0.0112	0.4775
25	22.01	27.98	99.7000	34	402	0.0876	0.9372	1.0000	0.5325	16.5734	15.7779	0.0000	0.0628	0.4675
26	21.39	28.16	127.2000	42	402	0.1000	0.9234	1.0000	0.5263	23.5262	22.3969	0.0000	0.0766	0.4737
27	21.7	29.56	114.1000	42	402	0.1149	0.9769	1.0000	0.5263	25.6445	24.4136	0.0000	0.0231	0.4737
28	22.4	25.77	114.7000	45	402	0.1299	0.8803	1.0000	0.5245	26.1769	24.9204	0.0000	0.1197	0.4755
29	21.34	29.77	116.1000	19	402	0.1483	0.9722	1.0000	0.5581	35.5563	33.8496	0.0000	0.0278	0.4419
30	22.44	26.82	110.0000	38	402	0.1676	0.9144	1.0000	0.5291	33.9326	32.3038	0.0000	0.0856	0.4709
31	21.9	28.17	76.7000	39	402	0.1894	0.9397	1.0000	0.5283	27.4351	26.1182	0.0000	0.0603	0.4717

Table A4 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1993

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.36	29.95	108.3000	41	402	0.2142	0.9784	1.0000	0.5269	45.5106	43.3261	0.0000	0.0216	0.4731
33	22.01	28.69	106.3000	38	402	0.2408	0.9594	1.0000	0.5291	49.4236	47.0513	0.0000	0.0406	0.4709
34	22.54	28.65	118.8000	40	402	0.2698	0.9747	1.0000	0.5276	62.7249	59.7141	0.0000	0.0253	0.4724
35	22.25	27.28	69.9000	39	402	0.2993	0.9228	1.0000	0.5283	38.8023	36.9398	0.0000	0.0772	0.4717
36	22.21	27.48	111.8000	53	402	0.3305	0.9278	1.0000	0.5208	67.9343	64.6734	0.0000	0.0722	0.4792
37	22.08	28.58	111.0000	28	402	0.3643	0.9581	1.0000	0.5394	79.5081	75.6917	0.0000	0.0419	0.4606
38	22.47	28.83	90.8000	45	402	0.4000	0.9781	1.0000	0.5245	70.8959	67.4929	0.0000	0.0219	0.4755
39	21.28	29.56	116.5000	47	402	0.4361	0.9638	1.0000	0.5235	97.5149	92.8341	0.0000	0.0362	0.4765
40	21.56	30.59	101.5000	53	402	0.4741	0.9888	0.9263	0.5208	94.2957	89.7695	0.0738	0.0112	0.4792
41	22.93	26.98	112.7000	35	402	0.5096	0.9347	1.0000	0.5315	108.5654	103.3542	0.0000	0.0653	0.4685
42	22.25	28.16	121.2000	44	402	0.5453	0.9503	1.0000	0.5251	125.4688	119.4463	0.0000	0.0497	0.4749
43	22.28	29.81	109.8000	28	402	0.5820	0.9932	1.0000	0.5394	130.2747	124.0215	0.0000	0.0068	0.4606
44	22.56	28.47	122.1000	43	402	0.6163	0.9697	1.0000	0.5257	145.9503	138.9446	0.0000	0.0303	0.4743
45	22.45	28.04	56.1000	31	402	0.6485	0.9528	1.0000	0.5356	70.6456	67.2546	0.0000	0.0472	0.4644
46	21.58	27.01	125.4000	19	402	0.6772	0.8934	1.0000	0.5581	161.1010	153.3681	0.0000	0.1066	0.4419
47	22.09	29.58	119.3000	35	402	0.7069	0.9897	1.0000	0.5315	168.7949	160.6927	0.0000	0.0103	0.4685
48	22.3	29.31	111.6000	50	402	0.7344	0.9878	1.0000	0.5221	160.8117	153.0928	0.0000	0.0122	0.4779
49	22.62	28.68	120.6000	32	402	0.7593	0.9781	1.0000	0.5345	182.1598	173.4161	0.0000	0.0219	0.4655
50	22.54	27.28	127.3000	33	402	0.7810	0.9319	1.0000	0.5335	188.0578	179.0310	0.0000	0.0681	0.4665
51	22.22	29.91	121.5000	44	402	0.8022	0.9903	1.0000	0.5251	192.8326	183.5766	0.0000	0.0097	0.4749
52	23.06	28.88	92.3000	54	402	0.8211	0.9981	1.0000	0.5204	149.7869	142.5971	0.0000	0.0019	0.4796
53	22.9	28.9	106.6000	31	402	0.8378	0.9937	1.0000	0.5356	180.8631	172.1817	0.0000	0.0063	0.4644
54	22.37	27.56	116.2000	29	402	0.8518	0.9353	1.0000	0.5381	189.5199	180.4229	0.0000	0.0647	0.4619
55	22.65	27.91	76.5000	28	402	0.8644	0.9550	1.0000	0.5394	129.6173	123.3957	0.0000	0.0450	0.4606
56	22.61	28.13	86.9000	44	402	0.8757	0.9606	1.0000	0.5251	146.0432	139.0331	0.0000	0.0394	0.4749
57	22.28	27.34	127.0000	31	402	0.8852	0.9256	1.0000	0.5356	212.0634	201.8844	0.0000	0.0744	0.4644
58	21.15	27.61	122.2000	53	402	0.8934	0.8987	1.0000	0.5208	194.4320	185.0993	0.0000	0.1013	0.4792
59	21.78	30.29	115.9000	57	402	0.9013	0.9948	0.9638	0.5194	205.3465	195.4899	0.0363	0.0052	0.4806
60	22.44	30.2	121.8000	47	402	0.9083	0.9520	0.9750	0.5235	209.7828	199.7133	0.0250	0.0480	0.4765
61	23.17	27.77	125.5000	37	402	0.9141	0.9669	1.0000	0.5298	223.6009	212.8680	0.0000	0.0331	0.4702
62	21.96	30.15	77.8000	49	402	0.9192	0.9918	0.9813	0.5225	141.0108	134.2423	0.0188	0.0082	0.4775

Table A5. Cowpea Biomass Growth with Stress Values for Makurdi 1994

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.75	27.59	97.6000	44	398	0.0027	0.9481	1.0000	0.5251	0.4747	0.4519	0.0000	0.0519	0.4749
2	22.11	26.84	103.0000	59	398	0.0032	0.9047	1.0000	0.5187	0.5455	0.5193	0.0000	0.0953	0.4813
3	21.43	28.73	98.2000	55	398	0.0037	0.9425	1.0000	0.5201	0.6314	0.6010	0.0000	0.0575	0.4799
4	22.97	28.05	70.7000	44	398	0.0043	0.9694	1.0000	0.5251	0.5509	0.5244	0.0000	0.0306	0.4749
5	22.11	28.21	84.1000	49	398	0.0050	0.9475	1.0000	0.5225	0.7411	0.7056	0.0000	0.0525	0.4775
6	22.34	29.1	110.2000	30	398	0.0058	0.9825	1.0000	0.5368	1.2095	1.1515	0.0000	0.0175	0.4632
7	22.24	28.73	80.7000	38	398	0.0068	0.9678	1.0000	0.5291	1.0029	0.9548	0.0000	0.0322	0.4709
8	22.1	25.88	90.5000	43	398	0.0078	0.8744	1.0000	0.5257	1.1600	1.1043	0.0000	0.1256	0.4743
9	21.91	28.43	112.3000	37	398	0.0091	0.9481	1.0000	0.5298	1.8284	1.7407	0.0000	0.0519	0.4702
10	21.9	29.16	113.5000	27	398	0.0106	0.9706	1.0000	0.5409	2.2521	2.1440	0.0000	0.0294	0.4591
11	22.18	27.4	101.4000	33	398	0.0122	0.9244	1.0000	0.5335	2.1872	2.0822	0.0000	0.0756	0.4665
12	21.07	28.87	61.2000	49	398	0.0142	0.9356	1.0000	0.5225	1.5170	1.4442	0.0000	0.0644	0.4775
13	21.85	28.87	102.2000	47	398	0.0165	0.9600	1.0000	0.5235	3.0289	2.8835	0.0000	0.0400	0.4765
14	22.05	28.1	92.7000	35	398	0.0191	0.9422	1.0000	0.5315	3.1743	3.0219	0.0000	0.0578	0.4685
15	21.38	28.26	98.8000	24	398	0.0221	0.9263	1.0000	0.5460	3.9495	3.7599	0.0000	0.0737	0.4540
16	22.06	28.06	107.0000	39	398	0.0256	0.9412	1.0000	0.5283	4.8708	4.6370	0.0000	0.0588	0.4717
17	22.7	26.44	103.6000	40	398	0.0295	0.9106	1.0000	0.5276	5.2490	4.9970	0.0000	0.0894	0.4724
18	22.25	27.17	115.7000	30	398	0.0340	0.9194	1.0000	0.5368	6.9416	6.6084	0.0000	0.0806	0.4632
19	22.22	27.69	107.4000	36	398	0.0393	0.9347	1.0000	0.5307	7.4776	7.1187	0.0000	0.0653	0.4693
20	22.03	27.57	120.6000	49	398	0.0452	0.9250	1.0000	0.5225	9.4253	8.9729	0.0000	0.0750	0.4775
21	22.07	27.83	101.6000	46	398	0.0521	0.9344	1.0000	0.5240	9.2693	8.8244	0.0000	0.0656	0.4760
22	21.89	28.14	100.2000	27	398	0.0600	0.9384	1.0000	0.5409	10.9156	10.3916	0.0000	0.0616	0.4591
23	22.72	27.78	109.4000	30	398	0.0692	0.9531	1.0000	0.5368	13.8477	13.1830	0.0000	0.0469	0.4632
24	22.46	27.27	80.6000	49	398	0.0794	0.9291	1.0000	0.5225	11.1022	10.5693	0.0000	0.0709	0.4775
25	22.19	27.3	78.9000	34	398	0.0908	0.9216	1.0000	0.5325	12.5639	11.9608	0.0000	0.0784	0.4675
26	21.98	28.45	105.2000	42	398	0.1040	0.9509	1.0000	0.5263	19.5852	18.6451	0.0000	0.0491	0.4737
27	22.79	28.71	115.6000	42	398	0.1196	0.9844	1.0000	0.5263	25.6000	24.3712	0.0000	0.0156	0.4737
28	23.07	27.11	118.0000	45	398	0.1362	0.9431	1.0000	0.5245	28.4346	27.0697	0.0000	0.0569	0.4755
29	22.79	29.17	50.2000	19	398	0.1560	0.9988	1.0000	0.5581	15.6041	14.8551	0.0000	0.0012	0.4419
30	22.56	27.56	70.8000	38	398	0.1766	0.9412	1.0000	0.5291	22.2621	21.1935	0.0000	0.0588	0.4709
31	22.42	27.55	96.4000	39	398	0.1992	0.9366	1.0000	0.5283	33.9664	32.3360	0.0000	0.0634	0.4717

Table A5 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1994

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.42	28.8	96.6000	41	398	0.2249	0.9756	1.0000	0.5269	39.9241	38.0077	0.0000	0.0244	0.4731
33	22.67	27.62	71.1000	38	398	0.2519	0.9466	1.0000	0.5291	32.0645	30.5254	0.0000	0.0534	0.4709
34	22.87	28.61	86.8000	40	398	0.2821	0.9838	1.0000	0.5276	45.4334	43.2526	0.0000	0.0162	0.4724
35	22.93	31.11	122.6000	39	398	0.3170	0.8470	0.8613	0.5283	62.1661	59.1821	0.1388	0.1530	0.4717
36	23.17	26.44	34.9000	53	398	0.3489	0.9253	1.0000	0.5208	20.9833	19.9761	0.0000	0.0747	0.4792
37	22.14	29.69	122.7000	28	398	0.3848	0.9947	1.0000	0.5394	90.5656	86.2185	0.0000	0.0053	0.4606
38	22.82	26.64	122.1000	45	398	0.4189	0.9206	1.0000	0.5245	88.3053	84.0666	0.0000	0.0794	0.4755
39	22.5	26.1	105.0000	47	398	0.4526	0.8938	1.0000	0.5235	79.4964	75.6806	0.0000	0.1062	0.4765
40	21.79	28.5	122.6000	53	398	0.4886	0.9466	1.0000	0.5208	105.5754	100.5077	0.0000	0.0534	0.4792
41	21.59	30.46	126.0000	35	398	0.5264	0.9963	0.9425	0.5315	125.5793	119.5515	0.0575	0.0037	0.4685
42	21.55	29.45	122.1000	44	398	0.5624	0.9688	1.0000	0.5251	124.8924	118.8976	0.0000	0.0313	0.4749
43	22.55	27.58	112.6000	28	398	0.5965	0.9416	1.0000	0.5394	121.9576	116.1036	0.0000	0.0584	0.4606
44	22.37	28.65	108.7000	43	398	0.6302	0.9694	1.0000	0.5257	124.7926	118.8026	0.0000	0.0306	0.4743
45	22.09	28.51	107.8000	31	398	0.6618	0.9563	1.0000	0.5356	130.6314	124.3611	0.0000	0.0437	0.4644
46	22.31	27.62	113.3000	19	398	0.6909	0.9353	1.0000	0.5581	146.0900	139.0777	0.0000	0.0647	0.4419
47	22.2	28.51	122.0000	35	398	0.7188	0.9597	1.0000	0.5315	159.9343	152.2575	0.0000	0.0403	0.4685
48	23.02	26.26	92.4000	50	398	0.7434	0.9150	1.0000	0.5221	117.3225	111.6910	0.0000	0.0850	0.4779
49	22.03	26.62	102.5000	32	398	0.7657	0.8953	1.0000	0.5345	134.2722	127.8272	0.0000	0.1047	0.4655
50	21.67	26.13	70.5000	33	398	0.7854	0.8687	1.0000	0.5335	91.7481	87.3442	0.0000	0.1313	0.4665
51	22.31	25.7	94.4000	44	398	0.8036	0.8753	1.0000	0.5251	124.6606	118.6769	0.0000	0.1247	0.4749
52	21.27	27.17	118.7000	54	398	0.8204	0.8887	1.0000	0.5204	161.0369	153.3071	0.0000	0.1113	0.4796
53	21.41	28.26	123.0000	31	398	0.8361	0.9272	1.0000	0.5356	182.5960	173.8314	0.0000	0.0728	0.4644
54	22.1	28.61	122.9000	29	398	0.8506	0.9597	1.0000	0.5381	193.0020	183.7379	0.0000	0.0403	0.4619
55	22.71	27.27	122.1000	28	398	0.8632	0.9369	1.0000	0.5394	190.4335	181.2927	0.0000	0.0631	0.4606
56	22.3	27.05	106.5000	44	398	0.8741	0.9172	1.0000	0.5251	160.2893	152.5954	0.0000	0.0828	0.4749
57	22.07	30.15	123.2000	31	398	0.8846	0.9835	0.9813	0.5356	205.2542	195.4020	0.0188	0.0165	0.4644
58	23.04	29.14	67.9000	53	398	0.8938	0.9865	1.0000	0.5208	111.4767	106.1258	0.0000	0.0135	0.4792
59	22.4	27.65	110.4000	57	398	0.9012	0.9391	1.0000	0.5194	173.4850	165.1577	0.0000	0.0609	0.4806
60	22.64	26.31	108.1000	47	398	0.9075	0.9047	1.0000	0.5235	166.1007	158.1279	0.0000	0.0953	0.4765
61	22.45	27.12	99.8000	37	398	0.9131	0.9241	1.0000	0.5298	159.5122	151.8556	0.0000	0.0759	0.4702
62	22.11	25.31	88.3000	49	398	0.9177	0.8569	1.0000	0.5225	129.7106	123.4845	0.0000	0.1431	0.4775

Table A6. Cowpea Biomass Growth with Stress Values for Makurdi 1995

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.5	26.93	121.8000	44	401	0.0027	0.9197	1.0000	0.5251	0.5996	0.5708	0.0000	0.0803	0.4749
2	21.66	27.92	58.3000	59	401	0.0032	0.9244	1.0000	0.5187	0.3302	0.3144	0.0000	0.0756	0.4813
3	22.23	29.64	119.4000	55	401	0.0037	0.9959	1.0000	0.5201	0.8563	0.8152	0.0000	0.0041	0.4799
4	22.1	29.74	104.9000	44	401	0.0043	0.9950	1.0000	0.5251	0.8892	0.8466	0.0000	0.0050	0.4749
5	22.06	28.61	109.0000	49	401	0.0050	0.9584	1.0000	0.5225	1.0317	0.9822	0.0000	0.0416	0.4775
6	22.63	27.04	101.2000	30	401	0.0058	0.9272	1.0000	0.5368	1.1033	1.0503	0.0000	0.0728	0.4632
7	22.53	26.21	79.8000	38	401	0.0067	0.8981	1.0000	0.5291	0.9580	0.9120	0.0000	0.1019	0.4709
8	21.25	28.09	106.1000	43	401	0.0078	0.9169	1.0000	0.5257	1.4944	1.4227	0.0000	0.0831	0.4743
9	22.58	27.21	104.3000	37	401	0.0090	0.9309	1.0000	0.5298	1.7426	1.6590	0.0000	0.0691	0.4702
10	22.88	28.36	58.1000	27	401	0.0106	0.9762	1.0000	0.5409	1.2129	1.1547	0.0000	0.0238	0.4591
11	22.92	26.96	101.1000	33	401	0.0122	0.9338	1.0000	0.5335	2.3077	2.1969	0.0000	0.0662	0.4665
12	22.39	25.64	86.5000	49	401	0.0140	0.8759	1.0000	0.5225	2.0832	1.9832	0.0000	0.1241	0.4775
13	22.75	29.03	101.6000	47	401	0.0164	0.9931	1.0000	0.5235	3.2496	3.0937	0.0000	0.0069	0.4765
14	22.09	25.57	100.8000	35	401	0.0188	0.8644	1.0000	0.5315	3.2635	3.1068	0.0000	0.1356	0.4685
15	21.73	27.84	97.7000	24	401	0.0217	0.9241	1.0000	0.5460	4.0143	3.8216	0.0000	0.0759	0.4540
16	22.92	28.53	90.4000	39	401	0.0253	0.9828	1.0000	0.5283	4.4561	4.2422	0.0000	0.0172	0.4717
17	21.81	27.16	109.9000	40	401	0.0292	0.9053	1.0000	0.5276	5.7363	5.4610	0.0000	0.0947	0.4724
18	22.81	27.78	77.6000	30	401	0.0338	0.9559	1.0000	0.5368	5.0450	4.8029	0.0000	0.0441	0.4632
19	22.53	25.94	63.1000	36	401	0.0388	0.8897	1.0000	0.5307	4.3283	4.1205	0.0000	0.1103	0.4693
20	21.95	29	111.2000	49	401	0.0450	0.9672	1.0000	0.5225	9.4668	9.0124	0.0000	0.0328	0.4775
21	22.4	29.88	121.2000	46	401	0.0524	0.9790	1.0000	0.5240	12.2068	11.6209	0.0000	0.0210	0.4760
22	23.44	28.11	121.0000	27	401	0.0608	0.9859	1.0000	0.5409	14.6949	13.9895	0.0000	0.0141	0.4591
23	22.72	28.38	109.2000	30	401	0.0702	0.9719	1.0000	0.5368	14.9952	14.2754	0.0000	0.0281	0.4632
24	22.99	27.41	80.8000	49	401	0.0808	0.9500	1.0000	0.5225	12.1430	11.5602	0.0000	0.0500	0.4775
25	22.41	27.35	99.8000	34	401	0.0925	0.9300	1.0000	0.5325	17.1288	16.3066	0.0000	0.0700	0.4675
26	22.27	27.43	95.1000	42	401	0.1056	0.9281	1.0000	0.5263	18.3909	17.5081	0.0000	0.0719	0.4737
27	21.65	29.04	121.6000	42	401	0.1209	0.9591	1.0000	0.5263	27.8164	26.4812	0.0000	0.0409	0.4737
28	23.13	27.29	89.5000	45	401	0.1379	0.9506	1.0000	0.5245	23.0660	21.9588	0.0000	0.0494	0.4755
29	22.55	28.5	95.6000	19	401	0.1573	0.9703	1.0000	0.5581	30.5080	29.0436	0.0000	0.0297	0.4419
30	22.57	27.46	90.4000	38	401	0.1780	0.9384	1.0000	0.5291	29.9307	28.4940	0.0000	0.0616	0.4709
31	22.87	27.11	103.8000	39	401	0.2007	0.9369	1.0000	0.5283	38.6323	36.7779	0.0000	0.0631	0.4717

Table A6 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1995

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.3	28.54	82.7000	41	401	0.2253	0.9325	1.0000	0.5269	34.3061	32.6594	0.0000	0.0675	0.4731
33	22.41	26.25	117.0000	38	401	0.2508	0.8956	1.0000	0.5291	52.1106	49.6093	0.0000	0.1044	0.4709
34	22.05	27.41	101.1000	40	401	0.2790	0.9206	1.0000	0.5276	51.3332	48.8692	0.0000	0.0794	0.4724
35	22.04	29.52	123.8000	39	401	0.3110	0.9863	1.0000	0.5283	75.1826	71.5739	0.0000	0.0137	0.4717
36	22.05	29.12	130.2000	53	401	0.3445	0.9741	1.0000	0.5208	85.2630	81.1704	0.0000	0.0259	0.4792
37	22.47	28.78	114.9000	28	401	0.3794	0.9766	1.0000	0.5394	86.0663	81.9351	0.0000	0.0234	0.4606
38	23.24	28.47	73.2000	45	401	0.4161	0.9909	1.0000	0.5245	59.3256	56.4779	0.0000	0.0091	0.4755
39	22.61	28.37	73.8000	47	401	0.4526	0.9681	1.0000	0.5235	63.4345	60.3897	0.0000	0.0319	0.4765
40	22.38	30.11	107.6000	53	401	0.4911	0.9633	0.9863	0.5208	99.3542	94.5852	0.0138	0.0367	0.4792
41	23.26	27.11	95.1000	35	401	0.5270	0.9491	1.0000	0.5315	94.7455	90.1977	0.0000	0.0509	0.4685
42	22.77	29.63	116.7000	44	401	0.5646	0.9700	1.0000	0.5251	125.7623	119.7257	0.0000	0.0300	0.4749
43	22.82	29.52	80.4000	28	401	0.6010	0.9745	1.0000	0.5394	95.1877	90.6187	0.0000	0.0255	0.4606
44	22.99	29.91	126.0000	43	401	0.6365	0.9325	1.0000	0.5257	147.3144	140.2434	0.0000	0.0675	0.4743
45	23.45	27.77	115.1000	31	401	0.6684	0.9756	1.0000	0.5356	150.6412	143.4104	0.0000	0.0244	0.4644
46	22.54	29.1	79.3000	19	401	0.6987	0.9888	1.0000	0.5581	114.5700	109.0706	0.0000	0.0112	0.4419
47	23.04	28.35	105.2000	35	401	0.7266	0.9809	1.0000	0.5315	149.3514	142.1825	0.0000	0.0191	0.4685
48	22.95	27.76	48.2000	50	401	0.7517	0.9597	1.0000	0.5221	68.0323	64.7668	0.0000	0.0403	0.4779
49	22.49	29.54	97.9000	32	401	0.7757	0.9977	1.0000	0.5345	151.7669	144.4820	0.0000	0.0023	0.4655
50	22.83	27.47	78.4000	33	401	0.7962	0.9469	1.0000	0.5335	118.1625	112.4907	0.0000	0.0531	0.4665
51	21.76	29.45	89.4000	44	401	0.8153	0.9753	1.0000	0.5251	139.8833	133.1689	0.0000	0.0247	0.4749
52	22.44	29.41	102.1000	54	401	0.8327	0.9953	1.0000	0.5204	165.0330	157.1114	0.0000	0.0047	0.4796
53	22.48	27.99	91.5000	31	401	0.8475	0.9522	1.0000	0.5356	148.2011	141.0874	0.0000	0.0478	0.4644
54	22.36	28.05	108.3000	29	401	0.8606	0.9503	1.0000	0.5381	178.5877	170.0155	0.0000	0.0497	0.4619
55	22.71	26.68	113.6000	28	401	0.8718	0.9184	1.0000	0.5394	183.8670	175.0414	0.0000	0.0816	0.4606
56	22.04	30.23	125.1000	44	401	0.8826	0.9798	0.9713	0.5251	212.8676	202.6499	0.0288	0.0202	0.4749
57	22.91	30.8	43.3000	31	401	0.8924	0.8717	0.9000	0.5356	67.6142	64.3687	0.1000	0.1283	0.4644
58	23.14	29.79	131.1000	53	401	0.9007	0.9303	1.0000	0.5208	214.3971	204.1060	0.0000	0.0697	0.4792
59	22.86	28.77	118.5000	57	401	0.9076	0.9884	1.0000	0.5194	206.9052	196.9738	0.0000	0.0116	0.4806
60	23.06	28.2	136.5000	47	401	0.9135	0.9769	1.0000	0.5235	238.9577	227.4878	0.0000	0.0231	0.4765
61	23.05	28.78	117.5000	37	401	0.9187	0.9947	1.0000	0.5298	213.1919	202.9587	0.0000	0.0053	0.4702
62	23.2	28.18	119.8000	49	401	0.9231	0.9806	1.0000	0.5225	212.3526	202.1597	0.0000	0.0194	0.4775

Table A7. Cowpea Biomass Growth with Stress Values for Makurdi 1996

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.23	28.87	110.8000	35	402	0.0027	0.9719	1.0000	0.5315	0.5974	0.5687	0.0000	0.0281	0.4685
2	22.52	27.41	109.6000	35	402	0.0032	0.9353	1.0000	0.5315	0.6602	0.6285	0.0000	0.0647	0.4685
3	22.09	28.9	107.0000	37	402	0.0037	0.9684	1.0000	0.5298	0.7763	0.7390	0.0000	0.0316	0.4702
4	22.01	26.72	85.0000	33	402	0.0043	0.8978	1.0000	0.5335	0.6641	0.6322	0.0000	0.1022	0.4665
5	21.66	27.87	58.5000	28	402	0.0050	0.9228	1.0000	0.5394	0.5502	0.5238	0.0000	0.0772	0.4606
6	21.96	26.58	29.3000	35	402	0.0057	0.8919	1.0000	0.5315	0.3025	0.2879	0.0000	0.1081	0.4685
7	21.8	27.73	78.1000	30	402	0.0066	0.9228	1.0000	0.5368	0.9756	0.9287	0.0000	0.0772	0.4632
8	21.32	28.21	61.2000	32	402	0.0077	0.9228	1.0000	0.5345	0.8813	0.8390	0.0000	0.0772	0.4655
9	21.41	29.22	66.7000	31	402	0.0089	0.9572	1.0000	0.5356	1.1620	1.1063	0.0000	0.0428	0.4644
10	22.67	28.64	127.4000	44	402	0.0104	0.9784	1.0000	0.5251	2.5971	2.4724	0.0000	0.0216	0.4749
11	21.55	27.14	76.5000	39	402	0.0120	0.8966	1.0000	0.5283	1.6567	1.5772	0.0000	0.1034	0.4717
12	21.84	26.04	103.8000	36	402	0.0138	0.8712	1.0000	0.5307	2.5176	2.3968	0.0000	0.1288	0.4693
13	20.98	29.08	76.0000	48	402	0.0160	0.9394	1.0000	0.5230	2.2711	2.1621	0.0000	0.0606	0.4770
14	22.46	29.71	110.7000	30	402	0.0187	0.9872	1.0000	0.5368	4.1788	3.9782	0.0000	0.0128	0.4632
15	22.61	27.99	121.9000	40	402	0.0217	0.9562	1.0000	0.5276	5.0884	4.8442	0.0000	0.0438	0.4724
16	22.53	26.91	110.6000	36	402	0.0251	0.9200	1.0000	0.5307	5.1573	4.9097	0.0000	0.0800	0.4693
17	22.19	28.14	101.4000	29	402	0.0291	0.9478	1.0000	0.5381	5.7232	5.4485	0.0000	0.0522	0.4619
18	22.78	27.95	31.1000	34	402	0.0337	0.9603	1.0000	0.5325	2.0419	1.9439	0.0000	0.0397	0.4675
19	22.41	27.06	96.4000	37	402	0.0389	0.9209	1.0000	0.5298	6.9593	6.6253	0.0000	0.0791	0.4702
20	22.22	27.43	98.3000	43	402	0.0448	0.9266	1.0000	0.5257	8.1624	7.7706	0.0000	0.0734	0.4743
21	21.56	28	41.9000	28	402	0.0516	0.9238	1.0000	0.5394	4.0955	3.8990	0.0000	0.0762	0.4606
22	22.33	27.66	105.4000	41	402	0.0594	0.9372	1.0000	0.5269	11.7585	11.1941	0.0000	0.0628	0.4731
23	22.45	27.21	124.8000	36	402	0.0682	0.9269	1.0000	0.5307	15.9251	15.1607	0.0000	0.0731	0.4693
24	21.42	28.69	99.7000	45	402	0.0784	0.9409	1.0000	0.5245	14.6690	13.9649	0.0000	0.0591	0.4755
25	22.18	26.43	120.7000	31	402	0.0893	0.8941	1.0000	0.5356	19.6313	18.6890	0.0000	0.1059	0.4644
26	21.77	29.03	115.5000	36	402	0.1025	0.9625	1.0000	0.5307	23.0127	21.9081	0.0000	0.0375	0.4693
27	22.75	29.67	44.5000	27	402	0.1183	0.9685	1.0000	0.5409	10.4944	9.9907	0.0000	0.0315	0.4591
28	23.06	26.02	65.5000	40	402	0.1342	0.9088	1.0000	0.5276	16.0378	15.2680	0.0000	0.0913	0.4724
29	21.98	28.02	108.3000	46	402	0.1525	0.9375	1.0000	0.5240	30.8611	29.3798	0.0000	0.0625	0.4760
30	22.29	29.59	131.4000	25	402	0.1740	0.9962	1.0000	0.5442	47.1539	44.8905	0.0000	0.0038	0.4558
31	22.75	29.47	108.8000	40	402	0.1981	0.9835	1.0000	0.5276	42.5417	40.4997	0.0000	0.0165	0.4724

Table A7 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1996

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.04	29.31	113.3000	31	402	0.2237	0.9797	1.0000	0.5356	50.6118	48.1824	0.0000	0.0203	0.4644
33	22.18	27.15	85.3000	36	402	0.2498	0.9166	1.0000	0.5307	39.4315	37.5388	0.0000	0.0834	0.4693
34	22.1	29.06	42.0000	48	402	0.2795	0.9737	1.0000	0.5230	22.7475	21.6556	0.0000	0.0263	0.4770
35	22.55	27.16	93.6000	38	402	0.3097	0.9284	1.0000	0.5291	54.1727	51.5724	0.0000	0.0716	0.4709
36	22.08	29.03	114.8000	46	402	0.3430	0.9722	1.0000	0.5240	76.3194	72.6560	0.0000	0.0278	0.4760
37	21.95	29.11	129.2000	39	402	0.3777	0.9706	1.0000	0.5283	95.2101	90.6400	0.0000	0.0294	0.4717
38	22.66	26.43	90.2000	32	402	0.4112	0.9091	1.0000	0.5345	68.5762	65.2846	0.0000	0.0909	0.4655
39	22.26	28.99	114.1000	25	402	0.4480	0.9766	1.0000	0.5442	103.3504	98.3896	0.0000	0.0234	0.4558
40	22.9	28.11	64.9000	47	402	0.4848	0.9691	1.0000	0.5235	60.7273	57.8124	0.0000	0.0309	0.4765
41	21.84	29.56	107.5000	47	402	0.5219	0.9813	1.0000	0.5235	109.6556	104.3922	0.0000	0.0188	0.4765
42	23.09	29.17	65.7000	43	402	0.5595	0.9805	1.0000	0.5257	72.0844	68.6243	0.0000	0.0195	0.4743
43	22.39	25.54	104.5000	39	402	0.5911	0.8728	1.0000	0.5283	108.3805	103.1782	0.0000	0.1272	0.4717
44	21.99	28.24	51.8000	25	402	0.6242	0.9447	1.0000	0.5442	63.2437	60.2080	0.0000	0.0553	0.4558
45	21.3	30.1	110.8000	43	402	0.6570	0.9813	0.9875	0.5257	142.8582	136.0010	0.0125	0.0187	0.4743
46	22.89	25.98	110.4000	45	402	0.6854	0.9022	1.0000	0.5245	136.2382	129.6987	0.0000	0.0978	0.4755
47	21.45	27.9	36.2000	41	402	0.7125	0.9172	1.0000	0.5269	47.4254	45.1489	0.0000	0.0828	0.4731
48	21.53	29.59	85.3000	34	402	0.7391	0.9725	1.0000	0.5325	124.2123	118.2501	0.0000	0.0275	0.4675
49	21.42	30.32	98.4000	44	402	0.7640	0.9919	0.9600	0.5251	148.9709	141.8203	0.0400	0.0081	0.4749
50	23.05	29.07	117.1000	30	402	0.7868	0.9910	1.0000	0.5368	186.4927	177.5410	0.0000	0.0090	0.4632
51	22.24	27.86	108.8000	40	402	0.8062	0.9406	1.0000	0.5276	165.6219	157.6720	0.0000	0.0594	0.4724
52	22.07	28.67	91.4000	37	402	0.8240	0.9606	1.0000	0.5298	145.8410	138.8407	0.0000	0.0394	0.4702
53	22.5	29.33	114.0000	40	402	0.8404	0.9947	1.0000	0.5276	191.2910	182.1091	0.0000	0.0053	0.4724
54	22.52	29.68	113.0000	39	402	0.8550	0.9850	1.0000	0.5283	191.3013	182.1189	0.0000	0.0150	0.4717
55	22.54	27.22	115.6000	41	402	0.8670	0.9300	1.0000	0.5269	186.8752	177.9051	0.0000	0.0700	0.4731
56	22.06	27.73	123.2000	34	402	0.8776	0.9309	1.0000	0.5325	203.9243	194.1360	0.0000	0.0691	0.4675
57	22.5	28.47	63.6000	46	402	0.8873	0.9678	1.0000	0.5240	108.8916	103.6648	0.0000	0.0322	0.4760
58	21.81	29.77	120.5000	30	402	0.8960	0.9869	1.0000	0.5368	217.6114	207.1660	0.0000	0.0131	0.4632
59	22.7	27.31	92.4000	33	402	0.9031	0.9378	1.0000	0.5335	158.8405	151.2162	0.0000	0.0622	0.4665
60	22.34	27.49	113.1000	38	402	0.9093	0.9322	1.0000	0.5291	192.9837	183.7205	0.0000	0.0678	0.4709
61	22.27	27.53	111.5000	24	402	0.9148	0.9312	1.0000	0.5460	197.3198	187.8485	0.0000	0.0688	0.4540
62	21.82	30.03	124.0000	41	402	0.9198	0.9953	0.9963	0.5269	227.5867	216.6625	0.0038	0.0047	0.4731

Table A8. Cowpea Biomass Growth with Stress Values for Makurdi 1997

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22	27.22	88.9000	35	403	0.0027	0.9131	1.0000	0.5315	0.4529	0.4311	0.0000	0.0869	0.4685
2	22.33	25.6	74.0000	35	403	0.0031	0.8728	1.0000	0.5315	0.4141	0.3943	0.0000	0.1272	0.4685
3	21.48	29.21	60.7000	37	403	0.0036	0.9591	1.0000	0.5298	0.4336	0.4127	0.0000	0.0409	0.4702
4	22.01	29.51	93.5000	33	403	0.0043	0.9850	1.0000	0.5335	0.8079	0.7691	0.0000	0.0150	0.4665
5	22.3	27.98	111.5000	28	403	0.0050	0.9463	1.0000	0.5394	1.0881	1.0359	0.0000	0.0537	0.4606
6	22.93	28.61	102.2000	35	403	0.0058	0.9856	1.0000	0.5315	1.1975	1.1400	0.0000	0.0144	0.4685
7	22.67	30.02	100.7000	30	403	0.0068	0.9483	0.9975	0.5368	1.3485	1.2838	0.0025	0.0517	0.4632
8	23.48	28.99	107.7000	32	403	0.0080	0.9648	1.0000	0.5345	1.7164	1.6340	0.0000	0.0352	0.4655
9	22.84	28.47	118.2000	31	403	0.0093	0.9784	1.0000	0.5356	2.2357	2.1284	0.0000	0.0216	0.4644
10	22.55	27.34	93.2000	44	403	0.0108	0.9341	1.0000	0.5251	1.9127	1.8209	0.0000	0.0659	0.4749
11	22.09	26.57	117.3000	39	403	0.0125	0.8956	1.0000	0.5283	2.6755	2.5471	0.0000	0.1044	0.4717
12	22.07	28.04	77.4000	36	403	0.0145	0.9409	1.0000	0.5307	2.1611	2.0574	0.0000	0.0591	0.4693
13	22.23	27.24	88.7000	48	403	0.0167	0.9209	1.0000	0.5230	2.7616	2.6290	0.0000	0.0791	0.4770
14	22.42	28.75	36.6000	30	403	0.0195	0.9741	1.0000	0.5368	1.4414	1.3722	0.0000	0.0259	0.4632
15	22.49	29.04	96.2000	40	403	0.0228	0.9853	1.0000	0.5276	4.3943	4.1834	0.0000	0.0147	0.4724
16	22.39	29.12	95.2000	36	403	0.0265	0.9847	1.0000	0.5307	5.0962	4.8516	0.0000	0.0153	0.4693
17	22.39	31.04	116.0000	29	403	0.0312	0.8928	0.8700	0.5381	6.7129	6.3907	0.1300	0.1072	0.4619
18	22.96	28.07	114.1000	34	403	0.0362	0.9697	1.0000	0.5325	8.2431	7.8475	0.0000	0.0303	0.4675
19	23.07	26.19	93.4000	37	403	0.0417	0.9144	1.0000	0.5298	7.2850	6.9353	0.0000	0.0856	0.4702
20	22.84	28.91	50.4000	43	403	0.0485	0.9922	1.0000	0.5257	4.9230	4.6867	0.0000	0.0078	0.4743
21	22.76	29.4	100.1000	28	403	0.0564	0.9880	1.0000	0.5394	11.6306	11.0723	0.0000	0.0120	0.4606
22	23.03	28.2	55.1000	41	403	0.0653	0.9759	1.0000	0.5269	7.1495	6.8063	0.0000	0.0241	0.4731
23	23.04	29.62	134.7000	36	403	0.0760	0.9505	1.0000	0.5307	19.9411	18.9839	0.0000	0.0495	0.4693
24	22.53	25.16	34.3000	45	403	0.0863	0.8653	1.0000	0.5245	5.1862	4.9372	0.0000	0.1347	0.4755
25	21.94	29.71	111.0000	31	403	0.0995	0.9891	1.0000	0.5356	22.5956	21.5110	0.0000	0.0109	0.4644
26	22.41	30.34	115.2000	36	403	0.1151	0.9438	0.9575	0.5307	25.6363	24.4057	0.0425	0.0563	0.4693
27	22.73	26.88	121.9000	27	403	0.1309	0.9253	1.0000	0.5409	30.8396	29.3593	0.0000	0.0747	0.4591
28	22.68	28.56	75.6000	40	403	0.1495	0.9762	1.0000	0.5276	22.4871	21.4077	0.0000	0.0238	0.4724
29	22.13	29.64	97.7000	46	403	0.1706	0.9928	1.0000	0.5240	33.4977	31.8898	0.0000	0.0072	0.4760
30	23.24	27.35	85.6000	25	403	0.1931	0.9559	1.0000	0.5442	33.2103	31.6162	0.0000	0.0441	0.4558
31	22.68	29.06	126.5000	40	403	0.2187	0.9919	1.0000	0.5276	55.9105	53.2268	0.0000	0.0081	0.4724

Table A8 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1997

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.53	29.34	120.7000	31	403	0.2466	0.9959	1.0000	0.5356	61.3340	58.3900	0.0000	0.0041	0.4644
33	23.03	27.52	83.1000	36	403	0.2755	0.9547	1.0000	0.5307	44.8036	42.6530	0.0000	0.0453	0.4693
34	22.73	26.22	87.0000	48	403	0.3047	0.9047	1.0000	0.5230	48.4421	46.1169	0.0000	0.0953	0.4770
35	22.31	27.54	122.5000	38	403	0.3364	0.9328	1.0000	0.5291	78.5398	74.7699	0.0000	0.0672	0.4709
36	22.11	29.15	121.6000	46	403	0.3711	0.9769	1.0000	0.5240	89.2029	84.9211	0.0000	0.0231	0.4760
37	22.39	29.6	112.2000	39	403	0.4078	0.9997	1.0000	0.5283	93.3288	88.8490	0.0000	0.0003	0.4717
38	22.93	28.48	79.8000	32	403	0.4447	0.9816	1.0000	0.5345	71.9031	68.4518	0.0000	0.0184	0.4655
39	22.74	28.5	121.1000	25	403	0.4817	0.9762	1.0000	0.5442	119.6941	113.9488	0.0000	0.0238	0.4558
40	23.27	28.36	125.8000	47	403	0.5192	0.9884	1.0000	0.5235	130.5204	124.2555	0.0000	0.0116	0.4765
41	22.96	26.31	112.8000	47	403	0.5533	0.9147	1.0000	0.5235	115.4273	109.8868	0.0000	0.0853	0.4765
42	22	31.35	98.7000	43	403	0.5912	0.8987	0.8313	0.5257	106.4821	101.3710	0.1688	0.1013	0.4743
43	23.79	27.93	126.4000	39	403	0.6259	0.9913	1.0000	0.5283	160.0170	152.3362	0.0000	0.0088	0.4717
44	23.97	28.37	83.7000	25	403	0.6595	0.9745	1.0000	0.5442	113.0541	107.6275	0.0000	0.0255	0.4558
45	22.62	29.08	110.6000	43	403	0.6905	0.9906	1.0000	0.5257	153.5850	146.2130	0.0000	0.0094	0.4743
46	22.86	28.98	130.5000	45	403	0.7194	0.9950	1.0000	0.5245	189.2334	180.1502	0.0000	0.0050	0.4755
47	22.87	29.77	122.3000	41	403	0.7467	0.9520	1.0000	0.5269	176.9204	168.4282	0.0000	0.0480	0.4731
48	23.46	28.16	120.2000	34	403	0.7708	0.9881	1.0000	0.5325	188.2722	179.2352	0.0000	0.0119	0.4675
49	23.49	27.9	120.7000	44	403	0.7925	0.9809	1.0000	0.5251	190.2931	181.1591	0.0000	0.0191	0.4749
50	23.55	27.51	84.6000	30	403	0.8119	0.9706	1.0000	0.5368	138.2152	131.5809	0.0000	0.0294	0.4632
51	23.21	30	66.1000	40	403	0.8303	0.9092	1.0000	0.5276	101.6907	96.8096	0.0000	0.0908	0.4724
52	23.56	27.53	121.4000	37	403	0.8457	0.9716	1.0000	0.5298	204.1136	194.3161	0.0000	0.0284	0.4702
53	22.36	29.31	106.0000	40	403	0.8595	0.9897	1.0000	0.5276	183.7339	174.9147	0.0000	0.0103	0.4724
54	23.17	29.92	117.2000	39	403	0.8722	0.9182	1.0000	0.5283	191.5187	182.3258	0.0000	0.0818	0.4717
55	23.32	29.45	110.8000	41	403	0.8831	0.9423	1.0000	0.5269	187.6302	178.6239	0.0000	0.0577	0.4731
56	23.13	28.85	105.7000	34	403	0.8924	0.9994	1.0000	0.5325	193.8601	184.5548	0.0000	0.0006	0.4675
57	23.72	28.86	112.4000	46	403	0.9006	0.9565	1.0000	0.5240	195.9517	186.5460	0.0000	0.0435	0.4760
58	23.27	29.74	110.7000	30	403	0.9078	0.9243	1.0000	0.5368	192.5599	183.3170	0.0000	0.0757	0.4632
59	22.56	30.29	129.8000	33	403	0.9139	0.9363	0.9638	0.5335	228.8302	217.8464	0.0363	0.0637	0.4665
60	23.46	27.77	83.2000	38	403	0.9190	0.9759	1.0000	0.5291	152.4698	145.1513	0.0000	0.0241	0.4709
61	23.3	26.62	107.9000	24	403	0.9232	0.9350	1.0000	0.5460	196.3995	186.9723	0.0000	0.0650	0.4540
62	23.24	28.98	55.1000	41	403	0.9271	0.9835	1.0000	0.5269	102.2398	97.3323	0.0000	0.0165	0.4731

Table A9. Cowpea Biomass Growth with Stress Values for Makurdi 1998

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.03	28.96	94.1000	35	398	0.0027	0.9684	1.0000	0.5315	0.4748	0.4520	0.0000	0.0316	0.4685
2	22.38	29.16	90.8000	35	398	0.0032	0.9856	1.0000	0.5315	0.5456	0.5194	0.0000	0.0144	0.4685
3	22.63	29.35	111.8000	37	398	0.0038	0.9994	1.0000	0.5298	0.7963	0.7581	0.0000	0.0006	0.4702
4	22.72	28.65	116.6000	33	398	0.0044	0.9803	1.0000	0.5335	0.9588	0.9128	0.0000	0.0197	0.4665
5	22.51	27.45	107.5000	28	398	0.0051	0.9363	1.0000	0.5394	0.9910	0.9434	0.0000	0.0637	0.4606
6	22.45	28.84	84.0000	35	398	0.0060	0.9778	1.0000	0.5315	0.9310	0.8863	0.0000	0.0222	0.4685
7	22.77	27.33	86.3000	30	398	0.0069	0.9406	1.0000	0.5368	1.0790	1.0272	0.0000	0.0594	0.4632
8	22.17	28.99	52.5000	32	398	0.0081	0.9737	1.0000	0.5345	0.7897	0.7518	0.0000	0.0263	0.4655
9	22.71	27.7	94.9000	31	398	0.0094	0.9503	1.0000	0.5356	1.6230	1.5451	0.0000	0.0497	0.4644
10	22.72	28.46	93.1000	44	398	0.0110	0.9744	1.0000	0.5251	1.8674	1.7778	0.0000	0.0256	0.4749
11	22.88	26.9	110.2000	39	398	0.0127	0.9306	1.0000	0.5283	2.4606	2.3425	0.0000	0.0694	0.4717
12	22.82	28.35	124.0000	36	398	0.0148	0.9741	1.0000	0.5307	3.3941	3.2312	0.0000	0.0259	0.4693
13	22.01	30.14	85.3000	48	398	0.0173	0.9887	0.9825	0.5230	2.7357	2.6044	0.0175	0.0113	0.4770
14	22.82	29	121.1000	30	398	0.0203	0.9944	1.0000	0.5368	4.6856	4.4607	0.0000	0.0056	0.4632
15	22.3	28.16	79.2000	40	398	0.0235	0.9519	1.0000	0.5276	3.3457	3.1851	0.0000	0.0481	0.4724
16	22.72	28.05	66.9000	36	398	0.0273	0.9616	1.0000	0.5307	3.3353	3.1752	0.0000	0.0384	0.4693
17	22.33	27.51	64.2000	29	398	0.0316	0.9325	1.0000	0.5381	3.6369	3.4623	0.0000	0.0675	0.4619
18	22.01	27.99	97.6000	34	398	0.0365	0.9375	1.0000	0.5325	6.3568	6.0516	0.0000	0.0625	0.4675
19	22.52	28.12	84.3000	37	398	0.0423	0.9575	1.0000	0.5298	6.4626	6.1524	0.0000	0.0425	0.4702
20	22.18	28.78	107.5000	43	398	0.0490	0.9675	1.0000	0.5257	9.5737	9.1142	0.0000	0.0325	0.4743
21	22.14	28.83	98.8000	28	398	0.0567	0.9678	1.0000	0.5394	10.4545	9.9527	0.0000	0.0322	0.4606
22	22.7	29.03	113.4000	41	398	0.0658	0.9916	1.0000	0.5269	13.9307	13.2620	0.0000	0.0084	0.4731
23	23.25	27.41	91.6000	36	398	0.0758	0.9581	1.0000	0.5307	12.6198	12.0141	0.0000	0.0419	0.4693
24	22.08	28.85	52.7000	45	398	0.0873	0.9666	1.0000	0.5245	8.3394	7.9391	0.0000	0.0334	0.4755
25	23.24	27.59	132.2000	31	398	0.1003	0.9634	1.0000	0.5356	24.4665	23.2921	0.0000	0.0366	0.4644
26	22.66	29.55	120.3000	36	398	0.1157	0.9843	1.0000	0.5307	25.9933	24.7456	0.0000	0.0158	0.4693
27	22.48	27.49	42.7000	27	398	0.1318	0.9366	1.0000	0.5409	10.1942	9.7049	0.0000	0.0634	0.4591
28	22.99	29.31	120.1000	40	398	0.1512	0.9775	1.0000	0.5276	33.4925	31.8848	0.0000	0.0225	0.4724
29	22.65	30.06	114.8000	46	398	0.1732	0.9468	0.9925	0.5240	35.2700	33.5770	0.0075	0.0532	0.4760
30	23.26	28.52	63.3000	25	398	0.1969	0.9931	1.0000	0.5442	24.0775	22.9218	0.0000	0.0069	0.4558
31	23.07	28.01	100.9000	40	398	0.2222	0.9713	1.0000	0.5276	41.0791	39.1073	0.0000	0.0288	0.4724

Table A9 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1998

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.98	27.45	110.6000	31	398	0.2492	0.9509	1.0000	0.5356	50.1820	47.7732	0.0000	0.0491	0.4644
33	22.39	29.35	114.5000	36	398	0.2794	0.9919	1.0000	0.5307	60.2053	57.3155	0.0000	0.0081	0.4693
34	22.73	29.76	109.0000	48	398	0.3125	0.9632	1.0000	0.5230	61.3484	58.4036	0.0000	0.0368	0.4770
35	22.82	27.12	81.2000	38	398	0.3446	0.9356	1.0000	0.5291	49.5255	47.1483	0.0000	0.0644	0.4709
36	21.84	28.06	98.8000	46	398	0.3781	0.9344	1.0000	0.5240	65.3910	62.2522	0.0000	0.0656	0.4760
37	21.83	30.54	122.8000	39	398	0.4155	0.9723	0.9325	0.5283	93.6936	89.1963	0.0675	0.0277	0.4717
38	22.29	29.22	87.3000	32	398	0.4526	0.9847	1.0000	0.5345	74.3485	70.7797	0.0000	0.0153	0.4655
39	22.98	27.04	79.1000	25	398	0.4882	0.9381	1.0000	0.5442	70.4830	67.0998	0.0000	0.0619	0.4558
40	22.75	27.25	89.6000	47	398	0.5237	0.9375	1.0000	0.5235	82.3295	78.3777	0.0000	0.0625	0.4765
41	21.81	29.52	100.7000	47	398	0.5601	0.9791	1.0000	0.5235	103.3561	98.3950	0.0000	0.0209	0.4765
42	22.18	29.3	109.1000	43	398	0.5957	0.9838	1.0000	0.5257	120.1655	114.3975	0.0000	0.0162	0.4743
43	23.23	26.45	63.9000	39	398	0.6280	0.9275	1.0000	0.5283	70.3049	66.9302	0.0000	0.0725	0.4717
44	22.86	28.96	119.2000	25	398	0.6610	0.9944	1.0000	0.5442	152.4210	145.1047	0.0000	0.0056	0.4558
45	22.87	29.99	70.7000	43	398	0.6929	0.9355	1.0000	0.5257	86.1323	81.9980	0.0000	0.0645	0.4743
46	23.44	27.09	124.1000	45	398	0.7205	0.9541	1.0000	0.5245	159.9825	152.3034	0.0000	0.0459	0.4755
47	22.33	29.16	90.4000	41	398	0.7468	0.9841	1.0000	0.5269	125.1555	119.1481	0.0000	0.0159	0.4731
48	22.95	27.62	85.5000	34	398	0.7702	0.9553	1.0000	0.5325	119.7529	114.0047	0.0000	0.0447	0.4675
49	22.03	30.51	117.1000	44	398	0.7927	0.9595	0.9363	0.5251	167.2011	159.1754	0.0638	0.0405	0.4749
50	22.72	30.43	112.6000	30	398	0.8133	0.9138	0.9463	0.5368	160.5857	152.8776	0.0538	0.0862	0.4632
51	23.17	30.15	118.2000	40	398	0.8316	0.9010	0.9813	0.5276	167.0615	159.0425	0.0188	0.0990	0.4724
52	22.56	29.89	110.5000	37	398	0.8474	0.9662	1.0000	0.5298	171.3978	163.1708	0.0000	0.0338	0.4702
53	23.01	29.52	125.3000	40	398	0.8614	0.9602	1.0000	0.5276	195.4998	186.1158	0.0000	0.0398	0.4724
54	23.63	26.46	97.1000	39	398	0.8728	0.9403	1.0000	0.5283	150.5148	143.2901	0.0000	0.0597	0.4717
55	23.4	29.29	93.9000	41	398	0.8836	0.9483	1.0000	0.5269	148.2163	141.1020	0.0000	0.0517	0.4731
56	23.14	29.95	96.1000	34	398	0.8931	0.9182	1.0000	0.5325	150.0343	142.8327	0.0000	0.0818	0.4675
57	22.31	29.92	55.2000	46	398	0.9012	0.9827	1.0000	0.5240	91.5823	87.1864	0.0000	0.0173	0.4760
58	23.54	27.64	106.6000	30	398	0.9079	0.9744	1.0000	0.5368	180.9796	172.2926	0.0000	0.0256	0.4632
59	22.85	28.4	97.8000	33	398	0.9137	0.9766	1.0000	0.5335	166.4423	158.4531	0.0000	0.0234	0.4665
60	22.53	27.03	119.9000	38	398	0.9186	0.9238	1.0000	0.5291	192.4345	183.1976	0.0000	0.0762	0.4709
61	21.49	30.23	109.8000	24	398	0.9230	0.9913	0.9713	0.5460	196.1107	186.6974	0.0288	0.0088	0.4540
62	21.86	31.53	99.0000	41	398	0.9271	0.8957	0.8088	0.5269	154.8796	147.4454	0.1913	0.1043	0.4731

Table A10. Cowpea Biomass Growth with Stress Values for Makurdi 1999

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.21	28.78	103.4000	35	399	0.0027	0.9684	1.0000	0.5315	0.5301	0.5046	0.0000	0.0316	0.4685
2	21.68	30.1	117.8000	35	399	0.0032	0.9931	0.9875	0.5315	0.7256	0.6908	0.0125	0.0069	0.4685
3	22.17	30.71	62.2000	37	399	0.0038	0.9340	0.9113	0.5298	0.4231	0.4028	0.0888	0.0660	0.4702
4	22.67	28.05	118.9000	33	399	0.0044	0.9600	1.0000	0.5335	0.9752	0.9284	0.0000	0.0400	0.4665
5	22.43	28.08	96.1000	28	399	0.0051	0.9534	1.0000	0.5394	0.9214	0.8771	0.0000	0.0466	0.4606
6	21.66	29.8	84.9000	35	399	0.0060	0.9831	1.0000	0.5315	0.9671	0.9206	0.0000	0.0169	0.4685
7	21.86	29.86	102.7000	30	399	0.0070	0.9913	1.0000	0.5368	1.3943	1.3274	0.0000	0.0088	0.4632
8	22.22	27.91	80.5000	32	399	0.0082	0.9416	1.0000	0.5345	1.2003	1.1427	0.0000	0.0584	0.4655
9	21.64	28.02	120.0000	31	399	0.0094	0.9269	1.0000	0.5356	2.0444	1.9463	0.0000	0.0731	0.4644
10	21.61	29.68	122.6000	44	399	0.0110	0.9778	1.0000	0.5251	2.5218	2.4008	0.0000	0.0222	0.4749
11	22.71	28.84	31.2000	39	399	0.0129	0.9859	1.0000	0.5283	0.7608	0.7243	0.0000	0.0141	0.4717
12	22.39	27.26	68.3000	36	399	0.0149	0.9266	1.0000	0.5307	1.8195	1.7321	0.0000	0.0734	0.4693
13	22.41	27.41	70.6000	48	399	0.0173	0.9319	1.0000	0.5230	2.1585	2.0549	0.0000	0.0681	0.4770
14	21.65	29.01	96.7000	30	399	0.0201	0.9581	1.0000	0.5368	3.6259	3.4519	0.0000	0.0419	0.4632
15	21.18	30.32	100.3000	40	399	0.0234	0.9844	0.9600	0.5276	4.4296	4.2170	0.0400	0.0156	0.4724
16	22.94	30.18	35.0000	36	399	0.0275	0.9160	0.9775	0.5307	1.6997	1.6181	0.0225	0.0840	0.4693
17	22.77	29.02	89.3000	29	399	0.0321	0.9934	1.0000	0.5381	5.5628	5.2958	0.0000	0.0066	0.4619
18	21.92	29.22	117.0000	34	399	0.0373	0.9731	1.0000	0.5325	8.2086	7.8146	0.0000	0.0269	0.4675
19	22.56	27.67	83.0000	37	399	0.0431	0.9447	1.0000	0.5298	6.5013	6.1892	0.0000	0.0553	0.4702
20	22.57	27.43	103.6000	43	399	0.0497	0.9375	1.0000	0.5257	9.2153	8.7729	0.0000	0.0625	0.4743
21	22.71	26.32	94.9000	28	399	0.0570	0.9072	1.0000	0.5394	9.6130	9.1516	0.0000	0.0928	0.4606
22	22.34	30.37	108.4000	41	399	0.0664	0.9468	0.9538	0.5269	13.0438	12.4177	0.0463	0.0533	0.4731
23	22.63	27.18	62.3000	36	399	0.0762	0.9316	1.0000	0.5307	8.5269	8.1176	0.0000	0.0684	0.4693
24	22.08	28.21	73.0000	45	399	0.0875	0.9466	1.0000	0.5245	11.5246	10.9715	0.0000	0.0534	0.4755
25	22.11	27.47	95.1000	31	399	0.1000	0.9244	1.0000	0.5356	17.1065	16.2854	0.0000	0.0756	0.4644
26	21.46	28.33	52.6000	36	399	0.1141	0.9309	1.0000	0.5307	10.7750	10.2578	0.0000	0.0691	0.4693
27	20.81	29.8	105.0000	27	399	0.1304	0.9566	1.0000	0.5409	25.7408	24.5052	0.0000	0.0434	0.4591
28	21.91	28.71	104.1000	40	399	0.1486	0.9569	1.0000	0.5276	28.3764	27.0144	0.0000	0.0431	0.4724
29	21.64	32.13	115.7000	46	399	0.1711	0.8672	0.7338	0.5240	32.6711	31.1029	0.2663	0.1328	0.4760
30	22.69	28.63	101.9000	25	399	0.1941	0.9788	1.0000	0.5442	38.2719	36.4348	0.0000	0.0212	0.4558
31	22.73	29.18	59.4000	40	399	0.2199	0.9972	1.0000	0.5276	24.9678	23.7694	0.0000	0.0028	0.4724

Table A10 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 1999

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.09	29.52	123.9000	31	399	0.2478	0.9878	1.0000	0.5356	59.0020	56.1699	0.0000	0.0122	0.4644
33	21.58	30.95	109.2000	36	399	0.2787	0.9602	0.8813	0.5307	56.3349	53.6308	0.1188	0.0398	0.4693
34	23.14	26.65	71.3000	48	399	0.3089	0.9309	1.0000	0.5230	38.9540	37.0842	0.0000	0.0691	0.4770
35	22.45	30.97	99.4000	38	399	0.3447	0.8935	0.8788	0.5291	58.8354	56.0113	0.1213	0.1065	0.4709
36	22.6	31.33	131.1000	46	399	0.3828	0.8553	0.8338	0.5240	81.6892	77.7681	0.1663	0.1447	0.4760
37	23.03	29.8	61.2000	39	399	0.4208	0.9378	1.0000	0.5283	46.3456	44.1210	0.0000	0.0622	0.4717
38	23.18	29.43	102.5000	32	399	0.4593	0.9543	1.0000	0.5345	87.2232	83.0365	0.0000	0.0457	0.4655
39	22.47	28.9	87.7000	25	399	0.4965	0.9803	1.0000	0.5442	84.3802	80.3299	0.0000	0.0197	0.4558
40	22.42	30.11	115.9000	47	399	0.5348	0.9602	0.9863	0.5235	113.1922	107.7589	0.0138	0.0398	0.4765
41	22.7	29.55	52.1000	47	399	0.5721	0.9813	1.0000	0.5235	55.6150	52.9454	0.0000	0.0188	0.4765
42	21.9	29.96	125.0000	43	399	0.6077	0.9956	1.0000	0.5257	144.4132	137.4814	0.0000	0.0044	0.4743
43	21.8	27.91	106.4000	39	399	0.6395	0.9284	1.0000	0.5283	121.2341	115.4149	0.0000	0.0716	0.4717
44	21.93	30.48	112.3000	25	399	0.6724	0.9693	0.9400	0.5442	144.6636	137.7197	0.0600	0.0307	0.4558
45	22.57	30.35	87.1000	43	399	0.7036	0.9310	0.9563	0.5257	108.9445	103.7151	0.0438	0.0690	0.4743
46	23.08	28.98	106.2000	45	399	0.7317	0.9955	1.0000	0.5245	147.3922	140.3174	0.0000	0.0045	0.4755
47	22.44	29.31	82.9000	41	399	0.7572	0.9922	1.0000	0.5269	119.2169	113.4945	0.0000	0.0078	0.4731
48	21.9	30.3	116.6000	34	399	0.7808	0.9850	0.9625	0.5325	173.4511	165.1255	0.0375	0.0150	0.4675
49	21.72	30.71	78.6000	44	399	0.8022	0.9678	0.9113	0.5251	116.3868	110.8002	0.0888	0.0323	0.4749
50	22.36	29.6	119.8000	30	399	0.8210	0.9988	1.0000	0.5368	191.5609	182.3660	0.0000	0.0012	0.4632
51	22.41	27.27	93.6000	40	399	0.8367	0.9275	1.0000	0.5276	139.2141	132.5318	0.0000	0.0725	0.4724
52	22.34	29.58	87.8000	37	399	0.8517	0.9975	1.0000	0.5298	143.5646	136.6735	0.0000	0.0025	0.4702
53	22.85	27.03	86.3000	40	399	0.8641	0.9338	1.0000	0.5276	133.4522	127.0465	0.0000	0.0662	0.4724
54	22.2	27.72	101.3000	39	399	0.8751	0.9350	1.0000	0.5283	159.0665	151.4313	0.0000	0.0650	0.4717
55	21.59	30.77	61.8000	41	399	0.8855	0.9730	0.9038	0.5269	101.9221	97.0299	0.0963	0.0270	0.4731
56	21.94	29.77	64.2000	34	399	0.8944	0.9909	1.0000	0.5325	110.0620	104.7790	0.0000	0.0091	0.4675
57	22.64	29.68	104.3000	46	399	0.9023	0.9760	1.0000	0.5240	174.8371	166.4449	0.0000	0.0240	0.4760
58	22.31	29.34	110.4000	30	399	0.9090	0.9891	1.0000	0.5368	193.5428	184.2527	0.0000	0.0109	0.4632
59	21.45	29.61	108.1000	33	399	0.9147	0.9706	1.0000	0.5335	185.9739	177.0472	0.0000	0.0294	0.4665
60	21.66	30.61	78.7000	38	399	0.9198	0.9798	0.9238	0.5291	136.2951	129.7530	0.0763	0.0202	0.4709
61	22.3	27.2	68.0000	24	399	0.9238	0.9219	1.0000	0.5460	114.8590	109.3458	0.0000	0.0781	0.4540
62	22.32	26.65	67.4000	41	399	0.9272	0.9053	1.0000	0.5269	108.2976	103.0993	0.0000	0.0947	0.4731

Table A11. Cowpea Biomass Growth with Stress Values for Makurdi 2000

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.42	27.65	40.6000	35	402	0.0027	0.9084	1.0000	0.5315	0.2025	0.1928	0.0000	0.0916	0.4685
2	22.14	26.38	105.1000	35	402	0.0031	0.8912	1.0000	0.5315	0.5930	0.5645	0.0000	0.1088	0.4685
3	21.47	26.6	67.2000	37	402	0.0036	0.8772	1.0000	0.5298	0.4278	0.4073	0.0000	0.1228	0.4702
4	21.79	27.7	78.8000	33	402	0.0042	0.9216	1.0000	0.5335	0.6146	0.5851	0.0000	0.0784	0.4665
5	22.19	27.26	73.8000	28	402	0.0048	0.9203	1.0000	0.5394	0.6730	0.6407	0.0000	0.0797	0.4606
6	22.03	29.08	109.8000	35	402	0.0056	0.9722	1.0000	0.5315	1.2166	1.1582	0.0000	0.0278	0.4685
7	22.78	26.27	73.0000	30	402	0.0065	0.9078	1.0000	0.5368	0.8812	0.8389	0.0000	0.0922	0.4632
8	22.02	27.11	92.8000	32	402	0.0075	0.9103	1.0000	0.5345	1.2924	1.2304	0.0000	0.0897	0.4655
9	21.78	25.47	103.8000	31	402	0.0086	0.8516	1.0000	0.5356	1.5512	1.4767	0.0000	0.1484	0.4644
10	22.07	28.89	101.3000	44	402	0.0100	0.9675	1.0000	0.5251	1.9654	1.8711	0.0000	0.0325	0.4749
11	22.29	27.57	90.3000	39	402	0.0116	0.9331	1.0000	0.5283	1.9705	1.8759	0.0000	0.0669	0.4717
12	21.97	28.4	104.8000	36	402	0.0135	0.9491	1.0000	0.5307	2.7141	2.5838	0.0000	0.0509	0.4693
13	23.23	28.83	44.0000	48	402	0.0158	0.9955	1.0000	0.5230	1.3794	1.3132	0.0000	0.0045	0.4770
14	23.09	26.06	93.0000	30	402	0.0183	0.9109	1.0000	0.5368	3.1596	3.0080	0.0000	0.0891	0.4632
15	22.59	28.17	109.7000	40	402	0.0212	0.9613	1.0000	0.5276	4.4937	4.2780	0.0000	0.0387	0.4724
16	22.1	30.06	95.8000	36	402	0.0248	0.9880	0.9925	0.5307	4.7462	4.5184	0.0075	0.0120	0.4693
17	22.82	26.6	116.8000	29	402	0.0287	0.9194	1.0000	0.5381	6.2989	5.9966	0.0000	0.0806	0.4619
18	22.05	28.72	107.3000	34	402	0.0333	0.9616	1.0000	0.5325	6.9504	6.6168	0.0000	0.0384	0.4675
19	22.4	29.64	118.1000	37	402	0.0388	0.9970	1.0000	0.5298	9.2080	8.7660	0.0000	0.0030	0.4702
20	22.62	27.9	98.1000	43	402	0.0449	0.9537	1.0000	0.5257	8.3996	7.9964	0.0000	0.0463	0.4743
21	22.52	28.62	85.9000	28	402	0.0520	0.9731	1.0000	0.5394	8.9271	8.4986	0.0000	0.0269	0.4606
22	22.71	27.49	111.7000	41	402	0.0600	0.9438	1.0000	0.5269	12.6763	12.0678	0.0000	0.0562	0.4731
23	22.42	27.72	87.9000	36	402	0.0690	0.9419	1.0000	0.5307	11.5384	10.9846	0.0000	0.0581	0.4693
24	22.32	26.7	97.0000	45	402	0.0789	0.9069	1.0000	0.5245	13.8532	13.1883	0.0000	0.0931	0.4755
25	22.32	28.59	83.3000	31	402	0.0908	0.9659	1.0000	0.5356	14.8949	14.1799	0.0000	0.0341	0.4644
26	22.39	28.27	117.2000	36	402	0.1042	0.9581	1.0000	0.5307	23.6328	22.4984	0.0000	0.0419	0.4693
27	22.46	27.63	103.5000	27	402	0.1190	0.9403	1.0000	0.5409	23.8416	22.6972	0.0000	0.0597	0.4591
28	22.49	27.88	62.8000	40	402	0.1358	0.9491	1.0000	0.5276	16.2438	15.4641	0.0000	0.0509	0.4724
29	22.28	25.6	64.9000	46	402	0.1528	0.8713	1.0000	0.5240	17.2267	16.3998	0.0000	0.1287	0.4760
30	21.95	28.09	120.3000	25	402	0.1731	0.9388	1.0000	0.5442	40.4650	38.5227	0.0000	0.0613	0.4558
31	22.08	26.7	67.8000	40	402	0.1944	0.8994	1.0000	0.5276	23.7921	22.6501	0.0000	0.1006	0.4724

Table A11. Continuation Cowpea Biomass Growth with Stress Values for Makurdi 2000

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.17	27.3	93.5000	31	402	0.2181	0.9209	1.0000	0.5356	38.2790	36.4416	0.0000	0.0791	0.4644
33	21.7	26.96	96.8000	36	402	0.2431	0.8956	1.0000	0.5307	42.5624	40.5194	0.0000	0.1044	0.4693
34	21.92	27.8	106.1000	48	402	0.2710	0.9288	1.0000	0.5230	53.1376	50.5870	0.0000	0.0713	0.4770
35	21.59	28.98	62.7000	38	402	0.3015	0.9553	1.0000	0.5291	36.3570	34.6119	0.0000	0.0447	0.4709
36	22.69	28.67	117.2000	46	402	0.3347	0.9800	1.0000	0.5240	76.6418	72.9630	0.0000	0.0200	0.4760
37	22.5	25.66	85.2000	39	402	0.3658	0.8800	1.0000	0.5283	55.1315	52.4852	0.0000	0.1200	0.4717
38	22.21	27.35	110.6000	32	402	0.3996	0.9238	1.0000	0.5345	83.0204	79.0354	0.0000	0.0762	0.4655
39	22.24	29.45	122.9000	25	402	0.4366	0.9903	1.0000	0.5442	110.0298	104.7484	0.0000	0.0097	0.4558
40	22.67	26.67	86.1000	47	402	0.4714	0.9169	1.0000	0.5235	74.1215	70.5637	0.0000	0.0831	0.4765
41	22.56	28.1	84.6000	47	402	0.5078	0.9581	1.0000	0.5235	81.9765	78.0416	0.0000	0.0419	0.4765
42	22.2	27.64	101.9000	43	402	0.5428	0.9325	1.0000	0.5257	103.1562	98.2047	0.0000	0.0675	0.4743
43	21.95	29.24	110.6000	39	402	0.5786	0.9747	1.0000	0.5283	125.3754	119.3574	0.0000	0.0253	0.4717
44	22.32	27.53	67.2000	25	402	0.6118	0.9328	1.0000	0.5442	79.3959	75.5849	0.0000	0.0672	0.4558
45	22.68	26.79	105.9000	43	402	0.6431	0.9209	1.0000	0.5257	125.4499	119.4283	0.0000	0.0791	0.4743
46	22.14	29.19	57.1000	45	402	0.6747	0.9791	1.0000	0.5245	75.2801	71.6667	0.0000	0.0209	0.4755
47	22.1	27.34	105.0000	41	402	0.7026	0.9200	1.0000	0.5269	136.0705	129.5391	0.0000	0.0800	0.4731
48	22.56	27.67	105.6000	34	402	0.7292	0.9447	1.0000	0.5325	147.3830	140.3086	0.0000	0.0553	0.4675
49	22.79	27.35	76.4000	44	402	0.7537	0.9419	1.0000	0.5251	108.3612	103.1599	0.0000	0.0581	0.4749
50	22.03	28.89	120.3000	30	402	0.7767	0.9663	1.0000	0.5368	184.4023	175.5510	0.0000	0.0337	0.4632
51	22.42	27.94	103.3000	40	402	0.7972	0.9488	1.0000	0.5276	156.8403	149.3120	0.0000	0.0513	0.4724
52	22.53	26.53	105.6000	37	402	0.8149	0.9081	1.0000	0.5298	157.5448	149.9827	0.0000	0.0919	0.4702
53	22.27	27.58	66.1000	40	402	0.8313	0.9328	1.0000	0.5276	102.8961	97.9571	0.0000	0.0672	0.4724
54	21.94	26.62	100.7000	39	402	0.8454	0.8925	1.0000	0.5283	152.7227	145.3920	0.0000	0.1075	0.4717
55	21.82	26.35	92.6000	41	402	0.8578	0.8803	1.0000	0.5269	140.1868	133.4578	0.0000	0.1197	0.4731
56	21.47	26.6	93.3000	34	402	0.8688	0.8772	1.0000	0.5325	144.0570	137.1423	0.0000	0.1228	0.4675
57	21.77	30.04	53.6000	46	402	0.8799	0.9941	0.9950	0.5240	93.4686	88.9821	0.0050	0.0059	0.4760
58	22.67	27.52	130.2000	30	402	0.8891	0.9434	1.0000	0.5368	223.0525	212.3460	0.0000	0.0566	0.4632
59	22.22	29.51	124.3000	33	402	0.8975	0.9916	1.0000	0.5335	224.5249	213.7477	0.0000	0.0084	0.4665
60	23.19	28.37	117.5000	38	402	0.9048	0.9863	1.0000	0.5291	211.0649	200.9338	0.0000	0.0137	0.4709
61	22.76	28.49	124.0000	24	402	0.9111	0.9766	1.0000	0.5460	229.1949	218.1936	0.0000	0.0234	0.4540
62	22.61	29.21	112.6000	41	402	0.9166	0.9944	1.0000	0.5269	205.7568	195.8805	0.0000	0.0056	0.4731

Table A12. Cowpea Biomass Growth with Stress Values for Makurdi 2001

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.81	27.89	65.1800	35	400	0.0027	0.9281	1.0000	0.5315	0.3232	0.3077	0.0000	0.0719	0.4685
2	22.25	28.07	59.0700	35	400	0.0032	0.9475	1.0000	0.5315	0.3479	0.3312	0.0000	0.0525	0.4685
3	22.44	28.51	69.4600	37	400	0.0037	0.9672	1.0000	0.5298	0.4855	0.4622	0.0000	0.0328	0.4702
4	22.34	29.54	84.5900	33	400	0.0043	0.9962	1.0000	0.5335	0.7187	0.6842	0.0000	0.0038	0.4665
5	22.55	29.62	76.0000	28	400	0.0051	0.9872	1.0000	0.5394	0.7594	0.7230	0.0000	0.0128	0.4606
6	23.38	28.9	51.6800	35	400	0.0060	0.9790	1.0000	0.5315	0.5924	0.5639	0.0000	0.0210	0.4685
7	22.79	27.3	74.2000	30	400	0.0069	0.9403	1.0000	0.5368	0.9579	0.9119	0.0000	0.0597	0.4632
8	22.4	30.41	87.7100	32	400	0.0082	0.9392	0.9488	0.5345	1.3253	1.2617	0.0513	0.0608	0.4655
9	23.29	28.26	76.3300	31	400	0.0095	0.9859	1.0000	0.5356	1.4184	1.3503	0.0000	0.0141	0.4644
10	22.52	27.89	74.5300	44	400	0.0111	0.9503	1.0000	0.5251	1.5211	1.4481	0.0000	0.0497	0.4749
11	22.69	27.18	77.6200	39	400	0.0128	0.9334	1.0000	0.5283	1.8144	1.7273	0.0000	0.0666	0.4717
12	22.89	28.25	70.7100	36	400	0.0150	0.9731	1.0000	0.5307	2.0178	1.9209	0.0000	0.0269	0.4693
13	22.85	29.31	88.0400	48	400	0.0175	0.9880	1.0000	0.5230	2.9444	2.8031	0.0000	0.0120	0.4770
14	22.2	29.39	77.2700	30	400	0.0205	0.9872	1.0000	0.5368	3.0939	2.9454	0.0000	0.0128	0.4632
15	22.33	27.28	80.2000	40	400	0.0237	0.9253	1.0000	0.5276	3.4186	3.2545	0.0000	0.0747	0.4724
16	22.2	28.69	85.8400	36	400	0.0275	0.9653	1.0000	0.5307	4.4622	4.2480	0.0000	0.0347	0.4693
17	22.19	29.21	88.6700	29	400	0.0320	0.9813	1.0000	0.5381	5.5311	5.2656	0.0000	0.0187	0.4619
18	22.75	29.78	107.6700	34	400	0.0374	0.9602	1.0000	0.5325	7.6076	7.2425	0.0000	0.0398	0.4675
19	22.11	27.58	83.5600	37	400	0.0432	0.9278	1.0000	0.5298	6.5434	6.2293	0.0000	0.0722	0.4702
20	22.33	27.12	73.4200	43	400	0.0497	0.9203	1.0000	0.5257	6.5090	6.1966	0.0000	0.0797	0.4743
21	21.79	29.12	90.6400	28	400	0.0575	0.9659	1.0000	0.5394	10.0137	9.5331	0.0000	0.0341	0.4606
22	22.83	27.86	62.1600	41	400	0.0663	0.9591	1.0000	0.5269	7.6876	7.3186	0.0000	0.0409	0.4731
23	21.95	28.78	91.6100	36	400	0.0765	0.9603	1.0000	0.5307	13.1700	12.5378	0.0000	0.0397	0.4693
24	22.26	29.52	87.3600	45	400	0.0884	0.9931	1.0000	0.5245	14.8432	14.1307	0.0000	0.0069	0.4755
25	22.36	28.33	58.1300	31	400	0.1015	0.9591	1.0000	0.5356	11.1807	10.6440	0.0000	0.0409	0.4644
26	21.68	27.92	94.4200	36	400	0.1157	0.9250	1.0000	0.5307	19.7882	18.8384	0.0000	0.0750	0.4693
27	22	29.45	91.6600	27	400	0.1327	0.9828	1.0000	0.5409	23.8509	22.7060	0.0000	0.0172	0.4591
28	22.05	29.85	67.9700	40	400	0.1519	0.9969	1.0000	0.5276	20.0415	19.0795	0.0000	0.0031	0.4724
29	23.12	27.98	71.2000	46	400	0.1728	0.9719	1.0000	0.5240	23.1279	22.0178	0.0000	0.0281	0.4760
30	22.38	27.14	67.6300	25	400	0.1947	0.9225	1.0000	0.5442	24.3896	23.2189	0.0000	0.0775	0.4558
31	22.34	27.49	81.6100	40	400	0.2188	0.9322	1.0000	0.5276	32.4048	30.8494	0.0000	0.0678	0.4724

Table A12 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2001

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.74	27.73	110.0417	31	400	0.2446	0.9209	1.0000	0.5356	48.9894	46.6379	0.0000	0.0791	0.4644
33	22.15	27.2	99.5000	36	400	0.2722	0.9172	1.0000	0.5307	48.6380	46.3034	0.0000	0.0828	0.4693
34	22.42	27.78	57.4583	48	400	0.3024	0.9438	1.0000	0.5230	31.6476	30.1286	0.0000	0.0562	0.4770
35	22.26	26.67	110.8708	38	400	0.3330	0.9041	1.0000	0.5291	65.1575	62.0300	0.0000	0.0959	0.4709
36	22.37	26.74	91.9500	46	400	0.3651	0.9097	1.0000	0.5240	59.0498	56.2154	0.0000	0.0903	0.4760
37	21.83	27.99	90.8917	39	400	0.3991	0.9319	1.0000	0.5283	65.9060	62.7425	0.0000	0.0681	0.4717
38	21.79	29.74	113.7917	32	400	0.4360	0.9853	1.0000	0.5345	96.4193	91.7912	0.0000	0.0147	0.4655
39	22.24	28.26	94.7417	25	400	0.4722	0.9531	1.0000	0.5442	85.6099	81.5006	0.0000	0.0469	0.4558
40	21.71	26.01	42.8500	47	400	0.5050	0.8663	1.0000	0.5235	36.2112	34.4731	0.0000	0.1338	0.4765
41	21.69	28.88	95.8083	47	400	0.5409	0.9553	1.0000	0.5235	95.6385	91.0478	0.0000	0.0447	0.4765
42	22.59	27.96	87.9500	43	400	0.5761	0.9547	1.0000	0.5257	93.8258	89.3222	0.0000	0.0453	0.4743
43	22.56	25.53	45.1292	39	400	0.6074	0.8778	1.0000	0.5283	46.9085	44.6569	0.0000	0.1222	0.4717
44	21.92	28.02	77.7417	25	400	0.6395	0.9356	1.0000	0.5442	93.3958	88.9128	0.0000	0.0644	0.4558
45	21.64	29.35	111.8000	43	400	0.6709	0.9684	1.0000	0.5257	140.9115	134.1477	0.0000	0.0316	0.4743
46	22.23	29.29	109.2583	45	400	0.7010	0.9850	1.0000	0.5245	146.0127	139.0041	0.0000	0.0150	0.4755
47	22.62	26.86	88.0792	41	400	0.7271	0.9213	1.0000	0.5269	114.7142	109.2080	0.0000	0.0787	0.4731
48	21.89	27.37	81.3583	34	400	0.7511	0.9144	1.0000	0.5325	109.7827	104.5131	0.0000	0.0856	0.4675
49	22.33	27.88	106.8000	44	400	0.7738	0.9441	1.0000	0.5251	151.1674	143.9113	0.0000	0.0559	0.4749
50	22.28	28.28	103.5500	30	400	0.7947	0.9550	1.0000	0.5368	155.6627	148.1909	0.0000	0.0450	0.4632
51	22.59	25.97	97.8208	40	400	0.8124	0.8925	1.0000	0.5276	138.0753	131.4477	0.0000	0.1075	0.4724
52	22.8	27.71	88.6083	37	400	0.8294	0.9534	1.0000	0.5298	136.9862	130.4109	0.0000	0.0466	0.4702
53	21.93	27.39	112.5417	40	400	0.8440	0.9163	1.0000	0.5276	169.4282	161.2957	0.0000	0.0837	0.4724
54	22.35	26.71	90.3083	39	400	0.8569	0.9081	1.0000	0.5283	136.9996	130.4236	0.0000	0.0919	0.4717
55	22.02	26.96	116.5500	41	400	0.8684	0.9056	1.0000	0.5269	178.2169	169.6625	0.0000	0.0944	0.4731
56	21.02	28.95	108.7500	34	400	0.8789	0.9366	1.0000	0.5325	175.8827	167.4403	0.0000	0.0634	0.4675
57	22.5	30	123.6708	46	400	0.8889	0.9625	1.0000	0.5240	204.5804	194.7605	0.0000	0.0375	0.4760
58	22.49	28.84	122.0083	30	400	0.8972	0.9791	1.0000	0.5368	212.2991	202.1087	0.0000	0.0209	0.4632
59	22.65	28.04	104.3500	33	400	0.9044	0.9591	1.0000	0.5335	178.1629	169.6110	0.0000	0.0409	0.4665
60	23.03	28.02	70.1583	38	400	0.9107	0.9703	1.0000	0.5291	121.0261	115.2169	0.0000	0.0297	0.4709
61	22.29	29.15	110.5583	24	400	0.9162	0.9825	1.0000	0.5460	200.5068	190.8825	0.0000	0.0175	0.4540
62	22.77	26.66	55.0417	41	400	0.9207	0.9197	1.0000	0.5269	90.6180	86.2684	0.0000	0.0803	0.4731

Table A13. Cowpea Biomass Growth with Stress Values for Makurdi 2002

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.27	28.39	60.7083	41	406	0.0027	0.9581	1.0000	0.5269	0.3384	0.3222	0.0000	0.0419	0.4731
2	22.69	26.47	88.1000	29	406	0.0032	0.9112	1.0000	0.5381	0.5516	0.5251	0.0000	0.0888	0.4619
3	21.93	28.54	97.5583	43	406	0.0037	0.9522	1.0000	0.5257	0.7258	0.6910	0.0000	0.0478	0.4743
4	22.19	29.07	101.6500	39	406	0.0043	0.9769	1.0000	0.5283	0.9110	0.8673	0.0000	0.0231	0.4717
5	23.23	29.25	86.7500	34	406	0.0051	0.9640	1.0000	0.5325	0.9089	0.8653	0.0000	0.0360	0.4675
6	22.38	28.59	90.9083	29	406	0.0059	0.9678	1.0000	0.5381	1.1272	1.0731	0.0000	0.0322	0.4619
7	22.88	27.09	81.8583	41	406	0.0068	0.9366	1.0000	0.5269	1.1162	1.0626	0.0000	0.0634	0.4731
8	21.78	28.61	77.3208	39	406	0.0080	0.9497	1.0000	0.5283	1.2463	1.1865	0.0000	0.0503	0.4717
9	22.11	27.99	80.9500	21	406	0.0092	0.9406	1.0000	0.5526	1.5692	1.4938	0.0000	0.0594	0.4474
10	22.2	27.33	97.7292	24	406	0.0107	0.9228	1.0000	0.5460	2.1253	2.0233	0.0000	0.0772	0.4540
11	22.42	28.27	66.6500	41	406	0.0124	0.9591	1.0000	0.5269	1.6917	1.6105	0.0000	0.0409	0.4731
12	22.35	27.94	84.3792	49	406	0.0145	0.9466	1.0000	0.5225	2.4337	2.3169	0.0000	0.0534	0.4775
13	22.7	27.93	88.6917	32	406	0.0168	0.9572	1.0000	0.5345	3.0762	2.9286	0.0000	0.0428	0.4655
14	22.21	30.01	89.1708	39	406	0.0197	0.9835	0.9988	0.5283	3.6787	3.5022	0.0013	0.0165	0.4717
15	22.2	29.31	92.3792	35	406	0.0230	0.9847	1.0000	0.5315	4.4783	4.2634	0.0000	0.0153	0.4685
16	22.74	27.52	95.2083	39	406	0.0266	0.9456	1.0000	0.5283	5.1049	4.8598	0.0000	0.0544	0.4717
17	22.11	28.96	100.9000	38	406	0.0309	0.9709	1.0000	0.5291	6.4672	6.1567	0.0000	0.0291	0.4709
18	21.94	29.91	108.5792	36	406	0.0361	0.9953	1.0000	0.5307	8.3442	7.9437	0.0000	0.0047	0.4693
19	22.89	29.28	79.5083	42	406	0.0421	0.9872	1.0000	0.5263	7.0131	6.6765	0.0000	0.0128	0.4737
20	23.18	29.51	99.2208	28	406	0.0492	0.9483	1.0000	0.5394	10.0668	9.5836	0.0000	0.0517	0.4606
21	22.64	26.14	86.0208	36	406	0.0563	0.8994	1.0000	0.5307	9.3288	8.8811	0.0000	0.1006	0.4693
22	21.76	27.85	45.4083	40	406	0.0647	0.9253	1.0000	0.5276	5.7863	5.5085	0.0000	0.0747	0.4724
23	21.86	27.49	84.3083	17	406	0.0741	0.9172	1.0000	0.5649	13.0642	12.4371	0.0000	0.0828	0.4351
24	22.42	29.22	95.4583	32	406	0.0857	0.9888	1.0000	0.5345	17.4396	16.6025	0.0000	0.0112	0.4655
25	22.32	29.49	45.0292	38	406	0.0989	0.9941	1.0000	0.5291	9.4508	8.9971	0.0000	0.0059	0.4709
26	22.92	29.46	109.6583	42	406	0.1142	0.9715	1.0000	0.5263	25.8347	24.5947	0.0000	0.0285	0.4737
27	22.83	29.14	95.3917	32	406	0.1313	0.9991	1.0000	0.5345	26.9782	25.6833	0.0000	0.0009	0.4655
28	22.33	26.4	91.4000	30	406	0.1484	0.8978	1.0000	0.5368	26.3706	25.1048	0.0000	0.1022	0.4632
29	22.27	26.93	64.1083	47	406	0.1676	0.9125	1.0000	0.5235	20.7063	19.7124	0.0000	0.0875	0.4765
30	21.71	30.03	89.8000	36	406	0.1906	0.9919	0.9963	0.5307	36.3533	34.6084	0.0038	0.0081	0.4693
31	23.17	27.74	106.7417	38	406	0.2153	0.9659	1.0000	0.5291	47.3767	45.1026	0.0000	0.0341	0.4709

Table A13 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2002

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.01	29.05	52.0000	43	406	0.2422	0.9706	1.0000	0.5257	25.9282	24.6837	0.0000	0.0294	0.4743
33	22.64	29.47	118.1417	38	406	0.2723	0.9918	1.0000	0.5291	68.1023	64.8334	0.0000	0.0082	0.4709
34	22.61	28.99	99.1000	21	406	0.3040	0.9875	1.0000	0.5526	66.3243	63.1408	0.0000	0.0125	0.4474
35	22.69	27.48	78.4292	35	406	0.3360	0.9428	1.0000	0.5315	53.2806	50.7231	0.0000	0.0572	0.4685
36	22.07	28.4	93.6583	25	406	0.3698	0.9522	1.0000	0.5442	72.3965	68.9215	0.0000	0.0478	0.4558
37	22.07	28.73	115.3417	39	406	0.4051	0.9625	1.0000	0.5283	95.8533	91.2524	0.0000	0.0375	0.4717
38	22.37	29.37	82.3000	47	406	0.4423	0.9919	1.0000	0.5235	76.2578	72.5974	0.0000	0.0081	0.4765
39	22.98	30.27	90.4417	28	406	0.4818	0.9063	0.9663	0.5394	85.9324	81.8077	0.0338	0.0938	0.4606
40	23.51	27.43	123.5292	32	406	0.5184	0.9669	1.0000	0.5345	133.5095	127.1010	0.0000	0.0331	0.4655
41	22.87	29.07	42.7292	29	406	0.5556	0.9981	1.0000	0.5381	51.4421	48.9729	0.0000	0.0019	0.4619
42	22.2	30.31	124.2417	31	406	0.5925	0.9618	0.9613	0.5356	152.9953	145.6515	0.0388	0.0382	0.4644
43	22.64	30.33	105.4792	43	406	0.6285	0.9273	0.9588	0.5257	130.3622	124.1048	0.0413	0.0727	0.4743
44	23.67	27.87	107.6708	39	406	0.6611	0.9856	1.0000	0.5283	149.5407	142.3627	0.0000	0.0144	0.4717
45	23.46	29.69	75.7792	38	406	0.6933	0.9137	1.0000	0.5291	102.4692	97.5507	0.0000	0.0863	0.4709
46	22.84	28.04	120.8708	42	406	0.7212	0.9650	1.0000	0.5263	178.6111	170.0378	0.0000	0.0350	0.4737
47	22.02	27.59	98.0792	45	406	0.7459	0.9253	1.0000	0.5245	143.2562	136.3799	0.0000	0.0747	0.4755
48	22.36	28.62	100.9000	31	406	0.7697	0.9681	1.0000	0.5356	162.4602	154.6621	0.0000	0.0319	0.4644
49	21.82	28.13	85.9792	43	406	0.7905	0.9359	1.0000	0.5257	134.9121	128.4363	0.0000	0.0641	0.4743
50	21.21	29.4	90.8583	43	406	0.8098	0.9566	1.0000	0.5257	149.2658	142.1010	0.0000	0.0434	0.4743
51	22.49	28.96	85.8708	38	406	0.8276	0.9828	1.0000	0.5291	149.0758	141.9201	0.0000	0.0172	0.4709
52	22.13	29.53	87.7208	34	406	0.8435	0.9894	1.0000	0.5325	157.2616	149.7130	0.0000	0.0106	0.4675
53	22.53	26.82	101.4792	38	406	0.8566	0.9172	1.0000	0.5291	170.1743	162.0059	0.0000	0.0828	0.4709
54	22.39	29.84	105.4083	46	406	0.8693	0.9827	1.0000	0.5240	190.3754	181.2374	0.0000	0.0173	0.4760
55	20.96	31.59	125.0708	44	406	0.8806	0.9588	0.8013	0.5251	223.6827	212.9459	0.1986	0.0412	0.4749
56	23.09	26.8	114.9292	43	406	0.8896	0.9341	1.0000	0.5257	202.5298	192.8084	0.0000	0.0659	0.4743
57	23.38	26.86	70.9583	34	406	0.8976	0.9450	1.0000	0.5325	129.2974	123.0911	0.0000	0.0550	0.4675
58	22.4	30.35	124.0708	36	406	0.9051	0.9438	0.9563	0.5307	226.9035	216.0122	0.0438	0.0563	0.4693
59	23.34	27.27	71.3917	37	406	0.9112	0.9566	1.0000	0.5298	133.0200	126.6351	0.0000	0.0434	0.4702
60	22.81	27.68	58.6292	39	406	0.9165	0.9528	1.0000	0.5283	109.1274	103.8893	0.0000	0.0472	0.4717
61	22.29	27.28	92.9500	40	406	0.9210	0.9241	1.0000	0.5276	168.3795	160.2973	0.0000	0.0759	0.4724
62	21.85	28.9	78.5292	40	406	0.9250	0.9609	1.0000	0.5276	148.5795	141.4477	0.0000	0.0391	0.4724

Table A14. Cowpea Biomass Growth with Stress Values for Makurdi 2003

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.1	29.27	98.0083	41	404	0.0028	0.9722	1.0000	0.5269	0.5433	0.5172	0.0000	0.0278	0.4731
2	22.96	29.69	91.2208	29	404	0.0032	0.9512	1.0000	0.5381	0.5945	0.5659	0.0000	0.0488	0.4619
3	22.7	27.18	76.4500	43	404	0.0038	0.9337	1.0000	0.5257	0.5545	0.5278	0.0000	0.0663	0.4743
4	22.14	29.24	89.0708	39	404	0.0044	0.9806	1.0000	0.5283	0.7971	0.7588	0.0000	0.0194	0.4717
5	22.15	29.13	83.9792	34	404	0.0051	0.9775	1.0000	0.5325	0.8822	0.8398	0.0000	0.0225	0.4675
6	22.72	28.39	69.2708	29	404	0.0060	0.9722	1.0000	0.5381	0.8536	0.8127	0.0000	0.0278	0.4619
7	22.35	27.69	66.0083	41	404	0.0070	0.9388	1.0000	0.5269	0.8929	0.8501	0.0000	0.0612	0.4731
8	22.15	28.62	93.1917	39	404	0.0081	0.9616	1.0000	0.5283	1.5082	1.4358	0.0000	0.0384	0.4717
9	22.59	30.01	84.4292	21	404	0.0096	0.9550	0.9988	0.5526	1.6681	1.5880	0.0013	0.0450	0.4474
10	22.56	27.96	71.5000	24	404	0.0111	0.9537	1.0000	0.5460	1.6212	1.5433	0.0000	0.0463	0.4540
11	22.53	29.54	94.8208	41	404	0.0130	0.9948	1.0000	0.5269	2.5352	2.4135	0.0000	0.0052	0.4731
12	22.83	29.46	77.0208	49	404	0.0153	0.9783	1.0000	0.5225	2.3545	2.2415	0.0000	0.0217	0.4775
13	22.76	28.28	81.2917	32	404	0.0178	0.9700	1.0000	0.5345	2.9358	2.7949	0.0000	0.0300	0.4655
14	23.14	29.3	94.1417	39	404	0.0208	0.9670	1.0000	0.5283	3.9271	3.7386	0.0000	0.0330	0.4717
15	23.04	28.73	105.5792	35	404	0.0243	0.9928	1.0000	0.5315	5.3126	5.0576	0.0000	0.0072	0.4685
16	22.38	29.08	98.8792	39	404	0.0283	0.9831	1.0000	0.5283	5.7062	5.4323	0.0000	0.0169	0.4717
17	23.16	27.69	81.9292	38	404	0.0329	0.9641	1.0000	0.5291	5.3904	5.1317	0.0000	0.0359	0.4709
18	22.45	30.05	94.1083	36	404	0.0385	0.9625	0.9938	0.5307	7.2503	6.9023	0.0063	0.0375	0.4693
19	23.09	27.85	24.7292	42	404	0.0446	0.9669	1.0000	0.5263	2.2007	2.0951	0.0000	0.0331	0.4737
20	22.27	26.38	73.9000	28	404	0.0511	0.8953	1.0000	0.5394	7.1515	6.8082	0.0000	0.1047	0.4606
21	22.16	29.11	112.1417	36	404	0.0592	0.9772	1.0000	0.5307	13.5012	12.8532	0.0000	0.0228	0.4693
22	21.81	27.09	94.7208	40	404	0.0678	0.9031	1.0000	0.5276	11.9914	11.4159	0.0000	0.0969	0.4724
23	21.64	28.37	89.2208	17	404	0.0779	0.9378	1.0000	0.5649	14.4257	13.7333	0.0000	0.0622	0.4351
24	22.06	28.65	88.6500	32	404	0.0896	0.9597	1.0000	0.5345	15.9634	15.1972	0.0000	0.0403	0.4655
25	22.03	26.21	64.2417	38	404	0.1017	0.8825	1.0000	0.5291	11.9552	11.3814	0.0000	0.1175	0.4709
26	22.02	28.94	104.6000	42	404	0.1166	0.9675	1.0000	0.5263	24.3470	23.1783	0.0000	0.0325	0.4737
27	23	26.62	84.0792	32	404	0.1326	0.9256	1.0000	0.5345	21.6273	20.5892	0.0000	0.0744	0.4655
28	22.21	28.94	109.8792	30	404	0.1514	0.9734	1.0000	0.5368	34.0806	32.4448	0.0000	0.0266	0.4632
29	22.54	27.16	98.7417	47	404	0.1713	0.9281	1.0000	0.5235	32.2133	30.6671	0.0000	0.0719	0.4765
30	22.51	29.54	102.6500	36	404	0.1950	0.9963	1.0000	0.5307	41.4727	39.4820	0.0000	0.0037	0.4693
31	22.14	27.61	77.5500	38	404	0.2190	0.9297	1.0000	0.5291	32.7467	31.1749	0.0000	0.0703	0.4709

Table A14 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2003

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.27	30.2	92.7792	43	404	0.2467	0.9834	0.9750	0.5257	46.3729	44.1470	0.0250	0.0166	0.4743
33	22.25	28.4	107.3917	38	404	0.2757	0.9578	1.0000	0.5291	58.7991	55.9767	0.0000	0.0422	0.4709
34	21.43	31.01	39.4500	21	404	0.3084	0.9670	0.8738	0.5526	25.4848	24.2616	0.1263	0.0330	0.4474
35	22.73	29.84	92.0917	35	404	0.3433	0.9572	1.0000	0.5315	63.0493	60.0229	0.0000	0.0428	0.4685
36	23.02	25.72	85.8792	25	404	0.3754	0.8981	1.0000	0.5442	61.7527	58.7886	0.0000	0.1019	0.4558
37	22.64	27.66	86.8708	39	404	0.4103	0.9469	1.0000	0.5283	69.8801	66.5259	0.0000	0.0531	0.4717
38	21.89	27.66	89.6000	47	404	0.4450	0.9234	1.0000	0.5235	75.5457	71.9195	0.0000	0.0766	0.4765
39	23.11	29.67	85.4292	28	404	0.4839	0.9415	1.0000	0.5394	82.2869	78.3371	0.0000	0.0585	0.4606
40	23.09	26.81	93.6208	32	404	0.5192	0.9344	1.0000	0.5345	95.1608	90.5931	0.0000	0.0656	0.4655
41	22.69	27.84	96.5583	29	404	0.5549	0.9541	1.0000	0.5381	107.8038	102.6292	0.0000	0.0459	0.4619
42	22.21	30.49	121.3208	31	404	0.5920	0.9475	0.9388	0.5356	142.8675	136.0098	0.0613	0.0525	0.4644
43	23.23	27.49	91.5708	43	404	0.6256	0.9600	1.0000	0.5257	113.3089	107.8700	0.0000	0.0400	0.4743
44	22.65	29.02	73.7792	39	404	0.6585	0.9897	1.0000	0.5283	99.5680	94.7887	0.0000	0.0103	0.4717
45	22.82	31.11	110.1000	38	404	0.6916	0.8553	0.8613	0.5291	135.0479	128.5656	0.1388	0.1447	0.4709
46	23.46	31.25	124.7000	42	404	0.7229	0.7968	0.8438	0.5263	148.1692	141.0571	0.1563	0.2033	0.4737
47	22.76	26.88	95.3417	45	404	0.7476	0.9263	1.0000	0.5245	135.7281	129.2132	0.0000	0.0737	0.4755
48	21.18	30.31	121.7792	31	404	0.7715	0.9841	0.9613	0.5356	194.1014	184.7845	0.0388	0.0159	0.4644
49	22.09	30.99	116.5500	43	404	0.7943	0.9190	0.8763	0.5257	175.2861	166.8724	0.1238	0.0810	0.4743
50	23.06	29.39	75.9792	43	404	0.8142	0.9662	1.0000	0.5257	123.1687	117.2566	0.0000	0.0338	0.4743
51	22.98	29.7	104.0083	38	404	0.8322	0.9490	1.0000	0.5291	170.3296	162.1538	0.0000	0.0510	0.4709
52	23.06	26.43	52.7792	34	404	0.8466	0.9216	1.0000	0.5325	85.9385	81.8134	0.0000	0.0784	0.4675
53	22.73	27.4	108.4708	38	404	0.8597	0.9416	1.0000	0.5291	182.0661	173.3270	0.0000	0.0584	0.4709
54	22.45	29.07	108.5583	46	404	0.8717	0.9850	1.0000	0.5240	191.4533	182.2635	0.0000	0.0150	0.4760
55	22.25	30.09	100.9208	44	404	0.8826	0.9745	0.9888	0.5251	178.6502	170.0750	0.0113	0.0255	0.4749
56	22.33	30.66	106.0417	43	404	0.8922	0.9258	0.9175	0.5257	180.4697	171.8071	0.0825	0.0742	0.4743
57	23.54	28.67	102.2917	34	404	0.9004	0.9843	1.0000	0.5325	189.1930	180.1117	0.0000	0.0158	0.4675
58	22.24	30.93	95.1917	36	404	0.9076	0.9122	0.8838	0.5307	163.9379	156.0689	0.1163	0.0878	0.4693
59	23.78	28.32	89.9000	37	404	0.9137	0.9925	1.0000	0.5298	169.3014	161.1749	0.0000	0.0075	0.4702
60	23.42	27.59	100.1000	39	404	0.9187	0.9691	1.0000	0.5283	184.5409	175.6830	0.0000	0.0309	0.4717
61	23.22	30	93.0917	40	404	0.9234	0.9085	1.0000	0.5276	161.4935	153.7418	0.0000	0.0915	0.4724
62	23.93	29.32	83.6208	40	404	0.9273	0.9063	1.0000	0.5276	145.3286	138.3528	0.0000	0.0938	0.4724

Table A15. Cowpea Biomass Growth with Stress Values for Makurdi 2004

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.22	28.92	76.8708	41	405	0.0027	0.9731	1.0000	0.5269	0.4301	0.4094	0.0000	0.0269	0.4731
2	22.41	28.61	73.7792	29	405	0.0032	0.9694	1.0000	0.5381	0.4901	0.4666	0.0000	0.0306	0.4619
3	22.97	29.15	84.3792	43	405	0.0038	0.9910	1.0000	0.5257	0.6570	0.6254	0.0000	0.0090	0.4743
4	23	27.63	90.8417	39	405	0.0044	0.9572	1.0000	0.5283	0.7997	0.7613	0.0000	0.0428	0.4717
5	22.64	30.26	87.8708	34	405	0.0052	0.9325	0.9675	0.5325	0.8946	0.8516	0.0325	0.0675	0.4675
6	23.37	28.71	90.8000	29	405	0.0060	0.9940	1.0000	0.5381	1.1679	1.1118	0.0000	0.0060	0.4619
7	23.25	26.3	71.4417	41	405	0.0070	0.9234	1.0000	0.5269	0.9681	0.9216	0.0000	0.0766	0.4731
8	22.39	29.47	86.9208	39	405	0.0082	0.9956	1.0000	0.5283	1.4912	1.4197	0.0000	0.0044	0.4717
9	22.81	26.53	81.4917	21	405	0.0095	0.9169	1.0000	0.5526	1.5573	1.4825	0.0000	0.0831	0.4474
10	22.2	28.73	42.3000	24	405	0.0111	0.9666	1.0000	0.5460	0.9812	0.9341	0.0000	0.0334	0.4540
11	22.76	28.04	103.1000	41	405	0.0129	0.9625	1.0000	0.5269	2.6758	2.5473	0.0000	0.0375	0.4731
12	22.42	28.45	89.6792	49	405	0.0150	0.9647	1.0000	0.5225	2.6933	2.5640	0.0000	0.0353	0.4775
13	23.02	28.23	82.9208	32	405	0.0175	0.9766	1.0000	0.5345	3.0068	2.8625	0.0000	0.0234	0.4655
14	22.42	28.47	82.8292	39	405	0.0203	0.9653	1.0000	0.5283	3.4141	3.2502	0.0000	0.0347	0.4717
15	22.31	28.77	101.3583	35	405	0.0237	0.9713	1.0000	0.5315	4.9226	4.6863	0.0000	0.0288	0.4685
16	22.49	26.88	34.9417	39	405	0.0273	0.9178	1.0000	0.5283	1.8387	1.7505	0.0000	0.0822	0.4717
17	22.97	28.2	86.6500	38	405	0.0317	0.9741	1.0000	0.5291	5.6361	5.3655	0.0000	0.0259	0.4709
18	22.23	29.76	94.2500	36	405	0.0370	0.9997	1.0000	0.5307	7.3628	7.0094	0.0000	0.0003	0.4693
19	21.76	29.99	85.7083	42	405	0.0431	0.9922	1.0000	0.5263	7.6729	7.3046	0.0000	0.0078	0.4737
20	22.84	26.66	83.8417	28	405	0.0496	0.9219	1.0000	0.5394	8.2248	7.8300	0.0000	0.0781	0.4606
21	22.23	29.01	101.0083	36	405	0.0575	0.9763	1.0000	0.5307	11.9624	11.3882	0.0000	0.0237	0.4693
22	22.26	27.66	82.7083	40	405	0.0661	0.9350	1.0000	0.5276	10.7274	10.2125	0.0000	0.0650	0.4724
23	22.7	28.1	91.3292	17	405	0.0762	0.9625	1.0000	0.5649	15.0564	14.3336	0.0000	0.0375	0.4351
24	22.28	29.54	80.7083	32	405	0.0882	0.9944	1.0000	0.5345	15.0401	14.3181	0.0000	0.0056	0.4655
25	21.78	29.65	64.5083	38	405	0.1016	0.9822	1.0000	0.5291	13.5390	12.8891	0.0000	0.0178	0.4709
26	22.51	29.26	97.4208	42	405	0.1169	0.9928	1.0000	0.5263	23.6639	22.5280	0.0000	0.0072	0.4737
27	22.65	29.02	98.2500	32	405	0.1341	0.9897	1.0000	0.5345	27.7218	26.3911	0.0000	0.0103	0.4655
28	23.02	29.38	82.6583	30	405	0.1539	0.9700	1.0000	0.5368	26.3402	25.0758	0.0000	0.0300	0.4632
29	22.94	30.59	108.8500	47	405	0.1767	0.8852	0.9263	0.5235	35.4573	33.7553	0.0738	0.1148	0.4765
30	23.2	28.06	101.7417	36	405	0.2003	0.9769	1.0000	0.5307	42.0227	40.0056	0.0000	0.0231	0.4693
31	22.53	30.99	101.1000	38	405	0.2281	0.8860	0.8763	0.5291	42.9931	40.9294	0.1238	0.1140	0.4709

Table A15 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2004

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.03	28.07	78.6208	43	405	0.2561	0.9719	1.0000	0.5257	40.9178	38.9538	0.0000	0.0281	0.4743
33	22.47	29.08	99.5000	38	405	0.2867	0.9859	1.0000	0.5291	59.1789	56.3383	0.0000	0.0141	0.4709
34	23.24	26.68	89.0917	21	405	0.3175	0.9350	1.0000	0.5526	58.1235	55.3336	0.0000	0.0650	0.4474
35	22.22	29	85.5708	35	405	0.3513	0.9756	1.0000	0.5315	62.0012	59.0251	0.0000	0.0244	0.4685
36	22.85	26.33	86.4083	25	405	0.3842	0.9119	1.0000	0.5442	65.5106	62.3661	0.0000	0.0881	0.4558
37	22.59	30.42	100.6083	39	405	0.4225	0.9242	0.9475	0.5283	82.5389	78.5770	0.0525	0.0758	0.4717
38	23.05	29.04	82.8792	47	405	0.4604	0.9932	1.0000	0.5235	78.8983	75.1112	0.0000	0.0068	0.4765
39	23.29	27.42	106.1500	28	405	0.4968	0.9597	1.0000	0.5394	108.5752	103.3636	0.0000	0.0403	0.4606
40	22.48	28.82	97.8500	32	405	0.5337	0.9781	1.0000	0.5345	108.5801	103.3683	0.0000	0.0219	0.4655
41	22.12	29.73	51.5583	29	405	0.5705	0.9953	1.0000	0.5381	62.6478	59.6407	0.0000	0.0047	0.4619
42	22.03	29.46	112.1417	31	405	0.6058	0.9841	1.0000	0.5356	142.3934	135.5585	0.0000	0.0159	0.4644
43	22.59	29.14	106.2292	43	405	0.6398	0.9916	1.0000	0.5257	140.8815	134.1191	0.0000	0.0084	0.4743
44	22.92	29.52	93.8500	39	405	0.6727	0.9670	1.0000	0.5283	128.2605	122.1040	0.0000	0.0330	0.4717
45	23.06	29.17	88.5708	38	405	0.7032	0.9827	1.0000	0.5291	128.7868	122.6050	0.0000	0.0173	0.4709
46	23.18	28.68	111.5083	42	405	0.7312	0.9956	1.0000	0.5263	169.9040	161.7486	0.0000	0.0044	0.4737
47	22.9	28.06	96.3083	45	405	0.7562	0.9675	1.0000	0.5245	146.9791	139.9241	0.0000	0.0325	0.4755
48	22.2	27.81	59.3708	31	405	0.7783	0.9378	1.0000	0.5356	92.3068	87.8761	0.0000	0.0622	0.4644
49	21.01	30.5	119.5000	43	405	0.7993	0.9847	0.9375	0.5257	196.6405	187.2018	0.0625	0.0153	0.4743
50	23.03	30.6	65.7917	43	405	0.8195	0.8777	0.9250	0.5257	98.9330	94.1842	0.0750	0.1223	0.4743
51	23.63	29.47	92.4083	38	405	0.8370	0.9175	1.0000	0.5291	149.3131	142.1461	0.0000	0.0825	0.4709
52	23.51	28.82	96.8917	34	405	0.8521	0.9753	1.0000	0.5325	170.5138	162.3291	0.0000	0.0247	0.4675
53	22.96	30.05	124.8000	38	405	0.8657	0.9242	0.9938	0.5291	210.0998	200.0150	0.0063	0.0758	0.4709
54	23.11	30.46	118.3583	46	405	0.8777	0.8823	0.9425	0.5240	191.0032	181.8350	0.0575	0.1178	0.4760
55	24.12	30.11	115.8083	44	405	0.8884	0.8327	0.9863	0.5251	178.9105	170.3228	0.0138	0.1673	0.4749
56	22.96	29.67	103.1583	43	405	0.8971	0.9527	1.0000	0.5257	184.3357	175.4876	0.0000	0.0473	0.4743
57	23.23	28.82	99.8500	34	405	0.9046	0.9963	1.0000	0.5325	190.5528	181.4062	0.0000	0.0037	0.4675
58	23.14	29.13	99.9417	36	405	0.9111	0.9798	1.0000	0.5307	188.2746	179.2375	0.0000	0.0202	0.4693
59	22.77	30.28	75.0000	37	405	0.9168	0.9213	0.9650	0.5298	133.4778	127.0709	0.0350	0.0787	0.4702
60	23.24	30.24	106.9292	39	405	0.9218	0.8890	0.9700	0.5283	184.1019	175.2651	0.0300	0.1110	0.4717
61	22.98	30.09	127.4917	40	405	0.9260	0.9198	0.9888	0.5276	227.8253	216.8896	0.0113	0.0803	0.4724
62	23.35	30.13	115.6500	40	405	0.9296	0.8890	0.9838	0.5276	200.5374	190.9116	0.0163	0.1110	0.4724

Table A16. Cowpea Biomass Growth with Stress Values for Makurdi 2005

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.64	27.81	56.0917	41	399	0.0027	0.9516	1.0000	0.5269	0.2793	0.2659	0.0000	0.0484	0.4731
2	22.52	29.07	78.9000	29	399	0.0032	0.9872	1.0000	0.5381	0.4872	0.4639	0.0000	0.0128	0.4619
3	21.94	30.33	83.6708	43	399	0.0038	0.9798	0.9588	0.5257	0.5884	0.5601	0.0413	0.0202	0.4743
4	22.11	30.08	90.0917	39	399	0.0044	0.9858	0.9900	0.5283	0.7519	0.7158	0.0100	0.0142	0.4717
5	22.7	27.2	57.3917	34	399	0.0051	0.9344	1.0000	0.5325	0.5310	0.5055	0.0000	0.0656	0.4675
6	22.04	30.4	78.2292	29	399	0.0060	0.9670	0.9500	0.5381	0.8894	0.8467	0.0500	0.0330	0.4619
7	22.45	29.9	101.0792	41	399	0.0071	0.9738	1.0000	0.5269	1.3308	1.2669	0.0000	0.0262	0.4731
8	22.8	30.09	97.4500	39	399	0.0083	0.9332	0.9888	0.5283	1.4513	1.3816	0.0113	0.0668	0.4717
9	22.49	27.83	97.5417	21	399	0.0097	0.9475	1.0000	0.5526	1.7925	1.7065	0.0000	0.0525	0.4474
10	21.64	29.13	81.8292	24	399	0.0113	0.9616	1.0000	0.5460	1.7557	1.6715	0.0000	0.0384	0.4540
11	22.16	27.95	64.8208	41	399	0.0131	0.9409	1.0000	0.5269	1.5239	1.4508	0.0000	0.0591	0.4731
12	22.28	27.87	96.6292	49	399	0.0151	0.9422	1.0000	0.5225	2.6169	2.4913	0.0000	0.0578	0.4775
13	21.79	31.14	101.3208	32	399	0.0178	0.9303	0.8575	0.5345	3.2580	3.1016	0.1425	0.0697	0.4655
14	22.77	27.76	46.6500	39	399	0.0207	0.9541	1.0000	0.5283	1.7659	1.6812	0.0000	0.0459	0.4717
15	21.93	28.68	70.2708	35	399	0.0240	0.9566	1.0000	0.5315	3.1160	2.9664	0.0000	0.0434	0.4685
16	22.41	29.34	71.6208	39	399	0.0280	0.9922	1.0000	0.5283	3.8207	3.6373	0.0000	0.0078	0.4717
17	22.57	28.52	82.0792	38	399	0.0326	0.9716	1.0000	0.5291	4.9910	4.7515	0.0000	0.0284	0.4709
18	22.77	29.09	103.5292	36	399	0.0380	0.9956	1.0000	0.5307	7.5437	7.1816	0.0000	0.0044	0.4693
19	22.57	27.27	90.1583	42	399	0.0438	0.9325	1.0000	0.5263	7.0388	6.7009	0.0000	0.0675	0.4737
20	22.03	29.6	97.7708	28	399	0.0509	0.9884	1.0000	0.5394	9.6378	9.1752	0.0000	0.0116	0.4606
21	22.64	27.82	40.9000	36	399	0.0587	0.9519	1.0000	0.5307	4.4090	4.1974	0.0000	0.0481	0.4693
22	23.19	28.13	109.6000	40	399	0.0680	0.9788	1.0000	0.5276	13.9794	13.3083	0.0000	0.0212	0.4724
23	23.23	27.91	80.2917	17	399	0.0785	0.9731	1.0000	0.5649	12.5880	11.9838	0.0000	0.0269	0.4351
24	22.46	28.57	72.1083	32	399	0.0904	0.9697	1.0000	0.5345	12.2766	11.6873	0.0000	0.0303	0.4655
25	22.29	28.8	105.1583	38	399	0.1040	0.9716	1.0000	0.5291	20.4146	19.4347	0.0000	0.0284	0.4709
26	22.92	28.96	88.9500	42	399	0.1197	0.9963	1.0000	0.5263	20.2746	19.3014	0.0000	0.0037	0.4737
27	23.38	28.51	64.4083	32	399	0.1374	0.9966	1.0000	0.5345	17.1200	16.2982	0.0000	0.0034	0.4655
28	22.78	29.8	92.6583	30	399	0.1576	0.9565	1.0000	0.5368	27.2437	25.9360	0.0000	0.0435	0.4632
29	23.12	27.35	91.2708	47	399	0.1787	0.9522	1.0000	0.5235	29.5332	28.1156	0.0000	0.0478	0.4765
30	22	29.88	75.7500	36	399	0.2030	0.9962	1.0000	0.5307	29.5295	28.1120	0.0000	0.0038	0.4693
31	22.96	30.86	98.6792	38	399	0.2313	0.8635	0.8925	0.5291	37.8739	36.0559	0.1075	0.1365	0.4709

Table A16 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2005

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.97	29.54	110.7583	43	399	0.2609	0.9618	1.0000	0.5257	53.0678	50.5205	0.0000	0.0382	0.4743
33	23.13	30.28	93.6000	38	399	0.2937	0.8943	0.9650	0.5291	47.2387	44.9712	0.0350	0.1057	0.4709
34	23	30.37	117.1208	21	399	0.3285	0.8972	0.9538	0.5526	69.3020	65.9755	0.0463	0.1028	0.4474
35	22.64	31.51	82.8500	35	399	0.3661	0.8387	0.8113	0.5315	49.1278	46.7696	0.1888	0.1613	0.4685
36	23.82	27.89	76.3417	25	399	0.4024	0.9909	1.0000	0.5442	60.1741	57.2858	0.0000	0.0091	0.4558
37	23.29	27.76	70.8708	39	399	0.4388	0.9703	1.0000	0.5283	57.9054	55.1260	0.0000	0.0297	0.4717
38	23.07	29	68.0000	47	399	0.4768	0.9948	1.0000	0.5235	61.3292	58.3854	0.0000	0.0052	0.4765
39	22.03	29.19	92.2083	28	399	0.5138	0.9756	1.0000	0.5394	90.5675	86.2202	0.0000	0.0244	0.4606
40	22.69	29.49	79.8500	32	399	0.5514	0.9865	1.0000	0.5345	84.3342	80.2861	0.0000	0.0135	0.4655
41	23.23	27.42	79.8917	29	399	0.5864	0.9578	1.0000	0.5381	87.6998	83.4902	0.0000	0.0422	0.4619
42	22.4	30.12	83.7583	31	399	0.6221	0.9610	0.9850	0.5356	97.4258	92.7493	0.0150	0.0390	0.4644
43	23.13	28.2	91.2292	43	399	0.6549	0.9791	1.0000	0.5257	111.6943	106.3329	0.0000	0.0209	0.4743
44	22.62	29.78	100.2417	39	399	0.6868	0.9700	1.0000	0.5283	128.1561	122.0046	0.0000	0.0300	0.4717
45	22.53	29.07	106.0417	38	399	0.7158	0.9875	1.0000	0.5291	144.0448	137.1307	0.0000	0.0125	0.4709
46	22.73	27.33	93.7583	42	399	0.7413	0.9394	1.0000	0.5263	124.8137	118.8226	0.0000	0.0606	0.4737
47	22.88	28.6	110.3292	45	399	0.7658	0.9838	1.0000	0.5245	158.3669	150.7653	0.0000	0.0162	0.4755
48	22.86	27.6	95.8000	31	399	0.7873	0.9519	1.0000	0.5356	139.6936	132.9883	0.0000	0.0481	0.4644
49	21.77	28.46	103.7083	43	399	0.8067	0.9447	1.0000	0.5257	150.9237	143.6793	0.0000	0.0553	0.4743
50	21.91	29.18	77.5083	43	399	0.8246	0.9716	1.0000	0.5257	118.5793	112.8875	0.0000	0.0284	0.4743
51	22.47	30.04	118.6417	38	399	0.8413	0.9618	0.9950	0.5291	184.4831	175.6279	0.0050	0.0382	0.4709
52	23.14	29.2	84.5583	34	399	0.8559	0.9745	1.0000	0.5325	136.4196	129.8715	0.0000	0.0255	0.4675
53	22.61	27.85	100.3292	38	399	0.8681	0.9519	1.0000	0.5291	159.3194	151.6721	0.0000	0.0481	0.4709
54	22.63	29.24	111.9500	46	399	0.8792	0.9959	1.0000	0.5240	186.5967	177.6401	0.0000	0.0041	0.4760
55	23.14	26.68	107.5792	44	399	0.8884	0.9319	1.0000	0.5251	169.8799	161.7256	0.0000	0.0681	0.4749
56	22.35	29.12	95.4917	43	399	0.8969	0.9834	1.0000	0.5257	160.8314	153.1115	0.0000	0.0166	0.4743
57	22.56	28.65	105.9000	34	399	0.9042	0.9753	1.0000	0.5325	180.6348	171.9643	0.0000	0.0247	0.4675
58	22.48	28.98	90.1792	36	399	0.9106	0.9831	1.0000	0.5307	155.6192	148.1495	0.0000	0.0169	0.4693
59	22.5	29.7	100.1292	37	399	0.9162	0.9850	1.0000	0.5298	173.9225	165.5742	0.0000	0.0150	0.4702
60	22.08	30.7	111.7000	39	399	0.9212	0.9415	0.9125	0.5283	185.9163	176.9923	0.0875	0.0585	0.4717
61	22.79	28.21	113.6583	40	399	0.9252	0.9688	1.0000	0.5276	195.2412	185.8696	0.0000	0.0313	0.4724
62	22.59	30.13	89.9000	40	399	0.9289	0.9460	0.9838	0.5276	151.3992	144.1320	0.0163	0.0540	0.4724

Table A17. Cowpea Biomass Growth with Stress Values for Makurdi 2006

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.79	27.91	98.0708	32	398	0.0027	0.9594	1.0000	0.5345	0.4922	0.4686	0.0000	0.0406	0.4655
2	22.9	29.32	86.1292	44	398	0.0032	0.9835	1.0000	0.5251	0.5112	0.4866	0.0000	0.0165	0.4749
3	22.56	29.24	90.7292	39	398	0.0038	0.9937	1.0000	0.5283	0.6414	0.6106	0.0000	0.0063	0.4717
4	23.09	28.67	84.6917	39	398	0.0044	0.9925	1.0000	0.5283	0.7004	0.6668	0.0000	0.0075	0.4717
5	22.53	27.1	101.3292	31	398	0.0051	0.9259	1.0000	0.5356	0.9185	0.8744	0.0000	0.0741	0.4644
6	22.76	29.48	111.3417	48	398	0.0060	0.9820	1.0000	0.5230	1.2268	1.1679	0.0000	0.0180	0.4770
7	23.16	27.91	52.2917	45	398	0.0070	0.9709	1.0000	0.5245	0.6667	0.6347	0.0000	0.0291	0.4755
8	22.32	26.32	66.4583	33	398	0.0081	0.8950	1.0000	0.5335	0.9155	0.8716	0.0000	0.1050	0.4665
9	22.1	27.24	87.6083	36	398	0.0093	0.9169	1.0000	0.5307	1.4224	1.3541	0.0000	0.0831	0.4693
10	22.83	27.44	86.1083	44	398	0.0108	0.9459	1.0000	0.5251	1.6577	1.5782	0.0000	0.0541	0.4749
11	21.68	27.99	70.4417	44	398	0.0126	0.9272	1.0000	0.5251	1.5390	1.4651	0.0000	0.0728	0.4749
12	22.08	29.9	75.2417	17	398	0.0147	0.9994	1.0000	0.5649	2.2317	2.1246	0.0000	0.0006	0.4351
13	22.51	28.3	86.5792	39	398	0.0171	0.9628	1.0000	0.5283	2.6920	2.5628	0.0000	0.0372	0.4717
14	22.78	29.56	94.3500	38	398	0.0200	0.9745	1.0000	0.5291	3.4843	3.3171	0.0000	0.0255	0.4709
15	23.04	26.51	84.5083	45	398	0.0231	0.9234	1.0000	0.5245	3.3876	3.2250	0.0000	0.0766	0.4755
16	22.96	26.65	77.8417	23	398	0.0267	0.9253	1.0000	0.5480	3.7731	3.5920	0.0000	0.0747	0.4520
17	22.13	27.81	69.2208	22	398	0.0309	0.9356	1.0000	0.5502	3.9383	3.7493	0.0000	0.0644	0.4498
18	22.41	29.15	94.7500	44	398	0.0360	0.9863	1.0000	0.5251	6.3152	6.0121	0.0000	0.0137	0.4749
19	22.3	29.57	94.1417	38	398	0.0419	0.9959	1.0000	0.5291	7.4383	7.0812	0.0000	0.0041	0.4709
20	22.85	29.03	79.5583	36	398	0.0488	0.9963	1.0000	0.5307	7.3411	6.9887	0.0000	0.0037	0.4693
21	22.96	26.84	83.9000	29	398	0.0562	0.9312	1.0000	0.5381	8.4467	8.0413	0.0000	0.0688	0.4619
22	21.97	28.9	80.8500	32	398	0.0649	0.9647	1.0000	0.5345	9.6784	9.2138	0.0000	0.0353	0.4655
23	21.79	28.67	82.5417	42	398	0.0748	0.9519	1.0000	0.5263	11.0548	10.5242	0.0000	0.0481	0.4737
24	23.26	26.41	72.2500	39	398	0.0857	0.9272	1.0000	0.5283	10.8383	10.3181	0.0000	0.0728	0.4717
25	22.2	27.57	69.1583	13	398	0.0980	0.9303	1.0000	0.5849	13.1840	12.5512	0.0000	0.0697	0.4151
26	22.06	26.66	75.6000	33	398	0.1113	0.8975	1.0000	0.5335	14.4089	13.7173	0.0000	0.1025	0.4665
27	21.8	29.02	82.1208	42	398	0.1274	0.9631	1.0000	0.5263	18.9610	18.0508	0.0000	0.0369	0.4737
28	22.73	29.08	83.5292	38	398	0.1460	0.9941	1.0000	0.5291	22.9298	21.8292	0.0000	0.0059	0.4709
29	22.01	28.41	81.6500	37	398	0.1658	0.9506	1.0000	0.5298	24.3774	23.2073	0.0000	0.0494	0.4702
30	22.91	27.66	95.7708	27	398	0.1878	0.9553	1.0000	0.5409	33.2205	31.6259	0.0000	0.0447	0.4591
31	22.66	28.82	93.5500	36	398	0.2126	0.9838	1.0000	0.5307	37.1225	35.3406	0.0000	0.0162	0.4693

Table A17 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2006

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.81	28.07	53.5083	33	398	0.2392	0.9650	1.0000	0.5335	23.5535	22.4230	0.0000	0.0350	0.4665
33	21.99	27.59	78.8917	37	398	0.2666	0.9244	1.0000	0.5298	36.8279	35.0602	0.0000	0.0756	0.4702
34	23.24	28.44	99.5708	36	398	0.2980	0.9900	1.0000	0.5307	55.7322	53.0570	0.0000	0.0100	0.4693
35	22.58	30.12	50.0583	19	398	0.3324	0.9475	0.9850	0.5581	31.4592	29.9492	0.0150	0.0525	0.4419
36	22.91	27.12	94.6500	33	398	0.3655	0.9384	1.0000	0.5335	61.9244	58.9521	0.0000	0.0616	0.4665
37	23.07	27.8	95.0000	46	398	0.4008	0.9647	1.0000	0.5240	68.8149	65.5117	0.0000	0.0353	0.4760
38	22.37	29.59	76.1708	30	398	0.4382	0.9988	1.0000	0.5368	63.9817	60.9106	0.0000	0.0012	0.4632
39	22.62	28.58	93.5292	33	398	0.4752	0.9750	1.0000	0.5335	82.6471	78.6800	0.0000	0.0250	0.4665
40	22.55	28.55	66.7208	37	398	0.5121	0.9719	1.0000	0.5298	62.8976	59.8785	0.0000	0.0281	0.4702
41	22.43	27.04	90.5000	43	398	0.5466	0.9209	1.0000	0.5257	85.6149	81.5054	0.0000	0.0791	0.4743
42	23.35	28.27	82.4792	48	398	0.5828	0.9881	1.0000	0.5230	88.8085	84.5457	0.0000	0.0119	0.4770
43	22.88	29.78	106.0792	43	398	0.6188	0.9505	1.0000	0.5257	117.2616	111.6330	0.0000	0.0495	0.4743
44	23.48	28.2	88.8208	41	398	0.6521	0.9900	1.0000	0.5269	108.0247	102.8395	0.0000	0.0100	0.4731
45	23.22	26.91	88.8208	43	398	0.6820	0.9416	1.0000	0.5257	107.1960	102.0506	0.0000	0.0584	0.4743
46	22.6	27.51	90.6792	28	398	0.7100	0.9409	1.0000	0.5394	116.8339	111.2259	0.0000	0.0591	0.4606
47	22.26	27.41	76.8083	42	398	0.7356	0.9272	1.0000	0.5263	98.5734	93.8419	0.0000	0.0728	0.4737
48	21.52	30.65	106.3792	49	398	0.7612	0.9872	0.9188	0.5225	149.3372	142.1690	0.0813	0.0128	0.4775
49	23.51	31.04	112.1417	39	398	0.7859	0.8088	0.8700	0.5283	134.6350	128.1726	0.1300	0.1912	0.4717
50	23.17	27.62	109.5583	37	398	0.8058	0.9622	1.0000	0.5298	160.9064	153.1829	0.0000	0.0378	0.4702
51	23.07	29.83	92.8000	41	398	0.8248	0.9325	1.0000	0.5269	134.4587	128.0046	0.0000	0.0675	0.4731
52	23.63	26.16	103.6917	35	398	0.8401	0.9309	1.0000	0.5315	154.1129	146.7155	0.0000	0.0691	0.4685
53	22.89	28.72	100.8500	19	398	0.8546	0.9878	1.0000	0.5581	169.8674	161.7137	0.0000	0.0122	0.4419
54	23.26	29.96	109.0583	17	398	0.8679	0.9085	1.0000	0.5649	173.6838	165.3470	0.0000	0.0915	0.4351
55	24.4	29.12	111.1083	38	398	0.8796	0.8860	1.0000	0.5291	163.7879	155.9260	0.0000	0.1140	0.4709
56	23.63	28.86	111.4500	42	398	0.8895	0.9633	1.0000	0.5263	179.6774	171.0529	0.0000	0.0367	0.4737
57	23.72	29.01	90.8000	26	398	0.8981	0.9452	1.0000	0.5425	149.5026	142.3265	0.0000	0.0548	0.4575
58	23.06	30	90.6417	35	398	0.9057	0.9205	1.0000	0.5315	143.6032	136.7102	0.0000	0.0795	0.4685
59	22.28	30.72	103.9417	27	398	0.9122	0.9250	0.9100	0.5409	169.5925	161.4520	0.0900	0.0750	0.4591
60	23.23	29.42	99.0792	31	398	0.9177	0.9512	1.0000	0.5356	165.6186	157.6689	0.0000	0.0488	0.4644
61	22.85	30.48	100.8500	39	398	0.9225	0.9003	0.9400	0.5283	158.1913	150.5981	0.0600	0.0997	0.4717
62	23.59	28.36	107.6417	33	398	0.9264	0.9984	1.0000	0.5335	189.8965	180.7814	0.0000	0.0016	0.4665

Table A18. Cowpea Biomass Growth with Stress Values for Makurdi 2007

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.41	26.97	67.4417	32	403	0.0027	0.9181	1.0000	0.5345	0.3476	0.3309	0.0000	0.0819	0.4655
2	22.76	26.12	37.4417	44	403	0.0031	0.9025	1.0000	0.5251	0.2152	0.2049	0.0000	0.0975	0.4749
3	22.2	28.53	98.2083	39	403	0.0037	0.9603	1.0000	0.5283	0.7044	0.6706	0.0000	0.0397	0.4717
4	22.07	28.4	92.9500	39	403	0.0043	0.9522	1.0000	0.5283	0.7693	0.7324	0.0000	0.0478	0.4717
5	21.44	29.3	87.0000	31	403	0.0050	0.9606	1.0000	0.5356	0.8582	0.8170	0.0000	0.0394	0.4644
6	23.22	27.42	76.9792	48	403	0.0058	0.9575	1.0000	0.5230	0.8607	0.8194	0.0000	0.0425	0.4770
7	22.45	27.69	79.8292	45	403	0.0067	0.9419	1.0000	0.5245	1.0228	0.9737	0.0000	0.0581	0.4755
8	22.71	27.06	96.5583	33	403	0.0078	0.9303	1.0000	0.5335	1.4405	1.3714	0.0000	0.0697	0.4665
9	22.49	27.83	45.1500	36	403	0.0090	0.9475	1.0000	0.5307	0.7931	0.7550	0.0000	0.0525	0.4693
10	22.48	27.11	81.3083	44	403	0.0105	0.9247	1.0000	0.5251	1.5967	1.5200	0.0000	0.0753	0.4749
11	22.35	26.99	85.1917	44	403	0.0121	0.9169	1.0000	0.5251	1.9176	1.8255	0.0000	0.0831	0.4749
12	21.02	29.01	91.7292	17	403	0.0140	0.9384	1.0000	0.5649	2.6366	2.5100	0.0000	0.0616	0.4351
13	21.66	28.32	71.2417	39	403	0.0163	0.9369	1.0000	0.5283	2.2156	2.1092	0.0000	0.0631	0.4717
14	22.68	27.12	91.3583	38	403	0.0188	0.9312	1.0000	0.5291	3.2735	3.1164	0.0000	0.0688	0.4709
15	21.71	29.26	95.9000	45	403	0.0219	0.9678	1.0000	0.5245	4.1200	3.9222	0.0000	0.0322	0.4755
16	22.5	29.67	94.6208	23	403	0.0256	0.9872	1.0000	0.5480	5.0678	4.8245	0.0000	0.0128	0.4520
17	22.75	28.12	103.7292	22	403	0.0298	0.9647	1.0000	0.5502	6.3314	6.0275	0.0000	0.0353	0.4498
18	22.14	27.34	57.6417	44	403	0.0343	0.9213	1.0000	0.5251	3.6976	3.5201	0.0000	0.0787	0.4749
19	21.86	28.29	94.9583	38	403	0.0397	0.9422	1.0000	0.5291	7.2554	6.9071	0.0000	0.0578	0.4709
20	21.9	27.37	72.8792	36	403	0.0456	0.9147	1.0000	0.5307	6.2359	5.9365	0.0000	0.0853	0.4693
21	22.56	27.24	64.9917	29	403	0.0526	0.9312	1.0000	0.5381	6.6120	6.2946	0.0000	0.0688	0.4619
22	21.86	27.87	70.8917	32	403	0.0605	0.9291	1.0000	0.5345	8.2201	7.8256	0.0000	0.0709	0.4655
23	21.82	28.77	64.0500	42	403	0.0697	0.9559	1.0000	0.5263	8.6765	8.2600	0.0000	0.0441	0.4737
24	21.55	30.07	102.5708	39	403	0.0806	0.9881	0.9913	0.5283	16.6776	15.8770	0.0088	0.0119	0.4717
25	22.19	30.81	24.5917	13	403	0.0937	0.9250	0.8988	0.5849	4.8143	4.5832	0.1013	0.0750	0.4151
26	22.89	28.61	81.1083	33	403	0.1079	0.9844	1.0000	0.5335	17.7413	16.8897	0.0000	0.0156	0.4665
27	23.02	26.56	73.8583	42	403	0.1228	0.9244	1.0000	0.5263	17.0441	16.2260	0.0000	0.0756	0.4737
28	22.34	30.42	109.7792	38	403	0.1414	0.9430	0.9475	0.5291	29.9153	28.4793	0.0525	0.0570	0.4709
29	22.32	29.94	121.8417	37	403	0.1620	0.9805	1.0000	0.5298	39.5939	37.6934	0.0000	0.0195	0.4702
30	23.12	26.56	118.0000	27	403	0.1829	0.9275	1.0000	0.5409	41.8128	39.8058	0.0000	0.0725	0.4591
31	22.37	28.52	111.5083	36	403	0.2068	0.9653	1.0000	0.5307	45.6180	43.4283	0.0000	0.0347	0.4693

Table A18 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2007

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.55	30.11	111.7708	33	403	0.2344	0.9505	0.9863	0.5335	51.3079	48.8451	0.0138	0.0495	0.4665
33	23.04	26.42	90.3792	37	403	0.2614	0.9206	1.0000	0.5298	44.5031	42.3669	0.0000	0.0794	0.4702
34	22.95	26.62	89.1292	36	403	0.2903	0.9241	1.0000	0.5307	49.0022	46.6501	0.0000	0.0759	0.4693
35	21.99	28.73	92.6292	19	403	0.3221	0.9600	1.0000	0.5581	61.7481	58.7842	0.0000	0.0400	0.4419
36	22.97	27.17	101.2208	33	403	0.3550	0.9419	1.0000	0.5335	69.7238	66.3771	0.0000	0.0581	0.4665
37	22.04	27.95	78.2708	46	403	0.3889	0.9372	1.0000	0.5240	57.7313	54.9602	0.0000	0.0628	0.4760
38	22.28	27.24	66.2083	30	403	0.4232	0.9225	1.0000	0.5368	53.5863	51.0142	0.0000	0.0775	0.4632
39	22.01	29.26	102.2792	33	403	0.4601	0.9772	1.0000	0.5335	94.7463	90.1985	0.0000	0.0228	0.4665
40	22.41	30.59	100.8583	37	403	0.4993	0.9250	0.9263	0.5298	95.3172	90.7419	0.0738	0.0750	0.4702
41	23.48	26.93	107.9083	43	403	0.5351	0.9503	1.0000	0.5257	111.4026	106.0553	0.0000	0.0497	0.4743
42	22.61	27.04	110.8792	48	403	0.5693	0.9266	1.0000	0.5230	118.1511	112.4799	0.0000	0.0734	0.4770
43	22.17	29.46	103.4792	43	403	0.6048	0.9884	1.0000	0.5257	125.5919	119.5635	0.0000	0.0116	0.4743
44	21.42	30.55	113.8083	41	403	0.6391	0.9991	0.9313	0.5269	147.8843	140.7859	0.0688	0.0009	0.4731
45	23.13	28.5	100.0292	43	403	0.6712	0.9884	1.0000	0.5257	134.7417	128.2741	0.0000	0.0116	0.4743
46	23.37	28.27	92.3417	28	403	0.7013	0.9888	1.0000	0.5394	133.4094	127.0058	0.0000	0.0112	0.4606
47	22.52	28.59	102.9708	42	403	0.7288	0.9722	1.0000	0.5263	148.3016	141.1832	0.0000	0.0278	0.4737
48	23.28	29.26	115.8000	49	403	0.7552	0.9595	1.0000	0.5225	169.3476	161.2189	0.0000	0.0405	0.4775
49	21.56	28.54	82.2208	39	403	0.7775	0.9406	1.0000	0.5283	122.6935	116.8042	0.0000	0.0594	0.4717
50	22.89	28.12	97.6417	37	403	0.7983	0.9691	1.0000	0.5298	154.5762	147.1565	0.0000	0.0309	0.4702
51	21.6	29.31	94.5583	41	403	0.8170	0.9659	1.0000	0.5269	151.8646	144.5751	0.0000	0.0341	0.4731
52	22.93	25.87	99.3708	35	403	0.8326	0.9000	1.0000	0.5315	152.8723	145.5344	0.0000	0.1000	0.4685
53	22.4	29.07	95.7000	19	403	0.8479	0.9834	1.0000	0.5581	172.0072	163.7509	0.0000	0.0166	0.4419
54	22.64	26.76	83.8917	17	403	0.8605	0.9188	1.0000	0.5649	144.7173	137.7708	0.0000	0.0812	0.4351
55	22.27	27.25	86.7417	38	403	0.8718	0.9225	1.0000	0.5291	142.5421	135.7001	0.0000	0.0775	0.4709
56	21.01	29.41	109.4208	42	403	0.8820	0.9506	1.0000	0.5263	186.4897	177.5382	0.0000	0.0494	0.4737
57	22.02	29.52	111.2917	26	403	0.8913	0.9856	1.0000	0.5425	204.8442	195.0117	0.0000	0.0144	0.4575
58	22.79	29.16	93.2083	35	403	0.8995	0.9984	1.0000	0.5315	171.8587	163.6094	0.0000	0.0016	0.4685
59	23.31	29.53	111.5000	27	403	0.9068	0.9370	1.0000	0.5409	197.9187	188.4186	0.0000	0.0630	0.4591
60	22.98	28.46	54.3917	31	403	0.9129	0.9825	1.0000	0.5356	100.9160	96.0721	0.0000	0.0175	0.4644
61	22.94	27.24	83.2583	39	403	0.9179	0.9431	1.0000	0.5283	147.0659	140.0068	0.0000	0.0569	0.4717
62	21.99	30.39	102.0792	33	403	0.9226	0.9715	0.9513	0.5335	188.4972	179.4493	0.0488	0.0285	0.4665

Table A19. Cowpea Biomass Growth with Stress Values for Makurdi 2008

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.71	26.18	65.7917	32	402	0.0027	0.9028	1.0000	0.5345	0.3277	0.3120	0.0000	0.0972	0.4655
2	22.14	26.26	58.2208	44	402	0.0031	0.8875	1.0000	0.5251	0.3227	0.3072	0.0000	0.1125	0.4749
3	22.39	27.51	81.0583	39	402	0.0036	0.9344	1.0000	0.5283	0.5523	0.5258	0.0000	0.0656	0.4717
4	22.28	27.18	82.5000	39	402	0.0042	0.9206	1.0000	0.5283	0.6413	0.6106	0.0000	0.0794	0.4717
5	21.86	27.63	61.0083	31	402	0.0049	0.9216	1.0000	0.5356	0.5574	0.5306	0.0000	0.0784	0.4644
6	21.4	29.78	100.0083	48	402	0.0057	0.9744	1.0000	0.5230	1.1015	1.0486	0.0000	0.0256	0.4770
7	21.92	29.87	83.0417	45	402	0.0067	0.9934	1.0000	0.5245	1.0953	1.0427	0.0000	0.0066	0.4755
8	23.26	27.18	95.5500	33	402	0.0077	0.9512	1.0000	0.5335	1.4274	1.3589	0.0000	0.0488	0.4665
9	22.73	28.31	46.9083	36	402	0.0090	0.9700	1.0000	0.5307	0.8290	0.7892	0.0000	0.0300	0.4693
10	22.39	26.76	88.3500	44	402	0.0104	0.9109	1.0000	0.5251	1.6761	1.5957	0.0000	0.0891	0.4749
11	22.3	29.23	96.7083	44	402	0.0122	0.9853	1.0000	0.5251	2.3190	2.2077	0.0000	0.0147	0.4749
12	22.25	28.26	97.4208	17	402	0.0142	0.9534	1.0000	0.5649	2.8269	2.6912	0.0000	0.0466	0.4351
13	21.37	28.07	52.9792	39	402	0.0164	0.9200	1.0000	0.5283	1.6034	1.5264	0.0000	0.0800	0.4717
14	22.13	28.61	85.4792	38	402	0.0190	0.9606	1.0000	0.5291	3.1455	2.9945	0.0000	0.0394	0.4709
15	22.35	28.56	92.9083	45	402	0.0221	0.9659	1.0000	0.5245	3.9648	3.7745	0.0000	0.0341	0.4755
16	22.56	29.3	77.7583	23	402	0.0259	0.9956	1.0000	0.5480	4.1736	3.9732	0.0000	0.0044	0.4520
17	22.56	26.93	84.5083	22	402	0.0298	0.9216	1.0000	0.5502	4.8638	4.6303	0.0000	0.0784	0.4498
18	22.76	27.51	93.0583	44	402	0.0345	0.9459	1.0000	0.5251	6.0730	5.7815	0.0000	0.0541	0.4749
19	22.06	29.35	96.9417	38	402	0.0402	0.9816	1.0000	0.5291	7.6915	7.3223	0.0000	0.0184	0.4709
20	22.67	27.8	92.0083	36	402	0.0464	0.9522	1.0000	0.5307	8.2150	7.8207	0.0000	0.0478	0.4693
21	22.28	28.82	81.5792	29	402	0.0538	0.9719	1.0000	0.5381	8.7345	8.3153	0.0000	0.0281	0.4619
22	22.57	28.74	79.3292	32	402	0.0623	0.9784	1.0000	0.5345	9.8393	9.3670	0.0000	0.0216	0.4655
23	21.98	29.46	113.3708	42	402	0.0721	0.9825	1.0000	0.5263	16.0900	15.3176	0.0000	0.0175	0.4737
24	21.93	29.76	54.4708	39	402	0.0834	0.9903	1.0000	0.5283	9.0471	8.6129	0.0000	0.0097	0.4717
25	22.59	29.02	114.4500	13	402	0.0963	0.9878	1.0000	0.5849	24.2234	23.0607	0.0000	0.0122	0.4151
26	21.56	28.89	105.8083	33	402	0.1103	0.9516	1.0000	0.5335	22.5343	21.4526	0.0000	0.0484	0.4665
27	22.74	27.17	87.8917	42	402	0.1257	0.9347	1.0000	0.5263	20.6784	19.6858	0.0000	0.0653	0.4737
28	22.24	27.76	78.2792	38	402	0.1430	0.9375	1.0000	0.5291	21.1222	20.1084	0.0000	0.0625	0.4709
29	21.9	30.31	103.4500	37	402	0.1637	0.9843	0.9613	0.5298	33.5947	31.9821	0.0388	0.0157	0.4702
30	22.45	28.66	80.8917	27	402	0.1858	0.9722	1.0000	0.5409	30.0743	28.6307	0.0000	0.0278	0.4591
31	23	26.57	86.4708	36	402	0.2089	0.9241	1.0000	0.5307	33.7060	32.0881	0.0000	0.0759	0.4693

Table A19 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2008

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.23	29.18	87.6208	33	402	0.2356	0.9816	1.0000	0.5335	41.1337	39.1593	0.0000	0.0184	0.4665
33	22.75	28.28	86.4208	37	402	0.2642	0.9697	1.0000	0.5298	44.6309	42.4886	0.0000	0.0303	0.4702
34	22.18	29.79	105.7417	36	402	0.2957	0.9991	1.0000	0.5307	63.0783	60.0505	0.0000	0.0009	0.4693
35	23.23	28.09	114.5292	19	402	0.3285	0.9788	1.0000	0.5581	78.1987	74.4451	0.0000	0.0212	0.4419
36	23	25.93	94.2917	33	402	0.3603	0.9041	1.0000	0.5335	62.3331	59.3411	0.0000	0.0959	0.4665
37	22.23	27.84	102.3917	46	402	0.3944	0.9397	1.0000	0.5240	75.6649	72.0330	0.0000	0.0603	0.4760
38	21.87	26.83	103.5500	30	402	0.4279	0.8969	1.0000	0.5368	81.1636	77.2678	0.0000	0.1031	0.4632
39	21.82	27.3	63.2083	33	402	0.4623	0.9100	1.0000	0.5335	53.9744	51.3837	0.0000	0.0900	0.4665
40	22.58	27.24	88.6292	37	402	0.4977	0.9319	1.0000	0.5298	82.8680	78.8903	0.0000	0.0681	0.4702
41	21.64	30.17	102.7792	43	402	0.5352	0.9941	0.9788	0.5257	109.3618	104.1125	0.0213	0.0059	0.4743
42	22.66	29.07	107.0708	48	402	0.5718	0.9916	1.0000	0.5230	120.8022	115.0037	0.0000	0.0084	0.4770
43	23.69	28.55	95.6917	43	402	0.6078	0.9820	1.0000	0.5257	114.2400	108.7565	0.0000	0.0180	0.4743
44	23.34	28.72	102.1417	41	402	0.6421	0.9955	1.0000	0.5269	130.8939	124.6110	0.0000	0.0045	0.4731
45	22.35	28.61	91.5000	43	402	0.6734	0.9675	1.0000	0.5257	119.2300	113.5069	0.0000	0.0325	0.4743
46	22.4	29.93	93.0583	28	402	0.7040	0.9753	1.0000	0.5394	131.1290	124.8348	0.0000	0.0247	0.4606
47	22.29	30.43	91.1583	42	402	0.7326	0.9460	0.9463	0.5263	126.5076	120.4353	0.0538	0.0540	0.4737
48	22.65	29.64	114.1500	49	402	0.7585	0.9783	1.0000	0.5225	168.3915	160.3087	0.0000	0.0217	0.4775
49	22.55	29.4	113.0917	39	402	0.7818	0.9984	1.0000	0.5283	177.4366	168.9196	0.0000	0.0016	0.4717
50	23.26	27.72	79.8208	37	402	0.8021	0.9681	1.0000	0.5298	124.9611	118.9630	0.0000	0.0319	0.4702
51	23.01	27.12	109.2583	41	402	0.8200	0.9416	1.0000	0.5269	169.1202	161.0025	0.0000	0.0584	0.4731
52	22.2	30.46	113.7208	35	402	0.8373	0.9505	0.9425	0.5315	183.0290	174.2437	0.0575	0.0495	0.4685
53	22.75	30.15	100.3292	19	402	0.8526	0.9325	0.9813	0.5581	169.3834	161.2530	0.0188	0.0675	0.4419
54	23.23	27.68	101.0500	17	402	0.8653	0.9659	1.0000	0.5649	181.5476	172.8333	0.0000	0.0341	0.4351
55	21.2	29.23	96.3000	38	402	0.8763	0.9509	1.0000	0.5291	161.5394	153.7855	0.0000	0.0491	0.4709
56	21.62	29.84	119.0917	42	402	0.8863	0.9831	1.0000	0.5263	207.7986	197.8243	0.0000	0.0169	0.4737
57	22.35	30.03	102.9417	26	402	0.8953	0.9715	0.9963	0.5425	184.8017	175.9312	0.0038	0.0285	0.4575
58	22.97	29.26	109.6792	35	402	0.9030	0.9827	1.0000	0.5315	196.8548	187.4058	0.0000	0.0173	0.4685
59	22.92	30.85	107.5917	27	402	0.9100	0.8672	0.8938	0.5409	174.7509	166.3629	0.1063	0.1328	0.4591
60	22.69	29.82	93.8708	31	402	0.9158	0.9617	1.0000	0.5356	168.4932	160.4055	0.0000	0.0383	0.4644
61	23	29.7	105.1208	39	402	0.9208	0.9475	1.0000	0.5283	184.3559	175.5068	0.0000	0.0525	0.4717
62	23.25	26.14	115.6708	33	402	0.9247	0.9184	1.0000	0.5335	199.3887	189.8180	0.0000	0.0816	0.4665

Table A20. Cowpea Biomass Growth with Stress Values for Makurdi 2009

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.03	27.65	83.1792	35	401	0.0027	0.9275	1.0000	0.5315	0.4186	0.3985	0.0000	0.0725	0.4685
2	22.28	29.24	83.0792	35	401	0.0032	0.9850	1.0000	0.5315	0.5195	0.4946	0.0000	0.0150	0.4685
3	22.56	27.26	78.9000	37	401	0.0037	0.9319	1.0000	0.5298	0.5398	0.5139	0.0000	0.0681	0.4702
4	22.86	26.85	86.1417	33	401	0.0043	0.9284	1.0000	0.5335	0.6854	0.6525	0.0000	0.0716	0.4665
5	22.56	29.82	53.7083	28	401	0.0050	0.9715	1.0000	0.5394	0.5312	0.5057	0.0000	0.0285	0.4606
6	22.98	27.84	86.1208	35	401	0.0059	0.9631	1.0000	0.5315	0.9699	0.9233	0.0000	0.0369	0.4685
7	22.83	27.5	82.0292	30	401	0.0068	0.9478	1.0000	0.5368	1.0674	1.0161	0.0000	0.0522	0.4632
8	22.68	27.44	84.5583	32	401	0.0079	0.9413	1.0000	0.5345	1.2633	1.2027	0.0000	0.0587	0.4655
9	22.71	26.54	80.6083	31	401	0.0092	0.9141	1.0000	0.5356	1.3548	1.2897	0.0000	0.0859	0.4644
10	21.49	28.54	108.8292	44	401	0.0106	0.9384	1.0000	0.5251	2.1359	2.0333	0.0000	0.0616	0.4749
11	22.6	27.22	94.4917	39	401	0.0123	0.9319	1.0000	0.5283	2.1468	2.0438	0.0000	0.0681	0.4717
12	22.43	29.35	69.0208	36	401	0.0144	0.9931	1.0000	0.5307	1.9634	1.8692	0.0000	0.0069	0.4693
13	22.72	30.22	103.7000	48	401	0.0169	0.9295	0.9725	0.5230	3.1995	3.0459	0.0275	0.0705	0.4770
14	23.55	27.83	73.2083	30	401	0.0198	0.9806	1.0000	0.5368	2.8527	2.7158	0.0000	0.0194	0.4632
15	22.98	28.83	74.9208	40	401	0.0231	0.9941	1.0000	0.5276	3.3980	3.2349	0.0000	0.0059	0.4724
16	22.93	25.74	80.9708	36	401	0.0265	0.8959	1.0000	0.5307	3.8279	3.6442	0.0000	0.1041	0.4693
17	21.92	27.24	77.6917	29	401	0.0306	0.9112	1.0000	0.5381	4.3632	4.1538	0.0000	0.0888	0.4619
18	22.64	27.85	93.7583	34	401	0.0354	0.9528	1.0000	0.5325	6.3122	6.0092	0.0000	0.0472	0.4675
19	22.41	27.28	86.4708	37	401	0.0408	0.9278	1.0000	0.5298	6.5047	6.1925	0.0000	0.0722	0.4702
20	22.62	30.17	90.6500	43	401	0.0477	0.9407	0.9788	0.5257	8.0206	7.6356	0.0213	0.0593	0.4743
21	23.02	29.98	60.6208	28	401	0.0558	0.9250	1.0000	0.5394	6.3256	6.0220	0.0000	0.0750	0.4606
22	23.32	28.78	96.1208	41	401	0.0649	0.9925	1.0000	0.5269	12.2177	11.6313	0.0000	0.0075	0.4731
23	22.73	28.04	82.4500	36	401	0.0748	0.9616	1.0000	0.5307	11.7922	11.2262	0.0000	0.0384	0.4693
24	22.68	28.56	103.4292	45	401	0.0863	0.9762	1.0000	0.5245	17.1268	16.3047	0.0000	0.0238	0.4755
25	23.08	28.97	64.5417	31	401	0.0997	0.9963	1.0000	0.5356	12.8692	12.2515	0.0000	0.0037	0.4644
26	22.53	26.89	105.8917	36	401	0.1136	0.9194	1.0000	0.5307	21.9983	20.9424	0.0000	0.0806	0.4693
27	22.64	28.3	64.9208	27	401	0.1300	0.9669	1.0000	0.5409	16.5446	15.7504	0.0000	0.0331	0.4591
28	21.69	30.12	96.2500	40	401	0.1489	0.9941	0.9850	0.5276	28.1746	26.8222	0.0150	0.0059	0.4724
29	23.01	28.76	108.6708	46	401	0.1700	0.9928	1.0000	0.5240	36.0140	34.2853	0.0000	0.0072	0.4760
30	22.93	29.4	56.5583	25	401	0.1937	0.9753	1.0000	0.5442	21.7910	20.7450	0.0000	0.0247	0.4558
31	23.5	27.91	100.8292	40	401	0.2191	0.9816	1.0000	0.5276	42.8694	40.8117	0.0000	0.0184	0.4724

Table A20 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2009

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.22	28.87	74.1708	31	401	0.2473	0.9932	1.0000	0.5356	36.5657	34.8105	0.0000	0.0068	0.4644
33	22.87	28.63	84.9792	36	401	0.2772	0.9844	1.0000	0.5307	46.1062	43.8931	0.0000	0.0156	0.4693
34	22.3	30.41	107.7000	48	401	0.3103	0.9468	0.9488	0.5230	62.0150	59.0383	0.0513	0.0533	0.4770
35	22.88	30.74	95.4917	38	401	0.3464	0.8785	0.9075	0.5291	57.6146	54.8491	0.0925	0.1215	0.4709
36	23.21	28.96	109.0208	46	401	0.3825	0.9872	1.0000	0.5240	80.8460	76.9654	0.0000	0.0128	0.4760
37	22.99	27.6	100.6917	39	401	0.4179	0.9559	1.0000	0.5283	79.6428	75.8199	0.0000	0.0441	0.4717
38	22.12	28.29	82.6417	32	401	0.4538	0.9503	1.0000	0.5345	71.3822	67.9559	0.0000	0.0497	0.4655
39	22.34	29.56	64.5417	25	401	0.4916	0.9969	1.0000	0.5442	64.5040	61.4078	0.0000	0.0031	0.4558
40	22.51	30.97	111.3083	47	401	0.5311	0.8890	0.8788	0.5235	103.1047	98.1557	0.1213	0.1110	0.4765
41	23.59	30.98	117.7417	47	401	0.5711	0.8073	0.8775	0.5235	106.4874	101.3760	0.1225	0.1927	0.4765
42	23.96	28.8	113.6292	43	401	0.6077	0.9430	1.0000	0.5257	128.2809	122.1234	0.0000	0.0570	0.4743
43	23.2	28.57	95.1000	39	401	0.6417	0.9928	1.0000	0.5283	119.9472	114.1897	0.0000	0.0072	0.4717
44	23.11	29.01	51.1083	25	401	0.6742	0.9910	1.0000	0.5442	69.6272	66.2851	0.0000	0.0090	0.4558
45	22.6	29.2	109.3083	43	401	0.7042	0.9937	1.0000	0.5257	150.6883	143.4553	0.0000	0.0063	0.4743
46	21.99	30.12	100.0708	45	401	0.7323	0.9918	0.9850	0.5245	142.8597	136.0024	0.0150	0.0082	0.4755
47	23.46	29.51	98.4500	41	401	0.7587	0.9273	1.0000	0.5269	136.7677	130.2029	0.0000	0.0727	0.4731
48	23.15	28.87	89.6417	34	401	0.7820	0.9985	1.0000	0.5325	139.6711	132.9669	0.0000	0.0015	0.4675
49	22.91	29.51	108.6000	44	401	0.8033	0.9685	1.0000	0.5251	166.2503	158.2703	0.0000	0.0315	0.4749
50	23.07	26.69	81.0792	30	401	0.8208	0.9300	1.0000	0.5368	124.5022	118.5261	0.0000	0.0700	0.4632
51	22.16	30.69	90.1792	40	401	0.8381	0.9362	0.9138	0.5276	139.8989	133.1838	0.0863	0.0638	0.4724
52	22.9	26.93	102.9792	37	401	0.8520	0.9322	1.0000	0.5298	162.3886	154.5939	0.0000	0.0678	0.4702
53	22.64	28.59	92.6208	40	401	0.8649	0.9759	1.0000	0.5276	154.5689	147.1496	0.0000	0.0241	0.4724
54	23.55	27.51	90.2292	39	401	0.8762	0.9706	1.0000	0.5283	151.9167	144.6247	0.0000	0.0294	0.4717
55	23.08	26.95	91.3917	41	401	0.8858	0.9384	1.0000	0.5269	150.0077	142.8074	0.0000	0.0616	0.4731
56	22.97	28.87	73.0500	34	401	0.8947	0.9950	1.0000	0.5325	129.7578	123.5294	0.0000	0.0050	0.4675
57	21.46	30.03	104.8708	46	401	0.9023	0.9841	0.9963	0.5240	182.8536	174.0766	0.0038	0.0159	0.4760
58	22.38	29.13	76.8292	30	401	0.9090	0.9847	1.0000	0.5368	138.3312	131.6913	0.0000	0.0153	0.4632
59	22.9	29.19	70.3708	33	401	0.9148	0.9932	1.0000	0.5335	127.8265	121.6908	0.0000	0.0068	0.4665
60	22.83	27.89	102.6583	38	401	0.9197	0.9600	1.0000	0.5291	179.6932	171.0679	0.0000	0.0400	0.4709
61	22.83	27.1	53.3208	24	401	0.9238	0.9353	1.0000	0.5460	94.2637	89.7390	0.0000	0.0647	0.4540
62	22.18	30.88	91.6208	41	401	0.9277	0.9205	0.8900	0.5269	154.4886	147.0732	0.1100	0.0795	0.4731

Table A21. Cowpea Biomass Growth with Stress Values for Makurdi 2010

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.09	29.55	91.9100	41	398	0.003	0.9888	1.0000	0.5269	0.4709	0.4483	0.0000	0.0112	0.4731
2	23.52	28.71	66.7000	29	398	0.003	0.9827	1.0000	0.5381	0.4073	0.3877	0.0000	0.0173	0.4619
3	22.99	29.19	95.2400	43	398	0.004	0.9865	1.0000	0.5257	0.6695	0.6373	0.0000	0.0135	0.4743
4	23.23	28.89	82.9600	39	398	0.004	0.9910	1.0000	0.5283	0.6908	0.6577	0.0000	0.0090	0.4717
5	22.32	28.65	76.9900	34	398	0.005	0.9678	1.0000	0.5325	0.7362	0.7008	0.0000	0.0322	0.4675
6	22.62	28.11	68.0200	29	398	0.006	0.9603	1.0000	0.5381	0.7597	0.7233	0.0000	0.0397	0.4619
7	22.58	29.83	82.7100	41	398	0.007	0.9693	1.0000	0.5269	1.0725	1.0211	0.0000	0.0307	0.4731
8	23.24	29.51	79.2400	39	398	0.008	0.9438	1.0000	0.5283	1.1800	1.1234	0.0000	0.0563	0.4717
9	23.58	27.48	53.9700	21	398	0.010	0.9706	1.0000	0.5526	1.0083	0.9599	0.0000	0.0294	0.4474
10	23.17	27.63	65.5500	24	398	0.011	0.9625	1.0000	0.5460	1.3974	1.3303	0.0000	0.0375	0.4540
11	22.67	28.68	95.5300	41	398	0.013	0.9797	1.0000	0.5269	2.3352	2.2231	0.0000	0.0203	0.4731
12	22.93	30.04	99.4000	49	398	0.016	0.9273	0.9950	0.5225	2.6826	2.5538	0.0050	0.0727	0.4775
13	23.12	27.8	78.6500	32	398	0.018	0.9663	1.0000	0.5345	2.6336	2.5072	0.0000	0.0337	0.4655
14	23.06	28.47	81.0800	39	398	0.021	0.9853	1.0000	0.5283	3.1933	3.0400	0.0000	0.0147	0.4717
15	22.53	29.01	78.3900	35	398	0.025	0.9856	1.0000	0.5315	3.6242	3.4503	0.0000	0.0144	0.4685
16	22.63	29.15	79.2100	39	398	0.029	0.9931	1.0000	0.5283	4.2800	4.0746	0.0000	0.0069	0.4717
17	22.3	27.74	81.3500	38	398	0.033	0.9388	1.0000	0.5291	4.8116	4.5806	0.0000	0.0613	0.4709
18	22.48	29.21	79.9500	36	398	0.039	0.9903	1.0000	0.5307	5.8277	5.5480	0.0000	0.0097	0.4693
19	21.84	29.02	89.5100	42	398	0.045	0.9644	1.0000	0.5263	7.3028	6.9523	0.0000	0.0356	0.4737
20	23	28.73	63.7200	28	398	0.052	0.9916	1.0000	0.5394	6.3688	6.0631	0.0000	0.0084	0.4606
21	23.25	27.62	86.7700	36	398	0.060	0.9647	1.0000	0.5307	9.5978	9.1371	0.0000	0.0353	0.4693
22	22.75	28.98	90.9200	40	398	0.070	0.9916	1.0000	0.5276	11.9139	11.3421	0.0000	0.0084	0.4724
23	22.96	25.76	42.3800	17	398	0.080	0.8975	1.0000	0.5649	6.1435	5.8486	0.0000	0.1025	0.4351
24	21.99	27.64	85.3600	32	398	0.092	0.9259	1.0000	0.5345	13.8211	13.1577	0.0000	0.0741	0.4655
25	20.98	29.56	87.1400	38	398	0.105	0.9544	1.0000	0.5291	16.5069	15.7145	0.0000	0.0456	0.4709
26	22.76	28.59	94.6000	42	398	0.120	0.9797	1.0000	0.5263	21.0107	20.0021	0.0000	0.0203	0.4737
27	22.76	27.9	78.0700	32	398	0.138	0.9581	1.0000	0.5345	19.6625	18.7187	0.0000	0.0419	0.4655
28	21.85	28.15	80.0900	30	398	0.156	0.9375	1.0000	0.5368	22.5026	21.4225	0.0000	0.0625	0.4632
29	22.3	28.95	99.2700	47	398	0.178	0.9766	1.0000	0.5235	32.2290	30.6820	0.0000	0.0234	0.4765
30	22.62	27.69	90.0300	36	398	0.201	0.9472	1.0000	0.5307	32.4485	30.8909	0.0000	0.0528	0.4693
31	21.29	28.4	98.6200	38	398	0.225	0.9278	1.0000	0.5291	38.9505	37.0809	0.0000	0.0722	0.4709

Table A21 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2010

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.54	29.71	102.8800	43	398	0.253	0.9766	1.0000	0.5257	47.7678	45.4750	0.0000	0.0234	0.4743
33	22.18	27.7	94.4400	38	398	0.282	0.9337	1.0000	0.5291	46.9797	44.7246	0.0000	0.0663	0.4709
34	22.92	28.81	44.1500	21	398	0.314	0.9916	1.0000	0.5526	27.1627	25.8589	0.0000	0.0084	0.4474
35	22.69	28.4	91.4800	35	398	0.348	0.9716	1.0000	0.5315	58.7056	55.8877	0.0000	0.0284	0.4685
36	22.38	28.59	51.0900	25	398	0.382	0.9678	1.0000	0.5442	36.7807	35.0152	0.0000	0.0322	0.4558
37	22.78	29.26	94.7700	39	398	0.419	0.9970	1.0000	0.5283	74.8580	71.2648	0.0000	0.0030	0.4717
38	21.73	29.85	109.7700	47	398	0.457	0.9869	1.0000	0.5235	92.5964	88.1518	0.0000	0.0131	0.4765
39	23.26	26.67	59.3000	28	398	0.492	0.9353	1.0000	0.5394	52.6524	50.1251	0.0000	0.0647	0.4606
40	23.19	25.65	82.4100	32	398	0.526	0.9013	1.0000	0.5345	74.6961	71.1107	0.0000	0.0987	0.4655
41	22.24	26.77	85.1500	29	398	0.560	0.9066	1.0000	0.5381	83.1609	79.1692	0.0000	0.0934	0.4619
42	21.32	29.2	75.7700	31	398	0.595	0.9537	1.0000	0.5356	82.2766	78.3273	0.0000	0.0463	0.4644
43	21.68	30.3	98.0200	43	398	0.629	0.9994	0.9625	0.5257	115.8656	110.3040	0.0375	0.0006	0.4743
44	23.08	28.23	85.4500	39	398	0.662	0.9784	1.0000	0.5283	104.4974	99.4815	0.0000	0.0216	0.4717
45	22.23	29.22	90.5300	38	398	0.692	0.9828	1.0000	0.5291	116.5060	110.9137	0.0000	0.0172	0.4709
46	22.89	29.52	101.5200	42	398	0.722	0.9693	1.0000	0.5263	133.5943	127.1818	0.0000	0.0307	0.4737
47	22.76	27.88	98.7300	45	398	0.747	0.9575	1.0000	0.5245	132.4440	126.0866	0.0000	0.0425	0.4755
48	21.54	27.8	86.7400	31	398	0.770	0.9169	1.0000	0.5356	117.1917	111.5665	0.0000	0.0831	0.4644
49	22.57	30.19	94.3000	43	398	0.792	0.9430	0.9763	0.5257	132.4053	126.0498	0.0238	0.0570	0.4743
50	23.34	27.83	105.7600	43	398	0.812	0.9741	1.0000	0.5257	157.1534	149.6100	0.0000	0.0259	0.4743
51	22.88	27.88	94.4500	38	398	0.829	0.9612	1.0000	0.5291	142.3454	135.5128	0.0000	0.0388	0.4709
52	22.23	29.95	92.4700	34	398	0.845	0.9865	1.0000	0.5325	146.7257	139.6829	0.0000	0.0135	0.4675
53	22.72	30.53	82.9600	38	398	0.859	0.9063	0.9338	0.5291	122.2220	116.3554	0.0663	0.0938	0.4709
54	23.48	29.45	103.7700	46	398	0.872	0.9303	1.0000	0.5240	157.7120	150.1419	0.0000	0.0697	0.4760
55	22.55	30.03	102.9700	44	398	0.883	0.9565	0.9963	0.5251	163.2599	155.4234	0.0038	0.0435	0.4749
56	23.5	29.55	98.4900	43	398	0.893	0.9213	1.0000	0.5257	152.2047	144.8989	0.0000	0.0787	0.4743
57	23.41	28.45	81.0200	34	398	0.901	0.9956	1.0000	0.5325	138.2958	131.6576	0.0000	0.0044	0.4675
58	22.77	26.76	95.5200	36	398	0.907	0.9228	1.0000	0.5307	151.6935	144.4122	0.0000	0.0772	0.4693
59	21.39	29.07	99.4200	37	398	0.913	0.9519	1.0000	0.5298	163.6499	155.7947	0.0000	0.0481	0.4702
60	23.08	29.37	88.0500	39	398	0.918	0.9662	1.0000	0.5283	147.5616	140.4786	0.0000	0.0338	0.4717
61	22.62	28.51	94.2500	40	398	0.923	0.9728	1.0000	0.5276	159.5802	151.9204	0.0000	0.0272	0.4724
62	22.99	28.53	95.6100	40	398	0.927	0.9850	1.0000	0.5276	164.6005	156.6997	0.0000	0.0150	0.4724

Table A22. Cowpea Biomass Growth with Stress Values for Makurdi 2011

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.36	26.81	89.0300	32	402	0.0027	0.9116	1.0000	0.5345	0.4484	0.4269	0.0000	0.0884	0.4655
2	21.83	29.55	87.3300	44	402	0.0032	0.9806	1.0000	0.5251	0.5435	0.5174	0.0000	0.0194	0.4749
3	22.74	28.41	80.3700	39	402	0.0037	0.9734	1.0000	0.5283	0.5834	0.5554	0.0000	0.0266	0.4717
4	22.66	28.12	83.9800	39	402	0.0043	0.9619	1.0000	0.5283	0.7022	0.6685	0.0000	0.0381	0.4717
5	22.62	27.16	65.5900	31	402	0.0050	0.9306	1.0000	0.5356	0.6239	0.5939	0.0000	0.0694	0.4644
6	21.19	29.92	98.3000	48	402	0.0059	0.9722	1.0000	0.5230	1.1132	1.0598	0.0000	0.0278	0.4770
7	22.29	29.96	96.7200	45	402	0.0069	0.9813	1.0000	0.5245	1.3014	1.2390	0.0000	0.0188	0.4755
8	23.15	26.1	87.2000	33	402	0.0079	0.9141	1.0000	0.5335	1.2852	1.2235	0.0000	0.0859	0.4665
9	22.5	27.76	82.1300	36	402	0.0092	0.9456	1.0000	0.5307	1.4472	1.3777	0.0000	0.0544	0.4693
10	22	29.09	95.7600	44	402	0.0108	0.9716	1.0000	0.5251	2.0007	1.9046	0.0000	0.0284	0.4749
11	22	29.85	94.3900	44	402	0.0126	0.9953	1.0000	0.5251	2.3644	2.2509	0.0000	0.0047	0.4749
12	22.85	25.87	32.6200	17	402	0.0145	0.8975	1.0000	0.5649	0.9133	0.8694	0.0000	0.1025	0.4351
13	21.6	29.25	84.0500	39	402	0.0169	0.9641	1.0000	0.5283	2.7510	2.6190	0.0000	0.0359	0.4717
14	21.97	29.05	87.8700	38	402	0.0197	0.9694	1.0000	0.5291	3.3718	3.2099	0.0000	0.0306	0.4709
15	22.43	29.73	92.9900	45	402	0.0230	0.9880	1.0000	0.5245	4.2195	4.0170	0.0000	0.0120	0.4755
16	22.64	26.61	54.5500	23	402	0.0265	0.9141	1.0000	0.5480	2.7587	2.6263	0.0000	0.0859	0.4520
17	22.08	28.37	52.1400	22	402	0.0308	0.9516	1.0000	0.5502	3.1945	3.0412	0.0000	0.0484	0.4498
18	22.05	27.38	99.8800	44	402	0.0355	0.9197	1.0000	0.5251	6.5062	6.1939	0.0000	0.0803	0.4749
19	21.01	29.78	91.3400	38	402	0.0411	0.9622	1.0000	0.5291	7.2705	6.9215	0.0000	0.0378	0.4709
20	22.72	27.23	89.8500	36	402	0.0474	0.9359	1.0000	0.5307	8.0490	7.6626	0.0000	0.0641	0.4693
21	22.79	26.57	71.2900	29	402	0.0545	0.9175	1.0000	0.5381	7.2940	6.9439	0.0000	0.0825	0.4619
22	21.23	28.19	77.9700	32	402	0.0625	0.9194	1.0000	0.5345	9.1163	8.6787	0.0000	0.0806	0.4655
23	21.53	29.36	105.3900	42	402	0.0722	0.9653	1.0000	0.5263	14.7051	13.9993	0.0000	0.0347	0.4737
24	22.15	28.41	101.5900	39	402	0.0831	0.9550	1.0000	0.5283	16.1982	15.4207	0.0000	0.0450	0.4717
25	23.13	26.81	31.6000	13	402	0.0951	0.9356	1.0000	0.5849	6.2595	5.9590	0.0000	0.0644	0.4151
26	22.59	27.66	80.1900	33	402	0.1089	0.9453	1.0000	0.5335	16.7528	15.9487	0.0000	0.0547	0.4665
27	22.08	28.08	100.3400	42	402	0.1243	0.9425	1.0000	0.5263	23.5362	22.4064	0.0000	0.0575	0.4737
28	22.35	28.18	87.3300	38	402	0.1417	0.9541	1.0000	0.5291	23.7696	22.6287	0.0000	0.0459	0.4709
29	23.18	27.78	94.2300	37	402	0.1614	0.9675	1.0000	0.5298	29.6675	28.2435	0.0000	0.0325	0.4702
30	23.19	27.92	58.9600	27	402	0.1833	0.9722	1.0000	0.5409	21.6283	20.5901	0.0000	0.0278	0.4591
31	22.76	28.34	79.0200	36	402	0.2075	0.9719	1.0000	0.5307	32.1685	30.6245	0.0000	0.0281	0.4693

Table A22 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2011

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.92	28.82	74.0300	33	402	0.2343	0.9919	1.0000	0.5335	34.9248	33.2485	0.0000	0.0081	0.4665
33	21.97	26.93	72.6700	37	402	0.2608	0.9031	1.0000	0.5298	34.5010	32.8449	0.0000	0.0969	0.4702
34	21.6	28.96	86.8800	36	402	0.2906	0.9550	1.0000	0.5307	48.6903	46.3532	0.0000	0.0450	0.4693
35	22.52	27.13	25.4600	19	402	0.3214	0.9266	1.0000	0.5581	16.0991	15.3263	0.0000	0.0734	0.4419
36	22.04	28.03	78.5400	33	402	0.3541	0.9397	1.0000	0.5335	53.0413	50.4953	0.0000	0.0603	0.4665
37	21.97	29.23	107.9400	46	402	0.3894	0.9750	1.0000	0.5240	81.6973	77.7758	0.0000	0.0250	0.4760
38	22.49	29.01	72.7100	30	402	0.4260	0.9844	1.0000	0.5368	62.2744	59.2852	0.0000	0.0156	0.4632
39	22.48	28.83	77.9300	33	402	0.4630	0.9784	1.0000	0.5335	71.6566	68.2171	0.0000	0.0216	0.4665
40	22.31	29.3	99.5300	37	402	0.5005	0.9878	1.0000	0.5298	99.2027	94.4410	0.0000	0.0122	0.4702
41	22.69	26.48	106.0500	43	402	0.5349	0.9116	1.0000	0.5257	103.4161	98.4521	0.0000	0.0884	0.4743
42	21.86	29.69	112.3300	48	402	0.5713	0.9859	1.0000	0.5230	125.9040	119.8606	0.0000	0.0141	0.4770
43	22.6	27.55	104.4100	43	402	0.6050	0.9422	1.0000	0.5257	119.0467	113.3325	0.0000	0.0578	0.4743
44	23.03	26.39	103.3300	41	402	0.6367	0.9194	1.0000	0.5269	121.2597	115.4392	0.0000	0.0806	0.4731
45	22.51	28.73	108.4600	43	402	0.6686	0.9763	1.0000	0.5257	141.5855	134.7894	0.0000	0.0237	0.4743
46	22.01	28.8	75.6200	28	402	0.6981	0.9628	1.0000	0.5394	104.3164	99.3092	0.0000	0.0372	0.4606
47	22.05	29.44	99.3500	42	402	0.7261	0.9841	1.0000	0.5263	142.1550	135.3315	0.0000	0.0159	0.4737
48	22.75	29.2	115.6900	49	402	0.7523	0.9984	1.0000	0.5225	172.7656	164.4728	0.0000	0.0016	0.4775
49	22.92	28.15	94.5800	39	402	0.7755	0.9709	1.0000	0.5283	143.1556	136.2842	0.0000	0.0291	0.4717
50	22.83	28.01	94.8000	37	402	0.7964	0.9638	1.0000	0.5298	146.6886	139.6475	0.0000	0.0362	0.4702
51	22.54	29.58	103.3800	41	402	0.8160	0.9910	1.0000	0.5269	167.6039	159.5589	0.0000	0.0090	0.4731
52	22.33	30.37	88.5900	35	402	0.8337	0.9475	0.9538	0.5315	141.5354	134.7417	0.0463	0.0525	0.4685
53	23.9	26.72	66.1800	19	402	0.8485	0.9569	1.0000	0.5581	114.0964	108.6198	0.0000	0.0431	0.4419
54	23.54	28.03	47.5300	17	402	0.8619	0.9866	1.0000	0.5649	86.8760	82.7059	0.0000	0.0134	0.4351
55	23.27	29.45	81.0200	38	402	0.8742	0.9460	1.0000	0.5291	134.8669	128.3933	0.0000	0.0540	0.4709
56	22.44	29.01	101.2700	42	402	0.8844	0.9828	1.0000	0.5263	176.2668	167.8060	0.0000	0.0172	0.4737
57	23.05	26.4	96.6200	26	402	0.8929	0.9203	1.0000	0.5425	163.8673	156.0017	0.0000	0.0797	0.4575
58	22.71	30.8	78.5700	35	402	0.9012	0.8867	0.9000	0.5315	126.9887	120.8932	0.1000	0.1133	0.4685
59	23.22	27.03	75.2000	27	402	0.9078	0.9453	1.0000	0.5409	132.8039	126.4293	0.0000	0.0547	0.4591
60	22.73	26.83	82.0800	31	402	0.9134	0.9238	1.0000	0.5356	141.1278	134.3537	0.0000	0.0762	0.4644
61	21.98	27.32	94.0700	39	402	0.9182	0.9156	1.0000	0.5283	158.9698	151.3393	0.0000	0.0844	0.4717
62	22.67	26.9	82.3000	33	402	0.9224	0.9241	1.0000	0.5335	142.3841	135.5497	0.0000	0.0759	0.4665

Table A23. Cowpea Biomass Growth with Stress Values for Makurdi 2012

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.7	29.33	96.1300	45	401	0.0027	0.9697	1.0000	0.5245	0.5024	0.4783	0.0000	0.0303	0.4755
2	21.77	29.43	108.1300	46	401	0.0032	0.9750	1.0000	0.5240	0.6632	0.6313	0.0000	0.0250	0.4760
3	22.84	25.52	57.4500	19	401	0.0037	0.8863	1.0000	0.5581	0.3929	0.3740	0.0000	0.1138	0.4419
4	22.38	28.15	71.5700	28	401	0.0043	0.9541	1.0000	0.5394	0.5929	0.5644	0.0000	0.0459	0.4606
5	22.51	29.76	90.4600	41	401	0.0050	0.9797	1.0000	0.5269	0.8826	0.8403	0.0000	0.0203	0.4731
6	22.52	27.14	74.0600	26	401	0.0058	0.9269	1.0000	0.5425	0.8156	0.7764	0.0000	0.0731	0.4575
7	21.85	26.74	68.4300	27	401	0.0067	0.8934	1.0000	0.5409	0.8348	0.7947	0.0000	0.1066	0.4591
8	21.48	29.3	77.7700	33	401	0.0078	0.9619	1.0000	0.5335	1.1736	1.1173	0.0000	0.0381	0.4665
9	22.44	26.8	81.7200	32	401	0.0091	0.9138	1.0000	0.5345	1.3568	1.2917	0.0000	0.0862	0.4655
10	21.99	25.45	72.5900	22	401	0.0104	0.8575	1.0000	0.5502	1.3336	1.2696	0.0000	0.1425	0.4498
11	21.53	28.34	69.0200	30	401	0.0120	0.9334	1.0000	0.5368	1.5609	1.4860	0.0000	0.0666	0.4632
12	19.98	30	117.0800	48	401	0.0140	0.9369	1.0000	0.5230	3.0017	2.8577	0.0000	0.0631	0.4770
13	22.29	29.93	100.4500	44	401	0.0164	0.9835	1.0000	0.5251	3.1806	3.0280	0.0000	0.0165	0.4749
14	23.11	26.97	65.8600	24	401	0.0190	0.9400	1.0000	0.5460	2.4022	2.2869	0.0000	0.0600	0.4540
15	22.48	27.75	82.7400	35	401	0.0220	0.9447	1.0000	0.5315	3.4232	3.2589	0.0000	0.0553	0.4685
16	22.48	29.01	81.3200	35	401	0.0256	0.9841	1.0000	0.5315	4.0862	3.8901	0.0000	0.0159	0.4685
17	22.33	26.29	71.8900	27	401	0.0295	0.8944	1.0000	0.5409	3.8389	3.6546	0.0000	0.1056	0.4591
18	22.37	25.64	76.7700	26	401	0.0337	0.8753	1.0000	0.5425	4.6072	4.3861	0.0000	0.1247	0.4575
19	22.15	29.28	78.4000	35	401	0.0392	0.9822	1.0000	0.5315	6.0172	5.7284	0.0000	0.0178	0.4685
20	22.69	27.01	54.9800	27	401	0.0452	0.9281	1.0000	0.5409	4.6763	4.4518	0.0000	0.0719	0.4591
21	22.43	27.59	65.2900	25	401	0.0521	0.9381	1.0000	0.5442	6.5113	6.1987	0.0000	0.0619	0.4558
22	21.74	28.83	83.2500	35	401	0.0602	0.9553	1.0000	0.5315	9.5359	9.0782	0.0000	0.0447	0.4685
23	21.49	28.28	90.4800	37	401	0.0692	0.9303	1.0000	0.5298	11.5577	11.0029	0.0000	0.0697	0.4702
24	21.98	28.96	102.0700	43	401	0.0798	0.9669	1.0000	0.5257	15.5046	14.7603	0.0000	0.0331	0.4743
25	22.22	28.03	89.5000	33	401	0.0915	0.9453	1.0000	0.5335	15.4790	14.7361	0.0000	0.0547	0.4665
26	22.67	27.61	104.6700	43	401	0.1048	0.9463	1.0000	0.5257	20.4531	19.4714	0.0000	0.0537	0.4743
27	22.26	29.14	98.6600	40	401	0.1204	0.9813	1.0000	0.5276	23.0438	21.9377	0.0000	0.0187	0.4724
28	21.46	29.25	99.9800	41	401	0.1375	0.9597	1.0000	0.5269	26.0476	24.7973	0.0000	0.0403	0.4731
29	23.08	27.04	71.8600	30	401	0.1562	0.9412	1.0000	0.5368	21.2465	20.2266	0.0000	0.0588	0.4632
30	22.17	27.1	80.7700	29	401	0.1762	0.9147	1.0000	0.5381	26.2479	24.9880	0.0000	0.0853	0.4619
31	20.89	28.3	94.0600	41	401	0.1981	0.9122	1.0000	0.5269	33.5646	31.9535	0.0000	0.0878	0.4731

Table A23 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2012

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.08	30.08	92.5900	38	401	0.2245	0.9880	0.9900	0.5291	40.7172	38.7628	0.0100	0.0120	0.4709
33	22.43	26.67	82.2800	25	401	0.2504	0.9094	1.0000	0.5442	38.2057	36.3718	0.0000	0.0906	0.4558
34	21.21	28.76	94.9500	42	401	0.2790	0.9366	1.0000	0.5263	48.9299	46.5813	0.0000	0.0634	0.4737
35	21.8	29.46	78.9700	28	401	0.3108	0.9769	1.0000	0.5394	48.4594	46.1334	0.0000	0.0231	0.4606
36	22.54	28.55	96.1000	39	401	0.3441	0.9716	1.0000	0.5283	63.6029	60.5500	0.0000	0.0284	0.4717
37	23.16	26.48	96.5100	40	401	0.3772	0.9263	1.0000	0.5276	66.6709	63.4707	0.0000	0.0737	0.4724
38	21.98	28.98	67.0900	28	401	0.4129	0.9675	1.0000	0.5394	54.1813	51.5806	0.0000	0.0325	0.4606
39	22.25	28.6	111.5500	46	401	0.4492	0.9641	1.0000	0.5240	94.8653	90.3118	0.0000	0.0359	0.4760
40	22.98	27.94	84.5500	35	401	0.4859	0.9663	1.0000	0.5315	79.0750	75.2794	0.0000	0.0337	0.4685
41	22.21	29.93	124.1100	48	401	0.5239	0.9895	1.0000	0.5230	126.1005	120.0477	0.0000	0.0105	0.4770
42	22.14	28.81	101.6100	40	401	0.5599	0.9672	1.0000	0.5276	108.7951	103.5729	0.0000	0.0328	0.4724
43	23.14	26.48	101.9100	38	401	0.5935	0.9256	1.0000	0.5291	110.9881	105.6607	0.0000	0.0744	0.4709
44	23.31	27.3	87.2800	35	401	0.6269	0.9566	1.0000	0.5315	104.2465	99.2427	0.0000	0.0434	0.4685
45	22.12	28.76	107.1300	44	401	0.6589	0.9650	1.0000	0.5251	134.0402	127.6063	0.0000	0.0350	0.4749
46	22.6	27.3	68.9200	31	401	0.6882	0.9344	1.0000	0.5356	88.9534	84.6836	0.0000	0.0656	0.4644
47	22.51	28.6	99.3800	38	401	0.7167	0.9722	1.0000	0.5291	137.2730	130.6839	0.0000	0.0278	0.4709
48	22.74	26.12	73.3700	27	401	0.7411	0.9019	1.0000	0.5409	99.4000	94.6288	0.0000	0.0981	0.4591
49	21.26	30.01	48.5200	20	401	0.7655	0.9772	0.9988	0.5552	75.5107	71.8861	0.0013	0.0228	0.4448
50	22.55	28.09	80.3000	32	401	0.7872	0.9575	1.0000	0.5345	121.2307	115.4117	0.0000	0.0425	0.4655
51	23.34	28.93	53.0900	29	401	0.8078	0.9798	1.0000	0.5381	84.7249	80.6581	0.0000	0.0202	0.4619
52	22.62	29.19	114.8400	47	401	0.8260	0.9941	1.0000	0.5235	184.9797	176.1007	0.0000	0.0059	0.4765
53	22.92	27.53	60.3400	21	401	0.8415	0.9516	1.0000	0.5526	100.0509	95.2484	0.0000	0.0484	0.4474
54	22.76	27.12	91.4000	38	401	0.8551	0.9338	1.0000	0.5291	144.6783	137.7337	0.0000	0.0662	0.4709
55	22.54	26.9	93.3400	37	401	0.8669	0.9200	1.0000	0.5298	147.8114	140.7165	0.0000	0.0800	0.4702
56	21.99	29.28	74.9900	34	401	0.8780	0.9772	1.0000	0.5325	128.3863	122.2237	0.0000	0.0228	0.4675
57	22.46	29.99	104.3400	46	401	0.8881	0.9662	1.0000	0.5240	175.8202	167.3808	0.0000	0.0338	0.4760
58	22.93	27.24	101.1100	41	401	0.8963	0.9428	1.0000	0.5269	168.7123	160.6141	0.0000	0.0572	0.4731
59	22.33	29.49	96.4900	41	401	0.9038	0.9944	1.0000	0.5269	171.2327	163.0135	0.0000	0.0056	0.4731
60	23.48	28.4	107.8000	44	401	0.9103	0.9962	1.0000	0.5251	192.3749	183.1409	0.0000	0.0038	0.4749
61	22.4	30.19	108.1300	45	401	0.9161	0.9557	0.9763	0.5245	186.0914	177.1590	0.0238	0.0443	0.4755
62	22.87	29.88	114.8500	49	401	0.9210	0.9438	1.0000	0.5225	195.4839	186.1007	0.0000	0.0563	0.4775

Table A24. Cowpea Biomass Growth with Stress Values for Makurdi 2013

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.15	27.9	67.3400	30	404	0.0027	0.9391	1.0000	0.5368	0.3631	0.3456	0.0000	0.0609	0.4632
2	21.59	29.92	69.4100	37	404	0.0032	0.9847	1.0000	0.5298	0.4532	0.4314	0.0000	0.0153	0.4702
3	21.66	29.69	63.7600	36	404	0.0037	0.9797	1.0000	0.5307	0.4850	0.4617	0.0000	0.0203	0.4693
4	22.83	28.69	80.8500	40	404	0.0044	0.9850	1.0000	0.5276	0.7191	0.6846	0.0000	0.0150	0.4724
5	22.62	30.75	87.4500	44	404	0.0052	0.8972	0.9063	0.5251	0.8325	0.7926	0.0938	0.1028	0.4749
6	23.37	28.1	86.2200	33	404	0.0060	0.9834	1.0000	0.5335	1.0688	1.0175	0.0000	0.0166	0.4665
7	22.85	27.94	73.2400	31	404	0.0070	0.9622	1.0000	0.5356	1.0392	0.9893	0.0000	0.0378	0.4644
8	21.93	28.71	73.4100	30	404	0.0082	0.9575	1.0000	0.5368	1.2093	1.1513	0.0000	0.0425	0.4632
9	21.65	29.8	64.8800	31	404	0.0096	0.9828	1.0000	0.5356	1.2792	1.2178	0.0000	0.0172	0.4644
10	22.42	28.38	69.9000	27	404	0.0111	0.9625	1.0000	0.5409	1.5872	1.5110	0.0000	0.0375	0.4591
11	22.3	29.76	71.9700	33	404	0.0130	0.9955	1.0000	0.5335	1.9528	1.8591	0.0000	0.0045	0.4665
12	23.09	27.76	68.1000	25	404	0.0152	0.9641	1.0000	0.5442	2.1250	2.0230	0.0000	0.0359	0.4558
13	22.46	28.17	75.5200	30	404	0.0176	0.9572	1.0000	0.5368	2.6829	2.5542	0.0000	0.0428	0.4632
14	22.51	26.86	74.5500	27	404	0.0204	0.9178	1.0000	0.5409	2.9550	2.8131	0.0000	0.0822	0.4591
15	22.55	26.88	72.4800	26	404	0.0235	0.9197	1.0000	0.5425	3.3335	3.1735	0.0000	0.0803	0.4575
16	22.11	27.4	71.9800	28	404	0.0272	0.9222	1.0000	0.5394	3.8108	3.6279	0.0000	0.0778	0.4606
17	20.7	29.08	88.8600	39	404	0.0314	0.9306	1.0000	0.5283	5.3715	5.1137	0.0000	0.0694	0.4717
18	22.21	25.7	75.3400	30	404	0.0359	0.8722	1.0000	0.5368	4.9618	4.7236	0.0000	0.1278	0.4632
19	21.33	28.74	102.0200	40	404	0.0415	0.9397	1.0000	0.5276	8.2188	7.8243	0.0000	0.0603	0.4724
20	21.34	30.19	85.0900	41	404	0.0482	0.9853	0.9763	0.5269	8.3422	7.9417	0.0238	0.0147	0.4731
21	22.39	27.65	29.3800	17	404	0.0555	0.9388	1.0000	0.5649	3.3912	3.2285	0.0000	0.0613	0.4351
22	22.94	27.44	98.9200	41	404	0.0640	0.9494	1.0000	0.5269	12.4179	11.8219	0.0000	0.0506	0.4731
23	22.05	29.3	94.4100	41	404	0.0740	0.9797	1.0000	0.5269	14.1439	13.4650	0.0000	0.0203	0.4731
24	22.18	29.62	89.7600	35	404	0.0857	0.9937	1.0000	0.5315	15.9174	15.1533	0.0000	0.0063	0.4685
25	22.3	29.85	95.7300	39	404	0.0990	0.9887	1.0000	0.5283	19.4103	18.4786	0.0000	0.0113	0.4717
26	22.41	29.35	85.3700	35	404	0.1140	0.9925	1.0000	0.5315	20.1293	19.1631	0.0000	0.0075	0.4685
27	22.55	26.69	75.0600	25	404	0.1295	0.9138	1.0000	0.5442	18.9487	18.0392	0.0000	0.0862	0.4558
28	21.91	27.85	83.0900	31	404	0.1471	0.9300	1.0000	0.5356	23.8630	22.7176	0.0000	0.0700	0.4644
29	20.9	29.92	99.4700	43	404	0.1673	0.9631	1.0000	0.5257	33.0215	31.4365	0.0000	0.0369	0.4743
30	21.9	28.94	76.7700	32	404	0.1896	0.9638	1.0000	0.5345	29.3908	27.9800	0.0000	0.0362	0.4655
31	22.58	28.15	77.8100	33	404	0.2140	0.9603	1.0000	0.5335	33.4364	31.8314	0.0000	0.0397	0.4665

Table A24 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2013

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.69	28.81	95.0200	40	404	0.2412	0.9844	1.0000	0.5276	46.6637	44.4239	0.0000	0.0156	0.4724
33	22.05	30.44	62.9500	31	404	0.2716	0.9632	0.9450	0.5356	34.5785	32.9187	0.0550	0.0368	0.4644
34	22.88	30.64	111.3600	49	404	0.3053	0.8860	0.9200	0.5225	61.6874	58.7264	0.0800	0.1140	0.4775
35	23.12	29.63	88.4400	39	404	0.3401	0.9438	1.0000	0.5283	58.7874	55.9656	0.0000	0.0563	0.4717
36	23.14	30.8	106.4600	49	404	0.3780	0.8545	0.9000	0.5225	70.4296	67.0490	0.1000	0.1455	0.4775
37	23.5	28.33	64.6600	28	404	0.4148	0.9947	1.0000	0.5394	56.4009	53.6937	0.0000	0.0053	0.4606
38	23.05	29.98	81.3800	39	404	0.4537	0.9228	1.0000	0.5283	70.5446	67.1585	0.0000	0.0773	0.4717
39	23.25	28.96	68.1300	29	404	0.4919	0.9843	1.0000	0.5381	69.5653	66.2261	0.0000	0.0158	0.4619
40	22.81	28.88	26.7800	21	404	0.5293	0.9903	1.0000	0.5526	30.4024	28.9431	0.0000	0.0097	0.4474
41	22.48	28.23	70.4000	30	404	0.5649	0.9597	1.0000	0.5368	80.3025	76.4480	0.0000	0.0403	0.4632
42	22.13	30.2	61.8200	29	404	0.6013	0.9753	0.9750	0.5381	76.4545	72.7846	0.0250	0.0247	0.4619
43	22.49	30.89	112.7400	48	404	0.6372	0.8965	0.8888	0.5230	132.0302	125.6928	0.1113	0.1035	0.4770
44	22.87	29.73	97.3800	39	404	0.6704	0.9550	1.0000	0.5283	129.1099	122.9126	0.0000	0.0450	0.4717
45	22.72	30.09	102.3500	46	404	0.7017	0.9392	0.9888	0.5240	138.5416	131.8916	0.0113	0.0608	0.4760
46	22.37	29.92	112.5200	46	404	0.7301	0.9782	1.0000	0.5240	165.0647	157.1416	0.0000	0.0218	0.4760
47	22.44	30.38	95.5500	41	404	0.7566	0.9385	0.9525	0.5269	140.1339	133.4075	0.0475	0.0615	0.4731
48	23.05	30.61	90.8300	43	404	0.7813	0.8755	0.9238	0.5257	128.0099	121.8654	0.0763	0.1245	0.4743
49	23.12	29.65	85.7300	39	404	0.8028	0.9423	1.0000	0.5283	134.2902	127.8442	0.0000	0.0577	0.4717
50	23.39	28.87	110.7600	40	404	0.8218	0.9805	1.0000	0.5276	184.5585	175.6997	0.0000	0.0195	0.4724
51	22.59	26.78	101.5300	37	404	0.8372	0.9178	1.0000	0.5298	162.0206	154.2436	0.0000	0.0822	0.4702
52	21.35	30.15	91.5900	37	404	0.8520	0.9844	0.9813	0.5298	159.5180	151.8611	0.0188	0.0156	0.4702
53	22.67	27.2	76.6800	32	404	0.8643	0.9334	1.0000	0.5345	129.6093	123.3881	0.0000	0.0666	0.4655
54	22.03	27.41	98.1200	35	404	0.8751	0.9200	1.0000	0.5315	164.5883	156.6881	0.0000	0.0800	0.4685
55	22.73	26.13	47.0900	19	404	0.8845	0.9019	1.0000	0.5581	82.1732	78.2289	0.0000	0.0981	0.4419
56	21.77	27.29	105.7000	41	404	0.8928	0.9081	1.0000	0.5269	177.0021	168.5060	0.0000	0.0919	0.4731
57	21.94	29.37	94.7000	37	404	0.9007	0.9784	1.0000	0.5298	173.3157	164.9965	0.0000	0.0216	0.4702
58	21.58	31.11	113.3500	47	404	0.9078	0.9483	0.8613	0.5235	200.2061	190.5962	0.1388	0.0517	0.4765
59	22.1	30.91	114.9900	51	404	0.9140	0.9242	0.8863	0.5216	198.6084	189.0752	0.1138	0.0758	0.4784
60	22.98	28.11	71.9200	27	404	0.9190	0.9716	1.0000	0.5409	136.1376	129.6030	0.0000	0.0284	0.4591
61	22.73	27.6	69.1900	26	404	0.9232	0.9478	1.0000	0.5425	128.7312	122.5521	0.0000	0.0522	0.4575
62	22.62	29.58	69.3700	29	404	0.9271	0.9850	1.0000	0.5381	133.6039	127.1909	0.0000	0.0150	0.4619

Table A25. Cowpea Biomass Growth with Stress Values for Makurdi 2014

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.94	27.88	75.6500	27	406	0.0027	0.9631	1.0000	0.5409	0.4355	0.4146	0.0000	0.0369	0.4591
2	22.42	27.85	82.6600	33	406	0.0032	0.9459	1.0000	0.5335	0.5360	0.5103	0.0000	0.0541	0.4665
3	22.08	29.56	68.7000	25	406	0.0037	0.9888	1.0000	0.5442	0.5561	0.5294	0.0000	0.0112	0.4558
4	22.52	29.72	64.9000	21	406	0.0044	0.9820	1.0000	0.5526	0.6221	0.5922	0.0000	0.0180	0.4474
5	22.92	27.81	65.8300	29	406	0.0051	0.9603	1.0000	0.5381	0.7001	0.6665	0.0000	0.0397	0.4619
6	22.55	28.86	96.6000	34	406	0.0060	0.9816	1.0000	0.5325	1.2148	1.1565	0.0000	0.0184	0.4675
7	22.26	28.84	83.2000	30	406	0.0070	0.9719	1.0000	0.5368	1.2188	1.1603	0.0000	0.0281	0.4632
8	22.11	28.25	50.6500	23	406	0.0081	0.9488	1.0000	0.5480	0.8596	0.8183	0.0000	0.0513	0.4520
9	21.92	29.39	89.7300	36	406	0.0094	0.9784	1.0000	0.5307	1.7760	1.6907	0.0000	0.0216	0.4693
10	22.61	30.32	104.2600	44	406	0.0111	0.9303	0.9600	0.5251	2.2847	2.1751	0.0400	0.0697	0.4749
11	22.73	29.33	55.4200	21	406	0.0130	0.9955	1.0000	0.5526	1.6022	1.5253	0.0000	0.0045	0.4474
12	22.72	28.19	72.1100	28	406	0.0152	0.9659	1.0000	0.5394	2.2994	2.1891	0.0000	0.0341	0.4606
13	21.81	30.05	80.9800	40	406	0.0177	0.9956	0.9938	0.5276	3.0444	2.8983	0.0063	0.0044	0.4724
14	23.1	30.98	104.1500	47	406	0.0210	0.8440	0.8775	0.5235	3.8917	3.7049	0.1225	0.1560	0.4765
15	22.82	28.61	69.0200	31	406	0.0244	0.9822	1.0000	0.5356	3.5799	3.4081	0.0000	0.0178	0.4644
16	23.08	27	39.8400	14	406	0.0283	0.9400	1.0000	0.5789	2.4739	2.3551	0.0000	0.0600	0.4211
17	23.06	27.9	92.1200	47	406	0.0329	0.9675	1.0000	0.5235	6.1850	5.8881	0.0000	0.0325	0.4765
18	22.58	28.15	90.7100	35	406	0.0381	0.9603	1.0000	0.5315	7.1166	6.7750	0.0000	0.0397	0.4685
19	22.75	28.59	90.4600	36	406	0.0443	0.9794	1.0000	0.5307	8.3947	7.9918	0.0000	0.0206	0.4693
20	22.75	27.24	66.1500	26	406	0.0510	0.9372	1.0000	0.5425	6.9241	6.5918	0.0000	0.0628	0.4575
21	22.03	29.94	86.8200	39	406	0.0593	0.9991	1.0000	0.5283	10.9682	10.4417	0.0000	0.0009	0.4717
22	22.7	29.87	79.1300	35	406	0.0691	0.9572	1.0000	0.5315	11.2175	10.6791	0.0000	0.0428	0.4685
23	22.69	28.13	62.2200	30	406	0.0796	0.9631	1.0000	0.5368	10.3303	9.8344	0.0000	0.0369	0.4632
24	21.48	30.45	87.4600	40	406	0.0920	0.9978	0.9438	0.5276	17.0975	16.2768	0.0563	0.0022	0.4724
25	22.29	30.73	91.4100	39	406	0.1067	0.9235	0.9088	0.5283	19.1999	18.2784	0.0913	0.0765	0.4717
26	23.05	27.88	90.7700	40	406	0.1223	0.9666	1.0000	0.5276	22.8318	21.7359	0.0000	0.0334	0.4724
27	21.88	27.77	76.7700	35	406	0.1389	0.9266	1.0000	0.5315	21.1939	20.1766	0.0000	0.0734	0.4685
28	22.36	30.32	40.6800	18	406	0.1595	0.9490	0.9600	0.5613	13.9414	13.2722	0.0400	0.0510	0.4387
29	22.48	28.3	91.1500	33	406	0.1809	0.9619	1.0000	0.5335	34.1419	32.5031	0.0000	0.0381	0.4665
30	22.99	27.83	76.6900	31	406	0.2046	0.9631	1.0000	0.5356	32.6546	31.0872	0.0000	0.0369	0.4644
31	22.23	29.23	89.9300	38	406	0.2310	0.9831	1.0000	0.5291	43.5865	41.4943	0.0000	0.0169	0.4709

Table A25 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2014

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.94	30.28	70.4500	30	406	0.2612	0.9085	0.9650	0.5368	36.2095	34.4714	0.0350	0.0915	0.4632
33	23.03	26.47	66.3600	30	406	0.2901	0.9219	1.0000	0.5368	38.4305	36.5858	0.0000	0.0781	0.4632
34	21.43	29.44	78.5000	37	406	0.3221	0.9647	1.0000	0.5298	52.1352	49.6327	0.0000	0.0353	0.4702
35	21.76	31.4	109.8400	46	406	0.3583	0.9130	0.8250	0.5240	75.9501	72.3045	0.1750	0.0870	0.4760
36	22.28	30.39	102.3400	40	406	0.3954	0.9497	0.9513	0.5276	81.7969	77.8707	0.0488	0.0503	0.4724
37	23.33	27.29	96.5500	38	406	0.4311	0.9569	1.0000	0.5291	85.0074	80.9270	0.0000	0.0431	0.4709
38	22.9	27.12	89.4500	32	406	0.4666	0.9381	1.0000	0.5345	84.4361	80.3832	0.0000	0.0619	0.4655
39	22.34	30.21	71.5800	31	406	0.5052	0.9588	0.9738	0.5356	74.9230	71.3266	0.0263	0.0412	0.4644
40	23.24	29.08	79.3800	31	406	0.5432	0.9760	1.0000	0.5356	90.9350	86.5701	0.0000	0.0240	0.4644
41	22.94	26.82	107.7600	44	406	0.5774	0.9300	1.0000	0.5251	122.5745	116.6909	0.0000	0.0700	0.4749
42	22.39	30.38	86.4300	33	406	0.6137	0.9423	0.9525	0.5335	107.5706	102.4072	0.0475	0.0577	0.4665
43	22.48	27.48	48.6600	20	406	0.6455	0.9363	1.0000	0.5552	65.8732	62.7113	0.0000	0.0637	0.4448
44	22.33	29.04	102.3800	43	406	0.6770	0.9803	1.0000	0.5257	144.1063	137.1892	0.0000	0.0197	0.4743
45	21.98	27.32	49.1300	22	406	0.7046	0.9156	1.0000	0.5502	70.3565	66.9794	0.0000	0.0844	0.4498
46	21.47	28.8	109.9300	43	406	0.7311	0.9459	1.0000	0.5257	161.2418	153.5022	0.0000	0.0541	0.4743
47	21.64	27.55	68.9000	31	406	0.7548	0.9122	1.0000	0.5356	102.5039	97.5837	0.0000	0.0878	0.4644
48	22.26	28.76	95.7000	33	406	0.7777	0.9694	1.0000	0.5335	155.2758	147.8226	0.0000	0.0306	0.4665
49	21.89	26.97	90.0100	29	406	0.7971	0.9019	1.0000	0.5381	140.4726	133.7299	0.0000	0.0981	0.4619
50	21.42	29.09	99.0500	36	406	0.8157	0.9534	1.0000	0.5307	164.9248	157.0084	0.0000	0.0466	0.4693
51	22.36	28.9	89.1400	33	406	0.8327	0.9769	1.0000	0.5335	156.0635	148.5724	0.0000	0.0231	0.4665
52	22.01	27.84	68.0800	29	406	0.8472	0.9328	1.0000	0.5381	116.7993	111.1929	0.0000	0.0672	0.4619
53	22.23	30.38	120.6600	42	406	0.8613	0.9543	0.9525	0.5263	210.5527	200.4462	0.0475	0.0457	0.4737
54	22.29	30.78	96.3800	34	406	0.8737	0.9198	0.9025	0.5325	166.3769	158.3908	0.0975	0.0803	0.4675
55	22.39	32.02	109.4400	45	406	0.8849	0.8192	0.7475	0.5245	167.9017	159.8424	0.2525	0.1808	0.4755
56	22.66	31.65	105.0000	44	406	0.8946	0.8267	0.7938	0.5251	164.5137	156.6171	0.2063	0.1733	0.4749
57	23.4	26.87	88.7400	30	406	0.9020	0.9459	1.0000	0.5368	163.9724	156.1017	0.0000	0.0541	0.4632
58	23.12	28.36	94.6300	38	406	0.9087	0.9838	1.0000	0.5291	180.5501	171.8837	0.0000	0.0162	0.4709
59	22.71	27.05	92.9500	39	406	0.9142	0.9300	1.0000	0.5283	168.4320	160.3473	0.0000	0.0700	0.4717
60	22.3	29.33	70.1100	27	406	0.9192	0.9884	1.0000	0.5409	139.0098	132.3373	0.0000	0.0116	0.4591
61	22.14	30.37	100.3200	38	406	0.9237	0.9617	0.9538	0.5291	190.2267	181.0958	0.0463	0.0383	0.4709
62	23.26	30.18	98.9300	40	406	0.9277	0.8920	0.9775	0.5276	174.2504	165.8864	0.0225	0.1080	0.4724

Table A26. Cowpea Biomass Growth with Stress Values for Makurdi 2015

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.13	29.42	80.6600	37	398	0.0028	0.9588	1.0000	0.5298	0.4047	0.3853	0.0000	0.0412	0.4702
2	23.64	28.62	62.6600	26	398	0.0032	0.9805	1.0000	0.5425	0.3866	0.3681	0.0000	0.0195	0.4575
3	22.98	29.58	84.1000	37	398	0.0038	0.9580	1.0000	0.5298	0.5824	0.5545	0.0000	0.0420	0.4702
4	23.03	30.73	87.7300	37	398	0.0045	0.8680	0.9088	0.5298	0.6512	0.6200	0.0913	0.1320	0.4702
5	23.41	28.44	93.1400	37	398	0.0053	0.9953	1.0000	0.5298	0.9289	0.8843	0.0000	0.0047	0.4702
6	23.5	27.75	89.2300	34	398	0.0062	0.9766	1.0000	0.5325	1.0249	0.9757	0.0000	0.0234	0.4675
7	22.79	30.24	87.0600	34	398	0.0073	0.9228	0.9700	0.5325	1.1133	1.0598	0.0300	0.0773	0.4675
8	23.19	29.28	98.9200	39	398	0.0086	0.9648	1.0000	0.5283	1.5414	1.4674	0.0000	0.0352	0.4717
9	23.01	30.8	98.1500	36	398	0.0101	0.8642	0.9000	0.5307	1.6270	1.5489	0.1000	0.1358	0.4693
10	23.64	28.73	44.7200	18	398	0.0119	0.9722	1.0000	0.5613	1.0352	0.9855	0.0000	0.0278	0.4387
11	23.23	29.83	63.9700	32	398	0.0140	0.9205	1.0000	0.5345	1.5713	1.4959	0.0000	0.0795	0.4655
12	22.81	26.26	74.4600	38	398	0.0161	0.9084	1.0000	0.5291	2.0614	1.9625	0.0000	0.0916	0.4709
13	22.01	28.82	28.0400	14	398	0.0187	0.9634	1.0000	0.5789	1.0479	0.9976	0.0000	0.0366	0.4211
14	23.43	28.9	85.4100	36	398	0.0220	0.9753	1.0000	0.5307	3.4699	3.3033	0.0000	0.0247	0.4693
15	22.98	30.01	90.1000	42	398	0.0258	0.9257	0.9988	0.5263	4.0472	3.8529	0.0013	0.0743	0.4737
16	22.69	27.01	94.4900	36	398	0.0298	0.9281	1.0000	0.5307	4.9560	4.7181	0.0000	0.0719	0.4693
17	21.71	29.37	65.2100	24	398	0.0346	0.9713	1.0000	0.5460	4.2792	4.0738	0.0000	0.0288	0.4540
18	22.8	28.44	60.5500	23	398	0.0402	0.9763	1.0000	0.5480	4.6575	4.4339	0.0000	0.0237	0.4520
19	22.73	28.08	83.8700	36	398	0.0466	0.9628	1.0000	0.5307	7.1370	6.7945	0.0000	0.0372	0.4693
20	22.94	27.9	90.4700	37	398	0.0539	0.9638	1.0000	0.5298	8.9041	8.4767	0.0000	0.0362	0.4702
21	22.48	29.22	71.0000	27	398	0.0626	0.9906	1.0000	0.5409	8.5090	8.1006	0.0000	0.0094	0.4591
22	22.91	29.73	80.8800	35	398	0.0728	0.9520	1.0000	0.5315	10.6526	10.1413	0.0000	0.0480	0.4685
23	23.87	29.55	92.5500	38	398	0.0849	0.8935	1.0000	0.5291	13.2730	12.6359	0.0000	0.1065	0.4709
24	22.44	28.15	34.1900	16	398	0.0974	0.9559	1.0000	0.5690	6.4789	6.1679	0.0000	0.0441	0.4310
25	22.34	27.73	75.0600	29	398	0.1114	0.9397	1.0000	0.5381	15.1153	14.3898	0.0000	0.0603	0.4619
26	23.09	29.74	86.4900	34	398	0.1286	0.9378	1.0000	0.5325	19.8534	18.9004	0.0000	0.0622	0.4675
27	23.16	30.33	111.3000	46	398	0.1484	0.8883	0.9588	0.5240	27.4780	26.1591	0.0413	0.1117	0.4760
28	23.29	28.98	102.4800	42	398	0.1697	0.9798	1.0000	0.5263	32.0595	30.5207	0.0000	0.0202	0.4737
29	23.04	30.39	90.2000	42	398	0.1943	0.8928	0.9513	0.5263	29.4335	28.0207	0.0488	0.1072	0.4737
30	23.85	28.79	98.6200	42	398	0.2207	0.9520	1.0000	0.5263	38.9870	37.1156	0.0000	0.0480	0.4737
31	23.58	29.12	103.3000	47	398	0.2496	0.9475	1.0000	0.5235	45.7225	43.5278	0.0000	0.0525	0.4765

Table A25 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2015

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.29	26.39	60.4800	24	398	0.2779	0.9275	1.0000	0.5460	30.4249	28.9645	0.0000	0.0725	0.4540
33	23.04	29.05	94.4400	43	398	0.3104	0.9932	1.0000	0.5257	54.7221	52.0954	0.0000	0.0068	0.4743
34	23.05	29.55	85.5300	32	398	0.3454	0.9550	1.0000	0.5345	53.9099	51.3222	0.0000	0.0450	0.4655
35	22.43	30.25	97.2100	39	398	0.3820	0.9490	0.9688	0.5283	66.5682	63.3729	0.0313	0.0510	0.4717
36	23.32	27.55	66.2300	28	398	0.4178	0.9647	1.0000	0.5394	51.4754	49.0046	0.0000	0.0353	0.4606
37	22.72	29.67	100.1500	40	398	0.4560	0.9708	1.0000	0.5276	83.6145	79.6010	0.0000	0.0292	0.4724
38	23.56	27.53	78.4800	32	398	0.4929	0.9716	1.0000	0.5345	71.8115	68.3645	0.0000	0.0284	0.4655
39	22.55	29.65	102.0000	43	398	0.5308	0.9850	1.0000	0.5257	100.2341	95.4229	0.0000	0.0150	0.4743
40	22.87	31.12	96.2600	41	398	0.5702	0.8507	0.8600	0.5269	87.9614	83.7393	0.1400	0.1493	0.4731
41	23.78	28.67	54.6600	21	398	0.6065	0.9662	1.0000	0.5526	63.2791	60.2417	0.0000	0.0338	0.4474
42	22.98	29.31	67.8800	33	398	0.6410	0.9783	1.0000	0.5335	81.1840	77.2871	0.0000	0.0217	0.4665
43	23.38	29.8	103.8800	39	398	0.6746	0.9115	1.0000	0.5283	120.6435	114.8526	0.0000	0.0885	0.4717
44	22.58	31.3	108.6400	48	398	0.7065	0.8590	0.8375	0.5230	123.2795	117.3621	0.1625	0.1410	0.4770
45	23.69	28.43	86.4300	30	398	0.7344	0.9910	1.0000	0.5368	120.7246	114.9298	0.0000	0.0090	0.4632
46	22.94	27.8	92.4800	41	398	0.7590	0.9606	1.0000	0.5269	127.0193	120.9224	0.0000	0.0394	0.4731
47	23.48	27.09	101.5900	43	398	0.7812	0.9553	1.0000	0.5257	142.4918	135.6522	0.0000	0.0447	0.4743
48	22.65	31.42	96.6300	42	398	0.8036	0.8448	0.8225	0.5263	123.4226	117.4983	0.1775	0.1553	0.4737
49	23.16	30.77	45.4200	20	398	0.8234	0.8553	0.9038	0.5552	63.4884	60.4410	0.0963	0.1447	0.4448
50	23.33	28.83	102.1200	43	398	0.8400	0.9880	1.0000	0.5257	159.2844	151.6387	0.0000	0.0120	0.4743
51	23.33	28.58	94.8400	41	398	0.8546	0.9972	1.0000	0.5269	152.2601	144.9516	0.0000	0.0028	0.4731
52	22.74	29.5	101.3400	41	398	0.8676	0.9820	1.0000	0.5269	162.6490	154.8419	0.0000	0.0180	0.4731
53	23.55	28.19	99.2200	35	398	0.8788	0.9919	1.0000	0.5315	164.3494	156.4606	0.0000	0.0081	0.4685
54	22.96	27.76	114.1700	41	398	0.8882	0.9600	1.0000	0.5269	183.4040	174.6006	0.0000	0.0400	0.4731
55	22.48	28.95	67.3300	23	398	0.8967	0.9822	1.0000	0.5480	116.1833	110.6065	0.0000	0.0178	0.4520
56	22.55	29.44	92.5200	39	398	0.9042	0.9997	1.0000	0.5283	157.9653	150.3830	0.0000	0.0003	0.4717
57	22.16	30.73	93.2700	38	398	0.9109	0.9332	0.9088	0.5291	149.9681	142.7697	0.0913	0.0668	0.4709
58	22.76	28.03	80.7000	34	398	0.9163	0.9622	1.0000	0.5325	135.4405	128.9393	0.0000	0.0378	0.4675
59	22.07	31.14	122.4600	49	398	0.9213	0.9092	0.8575	0.5225	191.6351	182.4366	0.1425	0.0908	0.4775
60	23.05	30.32	106.4700	42	398	0.9256	0.8972	0.9600	0.5263	166.3686	158.3829	0.0400	0.1028	0.4737
61	23.54	29.26	103.1200	39	398	0.9292	0.9400	1.0000	0.5283	170.1216	161.9558	0.0000	0.0600	0.4717
62	22.94	29.3	76.6000	36	398	0.9322	0.9820	1.0000	0.5307	133.0402	126.6543	0.0000	0.0180	0.4693

Table A27. Cowpea Biomass Growth with Stress Values for Makurdi 2016

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.58	27.14	86.7000	36	401	0.0027	0.9288	1.0000	0.5307	0.4362	0.4153	0.0000	0.0713	0.4693
2	22.06	28.48	82.7300	34	401	0.0032	0.9544	1.0000	0.5325	0.4998	0.4758	0.0000	0.0456	0.4675
3	22.8	28.15	75.0900	27	401	0.0037	0.9672	1.0000	0.5409	0.5448	0.5187	0.0000	0.0328	0.4591
4	22.73	27.4	78.9000	35	401	0.0043	0.9416	1.0000	0.5315	0.6363	0.6058	0.0000	0.0584	0.4685
5	22.35	29.07	29.1000	14	401	0.0050	0.9819	1.0000	0.5789	0.3116	0.2967	0.0000	0.0181	0.4211
6	22.23	29.26	99.4500	42	401	0.0059	0.9841	1.0000	0.5263	1.1348	1.0804	0.0000	0.0159	0.4737
7	22.78	28.39	67.6600	32	401	0.0069	0.9741	1.0000	0.5345	0.9061	0.8626	0.0000	0.0259	0.4655
8	22.46	29.46	93.9600	40	401	0.0080	0.9975	1.0000	0.5276	1.4902	1.4187	0.0000	0.0025	0.4724
9	23.27	28.6	88.1500	41	401	0.0094	0.9959	1.0000	0.5269	1.6325	1.5542	0.0000	0.0041	0.4731
10	23.31	27.65	76.3600	32	401	0.0110	0.9675	1.0000	0.5345	1.6242	1.5462	0.0000	0.0325	0.4655
11	22.37	28.79	79.6400	34	401	0.0128	0.9737	1.0000	0.5325	1.9809	1.8858	0.0000	0.0263	0.4675
12	22.68	26.79	50.7900	19	401	0.0148	0.9209	1.0000	0.5581	1.4480	1.3785	0.0000	0.0791	0.4419
13	22.15	28.36	86.7300	33	401	0.0172	0.9534	1.0000	0.5335	2.8428	2.7063	0.0000	0.0466	0.4665
14	21.92	28.58	82.4300	35	401	0.0200	0.9531	1.0000	0.5315	3.1253	2.9753	0.0000	0.0469	0.4685
15	21.93	29.08	98.3500	42	401	0.0232	0.9691	1.0000	0.5263	4.3680	4.1583	0.0000	0.0309	0.4737
16	23.08	28.62	81.8300	33	401	0.0271	0.9906	1.0000	0.5335	4.3941	4.1831	0.0000	0.0094	0.4665
17	22.26	28.08	86.2300	36	401	0.0314	0.9481	1.0000	0.5307	5.1068	4.8617	0.0000	0.0519	0.4693
18	22.4	26.21	95.2200	40	401	0.0361	0.8941	1.0000	0.5276	6.0691	5.7778	0.0000	0.1059	0.4724
19	21.5	27.6	90.4000	38	401	0.0415	0.9094	1.0000	0.5291	6.7570	6.4327	0.0000	0.0906	0.4709
20	22.08	29.12	100.4300	42	401	0.0481	0.9750	1.0000	0.5263	9.2895	8.8436	0.0000	0.0250	0.4737
21	21.94	28.67	57.6600	23	401	0.0556	0.9566	1.0000	0.5480	6.2968	5.9946	0.0000	0.0434	0.4520
22	23.01	27.69	100.6300	36	401	0.0642	0.9594	1.0000	0.5307	12.3242	11.7326	0.0000	0.0406	0.4693
23	23.01	28.02	69.9000	29	401	0.0741	0.9697	1.0000	0.5381	10.1309	9.6447	0.0000	0.0303	0.4619
24	22.23	29.17	92.4000	40	401	0.0856	0.9813	1.0000	0.5276	15.3434	14.6069	0.0000	0.0187	0.4724
25	22.54	29.42	98.7000	45	401	0.0989	0.9988	1.0000	0.5245	19.1595	18.2398	0.0000	0.0012	0.4755
26	23.6	28.65	86.9000	42	401	0.1141	0.9813	1.0000	0.5263	19.1889	18.2678	0.0000	0.0188	0.4737
27	23.24	28.58	81.2800	31	401	0.1311	0.9944	1.0000	0.5356	21.2621	20.2415	0.0000	0.0056	0.4644
28	22.87	28.02	85.3000	38	401	0.1495	0.9653	1.0000	0.5291	24.4073	23.2358	0.0000	0.0347	0.4709
29	22.87	27.85	74.2700	26	401	0.1699	0.9600	1.0000	0.5425	24.6243	23.4423	0.0000	0.0400	0.4575
30	22.72	27.9	98.9300	35	401	0.1923	0.9569	1.0000	0.5315	36.2626	34.5220	0.0000	0.0431	0.4685
31	22.49	29.11	92.7900	39	401	0.2177	0.9875	1.0000	0.5283	39.4900	37.5945	0.0000	0.0125	0.4717

Table A27 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2016

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.61	29.08	85.7500	33	401	0.2445	0.9591	1.0000	0.5335	40.1962	38.2667	0.0000	0.0409	0.4665
33	22.14	29.72	44.7500	18	401	0.2745	0.9956	1.0000	0.5613	25.7284	24.4935	0.0000	0.0044	0.4387
34	22.76	27.04	91.4000	39	401	0.3045	0.9312	1.0000	0.5283	51.3101	48.8473	0.0000	0.0688	0.4717
35	22.33	28.28	80.7300	31	401	0.3370	0.9566	1.0000	0.5356	52.2324	49.7253	0.0000	0.0434	0.4644
36	22.12	29.9	77.0500	30	401	0.3726	0.9985	1.0000	0.5368	57.6565	54.8890	0.0000	0.0015	0.4632
37	22.69	27.98	89.0700	33	401	0.4078	0.9584	1.0000	0.5335	69.5920	66.2516	0.0000	0.0416	0.4665
38	22.11	28.99	57.9100	22	401	0.4443	0.9719	1.0000	0.5502	51.5569	49.0822	0.0000	0.0281	0.4498
39	22.66	27.74	101.0000	41	401	0.4804	0.9500	1.0000	0.5269	91.0120	86.6434	0.0000	0.0500	0.4731
40	21.93	29.98	84.5500	32	401	0.5181	0.9972	1.0000	0.5345	87.5017	83.3016	0.0000	0.0028	0.4655
41	23.03	26.58	98.4900	34	401	0.5527	0.9253	1.0000	0.5325	100.5101	95.6856	0.0000	0.0747	0.4675
42	22.91	26.88	103.9100	41	401	0.5867	0.9309	1.0000	0.5269	112.0603	106.6814	0.0000	0.0691	0.4731
43	22.88	28.73	73.0900	29	401	0.6214	0.9878	1.0000	0.5381	90.4652	86.1229	0.0000	0.0122	0.4619
44	23.15	27.09	88.0500	33	401	0.6531	0.9450	1.0000	0.5335	108.6368	103.4223	0.0000	0.0550	0.4665
45	21.98	29.64	107.8400	45	401	0.6844	0.9881	1.0000	0.5245	143.3503	136.4695	0.0000	0.0119	0.4755
46	22.34	31.33	97.6800	39	401	0.7154	0.8747	0.8338	0.5283	121.0163	115.2075	0.1663	0.1253	0.4717
47	23.65	28.44	95.9800	32	401	0.7426	0.9932	1.0000	0.5345	141.7922	134.9862	0.0000	0.0068	0.4655
48	23.01	29.87	76.5700	28	402	0.7680	0.9340	1.0000	0.5394	112.7264	107.3155	0.0000	0.0660	0.4606
49	23.06	29.08	92.7600	42	402	0.7905	0.9895	1.0000	0.5263	145.2833	138.3097	0.0000	0.0105	0.4737
50	22.77	30.36	94.4400	39	402	0.8113	0.9153	0.9550	0.5283	140.9544	134.1886	0.0450	0.0847	0.4717
51	23.31	29.3	97.8400	36	402	0.8295	0.9543	1.0000	0.5307	156.3668	148.8612	0.0000	0.0457	0.4693
52	23.23	29.34	100.3500	40	402	0.8456	0.9572	1.0000	0.5276	163.0612	155.2343	0.0000	0.0428	0.4724
53	23.67	28.49	103.8100	42	402	0.8596	0.9880	1.0000	0.5263	176.5500	168.0756	0.0000	0.0120	0.4737
54	23.57	28.02	50.4100	17	402	0.8718	0.9872	1.0000	0.5649	93.2496	88.7737	0.0000	0.0128	0.4351
55	23.49	28.66	91.9000	31	402	0.8826	0.9888	1.0000	0.5356	163.4274	155.5829	0.0000	0.0112	0.4644
56	23.73	28.08	113.2300	42	402	0.8919	0.9941	1.0000	0.5263	201.0141	191.3654	0.0000	0.0059	0.4737
57	22.6	29.24	91.2800	36	402	0.9000	0.9950	1.0000	0.5307	165.0363	157.1146	0.0000	0.0050	0.4693
58	23.53	28.05	100.9500	38	402	0.9069	0.9869	1.0000	0.5291	181.8780	173.1478	0.0000	0.0131	0.4709
59	22.99	30.24	113.4500	44	402	0.9133	0.9078	0.9700	0.5251	187.9064	178.8869	0.0300	0.0922	0.4749
60	23.77	28.63	116.0900	43	402	0.9186	0.9700	1.0000	0.5257	206.8890	196.9584	0.0000	0.0300	0.4743
61	23.42	28.41	105.3700	37	402	0.9231	0.9947	1.0000	0.5298	195.0376	185.6758	0.0000	0.0053	0.4702
62	22.67	29.46	108.4600	44	402	0.9270	0.9902	1.0000	0.5251	198.9074	189.3598	0.0000	0.0098	0.4749

Table A28. Cowpea Biomass Growth with Stress Values for Makurdi 2017

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.91	28.65	69.0800	38	404	0.0027	0.9863	1.0000	0.5291	0.3884	0.369783	0.0000	0.0137	0.4709
2	23.11	28.3	34.3400	18	404	0.0032	0.9816	1.0000	0.5613	0.2385	0.227007	0.0000	0.0184	0.4387
3	23.02	27.1	55.2700	34	404	0.0037	0.9413	1.0000	0.5325	0.4056	0.386151	0.0000	0.0587	0.4675
4	22.01	28.48	89.1800	51	404	0.0043	0.9528	1.0000	0.5216	0.7555	0.719193	0.0000	0.0472	0.4784
5	21.74	29.9	55.3100	42	404	0.0051	0.9888	1.0000	0.5263	0.5742	0.546601	0.0000	0.0112	0.4737
6	22.83	30.6	66.2300	38	404	0.0060	0.8928	0.9250	0.5291	0.7368	0.701473	0.0750	0.1072	0.4709
7	23	27.81	73.8400	31	404	0.0070	0.9628	1.0000	0.5356	1.0453	0.99508	0.0000	0.0372	0.4644
8	22.54	28.15	71.8300	37	404	0.0082	0.9591	1.0000	0.5298	1.1667	1.11066	0.0000	0.0409	0.4702
9	22.43	28.76	84.8400	38	404	0.0095	0.9747	1.0000	0.5291	1.6320	1.553637	0.0000	0.0253	0.4709
10	22.18	30.67	112.0200	53	404	0.0112	0.9362	0.9163	0.5208	2.3971	2.28205	0.0838	0.0638	0.4792
11	22.87	28.69	91.4100	43	404	0.0131	0.9863	1.0000	0.5257	2.4303	2.313646	0.0000	0.0137	0.4743
12	22.77	27.27	74.6500	34	404	0.0152	0.9388	1.0000	0.5325	2.2187	2.112212	0.0000	0.0613	0.4675
13	22.19	28.03	87.7700	43	404	0.0176	0.9444	1.0000	0.5257	3.0056	2.861289	0.0000	0.0556	0.4743
14	21.62	29.26	74.5400	31	404	0.0205	0.9650	1.0000	0.5356	3.0917	2.94331	0.0000	0.0350	0.4644
15	22.83	28.2	78.3000	36	404	0.0238	0.9697	1.0000	0.5307	3.7624	3.581759	0.0000	0.0303	0.4693
16	23.29	28.16	70.0000	33	404	0.0278	0.9828	1.0000	0.5335	3.9935	3.8018	0.0000	0.0172	0.4665
17	22.72	27.37	75.2200	36	404	0.0321	0.9403	1.0000	0.5307	4.7250	4.498156	0.0000	0.0597	0.4693
18	22.83	26.98	86.5300	40	403	0.0371	0.9316	1.0000	0.5276	6.0901	5.79778	0.0000	0.0684	0.4724
19	21.98	29.9	91.7000	40	403	0.0432	0.9962	1.0000	0.5276	8.0406	7.654697	0.0000	0.0038	0.4724
20	23.02	27.48	68.1700	25	403	0.0499	0.9531	1.0000	0.5442	6.8188	6.49149	0.0000	0.0469	0.4558
21	22.7	29.8	86.8800	37	403	0.0582	0.9625	1.0000	0.5298	9.9601	9.482037	0.0000	0.0375	0.4702
22	22.61	29.23	88.6600	49	403	0.0675	0.9950	1.0000	0.5225	12.0236	11.44649	0.0000	0.0050	0.4775
23	22.74	28.53	81.2200	35	403	0.0780	0.9772	1.0000	0.5315	12.7134	12.10312	0.0000	0.0228	0.4685
24	22.93	25.55	53.6600	26	403	0.0889	0.8900	1.0000	0.5425	8.8902	8.463428	0.0000	0.1100	0.4575
25	22.07	28.53	85.1500	36	403	0.1020	0.9563	1.0000	0.5307	17.0161	16.19936	0.0000	0.0437	0.4693
26	22.48	29.15	111.8300	47	403	0.1173	0.9884	1.0000	0.5235	26.2100	24.95196	0.0000	0.0116	0.4765
27	22.61	29.64	113.7000	51	403	0.1349	0.9813	1.0000	0.5216	30.3192	28.86388	0.0000	0.0188	0.4784
28	23.52	27.56	93.7700	34	403	0.1539	0.9713	1.0000	0.5325	28.8228	27.43926	0.0000	0.0288	0.4675
29	23.11	29.34	86.0100	41	403	0.1760	0.9662	1.0000	0.5269	29.7631	28.33451	0.0000	0.0338	0.4731
30	22.99	28.84	103.1000	49	403	0.1999	0.9947	1.0000	0.5225	41.3813	39.39497	0.0000	0.0053	0.4775
31	22.98	27.71	90.2100	39	403	0.2252	0.9591	1.0000	0.5283	39.7628	37.85417	0.0000	0.0409	0.4717

Table A28 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2017

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.68	28.87	95.3100	40	403	0.2535	0.9859	1.0000	0.5276	48.5336	46.20403	0.0000	0.0141	0.4724
33	22.69	28.23	83.0700	37	403	0.2832	0.9663	1.0000	0.5298	46.5175	44.28461	0.0000	0.0337	0.4702
34	22.92	28.61	75.0800	35	403	0.3155	0.9853	1.0000	0.5315	47.9158	45.61586	0.0000	0.0147	0.4685
35	21.96	29.95	98.3400	43	403	0.3500	0.9972	1.0000	0.5257	69.6784	66.33385	0.0000	0.0028	0.4743
36	22.83	29.3	104.9400	51	403	0.3862	0.9903	1.0000	0.5216	80.8504	76.96963	0.0000	0.0097	0.4784
37	23.69	29.37	69.6900	37	403	0.4246	0.9205	1.0000	0.5298	55.7338	53.05861	0.0000	0.0795	0.4702
38	23.34	28.84	110.7700	49	403	0.4626	0.9865	1.0000	0.5225	102.0153	97.11855	0.0000	0.0135	0.4775
39	22.65	26.75	100.7900	40	403	0.4975	0.9188	1.0000	0.5276	93.8719	89.36602	0.0000	0.0813	0.4724
40	22.62	29.75	98.5700	50	403	0.5356	0.9722	1.0000	0.5221	103.5007	98.5327	0.0000	0.0278	0.4779
41	22.89	29.48	89.3400	35	403	0.5730	0.9722	1.0000	0.5315	102.1689	97.2648	0.0000	0.0278	0.4685
42	23.5	27.78	103.6600	43	403	0.6079	0.9775	1.0000	0.5257	125.0555	119.0528	0.0000	0.0225	0.4743
43	22.33	29.86	84.6100	37	403	0.6423	0.9858	1.0000	0.5298	109.6190	104.3573	0.0000	0.0142	0.4702
44	23.48	26.94	110.0600	50	403	0.6730	0.9506	1.0000	0.5221	141.9866	135.1713	0.0000	0.0494	0.4779
45	22.91	26.65	95.8200	34	403	0.7011	0.9238	1.0000	0.5325	127.6240	121.4981	0.0000	0.0762	0.4675
46	22.69	29.12	104.1900	48	403	0.7292	0.9941	1.0000	0.5230	152.5558	145.2332	0.0000	0.0059	0.4770
47	22.56	27.87	100.4700	38	403	0.7539	0.9509	1.0000	0.5291	147.1836	140.1188	0.0000	0.0491	0.4709
48	22.32	29.58	108.8800	50	404	0.7776	0.9969	1.0000	0.5221	172.7127	164.4225	0.0000	0.0031	0.4779
49	22.92	31.31	120.4600	50	404	0.8005	0.8327	0.8363	0.5221	164.3126	156.4256	0.1638	0.1673	0.4779
50	22.55	29.85	90.0400	42	404	0.8198	0.9700	1.0000	0.5263	147.6904	140.6013	0.0000	0.0300	0.4737
51	23.68	28.87	121.3800	50	404	0.8370	0.9588	1.0000	0.5221	199.3195	189.7521	0.0000	0.0412	0.4779
52	23.8	28.55	69.3700	29	404	0.8521	0.9737	1.0000	0.5381	121.3955	115.5685	0.0000	0.0263	0.4619
53	22.86	27.6	97.6900	40	404	0.8647	0.9519	1.0000	0.5276	166.2829	158.3013	0.0000	0.0481	0.4724
54	22.84	28.94	113.1700	47	404	0.8763	0.9931	1.0000	0.5235	202.0795	192.3797	0.0000	0.0069	0.4765
55	22.93	28.39	96.6800	37	404	0.8862	0.9788	1.0000	0.5298	174.1583	165.7987	0.0000	0.0212	0.4702
56	23.23	28.69	114.7000	51	404	0.8951	0.9975	1.0000	0.5216	209.3954	199.3444	0.0000	0.0025	0.4784
57	22.38	29.69	74.3000	35	404	0.9028	0.9948	1.0000	0.5315	139.0238	132.3507	0.0000	0.0052	0.4685
58	22.8	27.15	112.0300	50	404	0.9091	0.9359	1.0000	0.5221	195.0634	185.7004	0.0000	0.0641	0.4779
59	21.76	29.76	105.6600	47	404	0.9149	0.9850	1.0000	0.5235	195.3649	185.9874	0.0000	0.0150	0.4765
60	22.51	30.58	101.4600	51	404	0.9200	0.9182	0.9275	0.5216	175.2595	166.8471	0.0725	0.0818	0.4784
61	23.11	27.61	95.4500	41	404	0.9242	0.9600	1.0000	0.5269	174.9045	166.5091	0.0000	0.0400	0.4731
62	22.22	31.41	116.0800	48	404	0.9281	0.8778	0.8238	0.5230	193.8489	184.5442	0.1763	0.1222	0.4770

Table A29. Cowpea Biomass Growth with Stress Values for Makurdi 2018

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.9	30.48	104.6800	54	406	0.0028	0.8965	0.9400	0.5204	0.5467	0.4996	0.0600	0.1035	0.4796
2	22.75	29.98	78.1200	45	406	0.0033	0.9452	1.0000	0.5245	0.5104	0.4664	0.0000	0.0548	0.4755
3	23.34	27.25	45.7600	24	406	0.0038	0.9559	1.0000	0.5460	0.3665	0.3350	0.0000	0.0441	0.4540
4	22.33	28.8	93.3800	45	406	0.0044	0.9728	1.0000	0.5245	0.8538	0.7803	0.0000	0.0272	0.4755
5	22.19	29.51	73.9300	33	406	0.0052	0.9906	1.0000	0.5335	0.8196	0.7490	0.0000	0.0094	0.4665
6	22.66	28.48	69.4500	33	406	0.0061	0.9731	1.0000	0.5335	0.8829	0.8069	0.0000	0.0269	0.4665
7	22.76	27.03	74.8100	30	406	0.0070	0.9309	1.0000	0.5368	1.0615	0.9701	0.0000	0.0691	0.4632
8	22.69	27.55	70.5800	25	406	0.0082	0.9450	1.0000	0.5442	1.1973	1.0943	0.0000	0.0550	0.4558
9	22.87	27.96	83.7500	34	406	0.0095	0.9634	1.0000	0.5325	1.6512	1.5091	0.0000	0.0366	0.4675
10	23.01	27.93	53.2900	24	406	0.0111	0.9669	1.0000	0.5460	1.2600	1.1515	0.0000	0.0331	0.4540
11	22.15	29.83	84.2000	30	406	0.0130	0.9994	1.0000	0.5368	2.3690	2.1651	0.0000	0.0006	0.4632
12	22.87	29.88	82.8800	44	406	0.0153	0.9438	1.0000	0.5251	2.5311	2.3133	0.0000	0.0563	0.4749
13	22.66	30.26	76.4300	34	406	0.0180	0.9310	0.9675	0.5325	2.7449	2.5086	0.0325	0.0690	0.4675
14	22.83	29.58	107.4500	46	406	0.0210	0.9693	1.0000	0.5240	4.6336	4.2348	0.0000	0.0307	0.4760
15	22.94	29.34	91.5200	38	406	0.0246	0.9790	1.0000	0.5291	4.7115	4.3059	0.0000	0.0210	0.4709
16	22.61	28.78	99.2600	45	406	0.0287	0.9809	1.0000	0.5245	5.9129	5.4039	0.0000	0.0191	0.4755
17	22.7	28.72	85.5600	39	406	0.0334	0.9819	1.0000	0.5283	5.9818	5.4669	0.0000	0.0181	0.4717
18	23.01	29.45	78.5300	40	405	0.0391	0.9655	1.0000	0.5276	6.2128	5.6780	0.0000	0.0345	0.4724
19	22.87	27.41	77.2300	37	405	0.0451	0.9463	1.0000	0.5298	6.9498	6.3516	0.0000	0.0537	0.4702
20	21.73	29.23	83.3800	36	405	0.0523	0.9675	1.0000	0.5307	8.8994	8.1334	0.0000	0.0325	0.4693
21	21.87	30	98.3200	45	405	0.0607	0.9959	1.0000	0.5245	12.4043	11.3365	0.0000	0.0041	0.4755
22	23.67	26.98	98.7600	43	405	0.0700	0.9578	1.0000	0.5257	13.8511	12.6588	0.0000	0.0422	0.4743
23	22.69	28.98	75.0400	36	405	0.0810	0.9897	1.0000	0.5307	12.7008	11.6075	0.0000	0.0103	0.4693
24	22.66	29	93.3900	39	405	0.0936	0.9894	1.0000	0.5283	18.1638	16.6002	0.0000	0.0106	0.4717
25	22.73	27.8	68.7000	30	405	0.1073	0.9541	1.0000	0.5368	15.0073	13.7155	0.0000	0.0459	0.4632
26	23.14	27.86	40.3600	15	405	0.1229	0.9688	1.0000	0.5736	10.9623	10.0186	0.0000	0.0313	0.4264
27	22.56	25.08	80.6100	24	405	0.1385	0.8638	1.0000	0.5460	20.9348	19.1327	0.0000	0.1362	0.4540
28	21.73	31.41	96.5700	42	405	0.1592	0.9145	0.8238	0.5263	29.4340	26.9003	0.1763	0.0855	0.4737
29	23.19	28.9	107.7100	48	405	0.1817	0.9932	1.0000	0.5230	40.4215	36.9420	0.0000	0.0068	0.4770
30	22.9	28.38	115.1800	54	405	0.2057	0.9775	1.0000	0.5204	47.9459	43.8187	0.0000	0.0225	0.4796
31	22.9	27.92	114.1500	48	405	0.2317	0.9631	1.0000	0.5230	52.9754	48.4153	0.0000	0.0369	0.4770

Table A29 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2018

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.73	27.93	86.6800	43	405	0.2596	0.9581	1.0000	0.5257	45.0659	41.1867	0.0000	0.0419	0.4743
33	22.5	29.54	106.9300	47	405	0.2908	0.9970	1.0000	0.5235	64.5543	58.9975	0.0000	0.0030	0.4765
34	22.9	29.52	104.3300	49	405	0.3245	0.9685	1.0000	0.5225	68.1479	62.2817	0.0000	0.0315	0.4775
35	22.98	28.48	103.3000	45	405	0.3589	0.9831	1.0000	0.5245	76.0436	69.4978	0.0000	0.0169	0.4755
36	23.12	29.97	112.7900	48	405	0.3966	0.9182	1.0000	0.5230	85.4288	78.0751	0.0000	0.0818	0.4770
37	23.57	29.75	126.1600	51	405	0.4355	0.9010	1.0000	0.5216	102.6992	93.8589	0.0000	0.0990	0.4784
38	24	27.87	79.3500	37	405	0.4733	0.9959	1.0000	0.5298	78.8083	72.0245	0.0000	0.0041	0.4702
39	23.42	27.86	102.8400	47	405	0.5103	0.9775	1.0000	0.5235	106.8063	97.6124	0.0000	0.0225	0.4765
40	23.03	28.74	57.4200	26	405	0.5476	0.9928	1.0000	0.5425	67.3414	61.5446	0.0000	0.0072	0.4575
41	22.67	29.02	110.8500	42	405	0.5838	0.9903	1.0000	0.5263	134.1357	122.5893	0.0000	0.0097	0.4737
42	23.33	27.95	92.8800	39	405	0.6183	0.9775	1.0000	0.5283	117.9456	107.7929	0.0000	0.0225	0.4717
43	22.48	30.73	124.1000	52	405	0.6532	0.9092	0.9088	0.5212	152.7860	139.6342	0.0913	0.0908	0.4788
44	22.3	28.62	116.6700	49	405	0.6838	0.9663	1.0000	0.5225	160.1928	146.4034	0.0000	0.0337	0.4775
45	23.46	29.45	74.5900	31	405	0.7142	0.9318	1.0000	0.5356	105.7260	96.6251	0.0000	0.0682	0.4644
46	23.17	28.76	106.7400	42	405	0.7413	0.9978	1.0000	0.5263	165.2556	151.0304	0.0000	0.0022	0.4737
47	23.03	31.73	126.8100	55	405	0.7682	0.7930	0.7838	0.5201	159.7872	146.0327	0.2163	0.2070	0.4799
48	23.84	29.68	105.7300	50	406	0.7916	0.8860	1.0000	0.5221	156.1919	142.7469	0.0000	0.1140	0.4779
49	22.93	28.15	80.2100	37	406	0.8111	0.9713	1.0000	0.5298	135.0644	123.4380	0.0000	0.0288	0.4702
50	21.66	29.53	100.8900	45	406	0.8286	0.9747	1.0000	0.5245	172.4225	157.5804	0.0000	0.0253	0.4755
51	22.79	30.7	100.4100	47	406	0.8452	0.8883	0.9125	0.5235	159.2106	145.5057	0.0875	0.1117	0.4765
52	23.91	26.62	87.4800	34	406	0.8586	0.9541	1.0000	0.5325	153.9457	140.6940	0.0000	0.0459	0.4675
53	22.95	30.29	96.6600	39	406	0.8715	0.9070	0.9638	0.5283	162.8436	148.8260	0.0363	0.0930	0.4717
54	22.73	30.31	120.2300	51	406	0.8826	0.9220	0.9613	0.5216	205.8978	188.1742	0.0388	0.0780	0.4784
55	23.36	28.96	104.0900	44	406	0.8920	0.9760	1.0000	0.5251	191.9767	175.4513	0.0000	0.0240	0.4749
56	23.26	27.34	113.5400	49	406	0.8998	0.9563	1.0000	0.5225	205.9509	188.2227	0.0000	0.0437	0.4775
57	22.35	28.78	77.0600	34	406	0.9067	0.9728	1.0000	0.5325	146.0176	133.4484	0.0000	0.0272	0.4675
58	22.77	29.27	99.4100	47	406	0.9129	0.9970	1.0000	0.5235	191.0835	174.6350	0.0000	0.0030	0.4765
59	22.98	27.22	101.1900	52	406	0.9179	0.9438	1.0000	0.5212	184.3317	168.4644	0.0000	0.0562	0.4788
60	22.4	30.8	110.0800	51	406	0.9227	0.9100	0.9000	0.5216	194.5146	177.7707	0.1000	0.0900	0.4784
61	22.81	28.76	79.7600	42	406	0.9266	0.9866	1.0000	0.5263	154.8050	141.4794	0.0000	0.0134	0.4737
62	22.53	29.22	101.8400	41	406	0.9299	0.9922	1.0000	0.5269	199.7523	182.5576	0.0000	0.0078	0.4731

Table A30. Cowpea Biomass Growth with Stress Values for Makurdi 2019

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.43	29.01	83.0900	35	409	0.0028	0.9670	1.0000	0.5315	0.4961	0.4534	0.0000	0.0330	0.4685
2	23.01	30.26	90.7000	41	409	0.0033	0.9047	0.9675	0.5269	0.5929	0.5418	0.0325	0.0953	0.4731
3	23.36	29.83	87.3800	49	409	0.0038	0.9108	1.0000	0.5225	0.6727	0.6148	0.0000	0.0892	0.4775
4	22.87	28.33	83.5300	35	409	0.0045	0.9750	1.0000	0.5315	0.8179	0.7475	0.0000	0.0250	0.4685
5	22.53	28.1	76.8800	39	409	0.0052	0.9572	1.0000	0.5283	0.8555	0.7818	0.0000	0.0428	0.4717
6	21.01	30.17	83.6400	39	409	0.0061	0.9744	0.9788	0.5283	1.1062	1.0110	0.0213	0.0256	0.4717
7	22.23	27.85	88.7400	37	409	0.0071	0.9400	1.0000	0.5298	1.3185	1.2050	0.0000	0.0600	0.4702
8	20.77	30.55	95.4400	48	409	0.0083	0.9788	0.9313	0.5230	1.7023	1.5558	0.0688	0.0212	0.4770
9	22.86	28.24	47.8700	25	409	0.0097	0.9719	1.0000	0.5442	1.0291	0.9405	0.0000	0.0281	0.4558
10	21.63	28.4	94.2300	36	409	0.0112	0.9384	1.0000	0.5307	2.2128	2.0223	0.0000	0.0616	0.4693
11	21.69	29.36	77.6700	35	409	0.0131	0.9703	1.0000	0.5315	2.2019	2.0124	0.0000	0.0297	0.4685
12	22.05	29.38	85.2700	41	409	0.0153	0.9822	1.0000	0.5269	2.8318	2.5881	0.0000	0.0178	0.4731
13	22.53	28.31	85.4800	41	409	0.0178	0.9638	1.0000	0.5269	3.2413	2.9623	0.0000	0.0362	0.4731
14	22.15	28.53	96.1900	44	409	0.0206	0.9588	1.0000	0.5251	4.2023	3.8405	0.0000	0.0413	0.4749
15	22.05	27.95	108.7800	43	409	0.0239	0.9375	1.0000	0.5257	5.3861	4.9224	0.0000	0.0625	0.4743
16	22.49	28.85	105.4000	37	409	0.0278	0.9794	1.0000	0.5298	6.3999	5.8490	0.0000	0.0206	0.4702
17	22.49	28.88	43.9000	23	409	0.0324	0.9803	1.0000	0.5480	3.2123	2.9358	0.0000	0.0197	0.4520
18	23.03	29.49	97.9100	40	408	0.0379	0.9610	1.0000	0.5276	7.8002	7.1287	0.0000	0.0390	0.4724
19	23.38	30.74	89.3700	37	408	0.0446	0.8410	0.9075	0.5298	7.3665	6.7324	0.0925	0.1590	0.4702
20	22.11	30.78	111.8600	49	408	0.0521	0.9332	0.9025	0.5225	11.7953	10.7799	0.0975	0.0668	0.4775
21	23.27	27.28	90.6300	45	408	0.0602	0.9547	1.0000	0.5245	11.3306	10.3553	0.0000	0.0453	0.4755
22	23.51	28.41	24.6800	14	408	0.0698	0.9975	1.0000	0.5789	4.1282	3.7728	0.0000	0.0025	0.4211
23	23.38	29.73	103.5200	47	408	0.0813	0.9168	1.0000	0.5235	16.7609	15.3182	0.0000	0.0832	0.4765
24	22.94	28.79	92.1400	34	408	0.0939	0.9916	1.0000	0.5325	18.9555	17.3238	0.0000	0.0084	0.4675
25	22.84	28.73	84.5600	36	408	0.1081	0.9866	1.0000	0.5307	19.8636	18.1537	0.0000	0.0134	0.4693
26	21.64	29.96	81.7500	37	408	0.1242	0.9875	1.0000	0.5298	22.0471	20.1493	0.0000	0.0125	0.4702
27	22.13	29.41	68.3500	34	408	0.1423	0.9856	1.0000	0.5325	21.1750	19.3523	0.0000	0.0144	0.4675
28	22.4	27.17	91.3000	43	408	0.1611	0.9241	1.0000	0.5257	29.6439	27.0922	0.0000	0.0759	0.4743
29	22.26	30.66	111.4900	52	408	0.1843	0.9310	0.9175	0.5212	41.3777	37.8159	0.0825	0.0690	0.4788
30	23.39	26.04	89.3900	46	408	0.2072	0.9197	1.0000	0.5240	37.0306	33.8430	0.0000	0.0803	0.4760
31	23.27	29.54	88.1500	35	408	0.2350	0.9392	1.0000	0.5315	42.9066	39.2132	0.0000	0.0608	0.4685

Table A30 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2019

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.91	28.14	93.9400	44	408	0.2635	0.9703	1.0000	0.5251	52.3271	47.8228	0.0000	0.0297	0.4749
33	22.88	29.48	67.6900	33	408	0.2954	0.9730	1.0000	0.5335	43.0604	39.3537	0.0000	0.0270	0.4665
34	22.71	28.35	95.6900	45	408	0.3279	0.9706	1.0000	0.5245	66.2775	60.5723	0.0000	0.0294	0.4755
35	23.23	28.35	87.7200	34	408	0.3626	0.9869	1.0000	0.5325	69.3420	63.3730	0.0000	0.0131	0.4675
36	22.9	26.88	80.7500	32	408	0.3965	0.9306	1.0000	0.5345	66.0760	60.3882	0.0000	0.0694	0.4655
37	22.48	28.83	89.2300	41	408	0.4330	0.9784	1.0000	0.5269	82.6577	75.5425	0.0000	0.0216	0.4731
38	22.44	29.69	98.4800	48	408	0.4711	0.9902	1.0000	0.5230	99.6907	91.1094	0.0000	0.0098	0.4770
39	23.05	29.55	95.6400	44	408	0.5097	0.9550	1.0000	0.5251	101.4340	92.7025	0.0000	0.0450	0.4749
40	22.56	29.17	96.9500	46	408	0.5469	0.9916	1.0000	0.5240	114.3100	104.4702	0.0000	0.0084	0.4760
41	23.33	29.44	89.9500	42	408	0.5844	0.9423	1.0000	0.5263	108.1573	98.8471	0.0000	0.0577	0.4737
42	23.61	28.94	91.3000	46	408	0.6202	0.9588	1.0000	0.5240	118.0410	107.8800	0.0000	0.0412	0.4760
43	23.33	26.98	88.3900	42	408	0.6521	0.9472	1.0000	0.5263	119.2121	108.9503	0.0000	0.0528	0.4737
44	22.33	28.15	93.5700	42	408	0.6823	0.9525	1.0000	0.5263	132.7929	121.3621	0.0000	0.0475	0.4737
45	22.26	30.29	104.8100	57	408	0.7125	0.9588	0.9638	0.5194	154.2820	141.0014	0.0363	0.0412	0.4806
46	22.36	29.18	87.3200	43	408	0.7394	0.9856	1.0000	0.5257	138.8073	126.8587	0.0000	0.0144	0.4743
47	22.81	28.26	95.3400	43	408	0.7638	0.9709	1.0000	0.5257	154.2157	140.9408	0.0000	0.0291	0.4743
48	22.74	26.48	83.0800	34	409	0.7847	0.9131	1.0000	0.5325	133.3404	121.8625	0.0000	0.0869	0.4675
49	22.37	30.4	79.0700	33	409	0.8059	0.9423	0.9500	0.5335	134.7372	123.1390	0.0500	0.0577	0.4665
50	22.31	28.7	86.9200	40	409	0.8238	0.9691	1.0000	0.5276	154.0120	140.7547	0.0000	0.0309	0.4724
51	22.81	29.91	85.5200	34	409	0.8407	0.9460	1.0000	0.5325	152.3438	139.2300	0.0000	0.0540	0.4675
52	22.73	29.41	95.8200	45	409	0.8553	0.9895	1.0000	0.5245	178.9359	163.5331	0.0000	0.0105	0.4755
53	21.87	26.48	59.4300	25	409	0.8667	0.8859	1.0000	0.5442	104.4593	95.4674	0.0000	0.1141	0.4558
54	21.31	29.51	106.5200	42	409	0.8777	0.9631	1.0000	0.5263	199.3509	182.1908	0.0000	0.0369	0.4737
55	22.57	29.44	85.7700	34	409	0.8877	0.9992	1.0000	0.5325	170.4133	155.7441	0.0000	0.0008	0.4675
56	21.88	29.98	101.0800	44	409	0.8964	0.9956	1.0000	0.5251	199.2545	182.1026	0.0000	0.0044	0.4749
57	22.3	30.83	96.4600	48	409	0.9042	0.9153	0.8963	0.5230	175.6148	160.4978	0.1038	0.0847	0.4770
58	23.55	27.62	59.3700	26	409	0.9105	0.9741	1.0000	0.5425	120.1519	109.8092	0.0000	0.0259	0.4575
59	23.23	27.15	99.6700	42	409	0.9159	0.9494	1.0000	0.5263	191.8599	175.3446	0.0000	0.0506	0.4737
60	22.49	28.77	99.7700	43	409	0.9206	0.9769	1.0000	0.5257	198.4177	181.3379	0.0000	0.0231	0.4743
61	22.2	29.94	99.9000	46	409	0.9249	0.9895	1.0000	0.5240	201.5272	184.1798	0.0000	0.0105	0.4760
62	23.15	27.49	103.5200	45	409	0.9284	0.9575	1.0000	0.5245	203.0444	185.5663	0.0000	0.0425	0.4755

Table A31. Cowpea Biomass Growth with Stress Values for Makurdi 2020

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	20.98	31.21	86.2700	44	411	0.0028	0.9858	0.8488	0.5251	0.5322	0.4864	0.1513	0.0142	0.4749
2	21.94	30.87	107.5200	59	411	0.0032	0.9392	0.8913	0.5187	0.7353	0.6720	0.1088	0.0608	0.4813
3	22.96	31.29	104.4400	55	411	0.0039	0.8313	0.8388	0.5201	0.7516	0.6869	0.1613	0.1687	0.4799
4	23.55	28.45	84.0800	44	411	0.0045	1.0000	1.0000	0.5251	0.8619	0.7877	0.0000	0.0000	0.4749
5	23.36	30.11	100.8500	49	411	0.0053	0.8898	0.9863	0.5225	1.0811	0.9881	0.0138	0.1102	0.4775
6	23.54	28.59	64.7600	30	411	0.0063	0.9903	1.0000	0.5368	0.9312	0.8510	0.0000	0.0097	0.4632
7	22.58	28.04	91.9500	38	411	0.0073	0.9569	1.0000	0.5291	1.4658	1.3397	0.0000	0.0431	0.4709
8	22.65	30.4	82.8800	43	411	0.0086	0.9213	0.9500	0.5257	1.4890	1.3608	0.0500	0.0787	0.4743
9	23.4	27.44	82.5300	37	411	0.0100	0.9638	1.0000	0.5298	1.8213	1.6645	0.0000	0.0362	0.4702
10	22.38	27.39	66.5500	27	411	0.0116	0.9303	1.0000	0.5409	1.6767	1.5324	0.0000	0.0697	0.4591
11	21.79	29.9	78.8000	33	411	0.0135	0.9903	1.0000	0.5335	2.4371	2.2273	0.0000	0.0097	0.4665
12	22.58	29.42	99.7300	49	411	0.0159	1.0000	1.0000	0.5225	3.5714	3.2639	0.0000	0.0000	0.4775
13	22.35	28.22	99.6600	47	411	0.0184	0.9553	1.0000	0.5235	3.9688	3.6271	0.0000	0.0447	0.4765
14	22.61	28.5	77.8800	35	411	0.0215	0.9722	1.0000	0.5315	3.7319	3.4107	0.0000	0.0278	0.4685
15	21.9	28.32	71.2300	24	411	0.0249	0.9444	1.0000	0.5460	3.9468	3.6071	0.0000	0.0556	0.4540
16	21.16	29.54	90.8300	39	411	0.0289	0.9594	1.0000	0.5283	5.7429	5.2486	0.0000	0.0406	0.4717
17	21.38	28.42	87.1200	40	411	0.0333	0.9312	1.0000	0.5276	6.1675	5.6366	0.0000	0.0688	0.4724
18	22.61	28.08	67.1300	30	410	0.0386	0.9591	1.0000	0.5368	5.6953	5.2050	0.0000	0.0409	0.4632
19	22.05	29.36	79.3000	36	410	0.0449	0.9816	1.0000	0.5307	7.9097	7.2289	0.0000	0.0184	0.4693
20	22.44	29.14	104.5900	49	410	0.0522	0.9869	1.0000	0.5225	11.9975	10.9648	0.0000	0.0131	0.4775
21	23.3	28.59	84.7800	46	410	0.0606	0.9966	1.0000	0.5240	11.4420	10.4571	0.0000	0.0034	0.4760
22	22.54	27.66	82.5300	27	410	0.0698	0.9438	1.0000	0.5409	12.5324	11.4536	0.0000	0.0562	0.4591
23	22.35	29	70.3800	30	410	0.0806	0.9797	1.0000	0.5368	12.7205	11.6255	0.0000	0.0203	0.4632
24	21.5	29.19	110.8800	49	410	0.0927	0.9591	1.0000	0.5225	21.9553	20.0654	0.0000	0.0409	0.4775
25	22.08	30.78	72.6500	34	410	0.1073	0.9355	0.9025	0.5325	16.5637	15.1379	0.0975	0.0645	0.4675
26	23.14	29.19	83.2200	42	410	0.1237	0.9753	1.0000	0.5263	22.5334	20.5937	0.0000	0.0247	0.4737
27	22.69	26.47	91.8800	42	410	0.1403	0.9112	1.0000	0.5263	26.3557	24.0870	0.0000	0.0888	0.4737
28	21.99	29.53	97.4600	45	410	0.1602	0.9850	1.0000	0.5245	34.3925	31.4320	0.0000	0.0150	0.4755
29	22.36	30.3	40.0800	19	410	0.1831	0.9505	0.9625	0.5581	16.6014	15.1724	0.0375	0.0495	0.4419
30	23.1	27.19	86.1800	38	410	0.2066	0.9466	1.0000	0.5291	38.0102	34.7383	0.0000	0.0534	0.4709
31	22.33	28.26	80.5200	39	410	0.2323	0.9559	1.0000	0.5283	40.2865	36.8186	0.0000	0.0441	0.4717

Table A31 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2020

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.49	29.65	89.5900	41	410	0.2617	0.9895	1.0000	0.5269	52.1223	47.6356	0.0000	0.0105	0.4731
33	22.87	27.78	76.5000	38	410	0.2917	0.9578	1.0000	0.5291	48.2192	44.0685	0.0000	0.0422	0.4709
34	22.15	29.05	84.1000	40	410	0.3242	0.9750	1.0000	0.5276	59.7977	54.6503	0.0000	0.0250	0.4724
35	22.34	30.18	80.4800	39	410	0.3597	0.9610	0.9775	0.5283	62.6738	57.2788	0.0225	0.0390	0.4717
36	23.26	29.75	93.3200	53	410	0.3973	0.9242	1.0000	0.5208	76.0986	69.5481	0.0000	0.0758	0.4792
37	22.36	27.21	74.9500	28	410	0.4318	0.9241	1.0000	0.5394	68.7889	62.8675	0.0000	0.0759	0.4606
38	21.78	28.27	102.7300	45	410	0.4674	0.9391	1.0000	0.5245	100.8438	92.1632	0.0000	0.0609	0.4755
39	20.76	30.69	83.8400	47	410	0.5047	0.9828	0.9138	0.5235	92.8254	84.8350	0.0863	0.0172	0.4765
40	22.58	29.82	94.3100	53	410	0.5427	0.9700	1.0000	0.5208	110.2629	100.7715	0.0000	0.0300	0.4792
41	22.32	29.84	74.0400	35	410	0.5796	0.9880	1.0000	0.5315	96.1037	87.8311	0.0000	0.0120	0.4685
42	21.51	28.99	97.5600	44	410	0.6135	0.9531	1.0000	0.5251	127.7226	116.7282	0.0000	0.0469	0.4749
43	22.85	27.57	80.1900	28	410	0.6457	0.9506	1.0000	0.5394	113.2252	103.4788	0.0000	0.0494	0.4606
44	22.17	28.68	81.5900	43	410	0.6767	0.9641	1.0000	0.5257	119.3136	109.0431	0.0000	0.0359	0.4743
45	22.36	28.22	83.4500	31	410	0.7055	0.9556	1.0000	0.5356	128.4932	117.4325	0.0000	0.0444	0.4644
46	21.61	26.57	45.4500	19	410	0.7302	0.8806	1.0000	0.5581	69.5505	63.5636	0.0000	0.1194	0.4419
47	22.08	30.11	78.4800	35	410	0.7562	0.9858	0.9863	0.5315	132.5941	121.1804	0.0138	0.0142	0.4685
48	22.38	29.12	101.9000	50	411	0.7794	0.9844	1.0000	0.5221	176.3781	161.1955	0.0000	0.0156	0.4779
49	22.99	28.44	66.0700	32	411	0.8003	0.9822	1.0000	0.5345	119.9536	109.6280	0.0000	0.0178	0.4655
50	22.89	27.33	79.3700	33	411	0.8184	0.9444	1.0000	0.5335	141.4071	129.2348	0.0000	0.0556	0.4665
51	22.21	29.37	88.4100	44	411	0.8353	0.9869	1.0000	0.5251	165.3677	151.1329	0.0000	0.0131	0.4749
52	23.3	28.15	109.2300	54	411	0.8502	0.9828	1.0000	0.5204	205.2765	187.6063	0.0000	0.0172	0.4796
53	22.52	27.35	77.6800	31	411	0.8628	0.9334	1.0000	0.5356	144.8015	132.3370	0.0000	0.0666	0.4644
54	20.85	29.12	67.0900	29	411	0.8740	0.9366	1.0000	0.5381	127.6863	116.6950	0.0000	0.0634	0.4619
55	21.71	30.18	82.4500	28	411	0.8844	0.9966	0.9775	0.5394	169.3930	154.8116	0.0225	0.0034	0.4606
56	22.36	29.12	96.2900	44	411	0.8934	0.9838	1.0000	0.5251	192.0248	175.4953	0.0000	0.0162	0.4749
57	21.98	28.04	90.9700	31	411	0.9009	0.9381	1.0000	0.5356	177.9467	162.6291	0.0000	0.0619	0.4644
58	21.77	29.41	115.3800	53	411	0.9076	0.9744	1.0000	0.5208	229.6615	209.8922	0.0000	0.0256	0.4792
59	21.99	31.05	112.0700	57	411	0.9138	0.9220	0.8688	0.5194	211.9290	193.6862	0.1313	0.0780	0.4806
60	22.9	28.94	97.1700	47	411	0.9190	0.9950	1.0000	0.5235	201.0007	183.6985	0.0000	0.0050	0.4765
61	22.88	29.87	77.7500	37	411	0.9235	0.9438	1.0000	0.5298	155.1606	141.8043	0.0000	0.0563	0.4702
62	22.56	27.31	109.0900	49	411	0.9271	0.9334	1.0000	0.5225	213.1789	194.8285	0.0000	0.0666	0.4775

Table A32. Cowpea Biomass Growth with Stress Values for Makurdi 2021

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.69	28.6	95.9100	39	413	0.0027	0.9778	1.0000	0.5283	0.6035	0.5515	0.0000	0.0222	0.4717
2	23.08	28.4	50.8200	20	413	0.0032	0.9837	1.0000	0.5552	0.3955	0.3615	0.0000	0.0163	0.4448
3	23.17	26.9	75.6300	34	413	0.0037	0.9397	1.0000	0.5325	0.6264	0.5725	0.0000	0.0603	0.4675
4	22.4	28.62	85.7600	36	413	0.0044	0.9694	1.0000	0.5307	0.8522	0.7788	0.0000	0.0306	0.4693
5	21.98	28.78	93.1800	37	413	0.0051	0.9613	1.0000	0.5298	1.0683	0.9763	0.0000	0.0387	0.4702
6	22.76	27.48	82.1600	45	413	0.0059	0.9450	1.0000	0.5245	1.0655	0.9738	0.0000	0.0550	0.4755
7	22.47	28.23	94.0500	41	413	0.0069	0.9594	1.0000	0.5269	1.4488	1.3241	0.0000	0.0406	0.4731
8	22.37	29.68	85.2800	36	413	0.0081	0.9963	1.0000	0.5307	1.6106	1.4720	0.0000	0.0037	0.4693
9	22.39	27.89	113.1200	50	413	0.0094	0.9463	1.0000	0.5221	2.3194	2.1198	0.0000	0.0537	0.4779
10	22.33	28.76	98.6900	45	413	0.0109	0.9716	1.0000	0.5245	2.4345	2.2249	0.0000	0.0284	0.4755
11	23.73	28.65	88.4400	35	413	0.0128	0.9715	1.0000	0.5315	2.5939	2.3706	0.0000	0.0285	0.4685
12	22.9	29.75	93.8300	41	413	0.0150	0.9513	1.0000	0.5269	3.1375	2.8674	0.0000	0.0487	0.4731
13	23.17	28.81	107.4900	48	413	0.0176	0.9994	1.0000	0.5230	4.3857	4.0082	0.0000	0.0006	0.4770
14	21.55	28.3	68.8600	30	413	0.0204	0.9328	1.0000	0.5368	3.1156	2.8474	0.0000	0.0672	0.4632
15	22.23	29.79	90.4400	39	413	0.0238	0.9985	1.0000	0.5283	5.0406	4.6067	0.0000	0.0015	0.4717
16	22.45	29.93	91.0100	44	413	0.0279	0.9715	1.0000	0.5251	5.7419	5.2476	0.0000	0.0285	0.4749
17	22.54	30.94	113.7500	57	413	0.0328	0.8890	0.8825	0.5194	7.6384	6.9809	0.1175	0.1110	0.4806
18	23.37	28.34	26.4800	28	413	0.0382	0.9909	1.0000	0.5394	2.3981	2.1916	0.0000	0.0091	0.4606
19	22.82	28.81	71.9800	32	413	0.0444	0.9884	1.0000	0.5345	7.4951	6.8499	0.0000	0.0116	0.4655
20	22.26	29.84	54.5300	29	413	0.0517	0.9925	1.0000	0.5381	6.6843	6.1089	0.0000	0.0075	0.4619
21	22.69	29.37	88.2300	48	413	0.0602	0.9955	1.0000	0.5230	12.2612	11.2057	0.0000	0.0045	0.4770
22	23.13	26.76	91.2300	44	413	0.0692	0.9341	1.0000	0.5251	13.7283	12.5465	0.0000	0.0659	0.4749
23	23.02	28.17	61.7800	38	413	0.0799	0.9747	1.0000	0.5291	11.2851	10.3137	0.0000	0.0253	0.4709
24	22.05	29.3	92.2000	42	413	0.0921	0.9797	1.0000	0.5263	19.4203	17.7486	0.0000	0.0203	0.4737
25	22.69	29.74	95.4000	48	413	0.1065	0.9678	1.0000	0.5230	22.8088	20.8454	0.0000	0.0323	0.4770
26	23.04	30.9	107.8600	51	413	0.1236	0.8545	0.8875	0.5216	26.3650	24.0955	0.1125	0.1455	0.4784
27	22.87	30.26	67.4800	34	413	0.1425	0.9152	0.9675	0.5325	20.7953	19.0053	0.0325	0.0848	0.4675
28	23.4	29.12	71.6600	35	413	0.1634	0.9610	1.0000	0.5315	26.5310	24.2473	0.0000	0.0390	0.4685
29	22.9	29.82	98.5300	55	413	0.1867	0.9460	1.0000	0.5201	40.1526	36.6962	0.0000	0.0540	0.4799
30	22.27	29.49	58.7200	28	413	0.2117	0.9925	1.0000	0.5394	29.5229	26.9816	0.0000	0.0075	0.4606
31	22.12	31.09	92.2300	44	413	0.2403	0.9092	0.8638	0.5251	46.9327	42.8927	0.1363	0.0908	0.4749
32	22.6	28.94	99.8600	44	413	0.2696	0.9856	1.0000	0.5251	61.8221	56.5005	0.0000	0.0144	0.4749

Table A32 Continuation. Cowpea Biomass Growth with Stress Values for Makurdi 2021

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.6	28.94	99.8600	44	413	0.2696	0.9856	1.0000	0.5251	61.8221	56.5005	0.0000	0.0144	0.4749
33	22.89	30.35	112.8800	55	413	0.3029	0.9070	0.9563	0.5201	71.5384	65.3803	0.0438	0.0930	0.4799
34	23.45	28.65	63.1600	36	413	0.3369	0.9925	1.0000	0.5307	49.7153	45.4358	0.0000	0.0075	0.4693
35	22.57	30.73	97.5400	51	413	0.3739	0.9025	0.9088	0.5216	76.1678	69.6113	0.0913	0.0975	0.4784
36	23.15	29.92	109.0900	54	413	0.4120	0.9198	1.0000	0.5204	95.4353	87.2203	0.0000	0.0803	0.4796
37	23.16	31.1	109.4200	51	413	0.4523	0.8305	0.8625	0.5216	95.1155	86.9279	0.1375	0.1695	0.4784
38	23.41	26.36	101.1600	44	413	0.4876	0.9303	1.0000	0.5251	106.8995	97.6976	0.0000	0.0697	0.4749
39	23.13	27.72	58.5500	22	413	0.5241	0.9641	1.0000	0.5502	72.2035	65.9882	0.0000	0.0359	0.4498
40	22.43	30.88	90.3600	39	413	0.5628	0.9017	0.8900	0.5283	107.4775	98.2258	0.1100	0.0983	0.4717
41	23.18	28.91	89.7300	43	413	0.5990	0.9932	1.0000	0.5257	124.4936	113.7772	0.0000	0.0068	0.4743
42	22.58	27.28	57.8400	38	413	0.6313	0.9331	1.0000	0.5291	79.9734	73.0893	0.0000	0.0669	0.4709
43	21.36	30.3	91.2600	39	413	0.6640	0.9894	0.9625	0.5283	140.4999	128.4057	0.0375	0.0106	0.4717
44	22.81	30.12	100.5500	49	413	0.6958	0.9303	0.9850	0.5225	150.8555	137.8698	0.0150	0.0697	0.4775
45	22.07	30.68	110.2700	50	413	0.7251	0.9438	0.9150	0.5221	174.7590	159.7157	0.0850	0.0563	0.4779
46	22.9	28.52	70.0500	31	413	0.7509	0.9819	1.0000	0.5356	122.7203	112.1565	0.0000	0.0181	0.4644
47	23.03	29.59	120.5900	53	413	0.7754	0.9535	1.0000	0.5208	205.9902	188.2586	0.0000	0.0465	0.4792
48	23.44	27.79	99.8500	50	413	0.7965	0.9759	1.0000	0.5221	179.7725	164.2977	0.0000	0.0241	0.4779
49	23.19	29.53	109.2900	53	413	0.8164	0.9460	1.0000	0.5208	195.0307	178.2424	0.0000	0.0540	0.4792
50	23.21	29.27	119.0600	56	413	0.8340	0.9640	1.0000	0.5197	220.6953	201.6978	0.0000	0.0360	0.4803
51	23.16	31.05	118.1300	55	413	0.8503	0.8342	0.8688	0.5201	193.3407	176.6979	0.1313	0.1658	0.4799
52	23.65	30.88	120.7700	57	413	0.8647	0.8102	0.8900	0.5194	194.9582	178.1762	0.1100	0.1898	0.4806
53	24.05	28.37	108.3000	53	413	0.8765	0.9685	1.0000	0.5208	212.4152	194.1305	0.0000	0.0315	0.4792
54	23.16	27.02	102.9700	49	413	0.8861	0.9431	1.0000	0.5225	199.4735	182.3028	0.0000	0.0569	0.4775
55	22.32	31.76	120.8500	56	413	0.8955	0.8440	0.7800	0.5197	210.5951	192.4671	0.2200	0.1560	0.4803
56	24.59	27.66	106.3800	55	413	0.9032	0.9813	1.0000	0.5201	217.5315	198.8064	0.0000	0.0188	0.4799
57	23.88	30.03	90.7500	48	413	0.9102	0.8568	0.9963	0.5230	164.1976	150.0635	0.0038	0.1432	0.4770
58	23.98	29.85	101.6600	51	413	0.9162	0.8628	1.0000	0.5216	185.9578	169.9506	0.0000	0.1372	0.4784
59	23.86	30.15	109.5200	53	413	0.9213	0.8493	0.9813	0.5208	197.9933	180.9501	0.0188	0.1507	0.4792
60	23.41	29.54	116.8000	59	413	0.9256	0.9287	1.0000	0.5187	231.0409	211.1529	0.0000	0.0713	0.4813
61	22.65	31.05	109.1700	57	413	0.9293	0.8725	0.8688	0.5194	203.9391	186.3840	0.1313	0.1275	0.4806
62	23.18	30.76	104.4300	53	413	0.9325	0.8545	0.9050	0.5208	192.2520	175.7030	0.0950	0.1455	0.4792

Table A33. Cowpea Biomass Growth with Stress Values for Mokwa 1990

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.58	27.43	107.7000	35	399	0.0027	0.9670	1.0000	0.5302	0.5644	0.5531	0.0000	0.0330	0.4698
2	21.62	29.68	124.4000	40	399	0.0032	0.9025	0.7600	0.5264	0.7061	0.6920	0.2400	0.0975	0.4736
3	22.42	28.15	87.9000	37	399	0.0037	0.9572	0.9786	0.5285	0.6188	0.6064	0.0214	0.0428	0.4715
4	22.16	26.72	92.7000	35	399	0.0043	0.9627	1.0000	0.5302	0.7601	0.7449	0.0000	0.0373	0.4698
5	21.9	27.06	65.5000	26	399	0.0049	0.9653	1.0000	0.5406	0.6343	0.6216	0.0000	0.0347	0.4594
6	21.93	28.03	127.3000	36	399	0.0057	0.9987	0.9957	0.5293	1.4492	1.4202	0.0043	0.0013	0.4707
7	21.67	29.6	126.1000	36	399	0.0067	0.9047	0.7714	0.5293	1.5191	1.4887	0.2286	0.0953	0.4707
8	22.27	29.96	121.8000	31	399	0.0078	0.8327	0.7200	0.5341	1.5989	1.5669	0.2800	0.1673	0.4659
9	22.31	28.42	39.3000	37	399	0.0091	0.9452	0.9400	0.5285	0.6749	0.6614	0.0600	0.0548	0.4715
10	22.45	30.24	133.9000	38	399	0.0107	0.7983	0.6800	0.5278	2.2794	2.2339	0.3200	0.2017	0.4722
11	22.99	29.84	124.7000	45	399	0.0126	0.7878	0.7371	0.5235	2.4435	2.3946	0.2629	0.2122	0.4765
12	23.19	29.26	55.6000	41	399	0.0148	0.8162	0.8200	0.5258	1.3304	1.3038	0.1800	0.1838	0.4742
13	22.21	30.12	123.3000	37	399	0.0174	0.8253	0.6971	0.5285	3.5153	3.4450	0.3029	0.1747	0.4715
14	22.79	26.97	124.6000	16	399	0.0201	0.9920	1.0000	0.5660	5.2909	5.1851	0.0000	0.0080	0.4340
15	20.97	29.92	94.5000	38	399	0.0234	0.9332	0.7257	0.5278	4.0937	4.0118	0.2743	0.0668	0.4722
16	22.75	29.18	88.2000	30	399	0.0273	0.8553	0.8314	0.5352	4.1476	4.0646	0.1686	0.1447	0.4648
17	22.82	29.77	118.5000	24	399	0.0319	0.8057	0.7471	0.5440	6.2489	6.1239	0.2529	0.1943	0.4560
18	22.53	29.19	117.5000	40	399	0.0372	0.8710	0.8300	0.5264	7.5515	7.4005	0.1700	0.1290	0.4736
19	22.31	29.18	114.6000	34	399	0.0433	0.8883	0.8314	0.5311	8.8107	8.6345	0.1686	0.1117	0.4689
20	22.41	29.97	43.6000	32	399	0.0505	0.8215	0.7186	0.5330	3.6293	3.5567	0.2814	0.1785	0.4670
21	22.57	28.79	100.8000	32	399	0.0585	0.8980	0.8871	0.5330	10.6331	10.4204	0.1129	0.1020	0.4670
22	22.47	29.77	106.8000	33	399	0.0680	0.8320	0.7471	0.5320	12.1103	11.8680	0.2529	0.1680	0.4680
23	22.95	27.18	110.0000	29	399	0.0782	0.9903	1.0000	0.5364	17.2022	16.8581	0.0000	0.0097	0.4636
24	22.23	28.53	132.8000	41	399	0.0900	0.9430	0.9243	0.5258	22.3014	21.8554	0.0757	0.0570	0.4742
25	22.36	27.64	126.5000	32	399	0.1029	1.0000	1.0000	0.5330	26.1334	25.6107	0.0000	0.0000	0.4670
26	21.82	30.16	129.1000	41	399	0.1186	0.8515	0.6914	0.5258	25.8008	25.2848	0.3086	0.1485	0.4742
27	23.11	31.62	113.0000	23	399	0.1378	0.6452	0.4829	0.5459	18.2650	17.8997	0.5171	0.3548	0.4541
28	22.65	29.37	119.9000	42	399	0.1577	0.8485	0.8043	0.5251	31.7303	31.0957	0.1957	0.1515	0.4749
29	22.41	28.75	109.3000	40	399	0.1793	0.9130	0.8929	0.5264	35.4655	34.7562	0.1071	0.0870	0.4736
30	22.31	28.23	96.9000	39	399	0.2026	0.9595	0.9671	0.5271	37.3803	36.6327	0.0329	0.0405	0.4729
31	22.95	29.1	125.8000	45	399	0.2293	0.8463	0.8429	0.5235	48.1127	47.1504	0.1571	0.1537	0.4765

Table A33 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1990

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.01	30.41	117.5000	30	399	0.2586	0.8185	0.6557	0.5352	50.1301	49.1275	0.3443	0.1815	0.4648
33	22.88	30.62	127.4000	30	399	0.2913	0.7375	0.6257	0.5352	55.1665	54.0632	0.3743	0.2625	0.4648
34	23.01	28.31	109.8000	45	399	0.3239	0.9010	0.9557	0.5235	63.1601	61.8969	0.0443	0.0990	0.4765
35	22.56	27.94	122.9000	49	399	0.3572	0.9625	1.0000	0.5216	82.9799	81.3203	0.0000	0.0375	0.4784
36	22.22	30.34	97.5000	42	399	0.3941	0.8080	0.6657	0.5251	61.4001	60.1721	0.3343	0.1920	0.4749
37	22.65	28.01	111.8000	40	399	0.4299	0.9505	0.9986	0.5264	90.5508	88.7398	0.0014	0.0495	0.4736
38	22.05	30.45	120.5000	26	399	0.4684	0.8125	0.6500	0.5406	93.3453	91.4784	0.3500	0.1875	0.4594
39	21.93	30.19	116.9000	36	399	0.5064	0.8410	0.6871	0.5293	99.2421	97.2573	0.3129	0.1590	0.4707
40	22.63	29.12	92.9000	48	399	0.5437	0.8688	0.8400	0.5220	86.2524	84.5274	0.1600	0.1312	0.4780
41	23.2	30.25	96.4000	49	399	0.5820	0.7412	0.6786	0.5216	81.6808	80.0472	0.3214	0.2588	0.4784
42	22.26	30.67	129.0000	44	399	0.6184	0.7802	0.6186	0.5240	122.8156	120.3593	0.3814	0.2198	0.4760
43	22.93	29.69	130.4000	42	399	0.6527	0.8035	0.7586	0.5251	135.2302	132.5256	0.2414	0.1965	0.4749
44	22.49	31.48	125.4000	32	399	0.6862	0.7023	0.5029	0.5330	114.4285	112.1399	0.4971	0.2977	0.4670
45	22.63	28.37	126.6000	34	399	0.7147	0.9250	0.9471	0.5311	167.3732	164.0257	0.0529	0.0750	0.4689
46	21.9	28.27	121.7000	45	399	0.7404	0.9872	0.9614	0.5235	175.3483	171.8413	0.0386	0.0128	0.4765
47	20.42	30.18	120.1000	49	399	0.7643	0.9550	0.6886	0.5216	172.1665	168.7231	0.3114	0.0450	0.4784
48	22.33	28.78	129.4000	41	399	0.7865	0.9168	0.8886	0.5258	184.7045	181.0104	0.1114	0.0832	0.4742
49	21.93	29.95	133.4000	39	399	0.8069	0.8590	0.7214	0.5271	183.5219	179.8514	0.2786	0.1410	0.4729
50	22.15	31.4	121.5000	46	399	0.8262	0.7338	0.5143	0.5230	142.6307	139.7781	0.4857	0.2662	0.4770
51	22.93	27.97	112.3000	42	399	0.8419	0.9325	1.0000	0.5251	174.3298	170.8432	0.0000	0.0675	0.4749
52	22.78	29.23	130.3000	44	399	0.8563	0.8492	0.8243	0.5240	186.9607	183.2215	0.1757	0.1508	0.4760
53	22.81	28.78	97.9000	34	399	0.8688	0.8807	0.8886	0.5311	149.8036	146.8076	0.1114	0.1193	0.4689
54	22.37	28.6	126.7000	30	399	0.8796	0.9273	0.9143	0.5352	208.2533	204.0882	0.0857	0.0727	0.4648
55	22.19	30.41	119.6000	35	399	0.8895	0.8050	0.6557	0.5302	170.9678	167.5484	0.3443	0.1950	0.4698
56	22.01	31.45	117.3000	42	399	0.8983	0.7405	0.5071	0.5251	149.0067	146.0266	0.4929	0.2595	0.4749
57	22.21	31.39	119.7000	47	399	0.9059	0.7300	0.5157	0.5225	153.7262	150.6517	0.4843	0.2700	0.4775
58	23.03	29.93	117.8000	45	399	0.9124	0.7780	0.7243	0.5235	164.8188	161.5224	0.2757	0.2220	0.4765
59	23.14	28.74	110.9000	43	399	0.9177	0.8590	0.8943	0.5246	172.6846	169.2309	0.1057	0.1410	0.4754
60	22.57	30.1	111.4000	44	399	0.9224	0.7997	0.7000	0.5240	162.1568	158.9137	0.3000	0.2003	0.4760
61	23.5	29.49	95.6000	30	399	0.9265	0.7758	0.7871	0.5352	138.4777	135.7081	0.2129	0.2242	0.4648
62	21.28	26.36	94.4000	43	399	0.9295	0.9213	1.0000	0.5246	159.6810	156.4874	0.0000	0.0787	0.4754

Table A34. Cowpea Biomass Growth with Stress Values for Mokwa 1991

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.78	28.55	125.3000	35	400	0.0027	0.9753	0.9214	0.5302	0.6771	0.6636	0.0786	0.0247	0.4698
2	22.32	28.31	101.4000	40	400	0.0032	0.9528	0.9557	0.5264	0.6192	0.6068	0.0443	0.0472	0.4736
3	22.41	26.48	87.1000	37	400	0.0037	0.9630	1.0000	0.5285	0.6234	0.6109	0.0000	0.0370	0.4715
4	21.63	28.32	87.8000	35	400	0.0043	0.9983	0.9543	0.5302	0.7585	0.7433	0.0457	0.0017	0.4698
5	22.08	25.26	101.4000	26	400	0.0049	0.9113	1.0000	0.5406	0.9342	0.9156	0.0000	0.0887	0.4594
6	21.19	27.62	81.2000	36	400	0.0056	0.9603	1.0000	0.5293	0.8908	0.8730	0.0000	0.0397	0.4707
7	21.27	28.44	92.7000	36	400	0.0065	0.9903	0.9371	0.5293	1.2155	1.1912	0.0629	0.0097	0.4707
8	21.98	28.24	109.6000	31	400	0.0076	0.9835	0.9657	0.5341	1.6730	1.6395	0.0343	0.0165	0.4659
9	21.5	28.98	106.3000	37	400	0.0088	0.9640	0.8600	0.5285	1.8307	1.7941	0.1400	0.0360	0.4715
10	22.17	27.32	104.5000	38	400	0.0102	0.9830	1.0000	0.5278	2.1206	2.0781	0.0000	0.0170	0.4722
11	21.79	26.56	36.1000	45	400	0.0118	0.9450	1.0000	0.5235	0.8035	0.7874	0.0000	0.0550	0.4765
12	21.67	27.66	63.3000	41	400	0.0136	0.9777	1.0000	0.5258	1.6920	1.6581	0.0000	0.0223	0.4742
13	21.87	28.57	88.4000	37	400	0.0158	0.9670	0.9186	0.5285	2.7293	2.6747	0.0814	0.0330	0.4715
14	21.75	26.04	72.1000	16	400	0.0181	0.9263	1.0000	0.5660	2.6174	2.5651	0.0000	0.0737	0.4340
15	21.68	24.79	64.4000	38	400	0.0206	0.8823	1.0000	0.5278	2.3640	2.3167	0.0000	0.1177	0.4722
16	20.54	28.77	115.3000	30	400	0.0238	0.9770	0.8900	0.5352	5.4836	5.3740	0.1100	0.0230	0.4648
17	21.94	28.56	117.9000	24	400	0.0276	0.9625	0.9200	0.5440	6.5131	6.3828	0.0800	0.0375	0.4560
18	22.14	28.28	133.1000	40	400	0.0320	0.9685	0.9600	0.5264	8.2957	8.1298	0.0400	0.0315	0.4736
19	22.37	29.75	135.1000	34	400	0.0373	0.8410	0.7500	0.5311	8.6112	8.4390	0.2500	0.1590	0.4689
20	22.66	31.03	107.0000	32	400	0.0438	0.7233	0.5671	0.5330	6.9169	6.7785	0.4329	0.2767	0.4670
21	22.57	27.73	52.6000	32	400	0.0506	0.9775	1.0000	0.5330	5.3072	5.2011	0.0000	0.0225	0.4670
22	21.75	27.96	99.5000	33	400	0.0582	0.9903	1.0000	0.5320	11.6783	11.4447	0.0000	0.0097	0.4680
23	21.66	28.01	129.5000	29	400	0.0669	0.9890	0.9986	0.5364	17.5800	17.2284	0.0014	0.0110	0.4636
24	22.47	28.63	116.9000	41	400	0.0772	0.9175	0.9100	0.5258	16.6600	16.3268	0.0900	0.0825	0.4742
25	22.14	29.43	112.2000	32	400	0.0892	0.8823	0.7957	0.5330	18.0028	17.6427	0.2043	0.1178	0.4670
26	22.44	29.62	134.6000	41	400	0.1030	0.8455	0.7686	0.5258	23.5806	23.1090	0.2314	0.1545	0.4742
27	22.96	28.43	141.5000	23	400	0.1184	0.8957	0.9386	0.5459	31.3264	30.6999	0.0614	0.1043	0.4541
28	23.37	30.14	114.8000	42	400	0.1368	0.7367	0.6943	0.5251	23.2482	22.7833	0.3057	0.2633	0.4749
29	23	27.52	110.7000	40	400	0.1557	0.9610	1.0000	0.5264	33.3517	32.6847	0.0000	0.0390	0.4736
30	22.04	28.18	88.6000	39	400	0.1764	0.9835	0.9743	0.5271	30.9868	30.3671	0.0257	0.0165	0.4729
31	22.02	29.39	139.0000	45	400	0.2001	0.8943	0.8014	0.5235	49.7924	48.7966	0.1986	0.1057	0.4765

Table A34 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1991

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.58	30.71	129.8000	30	400	0.2268	0.8283	0.6129	0.5352	49.9038	48.9057	0.3871	0.1717	0.4648
33	22.2	29.47	98.3000	30	400	0.2552	0.8747	0.7900	0.5352	44.9236	44.0251	0.2100	0.1253	0.4648
34	22.98	27.91	99.5000	45	400	0.2850	0.9332	1.0000	0.5235	52.9964	51.9365	0.0000	0.0668	0.4765
35	22.11	29.79	122.7000	49	400	0.3178	0.8575	0.7443	0.5216	66.7135	65.3793	0.2557	0.1425	0.4784
36	22	28.87	131.2000	42	400	0.3513	0.9347	0.8757	0.5251	86.5328	84.8022	0.1243	0.0653	0.4749
37	22.66	27.48	104.9000	40	400	0.3852	0.9895	1.0000	0.5264	80.5130	78.9027	0.0000	0.0105	0.4736
38	22.1	30.65	110.7000	26	400	0.4232	0.7938	0.6214	0.5406	76.9023	75.3642	0.3786	0.2063	0.4594
39	23.03	29.11	117.3000	36	400	0.4612	0.8395	0.8414	0.5293	91.9546	90.1155	0.1586	0.1605	0.4707
40	22.41	30.14	122.5000	48	400	0.4998	0.8088	0.6943	0.5220	98.8726	96.8952	0.3057	0.1912	0.4780
41	22.45	30.46	109.3000	49	400	0.5386	0.7818	0.6486	0.5216	91.8002	89.9642	0.3514	0.2182	0.4784
42	21.68	30.18	122.6000	44	400	0.5752	0.8605	0.6886	0.5240	121.6334	119.2007	0.3114	0.1395	0.4760
43	22.91	30.14	103.5000	42	400	0.6120	0.7713	0.6943	0.5251	98.1309	96.1683	0.3057	0.2287	0.4749
44	22.79	31.06	116.2000	32	400	0.6479	0.7113	0.5629	0.5330	109.1687	106.9853	0.4371	0.2887	0.4670
45	22.6	30.25	122.9000	34	400	0.6807	0.7862	0.6786	0.5311	133.6093	130.9371	0.3214	0.2138	0.4689
46	23.29	28.83	97.3000	45	400	0.7106	0.8410	0.8814	0.5235	116.4236	114.0951	0.1186	0.1590	0.4765
47	22.99	28.23	128.1000	49	400	0.7374	0.9085	0.9671	0.5216	171.2095	167.7854	0.0329	0.0915	0.4784
48	23.63	28.74	123.7000	41	400	0.7629	0.8223	0.8943	0.5258	156.0573	152.9361	0.1057	0.1777	0.4742
49	23.1	28.37	108.7000	39	400	0.7855	0.8898	0.9471	0.5271	153.1545	150.0914	0.0529	0.1102	0.4729
50	22.94	25.64	73.9000	46	400	0.8040	0.9527	1.0000	0.5230	113.2250	110.9605	0.0000	0.0473	0.4770
51	22.22	29.44	123.4000	42	400	0.8225	0.8755	0.7943	0.5251	178.4937	174.9239	0.2057	0.1245	0.4749
52	22.24	30.54	120.9000	44	400	0.8395	0.7915	0.6371	0.5240	161.0215	157.8011	0.3629	0.2085	0.4760
53	22.32	29.45	96.2000	34	400	0.8541	0.8673	0.7929	0.5311	144.7498	141.8548	0.2071	0.1327	0.4689
54	22.65	27.92	84.4000	30	400	0.8665	0.9572	1.0000	0.5352	143.3167	140.4503	0.0000	0.0428	0.4648
55	22.34	27.8	97.5000	35	400	0.8773	0.9895	1.0000	0.5302	171.6410	168.2082	0.0000	0.0105	0.4698
56	22.43	30.34	117.5000	42	400	0.8876	0.7923	0.6657	0.5251	165.9638	162.6445	0.3343	0.2077	0.4749
57	21.81	30.31	113.9000	47	400	0.8963	0.8410	0.6700	0.5225	171.5814	168.1498	0.3300	0.1590	0.4775
58	21.88	30.24	108.9000	45	400	0.9039	0.8410	0.6800	0.5235	165.7526	162.4376	0.3200	0.1590	0.4765
59	21.85	30.14	88.1000	43	400	0.9104	0.8507	0.6943	0.5246	136.9134	134.1751	0.3057	0.1493	0.4754
60	21.77	30.22	117.3000	44	400	0.9161	0.8508	0.6829	0.5240	183.2265	179.5620	0.3171	0.1492	0.4760
61	21.4	30.11	117.7000	30	400	0.9209	0.8868	0.6986	0.5352	196.7516	192.8165	0.3014	0.1132	0.4648
62	22.19	28.64	92.4000	43	400	0.9249	0.9378	0.9086	0.5246	160.7994	157.5834	0.0914	0.0622	0.4754

Table A35. Cowpea Biomass Growth with Stress Values for Mokwa 1992

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.18	29.68	100.1000	35	401	0.0027	0.9355	0.7600	0.5302	0.5284	0.5178	0.2400	0.0645	0.4698
2	22.13	28.37	120.1000	40	401	0.0032	0.9625	0.9471	0.5264	0.7539	0.7389	0.0529	0.0375	0.4736
3	21.56	29.03	85.7000	37	401	0.0037	0.9557	0.8529	0.5285	0.6247	0.6122	0.1471	0.0443	0.4715
4	22.25	27.38	88.3000	35	401	0.0043	0.9877	1.0000	0.5302	0.7732	0.7578	0.0000	0.0123	0.4698
5	21.76	27.44	78.1000	26	401	0.0050	0.9733	1.0000	0.5406	0.7947	0.7788	0.0000	0.0267	0.4594
6	21.75	27.54	58.4000	36	401	0.0058	0.9763	1.0000	0.5293	0.6752	0.6617	0.0000	0.0237	0.4707
7	21.82	28.96	67.6000	36	401	0.0067	0.9415	0.8629	0.5293	0.8781	0.8606	0.1371	0.0585	0.4707
8	21.61	28.08	76.6000	31	401	0.0078	0.9897	0.9886	0.5341	1.2228	1.1984	0.0114	0.0103	0.4659
9	20.81	27.7	114.4000	37	401	0.0090	0.9503	1.0000	0.5285	1.9989	1.9589	0.0000	0.0497	0.4715
10	21.24	28.61	119.3000	38	401	0.0104	0.9950	0.9129	0.5278	2.5264	2.4758	0.0871	0.0050	0.4722
11	22.37	26.89	85.5000	45	401	0.0120	0.9753	1.0000	0.5235	2.0341	1.9934	0.0000	0.0247	0.4765
12	21.59	28.75	92.7000	41	401	0.0139	0.9745	0.8929	0.5258	2.5704	2.5190	0.1071	0.0255	0.4742
13	20.93	27.34	89.1000	37	401	0.0160	0.9423	1.0000	0.5285	2.7601	2.7049	0.0000	0.0577	0.4715
14	21.51	24.86	77.9000	16	401	0.0182	0.8790	1.0000	0.5660	2.7437	2.6889	0.0000	0.1210	0.4340
15	21.11	25.59	36.8000	38	401	0.0208	0.8900	1.0000	0.5278	1.3947	1.3668	0.0000	0.1100	0.4722
16	21.31	25.65	54.4000	30	401	0.0237	0.8987	1.0000	0.5352	2.4081	2.3600	0.0000	0.1013	0.4648
17	21.64	28	121.2000	24	401	0.0274	0.9880	1.0000	0.5440	6.9256	6.7871	0.0000	0.0120	0.4560
18	21.66	29.62	84.7000	40	401	0.0318	0.9040	0.7686	0.5264	4.9863	4.8866	0.2314	0.0960	0.4736
19	22.03	26.4	97.2000	34	401	0.0365	0.9477	1.0000	0.5311	6.9405	6.8017	0.0000	0.0523	0.4689
20	21.47	28.43	114.9000	32	401	0.0422	0.9967	0.9386	0.5330	9.9947	9.7948	0.0614	0.0033	0.4670
21	22.08	28.32	52.5000	32	401	0.0487	0.9700	0.9543	0.5330	5.1368	5.0340	0.0457	0.0300	0.4670
22	22.24	26.97	85.2000	33	401	0.0559	0.9737	1.0000	0.5320	9.5881	9.3964	0.0000	0.0263	0.4680
23	21.89	27.47	88.1000	29	401	0.0642	0.9787	1.0000	0.5364	11.5296	11.2990	0.0000	0.0213	0.4636
24	21.18	29.23	105.7000	41	401	0.0739	0.9693	0.8243	0.5258	15.4611	15.1519	0.1757	0.0307	0.4742
25	22.35	28.08	114.1000	32	401	0.0850	0.9678	0.9886	0.5330	19.4216	19.0331	0.0114	0.0323	0.4670
26	21.5	28.88	125.8000	41	401	0.0975	0.9715	0.8743	0.5258	24.3254	23.8389	0.1257	0.0285	0.4742
27	21.77	27.28	61.8000	23	401	0.1109	0.9683	1.0000	0.5459	14.0754	13.7939	0.0000	0.0317	0.4541
28	21.6	28.07	103.7000	42	401	0.1263	0.9890	0.9900	0.5251	26.4223	25.8939	0.0100	0.0110	0.4749
29	22.13	29.76	95.7000	40	401	0.1448	0.8583	0.7486	0.5264	24.3187	23.8323	0.2514	0.1418	0.4736
30	22.5	29.93	121.9000	39	401	0.1658	0.8178	0.7243	0.5271	33.8469	33.1700	0.2757	0.1823	0.4729
31	22.39	27.23	75.3000	45	401	0.1871	0.9873	1.0000	0.5235	28.2847	27.7190	0.0000	0.0127	0.4765

Table A35 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1992

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.74	27.17	93.1000	30	401	0.2098	0.9637	1.0000	0.5352	39.1265	38.3440	0.0000	0.0363	0.4648
33	21.06	29.66	80.2000	30	401	0.2359	0.9460	0.7629	0.5352	37.2161	36.4718	0.2371	0.0540	0.4648
34	22.45	26.98	128.6000	45	401	0.2630	0.9810	1.0000	0.5235	67.4658	66.1165	0.0000	0.0190	0.4765
35	21.44	29.5	112.9000	49	401	0.2934	0.9295	0.7857	0.5216	62.3802	61.1326	0.2143	0.0705	0.4784
36	21.89	28.71	96.2000	42	401	0.3253	0.9550	0.8986	0.5251	60.9652	59.7459	0.1014	0.0450	0.4749
37	22.24	27.85	70.9000	40	401	0.3582	0.9932	1.0000	0.5264	51.5809	50.5493	0.0000	0.0068	0.4736
38	22.02	28.06	136.0000	26	401	0.3923	0.9940	0.9914	0.5406	111.3792	109.1516	0.0086	0.0060	0.4594
39	21.95	26.53	134.7000	36	401	0.4255	0.9493	1.0000	0.5293	111.8751	109.6376	0.0000	0.0507	0.4707
40	20.52	27.52	149.5000	48	401	0.4586	0.9347	1.0000	0.5220	129.9405	127.3416	0.0000	0.0653	0.4780
41	21.21	29.4	135.0000	49	401	0.4949	0.9543	0.8000	0.5216	129.1751	126.5916	0.2000	0.0457	0.4784
42	22.3	30.43	133.0000	44	401	0.5335	0.7952	0.6529	0.5240	114.8605	112.5633	0.3471	0.2048	0.4760
43	21.98	30.43	144.2000	42	401	0.5710	0.8193	0.6529	0.5251	137.5954	134.8435	0.3471	0.1807	0.4749
44	22.4	29.81	135.4000	32	401	0.6070	0.8343	0.7414	0.5330	141.9575	139.1183	0.2586	0.1657	0.4670
45	22.66	28.54	130.9000	34	401	0.6404	0.9100	0.9229	0.5311	157.3625	154.2153	0.0771	0.0900	0.4689
46	21.54	29.18	128.1000	45	401	0.6716	0.9460	0.8314	0.5235	165.4790	162.1694	0.1686	0.0540	0.4765
47	21.64	28.09	118.7000	49	401	0.6999	0.9910	0.9871	0.5216	166.7952	163.4593	0.0129	0.0090	0.4784
48	20.94	28.99	123.3000	41	401	0.7265	0.9977	0.8586	0.5258	182.5095	178.8593	0.1414	0.0023	0.4742
49	21.06	29.58	129.4000	39	401	0.7516	0.9520	0.7743	0.5271	189.5662	185.7749	0.2257	0.0480	0.4729
50	21.81	30.11	133.8000	46	401	0.7755	0.8560	0.6986	0.5230	180.4271	176.8186	0.3014	0.1440	0.4770
51	21.61	30.9	121.4000	42	401	0.7975	0.8118	0.5857	0.5251	160.3106	157.1044	0.4143	0.1882	0.4749
52	21.6	29.52	120.7000	44	401	0.8163	0.9160	0.7829	0.5240	183.7149	180.0406	0.2171	0.0840	0.4760
53	22.3	29.59	119.1000	34	401	0.8336	0.8583	0.7729	0.5311	175.7837	172.2680	0.2271	0.1418	0.4689
54	22.12	28.6	127.4000	30	401	0.8484	0.9460	0.9143	0.5352	212.5829	208.3312	0.0857	0.0540	0.4648
55	22.58	29.66	128.7000	35	401	0.8622	0.8320	0.7629	0.5302	190.1246	186.3221	0.2371	0.1680	0.4698
56	21.31	29.92	91.5000	42	401	0.8738	0.9077	0.7257	0.5251	148.0573	145.0961	0.2743	0.0923	0.4749
57	22.79	27.56	98.4000	47	401	0.8838	0.9738	1.0000	0.5225	171.8690	168.4316	0.0000	0.0262	0.4775
58	22.13	28.6	88.4000	45	401	0.8927	0.9452	0.9143	0.5235	151.6751	148.6416	0.0857	0.0548	0.4765
59	22.04	29.76	113.6000	43	401	0.9007	0.8650	0.7486	0.5246	180.3367	176.7300	0.2514	0.1350	0.4754
60	22.43	28.14	122.1000	44	401	0.9073	0.9572	0.9800	0.5240	215.8626	211.5453	0.0200	0.0428	0.4760
61	22.28	30.76	120.8000	30	401	0.9136	0.7720	0.6057	0.5352	177.1272	173.5847	0.3943	0.2280	0.4648
62	22.48	30.83	122.9000	43	401	0.9190	0.7517	0.5957	0.5246	173.0077	169.5475	0.4043	0.2483	0.4754

Table A36. Cowpea Biomass Growth with Stress Values for Mokwa 1993

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.45	29.3	107.4000	35	402	0.0028	0.8688	0.8143	0.5302	0.5369	0.5262	0.1857	0.1312	0.4698
2	22.02	30.15	123.8000	40	402	0.0032	0.8372	0.6929	0.5264	0.6952	0.6813	0.3071	0.1628	0.4736
3	22.75	28.3	91.7000	37	402	0.0038	0.9213	0.9571	0.5285	0.6641	0.6508	0.0429	0.0787	0.4715
4	22.47	28.78	105.6000	35	402	0.0044	0.9063	0.8886	0.5302	0.8816	0.8640	0.1114	0.0938	0.4698
5	22.72	26.87	49.3000	26	402	0.0051	0.9863	1.0000	0.5406	0.5292	0.5187	0.0000	0.0137	0.4594
6	22.01	28.62	107.8000	36	402	0.0059	0.9527	0.9114	0.5293	1.2745	1.2490	0.0886	0.0473	0.4707
7	22.19	28.65	109.8000	36	402	0.0069	0.9370	0.9071	0.5293	1.4880	1.4582	0.0929	0.0630	0.4707
8	22.65	27.18	95.4000	31	402	0.0080	0.9943	1.0000	0.5341	1.6050	1.5729	0.0000	0.0057	0.4659
9	22.41	27.09	53.7000	37	402	0.0093	0.9833	1.0000	0.5285	1.0234	1.0029	0.0000	0.0167	0.4715
10	21.83	28.66	127.4000	38	402	0.0108	0.9633	0.9057	0.5278	2.7615	2.7063	0.0943	0.0367	0.4722
11	22.51	26.33	109.8000	45	402	0.0125	0.9613	1.0000	0.5235	2.7165	2.6622	0.0000	0.0387	0.4765
12	21.11	29.38	118.1000	41	402	0.0145	0.9633	0.8029	0.5258	3.4173	3.3490	0.1971	0.0367	0.4742
13	22.48	28.37	80.6000	37	402	0.0169	0.9362	0.9471	0.5285	2.6522	2.5991	0.0529	0.0638	0.4715
14	22.37	27.6	110.3000	16	402	0.0195	0.9990	1.0000	0.5660	4.8039	4.7078	0.0000	0.0010	0.4340
15	21.53	29.18	108.6000	38	402	0.0227	0.9468	0.8314	0.5278	4.8570	4.7598	0.1686	0.0533	0.4722
16	21.58	29.37	102.0000	30	402	0.0264	0.9287	0.8043	0.5352	5.2763	5.1708	0.1957	0.0713	0.4648
17	22.36	24.8	86.0000	24	402	0.0301	0.9053	1.0000	0.5440	5.0286	4.9280	0.0000	0.0947	0.4560
18	21.83	26.85	107.6000	40	402	0.0346	0.9560	1.0000	0.5264	7.3839	7.2363	0.0000	0.0440	0.4736
19	21.94	29.31	128.4000	34	402	0.0402	0.9063	0.8129	0.5311	9.7916	9.5957	0.1871	0.0938	0.4689
20	22.28	30.75	115.0000	32	402	0.0470	0.7727	0.6071	0.5330	8.7861	8.6104	0.3929	0.2273	0.4670
21	22.46	30.22	114.0000	32	402	0.0549	0.7990	0.6829	0.5330	10.5118	10.3016	0.3171	0.2010	0.4670
22	22.74	27.32	109.6000	33	402	0.0632	0.9955	1.0000	0.5320	14.4705	14.1811	0.0000	0.0045	0.4680
23	21.7	27.71	112.1000	29	402	0.0725	0.9803	1.0000	0.5364	16.8465	16.5096	0.0000	0.0197	0.4636
24	22.23	28.67	136.3000	41	402	0.0835	0.9325	0.9043	0.5258	22.0069	21.5667	0.0957	0.0675	0.4742
25	22.43	29.32	128.6000	32	402	0.0964	0.8688	0.8114	0.5330	22.6422	22.1893	0.1886	0.1312	0.4670
26	22.46	28.38	132.8000	41	402	0.1106	0.9370	0.9457	0.5258	28.5403	27.9695	0.0543	0.0630	0.4742
27	21.64	29.57	125.1000	23	402	0.1268	0.9092	0.7757	0.5459	31.0539	30.4328	0.2243	0.0908	0.4541
28	21.81	29.92	114.2000	42	402	0.1453	0.8702	0.7257	0.5251	29.9011	29.3030	0.2743	0.1298	0.4749
29	22.03	29.85	95.7000	40	402	0.1660	0.8590	0.7357	0.5264	28.3283	27.7617	0.2643	0.1410	0.4736
30	22.5	28.97	86.7000	39	402	0.1886	0.8898	0.8614	0.5271	30.2520	29.6470	0.1386	0.1102	0.4729
31	22.26	28.67	125.9000	45	402	0.2131	0.9302	0.9043	0.5235	51.5326	50.5020	0.0957	0.0698	0.4765

Table A36 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1993

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.18	30.64	108.3000	30	402	0.2406	0.8635	0.6229	0.5352	47.4882	46.5384	0.3771	0.1365	0.4648
33	22.62	31.64	103.1000	30	402	0.2726	0.6805	0.4800	0.5352	36.2096	35.4854	0.5200	0.3195	0.4648
34	23.15	28.53	132.4000	45	402	0.3044	0.8740	0.9243	0.5235	72.7270	71.2725	0.0757	0.1260	0.4765
35	22.46	28.27	89.7000	49	402	0.3370	0.9452	0.9614	0.5216	58.7833	57.6076	0.0386	0.0548	0.4784
36	22.02	28.16	116.2000	42	402	0.3705	0.9865	0.9771	0.5251	87.9702	86.2108	0.0229	0.0135	0.4749
37	20.99	30.36	100.8000	40	402	0.4065	0.8988	0.6629	0.5264	76.4560	74.9269	0.3371	0.1012	0.4736
38	22.81	29.06	119.2000	26	402	0.4439	0.8598	0.8486	0.5406	96.9989	95.0590	0.1514	0.1402	0.4594
39	21.77	30.26	126.0000	36	402	0.4819	0.8477	0.6771	0.5293	107.4634	105.3141	0.3229	0.1523	0.4707
40	21.94	30.36	129.7000	48	402	0.5201	0.8275	0.6629	0.5220	114.9260	112.6275	0.3371	0.1725	0.4780
41	22.86	28.94	87.1000	49	402	0.5572	0.8650	0.8657	0.5216	86.3507	84.6237	0.1343	0.1350	0.4784
42	22.47	27.51	116.7000	44	402	0.5912	0.9993	1.0000	0.5240	142.4931	139.6432	0.0000	0.0007	0.4760
43	22.39	30.03	122.6000	42	402	0.6266	0.8185	0.7100	0.5251	130.2367	127.6320	0.2900	0.1815	0.4749
44	22.63	29.55	126.0000	32	402	0.6600	0.8365	0.7786	0.5330	146.2368	143.3120	0.2214	0.1635	0.4670
45	22.27	29.65	105.4000	34	402	0.6911	0.8560	0.7643	0.5311	130.6049	127.9928	0.2357	0.1440	0.4689
46	21.94	28.29	113.8000	45	402	0.7186	0.9827	0.9586	0.5235	165.9216	162.6032	0.0414	0.0173	0.4765
47	21.09	31.16	132.7000	49	402	0.7457	0.8313	0.5486	0.5216	169.1897	165.8059	0.4514	0.1687	0.4784
48	21.76	31.02	117.5000	41	402	0.7707	0.7915	0.5686	0.5258	148.6293	145.6567	0.4314	0.2085	0.4742
49	22.43	29.4	89.7000	39	402	0.7927	0.8628	0.8000	0.5271	127.5300	124.9794	0.2000	0.1372	0.4729
50	22.7	28.16	75.2000	46	402	0.8119	0.9355	0.9771	0.5230	117.8127	115.4564	0.0229	0.0645	0.4770
51	22.72	29.26	119.7000	42	402	0.8298	0.8515	0.8200	0.5251	175.1655	171.6622	0.1800	0.1485	0.4749
52	22.19	30.54	123.7000	44	402	0.8459	0.7952	0.6371	0.5240	171.9788	168.5392	0.3629	0.2048	0.4760
53	22.41	31.18	114.3000	34	402	0.8605	0.7307	0.5457	0.5311	150.5381	147.5274	0.4543	0.2693	0.4689
54	23.07	30.08	116.0000	30	402	0.8731	0.7638	0.7029	0.5352	163.2709	160.0055	0.2971	0.2362	0.4648
55	22.86	29.54	110.9000	35	402	0.8838	0.8200	0.7800	0.5302	168.0496	164.6886	0.2200	0.1800	0.4698
56	22.52	29.71	121.4000	42	402	0.8930	0.8327	0.7557	0.5251	186.9892	183.2494	0.2443	0.1673	0.4749
57	22.65	28.25	112.4000	47	402	0.9008	0.9325	0.9643	0.5225	194.5471	190.6561	0.0357	0.0675	0.4775
58	22.15	30.18	127.1000	45	402	0.9078	0.8253	0.6886	0.5235	196.5813	192.6497	0.3114	0.1747	0.4765
59	22.2	30.35	122.1000	43	402	0.9139	0.8088	0.6643	0.5246	186.7041	182.9700	0.3357	0.1912	0.4754
60	22.34	30.62	124.5000	44	402	0.9192	0.7780	0.6257	0.5240	184.0034	180.3234	0.3743	0.2220	0.4760
61	22.17	29.93	122.4000	30	402	0.9236	0.8425	0.7243	0.5352	201.0510	197.0299	0.2757	0.1575	0.4648
62	22.54	29.91	124.8000	43	402	0.9275	0.8162	0.7271	0.5246	195.4694	191.5600	0.2729	0.1838	0.4754

Table A37. Cowpea Biomass Growth with Stress Values for Mokwa 1994

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.83	27.15	85.1000	35	398	0.0027	0.9660	1.0000	0.5302	0.4384	0.4296	0.0000	0.0340	0.4698
2	22.27	29.38	74.2000	40	398	0.0032	0.8763	0.8029	0.5264	0.4031	0.3950	0.1971	0.1237	0.4736
3	22.03	26.69	44.3000	37	398	0.0037	0.9573	1.0000	0.5285	0.3046	0.2985	0.0000	0.0427	0.4715
4	21.8	26.14	103.4000	35	398	0.0042	0.9313	1.0000	0.5302	0.7974	0.7814	0.0000	0.0687	0.4698
5	22.09	26.34	60.3000	26	398	0.0049	0.9477	1.0000	0.5406	0.5558	0.5447	0.0000	0.0523	0.4594
6	21.91	27.18	104.4000	36	398	0.0056	0.9697	1.0000	0.5293	1.1141	1.0919	0.0000	0.0303	0.4707
7	22.19	26.9	103.9000	36	398	0.0065	0.9697	1.0000	0.5293	1.2812	1.2556	0.0000	0.0303	0.4707
8	21.58	29.58	113.6000	31	398	0.0076	0.9130	0.7743	0.5341	1.5533	1.5222	0.2257	0.0870	0.4659
9	22.56	29.01	91.2000	37	398	0.0088	0.8823	0.8557	0.5285	1.3946	1.3667	0.1443	0.1178	0.4715
10	22.4	26.68	91.2000	38	398	0.0102	0.9693	1.0000	0.5278	1.7669	1.7316	0.0000	0.0307	0.4722
11	21.91	26.86	95.7000	45	398	0.0118	0.9590	1.0000	0.5235	2.0973	2.0554	0.0000	0.0410	0.4765
12	21.42	27.91	119.9000	41	398	0.0136	0.9777	1.0000	0.5258	3.1094	3.0472	0.0000	0.0223	0.4742
13	21.6	26.69	54.2000	37	398	0.0156	0.9430	1.0000	0.5285	1.5666	1.5353	0.0000	0.0570	0.4715
14	21.61	26.53	117.3000	16	398	0.0180	0.9380	1.0000	0.5660	4.1468	4.0639	0.0000	0.0620	0.4340
15	21.75	28.1	125.7000	38	398	0.0208	0.9950	0.9857	0.5278	5.0876	4.9858	0.0143	0.0050	0.4722
16	22.01	26.68	114.2000	30	398	0.0239	0.9563	1.0000	0.5352	5.1823	5.0786	0.0000	0.0437	0.4648
17	21.35	28.68	100.8000	24	398	0.0277	0.9977	0.9029	0.5440	5.6137	5.5014	0.0971	0.0023	0.4560
18	22.01	25.1	120.9000	40	398	0.0316	0.9037	1.0000	0.5264	6.7291	6.5945	0.0000	0.0963	0.4736
19	21.48	28.86	116.7000	34	398	0.0365	0.9745	0.8771	0.5311	8.1795	8.0159	0.1229	0.0255	0.4689
20	21.89	27.71	119.4000	32	398	0.0421	0.9867	1.0000	0.5330	9.8005	9.6045	0.0000	0.0133	0.4670
21	21.64	28.63	37.4000	32	398	0.0486	0.9798	0.9100	0.5330	3.5209	3.4505	0.0900	0.0202	0.4670
22	21.53	27.64	92.3000	33	398	0.0558	0.9723	1.0000	0.5320	9.8795	9.6819	0.0000	0.0277	0.4680
23	22.22	26.31	110.6000	29	398	0.0638	0.9510	1.0000	0.5364	13.3444	13.0775	0.0000	0.0490	0.4636
24	21.53	28.93	63.7000	41	398	0.0735	0.9655	0.8671	0.5258	8.8087	8.6325	0.1329	0.0345	0.4742
25	22.42	26.7	81.3000	32	398	0.0840	0.9707	1.0000	0.5330	13.0954	12.8335	0.0000	0.0293	0.4670
26	22.27	26.06	94.8000	41	398	0.0955	0.9443	1.0000	0.5258	16.6595	16.3263	0.0000	0.0557	0.4742
27	21.91	27.89	107.5000	23	398	0.1091	0.9933	1.0000	0.5459	23.5679	23.0966	0.0000	0.0067	0.4541
28	21.94	29.34	104.1000	42	398	0.1251	0.9040	0.8086	0.5251	22.9168	22.4584	0.1914	0.0960	0.4749
29	22.7	26.73	75.8000	40	398	0.1420	0.9810	1.0000	0.5264	20.5988	20.1868	0.0000	0.0190	0.4736
30	22.37	28.02	45.1000	39	398	0.1613	0.9708	0.9971	0.5271	13.7979	13.5219	0.0029	0.0292	0.4729
31	22	28.45	94.3000	45	398	0.1828	0.9662	0.9357	0.5235	32.3075	31.6614	0.0643	0.0338	0.4765

Table A37 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1994

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.28	27.15	85.2000	30	398	0.2055	0.9810	1.0000	0.5352	34.0641	33.3828	0.0000	0.0190	0.4648
33	22.12	27.53	103.9000	30	398	0.2304	0.9883	1.0000	0.5352	46.9174	45.9790	0.0000	0.0117	0.4648
34	22.6	29.31	110.2000	45	398	0.2593	0.8568	0.8129	0.5235	47.4975	46.5475	0.1871	0.1432	0.4765
35	22.36	30.56	123.7000	49	398	0.2915	0.7810	0.6343	0.5216	54.4301	53.3415	0.3657	0.2190	0.4784
36	23.28	29.41	110.0000	42	398	0.3255	0.7983	0.7986	0.5251	55.6258	54.5133	0.2014	0.2017	0.4749
37	22.26	29.18	121.2000	40	398	0.3599	0.8920	0.8314	0.5264	75.9105	74.3923	0.1686	0.1080	0.4736
38	21.99	29.92	122.6000	26	398	0.3962	0.8568	0.7257	0.5406	83.3824	81.7147	0.2743	0.1432	0.4594
39	22.44	29.3	118.9000	36	398	0.4333	0.8695	0.8143	0.5293	87.8737	86.1162	0.1857	0.1305	0.4707
40	21.5	29.46	123.6000	48	398	0.4699	0.9280	0.7914	0.5220	104.2764	102.1909	0.2086	0.0720	0.4780
41	21.75	30.69	119.1000	49	398	0.5084	0.8170	0.6157	0.5216	95.6200	93.7076	0.3843	0.1830	0.4784
42	22.01	31.01	122.9000	44	398	0.5471	0.7735	0.5700	0.5240	101.0011	98.9811	0.4300	0.2265	0.4760
43	22.38	29.89	106.0000	42	398	0.5840	0.8298	0.7300	0.5251	99.9684	97.9690	0.2700	0.1702	0.4749
44	22.44	27.4	83.6000	32	398	0.6170	0.9947	1.0000	0.5330	101.3386	99.3118	0.0000	0.0053	0.4670
45	21.67	29.27	126.1000	34	398	0.6496	0.9295	0.8186	0.5311	149.8510	146.8540	0.1814	0.0705	0.4689
46	23.37	28.29	119.6000	45	398	0.6811	0.8755	0.9586	0.5235	138.3614	135.5941	0.0414	0.1245	0.4765
47	22.73	27.01	117.3000	49	398	0.7089	0.9913	1.0000	0.5216	159.3225	156.1360	0.0000	0.0087	0.4784
48	22.18	28.93	104.1000	41	398	0.7358	0.9168	0.8671	0.5258	136.8128	134.0766	0.1329	0.0832	0.4742
49	21.77	27.51	114.2000	39	398	0.7591	0.9760	1.0000	0.5271	165.2640	161.9587	0.0000	0.0240	0.4729
50	21.99	28.06	106.6000	46	398	0.7810	0.9963	0.9914	0.5230	160.7423	157.5274	0.0086	0.0037	0.4770
51	22.44	26.27	102.9000	42	398	0.8000	0.9570	1.0000	0.5251	153.3211	150.2546	0.0000	0.0430	0.4749
52	22.11	27.27	107.5000	44	398	0.8176	0.9793	1.0000	0.5240	167.1622	163.8189	0.0000	0.0207	0.4760
53	21.66	30.34	109.8000	34	398	0.8348	0.8500	0.6657	0.5311	153.3457	150.2788	0.3343	0.1500	0.4689
54	23.42	29.68	125.4000	30	398	0.8506	0.7675	0.7600	0.5352	162.3697	159.1223	0.2400	0.2325	0.4648
55	23.08	28.49	116.1000	35	398	0.8638	0.8823	0.9300	0.5302	173.8370	170.3603	0.0700	0.1177	0.4698
56	22.64	29.12	121.4000	42	398	0.8754	0.8680	0.8400	0.5251	179.5334	175.9427	0.1600	0.1320	0.4749
57	22.76	28.46	101.3000	47	398	0.8855	0.9085	0.9343	0.5225	157.7895	154.6337	0.0657	0.0915	0.4775
58	22.77	30.02	115.0000	45	398	0.8947	0.7908	0.7114	0.5235	157.8314	154.6748	0.2886	0.2092	0.4765
59	22.82	29.18	128.7000	43	398	0.9024	0.8500	0.8314	0.5246	191.9175	188.0792	0.1686	0.1500	0.4754
60	22.86	27.39	124.9000	44	398	0.9088	0.9813	1.0000	0.5240	216.3015	211.9755	0.0000	0.0188	0.4760
61	22.2	30.17	116.6000	30	398	0.9148	0.8222	0.6900	0.5352	173.9509	170.4719	0.3100	0.1778	0.4648
62	22.16	27.44	127.9000	43	398	0.9194	0.9867	1.0000	0.5246	225.5616	221.0504	0.0000	0.0133	0.4754

Table A38. Cowpea Biomass Growth with Stress Values for Mokwa 1995

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.98	27.54	116.7000	35	401	0.0027	0.9840	1.0000	0.5302	0.6436	0.6307	0.0000	0.0160	0.4698
2	21.96	29.34	37.5000	40	401	0.0032	0.9025	0.8086	0.5264	0.2201	0.2157	0.1914	0.0975	0.4736
3	22.57	27.58	99.8000	37	401	0.0037	0.9888	1.0000	0.5285	0.7489	0.7339	0.0000	0.0112	0.4715
4	22.23	28.83	79.6000	35	401	0.0043	0.9205	0.8814	0.5302	0.6511	0.6381	0.1186	0.0795	0.4698
5	22.56	29.15	131.3000	26	401	0.0051	0.8718	0.8357	0.5406	1.2144	1.1901	0.1643	0.1282	0.4594
6	23.14	27.71	92.6000	36	401	0.0059	0.9362	1.0000	0.5293	1.0499	1.0289	0.0000	0.0638	0.4707
7	22.39	26.57	78.5000	36	401	0.0068	0.9653	1.0000	0.5293	1.0597	1.0385	0.0000	0.0347	0.4707
8	22.24	27.98	44.6000	31	401	0.0079	0.9835	1.0000	0.5341	0.7190	0.7046	0.0000	0.0165	0.4659
9	22.18	29.66	124.6000	37	401	0.0093	0.8620	0.7629	0.5285	2.0400	1.9992	0.2371	0.1380	0.4715
10	23.19	28.8	85.8000	38	401	0.0108	0.8507	0.8857	0.5278	1.6218	1.5894	0.1143	0.1493	0.4722
11	23.02	27.07	85.9000	45	401	0.0126	0.9932	1.0000	0.5235	2.1814	2.1377	0.0000	0.0068	0.4765
12	22.45	27.06	128.0000	41	401	0.0145	0.9837	1.0000	0.5258	3.7394	3.6646	0.0000	0.0163	0.4742
13	22.07	29.04	84.1000	37	401	0.0169	0.9168	0.8514	0.5285	2.6824	2.6287	0.1486	0.0832	0.4715
14	22.55	29	91.1000	16	401	0.0198	0.8838	0.8571	0.5660	3.5014	3.4314	0.1429	0.1162	0.4340
15	22.93	28.22	71.7000	38	401	0.0230	0.9138	0.9686	0.5278	3.0939	3.0320	0.0314	0.0862	0.4722
16	22.72	27.59	95.5000	30	401	0.0267	0.9767	1.0000	0.5352	5.1773	5.0738	0.0000	0.0233	0.4648
17	21.85	28.35	103.6000	24	401	0.0309	0.9850	0.9500	0.5440	6.6648	6.5315	0.0500	0.0150	0.4560
18	22.35	27.58	87.4000	40	401	0.0357	0.9977	1.0000	0.5264	6.3668	6.2395	0.0000	0.0023	0.4736
19	22.06	28.25	107.2000	34	401	0.0413	0.9767	0.9643	0.5311	8.9204	8.7420	0.0357	0.0233	0.4689
20	21.83	29.43	119.7000	32	401	0.0479	0.9055	0.7957	0.5330	10.7566	10.5414	0.2043	0.0945	0.4670
21	22.73	29.79	126.5000	32	401	0.0559	0.8110	0.7443	0.5330	11.8732	11.6357	0.2557	0.1890	0.4670
22	22.83	28.62	124.8000	33	401	0.0648	0.8912	0.9114	0.5320	14.8873	14.5896	0.0886	0.1088	0.4680
23	22.87	27.84	120.0000	29	401	0.0747	0.9468	1.0000	0.5364	17.6769	17.3234	0.0000	0.0533	0.4636
24	22.33	29.95	108.8000	41	401	0.0866	0.8290	0.7214	0.5258	15.9446	15.6258	0.2786	0.1710	0.4742
25	22.99	28.59	126.8000	32	401	0.0998	0.8815	0.9157	0.5330	23.0980	22.6361	0.0843	0.1185	0.4670
26	22.96	28.74	68.7000	41	401	0.1149	0.8725	0.8943	0.5258	14.0631	13.7818	0.1057	0.1275	0.4742
27	22.12	29.65	120.6000	23	401	0.1319	0.8673	0.7643	0.5459	29.2569	28.6718	0.2357	0.1327	0.4541
28	23.16	28.67	99.0000	42	401	0.1510	0.8628	0.9043	0.5251	26.3178	25.7914	0.0957	0.1372	0.4749
29	22.91	27.82	58.5000	40	401	0.1716	0.9452	1.0000	0.5264	19.4035	19.0154	0.0000	0.0548	0.4736
30	21.79	28.98	74.0000	39	401	0.1943	0.9423	0.8600	0.5271	27.7392	27.1844	0.1400	0.0577	0.4729
31	22.37	29.12	121.7000	45	401	0.2198	0.8882	0.8400	0.5235	48.3090	47.3428	0.1600	0.1118	0.4765

Table A38 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1995

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.01	30	96.7000	30	401	0.2480	0.8492	0.7143	0.5352	42.3353	41.4886	0.2857	0.1508	0.4648
33	22.55	28.72	115.5000	30	401	0.2777	0.9048	0.8971	0.5352	60.3226	59.1162	0.1029	0.0952	0.4648
34	21.94	27.47	55.6000	45	401	0.3074	0.9803	1.0000	0.5235	34.0720	33.3906	0.0000	0.0197	0.4765
35	21.5	29.69	109.4000	49	401	0.3407	0.9108	0.7586	0.5216	68.7716	67.3961	0.2414	0.0892	0.4784
36	22.63	31.07	139.8000	42	401	0.3783	0.7225	0.5614	0.5251	77.9496	76.3906	0.4386	0.2775	0.4749
37	22.52	29.96	124.4000	40	401	0.4158	0.8140	0.7200	0.5264	86.1011	84.3791	0.2800	0.1860	0.4736
38	23.64	29.31	48.5000	26	401	0.4547	0.7787	0.8129	0.5406	36.0619	35.3407	0.1871	0.2213	0.4594
39	23.51	28.65	124.9000	36	401	0.4928	0.8380	0.9071	0.5293	106.0635	103.9423	0.0929	0.1620	0.4707
40	22.55	29.41	104.9000	48	401	0.5305	0.8530	0.7986	0.5220	96.2594	94.3342	0.2014	0.1470	0.4780
41	23.12	29.04	119.5000	49	401	0.5678	0.8380	0.8514	0.5216	115.1907	112.8869	0.1486	0.1620	0.4784
42	23.35	27.77	108.2000	44	401	0.6027	0.9160	1.0000	0.5240	121.5910	119.1592	0.0000	0.0840	0.4760
43	22.55	29.89	99.1000	42	401	0.6376	0.8170	0.7300	0.5251	105.3094	103.2032	0.2700	0.1830	0.4749
44	23.17	31.6	116.6000	32	401	0.6729	0.6422	0.4857	0.5330	95.0793	93.1777	0.5143	0.3578	0.4670
45	23.04	29.1	120.3000	34	401	0.7034	0.8395	0.8429	0.5311	146.5393	143.6086	0.1571	0.1605	0.4689
46	23.4	29.18	91.3000	45	401	0.7319	0.8065	0.8314	0.5235	109.5915	107.3997	0.1686	0.1935	0.4765
47	22.31	29.87	110.7000	49	401	0.7578	0.8365	0.7329	0.5216	142.1665	139.3231	0.2671	0.1635	0.4784
48	22.73	29.21	104.2000	41	401	0.7811	0.8545	0.8271	0.5258	142.0423	139.2015	0.1729	0.1455	0.4742
49	22.55	29.75	103.0000	39	401	0.8024	0.8275	0.7500	0.5271	140.0238	137.2233	0.2500	0.1725	0.4729
50	22.55	29.78	123.7000	46	401	0.8214	0.8253	0.7457	0.5230	170.3468	166.9399	0.2543	0.1747	0.4770
51	22.37	29.75	119.5000	42	401	0.8383	0.8410	0.7500	0.5251	171.8552	168.4181	0.2500	0.1590	0.4749
52	22.32	28.05	108.2000	44	401	0.8524	0.9722	0.9929	0.5240	182.5214	178.8710	0.0071	0.0278	0.4760
53	22.84	27.61	118.0000	34	401	0.8649	0.9662	1.0000	0.5311	203.4412	199.3724	0.0000	0.0338	0.4689
54	22.59	30.34	93.0000	30	401	0.8769	0.7803	0.6657	0.5352	132.2820	129.6364	0.3343	0.2198	0.4648
55	23.65	27.2	113.4000	35	401	0.8866	0.9363	1.0000	0.5302	193.8629	189.9857	0.0000	0.0637	0.4698
56	22.9	29.43	115.9000	42	401	0.8955	0.8253	0.7957	0.5251	174.7295	171.2349	0.2043	0.1747	0.4749
57	23.29	30.1	126.0000	47	401	0.9035	0.7457	0.7000	0.5225	172.3013	168.8552	0.3000	0.2543	0.4775
58	23.11	30.59	111.8000	45	401	0.9104	0.7225	0.6300	0.5235	149.5348	146.5441	0.3700	0.2775	0.4765
59	23.19	30	132.2000	43	401	0.9163	0.7608	0.7143	0.5246	187.7659	184.0106	0.2857	0.2392	0.4754
60	23.47	30.43	129.0000	44	401	0.9214	0.7075	0.6529	0.5240	171.1628	167.7395	0.3471	0.2925	0.4760
61	22.92	30.54	123.0000	30	401	0.9257	0.7405	0.6371	0.5352	175.2792	171.7736	0.3629	0.2595	0.4648
62	22.73	28.5	117.2000	43	401	0.9291	0.9077	0.9286	0.5246	201.4111	197.3829	0.0714	0.0923	0.4754

Table A39. Cowpea Biomass Growth with Stress Values for Mokwa 1996

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.38	27.78	85.1000	35	402	0.0027	0.9880	1.0000	0.5302	0.4800	0.4704	0.0000	0.0120	0.4698
2	22.11	27.61	95.3000	40	402	0.0032	0.9907	1.0000	0.5264	0.6206	0.6082	0.0000	0.0093	0.4736
3	22.37	26.86	54.7000	37	402	0.0037	0.9743	1.0000	0.5285	0.4069	0.3988	0.0000	0.0257	0.4715
4	21.77	27.64	75.6000	35	402	0.0042	0.9803	1.0000	0.5302	0.6571	0.6439	0.0000	0.0197	0.4698
5	21.79	27.39	78.4000	26	402	0.0049	0.9727	1.0000	0.5406	0.7972	0.7812	0.0000	0.0273	0.4594
6	21.63	28.44	54.7000	36	402	0.0057	0.9948	0.9371	0.5293	0.6467	0.6338	0.0629	0.0052	0.4707
7	22.25	26.52	87.4000	36	402	0.0066	0.9590	1.0000	0.5293	1.1493	1.1263	0.0000	0.0410	0.4707
8	21.73	28.1	109.1000	31	402	0.0076	0.9943	0.9857	0.5341	1.7403	1.7055	0.0143	0.0057	0.4659
9	20.93	29.8	111.4000	37	402	0.0089	0.9452	0.7429	0.5285	1.9468	1.9079	0.2571	0.0548	0.4715
10	22.09	29.92	99.8000	38	402	0.0104	0.8492	0.7257	0.5278	1.8334	1.7967	0.2743	0.1508	0.4722
11	22.61	27.07	80.4000	45	402	0.0120	0.9893	1.0000	0.5235	1.9761	1.9366	0.0000	0.0107	0.4765
12	22.32	26.77	108.3000	41	402	0.0139	0.9697	1.0000	0.5258	3.0245	2.9640	0.0000	0.0303	0.4742
13	21.65	27.95	81.8000	37	402	0.0161	0.9867	1.0000	0.5285	2.7033	2.6492	0.0000	0.0133	0.4715
14	22.09	29.99	119.2000	16	402	0.0188	0.8440	0.7157	0.5660	4.2238	4.1394	0.2843	0.1560	0.4340
15	23.15	26.35	37.4000	38	402	0.0217	0.9833	1.0000	0.5278	1.6634	1.6301	0.0000	0.0167	0.4722
16	22.73	26.14	80.9000	30	402	0.0250	0.9623	1.0000	0.5352	4.1106	4.0284	0.0000	0.0377	0.4648
17	21.66	26.29	92.0000	24	402	0.0287	0.9317	1.0000	0.5440	5.2692	5.1638	0.0000	0.0683	0.4560
18	21.58	27.83	86.6000	40	402	0.0330	0.9803	1.0000	0.5264	5.8224	5.7059	0.0000	0.0197	0.4736
19	22	27.88	109.3000	34	402	0.0381	0.9960	1.0000	0.5311	8.6970	8.5231	0.0000	0.0040	0.4689
20	22.36	27.71	118.4000	32	402	0.0440	0.9948	1.0000	0.5330	10.9048	10.6867	0.0000	0.0052	0.4670
21	21.33	29.39	41.2000	32	402	0.0510	0.9460	0.8014	0.5330	4.1756	4.0921	0.1986	0.0540	0.4670
22	22.77	27	116.8000	33	402	0.0586	0.9923	1.0000	0.5320	14.2605	13.9753	0.0000	0.0077	0.4680
23	22.2	28.04	115.7000	29	402	0.0675	0.9820	0.9943	0.5364	16.2323	15.9076	0.0057	0.0180	0.4636
24	20.83	29.39	94.8000	41	402	0.0776	0.9835	0.8014	0.5258	15.0113	14.7110	0.1986	0.0165	0.4742
25	21.88	29.48	117.3000	32	402	0.0896	0.8980	0.7886	0.5330	19.8365	19.4398	0.2114	0.1020	0.4670
26	22.24	29.7	121.3000	41	402	0.1034	0.8545	0.7571	0.5258	22.2251	21.7806	0.2429	0.1455	0.4742
27	22.77	27.97	98.7000	23	402	0.1184	0.9445	1.0000	0.5459	23.7736	23.2982	0.0000	0.0555	0.4541
28	22.61	29.44	82.2000	42	402	0.1361	0.8463	0.7943	0.5251	19.6059	19.2138	0.2057	0.1537	0.4749
29	22.48	28.49	97.9000	40	402	0.1552	0.9273	0.9300	0.5264	29.2407	28.6559	0.0700	0.0727	0.4736
30	21.88	30.32	125.5000	39	402	0.1772	0.8350	0.6686	0.5271	38.6013	37.8293	0.3314	0.1650	0.4729
31	22.37	29.91	114.2000	45	402	0.2016	0.8290	0.7271	0.5235	39.4131	38.6248	0.2729	0.1710	0.4765

Table A39 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1996

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.57	29.87	107.8000	30	402	0.2286	0.8170	0.7329	0.5352	42.5004	41.6504	0.2671	0.1830	0.4648
33	22.96	27.68	70.6000	30	402	0.2563	0.9520	1.0000	0.5352	36.3547	35.6277	0.0000	0.0480	0.4648
34	22.6	28.73	97.0000	45	402	0.2866	0.9003	0.8957	0.5235	51.6695	50.6361	0.1043	0.0997	0.4765
35	22.61	29.15	72.6000	49	402	0.3193	0.8680	0.8357	0.5216	41.3949	40.5670	0.1643	0.1320	0.4784
36	21.68	30.18	120.4000	42	402	0.3539	0.8605	0.6886	0.5251	75.9495	74.4306	0.3114	0.1395	0.4749
37	22.45	31.05	124.9000	40	402	0.3919	0.7375	0.5643	0.5264	74.9393	73.4405	0.4357	0.2625	0.4736
38	22.85	28.23	91.8000	26	402	0.4281	0.9190	0.9671	0.5406	76.9991	75.4591	0.0329	0.0810	0.4594
39	23.12	27.73	103.7000	36	402	0.4645	0.9362	1.0000	0.5293	94.1585	92.2754	0.0000	0.0638	0.4707
40	22.3	28.51	116.8000	48	402	0.5011	0.9392	0.9271	0.5220	113.1761	110.9126	0.0729	0.0608	0.4780
41	22.35	29.07	126.9000	49	402	0.5381	0.8935	0.8471	0.5216	125.4937	122.9839	0.1529	0.1065	0.4784
42	22.09	30.41	119.7000	44	402	0.5755	0.8125	0.6557	0.5240	115.6706	113.3572	0.3443	0.1875	0.4760
43	22.35	29.23	105.7000	42	402	0.6107	0.8815	0.8243	0.5251	117.8434	115.4865	0.1757	0.1185	0.4749
44	22.41	26.61	78.9000	32	402	0.6416	0.9673	1.0000	0.5330	102.9405	100.8817	0.0000	0.0327	0.4670
45	22	29.37	126.8000	34	402	0.6733	0.8972	0.8043	0.5311	160.4520	157.2430	0.1957	0.1028	0.4689
46	22.56	29.66	116.6000	45	402	0.7038	0.8335	0.7629	0.5235	141.2218	138.3974	0.2371	0.1665	0.4765
47	22.23	26.5	97.5000	49	402	0.7291	0.9577	1.0000	0.5216	140.0393	137.2385	0.0000	0.0423	0.4784
48	21.05	29.96	104.9000	41	402	0.7543	0.9242	0.7200	0.5258	151.6471	148.6142	0.2800	0.0758	0.4742
49	21.55	30.41	105.1000	39	402	0.7780	0.8530	0.6557	0.5271	144.9866	142.0869	0.3443	0.1470	0.4729
50	22.53	29.03	122.7000	46	402	0.7991	0.8830	0.8529	0.5230	178.5696	174.9982	0.1471	0.1170	0.4770
51	22.17	29.24	106.8000	42	402	0.8180	0.8943	0.8229	0.5251	161.8036	158.5675	0.1771	0.1057	0.4749
52	23.02	29.36	119.5000	44	402	0.8353	0.8215	0.8057	0.5240	169.4741	166.0846	0.1943	0.1785	0.4760
53	21.82	29.9	110.6000	34	402	0.8504	0.8710	0.7286	0.5311	171.5811	168.1495	0.2714	0.1290	0.4689
54	22.39	30.02	63.4000	30	402	0.8639	0.8193	0.7114	0.5352	94.7201	92.8257	0.2886	0.1807	0.4648
55	22.77	29.94	109.7000	35	402	0.8759	0.7968	0.7229	0.5302	160.0818	156.8802	0.2771	0.2033	0.4698
56	22.48	30.51	127.9000	42	402	0.8864	0.7757	0.6414	0.5251	182.1579	178.5147	0.3586	0.2243	0.4749
57	23.54	28.22	118.3000	47	402	0.8952	0.8680	0.9686	0.5225	189.4223	185.6338	0.0314	0.1320	0.4775
58	22.03	29.18	119.8000	45	402	0.9027	0.9092	0.8314	0.5235	203.0156	198.9553	0.1686	0.0908	0.4765
59	22.26	30.27	98.7000	43	402	0.9095	0.8102	0.6757	0.5246	150.4823	147.4726	0.3243	0.1898	0.4754
60	22.55	27.57	115.9000	44	402	0.9150	0.9910	1.0000	0.5240	217.1891	212.8453	0.0000	0.0090	0.4760
61	22.26	29.23	104.9000	30	402	0.9199	0.8882	0.8243	0.5352	180.9318	177.3131	0.1757	0.1118	0.4648
62	22.03	30.33	123.1000	43	402	0.9243	0.8230	0.6671	0.5246	193.7307	189.8561	0.3329	0.1770	0.4754

Table A40. Cowpea Biomass Growth with Stress Values for Mokwa 1997

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.03	25.59	94.2000	35	403	0.0027	0.9207	1.0000	0.5302	0.4963	0.4863	0.0000	0.0793	0.4698
2	21.55	29.39	9.4000	40	403	0.0031	0.9295	0.8014	0.5264	0.0579	0.0568	0.1986	0.0705	0.4736
3	22.85	26.39	96.3000	37	403	0.0036	0.9747	1.0000	0.5285	0.7227	0.7082	0.0000	0.0253	0.4715
4	21.55	30.49	99.2000	35	403	0.0043	0.8470	0.6443	0.5302	0.7612	0.7459	0.3557	0.1530	0.4698
5	23.2	29.33	113.2000	26	403	0.0050	0.8102	0.8100	0.5406	0.9961	0.9762	0.1900	0.1898	0.4594
6	22.76	28.46	90.6000	36	403	0.0059	0.9085	0.9343	0.5293	1.0222	1.0018	0.0657	0.0915	0.4707
7	22.17	30.82	123.9000	36	403	0.0069	0.7757	0.5971	0.5293	1.4062	1.3781	0.4029	0.2243	0.4707
8	23.67	31.03	126.8000	31	403	0.0082	0.6475	0.5671	0.5341	1.4396	1.4108	0.4329	0.3525	0.4659
9	23.73	29.25	104.3000	37	403	0.0097	0.7765	0.8214	0.5285	1.6547	1.6216	0.1786	0.2235	0.4715
10	22.95	29.26	106.7000	38	403	0.0113	0.8342	0.8200	0.5278	2.1297	2.0871	0.1800	0.1658	0.4722
11	22.31	28.87	88.8000	45	403	0.0132	0.9115	0.8757	0.5235	2.2402	2.1954	0.1243	0.0885	0.4765
12	22.48	28.34	111.2000	41	403	0.0154	0.9385	0.9514	0.5258	3.3765	3.3090	0.0486	0.0615	0.4742
13	22.19	29.56	115.5000	37	403	0.0180	0.8688	0.7771	0.5285	3.8145	3.7382	0.2229	0.1312	0.4715
14	23.29	27.95	125.1000	16	403	0.0209	0.9070	1.0000	0.5660	5.3829	5.2753	0.0000	0.0930	0.4340
15	22.57	29.03	122.0000	38	403	0.0244	0.8800	0.8529	0.5278	5.5414	5.4306	0.1471	0.1200	0.4722
16	22.86	28.73	94.1000	30	403	0.0285	0.8807	0.8957	0.5352	5.0579	4.9567	0.1043	0.1193	0.4648
17	22.33	31.08	130.6000	24	403	0.0335	0.7443	0.5600	0.5440	7.0869	6.9452	0.4400	0.2557	0.4560
18	23.4	30.52	88.3000	40	403	0.0394	0.7060	0.6400	0.5264	5.1775	5.0739	0.3600	0.2940	0.4736
19	23.34	26.55	60.7000	34	403	0.0455	0.9963	1.0000	0.5311	5.8450	5.7281	0.0000	0.0037	0.4689
20	23.09	28.82	108.3000	32	403	0.0529	0.8568	0.8829	0.5330	10.4705	10.2611	0.1171	0.1432	0.4670
21	22.41	28.54	108.8000	32	403	0.0612	0.9287	0.9229	0.5330	13.1884	12.9246	0.0771	0.0713	0.4670
22	22.85	29.33	93.2000	33	403	0.0710	0.8365	0.8100	0.5320	11.7965	11.5606	0.1900	0.1635	0.4680
23	22.84	29.01	129.9000	29	403	0.0822	0.8612	0.8557	0.5364	19.7602	19.3650	0.1443	0.1388	0.4636
24	21.57	28.72	108.5000	41	403	0.0944	0.9783	0.8971	0.5258	21.0807	20.6591	0.1029	0.0217	0.4742
25	21.64	28.94	110.4000	32	403	0.1082	0.9565	0.8657	0.5330	24.3746	23.8871	0.1343	0.0435	0.4670
26	22.46	30.42	126.5000	41	403	0.1250	0.7840	0.6543	0.5258	26.0854	25.5637	0.3457	0.2160	0.4742
27	22.83	30.57	130.3000	23	403	0.1442	0.7450	0.6329	0.5459	30.5983	29.9863	0.3671	0.2550	0.4541
28	22.9	29.96	125.1000	42	403	0.1655	0.7855	0.7200	0.5251	34.1894	33.5057	0.2800	0.2145	0.4749
29	22.85	30.64	103.8000	40	403	0.1896	0.7382	0.6229	0.5264	30.6249	30.0124	0.3771	0.2618	0.4736
30	23.44	28.67	116.9000	39	403	0.2152	0.8418	0.9043	0.5271	44.6800	43.7864	0.0957	0.1583	0.4729
31	22.23	30.28	135.5000	45	403	0.2434	0.8117	0.6743	0.5235	56.1128	54.9906	0.3257	0.1883	0.4765

Table A41 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1997

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.99	30.57	127.5000	30	403	0.2750	0.7330	0.6329	0.5352	55.0740	53.9725	0.3671	0.2670	0.4648
33	23.4	30.49	101.4000	30	403	0.3093	0.7083	0.6443	0.5352	47.5917	46.6398	0.3557	0.2917	0.4648
34	23.07	27.7	127.2000	45	403	0.3422	0.9423	1.0000	0.5235	85.9505	84.2315	0.0000	0.0577	0.4765
35	22.76	29.44	121.6000	49	403	0.3782	0.8350	0.7943	0.5216	80.1758	78.5723	0.2057	0.1650	0.4784
36	23.06	30.77	112.0000	42	403	0.4173	0.7128	0.6043	0.5251	70.0282	68.6276	0.3957	0.2872	0.4749
37	23.3	31.04	128.0000	40	403	0.4578	0.6745	0.5657	0.5264	83.2873	81.6216	0.4343	0.3255	0.4736
38	23.08	29.22	62.7000	26	403	0.4961	0.8275	0.8257	0.5406	55.7086	54.5945	0.1743	0.1725	0.4594
39	22.71	30.26	126.7000	36	403	0.5349	0.7773	0.6771	0.5293	111.6363	109.4036	0.3229	0.2227	0.4707
40	23.21	29.41	126.4000	48	403	0.5726	0.8035	0.7986	0.5220	121.5292	119.0986	0.2014	0.1965	0.4780
41	23.09	29.88	101.2000	49	403	0.6094	0.7773	0.7314	0.5216	100.0834	98.0818	0.2686	0.2227	0.4784
42	22.35	30.68	118.3000	44	403	0.6446	0.7727	0.6171	0.5240	123.6107	121.1385	0.3829	0.2273	0.4760
43	22.8	31.02	124.7000	42	403	0.6785	0.7135	0.5686	0.5251	126.9185	124.3801	0.4314	0.2865	0.4749
44	23.75	28.34	91.2000	32	403	0.7085	0.8432	0.9514	0.5330	116.2695	113.9441	0.0486	0.1568	0.4670
45	22.54	29.47	127.6000	34	403	0.7362	0.8493	0.7900	0.5311	169.6128	166.2205	0.2100	0.1507	0.4689
46	22.54	31.15	105.1000	45	403	0.7628	0.7233	0.5500	0.5235	121.5160	119.0857	0.4500	0.2767	0.4765
47	23.57	28.41	102.5000	49	403	0.7857	0.8515	0.9414	0.5216	143.1832	140.3195	0.0586	0.1485	0.4784
48	23.33	30.08	120.8000	41	403	0.8072	0.7443	0.7029	0.5258	152.7460	149.6911	0.2971	0.2557	0.4742
49	23.08	30.6	127.7000	39	403	0.8264	0.7240	0.6286	0.5271	161.2291	158.0045	0.3714	0.2760	0.4729
50	23.91	31.02	118.9000	46	403	0.8440	0.6303	0.5686	0.5230	132.4187	129.7703	0.4314	0.3698	0.4770
51	23.37	28.97	63.6000	42	403	0.8583	0.8245	0.8614	0.5251	94.6257	92.7332	0.1386	0.1755	0.4749
52	22.92	29.37	116.7000	44	403	0.8708	0.8282	0.8043	0.5240	176.5803	173.0487	0.1957	0.1718	0.4760
53	22.85	30.2	66.1000	34	403	0.8820	0.7713	0.6857	0.5311	95.6016	93.6896	0.3143	0.2287	0.4689
54	23.03	31.26	120.1000	30	403	0.8921	0.6782	0.5343	0.5352	155.4374	152.3286	0.4657	0.3218	0.4648
55	23.21	30.4	120.8000	35	403	0.9006	0.7293	0.6571	0.5302	168.3927	165.0249	0.3429	0.2707	0.4698
56	23.62	30.75	123.9000	42	403	0.9080	0.6722	0.6071	0.5251	159.0102	155.8300	0.3929	0.3278	0.4749
57	23.33	30.83	126.6000	47	403	0.9144	0.6880	0.5957	0.5225	166.5902	163.2584	0.4043	0.3120	0.4775
58	23.05	29.55	123.2000	45	403	0.9196	0.8050	0.7786	0.5235	191.1257	187.3032	0.2214	0.1950	0.4765
59	22.96	29.57	107.5000	43	403	0.9240	0.8102	0.7757	0.5246	169.0200	165.6396	0.2243	0.1898	0.4754
60	22.43	30.69	100.7000	44	403	0.9279	0.7660	0.6157	0.5240	150.1494	147.1464	0.3843	0.2340	0.4760
61	22.97	29.37	88.5000	30	403	0.9311	0.8245	0.8043	0.5352	145.5781	142.6666	0.1957	0.1755	0.4648
62	22.72	30.76	90.2000	43	403	0.9340	0.7390	0.6057	0.5246	130.7444	128.1295	0.3943	0.2610	0.4754

Table A42. Cowpea Biomass Growth with Stress Values for Mokwa 1998

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.79	28.37	74.8000	35	398	0.0027	0.9880	0.9471	0.5302	0.3964	0.3885	0.0529	0.0120	0.4698
2	22.3	27.62	72.9000	40	398	0.0032	0.9973	1.0000	0.5264	0.4495	0.4405	0.0000	0.0027	0.4736
3	22.13	28.06	114.0000	37	398	0.0037	0.9858	0.9914	0.5285	0.8109	0.7946	0.0086	0.0142	0.4715
4	22.11	30.34	123.8000	35	398	0.0043	0.8162	0.6657	0.5302	0.8596	0.8425	0.3343	0.1838	0.4698
5	22.73	28.1	87.6000	26	398	0.0050	0.9378	0.9857	0.5406	0.8307	0.8141	0.0143	0.0622	0.4594
6	22.07	28.09	90.5000	36	398	0.0059	0.9880	0.9871	0.5293	1.0286	1.0080	0.0129	0.0120	0.4707
7	22.29	28.44	98.8000	36	398	0.0068	0.9452	0.9371	0.5293	1.2514	1.2264	0.0629	0.0548	0.4707
8	22.54	26.99	22.8000	31	398	0.0079	0.9843	1.0000	0.5341	0.3513	0.3443	0.0000	0.0157	0.4659
9	22.17	29.47	94.2000	37	398	0.0093	0.8770	0.7900	0.5285	1.4970	1.4671	0.2100	0.1230	0.4715
10	22.3	29.5	92.4000	38	398	0.0108	0.8650	0.7857	0.5278	1.6926	1.6588	0.2143	0.1350	0.4722
11	22.69	26.86	98.9000	45	398	0.0125	0.9850	1.0000	0.5235	2.3677	2.3203	0.0000	0.0150	0.4765
12	21.86	27.35	127.3000	41	398	0.0145	0.9737	1.0000	0.5258	3.4942	3.4243	0.0000	0.0263	0.4742
13	22.05	30.63	121.5000	37	398	0.0170	0.7990	0.6243	0.5285	3.2309	3.1662	0.3757	0.2010	0.4715
14	23.69	29.39	121.0000	16	398	0.0200	0.7690	0.8014	0.5660	3.9002	3.8222	0.1986	0.2310	0.4340
15	22.94	29.25	90.0000	38	398	0.0234	0.8358	0.8214	0.5278	3.4407	3.3718	0.1786	0.1642	0.4722
16	22.03	29.39	45.3000	30	398	0.0273	0.8935	0.8014	0.5352	2.1877	2.1439	0.1986	0.1065	0.4648
17	22.55	28.91	57.4000	24	398	0.0317	0.8905	0.8700	0.5440	3.2705	3.2051	0.1300	0.1095	0.4560
18	22.91	28.25	71.4000	40	398	0.0369	0.9130	0.9643	0.5264	4.6901	4.5963	0.0357	0.0870	0.4736
19	22.19	27.25	90.0000	34	398	0.0425	0.9813	1.0000	0.5311	7.3818	7.2341	0.0000	0.0187	0.4689
20	22	28.11	87.3000	32	398	0.0490	0.9918	0.9843	0.5330	8.3819	8.2143	0.0157	0.0082	0.4670
21	22.41	29.11	123.7000	32	398	0.0569	0.8860	0.8414	0.5330	12.3131	12.0668	0.1586	0.1140	0.4670
22	22.61	28.29	92.0000	33	398	0.0657	0.9325	0.9586	0.5320	11.1163	10.8940	0.0414	0.0675	0.4680
23	22.81	26.99	71.5000	29	398	0.0754	0.9933	1.0000	0.5364	10.6518	10.4387	0.0000	0.0067	0.4636
24	22.87	28.25	36.0000	41	398	0.0870	0.9160	0.9643	0.5258	5.5887	5.4769	0.0357	0.0840	0.4742
25	22.45	27.12	128.0000	32	398	0.0994	0.9857	1.0000	0.5330	24.7694	24.2741	0.0000	0.0143	0.4670
26	22.04	31.83	126.1000	41	398	0.1155	0.7098	0.4529	0.5258	17.3490	17.0020	0.5471	0.2902	0.4742
27	23.6	30.97	109.8000	23	398	0.1342	0.6573	0.5757	0.5459	19.5959	19.2040	0.4243	0.3428	0.4541
28	23.35	29.79	109.6000	42	398	0.1545	0.7645	0.7443	0.5251	25.1894	24.6856	0.2557	0.2355	0.4749
29	22.68	30.1	116.3000	40	398	0.1769	0.7915	0.7000	0.5264	31.7601	31.1249	0.3000	0.2085	0.4736
30	23.28	31.19	68.3000	39	398	0.2030	0.6648	0.5443	0.5271	18.0049	17.6448	0.4557	0.3352	0.4729
31	23.33	28.62	110.9000	45	398	0.2297	0.8537	0.9114	0.5235	42.1874	41.3436	0.0886	0.1463	0.4765

Table A42 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1998

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.65	27.5	73.0000	30	398	0.2569	0.9888	1.0000	0.5352	36.7850	36.0493	0.0000	0.0112	0.4648
33	22.93	29.24	117.8000	30	398	0.2882	0.8372	0.8229	0.5352	56.3752	55.2477	0.1771	0.1628	0.4648
34	22.51	29.98	102.7000	45	398	0.3218	0.8132	0.7171	0.5235	52.1397	51.0969	0.2829	0.1868	0.4765
35	22.56	27.5	83.8000	49	398	0.3545	0.9955	1.0000	0.5216	57.1631	56.0198	0.0000	0.0045	0.4784
36	21.19	29.22	74.2000	42	398	0.3889	0.9693	0.8257	0.5251	54.4320	53.3434	0.1743	0.0307	0.4749
37	21.76	30.26	116.6000	40	398	0.4261	0.8485	0.6771	0.5264	82.2458	80.6009	0.3229	0.1515	0.4736
38	22.17	30.94	116.4000	26	398	0.4653	0.7668	0.5800	0.5406	83.1976	81.5337	0.4200	0.2332	0.4594
39	23.34	26.41	59.6000	36	398	0.5006	0.9917	1.0000	0.5293	58.0388	56.8780	0.0000	0.0083	0.4707
40	22.58	29.81	106.6000	48	398	0.5387	0.8208	0.7414	0.5220	91.1748	89.3513	0.2586	0.1793	0.4780
41	22.82	29.96	87.5000	49	398	0.5764	0.7915	0.7200	0.5216	77.1598	75.6166	0.2800	0.2085	0.4784
42	22.46	30.5	126.5000	44	398	0.6130	0.7780	0.6429	0.5240	117.1637	114.8205	0.3571	0.2220	0.4760
43	22.1	29.82	119.1000	42	398	0.6469	0.8560	0.7400	0.5251	128.3496	125.7826	0.2600	0.1440	0.4749
44	23.15	28.24	105.7000	32	398	0.6783	0.8957	0.9657	0.5330	126.8615	124.3242	0.0343	0.1043	0.4670
45	23.1	31.68	108.2000	34	398	0.7108	0.6415	0.4743	0.5311	86.7153	84.9810	0.5257	0.3585	0.4689
46	23.1	30.09	123.0000	45	398	0.7392	0.7608	0.7014	0.5235	134.1905	131.5067	0.2986	0.2392	0.4765
47	23.17	30.56	104.5000	49	398	0.7656	0.7202	0.6343	0.5216	111.3780	109.1504	0.3657	0.2798	0.4784
48	23.47	28.05	77.3000	41	398	0.7879	0.8860	0.9929	0.5258	105.1404	103.0376	0.0071	0.1140	0.4742
49	22.14	31.08	122.8000	39	398	0.8090	0.7585	0.5600	0.5271	147.1947	144.2508	0.4400	0.2415	0.4729
50	23.37	31.99	112.5000	46	398	0.8290	0.5980	0.4300	0.5230	88.8706	87.0932	0.5700	0.4020	0.4770
51	23.47	30.46	122.5000	42	398	0.8458	0.7053	0.6486	0.5251	142.2049	139.3608	0.3514	0.2947	0.4749
52	22.67	31.03	116.1000	44	398	0.8604	0.7225	0.5671	0.5240	140.1560	137.3528	0.4329	0.2775	0.4760
53	23.39	31.51	129.5000	34	398	0.8736	0.6325	0.4986	0.5311	132.2136	129.5693	0.5014	0.3675	0.4689
54	23.77	29.43	107.3000	30	398	0.8845	0.7600	0.7957	0.5352	143.0616	140.2003	0.2043	0.2400	0.4648
55	23.52	27.95	107.3000	35	398	0.8935	0.8898	1.0000	0.5302	167.5948	164.2429	0.0000	0.1102	0.4698
56	22.61	27.2	90.9000	42	398	0.9009	0.9937	1.0000	0.5251	158.3628	155.1955	0.0000	0.0063	0.4749
57	22.36	30.25	80.7000	47	398	0.9079	0.8043	0.6786	0.5225	114.1004	111.8184	0.3214	0.1957	0.4775
58	23.33	29.59	86.6000	45	398	0.9141	0.7810	0.7729	0.5235	119.9358	117.5371	0.2271	0.2190	0.4765
59	23.33	26.82	98.4000	43	398	0.9189	0.9888	1.0000	0.5246	173.8081	170.3319	0.0000	0.0112	0.4754
60	22.56	30.15	98.9000	44	398	0.9235	0.7968	0.6929	0.5240	141.3161	138.4898	0.3071	0.2032	0.4760
61	22.67	31.27	123.1000	30	398	0.9275	0.7045	0.5329	0.5352	158.8499	155.6729	0.4671	0.2955	0.4648
62	23.06	31.87	128.5000	43	398	0.9311	0.6303	0.4471	0.5246	124.9534	122.4543	0.5529	0.3698	0.4754

Table A43. Cowpea Biomass Growth with Stress Values for Mokwa 1999

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.08	29.5	112.1000	35	399	0.0027	0.8815	0.7857	0.5302	0.5424	0.5316	0.2143	0.1185	0.4698
2	22.28	29.62	122.1000	40	399	0.0032	0.8575	0.7686	0.5264	0.6690	0.6556	0.2314	0.1425	0.4736
3	22.3	27.66	63.9000	37	399	0.0037	0.9987	1.0000	0.5285	0.4753	0.4658	0.0000	0.0013	0.4715
4	21.99	29.29	110.1000	35	399	0.0044	0.9040	0.8157	0.5302	0.8689	0.8515	0.1843	0.0960	0.4698
5	21.99	28.44	106.7000	26	399	0.0051	0.9678	0.9371	0.5406	1.0695	1.0481	0.0629	0.0323	0.4594
6	21.33	30.7	45.9000	36	399	0.0060	0.8477	0.6143	0.5293	0.4627	0.4535	0.3857	0.1523	0.4707
7	22.41	27.02	83.0000	36	399	0.0069	0.9810	1.0000	0.5293	1.1206	1.0982	0.0000	0.0190	0.4707
8	21.98	27.86	63.2000	31	399	0.0080	0.9947	1.0000	0.5341	1.0122	0.9919	0.0000	0.0053	0.4659
9	21.53	29.44	109.8000	37	399	0.0093	0.9273	0.7943	0.5285	1.8914	1.8536	0.2057	0.0727	0.4715
10	21.87	30.73	135.2000	38	399	0.0110	0.8050	0.6100	0.5278	2.3723	2.3249	0.3900	0.1950	0.4722
11	22.47	31.18	78.5000	45	399	0.0129	0.7263	0.5457	0.5235	1.4552	1.4261	0.4543	0.2737	0.4765
12	23.39	26.59	77.6000	41	399	0.0150	0.9993	1.0000	0.5258	2.3046	2.2585	0.0000	0.0007	0.4742
13	22.34	27.22	115.5000	37	399	0.0174	0.9853	1.0000	0.5285	3.9316	3.8530	0.0000	0.0147	0.4715
14	21.88	29.79	99.7000	16	399	0.0203	0.8747	0.7443	0.5660	3.7682	3.6929	0.2557	0.1253	0.4340
15	21.51	30.97	130.2000	38	399	0.0238	0.8140	0.5757	0.5278	5.0042	4.9041	0.4243	0.1860	0.4722
16	22.84	30.72	77.5000	30	399	0.0280	0.7330	0.6114	0.5352	3.2023	3.1382	0.3886	0.2670	0.4648
17	22.54	31.49	111.1000	24	399	0.0330	0.6977	0.5014	0.5440	4.8271	4.7306	0.4986	0.3023	0.4560
18	21.63	30.61	119.2000	40	399	0.0385	0.8320	0.6271	0.5264	7.5711	7.4197	0.3729	0.1680	0.4736
19	22.65	30.81	86.2000	34	399	0.0452	0.7405	0.5986	0.5311	5.7687	5.6534	0.4014	0.2595	0.4689
20	23.49	28.52	111.5000	32	399	0.0526	0.8493	0.9257	0.5330	9.9973	9.7973	0.0743	0.1507	0.4670
21	22.85	28.51	108.4000	32	399	0.0610	0.8980	0.9271	0.5330	11.9100	11.6718	0.0729	0.1020	0.4670
22	21.95	31.3	108.6000	33	399	0.0712	0.7563	0.5286	0.5320	11.6323	11.3997	0.4714	0.2438	0.4680
23	22.93	30.29	65.8000	29	399	0.0829	0.7585	0.6729	0.5364	8.3569	8.1898	0.3271	0.2415	0.4636
24	22.75	29.91	74.6000	41	399	0.0961	0.8005	0.7271	0.5258	11.3632	11.1359	0.2729	0.1995	0.4742
25	21.4	29.64	84.5000	32	399	0.1104	0.9220	0.7657	0.5330	17.2590	16.9139	0.2343	0.0780	0.4670
26	21.55	27.29	48.1000	41	399	0.1252	0.9613	1.0000	0.5258	11.4650	11.2357	0.0000	0.0387	0.4742
27	20.3	30.66	98.4000	23	399	0.1431	0.9280	0.6200	0.5459	26.8524	26.3154	0.3800	0.0720	0.4541
28	22.45	28.44	100.1000	42	399	0.1628	0.9332	0.9371	0.5251	30.0827	29.4810	0.0629	0.0668	0.4749
29	21.69	31.89	117.7000	40	399	0.1868	0.7315	0.4443	0.5264	26.9015	26.3635	0.5557	0.2685	0.4736
30	23.65	30.95	104.4000	39	399	0.2141	0.6550	0.5786	0.5271	29.0562	28.4751	0.4214	0.3450	0.4729
31	22.71	28.62	112.1000	45	399	0.2412	0.9003	0.9114	0.5235	47.9760	47.0165	0.0886	0.0997	0.4765

Table A43 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 1999

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.74	30.16	127.3000	30	399	0.2710	0.8575	0.6914	0.5352	59.6150	58.4227	0.3086	0.1425	0.4648
33	23	30.08	119.7000	30	399	0.3041	0.7690	0.7029	0.5352	56.4178	55.2895	0.2971	0.2310	0.4648
34	22.64	29.79	35.2000	45	399	0.3386	0.8178	0.7443	0.5235	19.2107	18.8265	0.2557	0.1823	0.4765
35	23.06	29.89	94.0000	49	399	0.3753	0.7787	0.7300	0.5216	53.9499	52.8709	0.2700	0.2213	0.4784
36	21.65	32.11	125.1000	42	399	0.4142	0.7180	0.4129	0.5251	57.8369	56.6802	0.5871	0.2820	0.4749
37	24.3	32.06	94.5000	40	399	0.4570	0.5230	0.4200	0.5264	35.7241	35.0096	0.5800	0.4770	0.4736
38	23.9	29.05	108.8000	26	399	0.4961	0.7787	0.8500	0.5406	85.5753	83.8638	0.1500	0.2213	0.4594
39	22.85	30.49	107.8000	36	399	0.5354	0.7495	0.6443	0.5293	86.2263	84.5017	0.3557	0.2505	0.4707
40	22.35	32.83	119.4000	48	399	0.5760	0.6115	0.3100	0.5220	49.0887	48.1069	0.6900	0.3885	0.4780
41	23.27	30.93	96.6000	49	399	0.6140	0.6850	0.5814	0.5216	79.7861	78.1904	0.4186	0.3150	0.4784
42	22.46	31.09	114.0000	44	399	0.6494	0.7338	0.5586	0.5240	107.1875	105.0438	0.4414	0.2662	0.4760
43	22.76	30.55	99.5000	42	399	0.6826	0.7517	0.6357	0.5251	100.9585	98.9393	0.3643	0.2483	0.4749
44	22.36	28.63	88.4000	32	399	0.7113	0.9258	0.9100	0.5330	116.8303	114.4937	0.0900	0.0742	0.4670
45	21.58	31.19	32.1000	34	399	0.7394	0.7923	0.5443	0.5311	37.6014	36.8494	0.4557	0.2077	0.4689
46	23.15	30.01	104.3000	45	399	0.7653	0.7630	0.7129	0.5235	120.0488	117.6478	0.2871	0.2370	0.4765
47	22.17	31.8	118.7000	49	399	0.7893	0.7023	0.4571	0.5216	113.2525	110.9874	0.5429	0.2977	0.4784
48	22.42	32.41	82.2000	41	399	0.8112	0.6378	0.3700	0.5258	59.2492	58.0642	0.6300	0.3622	0.4742
49	22.51	33.42	105.2000	39	399	0.8312	0.5552	0.2257	0.5271	41.2650	40.4397	0.7743	0.4448	0.4729
50	23.13	32.62	110.7000	46	399	0.8486	0.5688	0.3400	0.5230	68.3990	67.0310	0.6600	0.4312	0.4770
51	23.44	32.32	120.8000	42	399	0.8637	0.5680	0.3829	0.5251	85.4307	83.7221	0.6171	0.4320	0.4749
52	23.82	30.91	122.9000	44	399	0.8764	0.6452	0.5843	0.5240	137.1234	134.3810	0.4157	0.3548	0.4760
53	23.41	29.88	111.9000	34	399	0.8869	0.7533	0.7314	0.5311	149.4879	146.4981	0.2686	0.2467	0.4689
54	22.11	30.93	99.7000	30	399	0.8960	0.7720	0.5814	0.5352	138.9754	136.1959	0.4186	0.2280	0.4648
55	22.11	29.41	57.5000	35	399	0.9035	0.8860	0.7986	0.5302	91.8850	90.0473	0.2014	0.1140	0.4698
56	21.94	31.41	107.5000	42	399	0.9103	0.7487	0.5129	0.5251	141.4977	138.6677	0.4871	0.2513	0.4749
57	22.87	30.8	115.7000	47	399	0.9162	0.7247	0.6000	0.5225	151.1507	148.1277	0.4000	0.2753	0.4775
58	22.45	31.65	116.6000	45	399	0.9214	0.6925	0.4786	0.5235	134.0665	131.3852	0.5214	0.3075	0.4765
59	21.45	32.36	116.0000	43	399	0.9257	0.7142	0.3771	0.5246	108.9206	106.7422	0.6229	0.2858	0.4754
60	22.28	32.27	104.6000	44	399	0.9295	0.6587	0.3900	0.5240	94.0543	92.1732	0.6100	0.3413	0.4760
61	23.49	30.36	66.9000	30	399	0.9326	0.7113	0.6629	0.5352	89.4312	87.6426	0.3371	0.2887	0.4648
62	22.7	27.44	81.2000	43	399	0.9350	0.9895	1.0000	0.5246	148.3896	145.4218	0.0000	0.0105	0.4754

Table A44. Cowpea Biomass Growth with Stress Values for Mokwa 2000

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.59	28.28	112.7000	35	402	0.0027	0.9347	0.9600	0.5302	0.6035	0.5915	0.0400	0.0653	0.4698
2	22.23	28.25	105.3000	40	402	0.0032	0.9640	0.9643	0.5264	0.6722	0.6587	0.0357	0.0360	0.4736
3	21.89	27.3	74.7000	37	402	0.0037	0.9730	1.0000	0.5285	0.5589	0.5477	0.0000	0.0270	0.4715
4	22.19	27.97	87.9000	35	402	0.0043	0.9880	1.0000	0.5302	0.7784	0.7628	0.0000	0.0120	0.4698
5	21.89	26.32	96.1000	26	402	0.0049	0.9403	1.0000	0.5406	0.9503	0.9313	0.0000	0.0597	0.4594
6	21.53	29.78	120.7000	36	402	0.0058	0.9017	0.7457	0.5293	1.3095	1.2833	0.2543	0.0983	0.4707
7	22.91	28.31	102.2000	36	402	0.0067	0.9085	0.9557	0.5293	1.3045	1.2784	0.0443	0.0915	0.4707
8	22.55	29.52	86.3000	31	402	0.0079	0.8448	0.7829	0.5341	1.2117	1.1874	0.2171	0.1553	0.4659
9	22.08	27.45	89.5000	37	402	0.0091	0.9843	1.0000	0.5285	1.6774	1.6439	0.0000	0.0157	0.4715
10	21.85	29.61	107.9000	38	402	0.0107	0.8905	0.7700	0.5278	2.1346	2.0919	0.2300	0.1095	0.4722
11	22.94	30.65	69.8000	45	402	0.0126	0.7307	0.6214	0.5235	1.3267	1.3001	0.3786	0.2693	0.4765
12	23.42	29.58	119.4000	41	402	0.0148	0.7750	0.7743	0.5258	2.8442	2.7874	0.2257	0.2250	0.4742
13	22.44	29.62	68.6000	37	402	0.0174	0.8455	0.7686	0.5285	2.0981	2.0562	0.2314	0.1545	0.4715
14	23.2	30.09	121.9000	16	402	0.0204	0.7533	0.7014	0.5660	4.1873	4.1035	0.2986	0.2467	0.4340
15	23.19	29.29	115.2000	38	402	0.0239	0.8140	0.8157	0.5278	4.6730	4.5795	0.1843	0.1860	0.4722
16	22.69	30.07	89.0000	30	402	0.0281	0.7930	0.7043	0.5352	4.1824	4.0988	0.2957	0.2070	0.4648
17	22.32	30.04	126.6000	24	402	0.0328	0.8230	0.7086	0.5440	7.3401	7.1933	0.2914	0.1770	0.4560
18	22.21	28.41	105.0000	40	402	0.0380	0.9535	0.9414	0.5264	7.9088	7.7506	0.0586	0.0465	0.4736
19	22.07	31.14	120.9000	34	402	0.0446	0.7593	0.5514	0.5311	8.5748	8.4033	0.4486	0.2408	0.4689
20	23.21	30.17	115.8000	32	402	0.0523	0.7465	0.6900	0.5330	9.4958	9.3059	0.3100	0.2535	0.4670
21	23.02	30.58	118.8000	32	402	0.0612	0.7300	0.6314	0.5330	11.1569	10.9338	0.3686	0.2700	0.4670
22	22.96	29.68	92.7000	33	402	0.0712	0.8020	0.7600	0.5320	11.1119	10.8897	0.2400	0.1980	0.4680
23	23.26	30.68	91.1000	29	402	0.0833	0.7045	0.6171	0.5364	11.3042	11.0782	0.3829	0.2955	0.4636
24	22.61	29.34	94.0000	41	402	0.0962	0.8537	0.8086	0.5258	16.0111	15.6908	0.1914	0.1463	0.4742
25	22.89	26.44	80.2000	32	402	0.1097	0.9777	1.0000	0.5330	18.0745	17.7130	0.0000	0.0223	0.4670
26	21.46	30.7	119.9000	41	402	0.1262	0.8380	0.6143	0.5258	26.3026	25.7765	0.3857	0.1620	0.4742
27	22.63	27.47	99.8000	23	402	0.1436	0.9925	1.0000	0.5459	30.6353	30.0226	0.0000	0.0075	0.4541
28	22.26	28.08	59.3000	42	402	0.1631	0.9745	0.9886	0.5251	19.5258	19.1353	0.0114	0.0255	0.4749
29	21.42	28.52	113.4000	40	402	0.1844	0.9980	0.9257	0.5264	43.3200	42.4536	0.0743	0.0020	0.4736
30	21.26	28.93	115.1000	39	402	0.2078	0.9858	0.8671	0.5271	49.0209	48.0404	0.1329	0.0142	0.4729
31	21.71	29.28	75.5000	45	402	0.2341	0.9257	0.8171	0.5235	33.7792	33.1036	0.1829	0.0743	0.4765

Table A44 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2000

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.12	29.7	120.2000	30	402	0.2633	0.8635	0.7571	0.5352	57.6799	56.5263	0.2429	0.1365	0.4648
33	21.42	29.25	48.6000	30	402	0.2934	0.9497	0.8214	0.5352	28.5891	28.0173	0.1786	0.0503	0.4648
34	22.6	29.36	88.2000	45	402	0.3268	0.8530	0.8057	0.5235	50.7578	49.7426	0.1943	0.1470	0.4765
35	22.2	27.94	104.5000	49	402	0.3598	0.9895	1.0000	0.5216	76.5298	74.9992	0.0000	0.0105	0.4784
36	21.52	30.26	106.0000	42	402	0.3959	0.8665	0.6771	0.5251	75.3218	73.8154	0.3229	0.1335	0.4749
37	22.78	29.06	118.0000	40	402	0.4331	0.8620	0.8486	0.5264	91.4638	89.6345	0.1514	0.1380	0.4736
38	22.54	29.02	138.9000	26	402	0.4705	0.8830	0.8543	0.5406	123.0372	120.5765	0.1457	0.1170	0.4594
39	22.11	30.4	135.9000	36	402	0.5090	0.8118	0.6571	0.5293	117.2345	114.8898	0.3429	0.1882	0.4707
40	22.48	28.14	59.6000	48	402	0.5449	0.9535	0.9800	0.5220	63.7566	62.4814	0.0200	0.0465	0.4780
41	22.43	26.87	110.8000	49	402	0.5786	0.9767	1.0000	0.5216	128.7856	126.2099	0.0000	0.0233	0.4784
42	21.12	31.11	122.5000	44	402	0.6143	0.8327	0.5557	0.5240	129.5104	126.9202	0.4443	0.1673	0.4760
43	21.64	30.53	112.7000	42	402	0.6483	0.8372	0.6386	0.5251	126.7072	124.1730	0.3614	0.1628	0.4749
44	22.55	29.92	74.6000	32	402	0.6807	0.8148	0.7257	0.5330	86.9778	85.2382	0.2743	0.1852	0.4670
45	23.11	28.22	66.4000	34	402	0.7099	0.9003	0.9686	0.5311	88.8826	87.1050	0.0314	0.0997	0.4689
46	21.14	30.12	116.7000	45	402	0.7369	0.9055	0.6971	0.5235	160.7572	157.5420	0.3029	0.0945	0.4765
47	23.17	29.79	106.9000	49	402	0.7629	0.7780	0.7443	0.5216	130.5084	127.8983	0.2557	0.2220	0.4784
48	22.79	28.98	120.3000	41	402	0.7856	0.8673	0.8600	0.5258	169.9532	166.5541	0.1400	0.1327	0.4742
49	21.97	30.29	102.1000	39	402	0.8064	0.8305	0.6729	0.5271	142.1402	139.2974	0.3271	0.1695	0.4729
50	22.25	30.55	111.3000	46	402	0.8253	0.7900	0.6357	0.5230	149.6621	146.6688	0.3643	0.2100	0.4770
51	22.07	29.85	108.4000	42	402	0.8416	0.8560	0.7357	0.5251	161.7333	158.4987	0.2643	0.1440	0.4749
52	22.25	28.97	100.8000	44	402	0.8557	0.9085	0.8614	0.5240	161.9424	158.7036	0.1386	0.0915	0.4760
53	22.39	30.92	105.7000	34	402	0.8689	0.7517	0.5829	0.5311	144.6111	141.7189	0.4171	0.2483	0.4689
54	22.58	29.85	61.0000	30	402	0.8802	0.8178	0.7357	0.5352	92.6749	90.8214	0.2643	0.1823	0.4648
55	22.91	27.14	90.4000	35	402	0.8893	0.9963	1.0000	0.5302	167.4658	164.1165	0.0000	0.0037	0.4698
56	22.11	27.84	100.4000	42	402	0.8973	0.9983	1.0000	0.5251	186.2678	182.5425	0.0000	0.0017	0.4749
57	21.65	30.27	102.0000	47	402	0.9047	0.8560	0.6757	0.5225	162.7634	159.5081	0.3243	0.1440	0.4775
58	21.97	30.09	113.1000	45	402	0.9111	0.8455	0.7014	0.5235	179.8742	176.2767	0.2986	0.1545	0.4765
59	22.42	30.24	120.8000	43	402	0.9168	0.8005	0.6800	0.5246	183.4058	179.7377	0.3200	0.1995	0.4754
60	23.09	29	110.6000	44	402	0.9215	0.8432	0.8571	0.5240	177.6203	174.0679	0.1429	0.1568	0.4760
61	22.63	30.46	122.4000	30	402	0.9258	0.7682	0.6486	0.5352	183.7548	180.0797	0.3514	0.2318	0.4648
62	22.17	30.92	117.1000	43	402	0.9294	0.7682	0.5829	0.5246	172.9753	169.5158	0.4171	0.2318	0.4754

Table A45. Cowpea Biomass Growth with Stress Values for Mokwa 2001

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.32	29.14	47.0580	35	400	0.0027	0.8905	0.8371	0.5302	0.2335	0.2289	0.1629	0.1095	0.4698
2	22.57	28.86	60.8000	40	400	0.0032	0.8928	0.8771	0.5264	0.3513	0.3442	0.1229	0.1072	0.4736
3	22.72	29.51	80.3710	37	400	0.0038	0.8327	0.7843	0.5285	0.5106	0.5004	0.2157	0.1673	0.4715
4	23.14	28	51.6580	35	400	0.0044	0.9145	1.0000	0.5302	0.4222	0.4137	0.0000	0.0855	0.4698
5	22.7	30.27	83.9710	26	400	0.0052	0.7773	0.6757	0.5406	0.7007	0.6867	0.3243	0.2227	0.4594
6	23.63	27.94	67.8000	36	400	0.0061	0.8823	1.0000	0.5293	0.7356	0.7209	0.0000	0.1178	0.4707
7	22.65	27.64	90.1210	36	400	0.0071	0.9783	1.0000	0.5293	1.2602	1.2350	0.0000	0.0217	0.4707
8	22.05	30.19	81.8710	31	400	0.0083	0.8320	0.6871	0.5341	1.1527	1.1297	0.3129	0.1680	0.4659
9	22.69	30.17	71.0500	37	400	0.0097	0.7855	0.6900	0.5285	1.0999	1.0779	0.3100	0.2145	0.4715
10	22.87	29.16	86.6000	38	400	0.0114	0.8477	0.8343	0.5278	1.6927	1.6589	0.1657	0.1523	0.4722
11	22.1	29.64	87.8500	45	400	0.0134	0.8695	0.7657	0.5235	2.0430	2.0021	0.2343	0.1305	0.4765
12	23.22	27.62	37.1790	41	400	0.0155	0.9370	1.0000	0.5258	1.0893	1.0675	0.0000	0.0630	0.4742
13	22.73	28	104.1790	37	400	0.0181	0.9452	1.0000	0.5285	3.5998	3.5278	0.0000	0.0548	0.4715
14	21.77	30.05	89.6920	16	400	0.0211	0.8635	0.7071	0.5660	3.5430	3.4722	0.2929	0.1365	0.4340
15	23.1	27.68	43.3420	38	400	0.0246	0.9415	1.0000	0.5278	2.0228	1.9824	0.0000	0.0585	0.4722
16	22.25	29.58	83.8790	30	400	0.0287	0.8628	0.7743	0.5352	4.2464	4.1614	0.2257	0.1372	0.4648
17	22.3	30.38	77.4210	24	400	0.0336	0.7990	0.6600	0.5440	4.3212	4.2348	0.3400	0.2010	0.4560
18	22.92	29.21	81.2710	40	400	0.0392	0.8402	0.8271	0.5264	5.3872	5.2795	0.1729	0.1598	0.4736
19	22.89	25.5	75.7420	34	400	0.0449	0.9463	1.0000	0.5311	6.5336	6.4030	0.0000	0.0537	0.4689
20	22.24	29.06	62.0080	32	400	0.0521	0.9025	0.8486	0.5330	5.9397	5.8209	0.1514	0.0975	0.4670
21	22.37	27.12	67.6080	32	400	0.0598	0.9830	1.0000	0.5330	8.1038	7.9418	0.0000	0.0170	0.4670
22	21.72	29.26	96.0210	33	400	0.0691	0.9265	0.8200	0.5320	12.5097	12.2595	0.1800	0.0735	0.4680
23	23.06	27.67	106.2000	29	400	0.0796	0.9452	1.0000	0.5364	16.3987	16.0708	0.0000	0.0548	0.4636
24	21.98	30.36	95.5080	41	400	0.0922	0.8245	0.6629	0.5258	14.6063	14.3142	0.3371	0.1755	0.4742
25	22.73	30.3	75.6080	32	400	0.1069	0.7727	0.6714	0.5330	12.7373	12.4825	0.3286	0.2273	0.4670
26	22.71	29.41	93.3210	41	400	0.1231	0.8410	0.7986	0.5258	19.4363	19.0476	0.2014	0.1590	0.4742
27	21.84	30.37	109.3000	23	400	0.1415	0.8342	0.6614	0.5459	26.9346	26.3959	0.3386	0.1658	0.4541
28	22.53	31.07	110.5710	42	400	0.1629	0.7300	0.5614	0.5251	26.4119	25.8837	0.4386	0.2700	0.4749
29	23.14	28.9	61.4710	40	400	0.1857	0.8470	0.8714	0.5264	19.4649	19.0756	0.1286	0.1530	0.4736
30	22.62	28.29	92.2420	39	400	0.2099	0.9318	0.9586	0.5271	36.3617	35.6345	0.0414	0.0682	0.4729
31	22.03	28.9	93.2290	45	400	0.2362	0.9303	0.8714	0.5235	41.0197	40.1993	0.1286	0.0697	0.4765

Table A45 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2001

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.32	29.65	112.1500	30	400	0.2657	0.8523	0.7643	0.5352	51.9912	50.9514	0.2357	0.1477	0.4648
33	22.03	30.11	103.6290	30	400	0.2975	0.8395	0.6986	0.5352	52.9884	51.9287	0.3014	0.1605	0.4648
34	22.9	28.03	95.4290	45	400	0.3300	0.9303	0.9957	0.5235	58.6574	57.4843	0.0043	0.0697	0.4765
35	21.8	27.9	109.0920	49	400	0.3627	0.9900	1.0000	0.5216	78.1385	76.5757	0.0000	0.0100	0.4784
36	21.69	28.06	62.2420	42	400	0.3966	0.9917	0.9914	0.5251	49.1653	48.1820	0.0086	0.0083	0.4749
37	22.15	29.08	83.8920	40	400	0.4330	0.9078	0.8457	0.5264	66.3965	65.0686	0.1543	0.0922	0.4736
38	20.98	31.43	107.2790	26	400	0.4714	0.8193	0.5100	0.5406	80.8211	79.2047	0.4900	0.1807	0.4594
39	22.37	28.91	97.5580	36	400	0.5085	0.9040	0.8700	0.5293	90.7981	88.9822	0.1300	0.0960	0.4707
40	21.9	28.78	88.6500	48	400	0.5445	0.9490	0.8886	0.5220	91.4591	89.6299	0.1114	0.0510	0.4780
41	22.33	29.97	87.0790	49	400	0.5815	0.8275	0.7186	0.5216	83.5905	81.9187	0.2814	0.1725	0.4784
42	21.97	29.96	108.1080	44	400	0.6168	0.8553	0.7200	0.5240	114.3034	112.0173	0.2800	0.1447	0.4760
43	21.86	29.5	74.3500	42	400	0.6499	0.8980	0.7857	0.5251	87.1563	85.4131	0.2143	0.1020	0.4749
44	22.5	29.6	73.0580	32	400	0.6818	0.8425	0.7714	0.5330	85.5593	83.8481	0.2286	0.1575	0.4670
45	21.92	31.18	101.6790	34	400	0.7125	0.7675	0.5457	0.5311	112.9452	110.6863	0.4543	0.2325	0.4689
46	21.8	30.76	111.2710	45	400	0.7403	0.8080	0.6057	0.5235	133.2671	130.6018	0.3943	0.1920	0.4765
47	22.92	30.46	121.2290	49	400	0.7663	0.7465	0.6486	0.5216	138.3460	135.5791	0.3514	0.2535	0.4784
48	22.96	28.86	122.8920	41	400	0.7887	0.8635	0.8771	0.5258	168.3190	164.9526	0.1229	0.1365	0.4742
49	22.51	29.44	112.0210	39	400	0.8090	0.8537	0.7943	0.5271	155.9878	152.8680	0.2057	0.1463	0.4729
50	21.77	30.67	117.3920	46	400	0.8274	0.8170	0.6186	0.5230	158.7345	155.5598	0.3814	0.1830	0.4770
51	22.27	30.88	123.2000	42	400	0.8440	0.7638	0.5886	0.5251	159.5262	156.3357	0.4114	0.2362	0.4749
52	22.82	27.54	109.9790	44	400	0.8575	0.9730	1.0000	0.5240	183.9178	180.2395	0.0000	0.0270	0.4760
53	22.89	30.32	114.3290	34	400	0.8705	0.7593	0.6686	0.5311	153.4870	150.4173	0.3314	0.2408	0.4689
54	22.46	28.57	87.9210	30	400	0.8811	0.9228	0.9186	0.5352	146.3307	143.4041	0.0814	0.0773	0.4648
55	21.31	30.33	116.0710	35	400	0.8905	0.8770	0.6671	0.5302	183.8306	180.1540	0.3329	0.1230	0.4698
56	22.17	30.49	114.4420	42	400	0.8990	0.8005	0.6443	0.5251	165.4312	162.1226	0.3557	0.1995	0.4749
57	22.7	29.96	116.3420	47	400	0.9063	0.8005	0.7200	0.5225	168.6853	165.3116	0.2800	0.1995	0.4775
58	22.66	31.94	120.5500	45	400	0.9130	0.6550	0.4371	0.5235	120.5412	118.1304	0.5629	0.3450	0.4765
59	22.96	32.36	105.1710	43	400	0.9188	0.6010	0.3771	0.5246	83.7772	82.1017	0.6229	0.3990	0.4754
60	22.43	30.63	107.2920	44	400	0.9234	0.7705	0.6243	0.5240	153.0027	149.9427	0.3757	0.2295	0.4760
61	22.39	31.21	102.8000	30	400	0.9274	0.7300	0.5414	0.5352	142.4770	139.6274	0.4586	0.2700	0.4648
62	22.01	30.51	104.7210	43	400	0.9307	0.8110	0.6414	0.5246	158.6030	155.4309	0.3586	0.1890	0.4754

Table A46. Cowpea Biomass Growth with Stress Values for Mokwa 2002

Dap	mint	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22	28.83	73.7210	40	406	0.0027	0.9378	0.8814	0.5264	0.4169	0.4086	0.1186	0.0622	0.4736
2	23.21	27.64	56.8000	38	406	0.0032	0.9362	1.0000	0.5278	0.3750	0.3675	0.0000	0.0638	0.4722
3	22.15	29.93	80.2710	48	406	0.0037	0.8440	0.7243	0.5220	0.5544	0.5433	0.2757	0.1560	0.4780
4	21.33	30.07	94.3500	35	406	0.0044	0.8950	0.7043	0.5302	0.8205	0.8041	0.2957	0.1050	0.4698
5	22.81	28.64	104.6790	30	406	0.0051	0.8912	0.9086	0.5352	1.0701	1.0487	0.0914	0.1088	0.4648
6	23.74	30.3	58.8000	32	406	0.0061	0.6970	0.6714	0.5330	0.5545	0.5434	0.3286	0.3030	0.4670
7	23.36	29.7	90.6790	43	406	0.0072	0.7705	0.7571	0.5246	1.0963	1.0743	0.2429	0.2295	0.4754
8	22.22	27.98	70.0710	35	406	0.0083	0.9850	1.0000	0.5302	1.2714	1.2459	0.0000	0.0150	0.4698
9	21.76	30.07	74.8210	24	406	0.0097	0.8628	0.7043	0.5440	1.4284	1.3998	0.2957	0.1372	0.4560
10	22.34	30.77	100.2920	40	406	0.0115	0.7668	0.6043	0.5264	1.9395	1.9007	0.3957	0.2332	0.4736
11	22.59	28.67	78.8790	37	406	0.0134	0.9055	0.9043	0.5285	2.1104	2.0682	0.0957	0.0945	0.4715
12	22.81	29.51	105.1710	43	406	0.0157	0.8260	0.7843	0.5246	2.9869	2.9272	0.2157	0.1740	0.4754
13	22.39	30.09	83.0000	24	406	0.0184	0.8140	0.7014	0.5440	2.8257	2.7692	0.2986	0.1860	0.4560
14	23.48	29.85	102.0290	23	406	0.0216	0.7503	0.7357	0.5459	3.7821	3.7064	0.2643	0.2497	0.4541
15	23.06	30.48	104.4210	32	406	0.0255	0.7345	0.6457	0.5330	4.3572	4.2701	0.3543	0.2655	0.4670
16	23.12	28.81	92.3000	16	406	0.0298	0.8553	0.8843	0.5660	5.5608	5.4496	0.1157	0.1447	0.4340
17	22.77	29.81	102.8290	31	406	0.0348	0.8065	0.7414	0.5341	6.4519	6.3228	0.2586	0.1935	0.4659
18	22.63	30.91	108.6580	39	406	0.0409	0.7345	0.5843	0.5271	7.1984	7.0544	0.4157	0.2655	0.4729
19	22.76	30.9	90.2790	38	406	0.0480	0.7255	0.5857	0.5278	6.9449	6.8060	0.4143	0.2745	0.4722
20	23.27	28.99	88.0080	26	406	0.0560	0.8305	0.8586	0.5406	9.2461	9.0612	0.1414	0.1695	0.4594
21	22.75	29.8	88.7210	38	406	0.0652	0.8088	0.7429	0.5278	10.3203	10.1138	0.2571	0.1912	0.4722
22	22.04	28.81	58.0420	30	406	0.0752	0.9363	0.8843	0.5352	9.1430	8.9601	0.1157	0.0637	0.4648
23	22.24	30.53	66.0210	22	406	0.0873	0.7923	0.6386	0.5480	10.4676	10.2582	0.3614	0.2077	0.4520
24	22.77	27.47	80.3420	25	406	0.1001	0.9820	1.0000	0.5422	17.9046	17.5465	0.0000	0.0180	0.4578
25	21.93	30.08	43.2710	33	406	0.1153	0.8493	0.7029	0.5320	9.4298	9.2412	0.2971	0.1507	0.4680
26	23.51	30.33	114.0710	35	406	0.1336	0.7120	0.6671	0.5302	24.0603	23.5791	0.3329	0.2880	0.4698
27	22.8	29.8	106.0210	32	406	0.1534	0.8050	0.7429	0.5330	29.1912	28.6074	0.2571	0.1950	0.4670
28	21.86	29.88	87.8790	22	406	0.1750	0.8695	0.7314	0.5480	30.6406	30.0278	0.2686	0.1305	0.4520
29	22.44	28.21	55.0920	41	406	0.1979	0.9512	0.9700	0.5258	22.8051	22.3490	0.0300	0.0488	0.4742
30	22.09	29.9	89.2000	29	406	0.2241	0.8508	0.7286	0.5364	38.1577	37.3945	0.2714	0.1492	0.4636
31	22.29	30.57	94.0000	34	406	0.2535	0.7855	0.6329	0.5311	41.5685	40.7371	0.3671	0.2145	0.4689

Table A46 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2002

Dap	mint	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.28	30.93	79.0000	44	406	0.2865	0.6843	0.5814	0.5240	33.9398	33.2610	0.4186	0.3158	0.4760
33	22.44	29.47	108.5000	22	406	0.3194	0.8568	0.7900	0.5480	68.0465	66.6856	0.2100	0.1432	0.4520
34	23.21	30.22	124.1710	27	406	0.3558	0.7428	0.6829	0.5391	73.9757	72.4962	0.3171	0.2573	0.4609
35	23.44	30.07	87.7500	35	406	0.3938	0.7367	0.7043	0.5302	56.4419	55.3130	0.2957	0.2633	0.4698
36	22.44	27.59	104.6290	41	406	0.4288	0.9977	1.0000	0.5258	98.4148	96.4465	0.0000	0.0023	0.4742
37	21.53	30.69	124.8580	49	406	0.4669	0.8335	0.6157	0.5216	105.9760	103.8565	0.3843	0.1665	0.4784
38	23.14	30.01	99.6210	43	406	0.5062	0.7637	0.7129	0.5246	84.4889	82.7991	0.2871	0.2363	0.4754
39	23.09	30.59	117.2920	44	406	0.5457	0.7240	0.6300	0.5240	101.5505	99.5195	0.3700	0.2760	0.4760
40	23.14	29.02	99.8710	29	406	0.5825	0.8380	0.8543	0.5364	109.3671	107.1798	0.1457	0.1620	0.4636
41	23.62	29.34	95.5080	36	406	0.6189	0.7780	0.8086	0.5293	101.8026	99.7665	0.1914	0.2220	0.4707
42	22.33	31.45	123.7080	29	406	0.6543	0.7165	0.5071	0.5364	123.0092	120.5490	0.4929	0.2835	0.4636
43	23.88	30.84	124.2920	47	406	0.6885	0.6460	0.5943	0.5225	120.7865	118.3708	0.4057	0.3540	0.4775
44	23.27	29.03	79.3920	41	406	0.7180	0.8275	0.8529	0.5258	103.7090	101.6348	0.1471	0.1725	0.4742
45	23.34	29.65	96.7500	31	406	0.7457	0.7758	0.7643	0.5341	124.9950	122.4951	0.2357	0.2242	0.4659
46	22.79	27.94	122.9080	47	406	0.7692	0.9452	1.0000	0.5225	195.2661	191.3608	0.0000	0.0548	0.4775
47	22.23	29.13	90.4580	44	406	0.7911	0.8980	0.8386	0.5240	140.8177	138.0013	0.1614	0.1020	0.4760
48	21.51	30.15	106.7210	45	406	0.8109	0.8755	0.6929	0.5235	165.8688	162.5514	0.3071	0.1245	0.4765
49	20.59	28.17	95.9210	43	406	0.8272	0.9587	0.9757	0.5246	166.8569	163.5197	0.0243	0.0413	0.4754
50	21.36	29.64	90.3790	48	406	0.8428	0.9250	0.7657	0.5220	153.8119	150.7357	0.2343	0.0750	0.4780
51	22.23	29.12	99.1920	25	406	0.8568	0.8987	0.8400	0.5422	173.2143	169.7500	0.1600	0.1013	0.4578
52	21.86	27.43	64.0210	35	406	0.8684	0.9763	1.0000	0.5302	120.3526	117.9456	0.0000	0.0237	0.4698
53	21.61	30.06	91.0580	36	406	0.8795	0.8747	0.7057	0.5293	155.0773	151.9758	0.2943	0.1253	0.4707
54	22.52	28.21	108.9500	40	406	0.8889	0.9452	0.9700	0.5264	201.5211	197.4907	0.0300	0.0548	0.4736
55	20.85	31.21	110.2210	43	406	0.8974	0.8455	0.5414	0.5246	183.4676	179.7983	0.4586	0.1545	0.4754
56	23.2	31.76	112.3000	29	406	0.9055	0.6280	0.4629	0.5364	123.6077	121.1356	0.5371	0.3720	0.4636
57	23.15	28.14	95.0210	33	406	0.9117	0.9033	0.9800	0.5320	174.0828	170.6011	0.0200	0.0967	0.4680
58	22.46	28.97	97.5580	32	406	0.9170	0.8928	0.8614	0.5330	178.0308	174.4702	0.1386	0.1072	0.4670
59	22.67	30.43	105.7920	38	406	0.9219	0.7675	0.6529	0.5278	165.2222	161.9178	0.3471	0.2325	0.4722
60	23.17	29.47	107.5920	40	406	0.9260	0.8020	0.7900	0.5264	175.9073	172.3892	0.2100	0.1980	0.4736
61	22.85	31.28	85.7920	29	406	0.9297	0.6902	0.5314	0.5364	122.3582	119.9110	0.4686	0.3098	0.4636
62	20.77	30.63	61.0290	42	406	0.9326	0.8950	0.6243	0.5251	111.8726	109.6351	0.3757	0.1050	0.4749

Table A47. Cowpea Biomass Growth with Stress Values for Mokwa 2003

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.25	28.4	84.7710	404	0.0028	0.8763	0.9429	0.5264	0.4370	0.4282	0.4282	0.0571	0.1238	0.4736
2	23.3	27.71	89.8500	404	0.0032	0.9242	1.0000	0.5278	0.5717	0.5603	0.5603	0.0000	0.0758	0.4722
3	22.37	28.9	109.0500	404	0.0038	0.9048	0.8714	0.5220	0.7850	0.7693	0.7693	0.1286	0.0953	0.4780
4	22.86	28.64	101.7920	404	0.0044	0.8875	0.9086	0.5302	0.8540	0.8369	0.8369	0.0914	0.1125	0.4698
5	22.52	26.55	100.2420	404	0.0051	0.9690	1.0000	0.5352	1.0712	1.0497	1.0497	0.0000	0.0310	0.4648
6	22.19	29.98	90.7210	404	0.0060	0.8372	0.7171	0.5330	0.9788	0.9593	0.9593	0.2829	0.1628	0.4670
7	21.99	27.02	84.7500	404	0.0069	0.9670	1.0000	0.5246	1.2005	1.1765	1.1765	0.0000	0.0330	0.4754
8	22.06	27.05	90.8920	404	0.0079	0.9703	1.0000	0.5302	1.5086	1.4784	1.4784	0.0000	0.0297	0.4698
9	22.23	28.7	85.6420	404	0.0093	0.9303	0.9000	0.5440	1.6299	1.5973	1.5973	0.1000	0.0698	0.4560
10	22.5	27.87	72.2000	404	0.0108	0.9722	1.0000	0.5264	1.6149	1.5826	1.5826	0.0000	0.0278	0.4736
11	22.22	29.49	63.8790	404	0.0126	0.8718	0.7871	0.5285	1.5044	1.4743	1.4743	0.2129	0.1283	0.4715
12	22.61	30.61	110.8920	404	0.0148	0.7585	0.6271	0.5246	2.6563	2.6032	2.6032	0.3729	0.2415	0.4754
13	22.5	30.33	94.9580	404	0.0174	0.7878	0.6671	0.5440	2.8790	2.8214	2.8214	0.3329	0.2123	0.4560
14	23.14	28.61	77.6080	404	0.0203	0.8688	0.9129	0.5459	3.0424	2.9816	2.9816	0.0871	0.1313	0.4541
15	22.33	28.61	88.2500	404	0.0237	0.9295	0.9129	0.5330	4.2036	4.1195	4.1195	0.0871	0.0705	0.4670
16	22.99	30.31	59.1290	404	0.0278	0.7525	0.6700	0.5660	2.8471	2.7902	2.7902	0.3300	0.2475	0.4340
17	23.17	27.97	86.2920	404	0.0324	0.9145	1.0000	0.5341	5.5400	5.4292	5.4292	0.0000	0.0855	0.4659
18	22.82	28.26	84.8500	404	0.0376	0.9190	0.9629	0.5271	6.2750	6.1495	6.1495	0.0371	0.0810	0.4729
19	22.11	28.18	52.4290	404	0.0434	0.9783	0.9743	0.5278	4.7778	4.6823	4.6823	0.0257	0.0218	0.4722
20	22.27	29.33	78.6580	404	0.0505	0.8800	0.8100	0.5406	7.6753	7.5218	7.5218	0.1900	0.1200	0.4594
21	21.88	28.54	94.8790	404	0.0583	0.9685	0.9229	0.5278	11.4813	11.2517	11.2517	0.0771	0.0315	0.4722
22	20.75	28.62	105.2000	404	0.0668	0.9790	0.9114	0.5352	14.9678	14.6685	14.6685	0.0886	0.0210	0.4648
23	22.07	28.4	81.5790	404	0.0769	0.9648	0.9429	0.5480	13.4830	13.2133	13.2133	0.0571	0.0353	0.4520
24	22.35	28.67	90.1000	404	0.0886	0.9235	0.9043	0.5422	16.2503	15.9253	15.9253	0.0957	0.0765	0.4578
25	22.41	29.82	48.2000	404	0.1025	0.8327	0.7400	0.5320	8.8908	8.7129	8.7129	0.2600	0.1673	0.4680
26	22.68	29.71	119.3500	404	0.1182	0.8208	0.7557	0.5302	24.9511	24.4521	24.4521	0.2443	0.1793	0.4698
27	21.61	29.69	107.9290	404	0.1354	0.9025	0.7586	0.5330	28.5666	27.9953	27.9953	0.2414	0.0975	0.4670
28	22.81	29.44	76.4790	404	0.1552	0.8313	0.7943	0.5480	21.9751	21.5356	21.5356	0.2057	0.1688	0.4520
29	23.17	27.15	78.6080	404	0.1760	0.9760	1.0000	0.5258	28.8371	28.2604	28.2604	0.0000	0.0240	0.4742
30	22.87	28.62	94.7580	404	0.1997	0.8882	0.9114	0.5364	36.6249	35.8924	35.8924	0.0886	0.1118	0.4636
31	21.89	30.05	85.6420	404	0.2260	0.8545	0.7071	0.5311	35.6859	34.9722	34.9722	0.2929	0.1455	0.4689

Table A47 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2003

Dap	mint	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.68	30.14	90.7790	404	0.2545	0.8635	0.6943	0.5240	42.4787	41.6292	41.6292	0.3057	0.1365	0.4760
33	22.11	30.01	95.1500	404	0.2855	0.8410	0.7129	0.5480	50.8759	49.8584	49.8584	0.2871	0.1590	0.4520
34	22.53	31.2	80.5000	404	0.3203	0.7202	0.5429	0.5391	40.6805	39.8668	39.8668	0.4571	0.2798	0.4609
35	22.8	29.53	81.4420	404	0.3555	0.8253	0.7814	0.5302	51.4660	50.4366	50.4366	0.2186	0.1748	0.4698
36	23.33	29.84	97.8420	404	0.3931	0.7622	0.7371	0.5258	62.6232	61.3708	61.3708	0.2629	0.2378	0.4742
37	22.86	28.72	92.6580	404	0.4299	0.8815	0.8971	0.5216	74.4064	72.9183	72.9183	0.1029	0.1185	0.4784
38	21.73	30.77	117.8710	404	0.4684	0.8125	0.6043	0.5246	95.5963	93.6844	93.6844	0.3957	0.1875	0.4754
39	22.94	29.7	110.5500	404	0.5071	0.8020	0.7571	0.5240	95.7131	93.7989	93.7989	0.2429	0.1980	0.4760
40	23.01	29.31	104.2920	404	0.5450	0.8260	0.8129	0.5364	102.3186	100.2722	100.2722	0.1871	0.1740	0.4636
41	23.1	28.81	117.8080	404	0.5815	0.8568	0.8843	0.5293	126.2369	123.7121	123.7121	0.1157	0.1433	0.4707
42	22.8	29.84	122.9290	404	0.6176	0.8020	0.7371	0.5364	132.7060	130.0519	130.0519	0.2629	0.1980	0.4636
43	23.39	30.38	99.4580	404	0.6531	0.7173	0.6600	0.5225	98.9024	96.9244	96.9244	0.3400	0.2828	0.4775
44	22.97	28.42	70.1710	404	0.6842	0.8957	0.9400	0.5258	91.8626	90.0253	90.0253	0.0600	0.1043	0.4742
45	22.45	30.67	88.5710	404	0.7147	0.7660	0.6186	0.5341	105.2152	103.1108	103.1108	0.3814	0.2340	0.4659
46	22.28	32.75	117.9420	404	0.7443	0.6227	0.3214	0.5225	71.3949	69.9670	69.9670	0.6786	0.3773	0.4775
47	23.93	29.57	104.6420	404	0.7700	0.7375	0.7757	0.5240	126.5171	123.9867	123.9867	0.2243	0.2625	0.4760
48	23.39	29.83	122.5080	404	0.7930	0.7585	0.7386	0.5235	156.7253	153.5908	153.5908	0.2614	0.2415	0.4765
49	23.05	30.43	120.2580	404	0.8137	0.7390	0.6529	0.5246	154.1300	151.0474	151.0474	0.3471	0.2610	0.4754
50	23.81	30.18	119.7500	404	0.8324	0.7008	0.6886	0.5220	148.1458	145.1829	145.1829	0.3114	0.2993	0.4780
51	22.87	30.76	113.3210	404	0.8487	0.7277	0.6057	0.5422	154.1932	151.1093	151.1093	0.3943	0.2723	0.4578
52	23.62	30.47	82.6500	404	0.8631	0.6932	0.6471	0.5302	106.5251	104.3946	104.3946	0.3529	0.3068	0.4698
53	23.38	28.75	111.2500	404	0.8750	0.8403	0.8929	0.5293	175.9048	172.3867	172.3867	0.1071	0.1598	0.4707
54	23.18	30.73	122.0790	404	0.8859	0.7068	0.6100	0.5264	163.4729	160.2034	160.2034	0.3900	0.2933	0.4736
55	23.08	31.95	109.0000	404	0.8956	0.6227	0.4357	0.5246	107.6217	105.4692	105.4692	0.5643	0.3773	0.4754
56	23.55	32.53	117.6290	404	0.9041	0.5440	0.3529	0.5364	82.9460	81.2871	81.2871	0.6471	0.4560	0.4636
57	24.12	29.85	101.6920	404	0.9110	0.7023	0.7357	0.5320	140.6238	137.8113	137.8113	0.2643	0.2978	0.4680
58	23.72	30.53	94.4420	404	0.9169	0.6813	0.6386	0.5330	127.7561	125.2010	125.2010	0.3614	0.3188	0.4670
59	23.79	29.39	91.5290	404	0.9218	0.7615	0.8014	0.5278	137.7817	135.0261	135.0261	0.1986	0.2385	0.4722
60	23.51	28.67	101.2420	404	0.9259	0.8365	0.9043	0.5264	167.7105	164.3563	164.3563	0.0957	0.1635	0.4736
61	23.5	26.89	94.0790	404	0.9292	0.9708	1.0000	0.5364	184.9587	181.2595	181.2595	0.0000	0.0293	0.4636
62	22.93	29.09	88.4290	404	0.9323	0.8485	0.8443	0.5251	149.2468	146.2619	146.2619	0.1557	0.1515	0.4749

Table A48. Cowpea Biomass Growth with Stress Values for Mokwa 2004

Dap	mint	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.73	29.76	52.0500	0.85	405	0.0028	0.8132	0.7486	0.5264	0.2537	0.2487	0.2514	0.1868	0.4736
2	22.47	29.63	85.5290	0.85	405	0.0032	0.8425	0.7671	0.5278	0.5082	0.4980	0.2329	0.1575	0.4722
3	22.84	30.12	106.7710	0.85	405	0.0038	0.7780	0.6971	0.5220	0.6828	0.6692	0.3029	0.2220	0.4780
4	23.52	29.71	96.5000	0.85	405	0.0045	0.7577	0.7557	0.5302	0.7203	0.7059	0.2443	0.2423	0.4698
5	22.26	30.58	88.3500	0.85	405	0.0053	0.7870	0.6314	0.5352	0.8141	0.7978	0.3686	0.2130	0.4648
6	22.59	30.11	76.8210	0.85	405	0.0062	0.7975	0.6986	0.5330	0.8404	0.8236	0.3014	0.2025	0.4670
7	23.56	28.02	48.7790	0.85	405	0.0073	0.8815	0.9971	0.5246	0.6790	0.6655	0.0029	0.1185	0.4754
8	23.11	25.86	64.2080	0.85	405	0.0084	0.9657	1.0000	0.5302	1.1425	1.1197	0.0000	0.0343	0.4698
9	22.25	30.14	92.4920	0.85	405	0.0099	0.8208	0.6943	0.5440	1.6850	1.6513	0.3057	0.1793	0.4560
10	22.41	29.29	61.0000	0.85	405	0.0116	0.8725	0.8157	0.5264	1.3371	1.3103	0.1843	0.1275	0.4736
11	21.88	30.19	95.7290	0.85	405	0.0136	0.8448	0.6871	0.5285	2.3896	2.3418	0.3129	0.1553	0.4715
12	22.18	30.94	99.8790	0.85	405	0.0160	0.7660	0.5800	0.5246	2.6410	2.5882	0.4200	0.2340	0.4754
13	23.17	27.57	99.6210	0.85	405	0.0186	0.9445	1.0000	0.5440	3.9171	3.8387	0.0000	0.0555	0.4560
14	22.84	29.59	103.2080	0.85	405	0.0218	0.8178	0.7729	0.5459	4.1324	4.0497	0.2271	0.1823	0.4541
15	22.43	30.33	114.1080	0.85	405	0.0255	0.7930	0.6671	0.5330	5.0749	4.9734	0.3329	0.2070	0.4670
16	23.1	30.06	61.8000	0.85	405	0.0300	0.7630	0.7057	0.5660	3.2987	3.2328	0.2943	0.2370	0.4340
17	22.96	28.28	102.8080	0.85	405	0.0349	0.9070	0.9600	0.5341	7.1577	7.0146	0.0400	0.0930	0.4659
18	22.42	28.54	114.9000	0.85	405	0.0405	0.9280	0.9229	0.5271	9.3725	9.1851	0.0771	0.0720	0.4729
19	23.17	30.67	102.6580	0.85	405	0.0475	0.7120	0.6186	0.5278	7.5602	7.4090	0.3814	0.2880	0.4722
20	22.87	30.05	98.0790	0.85	405	0.0555	0.7810	0.7071	0.5406	9.4827	9.2930	0.2929	0.2190	0.4594
21	23.01	30.17	114.6710	0.85	405	0.0649	0.7615	0.6900	0.5278	12.3279	12.0813	0.3100	0.2385	0.4722
22	23.07	30.08	108.6290	0.85	405	0.0757	0.7638	0.7029	0.5352	13.8481	13.5711	0.2971	0.2362	0.4648
23	22.8	29.17	88.8420	0.85	405	0.0876	0.8523	0.8329	0.5480	14.9764	14.6769	0.1671	0.1477	0.4520
24	22.66	28.8	104.2420	0.85	405	0.1009	0.8905	0.8857	0.5422	20.9343	20.5157	0.1143	0.1095	0.4578
25	21.73	29.97	79.0790	0.85	405	0.1161	0.8725	0.7186	0.5320	17.5678	17.2164	0.2814	0.1275	0.4680
26	22.72	30.46	79.0580	0.85	405	0.1341	0.7615	0.6486	0.5302	17.6436	17.2908	0.3514	0.2385	0.4698
27	23.82	31.9	103.9290	0.85	405	0.1560	0.5710	0.4429	0.5330	16.9018	16.5637	0.5571	0.4290	0.4670
28	23.63	27.75	100.3500	0.85	405	0.1776	0.8965	1.0000	0.5480	36.0857	35.3640	0.0000	0.1035	0.4520
29	22	29.84	109.1790	0.85	405	0.2017	0.8620	0.7371	0.5258	41.1407	40.3179	0.2629	0.1380	0.4742
30	23.23	30.24	86.0420	0.85	405	0.2296	0.7398	0.6800	0.5364	32.3097	31.6635	0.3200	0.2602	0.4636
31	22.99	30	122.1710	0.85	405	0.2595	0.7758	0.7143	0.5311	53.8376	52.7608	0.2857	0.2242	0.4689

Table A48 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2004

Dap	mint	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.02	30.94	86.9210	0.85	405	0.2917	0.7780	0.5800	0.5240	42.6101	41.7579	0.4200	0.2220	0.4760
33	23.5	30.3	112.7290	0.85	405	0.3269	0.7150	0.6714	0.5480	59.5269	58.3364	0.3286	0.2850	0.4520
34	23.16	29.8	100.2790	0.85	405	0.3631	0.7780	0.7429	0.5391	62.9577	61.6986	0.2571	0.2220	0.4609
35	22.45	30.11	79.2790	0.85	405	0.4002	0.8080	0.6986	0.5302	56.0367	54.9159	0.3014	0.1920	0.4698
36	22.95	30.47	119.5080	0.85	405	0.4394	0.7435	0.6471	0.5258	84.6166	82.9242	0.3529	0.2565	0.4742
37	22.87	29.14	96.7210	0.85	405	0.4773	0.8492	0.8371	0.5216	84.2983	82.6123	0.1629	0.1508	0.4784
38	22.75	31.17	110.8210	0.85	405	0.5175	0.7060	0.5471	0.5246	87.5539	85.8028	0.4529	0.2940	0.4754
39	23.36	29.61	108.7710	0.85	405	0.5559	0.7773	0.7700	0.5240	101.5315	99.5009	0.2300	0.2227	0.4760
40	22.8	28.07	98.2290	0.85	405	0.5910	0.9347	0.9900	0.5364	120.0033	117.6033	0.0100	0.0653	0.4636
41	22.13	29.56	101.8500	0.85	405	0.6257	0.8733	0.7771	0.5293	121.4299	119.0013	0.2229	0.1267	0.4707
42	22.72	28.62	105.0920	0.85	405	0.6583	0.8995	0.9114	0.5364	137.6013	134.8493	0.0886	0.1005	0.4636
43	23.22	29.59	93.2000	0.85	405	0.6903	0.7892	0.7729	0.5225	109.3721	107.1847	0.2271	0.2108	0.4775
44	23.03	29.04	100.3790	0.85	405	0.7195	0.8448	0.8514	0.5258	132.2288	129.5842	0.1486	0.1553	0.4742
45	23.01	29.19	124.2210	0.85	405	0.7464	0.8350	0.8300	0.5341	170.4537	167.0447	0.1700	0.1650	0.4659
46	23.26	27.98	71.6500	0.85	405	0.7703	0.9070	1.0000	0.5225	107.8172	105.6609	0.0000	0.0930	0.4775
47	23.14	29.64	105.9500	0.85	405	0.7930	0.7915	0.7657	0.5240	143.6448	140.7719	0.2343	0.2085	0.4760
48	22.01	29.87	58.5580	0.85	405	0.8127	0.8590	0.7329	0.5235	88.2241	86.4596	0.2671	0.1410	0.4765
49	21.64	30.93	115.2580	0.85	405	0.8308	0.8073	0.5814	0.5246	167.1567	163.8135	0.4186	0.1927	0.4754
50	22.63	31.23	105.9000	0.85	405	0.8473	0.7105	0.5386	0.5220	137.1994	134.4554	0.4614	0.2895	0.4780
51	23.68	30.83	93.3920	0.85	405	0.8621	0.6618	0.5957	0.5422	119.1015	116.7194	0.4043	0.3382	0.4578
52	22.82	28.43	98.0920	0.85	405	0.8738	0.9063	0.9386	0.5302	169.7740	166.3785	0.0614	0.0938	0.4698
53	23.25	30.28	123.8210	0.85	405	0.8848	0.7353	0.6743	0.5293	175.7692	172.2538	0.3257	0.2648	0.4707
54	23.58	30.37	107.5500	0.85	405	0.8943	0.7037	0.6614	0.5264	146.8964	143.9585	0.3386	0.2963	0.4736
55	23.82	30.38	103.5710	0.85	405	0.9027	0.6850	0.6600	0.5246	138.4859	135.7162	0.3400	0.3150	0.4754
56	23.79	30.62	98.9000	0.85	405	0.9098	0.6693	0.6257	0.5364	133.1690	130.5056	0.3743	0.3307	0.4636
57	23.93	30.38	104.4580	0.85	405	0.9159	0.6767	0.6600	0.5320	142.0059	139.1658	0.3400	0.3233	0.4680
58	23.37	30.36	101.8710	0.85	405	0.9211	0.7202	0.6629	0.5330	148.4936	145.5237	0.3371	0.2798	0.4670
59	23.43	31.62	118.3920	0.85	405	0.9256	0.6213	0.4829	0.5278	135.5145	132.8042	0.5171	0.3787	0.4722
60	23.67	30.8	105.0080	0.85	405	0.9294	0.6648	0.6000	0.5264	140.7822	137.9665	0.4000	0.3352	0.4736
61	23.74	31.95	117.0080	0.85	405	0.9327	0.5733	0.4357	0.5364	112.3716	110.1241	0.5643	0.4267	0.4636
62	23.25	30	106.1580	0.85	405	0.9353	0.7563	0.7143	0.5251	162.5568	159.3056	0.2857	0.2438	0.4749

Table A49. Cowpea Biomass Growth with Stress Values for Mokwa 2005

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.28	27.55	59.3710	0.85	399	0.0027	0.9378	1.0000	0.5264	0.3023	0.2963	0.0000	0.0622	0.4736
2	23.24	27.7	54.2080	0.85	399	0.0032	0.9295	1.0000	0.5278	0.3201	0.3137	0.0000	0.0705	0.4722
3	22.33	31.64	67.6000	0.85	399	0.0038	0.7023	0.4800	0.5220	0.3248	0.3183	0.5200	0.2977	0.4780
4	22.16	29.32	75.2210	0.85	399	0.0044	0.8890	0.8114	0.5302	0.5911	0.5793	0.1886	0.1110	0.4698
5	22.5	32.5	75.8710	0.85	399	0.0053	0.6250	0.3571	0.5352	0.3361	0.3293	0.6429	0.3750	0.4648
6	22.64	31.61	94.9500	0.85	399	0.0062	0.6813	0.4843	0.5330	0.7370	0.7222	0.5157	0.3188	0.4670
7	23.09	33.69	90.7500	0.85	399	0.0075	0.4915	0.1871	0.5246	0.2357	0.2310	0.8129	0.5085	0.4754
8	24.25	33.05	106.3080	0.85	399	0.0090	0.4525	0.2786	0.5302	0.4552	0.4461	0.7214	0.5475	0.4698
9	24.4	31.51	82.8790	0.85	399	0.0108	0.5568	0.4986	0.5440	0.9335	0.9149	0.5014	0.4432	0.4560
10	23.54	30.75	64.6500	0.85	399	0.0128	0.6783	0.6071	0.5264	1.1095	1.0873	0.3929	0.3218	0.4736
11	22.77	27.82	53.8710	0.85	399	0.0148	0.9557	1.0000	0.5285	1.5208	1.4904	0.0000	0.0443	0.4715
12	22.16	29.13	113.1420	0.85	399	0.0173	0.9033	0.8386	0.5246	3.4940	3.4241	0.1614	0.0967	0.4754
13	21.3	31.08	107.0420	0.85	399	0.0203	0.8215	0.5600	0.5440	3.6541	3.5810	0.4400	0.1785	0.4560
14	23.31	30.33	82.6000	0.85	399	0.0239	0.7270	0.6671	0.5459	2.9513	2.8922	0.3329	0.2730	0.4541
15	22.99	29.02	74.0290	0.85	399	0.0279	0.8493	0.8543	0.5330	3.5249	3.4544	0.1457	0.1507	0.4670
16	22.1	28.52	88.1210	0.85	399	0.0324	0.9535	0.9257	0.5660	5.8021	5.6861	0.0743	0.0465	0.4340
17	22.9	29.54	110.3080	0.85	399	0.0379	0.8170	0.7800	0.5341	6.8649	6.7276	0.2200	0.1830	0.4659
18	22.43	30.05	90.0500	0.85	399	0.0442	0.8140	0.7071	0.5271	6.4369	6.3082	0.2929	0.1860	0.4729
19	22.18	30.28	98.3580	0.85	399	0.0516	0.8155	0.6743	0.5278	8.2287	8.0641	0.3257	0.1845	0.4722
20	23.12	29.63	97.4080	0.85	399	0.0602	0.7938	0.7671	0.5406	9.4785	9.2889	0.2329	0.2063	0.4594
21	23.13	29.29	88.0580	0.85	399	0.0700	0.8185	0.8157	0.5278	10.0323	9.8317	0.1843	0.1815	0.4722
22	23.5	31.17	111.9580	0.85	399	0.0821	0.6497	0.5471	0.5352	12.0431	11.8022	0.4529	0.3503	0.4648
23	23.32	26.93	98.2080	0.85	399	0.0942	0.9813	1.0000	0.5480	18.7381	18.3633	0.0000	0.0188	0.4520
24	22.44	29.41	92.9500	0.85	399	0.1086	0.8612	0.7986	0.5422	17.7572	17.4021	0.2014	0.1388	0.4578
25	23.34	30.47	94.1000	0.85	399	0.1260	0.7142	0.6471	0.5320	16.9637	16.6245	0.3529	0.2858	0.4680
26	23.59	31.17	111.1500	0.85	399	0.1462	0.6430	0.5471	0.5302	20.8636	20.4463	0.4529	0.3570	0.4698
27	22.88	31.04	90.7500	0.85	399	0.1685	0.7060	0.5657	0.5330	21.6623	21.2290	0.4343	0.2940	0.4670
28	23.79	29.91	99.6210	0.85	399	0.1931	0.7225	0.7271	0.5480	28.6790	28.1054	0.2729	0.2775	0.4520
29	23.27	30.93	100.5710	0.85	399	0.2207	0.6850	0.5814	0.5258	30.1057	29.5036	0.4186	0.3150	0.4742
30	22.71	30.6	110.2000	0.85	399	0.2502	0.7517	0.6286	0.5364	41.8674	41.0300	0.3714	0.2483	0.4636
31	23.13	31.66	116.0710	0.85	399	0.2836	0.6408	0.4771	0.5311	37.8896	37.1319	0.5229	0.3592	0.4689

Table A49 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2005

Dap	mint	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	24.03	30.15	86.7920	0.85	399	0.3187	0.6865	0.6929	0.5240	37.4645	36.7152	0.3071	0.3135	0.4760
33	23.72	28.88	93.7790	0.85	399	0.3541	0.8050	0.8743	0.5480	55.1555	54.0524	0.1257	0.1950	0.4520
34	23.36	30.11	105.4080	0.85	399	0.3920	0.7398	0.6986	0.5391	62.0433	60.8025	0.3014	0.2602	0.4609
35	23.45	31.71	112.1710	0.85	399	0.4330	0.6130	0.4700	0.5302	52.6869	51.6332	0.5300	0.3870	0.4698
36	23.71	30.39	90.6210	0.85	399	0.4733	0.6925	0.6586	0.5258	58.8066	57.6304	0.3414	0.3075	0.4742
37	24.15	30.72	82.8920	0.85	399	0.5147	0.6348	0.6114	0.5216	53.1799	52.1163	0.3886	0.3652	0.4784
38	22.86	29.47	70.2500	0.85	399	0.5524	0.8253	0.7900	0.5246	63.2606	61.9954	0.2100	0.1747	0.4754
39	22.33	30.74	112.1420	0.85	399	0.5901	0.7698	0.6086	0.5240	100.5026	98.4925	0.3914	0.2302	0.4760
40	22.55	31.42	101.5920	0.85	399	0.6272	0.7023	0.5114	0.5364	86.1705	84.4471	0.4886	0.2977	0.4636
41	23.09	27.37	70.0920	0.85	399	0.6588	0.9655	1.0000	0.5293	88.8661	87.0888	0.0000	0.0345	0.4707
42	22.6	30.19	91.7290	0.85	399	0.6908	0.7907	0.6871	0.5364	101.2151	99.1908	0.3129	0.2093	0.4636
43	23.1	28	74.5080	0.85	399	0.7191	0.9175	1.0000	0.5225	96.7110	94.7767	0.0000	0.0825	0.4775
44	23.34	28.23	103.8920	0.85	399	0.7456	0.8823	0.9671	0.5258	135.2871	132.5813	0.0329	0.1178	0.4742
45	22.49	31.5	107.9580	0.85	399	0.7715	0.7008	0.5000	0.5341	109.8874	107.6897	0.5000	0.2992	0.4659
46	23.26	28.7	108.7710	0.85	399	0.7935	0.8530	0.9000	0.5225	144.8444	141.9475	0.1000	0.1470	0.4775
47	22.93	28.84	107.7500	0.85	399	0.8132	0.8673	0.8800	0.5240	149.9372	146.9384	0.1200	0.1327	0.4760
48	23.23	29.06	89.5500	0.85	399	0.8310	0.8283	0.8486	0.5235	121.4950	119.0651	0.1514	0.1717	0.4765
49	21.76	29.83	72.6580	0.85	399	0.8465	0.8807	0.7386	0.5246	107.0024	104.8624	0.2614	0.1193	0.4754
50	22.94	30.42	100.1080	0.85	399	0.8609	0.7480	0.6543	0.5220	126.7165	124.1822	0.3457	0.2520	0.4780
51	23.27	30.86	109.2290	0.85	399	0.8738	0.6903	0.5914	0.5422	134.5126	131.8223	0.4086	0.3097	0.4578
52	23.38	28.53	82.6500	0.85	399	0.8842	0.8568	0.9243	0.5302	124.9996	122.4996	0.0757	0.1432	0.4698
53	23.25	29.08	50.9080	0.85	399	0.8935	0.8253	0.8457	0.5293	74.8185	73.3221	0.1543	0.1747	0.4707
54	22.44	29.96	109.1790	0.85	399	0.9015	0.8200	0.7200	0.5264	159.9767	156.7772	0.2800	0.1800	0.4736
55	22.47	30.22	114.4000	0.85	399	0.9085	0.7983	0.6829	0.5246	163.8711	160.5937	0.3171	0.2017	0.4754
56	22.42	31.43	111.2790	0.85	399	0.9147	0.7112	0.5100	0.5364	139.0320	136.2513	0.4900	0.2888	0.4636
57	23.15	30.13	110.3210	0.85	399	0.9200	0.7540	0.6957	0.5320	153.2952	150.2293	0.3043	0.2460	0.4680
58	22.91	30.96	90.5710	0.85	399	0.9245	0.7097	0.5771	0.5330	119.2763	116.8908	0.4229	0.2903	0.4670
59	23.54	30.89	105.7290	0.85	399	0.9284	0.6678	0.5871	0.5278	130.2716	127.6662	0.4129	0.3322	0.4722
60	22.52	31.21	112.7420	0.85	399	0.9317	0.7202	0.5414	0.5264	149.9670	146.9676	0.4586	0.2798	0.4736
61	23.32	31.04	106.1290	0.85	399	0.9346	0.6730	0.5657	0.5364	134.8287	132.1321	0.4343	0.3270	0.4636
62	23.12	29.84	83.6290	0.85	399	0.9369	0.7780	0.7371	0.5251	120.5371	118.1264	0.2629	0.2220	0.4749

Table A50. Cowpea Biomass Growth with Stress Values for Mokwa 2006

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.85	27.78	37.8080	0.85	398	0.0028	0.8777	1.0000	0.5364	0.1814	0.1778	0.0000	0.1223	0.4636
2	22.74	29.51	80.8790	0.85	398	0.0032	0.8313	0.7843	0.5271	0.4242	0.4157	0.2157	0.1687	0.4729
3	23.2	29.03	97.9080	0.85	398	0.0038	0.8327	0.8529	0.5503	0.6306	0.6180	0.1471	0.1673	0.4497
4	23.29	29.01	95.1500	0.85	398	0.0045	0.8275	0.8557	0.5352	0.6956	0.6817	0.1443	0.1725	0.4648
5	22.14	29.62	87.3790	0.85	398	0.0052	0.8680	0.7686	0.5352	0.7847	0.7690	0.2314	0.1320	0.4648
6	22.61	30.25	104.2580	0.85	398	0.0061	0.7855	0.6786	0.5235	0.9758	0.9563	0.3214	0.2145	0.4765
7	23.45	28.45	68.9580	0.85	398	0.0072	0.8575	0.9357	0.5216	0.8224	0.8060	0.0643	0.1425	0.4784
8	22.77	24.96	41.6000	0.85	398	0.0083	0.9243	1.0000	0.5330	0.6271	0.6146	0.0000	0.0757	0.4670
9	22.29	26.25	50.2920	0.85	398	0.0095	0.9513	1.0000	0.5311	0.8955	0.8776	0.0000	0.0487	0.4689
10	21.49	28.42	106.0500	0.85	398	0.0110	0.9970	0.9400	0.5246	2.2665	2.2212	0.0600	0.0030	0.4754
11	22.04	29.48	59.8290	0.85	398	0.0129	0.8860	0.7886	0.5330	1.3490	1.3220	0.2114	0.1140	0.4670
12	22.63	30.14	69.7500	0.85	398	0.0151	0.7923	0.6943	0.5587	1.7323	1.6976	0.3057	0.2077	0.4413
13	23.53	28.08	88.8000	0.85	398	0.0177	0.8793	0.9886	0.5293	2.7087	2.6546	0.0114	0.1207	0.4707
14	23.27	27.29	86.5710	0.85	398	0.0205	0.9580	1.0000	0.5258	3.3194	3.2530	0.0000	0.0420	0.4742
15	22.73	29.33	74.5420	0.85	398	0.0240	0.8455	0.8100	0.5235	2.9372	2.8784	0.1900	0.1545	0.4765
16	22.9	29.84	69.0710	0.85	398	0.0282	0.7945	0.7371	0.5406	3.0971	3.0351	0.2629	0.2055	0.4594
17	23.12	26.56	85.7290	0.85	398	0.0325	0.9893	1.0000	0.5285	5.4028	5.2947	0.0000	0.0107	0.4715
18	22	29.51	110.5210	0.85	398	0.0378	0.8867	0.7843	0.5320	7.3134	7.1671	0.2157	0.1133	0.4680
19	22.18	29.58	111.4000	0.85	398	0.0441	0.8680	0.7743	0.5207	8.2216	8.0572	0.2257	0.1320	0.4793
20	23.19	29.11	87.2790	0.85	398	0.0514	0.8275	0.8414	0.5246	7.2120	7.0677	0.1586	0.1725	0.4754
21	23.26	27.88	98.0420	0.85	398	0.0595	0.9145	1.0000	0.5406	10.6843	10.4706	0.0000	0.0855	0.4594
22	22.25	27.17	67.9500	0.85	398	0.0682	0.9807	1.0000	0.5264	8.8692	8.6918	0.0000	0.0193	0.4736
23	21.29	29.24	78.4420	0.85	398	0.0785	0.9602	0.8229	0.5225	11.4560	11.2268	0.1771	0.0398	0.4775
24	23.07	27.09	83.2210	0.85	398	0.0901	0.9880	1.0000	0.5311	14.5834	14.2917	0.0000	0.0120	0.4689
25	22.3	27.17	84.3500	0.85	398	0.1029	0.9823	1.0000	0.5459	17.2463	16.9014	0.0000	0.0177	0.4541
26	21.81	28.06	82.3920	0.85	398	0.1174	0.9957	0.9914	0.5422	19.3539	18.9668	0.0086	0.0043	0.4578
27	22.51	26.49	85.1500	0.85	398	0.1332	0.9667	1.0000	0.5293	21.5005	21.0705	0.0000	0.0333	0.4707
28	22.17	29.97	87.6710	0.85	398	0.1526	0.8395	0.7186	0.5240	21.8158	21.3795	0.2814	0.1605	0.4760
29	23.02	27.5	93.9500	0.85	398	0.1732	0.9610	1.0000	0.5240	30.3693	29.7619	0.0000	0.0390	0.4760
30	22.19	28.72	97.6920	0.85	398	0.1962	0.9318	0.8971	0.5302	35.0865	34.3848	0.1029	0.0682	0.4698
31	22.7	28.99	84.1920	0.85	398	0.2220	0.8733	0.8586	0.5352	32.3723	31.7248	0.1414	0.1267	0.4648

Table A50 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2006

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.93	28.04	79.7290	0.85	398	0.2494	0.9273	0.9943	0.5391	36.8400	36.1032	0.0057	0.0727	0.4609
33	22.15	29.63	87.1080	0.85	398	0.2797	0.8665	0.7671	0.5302	41.4835	40.6538	0.2329	0.1335	0.4698
34	22.7	30.35	103.0790	0.85	398	0.3134	0.7713	0.6643	0.5271	48.6685	47.6951	0.3357	0.2287	0.4729
35	23.19	30.19	96.2710	0.85	398	0.3494	0.7465	0.6871	0.5285	49.1836	48.2000	0.3129	0.2535	0.4715
36	23.33	28.61	81.7580	0.85	398	0.3854	0.8545	0.9129	0.5320	53.0784	52.0168	0.0871	0.1455	0.4680
37	22.74	27.99	95.0000	0.85	398	0.4210	0.9453	1.0000	0.5251	73.5740	72.1025	0.0000	0.0547	0.4749
38	23.11	29.99	117.0580	0.85	398	0.4601	0.7675	0.7157	0.5341	81.8088	80.1726	0.2843	0.2325	0.4659
39	22.47	29.92	88.2000	0.85	398	0.4985	0.8208	0.7257	0.5235	70.0073	68.6072	0.2743	0.1793	0.4765
40	22.43	29.44	81.9500	0.85	398	0.5360	0.8597	0.7943	0.5251	73.5011	72.0311	0.2057	0.1403	0.4749
41	23.39	30.89	84.3500	0.85	398	0.5755	0.6790	0.5871	0.5225	63.8251	62.5486	0.4129	0.3210	0.4775
42	23.21	29.87	107.7710	0.85	398	0.6123	0.7690	0.7329	0.5246	98.6533	96.6803	0.2671	0.2310	0.4754
43	22.96	30.92	110.5080	0.85	398	0.6482	0.7090	0.5829	0.5230	98.4338	96.4651	0.4171	0.2910	0.4770
44	23.53	29.96	88.6000	0.85	398	0.6816	0.7382	0.7200	0.5264	86.9758	85.2363	0.2800	0.2618	0.4736
45	23.3	28.09	75.3500	0.85	398	0.7108	0.8957	0.9871	0.5235	93.0683	91.2070	0.0129	0.1043	0.4765
46	22.88	29.15	103.9080	0.85	398	0.7383	0.8477	0.8357	0.5330	128.4638	125.8945	0.1643	0.1523	0.4670
47	22.42	27.44	77.9000	0.85	398	0.7618	0.9953	1.0000	0.5230	114.4831	112.1934	0.0000	0.0047	0.4770
48	21.71	29.66	84.5000	0.85	398	0.7844	0.8972	0.7629	0.5293	116.6646	114.3313	0.2371	0.1028	0.4707
49	22.76	31.27	119.0290	0.85	398	0.8064	0.6977	0.5329	0.5246	130.1956	127.5917	0.4671	0.3023	0.4754
50	22.38	32.11	118.2710	0.85	398	0.8262	0.6633	0.4129	0.5230	99.1585	97.1754	0.5871	0.3367	0.4770
51	23.45	31.38	102.1000	0.85	398	0.8437	0.6378	0.5171	0.5235	105.2944	103.1885	0.4829	0.3622	0.4765
52	22.94	30.74	103.5000	0.85	398	0.8586	0.7240	0.6086	0.5352	127.6168	125.0644	0.3914	0.2760	0.4648
53	22.25	31.17	102.4000	0.85	398	0.8715	0.7435	0.5471	0.5556	134.5458	131.8548	0.4529	0.2565	0.4444
54	23.42	31.91	99.8000	0.85	398	0.8833	0.6003	0.4414	0.5320	86.5684	84.8370	0.5586	0.3997	0.4680
55	23.76	31.66	97.5000	0.85	398	0.8935	0.5935	0.4771	0.5293	91.4290	89.6004	0.5229	0.4065	0.4707
56	24.18	31.07	111.7710	0.85	398	0.9022	0.6063	0.5614	0.5271	119.4144	117.0261	0.4386	0.3938	0.4729
57	24.51	30.52	82.2290	0.85	398	0.9095	0.6227	0.6400	0.5240	90.4481	88.6392	0.3600	0.3773	0.4760
58	24.17	31.76	100.3080	0.85	398	0.9160	0.5552	0.4629	0.5251	87.5091	85.7589	0.5371	0.4448	0.4749
59	23.66	30.41	104.9000	0.85	398	0.9211	0.6948	0.6557	0.5271	131.1303	128.5077	0.3443	0.3053	0.4729
60	23.02	31.52	85.8580	0.85	398	0.9256	0.6595	0.4971	0.5278	96.5611	94.6299	0.5029	0.3405	0.4722
61	24.03	31.76	116.4210	0.85	398	0.9295	0.5657	0.4629	0.5240	105.0167	102.9163	0.5371	0.4343	0.4760
62	24.01	28.99	112.1790	0.85	398	0.9326	0.7750	0.8586	0.5278	158.5836	155.4119	0.1414	0.2250	0.4722

Table A51. Cowpea Biomass Growth with Stress Values for Mokwa 2007

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.07	28.29	59.7420	0.85	403	0.0027	0.9730	0.9586	0.5364	0.3412	0.3343	0.0414	0.0270	0.4636
2	22.31	28.62	88.6290	0.85	403	0.0032	0.9303	0.9114	0.5271	0.5547	0.5436	0.0886	0.0697	0.4729
3	22.06	27.45	86.3080	0.85	403	0.0037	0.9837	1.0000	0.5503	0.6908	0.6770	0.0000	0.0163	0.4497
4	22.13	29.26	90.5080	0.85	403	0.0043	0.8957	0.8200	0.5352	0.7501	0.7351	0.1800	0.1043	0.4648
5	22.41	29.15	91.9790	0.85	403	0.0051	0.8830	0.8357	0.5352	0.8792	0.8617	0.1643	0.1170	0.4648
6	22.59	27.48	60.6210	0.85	403	0.0059	0.9948	1.0000	0.5235	0.7415	0.7266	0.0000	0.0052	0.4765
7	22.08	28.22	76.0000	0.85	403	0.0068	0.9775	0.9686	0.5216	1.0579	1.0368	0.0314	0.0225	0.4784
8	22.26	28.52	94.2920	0.85	403	0.0079	0.9415	0.9257	0.5330	1.5051	1.4750	0.0743	0.0585	0.4670
9	22.65	27.82	43.4000	0.85	403	0.0092	0.9648	1.0000	0.5311	0.8225	0.8061	0.0000	0.0352	0.4689
10	22.48	27.84	76.1290	0.85	403	0.0107	0.9760	1.0000	0.5246	1.6751	1.6416	0.0000	0.0240	0.4754
11	21.62	26.72	80.4710	0.85	403	0.0123	0.9447	1.0000	0.5330	2.0031	1.9630	0.0000	0.0553	0.4670
12	21.71	28.18	97.5420	0.85	403	0.0143	0.9963	0.9743	0.5587	3.1102	3.0480	0.0257	0.0037	0.4413
13	22.4	25.62	46.4920	0.85	403	0.0164	0.9340	1.0000	0.5293	1.5113	1.4811	0.0000	0.0660	0.4707
14	21.38	29.11	115.9210	0.85	403	0.0191	0.9633	0.8414	0.5258	4.4830	4.3933	0.1586	0.0367	0.4742
15	22.59	28.62	61.6500	0.85	403	0.0222	0.9092	0.9114	0.5235	2.6103	2.5581	0.0886	0.0908	0.4765
16	22.06	29.55	82.4580	0.85	403	0.0259	0.8793	0.7786	0.5406	4.0675	3.9861	0.2214	0.1207	0.4594
17	23.13	29.67	84.8210	0.85	403	0.0304	0.7900	0.7614	0.5285	4.3094	4.2232	0.2386	0.2100	0.4715
18	22.3	28.05	89.2920	0.85	403	0.0352	0.9737	0.9929	0.5320	6.5164	6.3861	0.0071	0.0263	0.4680
19	21.94	27.86	72.0000	0.85	403	0.0406	0.9933	1.0000	0.5207	6.0533	5.9322	0.0000	0.0067	0.4793
20	21.96	27.93	95.0580	0.85	403	0.0468	0.9963	1.0000	0.5246	9.3129	9.1266	0.0000	0.0037	0.4754
21	22.32	27.91	69.8500	0.85	403	0.0540	0.9827	1.0000	0.5406	8.0271	7.8666	0.0000	0.0173	0.4594
22	22.29	25.24	77.3290	0.85	403	0.0615	0.9177	1.0000	0.5264	9.1951	9.0112	0.0000	0.0823	0.4736
23	21.35	28.96	80.0500	0.85	403	0.0708	0.9767	0.8629	0.5225	11.5787	11.3471	0.1371	0.0233	0.4775
24	21.8	30.32	95.6920	0.85	403	0.0821	0.8410	0.6686	0.5311	14.0415	13.7606	0.3314	0.1590	0.4689
25	22.06	31.11	52.8920	0.85	403	0.0954	0.7622	0.5557	0.5459	8.4047	8.2366	0.4443	0.2378	0.4541
26	22.83	28.61	101.9580	0.85	403	0.1097	0.8920	0.9129	0.5422	21.6672	21.2338	0.0871	0.1080	0.4578
27	21.98	29.04	76.0580	0.85	403	0.1257	0.9235	0.8514	0.5293	18.7136	18.3394	0.1486	0.0765	0.4707
28	22.36	29.83	123.2790	0.85	403	0.1443	0.8358	0.7386	0.5240	31.1975	30.5736	0.2614	0.1642	0.4760
29	22.14	31.19	128.3920	0.85	403	0.1659	0.7503	0.5443	0.5240	33.5327	32.8620	0.4557	0.2497	0.4760
30	22.64	29.29	119.9500	0.85	403	0.1890	0.8553	0.8157	0.5302	41.1436	40.3207	0.1843	0.1447	0.4698
31	22.31	30.46	109.8920	0.85	403	0.2150	0.7923	0.6486	0.5352	40.1035	39.3014	0.3514	0.2077	0.4648

Table A51 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2007

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.21	30.69	119.4000	0.85	403	0.2445	0.7075	0.6157	0.5391	44.5735	43.6820	0.3843	0.2925	0.4609
33	23.38	30.99	102.3790	0.85	403	0.2769	0.6723	0.5729	0.5302	40.4571	39.6479	0.4271	0.3277	0.4698
34	22.96	28.61	113.6290	0.85	403	0.3089	0.8823	0.9129	0.5271	65.3459	64.0390	0.0871	0.1178	0.4729
35	23.29	28.09	94.2000	0.85	403	0.3425	0.8965	0.9871	0.5285	61.1974	59.9734	0.0129	0.1035	0.4715
36	22.26	30.33	86.0710	0.85	403	0.3789	0.8057	0.6671	0.5320	55.9668	54.8474	0.3329	0.1943	0.4680
37	22.84	28.86	65.5920	0.85	403	0.4155	0.8725	0.8771	0.5251	49.9936	48.9937	0.1229	0.1275	0.4749
38	22.69	29.88	82.6500	0.85	403	0.4539	0.8073	0.7314	0.5341	64.7491	63.4541	0.2686	0.1927	0.4659
39	22.79	29.82	104.7710	0.85	403	0.4926	0.8043	0.7400	0.5235	86.9854	85.2457	0.2600	0.1957	0.4765
40	22.73	28.14	85.4710	0.85	403	0.5290	0.9347	0.9800	0.5251	88.8596	87.0824	0.0200	0.0653	0.4749
41	22.4	29.09	121.1000	0.85	403	0.5655	0.8883	0.8443	0.5225	127.2433	124.6985	0.1557	0.1117	0.4775
42	22.62	28.46	118.3080	0.85	403	0.6005	0.9190	0.9343	0.5246	137.1147	134.3724	0.0657	0.0810	0.4754
43	22.13	29.68	109.6920	0.85	403	0.6349	0.8642	0.7600	0.5230	126.0059	123.4858	0.2400	0.1358	0.4770
44	22.34	31.38	125.5790	0.85	403	0.6693	0.7210	0.5171	0.5264	125.4656	122.9563	0.4829	0.2790	0.4736
45	23.79	32.22	114.3000	0.85	403	0.7036	0.5493	0.3971	0.5235	70.2264	68.8218	0.6029	0.4507	0.4765
46	23.84	31.19	101.7210	0.85	403	0.7342	0.6227	0.5443	0.5330	99.2379	97.2531	0.4557	0.3773	0.4670
47	22.88	31.75	106.4000	0.85	403	0.7617	0.6528	0.4643	0.5230	98.3284	96.3618	0.5357	0.3472	0.4770
48	23.62	28.79	121.8210	0.85	403	0.7849	0.8193	0.8871	0.5293	166.0150	162.6947	0.1129	0.1807	0.4707
49	22.73	30.12	114.6420	0.85	403	0.8062	0.7862	0.6971	0.5246	152.6016	149.5496	0.3029	0.2138	0.4754
50	23.08	29.2	100.8080	0.85	403	0.8248	0.8290	0.8286	0.5230	144.3085	141.4223	0.1714	0.1710	0.4770
51	21.66	31.47	115.7920	0.85	403	0.8417	0.7653	0.5043	0.5235	150.5778	147.5663	0.4957	0.2347	0.4765
52	22.39	29.95	91.8710	0.85	403	0.8563	0.8245	0.7214	0.5352	138.9770	136.1974	0.2786	0.1755	0.4648
53	22.8	27.57	86.5920	0.85	403	0.8684	0.9722	1.0000	0.5556	162.6059	159.3538	0.0000	0.0278	0.4444
54	21.9	29.02	79.5290	0.85	403	0.8792	0.9310	0.8543	0.5320	138.6449	135.8720	0.1457	0.0690	0.4680
55	21.73	29.85	109.5420	0.85	403	0.8889	0.8815	0.7357	0.5293	181.8872	178.2494	0.2643	0.1185	0.4707
56	21.8	30.12	107.8710	0.85	403	0.8974	0.8560	0.6971	0.5271	174.8502	171.3532	0.3029	0.1440	0.4729
57	22.21	32.19	121.6580	0.85	403	0.9053	0.6700	0.4014	0.5240	118.5926	116.2207	0.5986	0.3300	0.4760
58	22.4	32.18	116.2290	0.85	403	0.9121	0.6565	0.4029	0.5251	112.2510	110.0060	0.5971	0.3435	0.4749
59	21.17	32.69	101.9290	0.85	403	0.9178	0.7105	0.3300	0.5271	87.8156	86.0593	0.6700	0.2895	0.4729
60	23.55	30.62	102.9420	0.85	403	0.9227	0.6872	0.6257	0.5278	137.9363	135.1776	0.3743	0.3128	0.4722
61	22.57	29.6	94.7580	0.85	403	0.9267	0.8372	0.7714	0.5240	154.2313	151.1466	0.2286	0.1628	0.4760
62	23.04	31.02	100.8500	0.85	403	0.9303	0.6955	0.5686	0.5278	137.8717	135.1143	0.4314	0.3045	0.4722

Table A52. Cowpea Biomass Growth with Stress Values for Mokwa 2008

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.68	28.05	41.2710	0.85	402	0.0027	0.9452	0.9929	0.5364	0.2260	0.2215	0.0071	0.0548	0.4636
2	22.44	27.32	85.6000	0.85	402	0.0032	0.9920	1.0000	0.5271	0.5606	0.5494	0.0000	0.0080	0.4729
3	22.15	28.23	68.3290	0.85	402	0.0037	0.9715	0.9671	0.5503	0.5323	0.5217	0.0329	0.0285	0.4497
4	22.3	25.07	59.0920	0.85	402	0.0042	0.9123	1.0000	0.5352	0.4818	0.4722	0.0000	0.0877	0.4648
5	21.28	28.38	73.3500	0.85	402	0.0049	0.9887	0.9457	0.5352	0.7512	0.7362	0.0543	0.0113	0.4648
6	21.8	28.91	69.7210	0.85	402	0.0057	0.9468	0.8700	0.5235	0.7791	0.7635	0.1300	0.0533	0.4765
7	22.04	27.04	83.7580	0.85	402	0.0066	0.9693	1.0000	0.5216	1.1032	1.0811	0.0000	0.0307	0.4784
8	22.23	29.15	83.2210	0.85	402	0.0077	0.8965	0.8357	0.5330	1.2106	1.1864	0.1643	0.1035	0.4670
9	22.61	28.33	83.9080	0.85	402	0.0090	0.9295	0.9529	0.5311	1.4699	1.4405	0.0471	0.0705	0.4689
10	22.13	29.65	88.2500	0.85	402	0.0105	0.8665	0.7643	0.5246	1.6659	1.6326	0.2357	0.1335	0.4754
11	22.49	26.88	89.8080	0.85	402	0.0122	0.9790	1.0000	0.5330	2.2502	2.2052	0.0000	0.0210	0.4670
12	21.95	28.15	91.7210	0.85	402	0.0141	0.9925	0.9786	0.5587	2.8327	2.7761	0.0214	0.0075	0.4413
13	22.4	28.21	48.3790	0.85	402	0.0164	0.9543	0.9700	0.5293	1.5824	1.5507	0.0300	0.0457	0.4707
14	22.31	26.82	69.2790	0.85	402	0.0189	0.9710	1.0000	0.5258	2.6421	2.5892	0.0000	0.0290	0.4742
15	21.31	29.2	96.8420	0.85	402	0.0220	0.9618	0.8286	0.5235	4.2284	4.1438	0.1714	0.0382	0.4765
16	22.78	29.11	76.6420	0.85	402	0.0257	0.8583	0.8414	0.5406	3.6028	3.5308	0.1586	0.1418	0.4594
17	22.23	31.04	90.0210	0.85	402	0.0302	0.7548	0.5657	0.5285	4.2759	4.1904	0.4343	0.2452	0.4715
18	22.87	29.01	99.3580	0.85	402	0.0352	0.8590	0.8557	0.5320	6.3061	6.1800	0.1443	0.1410	0.4680
19	22.16	28.81	83.4710	0.85	402	0.0409	0.9273	0.8843	0.5207	6.4944	6.3645	0.1157	0.0727	0.4793
20	22.37	30.26	104.2290	0.85	402	0.0477	0.8027	0.6771	0.5246	8.2629	8.0977	0.3229	0.1973	0.4754
21	22.89	29.96	98.6920	0.85	402	0.0558	0.7862	0.7200	0.5406	9.2248	9.0403	0.2800	0.2138	0.4594
22	22.78	29.29	92.1080	0.85	402	0.0648	0.8448	0.8157	0.5264	10.4664	10.2571	0.1843	0.1553	0.4736
23	22.17	30.25	98.4580	0.85	402	0.0753	0.8185	0.6786	0.5225	12.5027	12.2526	0.3214	0.1815	0.4775
24	22.76	30.8	96.6710	0.85	402	0.0878	0.7330	0.6000	0.5311	13.0270	12.7665	0.4000	0.2670	0.4689
25	23.13	28.98	96.1000	0.85	402	0.1014	0.8418	0.8600	0.5459	17.6655	17.3122	0.1400	0.1583	0.4541
26	22.71	28.84	100.5290	0.85	402	0.1166	0.8838	0.8800	0.5422	22.1599	21.7167	0.1200	0.1162	0.4578
27	22.31	29.08	51.5710	0.85	402	0.1337	0.8957	0.8457	0.5293	12.8905	12.6327	0.1543	0.1043	0.4707
28	22.3	29	96.5710	0.85	402	0.1527	0.9025	0.8571	0.5240	27.4987	26.9487	0.1429	0.0975	0.4760
29	21.98	29.87	99.9580	0.85	402	0.1742	0.8612	0.7329	0.5240	30.9916	30.3717	0.2671	0.1388	0.4760
30	23.14	29.88	101.2210	0.85	402	0.1989	0.7735	0.7314	0.5302	32.5648	31.9135	0.2686	0.2265	0.4698
31	23.54	27.42	91.7920	0.85	402	0.2244	0.9280	1.0000	0.5352	40.3398	39.5330	0.0000	0.0720	0.4648

Table A52 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2008

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.53	26.9	80.8420	0.85	402	0.2505	0.9810	1.0000	0.5391	42.2468	41.4018	0.0000	0.0190	0.4609
33	21.58	29.74	88.4290	0.85	402	0.2805	0.9010	0.7514	0.5302	46.7264	45.7919	0.2486	0.0990	0.4698
34	22.2	31.46	102.7580	0.85	402	0.3148	0.7255	0.5057	0.5271	46.8155	45.8792	0.4943	0.2745	0.4729
35	23.91	28.95	107.5500	0.85	402	0.3503	0.7855	0.8643	0.5285	61.6950	60.4611	0.1357	0.2145	0.4715
36	22.27	30.08	114.0000	0.85	402	0.3868	0.8238	0.7029	0.5320	76.2131	74.6888	0.2971	0.1762	0.4680
37	22.99	29.93	113.0290	0.85	402	0.4250	0.7810	0.7243	0.5251	77.7111	76.1569	0.2757	0.2190	0.4749
38	22.59	30.67	102.8420	0.85	402	0.4643	0.7555	0.6186	0.5341	75.9940	74.4742	0.3814	0.2445	0.4659
39	23.33	29.02	90.9420	0.85	402	0.5027	0.8238	0.8543	0.5235	77.7537	76.1986	0.1457	0.1762	0.4765
40	23.32	28.14	94.4580	0.85	402	0.5397	0.8905	0.9800	0.5251	94.0275	92.1470	0.0200	0.1095	0.4749
41	22.36	28.45	101.4420	0.85	402	0.5752	0.9392	0.9357	0.5225	112.9276	110.6691	0.0643	0.0608	0.4775
42	23.07	30.89	110.2080	0.85	402	0.6129	0.7030	0.5871	0.5246	98.2483	96.2833	0.4129	0.2970	0.4754
43	23.6	30.73	99.0290	0.85	402	0.6493	0.6753	0.6100	0.5230	89.5497	87.7588	0.3900	0.3247	0.4770
44	23.45	30.38	95.5000	0.85	402	0.6829	0.7128	0.6600	0.5264	96.5085	94.5784	0.3400	0.2872	0.4736
45	23.13	27.38	70.1790	0.85	402	0.7112	0.9618	1.0000	0.5235	99.1051	97.1230	0.0000	0.0382	0.4765
46	22.18	28.68	100.5580	0.85	402	0.7377	0.9355	0.9029	0.5330	145.8887	142.9709	0.0971	0.0645	0.4670
47	22.66	28.91	103.4080	0.85	402	0.7626	0.8823	0.8700	0.5230	143.5000	140.6300	0.1300	0.1178	0.4770
48	21.7	30.36	108.0790	0.85	402	0.7856	0.8455	0.6629	0.5293	149.8653	146.8680	0.3371	0.1545	0.4707
49	23.11	30.8	125.1790	0.85	402	0.8074	0.7068	0.6000	0.5246	147.7722	144.8167	0.4000	0.2932	0.4754
50	23.78	28.5	57.8920	0.85	402	0.8258	0.8290	0.9286	0.5230	81.7461	80.1112	0.0714	0.1710	0.4770
51	22.58	30.4	101.0000	0.85	402	0.8426	0.7765	0.6571	0.5235	136.4265	133.6980	0.3429	0.2235	0.4765
52	22.66	30.76	117.8500	0.85	402	0.8575	0.7435	0.6057	0.5352	158.5978	155.4258	0.3943	0.2565	0.4648
53	22.95	30.35	110.9080	0.85	402	0.8705	0.7525	0.6643	0.5556	159.1922	156.0083	0.3357	0.2475	0.4444
54	23.65	28.33	104.7580	0.85	402	0.8814	0.8515	0.9529	0.5320	164.9659	161.6666	0.0471	0.1485	0.4680
55	22.37	29.45	103.6420	0.85	402	0.8909	0.8635	0.7929	0.5293	166.4458	163.1169	0.2071	0.1365	0.4707
56	22.18	29.53	107.3210	0.85	402	0.8991	0.8717	0.7814	0.5271	174.8554	171.3583	0.2186	0.1283	0.4729
57	21.86	29.59	89.1080	0.85	402	0.9061	0.8912	0.7729	0.5240	148.7235	145.7490	0.2271	0.1088	0.4760
58	23.45	28.57	95.4580	0.85	402	0.9124	0.8485	0.9186	0.5251	153.0560	149.9949	0.0814	0.1515	0.4749
59	22.55	30.64	102.4710	0.85	402	0.9179	0.7608	0.6229	0.5271	148.7517	145.7767	0.3771	0.2392	0.4729
60	22.17	30.9	102.4710	0.85	402	0.9227	0.7697	0.5857	0.5278	151.4944	148.4645	0.4143	0.2303	0.4722
61	23.15	31.54	111.5210	0.85	402	0.9269	0.6483	0.4943	0.5240	130.6340	128.0213	0.5057	0.3517	0.4760
62	23.47	31.73	94.8080	0.85	402	0.9306	0.6100	0.4671	0.5278	99.1543	97.1713	0.5329	0.3900	0.4722

Table A53. Cowpea Biomass Growth with Stress Values for Mokwa 2009

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.12	29.84	105.2920	0.85	401	0.0028	0.8530	0.7371	0.5302	0.5096	0.4994	0.2629	0.1470	0.4698
2	22.71	29.55	94.8920	0.85	401	0.0032	0.8305	0.7786	0.5264	0.5214	0.5109	0.2214	0.1695	0.4736
3	23.15	29.48	89.5710	0.85	401	0.0038	0.8028	0.7886	0.5285	0.5619	0.5507	0.2114	0.1972	0.4715
4	22.39	28.53	83.1210	0.85	401	0.0044	0.9310	0.9243	0.5302	0.7076	0.6934	0.0757	0.0690	0.4698
5	22.79	27.53	62.5290	0.85	401	0.0052	0.9760	1.0000	0.5406	0.6617	0.6484	0.0000	0.0240	0.4594
6	22.09	29.48	86.4580	0.85	401	0.0060	0.8823	0.7886	0.5293	0.9473	0.9284	0.2114	0.1178	0.4707
7	22.48	29.63	85.7210	0.85	401	0.0071	0.8418	0.7671	0.5293	1.0510	1.0300	0.2329	0.1583	0.4707
8	22.77	29.01	77.7710	0.85	401	0.0083	0.8665	0.8557	0.5341	1.1594	1.1362	0.1443	0.1335	0.4659
9	22.6	29.37	93.8210	0.85	401	0.0097	0.8523	0.8043	0.5285	1.5950	1.5631	0.1957	0.1477	0.4715
10	22.61	28.02	102.8420	0.85	401	0.0113	0.9528	0.9971	0.5278	2.2710	2.2256	0.0029	0.0472	0.4722
11	23.07	28.11	116.5420	0.85	401	0.0132	0.9115	0.9843	0.5235	2.8482	2.7912	0.0157	0.0885	0.4765
12	22.66	29.46	92.8580	0.85	401	0.0154	0.8410	0.7914	0.5258	2.4634	2.4142	0.2086	0.1590	0.4742
13	22.03	29.94	92.2210	0.85	401	0.0181	0.8523	0.7229	0.5285	2.9162	2.8578	0.2771	0.1477	0.4715
14	23.24	27.41	39.8500	0.85	401	0.0210	0.9513	1.0000	0.5660	1.7501	1.7151	0.0000	0.0487	0.4340
15	22.47	28.31	87.0210	0.85	401	0.0244	0.9415	0.9557	0.5278	4.0990	4.0170	0.0443	0.0585	0.4722
16	22.97	27.8	75.4290	0.85	401	0.0283	0.9423	1.0000	0.5352	4.1875	4.1038	0.0000	0.0577	0.4648
17	21.89	27.73	52.9790	0.85	401	0.0327	0.9873	1.0000	0.5440	3.6154	3.5431	0.0000	0.0127	0.4560
18	21.4	29.01	104.5790	0.85	401	0.0379	0.9693	0.8557	0.5264	7.8483	7.6913	0.1443	0.0307	0.4736
19	22.56	27.74	90.9580	0.85	401	0.0438	0.9775	1.0000	0.5311	8.0288	7.8683	0.0000	0.0225	0.4689
20	22.19	27.48	80.5000	0.85	401	0.0504	0.9890	1.0000	0.5330	8.3082	8.1421	0.0000	0.0110	0.4670
21	21.44	30.55	71.5000	0.85	401	0.0586	0.8507	0.6357	0.5330	7.3809	7.2333	0.3643	0.1493	0.4670
22	23.27	29.95	86.3000	0.85	401	0.0684	0.7585	0.7214	0.5320	9.2571	9.0720	0.2786	0.2415	0.4680
23	22.81	28.62	80.6290	0.85	401	0.0791	0.8928	0.9114	0.5364	11.8653	11.6280	0.0886	0.1072	0.4636
24	22.55	29.93	100.5790	0.85	401	0.0917	0.8140	0.7243	0.5258	15.3346	15.0279	0.2757	0.1860	0.4742
25	22.55	30.29	81.8920	0.85	401	0.1062	0.7870	0.6729	0.5330	14.1772	13.8937	0.3271	0.2130	0.4670
26	22.58	30.11	101.7080	0.85	401	0.1227	0.7983	0.6986	0.5258	20.3411	19.9343	0.3014	0.2017	0.4742
27	23.48	29.32	74.3080	0.85	401	0.1413	0.7900	0.8114	0.5459	17.5884	17.2366	0.1886	0.2100	0.4541
28	23.32	29.25	96.3500	0.85	401	0.1620	0.8073	0.8214	0.5251	25.7054	25.1913	0.1786	0.1927	0.4749
29	22.82	30.01	100.3500	0.85	401	0.1853	0.7878	0.7129	0.5264	29.9490	29.3500	0.2871	0.2122	0.4736
30	23.49	30.71	95.5080	0.85	401	0.2121	0.6850	0.6129	0.5271	28.4129	27.8446	0.3871	0.3150	0.4729
31	23.45	29.74	105.5080	0.85	401	0.2407	0.7608	0.7514	0.5235	39.2860	38.5003	0.2486	0.2392	0.4765

Table A53 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2009

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.2	28.86	80.7210	0.85	401	0.2706	0.8455	0.8771	0.5352	38.3999	37.6319	0.1229	0.1545	0.4648
33	22.91	27.9	79.3210	0.85	401	0.3014	0.9392	1.0000	0.5352	46.6843	45.7507	0.0000	0.0608	0.4648
34	22.15	30.77	115.3790	0.85	401	0.3362	0.7810	0.6043	0.5235	61.6113	60.3790	0.3957	0.2190	0.4765
35	22.77	30.63	119.7080	0.85	401	0.3733	0.7450	0.6243	0.5216	67.4560	66.1069	0.3757	0.2550	0.4784
36	23.35	29.19	93.9210	0.85	401	0.4108	0.8095	0.8300	0.5251	63.7096	62.4354	0.1700	0.1905	0.4749
37	23.07	30.52	98.6080	0.85	401	0.4503	0.7307	0.6400	0.5264	66.3489	65.0220	0.3600	0.2693	0.4736
38	23.09	27.42	57.6420	0.85	401	0.4865	0.9617	1.0000	0.5406	56.6382	55.5054	0.0000	0.0383	0.4594
39	21.55	30.04	89.1080	0.85	401	0.5238	0.8807	0.7086	0.5293	84.5356	82.8449	0.2914	0.1193	0.4707
40	22.72	30.84	117.7290	0.85	401	0.5628	0.7330	0.5943	0.5220	98.4886	96.5189	0.4057	0.2670	0.4780
41	22.54	31.47	130.5290	0.85	401	0.6012	0.6993	0.5043	0.5216	107.4836	105.3339	0.4957	0.3007	0.4784
42	24.31	29.44	100.6580	0.85	401	0.6375	0.7188	0.7943	0.5240	93.8818	92.0042	0.2057	0.2813	0.4760
43	22.62	29.12	98.6710	0.85	401	0.6698	0.8695	0.8400	0.5251	117.2316	114.8870	0.1600	0.1305	0.4749
44	22.59	28.31	84.8210	0.85	401	0.6994	0.9325	0.9557	0.5330	114.5303	112.2397	0.0443	0.0675	0.4670
45	22.03	30.01	92.8000	0.85	401	0.7278	0.8470	0.7129	0.5311	118.0093	115.6491	0.2871	0.1530	0.4689
46	23.39	30.6	118.3290	0.85	401	0.7554	0.7007	0.6286	0.5235	127.3680	124.8207	0.3714	0.2993	0.4765
47	23.96	31.69	122.5080	0.85	401	0.7815	0.5762	0.4729	0.5216	101.3434	99.3165	0.5271	0.4238	0.4784
48	23.38	29.29	95.0710	0.85	401	0.8030	0.7997	0.8157	0.5258	124.6919	122.1981	0.1843	0.2003	0.4742
49	23.66	28.46	95.2000	0.85	401	0.8219	0.8410	0.9343	0.5271	134.7243	132.0298	0.0657	0.1590	0.4729
50	23.16	31.15	112.6290	0.85	401	0.8397	0.6767	0.5500	0.5230	130.0221	127.4216	0.4500	0.3233	0.4770
51	23.08	29.26	104.3920	0.85	401	0.8545	0.8245	0.8200	0.5251	150.0372	147.0365	0.1800	0.1755	0.4749
52	22.27	28.8	120.4080	0.85	401	0.8671	0.9198	0.8857	0.5240	195.4555	191.5464	0.1143	0.0803	0.4760
53	22.68	30.15	81.9420	0.85	401	0.8787	0.7878	0.6929	0.5311	117.0048	114.6647	0.3071	0.2122	0.4689
54	23.67	30.67	70.8500	0.85	401	0.8892	0.6745	0.6186	0.5352	88.3446	86.5777	0.3814	0.3255	0.4648
55	23.4	29.39	75.9000	0.85	401	0.8979	0.7908	0.8014	0.5302	110.9843	108.7647	0.1986	0.2092	0.4698
56	22.94	28.82	105.0000	0.85	401	0.9052	0.8680	0.8829	0.5251	168.2915	164.9256	0.1171	0.1320	0.4749
57	21.71	31.16	121.7000	0.85	401	0.9117	0.7847	0.5486	0.5225	176.7148	173.1805	0.4514	0.2153	0.4775
58	22.35	30.84	111.9580	0.85	401	0.9174	0.7608	0.5943	0.5235	158.8780	155.7004	0.4057	0.2392	0.4765
59	22.9	28.55	110.8290	0.85	401	0.9220	0.8912	0.9214	0.5246	185.5667	181.8553	0.0786	0.1088	0.4754
60	22.33	29.97	109.9500	0.85	401	0.9260	0.8275	0.7186	0.5240	171.4993	168.0693	0.2814	0.1725	0.4760
61	23.03	30.68	72.8000	0.85	401	0.9297	0.7217	0.6171	0.5352	101.5556	99.5245	0.3829	0.2783	0.4648
62	23.02	30.55	102.7000	0.85	401	0.9328	0.7323	0.6357	0.5246	142.9324	140.0738	0.3643	0.2677	0.4754

Table A54. Cowpea Biomass Growth with Stress Values for Mokwa 2010

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.82	29.29	101.3100	0.85	398	0.0027	0.9168	0.8157	0.5264	0.4970	0.4871	0.1843	0.0832	0.4736
2	22.76	30.37	88.9500	0.85	398	0.0032	0.7652	0.6614	0.5278	0.4308	0.4222	0.3386	0.2348	0.4722
3	23.4	29.28	118.9100	0.85	398	0.0038	0.7990	0.8171	0.5220	0.6999	0.6859	0.1829	0.2010	0.4780
4	22.99	29.48	81.2100	0.85	398	0.0045	0.8148	0.7886	0.5302	0.5819	0.5702	0.2114	0.1852	0.4698
5	22.68	28.91	63.9100	0.85	398	0.0052	0.8807	0.8700	0.5352	0.5847	0.5730	0.1300	0.1193	0.4648
6	22.9	27.33	82.2600	0.85	398	0.0061	0.9828	1.0000	0.5330	0.9719	0.9525	0.0000	0.0172	0.4670
7	22.55	26.87	114.5400	0.85	398	0.0070	0.9807	1.0000	0.5246	1.5381	1.5074	0.0000	0.0193	0.4754
8	22.16	28.37	86.3900	0.85	398	0.0082	0.9602	0.9471	0.5302	1.3358	1.3091	0.0529	0.0398	0.4698
9	22.73	29.45	65.7200	0.85	398	0.0096	0.8365	0.7929	0.5440	1.0653	1.0440	0.2071	0.1635	0.4560
10	22.74	29.44	100.2200	0.85	398	0.0113	0.8365	0.7943	0.5264	1.8431	1.8063	0.2057	0.1635	0.4736
11	22.76	28.05	100.9700	0.85	398	0.0131	0.9392	0.9929	0.5285	2.4374	2.3886	0.0071	0.0608	0.4715
12	22.12	29.83	109.6200	0.85	398	0.0154	0.8537	0.7386	0.5246	2.7940	2.7381	0.2614	0.1463	0.4754
13	22.44	28.38	68.8100	0.85	398	0.0179	0.9385	0.9457	0.5440	2.3262	2.2797	0.0543	0.0615	0.4560
14	22.7	27.83	70.2400	0.85	398	0.0207	0.9602	1.0000	0.5459	2.8314	2.7748	0.0000	0.0398	0.4541
15	22.29	29.54	81.0900	0.85	398	0.0242	0.8628	0.7800	0.5330	3.3495	3.2825	0.2200	0.1372	0.4670
16	23.33	28.05	48.8800	0.85	398	0.0282	0.8965	0.9929	0.5660	2.5951	2.5432	0.0071	0.1035	0.4340
17	22.74	29.5	73.2200	0.85	398	0.0330	0.8320	0.7857	0.5341	3.9789	3.8993	0.2143	0.1680	0.4659
18	22.65	28.9	89.8900	0.85	398	0.0384	0.8838	0.8714	0.5271	5.9604	5.8412	0.1286	0.1162	0.4729
19	22.89	28.37	89.7300	0.85	398	0.0446	0.9055	0.9471	0.5278	7.0887	6.9469	0.0529	0.0945	0.4722
20	23.03	28.43	67.6600	0.85	398	0.0518	0.8905	0.9386	0.5406	6.2516	6.1265	0.0614	0.1095	0.4594
21	22.37	28.32	99.0200	0.85	398	0.0598	0.9483	0.9543	0.5278	10.9894	10.7696	0.0457	0.0517	0.4722
22	22.28	28.19	79.4000	0.85	398	0.0690	0.9648	0.9729	0.5352	10.4786	10.2691	0.0271	0.0352	0.4648
23	22.69	27.8	60.1700	0.85	398	0.0794	0.9632	1.0000	0.5480	9.3433	9.1564	0.0000	0.0368	0.4520
24	22.58	28.3	72.1200	0.85	398	0.0914	0.9340	0.9571	0.5422	12.3661	12.1188	0.0429	0.0660	0.4578
25	22.44	27.73	85.7000	0.85	398	0.1046	0.9872	1.0000	0.5320	17.4471	17.0982	0.0000	0.0128	0.4680
26	22.37	28.76	90.7200	0.85	398	0.1200	0.9152	0.8914	0.5302	19.5741	19.1827	0.1086	0.0848	0.4698
27	22.58	28.65	78.8800	0.85	398	0.1373	0.9078	0.9071	0.5330	19.4235	19.0350	0.0929	0.0922	0.4670
28	23.08	28.44	52.8200	0.85	398	0.1569	0.8860	0.9371	0.5480	14.9121	14.6138	0.0629	0.1140	0.4520
29	22.55	29.61	106.5900	0.85	398	0.1791	0.8380	0.7700	0.5258	31.1723	30.5488	0.2300	0.1620	0.4742
30	23.04	29.03	73.1600	0.85	398	0.2036	0.8448	0.8529	0.5364	25.0122	24.5120	0.1471	0.1553	0.4636
31	22.13	29.38	77.2600	0.85	398	0.2299	0.8868	0.8029	0.5311	31.0009	30.3809	0.1971	0.1132	0.4689

Table A54 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2010

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.97	28.47	120.4600	0.85	398	0.2575	0.9670	0.9329	0.5240	58.2414	57.0766	0.0671	0.0330	0.4760
33	21.73	29.75	60.7400	0.85	398	0.2881	0.8890	0.7500	0.5480	31.5887	30.9570	0.2500	0.1110	0.4520
34	22.73	27.42	61.0600	0.85	398	0.3192	0.9887	1.0000	0.5391	38.4993	37.7293	0.0000	0.0113	0.4609
35	21.74	29.7	89.0100	0.85	398	0.3533	0.8920	0.7571	0.5302	55.1148	54.0125	0.2429	0.1080	0.4698
36	22.77	30.51	96.8500	0.85	398	0.3909	0.7540	0.6414	0.5258	55.6252	54.5127	0.3586	0.2460	0.4742
37	23.64	29.21	114.7800	0.85	398	0.4292	0.7862	0.8271	0.5216	74.8664	73.3691	0.1729	0.2138	0.4784
38	21.99	29.66	114.3100	0.85	398	0.4666	0.8763	0.7629	0.5246	90.8645	89.0472	0.2371	0.1237	0.4754
39	22.3	30.04	116.9100	0.85	398	0.5050	0.8245	0.7086	0.5240	94.5309	92.6402	0.2914	0.1755	0.4760
40	22.83	28.97	77.0900	0.85	398	0.5423	0.8650	0.8614	0.5364	71.8950	70.4571	0.1386	0.1350	0.4636
41	22.6	28.49	85.9900	0.85	398	0.5781	0.9182	0.9300	0.5293	89.5400	87.7492	0.0700	0.0818	0.4707
42	22.19	29.64	73.2100	0.85	398	0.6134	0.8628	0.7657	0.5364	77.0196	75.4792	0.2343	0.1372	0.4636
43	22.65	30.63	120.2600	0.85	398	0.6486	0.7540	0.6243	0.5225	113.8811	111.6034	0.3757	0.2460	0.4775
44	22.79	30.12	106.6100	0.85	398	0.6814	0.7818	0.6971	0.5258	110.6555	108.4424	0.3029	0.2182	0.4742
45	22.96	28.12	77.3400	0.85	398	0.7103	0.9190	0.9829	0.5341	99.9257	97.9272	0.0171	0.0810	0.4659
46	22.09	29.69	122.4600	0.85	398	0.7377	0.8665	0.7586	0.5225	151.5618	148.5305	0.2414	0.1335	0.4775
47	23.73	31.41	99.8600	0.85	398	0.7652	0.6145	0.5129	0.5240	89.2495	87.4646	0.4871	0.3855	0.4760
48	22.95	29.7	111.6200	0.85	398	0.7883	0.8013	0.7571	0.5235	136.7755	134.0399	0.2429	0.1987	0.4765
49	22.99	29.69	102.2300	0.85	398	0.8091	0.7990	0.7586	0.5246	128.4740	125.9045	0.2414	0.2010	0.4754
50	23.41	30.86	112.8400	0.85	398	0.8284	0.6798	0.5914	0.5220	122.9262	120.4677	0.4086	0.3202	0.4780
51	23.61	27.46	56.7500	0.85	398	0.8440	0.9198	1.0000	0.5422	88.5238	86.7533	0.0000	0.0803	0.4578
52	22.04	29.92	92.2500	0.85	398	0.8581	0.8530	0.7257	0.5302	132.6730	130.0196	0.2743	0.1470	0.4698
53	22.42	30.01	92.4600	0.85	398	0.8707	0.8177	0.7129	0.5293	129.1481	126.5652	0.2871	0.1823	0.4707
54	22.87	28.56	100.2200	0.85	398	0.8814	0.8928	0.9200	0.5264	153.8464	150.7695	0.0800	0.1072	0.4736
55	21.8	31.22	105.8300	0.85	398	0.8912	0.7735	0.5400	0.5246	141.8234	138.9870	0.4600	0.2265	0.4754
56	24.02	29.05	64.0700	0.85	398	0.8997	0.7697	0.8500	0.5364	88.2074	86.4433	0.1500	0.2303	0.4636
57	23.09	29.1	71.5000	0.85	398	0.9068	0.8358	0.8429	0.5320	106.8383	104.7016	0.1571	0.1642	0.4680
58	23.19	27.61	96.3400	0.85	398	0.9128	0.9400	1.0000	0.5330	163.2753	160.0098	0.0000	0.0600	0.4670
59	22.43	29.66	93.4100	0.85	398	0.9181	0.8432	0.7629	0.5278	141.4493	138.6203	0.2371	0.1568	0.4722
60	22.54	30.62	96.5200	0.85	398	0.9228	0.7630	0.6257	0.5264	132.5814	129.9298	0.3743	0.2370	0.4736
61	23.34	29.58	69.1900	0.85	398	0.9268	0.7810	0.7743	0.5364	99.5655	97.5741	0.2257	0.2190	0.4636
62	22.9	29.9	105.0500	0.85	398	0.9303	0.7900	0.7286	0.5251	150.2515	147.2465	0.2714	0.2100	0.4749

Table A55. Cowpea Biomass Growth with Stress Values for Mokwa 2011

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.51	26.34	76.8500	0.85	402	0.0027	0.9617	1.0000	0.5364	0.4241	0.4156	0.0000	0.0383	0.4636
2	21.97	29.52	91.0800	0.85	402	0.0032	0.8883	0.7829	0.5271	0.5337	0.5230	0.2171	0.1117	0.4729
3	22.65	27.25	57.7600	0.85	402	0.0037	0.9967	1.0000	0.5503	0.4602	0.4510	0.0000	0.0033	0.4497
4	22.21	26.36	80.2400	0.85	402	0.0042	0.9523	1.0000	0.5352	0.6849	0.6712	0.0000	0.0477	0.4648
5	21.51	27.33	72.9200	0.85	402	0.0049	0.9613	1.0000	0.5352	0.7253	0.7108	0.0000	0.0387	0.4648
6	20.79	30.56	108.2700	0.85	402	0.0057	0.8988	0.6343	0.5235	1.1508	1.1278	0.3657	0.1012	0.4765
7	22.07	29.42	111.4600	0.85	402	0.0067	0.8882	0.7971	0.5216	1.3641	1.3368	0.2029	0.1118	0.4784
8	22.41	28.68	82.4400	0.85	402	0.0078	0.9182	0.9029	0.5330	1.2437	1.2188	0.0971	0.0818	0.4670
9	22.47	28.73	80.6200	0.85	402	0.0091	0.9100	0.8957	0.5311	1.4017	1.3737	0.1043	0.0900	0.4689
10	21.9	29.96	99.0000	0.85	402	0.0107	0.8605	0.7200	0.5246	1.8823	1.8446	0.2800	0.1395	0.4754
11	23.45	29.82	82.6000	0.85	402	0.0126	0.7548	0.7400	0.5330	1.6496	1.6166	0.2600	0.2452	0.4670
12	21.98	26.44	48.1600	0.85	402	0.0145	0.9473	1.0000	0.5587	1.4556	1.4265	0.0000	0.0527	0.4413
13	21.52	28.7	82.5300	0.85	402	0.0168	0.9835	0.9000	0.5293	2.8468	2.7899	0.1000	0.0165	0.4707
14	21.81	28.58	94.4800	0.85	402	0.0195	0.9708	0.9171	0.5258	3.7086	3.6344	0.0829	0.0292	0.4742
15	21.98	30.19	109.5900	0.85	402	0.0228	0.8372	0.6871	0.5235	4.3231	4.2366	0.3129	0.1628	0.4765
16	22.44	27.9	58.7200	0.85	402	0.0265	0.9745	1.0000	0.5406	3.2278	3.1633	0.0000	0.0255	0.4594
17	22.22	26.7	94.4500	0.85	402	0.0304	0.9640	1.0000	0.5285	5.7774	5.6619	0.0000	0.0360	0.4715
18	21.77	29.32	86.8300	0.85	402	0.0354	0.9182	0.8114	0.5320	5.9169	5.7986	0.1886	0.0818	0.4680
19	22.21	30.67	125.9600	0.85	402	0.0414	0.7840	0.6186	0.5207	8.3987	8.2307	0.3814	0.2160	0.4793
20	22.82	29.94	101.5100	0.85	402	0.0484	0.7930	0.7229	0.5246	8.0617	7.9005	0.2771	0.2070	0.4754
21	22.42	26.19	68.1900	0.85	402	0.0554	0.9537	1.0000	0.5406	7.6841	7.5304	0.0000	0.0463	0.4594
22	20.84	29.51	97.9700	0.85	402	0.0639	0.9737	0.7843	0.5264	12.6537	12.4006	0.2157	0.0263	0.4736
23	21.64	31.51	115.0000	0.85	402	0.0745	0.7637	0.4986	0.5225	12.8673	12.6100	0.5014	0.2363	0.4775
24	22.9	29.72	86.5200	0.85	402	0.0865	0.8035	0.7543	0.5311	12.5950	12.3431	0.2457	0.1965	0.4689
25	23.15	26.83	65.8300	0.85	402	0.0990	0.9993	1.0000	0.5459	14.0269	13.7464	0.0000	0.0007	0.4541
26	22.69	25.97	72.9000	0.85	402	0.1125	0.9553	1.0000	0.5422	16.7530	16.4180	0.0000	0.0447	0.4578
27	22.39	29.28	94.7300	0.85	402	0.1292	0.8747	0.8171	0.5293	22.3438	21.8969	0.1829	0.1253	0.4707
28	22.28	30.4	110.9500	0.85	402	0.1485	0.7990	0.6571	0.5240	27.2063	26.6621	0.3429	0.2010	0.4760
29	22.55	29.86	103.3500	0.85	402	0.1700	0.8193	0.7343	0.5240	29.7384	29.1436	0.2657	0.1807	0.4760
30	21.97	28.12	90.1400	0.85	402	0.1920	0.9932	0.9829	0.5302	35.9383	35.2195	0.0171	0.0068	0.4698
31	20.87	30.14	71.9700	0.85	402	0.2168	0.9242	0.6943	0.5352	30.4428	29.8339	0.3057	0.0758	0.4648

Table A55 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2011

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.47	27.78	66.5900	0.85	402	0.2432	0.9813	1.0000	0.5391	33.7824	33.1068	0.0000	0.0188	0.4609
33	21.85	28.52	93.1200	0.85	402	0.2716	0.9722	0.9257	0.5302	51.4224	50.3940	0.0743	0.0278	0.4698
34	21.98	29.54	94.5600	0.85	402	0.3032	0.8860	0.7800	0.5271	52.8056	51.7494	0.2200	0.1140	0.4729
35	22.36	26.99	89.3200	0.85	402	0.3343	0.9783	1.0000	0.5285	60.8887	59.6709	0.0000	0.0217	0.4715
36	21.88	28.78	88.5000	0.85	402	0.3682	0.9505	0.8886	0.5320	64.9832	63.6836	0.1114	0.0495	0.4680
37	21.85	30.37	105.2800	0.85	402	0.4051	0.8335	0.6614	0.5251	73.6241	72.1517	0.3386	0.1665	0.4749
38	22.35	29.15	72.2000	0.85	402	0.4420	0.8875	0.8357	0.5341	59.6621	58.4688	0.1643	0.1125	0.4659
39	22.48	30.11	110.1300	0.85	402	0.4807	0.8057	0.6986	0.5235	88.0633	86.3021	0.3014	0.1943	0.4765
40	23.57	30.04	101.3200	0.85	402	0.5205	0.7293	0.7086	0.5251	79.6478	78.0548	0.2914	0.2707	0.4749
41	22.96	30.7	112.6400	0.85	402	0.5597	0.7255	0.6143	0.5225	94.2430	92.3581	0.3857	0.2745	0.4775
42	22.85	29.37	105.4200	0.85	402	0.5961	0.8335	0.8043	0.5246	108.3626	106.1953	0.1957	0.1665	0.4754
43	23.66	29.82	108.3800	0.85	402	0.6324	0.7390	0.7400	0.5230	104.4716	102.3822	0.2600	0.2610	0.4770
44	23.29	28.47	101.7300	0.85	402	0.6651	0.8680	0.9329	0.5264	121.9221	119.4837	0.0671	0.1320	0.4736
45	22.48	28.04	114.5300	0.85	402	0.6945	0.9610	0.9943	0.5235	157.8221	154.6656	0.0057	0.0390	0.4765
46	22.09	28.42	91.1000	0.85	402	0.7220	0.9617	0.9400	0.5330	132.9809	130.3213	0.0600	0.0383	0.4670
47	22.6	29.98	108.4800	0.85	402	0.7490	0.8065	0.7171	0.5230	135.1631	132.4599	0.2829	0.1935	0.4770
48	22.28	29.65	90.5000	0.85	402	0.7732	0.8553	0.7643	0.5293	124.9344	122.4357	0.2357	0.1447	0.4707
49	22.53	29.01	111.9800	0.85	402	0.7948	0.8845	0.8557	0.5246	162.8546	159.5975	0.1443	0.1155	0.4754
50	22.5	31.18	113.3800	0.85	402	0.8154	0.7240	0.5457	0.5230	138.0543	135.2932	0.4543	0.2760	0.4770
51	22.9	29.36	119.5200	0.85	402	0.8330	0.8305	0.8057	0.5235	170.7036	167.2895	0.1943	0.1695	0.4765
52	22.72	29.54	72.6600	0.85	402	0.8486	0.8305	0.7800	0.5352	108.0854	105.9237	0.2200	0.1695	0.4648
53	23.08	30.06	41.5000	0.85	402	0.8626	0.7645	0.7057	0.5556	59.9691	58.7697	0.2943	0.2355	0.4444
54	23.18	28.76	61.3400	0.85	402	0.8745	0.8545	0.8914	0.5320	96.1745	94.2510	0.1086	0.1455	0.4680
55	22.83	29.92	85.8500	0.85	402	0.8851	0.7938	0.7257	0.5293	125.9190	123.4006	0.2743	0.2063	0.4707
56	23.28	30.82	104.9100	0.85	402	0.8947	0.6925	0.5971	0.5271	135.1212	132.4187	0.4029	0.3075	0.4729
57	23.4	29.67	93.7300	0.85	402	0.9027	0.7697	0.7614	0.5240	134.5992	131.9072	0.2386	0.2303	0.4760
58	23.15	30.99	101.7700	0.85	402	0.9098	0.6895	0.5729	0.5251	132.2271	129.5826	0.4271	0.3105	0.4749
59	23.85	29.5	97.6200	0.85	402	0.9158	0.7487	0.7857	0.5271	139.1456	136.3627	0.2143	0.2513	0.4729
60	22.73	28.69	98.8900	0.85	402	0.9206	0.8935	0.9014	0.5278	169.3203	165.9339	0.0986	0.1065	0.4722
61	22.3	30.29	103.4100	0.85	402	0.9249	0.8057	0.6729	0.5240	159.2657	156.0804	0.3271	0.1943	0.4760
62	22.62	31.26	82.0600	0.85	402	0.9287	0.7090	0.5343	0.5278	112.4757	110.2262	0.4657	0.2910	0.4722

Table A56. Cowpea Biomass Growth with Stress Values for Mokwa 2012

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	20.93	29	99.8100	0.85	401	0.0027	0.9977	0.8571	0.5246	0.5533	0.5423	0.1429	0.0023	0.4754
2	21.65	28.57	97.4100	0.85	401	0.0032	0.9835	0.9186	0.5271	0.6219	0.6094	0.0814	0.0165	0.4729
3	22.12	27.98	100.5700	0.85	401	0.0037	0.9925	1.0000	0.5264	0.7518	0.7368	0.0000	0.0075	0.4736
4	22.46	26.58	67.9000	0.85	401	0.0043	0.9680	1.0000	0.5440	0.5912	0.5794	0.0000	0.0320	0.4560
5	22.18	29.16	82.1300	0.85	401	0.0050	0.8995	0.8343	0.5320	0.7595	0.7443	0.1657	0.1005	0.4680
6	22.43	26.39	91.4500	0.85	401	0.0057	0.9607	1.0000	0.5293	1.0371	1.0163	0.0000	0.0393	0.4707
7	22.11	29.05	73.4800	0.85	401	0.0067	0.9130	0.8500	0.5341	0.9328	0.9141	0.1500	0.0870	0.4659
8	22.08	27.55	50.9100	0.85	401	0.0078	0.9877	1.0000	0.5556	0.8425	0.8256	0.0000	0.0123	0.4444
9	21.83	28.15	77.4700	0.85	401	0.0090	0.9993	0.9786	0.5341	1.4467	1.4177	0.0214	0.0007	0.4659
10	21.96	25.75	37.8300	0.85	401	0.0103	0.9237	1.0000	0.5621	0.7883	0.7725	0.0000	0.0763	0.4379
11	21.16	28.38	80.1600	0.85	401	0.0120	0.9847	0.9457	0.5330	1.9537	1.9146	0.0543	0.0153	0.4670
12	21.29	29.74	104.0500	0.85	401	0.0139	0.9228	0.7514	0.5264	2.7352	2.6805	0.2486	0.0773	0.4736
13	22.75	30.55	94.6900	0.85	401	0.0164	0.7525	0.6357	0.5285	2.4010	2.3530	0.3643	0.2475	0.4715
14	23.5	28.08	75.0600	0.85	401	0.0192	0.8815	0.9886	0.5352	2.6360	2.5833	0.0114	0.1185	0.4648
15	22.69	27.27	79.4000	0.85	401	0.0222	0.9987	1.0000	0.5364	3.6659	3.5926	0.0000	0.0013	0.4636
16	21.63	28.73	65.5200	0.85	401	0.0257	0.9730	0.8957	0.5377	3.4257	3.3572	0.1043	0.0270	0.4623
17	22.33	28.68	85.1600	0.85	401	0.0299	0.9243	0.9029	0.5311	4.8556	4.7585	0.0971	0.0757	0.4689
18	22.11	28.71	62.3800	0.85	401	0.0347	0.9385	0.8986	0.5440	4.2935	4.2076	0.1014	0.0615	0.4560
19	22.95	28.81	72.7600	0.85	401	0.0404	0.8680	0.8843	0.5377	5.3326	5.2260	0.1157	0.1320	0.4623
20	22.29	27.33	59.1400	0.85	401	0.0466	0.9873	1.0000	0.5503	5.8115	5.6953	0.0000	0.0127	0.4497
21	22.43	26.66	60.0400	0.85	401	0.0534	0.9697	1.0000	0.5503	6.6505	6.5175	0.0000	0.0303	0.4497
22	22.26	28.58	77.5500	0.85	401	0.0618	0.9370	0.9171	0.5330	9.2932	9.1074	0.0829	0.0630	0.4670
23	21.3	29.83	98.1100	0.85	401	0.0714	0.9153	0.7386	0.5258	13.0925	12.8307	0.2614	0.0847	0.4742
24	22.73	29.91	107.4700	0.85	401	0.0829	0.8020	0.7271	0.5235	14.5367	14.2460	0.2729	0.1980	0.4765
25	22.49	28.31	111.5500	0.85	401	0.0954	0.9400	0.9557	0.5240	20.3544	19.9473	0.0443	0.0600	0.4760
26	22.9	28	81.9700	0.85	401	0.1095	0.9325	1.0000	0.5330	17.3235	16.9770	0.0000	0.0675	0.4670
27	22.49	27.39	85.5100	0.85	401	0.1248	0.9960	1.0000	0.5293	21.8526	21.4156	0.0000	0.0040	0.4707
28	21.97	27.78	80.8700	0.85	401	0.1418	0.9917	1.0000	0.5330	23.5465	23.0755	0.0000	0.0083	0.4670
29	21.73	29.52	100.5500	0.85	401	0.1617	0.9063	0.7829	0.5251	30.0596	29.4584	0.2171	0.0938	0.4749
30	22.58	27.33	80.9600	0.85	401	0.1828	0.9970	1.0000	0.5364	30.7416	30.1267	0.0000	0.0030	0.4636
31	22.37	30.09	109.1800	0.85	401	0.2079	0.8155	0.7014	0.5251	37.7669	37.0115	0.2986	0.1845	0.4749

Table A56 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2012

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.7	28.95	85.1800	0.85	401	0.2348	0.8763	0.8643	0.5293	36.0320	35.3114	0.1357	0.1237	0.4707
33	22.94	26.88	29.2400	0.85	401	0.2621	0.9940	1.0000	0.5812	17.2003	16.8563	0.0000	0.0060	0.4188
34	22.37	28.64	87.0700	0.85	401	0.2925	0.9242	0.9086	0.5271	48.2000	47.2360	0.0914	0.0758	0.4729
35	22.27	29.58	102.2000	0.85	401	0.3257	0.8613	0.7743	0.5271	58.6998	57.5258	0.2257	0.1387	0.4729
36	22.52	27.21	105.0200	0.85	401	0.3582	0.9910	1.0000	0.5264	76.2378	74.7130	0.0000	0.0090	0.4736
37	22.15	29.48	99.2600	0.85	401	0.3942	0.8778	0.7886	0.5271	70.3105	68.9043	0.2114	0.1222	0.4729
38	22.65	30.17	100.1900	0.85	401	0.4324	0.7885	0.6900	0.5258	69.7716	68.3762	0.3100	0.2115	0.4742
39	22.73	30.75	91.8400	0.85	401	0.4721	0.7390	0.6071	0.5285	65.7832	64.4676	0.3929	0.2610	0.4715
40	23.28	28.35	112.2400	0.85	401	0.5096	0.8777	0.9500	0.5246	102.2982	100.2523	0.0500	0.1223	0.4754
41	22.51	29.76	117.6400	0.85	401	0.5474	0.8297	0.7486	0.5235	108.6510	106.4780	0.2514	0.1703	0.4765
42	22.05	30.73	124.2500	0.85	401	0.5849	0.7915	0.6100	0.5225	116.7357	114.4010	0.3900	0.2085	0.4775
43	23.7	29.22	111.8900	0.85	401	0.6211	0.7810	0.8257	0.5246	110.5947	108.3828	0.1743	0.2190	0.4754
44	22.98	28.06	89.0500	0.85	401	0.6536	0.9220	0.9914	0.5271	109.8774	107.6798	0.0086	0.0780	0.4729
45	22.06	30.16	117.2800	0.85	401	0.6855	0.8335	0.6914	0.5240	136.3868	133.6591	0.3086	0.1665	0.4760
46	22.72	29.94	85.2700	0.85	401	0.7155	0.8005	0.7229	0.5311	100.7456	98.7307	0.2771	0.1995	0.4689
47	23.58	28.14	86.4500	0.85	401	0.7423	0.8710	0.9800	0.5278	114.6004	112.3084	0.0200	0.1290	0.4722
48	22.72	27.93	106.2500	0.85	401	0.7661	0.9513	1.0000	0.5258	158.1437	154.9809	0.0000	0.0487	0.4742
49	22.61	30.66	85.9200	0.85	401	0.7896	0.7548	0.6200	0.5271	104.8314	102.7347	0.3800	0.2452	0.4729
50	23.1	30.78	79.1600	0.85	401	0.8109	0.7090	0.6029	0.5320	94.0516	92.1705	0.3971	0.2910	0.4680
51	23.43	29.33	94.2000	0.85	401	0.8292	0.7930	0.8100	0.5264	126.6654	124.1320	0.1900	0.2070	0.4736
52	22.89	31.22	81.9800	0.85	401	0.8461	0.6918	0.5400	0.5285	98.5137	96.5434	0.4600	0.3082	0.4715
53	23.31	29.3	79.2700	0.85	401	0.8603	0.8043	0.8143	0.5302	112.9490	110.6900	0.1857	0.1957	0.4698
54	23.13	28	110.6600	0.85	401	0.8721	0.9153	1.0000	0.5251	180.1888	176.5851	0.0000	0.0847	0.4749
55	23.29	27.8	85.5400	0.85	401	0.8826	0.9182	1.0000	0.5302	142.7650	139.9097	0.0000	0.0818	0.4698
56	21.73	30.83	95.9200	0.85	401	0.8921	0.8080	0.5957	0.5240	140.7292	137.9146	0.4043	0.1920	0.4760
57	22.81	31.23	107.1900	0.85	401	0.9007	0.6970	0.5386	0.5235	136.8275	134.0909	0.4614	0.3030	0.4765
58	22.85	32.04	123.1900	0.85	401	0.9082	0.6333	0.4229	0.5211	116.3770	114.0495	0.5771	0.3668	0.4789
59	23.13	30.03	90.0400	0.85	401	0.9144	0.7630	0.7100	0.5264	128.4480	125.8790	0.2900	0.2370	0.4736
60	23.15	30.78	108.4800	0.85	401	0.9197	0.7053	0.6029	0.5230	142.9420	140.0831	0.3971	0.2947	0.4770
61	22.8	30.3	110.9100	0.85	401	0.9242	0.7675	0.6714	0.5240	160.1389	156.9361	0.3286	0.2325	0.4760
62	23.37	31.96	110.8300	0.85	401	0.9283	0.6003	0.4343	0.5220	104.1821	102.0984	0.5657	0.3997	0.4780

Table A57. Cowpea Biomass Growth with Stress Values for Mokwa 2013

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.19	25.17	37.5400	0.85	404	0.0027	0.9120	1.0000	0.5754	0.2155	0.2112	0.0000	0.0880	0.4246
2	21.42	30.03	70.6300	0.85	404	0.0031	0.8912	0.7100	0.5364	0.4321	0.4234	0.2900	0.1088	0.4636
3	23.09	27.06	70.5800	0.85	404	0.0037	0.9888	1.0000	0.5364	0.5566	0.5455	0.0000	0.0112	0.4636
4	22.43	27.15	89.9700	0.85	404	0.0042	0.9860	1.0000	0.5352	0.8180	0.8016	0.0000	0.0140	0.4648
5	21.9	29.83	102.2800	0.85	404	0.0050	0.8703	0.7386	0.5258	0.9442	0.9253	0.2614	0.1297	0.4742
6	23	28.1	74.5200	0.85	404	0.0058	0.9175	0.9857	0.5459	0.8790	0.8614	0.0143	0.0825	0.4541
7	22.27	28.1	65.5700	0.85	404	0.0067	0.9722	0.9857	0.5391	0.9412	0.9223	0.0143	0.0278	0.4609
8	21.09	29.29	93.3200	0.85	404	0.0078	0.9715	0.8157	0.5258	1.5176	1.4873	0.1843	0.0285	0.4742
9	21.04	29.81	80.0800	0.85	404	0.0091	0.9363	0.7414	0.5302	1.4746	1.4452	0.2586	0.0637	0.4698
10	22.17	28.42	64.5900	0.85	404	0.0106	0.9557	0.9400	0.5459	1.4545	1.4254	0.0600	0.0443	0.4541
11	22.56	26.67	97.3400	0.85	404	0.0123	0.9743	1.0000	0.5240	2.4782	2.4286	0.0000	0.0257	0.4760
12	21.88	27.52	84.1000	0.85	404	0.0142	0.9800	1.0000	0.5271	2.5041	2.4540	0.0000	0.0200	0.4729
13	22.13	29.78	61.8500	0.85	404	0.0166	0.8568	0.7457	0.5364	1.9170	1.8786	0.2543	0.1432	0.4636
14	21.89	29.96	82.1200	0.85	404	0.0194	0.8612	0.7200	0.5320	2.9667	2.9073	0.2800	0.1388	0.4680
15	22.76	27.79	74.2900	0.85	404	0.0225	0.9588	1.0000	0.5422	3.5358	3.4650	0.0000	0.0412	0.4578
16	21.99	29.37	76.6600	0.85	404	0.0263	0.8980	0.8043	0.5406	3.9696	3.8902	0.1957	0.1020	0.4594
17	21.7	29.07	109.4800	0.85	404	0.0305	0.9423	0.8471	0.5251	6.7083	6.5741	0.1529	0.0577	0.4749
18	22.1	28.59	78.4100	0.85	404	0.0353	0.9483	0.9157	0.5320	5.6804	5.5668	0.0843	0.0517	0.4680
19	22.31	28.52	97.2900	0.85	404	0.0410	0.9378	0.9257	0.5258	7.9868	7.8271	0.0743	0.0622	0.4742
20	21.38	29.5	112.0400	0.85	404	0.0475	0.9340	0.7857	0.5225	10.5475	10.3366	0.2143	0.0660	0.4775
21	22.22	29.9	98.3900	0.85	404	0.0553	0.8410	0.7286	0.5258	9.7698	9.5744	0.2714	0.1590	0.4742
22	22.94	29.05	91.1400	0.85	404	0.0642	0.8507	0.8500	0.5302	10.7247	10.5102	0.1500	0.1493	0.4698
23	22.18	29.32	77.4500	0.85	404	0.0743	0.8875	0.8114	0.5330	11.0611	10.8399	0.1886	0.1125	0.4670
24	22.78	27.73	82.5900	0.85	404	0.0855	0.9617	1.0000	0.5341	14.7283	14.4338	0.0000	0.0383	0.4659
25	22.57	30.07	119.3400	0.85	404	0.0990	0.8020	0.7043	0.5240	20.1775	19.7740	0.2957	0.1980	0.4760
26	22.33	29.76	88.8100	0.85	404	0.1142	0.8432	0.7486	0.5285	18.3632	17.9959	0.2514	0.1568	0.4715
27	22.4	28.76	97.8400	0.85	404	0.1308	0.9130	0.8914	0.5278	25.0524	24.5514	0.1086	0.0870	0.4722
28	22.35	27.29	45.2800	0.85	404	0.1484	0.9880	1.0000	0.5528	14.9124	14.6142	0.0000	0.0120	0.4472
29	21.72	29.31	96.8700	0.85	404	0.1689	0.9228	0.8129	0.5278	32.3736	31.7262	0.1871	0.0773	0.4722
30	22.76	28.96	99.2200	0.85	404	0.1921	0.8710	0.8629	0.5264	35.4976	34.7876	0.1371	0.1290	0.4736
31	23.05	29.44	102.0800	0.85	404	0.2181	0.8132	0.7943	0.5258	38.6855	37.9118	0.2057	0.1868	0.4742

Table A57 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2013

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.76	28.66	101.6600	0.85	404	0.2457	0.8935	0.9057	0.5258	47.6666	46.7133	0.0943	0.1065	0.4742
33	22.34	30.76	103.5300	0.85	404	0.2770	0.7675	0.6057	0.5251	46.9598	46.0206	0.3943	0.2325	0.4749
34	23.36	31.4	97.5100	0.85	404	0.3123	0.6430	0.5143	0.5235	40.9124	40.0942	0.4857	0.3570	0.4765
35	23.19	31.1	104.9900	0.85	404	0.3492	0.6782	0.5571	0.5230	52.8376	51.7808	0.4429	0.3218	0.4770
36	23.99	29.85	119.2100	0.85	404	0.3873	0.7120	0.7357	0.5216	69.6682	68.2748	0.2643	0.2880	0.4784
37	23.68	28.83	96.0000	0.85	404	0.4251	0.8118	0.8814	0.5330	71.7429	70.3080	0.1186	0.1882	0.4670
38	22.79	29.62	85.1800	0.85	404	0.4634	0.8193	0.7686	0.5320	69.9023	68.5042	0.2314	0.1807	0.4680
39	22.62	29.88	101.7100	0.85	404	0.5020	0.8125	0.7314	0.5271	88.8382	87.0615	0.2686	0.1875	0.4729
40	23.54	28.87	66.3800	0.85	404	0.5401	0.8193	0.8757	0.5406	64.5142	63.2239	0.1243	0.1807	0.4594
41	22.53	27.65	78.0500	0.85	404	0.5748	0.9865	1.0000	0.5341	96.0397	94.1189	0.0000	0.0135	0.4659
42	21.12	29.8	68.6600	0.85	404	0.6093	0.9310	0.7429	0.5391	85.3117	83.6054	0.2571	0.0690	0.4609
43	22.15	30.97	111.2900	0.85	404	0.6446	0.7660	0.5757	0.5235	116.8681	114.5308	0.4243	0.2340	0.4765
44	23.16	31.16	120.7900	0.85	404	0.6790	0.6760	0.5486	0.5220	117.5884	115.2366	0.4514	0.3240	0.4780
45	22.51	30.01	114.5400	0.85	404	0.7094	0.8110	0.7129	0.5230	140.0108	137.2105	0.2871	0.1890	0.4770
46	22.88	30.69	118.8800	0.85	404	0.7383	0.7323	0.6157	0.5235	136.6830	133.9494	0.3843	0.2677	0.4765
47	22.62	29.15	122.1200	0.85	404	0.7632	0.8673	0.8357	0.5235	171.9224	168.4840	0.1643	0.1327	0.4765
48	22.09	30.23	118.4800	0.85	404	0.7863	0.8260	0.6814	0.5251	164.1893	160.9055	0.3186	0.1740	0.4749
49	22.84	31.02	85.4800	0.85	404	0.8080	0.7105	0.5686	0.5311	105.8832	103.7656	0.4314	0.2895	0.4689
50	23.47	28.62	108.6100	0.85	404	0.8263	0.8432	0.9114	0.5264	161.8563	158.6191	0.0886	0.1568	0.4736
51	23.13	28.56	105.1600	0.85	404	0.8424	0.8733	0.9200	0.5271	165.6597	162.3465	0.0800	0.1267	0.4729
52	23.32	30.07	111.9600	0.85	404	0.8573	0.7457	0.7043	0.5240	152.3957	149.3478	0.2957	0.2543	0.4760
53	23.08	29.53	107.3400	0.85	404	0.8701	0.8043	0.7814	0.5264	160.6483	157.4353	0.2186	0.1957	0.4736
54	22.15	29.6	88.7900	0.85	404	0.8810	0.8688	0.7714	0.5341	147.4539	144.5049	0.2286	0.1312	0.4659
55	22.32	31.12	92.8900	0.85	404	0.8909	0.7420	0.5543	0.5264	131.3347	128.7080	0.4457	0.2580	0.4736
56	22.31	29.39	99.0500	0.85	404	0.8991	0.8725	0.8014	0.5264	166.1892	162.8654	0.1986	0.1275	0.4736
57	21.51	31.22	117.5800	0.85	404	0.9065	0.7952	0.5400	0.5230	180.0922	176.4903	0.4600	0.2048	0.4770
58	21.96	31.39	90.0900	0.85	404	0.9129	0.7487	0.5157	0.5293	129.0277	126.4472	0.4843	0.2513	0.4707
59	20.92	32.96	127.5200	0.85	404	0.9185	0.7090	0.2914	0.5196	98.3263	96.3598	0.7086	0.2910	0.4804
60	22.14	30.72	103.1900	0.85	404	0.9231	0.7855	0.6114	0.5258	159.8344	156.6377	0.3886	0.2145	0.4742
61	21.94	29.62	98.6500	0.85	404	0.9269	0.8830	0.7686	0.5293	173.6550	170.1819	0.2314	0.1170	0.4707
62	22.12	28.76	67.4100	0.85	404	0.9302	0.9340	0.8914	0.5377	127.9480	125.3891	0.1086	0.0660	0.4623

Table A58. Cowpea Biomass Growth with Stress Values for Mokwa 2014

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.84	26.91	56.9600	0.85	406	0.0027	0.9917	1.0000	0.5480	0.3527	0.3457	0.0000	0.0083	0.4520
2	22.42	28.27	83.0000	0.85	406	0.0032	0.9483	0.9614	0.5293	0.5532	0.5421	0.0386	0.0517	0.4707
3	22.12	27.31	89.9100	0.85	406	0.0037	0.9810	1.0000	0.5311	0.7202	0.7058	0.0000	0.0190	0.4689
4	22.12	29.38	87.6600	0.85	406	0.0043	0.8875	0.8029	0.5330	0.7458	0.7309	0.1971	0.1125	0.4670
5	22.55	29.5	83.0000	0.85	406	0.0050	0.8463	0.7857	0.5311	0.7869	0.7711	0.2143	0.1537	0.4689
6	22.3	29.52	110.6600	0.85	406	0.0059	0.8635	0.7829	0.5251	1.2400	1.2152	0.2171	0.1365	0.4749
7	22.33	29.47	67.6000	0.85	406	0.0069	0.8650	0.7900	0.5377	0.9099	0.8917	0.2100	0.1350	0.4623
8	22.58	26.57	36.6600	0.85	406	0.0080	0.9717	1.0000	0.5704	0.6794	0.6659	0.0000	0.0283	0.4296
9	22.33	27.37	79.8800	0.85	406	0.0093	0.9900	1.0000	0.5341	1.6362	1.6035	0.0000	0.0100	0.4659
10	21.62	30.13	100.9700	0.85	406	0.0108	0.8688	0.6957	0.5264	2.0931	2.0512	0.3043	0.1312	0.4736
11	22.51	29.71	92.6600	0.85	406	0.0127	0.8335	0.7557	0.5258	2.1581	2.1149	0.2443	0.1665	0.4742
12	22.83	27.3	70.9600	0.85	406	0.0147	0.9903	1.0000	0.5406	2.3422	2.2953	0.0000	0.0097	0.4594
13	21.76	30.01	78.5900	0.85	406	0.0172	0.8672	0.7129	0.5320	2.6135	2.5612	0.2871	0.1328	0.4680
14	22.68	29.9	115.0900	0.85	406	0.0202	0.8065	0.7286	0.5240	4.1127	4.0305	0.2714	0.1935	0.4760
15	22.72	29.78	100.5900	0.85	406	0.0237	0.8125	0.7457	0.5278	4.2750	4.1895	0.2543	0.1875	0.4722
16	23.54	28.27	42.3900	0.85	406	0.0277	0.8642	0.9614	0.5660	2.3990	2.3510	0.0386	0.1358	0.4340
17	22.88	26.83	91.6700	0.85	406	0.0319	0.9903	1.0000	0.5311	6.4410	6.3122	0.0000	0.0097	0.4689
18	22.27	28.83	66.5300	0.85	406	0.0371	0.9175	0.8814	0.5406	5.1215	5.0191	0.1186	0.0825	0.4594
19	22.41	28.76	83.0200	0.85	406	0.0431	0.9122	0.8914	0.5330	7.2735	7.1280	0.1086	0.0878	0.4670
20	23.01	28.05	94.1300	0.85	406	0.0499	0.9205	0.9929	0.5278	9.5517	9.3607	0.0071	0.0795	0.4722
21	22.31	30.03	69.4300	0.85	406	0.0582	0.8245	0.7100	0.5480	7.6318	7.4791	0.2900	0.1755	0.4520
22	22.98	28.68	74.1700	0.85	406	0.0674	0.8755	0.9029	0.5341	9.7813	9.5856	0.0971	0.1245	0.4659
23	22.4	28.37	67.8400	0.85	406	0.0777	0.9423	0.9471	0.5422	11.2688	11.0435	0.0529	0.0577	0.4578
24	21.31	29.86	108.3200	0.85	406	0.0896	0.9122	0.7343	0.5246	19.4260	19.0375	0.2657	0.0878	0.4754
25	21.87	29.49	83.7500	0.85	406	0.1032	0.8980	0.7871	0.5311	17.2333	16.8887	0.2129	0.1020	0.4689
26	22.76	29.33	91.5000	0.85	406	0.1189	0.8432	0.8100	0.5293	20.3059	19.8998	0.1900	0.1568	0.4707
27	22.55	28.4	89.3900	0.85	406	0.1359	0.9287	0.9429	0.5293	24.9826	24.4829	0.0571	0.0713	0.4707
28	22.15	29.58	98.9000	0.85	406	0.1555	0.8703	0.7743	0.5271	29.4972	28.9072	0.2257	0.1297	0.4729
29	22.09	30.37	112.2600	0.85	406	0.1778	0.8155	0.6614	0.5240	35.6603	34.9471	0.3386	0.1845	0.4760
30	22.73	29.85	98.2400	0.85	406	0.2025	0.8065	0.7357	0.5285	35.4632	34.7540	0.2643	0.1935	0.4715
31	22.9	29.07	105.9600	0.85	406	0.2291	0.8523	0.8471	0.5251	45.4421	44.5333	0.1529	0.1477	0.4749

Table A58 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2014

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.5	29.24	106.3800	0.85	406	0.2578	0.8695	0.8229	0.5271	52.5711	51.5196	0.1771	0.1305	0.4729
33	22.89	28.02	87.8300	0.85	406	0.2879	0.9318	0.9971	0.5320	52.4144	51.3661	0.0029	0.0682	0.4680
34	21.35	25.23	73.9400	0.85	406	0.3152	0.8860	1.0000	0.5341	46.1219	45.1994	0.0000	0.1140	0.4659
35	21.15	30.07	94.5900	0.85	406	0.3489	0.9085	0.7043	0.5246	65.7763	64.4608	0.2957	0.0915	0.4754
36	21.69	30.74	117.5100	0.85	406	0.3854	0.8178	0.6086	0.5235	81.0779	79.4563	0.3914	0.1823	0.4765
37	22.58	30.4	78.5800	0.85	406	0.4237	0.7765	0.6571	0.5330	57.6265	56.4740	0.3429	0.2235	0.4670
38	23.55	28.11	66.7400	0.85	406	0.4611	0.8755	0.9843	0.5422	61.0958	59.8739	0.0157	0.1245	0.4578
39	22.82	30.61	94.4800	0.85	406	0.5008	0.7428	0.6271	0.5285	77.6749	76.1214	0.3729	0.2573	0.4715
40	23.3	30.44	90.9300	0.85	406	0.5404	0.7195	0.6514	0.5278	78.0423	76.4815	0.3486	0.2805	0.4722
41	22.83	30.5	100.8900	0.85	406	0.5787	0.7503	0.6429	0.5264	96.4356	94.5069	0.3571	0.2497	0.4736
42	22.61	29.56	107.1000	0.85	406	0.6144	0.8372	0.7771	0.5235	120.6091	118.1970	0.2229	0.1628	0.4765
43	23.12	27.98	70.2700	0.85	406	0.6473	0.9175	1.0000	0.5391	94.0971	92.2151	0.0000	0.0825	0.4609
44	22.26	28.47	103.8100	0.85	406	0.6781	0.9452	0.9329	0.5258	146.3050	143.3789	0.0671	0.0548	0.4742
45	22.04	29.49	86.3100	0.85	406	0.7077	0.8852	0.7871	0.5320	120.2943	117.8884	0.2129	0.1148	0.4680
46	22.96	30.55	101.2300	0.85	406	0.7366	0.7367	0.6357	0.5278	121.2642	118.8389	0.3643	0.2633	0.4722
47	22.64	27.23	79.7900	0.85	406	0.7603	0.9957	1.0000	0.5391	136.1851	133.4614	0.0000	0.0043	0.4609
48	21.67	27.97	86.1600	0.85	406	0.7818	0.9880	1.0000	0.5311	147.8102	144.8540	0.0000	0.0120	0.4689
49	22.27	28.32	81.5200	0.85	406	0.8020	0.9557	0.9543	0.5352	139.8512	137.0542	0.0457	0.0443	0.4648
50	22.01	30.31	108.2700	0.85	406	0.8211	0.8260	0.6700	0.5251	161.2592	158.0341	0.3300	0.1740	0.4749
51	22.41	30.03	110.3700	0.85	406	0.8381	0.8170	0.7100	0.5264	166.3660	163.0387	0.2900	0.1830	0.4736
52	21.98	30.44	113.2700	0.85	406	0.8531	0.8185	0.6514	0.5240	173.3263	169.8598	0.3486	0.1815	0.4760
53	22.8	31.49	108.2000	0.85	406	0.8671	0.6783	0.5014	0.5271	133.4319	130.7633	0.4986	0.3218	0.4729
54	22.96	31.2	119.2000	0.85	406	0.8791	0.6880	0.5429	0.5220	157.3849	154.2372	0.4571	0.3120	0.4780
55	22.71	32.33	128.0900	0.85	406	0.8898	0.6220	0.3814	0.5220	113.0801	110.8185	0.6186	0.3780	0.4780
56	22.07	31.62	113.9100	0.85	406	0.8986	0.7233	0.4829	0.5230	149.4945	146.5046	0.5171	0.2767	0.4770
57	23.39	28.63	102.7100	0.85	406	0.9059	0.8485	0.9100	0.5264	173.7906	170.3148	0.0900	0.1515	0.4736
58	23.78	27.68	88.2000	0.85	406	0.9120	0.8905	1.0000	0.5311	159.0881	155.9064	0.0000	0.1095	0.4689
59	23.12	29.75	91.2300	0.85	406	0.9176	0.7847	0.7500	0.5302	145.6521	142.7391	0.2500	0.2153	0.4698
60	22.8	29.76	103.7400	0.85	406	0.9223	0.8080	0.7486	0.5251	169.7846	166.3890	0.2514	0.1920	0.4749
61	23.4	29.23	89.1600	0.85	406	0.9264	0.8028	0.8243	0.5271	146.1494	143.2264	0.1757	0.1972	0.4729
62	22.98	30.85	104.7300	0.85	406	0.9300	0.7128	1.0000	0.5240	152.1234	149.0809	0.4071	0.2872	0.4760

Table A59. Cowpea Biomass Growth with Stress Values for Mokwa 2015

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.87	29.7	84.6500	0.85	398	0.0028	0.8073	0.7571	0.5302	0.3710	0.3636	0.2429	0.1927	0.4698
2	23.36	28.14	85.2400	0.85	398	0.0032	0.8875	0.9800	0.5320	0.4822	0.4726	0.0200	0.1125	0.4680
3	23.12	27.19	83.5600	0.85	398	0.0038	0.9767	1.0000	0.5330	0.6062	0.5940	0.0000	0.0233	0.4670
4	22.12	30.26	89.7500	0.85	398	0.0044	0.8215	0.6771	0.5293	0.6389	0.6262	0.3229	0.1785	0.4707
5	23.62	30.63	39.5300	0.85	398	0.0052	0.6813	0.6243	0.5660	0.2959	0.2900	0.3757	0.3188	0.4340
6	23.83	29.46	85.3100	0.85	398	0.0062	0.7533	0.7914	0.5311	0.7817	0.7660	0.2086	0.2467	0.4689
7	23.04	28.6	61.9400	0.85	398	0.0072	0.8770	0.9143	0.5528	0.8048	0.7887	0.0857	0.1230	0.4472
8	22.93	30.14	78.5900	0.85	398	0.0085	0.7697	0.6943	0.5341	1.0202	0.9998	0.3057	0.2303	0.4659
9	23.81	29.5	78.0900	0.85	398	0.0100	0.7517	0.7857	0.5341	1.1675	1.1442	0.2143	0.2483	0.4659
10	23.47	28.09	60.2700	0.85	398	0.0117	0.8830	0.9871	0.5480	1.2694	1.2440	0.0129	0.1170	0.4520
11	22.62	27.57	82.8800	0.85	398	0.0136	0.9858	1.0000	0.5352	2.2089	2.1647	0.0000	0.0142	0.4648
12	21.5	30.42	115.5700	0.85	398	0.0160	0.8560	0.6543	0.5220	3.0526	2.9915	0.3457	0.1440	0.4780
13	22.99	30.05	56.4500	0.85	398	0.0188	0.7720	0.7071	0.5503	1.6672	1.6338	0.2929	0.2280	0.4497
14	23.35	27.51	80.7900	0.85	398	0.0218	0.9355	1.0000	0.5391	3.2944	3.2285	0.0000	0.0645	0.4609
15	22.85	27.01	84.7500	0.85	398	0.0252	0.9953	1.0000	0.5330	4.2050	4.1209	0.0000	0.0047	0.4670
16	22.27	29.36	85.8000	0.85	398	0.0294	0.8778	0.8057	0.5330	4.3775	4.2900	0.1943	0.1222	0.4670
17	22.51	28.55	51.0900	0.85	398	0.0342	0.9205	0.9214	0.5528	3.2943	3.2284	0.0786	0.0795	0.4472
18	22.58	28.58	90.5100	0.85	398	0.0397	0.9130	0.9171	0.5302	6.4485	6.3195	0.0829	0.0870	0.4698
19	22.52	28.94	89.6400	0.85	398	0.0462	0.8905	0.8657	0.5285	7.2164	7.0720	0.1343	0.1095	0.4715
20	23.13	26.55	95.7600	0.85	398	0.0531	0.9893	1.0000	0.5293	9.8730	9.6755	0.0000	0.0107	0.4707
21	22.26	30.12	95.6100	0.85	398	0.0619	0.8215	0.6971	0.5258	9.4657	9.2764	0.3029	0.1785	0.4742
22	22.65	30.48	110.6200	0.85	398	0.0721	0.7653	0.6457	0.5225	11.8258	11.5893	0.3543	0.2347	0.4775
23	23.05	29.89	85.0900	0.85	398	0.0839	0.7795	0.7300	0.5293	10.9199	10.7015	0.2700	0.2205	0.4707
24	22.82	28.97	51.1500	0.85	398	0.0969	0.8658	0.8614	0.5556	8.8359	8.6592	0.1386	0.1342	0.4444
25	22.09	29.44	97.0000	0.85	398	0.1115	0.8852	0.7943	0.5302	18.8143	18.4380	0.2057	0.1148	0.4698
26	21.94	29.6	92.5600	0.85	398	0.1280	0.8845	0.7714	0.5302	20.5891	20.1773	0.2286	0.1155	0.4698
27	23.54	30.94	95.9100	0.85	398	0.1483	0.6640	0.5800	0.5258	18.4042	18.0361	0.4200	0.3360	0.4742
28	23.44	30.44	42.2900	0.85	398	0.1708	0.7090	0.6514	0.5660	10.7407	10.5259	0.3486	0.2910	0.4340
29	23.26	30.72	105.1100	0.85	398	0.1959	0.7015	0.6114	0.5246	28.0776	27.5161	0.3886	0.2985	0.4754
30	23.29	30.53	109.2300	0.85	398	0.2235	0.7135	0.6386	0.5230	33.7554	33.0803	0.3614	0.2865	0.4770
31	23.48	28.48	86.9300	0.85	398	0.2519	0.8530	0.9314	0.5320	36.8317	36.0950	0.0686	0.1470	0.4680

Table A59 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2015

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.96	29.02	71.4500	0.85	398	0.2826	0.8515	0.8543	0.5480	34.9203	34.2219	0.1457	0.1485	0.4520
33	23.58	28.87	102.4900	0.85	398	0.3159	0.8162	0.8757	0.5240	51.3130	50.2868	0.1243	0.1838	0.4760
34	22.9	25.71	69.3700	0.85	398	0.3467	0.9537	1.0000	0.5440	46.2411	45.3162	0.0000	0.0463	0.4560
35	22.03	29.69	93.3000	0.85	398	0.3823	0.8710	0.7586	0.5278	60.7687	59.5533	0.2414	0.1290	0.4722
36	22.49	29.62	63.9300	0.85	398	0.4195	0.8418	0.7686	0.5391	45.1017	44.1997	0.2314	0.1583	0.4609
37	23.54	29.69	107.5700	0.85	398	0.4587	0.7577	0.7586	0.5258	72.8513	71.3943	0.2414	0.2423	0.4742
38	22.94	29.42	83.6500	0.85	398	0.4971	0.8230	0.7971	0.5320	67.4734	66.1240	0.2029	0.1770	0.4680
39	22.87	29.67	121.6200	0.85	398	0.5354	0.8095	0.7614	0.5235	102.2641	100.2188	0.2386	0.1905	0.4765
40	22.96	30.87	110.4100	0.85	398	0.5744	0.7128	0.5900	0.5240	87.7871	86.0314	0.4100	0.2872	0.4760
41	24.64	30.54	72.9800	0.85	398	0.6136	0.6115	0.6371	0.5330	54.0874	53.0057	0.3629	0.3885	0.4670
42	23.55	29.8	115.3900	0.85	398	0.6489	0.7487	0.7429	0.5230	108.6496	106.4766	0.2571	0.2513	0.4770
43	22.27	29.98	82.3200	0.85	398	0.6810	0.8313	0.7171	0.5302	91.5613	89.7301	0.2829	0.1687	0.4698
44	23.06	30.37	118.5900	0.85	398	0.7120	0.7428	0.6614	0.5240	121.7962	119.3603	0.3386	0.2573	0.4760
45	23.94	31.91	93.3200	0.85	398	0.7426	0.5612	0.4414	0.5278	63.6256	62.3531	0.5586	0.4388	0.4722
46	22.91	30.83	105.3600	0.85	398	0.7686	0.7195	0.5957	0.5258	113.5293	111.2587	0.4043	0.2805	0.4742
47	22.87	31.58	99.2200	0.85	398	0.7926	0.6662	0.4886	0.5271	94.8646	92.9673	0.5114	0.3338	0.4729
48	22.6	31.81	79.5300	0.85	398	0.8139	0.6693	0.4557	0.5341	73.1609	71.6977	0.5443	0.3307	0.4659
49	23.76	30.95	76.7500	0.85	398	0.8329	0.6467	0.5786	0.5341	81.8286	80.1920	0.4214	0.3533	0.4659
50	23.73	28.65	114.3500	0.85	398	0.8485	0.8215	0.9071	0.5246	154.9567	151.8576	0.0929	0.1785	0.4754
51	23.94	27.4	88.0900	0.85	398	0.8619	0.8995	1.0000	0.5341	135.1684	132.4650	0.0000	0.1005	0.4659
52	23.15	31.17	114.7400	0.85	398	0.8747	0.6760	0.5471	0.5240	131.7484	129.1134	0.4529	0.3240	0.4760
53	24.18	29.8	95.2300	0.85	398	0.8856	0.7015	0.7429	0.5278	115.7254	113.4109	0.2571	0.2985	0.4722
54	23.62	29.16	85.0300	0.85	398	0.8948	0.7915	0.8343	0.5311	118.5230	116.1525	0.1657	0.2085	0.4689
55	22.56	29.31	79.2500	0.85	398	0.9025	0.8598	0.8129	0.5302	120.8250	118.4085	0.1871	0.1402	0.4698
56	22.63	30.35	99.6500	0.85	398	0.9094	0.7765	0.6643	0.5258	137.1145	134.3723	0.3357	0.2235	0.4742
57	22.64	31.37	117.7900	0.85	398	0.9156	0.6992	0.5186	0.5235	144.9236	142.0251	0.4814	0.3008	0.4765
58	23.81	32.3	117.0200	0.85	398	0.9211	0.5418	0.3857	0.5235	83.4686	81.7993	0.6143	0.4582	0.4765
59	23.94	30.19	114.9500	0.85	398	0.9255	0.6902	0.6871	0.5220	142.0575	139.2164	0.3129	0.3098	0.4780
60	23.45	32.02	128.8600	0.85	398	0.9294	0.5898	0.4257	0.5220	111.4313	109.2027	0.5743	0.4102	0.4780
61	23.87	31.19	96.9500	0.85	398	0.9326	0.6205	0.5443	0.5285	109.8977	107.6997	0.4557	0.3795	0.4715
62	23.46	32.15	102.9400	0.85	398	0.9354	0.5793	0.4071	0.5258	84.1616	82.4783	0.5929	0.4207	0.4742

Table A60. Cowpea Biomass Growth with Stress Values for Mokwa 2016

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.56	29.3	82.3100	0.85	401	0.0028	0.8605	0.8143	0.5377	0.4074	0.3992	0.1857	0.1395	0.4623
2	23.19	29.24	93.3500	0.85	401	0.0032	0.8178	0.8229	0.5311	0.5097	0.4995	0.1771	0.1823	0.4689
3	23.25	28.01	90.7600	0.85	401	0.0038	0.9055	0.9986	0.5293	0.6391	0.6263	0.0014	0.0945	0.4707
4	22.14	29.19	87.1500	0.85	401	0.0044	0.9003	0.8300	0.5352	0.7210	0.7066	0.1700	0.0997	0.4648
5	23.01	30.39	83.7000	0.85	401	0.0052	0.7450	0.6586	0.5311	0.6714	0.6580	0.3414	0.2550	0.4689
6	23.05	29.56	112.2700	0.85	401	0.0061	0.8043	0.7771	0.5258	1.1318	1.1092	0.2229	0.1957	0.4742
7	22.58	30.19	89.5600	0.85	401	0.0072	0.7923	0.6871	0.5293	1.0537	1.0326	0.3129	0.2077	0.4707
8	22.37	30.24	101.0500	0.85	401	0.0085	0.8043	0.6800	0.5251	1.4074	1.3793	0.3200	0.1957	0.4749
9	23.18	29.76	97.2000	0.85	401	0.0100	0.7795	0.7486	0.5264	1.5483	1.5173	0.2514	0.2205	0.4736
10	23.44	28.54	72.3000	0.85	401	0.0117	0.8515	0.9229	0.5377	1.5052	1.4750	0.0771	0.1485	0.4623
11	22.62	29.32	85.6700	0.85	401	0.0137	0.8545	0.8114	0.5293	2.0626	2.0213	0.1886	0.1455	0.4707
12	22.72	28.01	41.4100	0.85	401	0.0159	0.9452	0.9986	0.5587	1.3540	1.3270	0.0014	0.0548	0.4413
13	22.57	26.55	71.5800	0.85	401	0.0184	0.9707	1.0000	0.5391	2.6758	2.6223	0.0000	0.0293	0.4609
14	21.64	26.62	86.1600	0.85	401	0.0211	0.9420	1.0000	0.5293	3.5245	3.4540	0.0000	0.0580	0.4707
15	21.93	29.96	103.3200	0.85	401	0.0247	0.8583	0.7200	0.5264	4.4741	4.3846	0.2800	0.1418	0.4736
16	22.87	28.56	86.4300	0.85	401	0.0287	0.8928	0.9200	0.5293	4.5609	4.4697	0.0800	0.1072	0.4707
17	22.46	29.02	83.4600	0.85	401	0.0335	0.8890	0.8543	0.5311	5.1236	5.0211	0.1457	0.1110	0.4689
18	22.62	28.13	74.9300	0.85	401	0.0388	0.9438	0.9814	0.5341	5.6937	5.5798	0.0186	0.0563	0.4659
19	21.61	28.3	103.8800	0.85	401	0.0448	0.9970	0.9571	0.5235	9.4298	9.2412	0.0429	0.0030	0.4765
20	22.62	29.86	95.0600	0.85	401	0.0522	0.8140	0.7343	0.5271	8.2759	8.1104	0.2657	0.1860	0.4729
21	23.32	29.33	105.9600	0.85	401	0.0609	0.8013	0.8100	0.5251	10.5485	10.3375	0.1900	0.1987	0.4749
22	23.3	28.19	74.7100	0.85	401	0.0705	0.8882	0.9729	0.5320	9.6713	9.4779	0.0271	0.1118	0.4680
23	22.26	28.51	96.7000	0.85	401	0.0812	0.9422	0.9271	0.5278	15.1776	14.8740	0.0729	0.0578	0.4722
24	22.82	30.02	113.2400	0.85	401	0.0943	0.7870	0.7114	0.5251	17.1448	16.8019	0.2886	0.2130	0.4749
25	23.4	30.19	102.6200	0.85	401	0.1096	0.7307	0.6871	0.5264	16.8006	16.4646	0.3129	0.2693	0.4736
26	23.51	28.28	90.6100	0.85	401	0.1259	0.8657	0.9600	0.5264	20.2013	19.7972	0.0400	0.1343	0.4736
27	23.3	28.51	83.7200	0.85	401	0.1444	0.8642	0.9271	0.5293	21.4760	21.0465	0.0729	0.1358	0.4707
28	23.35	28.89	84.0200	0.85	401	0.1652	0.8320	0.8729	0.5311	23.8243	23.3478	0.1271	0.1680	0.4689
29	22.79	28.01	61.0500	0.85	401	0.1873	0.9400	0.9986	0.5459	22.7926	22.3367	0.0014	0.0600	0.4541
30	22.8	28.48	101.5500	0.85	401	0.2119	0.9040	0.9314	0.5271	39.8331	39.0364	0.0686	0.0960	0.4729
31	22.08	27.72	91.2300	0.85	401	0.2375	0.9933	1.0000	0.5285	44.1823	43.2987	0.0000	0.0067	0.4715

Table A60 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2016

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.48	29.34	108.3200	0.85	401	0.2660	0.9385	0.8086	0.5258	55.2166	54.1122	0.1914	0.0615	0.4742
33	22.55	29.65	96.0200	0.85	401	0.2978	0.8350	0.7643	0.5293	49.1027	48.1207	0.2357	0.1650	0.4707
34	22.65	29.37	127.8500	0.85	401	0.3315	0.8485	0.8043	0.5203	72.6861	71.2323	0.1957	0.1515	0.4797
35	22.13	29.9	106.8900	0.85	401	0.3669	0.8477	0.7286	0.5251	67.8136	66.4574	0.2714	0.1523	0.4749
36	23.13	29.07	91.5400	0.85	401	0.4037	0.8350	0.8471	0.5320	63.7697	62.4943	0.1529	0.1650	0.4680
37	22.61	29.35	71.9200	0.85	401	0.4412	0.8530	0.8071	0.5352	56.2683	55.1429	0.1929	0.1470	0.4648
38	22.2	29.5	79.4500	0.85	401	0.4788	0.8725	0.7857	0.5352	68.9973	67.6174	0.2143	0.1275	0.4648
39	23.44	29.44	82.7400	0.85	401	0.5177	0.7840	0.7943	0.5311	69.2759	67.8904	0.2057	0.2160	0.4689
40	23.15	29.55	98.3500	0.85	401	0.5558	0.7975	0.7786	0.5258	89.0388	87.2580	0.2214	0.2025	0.4742
41	22.8	28.3	79.6000	0.85	401	0.5912	0.9175	0.9571	0.5341	89.5694	87.7780	0.0429	0.0825	0.4659
42	22.85	27.77	98.7700	0.85	401	0.6247	0.9535	1.0000	0.5271	120.4483	118.0393	0.0000	0.0465	0.4729
43	22.56	30.67	94.3000	0.85	401	0.6592	0.7577	0.6186	0.5271	96.4447	94.5158	0.3814	0.2423	0.4729
44	22.76	29.83	107.6600	0.85	401	0.6910	0.8057	0.7386	0.5246	122.1456	119.7027	0.2614	0.1943	0.4754
45	22.69	30.76	120.2300	0.85	401	0.7213	0.7412	0.6057	0.5240	130.8476	128.2306	0.3943	0.2588	0.4760
46	23.37	31.56	120.8500	0.85	401	0.7503	0.6303	0.4914	0.5216	109.0842	106.9025	0.5086	0.3698	0.4784
47	23.44	31.52	103.2800	0.85	401	0.7764	0.6280	0.4971	0.5240	97.2515	95.3065	0.5029	0.3720	0.4760
48	23.16	29.52	99.8000	0.85	402	0.7984	0.7990	0.7829	0.5264	132.1793	129.5357	0.2171	0.2010	0.4736
49	22.75	30.09	98.7700	0.85	402	0.8182	0.7870	0.7014	0.5235	131.3049	128.6788	0.2986	0.2130	0.4765
50	22.67	30.14	83.7800	0.85	402	0.8357	0.7892	0.6943	0.5285	115.1965	112.8925	0.3057	0.2108	0.4715
51	23.38	31.51	111.0900	0.85	402	0.8521	0.6333	0.4986	0.5220	117.8765	115.5189	0.5014	0.3668	0.4780
52	23.34	32.48	119.8400	0.85	402	0.8668	0.5635	0.3600	0.5225	83.1086	81.4464	0.6400	0.4365	0.4775
53	23.5	30.23	93.0500	0.85	402	0.8787	0.7202	0.6814	0.5264	122.2666	119.8213	0.3186	0.2798	0.4736
54	23.94	31.23	69.3800	0.85	402	0.8895	0.6123	0.5386	0.5341	79.5857	77.9940	0.4614	0.3878	0.4659
55	23.26	30.24	120.0100	0.85	402	0.8983	0.7375	0.6800	0.5240	164.3146	161.0283	0.3200	0.2625	0.4760
56	23.23	28.37	103.2000	0.85	402	0.9055	0.8800	0.9471	0.5278	171.1810	167.7574	0.0529	0.1200	0.4722
57	22.51	30.85	102.0700	0.85	402	0.9121	0.7480	0.5929	0.5264	144.5718	141.6804	0.4071	0.2520	0.4736
58	23.15	29.35	86.4100	0.85	402	0.9176	0.8125	0.8071	0.5293	134.4909	131.8011	0.1929	0.1875	0.4707
59	23.02	30.69	104.5700	0.85	402	0.9225	0.7217	0.6157	0.5246	144.0355	141.1547	0.3843	0.2783	0.4754
60	23.3	31.49	116.4800	0.85	402	0.9267	0.6408	0.5014	0.5240	136.7874	134.0517	0.4986	0.3592	0.4760
61	23.42	31.04	111.8800	0.85	402	0.9303	0.6655	0.5657	0.5240	143.1577	140.2946	0.4343	0.3345	0.4760
62	22.65	31.57	119.9700	0.85	402	0.9334	0.6835	0.4900	0.5235	147.9126	144.9544	0.5100	0.3165	0.4765

Table A61. Cowpea Biomass Growth with Stress Values for Mokwa 2017

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.26	28.58	67.7700	0.85	404	0.0028	0.8620	0.9171	0.5320	0.3476	0.3407	0.0829	0.1380	0.4680
2	22.9	29.01	52.1500	0.85	404	0.0032	0.8568	0.8557	0.5480	0.3211	0.3147	0.1443	0.1432	0.4520
3	23.1	26.69	35.2800	0.85	404	0.0037	0.9930	1.0000	0.5587	0.2977	0.2918	0.0000	0.0070	0.4413
4	22.28	28.94	79.7700	0.85	404	0.0044	0.9085	0.8657	0.5285	0.6807	0.6671	0.1343	0.0915	0.4715
5	22.55	30.3	103.5100	0.85	404	0.0052	0.7862	0.6714	0.5216	0.8882	0.8705	0.3286	0.2138	0.4784
6	23.01	30.71	97.1200	0.85	404	0.0061	0.7210	0.6129	0.5216	0.9037	0.8856	0.3871	0.2790	0.4784
7	23.06	28.4	70.8900	0.85	404	0.0071	0.8905	0.9429	0.5330	0.9733	0.9539	0.0571	0.1095	0.4670
8	22.88	28.11	68.7000	0.85	404	0.0083	0.9258	0.9843	0.5364	1.1508	1.1278	0.0157	0.0742	0.4636
9	22.38	28.53	81.9300	0.85	404	0.0097	0.9318	0.9243	0.5311	1.5938	1.5619	0.0757	0.0682	0.4689
10	22.52	31.84	124.9800	0.85	404	0.0115	0.6730	0.4514	0.5207	1.7692	1.7338	0.5486	0.3270	0.4793
11	23.37	29.98	106.0500	0.85	404	0.0135	0.7487	0.7171	0.5258	2.2932	2.2473	0.2829	0.2513	0.4742
12	23.26	27.43	55.1400	0.85	404	0.0157	0.9483	1.0000	0.5440	1.8172	1.7809	0.0000	0.0517	0.4560
13	22.25	28.81	76.9600	0.85	404	0.0183	0.9205	0.8843	0.5352	2.8214	2.7650	0.1157	0.0795	0.4648
14	22.56	29.15	66.5800	0.85	404	0.0214	0.8718	0.8357	0.5440	2.7442	2.6893	0.1643	0.1282	0.4560
15	22.56	28.62	74.2100	0.85	404	0.0249	0.9115	0.9114	0.5364	3.6717	3.5982	0.0886	0.0885	0.4636
16	22.91	28.62	64.3400	0.85	404	0.0290	0.8852	0.9114	0.5391	3.6216	3.5491	0.0886	0.1148	0.4609
17	22.9	27.92	68.0200	0.85	404	0.0337	0.9385	1.0000	0.5341	4.6672	4.5739	0.0000	0.0615	0.4659
18	22.72	29.17	75.8500	0.85	403	0.0393	0.8583	0.8329	0.5320	5.4458	5.3369	0.1671	0.1418	0.4680
19	22.37	30.12	104.1600	0.85	403	0.0459	0.8132	0.6971	0.5246	8.1600	7.9968	0.3029	0.1868	0.4754
20	22.69	26.57	97.9800	0.85	403	0.0527	0.9753	1.0000	0.5311	10.7066	10.4925	0.0000	0.0247	0.4689
21	22.37	29.95	72.3400	0.85	403	0.0613	0.8260	0.7214	0.5311	7.7929	7.6370	0.2786	0.1740	0.4689
22	22.61	29.98	106.8400	0.85	403	0.0714	0.8057	0.7171	0.5240	12.8913	12.6334	0.2829	0.1943	0.4760
23	22.64	30.86	85.2700	0.85	403	0.0833	0.7375	0.5914	0.5311	11.1318	10.9092	0.4086	0.2625	0.4689
24	23.18	28.9	71.3400	0.85	403	0.0963	0.8440	0.8714	0.5352	12.4207	12.1723	0.1286	0.1560	0.4648
25	22.99	27.86	80.7800	0.85	403	0.1105	0.9363	1.0000	0.5330	17.8274	17.4708	0.0000	0.0637	0.4670
26	22.23	31.7	98.1400	0.85	403	0.1281	0.7053	0.4714	0.5258	16.7382	16.4035	0.5286	0.2947	0.4742
27	23.33	30.95	125.8100	0.85	403	0.1483	0.6790	0.5786	0.5220	26.4839	25.9542	0.4214	0.3210	0.4780
28	24	30.63	96.7600	0.85	403	0.1713	0.6528	0.6243	0.5251	22.7515	22.2965	0.3757	0.3472	0.4749
29	23.22	30.02	116.6200	0.85	403	0.1959	0.7570	0.7114	0.5220	36.1470	35.4241	0.2886	0.2430	0.4780
30	22.8	28.56	112.3300	0.85	403	0.2214	0.8980	0.9200	0.5235	46.8108	45.8746	0.0800	0.1020	0.4765
31	22.23	30.74	111.0500	0.85	403	0.2506	0.7773	0.6086	0.5240	45.3854	44.4777	0.3914	0.2227	0.4760

Table A61 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2017

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.59	28.89	80.2900	0.85	403	0.2807	0.8890	0.8729	0.5285	42.4032	41.5552	0.1271	0.1110	0.4715
33	22.98	26.68	69.5200	0.85	403	0.3109	0.9887	1.0000	0.5406	46.2556	45.3305	0.0000	0.0113	0.4594
34	22.55	29.7	87.3400	0.85	403	0.3456	0.8313	0.7571	0.5285	53.0863	52.0246	0.2429	0.1687	0.4715
35	22.45	30.55	90.3100	0.85	403	0.3826	0.7750	0.6357	0.5278	56.5801	55.4485	0.3643	0.2250	0.4722
36	24.15	29.69	103.3800	0.85	403	0.4218	0.7120	0.7586	0.5251	65.2738	63.9683	0.2414	0.2880	0.4749
37	23.66	28.71	81.4200	0.85	403	0.4600	0.8222	0.8986	0.5302	65.3682	64.0609	0.1014	0.1778	0.4698
38	22.98	29.37	75.2700	0.85	403	0.4984	0.8237	0.8043	0.5364	66.3658	65.0385	0.1957	0.1763	0.4636
39	21.74	30.04	98.8300	0.85	403	0.5358	0.8665	0.7086	0.5264	96.7034	94.7694	0.2914	0.1335	0.4736
40	22.37	30.22	98.3400	0.85	403	0.5734	0.8057	0.6829	0.5264	95.7549	93.8398	0.3171	0.1943	0.4736
41	23.62	31.05	99.4400	0.85	403	0.6120	0.6497	0.5643	0.5264	83.3374	81.6706	0.4357	0.3503	0.4736
42	23.72	29.82	109.3400	0.85	403	0.6476	0.7345	0.7400	0.5240	109.1070	106.9249	0.2600	0.2655	0.4760
43	22.93	29.98	120.6600	0.85	403	0.6805	0.7818	0.7171	0.5220	134.1374	131.4547	0.2829	0.2182	0.4780
44	23.24	29.74	113.3300	0.85	403	0.7111	0.7765	0.7514	0.5220	130.7834	128.1678	0.2486	0.2235	0.4780
45	23.3	30.9	81.5000	0.85	403	0.7404	0.6850	0.5857	0.5320	88.0374	86.2766	0.4143	0.3150	0.4680
46	23.49	29.44	104.6600	0.85	403	0.7661	0.7803	0.7943	0.5240	131.2346	128.6099	0.2057	0.2198	0.4760
47	22.88	31.3	104.6000	0.85	403	0.7901	0.6865	0.5286	0.5235	118.8991	116.5212	0.4714	0.3135	0.4765
48	22.75	30.37	119.2100	0.85	404	0.8109	0.7660	0.6614	0.5211	156.7855	153.6498	0.3386	0.2340	0.4789
49	22.98	30.51	108.6600	0.85	404	0.8297	0.7382	0.6414	0.5246	141.8432	139.0063	0.3586	0.2618	0.4754
50	24.05	30.17	126.4000	0.85	404	0.8465	0.6835	0.6900	0.5216	154.9758	151.8763	0.3100	0.3165	0.4784
51	23.82	28.77	109.1200	0.85	404	0.8606	0.8057	0.8900	0.5264	161.8358	158.5990	0.1100	0.1943	0.4736
52	23.77	30.72	78.7000	0.85	404	0.8736	0.6633	0.6114	0.5377	99.6275	97.6349	0.3886	0.3367	0.4623
53	23.38	30.55	96.6500	0.85	404	0.8847	0.7053	0.6357	0.5271	129.1447	126.5618	0.3643	0.2947	0.4729
54	24.03	31.16	106.9600	0.85	404	0.8946	0.6108	0.5486	0.5240	124.4270	121.9385	0.4514	0.3892	0.4760
55	23.52	28.76	92.3900	0.85	404	0.9025	0.8290	0.8914	0.5278	148.2269	145.2623	0.1086	0.1710	0.4722
56	23.7	29.49	116.1600	0.85	404	0.9094	0.7608	0.7871	0.5220	170.4473	167.0383	0.2129	0.2392	0.4780
57	23.19	30.18	99.2600	0.85	404	0.9154	0.7472	0.6886	0.5264	145.2231	142.3187	0.3114	0.2528	0.4736
58	23.24	30.02	105.2800	0.85	404	0.9206	0.7555	0.7114	0.5235	155.7313	152.6167	0.2886	0.2445	0.4765
59	23.73	28.29	75.7600	0.85	404	0.9248	0.8485	0.9586	0.5352	129.2734	126.6879	0.0414	0.1515	0.4648
60	23.43	31.15	115.3400	0.85	404	0.9287	0.6565	0.5500	0.5220	149.1483	146.1654	0.4500	0.3435	0.4780
61	22.4	31.59	105.9700	0.85	404	0.9320	0.7008	0.4871	0.5258	136.9804	134.2408	0.5129	0.2992	0.4742
62	19.99	31.57	116.2200	0.85	404	0.9346	0.8830	0.4900	0.5207	190.9403	187.1215	0.5100	0.1170	0.4793

Table A62. Cowpea Biomass Growth with Stress Values for Mokwa 2018

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.57	29.82	110.7000	0.85	406	0.0028	0.8208	0.7400	0.5235	0.5491	0.5381	0.2600	0.1793	0.4765
2	23.21	27.36	84.8700	0.85	406	0.0032	0.9572	1.0000	0.5341	0.5834	0.5717	0.0000	0.0428	0.4659
3	22.57	26.87	56.2200	0.85	406	0.0037	0.9813	1.0000	0.5556	0.4772	0.4677	0.0000	0.0187	0.4444
4	22.25	29.33	46.5900	0.85	406	0.0044	0.8815	0.8100	0.5556	0.4157	0.4074	0.1900	0.1185	0.4444
5	22.56	27.89	68.5400	0.85	406	0.0051	0.9662	1.0000	0.5422	0.7613	0.7461	0.0000	0.0338	0.4578
6	22.55	27.54	70.9500	0.85	406	0.0059	0.9932	1.0000	0.5311	0.9215	0.9030	0.0000	0.0068	0.4689
7	22.74	27.05	99.4800	0.85	406	0.0068	0.9930	1.0000	0.5264	1.4845	1.4548	0.0000	0.0070	0.4736
8	22.75	26.76	79.4400	0.85	406	0.0079	0.9837	1.0000	0.5377	1.3887	1.3609	0.0000	0.0163	0.4623
9	22.34	28.2	55.2500	0.85	406	0.0092	0.9595	0.9714	0.5660	1.1537	1.1306	0.0286	0.0405	0.4340
10	22.65	25.95	53.1300	0.85	406	0.0106	0.9533	1.0000	0.5528	1.2402	1.2154	0.0000	0.0467	0.4472
11	22.26	28.24	80.9500	0.85	406	0.0123	0.9625	0.9657	0.5311	2.1308	2.0881	0.0343	0.0375	0.4689
12	22.08	29.96	105.0900	0.85	406	0.0144	0.8470	0.7200	0.5225	2.8046	2.7485	0.2800	0.1530	0.4775
13	22.54	29.92	101.1700	0.85	406	0.0169	0.8155	0.7257	0.5278	3.0806	3.0190	0.2743	0.1845	0.4722
14	22.89	30.02	113.5500	0.85	406	0.0199	0.7818	0.7114	0.5225	3.8556	3.7785	0.2886	0.2182	0.4775
15	22.88	28.06	66.1400	0.85	406	0.0231	0.9295	0.9914	0.5422	3.2237	3.1592	0.0086	0.0705	0.4578
16	22.27	27.93	75.8100	0.85	406	0.0268	0.9850	1.0000	0.5364	4.4871	4.3974	0.0000	0.0150	0.4636
17	21.65	29.15	82.2300	0.85	406	0.0311	0.9400	0.8357	0.5320	5.3484	5.2414	0.1643	0.0600	0.4680
18	22.65	29.15	62.4500	0.85	405	0.0363	0.8650	0.8357	0.5364	4.3310	4.2444	0.1643	0.1350	0.4636
19	22.19	28.05	78.9200	0.85	405	0.0419	0.9820	0.9929	0.5320	7.1239	6.9814	0.0071	0.0180	0.4680
20	22.28	27.64	95.2000	0.85	405	0.0483	0.9973	1.0000	0.5258	9.9462	9.7473	0.0000	0.0027	0.4742
21	22.22	29.36	99.2600	0.85	405	0.0561	0.8815	0.8057	0.5293	10.7136	10.4993	0.1943	0.1185	0.4707
22	23.44	27.83	95.1100	0.85	405	0.0650	0.9048	1.0000	0.5271	12.1456	11.9027	0.0000	0.0952	0.4729
23	23.51	28.76	90.0800	0.85	405	0.0754	0.8297	0.8914	0.5302	12.3222	12.0757	0.1086	0.1703	0.4698
24	23.15	26.48	74.1600	0.85	405	0.0864	0.9877	1.0000	0.5377	14.0248	13.7443	0.0000	0.0123	0.4623
25	22.07	28.51	86.5900	0.85	405	0.0992	0.9565	0.9271	0.5341	18.0817	17.7201	0.0729	0.0435	0.4659
26	21.61	26.55	79.5100	0.85	405	0.1124	0.9387	1.0000	0.5311	18.3619	17.9946	0.0000	0.0613	0.4689
27	20.92	29.44	71.2300	0.85	405	0.1283	0.9730	0.7943	0.5377	19.7130	19.3188	0.2057	0.0270	0.4623
28	22.15	28.45	99.3100	0.85	405	0.1463	0.9550	0.9357	0.5271	30.1407	29.5379	0.0643	0.0450	0.4729
29	22.12	31.33	119.6400	0.85	405	0.1682	0.7412	0.5243	0.5211	32.0400	31.3992	0.4757	0.2588	0.4789
30	23.34	29.29	95.2700	0.85	405	0.1920	0.8028	0.8157	0.5293	32.0346	31.3939	0.1843	0.1972	0.4707
31	23.15	29.25	106.6800	0.85	405	0.2180	0.8200	0.8214	0.5230	41.1062	40.2841	0.1786	0.1800	0.4770

Table A62 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2018

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	21.77	29.94	108.2200	0.85	405	0.2457	0.8717	0.7229	0.5235	50.0265	49.0260	0.2771	0.1283	0.4765
33	22.78	29.05	102.3300	0.85	405	0.2758	0.8628	0.8500	0.5235	52.5470	51.4960	0.1500	0.1372	0.4765
34	23.12	30.03	101.5600	0.85	405	0.3093	0.7637	0.7100	0.5246	51.8880	50.8502	0.2900	0.2363	0.4754
35	23.32	29.12	92.5500	0.85	405	0.3441	0.8170	0.8400	0.5285	56.6896	55.5558	0.1600	0.1830	0.4715
36	22.39	29.97	108.3900	0.85	405	0.3803	0.8230	0.7186	0.5235	73.2135	71.7492	0.2814	0.1770	0.4765
37	23.08	31.87	116.6500	0.85	405	0.4208	0.6287	0.4471	0.5225	56.8884	55.7506	0.5529	0.3713	0.4775
38	23.89	31.05	115.4800	0.85	405	0.4620	0.6295	0.5643	0.5225	72.3433	70.8965	0.4357	0.3705	0.4775
39	23.58	29.58	103.5100	0.85	405	0.5014	0.7630	0.7743	0.5251	85.7264	84.0118	0.2257	0.2370	0.4749
40	23.26	28.48	54.6200	0.85	405	0.5387	0.8695	0.9314	0.5503	58.0402	56.8794	0.0686	0.1305	0.4497
41	23.04	31.62	102.4700	0.85	405	0.5786	0.6505	0.4829	0.5258	76.7679	75.2325	0.5171	0.3495	0.4742
42	23.08	30.02	113.2600	0.85	405	0.6153	0.7675	0.7114	0.5251	115.7852	113.4695	0.2886	0.2325	0.4749
43	22.04	30.8	112.5300	0.85	405	0.6499	0.7870	0.6000	0.5235	124.2128	121.7285	0.4000	0.2130	0.4765
44	22.58	30.32	98.8800	0.85	405	0.6826	0.7825	0.6686	0.5264	114.6211	112.3287	0.3314	0.2175	0.4736
45	23.69	28.9	91.0200	0.85	405	0.7128	0.8057	0.8714	0.5293	114.0776	111.7961	0.1286	0.1943	0.4707
46	23.11	30.83	88.7300	0.85	405	0.7417	0.7045	0.5957	0.5271	100.7448	98.7299	0.4043	0.2955	0.4729
47	23.57	31.04	116.7100	0.85	405	0.7685	0.6543	0.5657	0.5216	126.1671	123.6437	0.4343	0.3458	0.4784
48	23.87	29.07	96.2400	0.85	406	0.7915	0.7795	0.8471	0.5264	130.7060	128.0918	0.1529	0.2205	0.4736
49	23.44	28.65	96.2600	0.85	406	0.8115	0.8432	0.9071	0.5302	146.0515	143.1305	0.0929	0.1568	0.4698
50	23.43	29.05	110.4400	0.85	406	0.8297	0.8140	0.8500	0.5230	163.1166	159.8542	0.1500	0.1860	0.4770
51	23.23	29.28	64.2300	0.85	406	0.8457	0.8117	0.8171	0.5341	98.4847	96.5150	0.1829	0.1883	0.4659
52	23.72	28.55	87.0300	0.85	406	0.8598	0.8298	0.9214	0.5311	137.8908	135.1330	0.0786	0.1702	0.4689
53	23.36	29.91	102.5700	0.85	406	0.8725	0.7548	0.7271	0.5246	148.1699	145.2065	0.2729	0.2452	0.4754
54	22.47	31.15	110.4000	0.85	406	0.8836	0.7285	0.5500	0.5246	155.9025	152.7844	0.4500	0.2715	0.4754
55	23.74	27.77	119.7800	0.85	406	0.8927	0.8868	1.0000	0.5220	206.9957	202.8558	0.0000	0.1132	0.4780
56	22.8	29.03	106.3900	0.85	406	0.9007	0.8628	0.8529	0.5251	181.5673	177.9359	0.1471	0.1372	0.4749
57	23.01	29.96	86.5900	0.85	406	0.9079	0.7773	0.7200	0.5320	135.9414	133.2226	0.2800	0.2227	0.4680
58	22.95	29.44	112.7300	0.85	406	0.9139	0.8208	0.7943	0.5230	184.9338	181.2352	0.2057	0.1793	0.4770
59	22.84	31.03	119.6200	0.85	406	0.9194	0.7097	0.5671	0.5211	170.1074	166.7053	0.4329	0.2903	0.4789
60	23.13	28.98	90.2700	0.85	406	0.9238	0.8418	0.8600	0.5293	155.3867	152.2789	0.1400	0.1583	0.4707
61	22.68	29.38	106.9600	0.85	406	0.9276	0.8455	0.8029	0.5235	183.6370	179.9643	0.1971	0.1545	0.4765
62	23.22	30.73	104.3100	0.85	406	0.9310	0.7037	0.6100	0.5240	149.7665	146.7712	0.3900	0.2963	0.4760

Table A63. Cowpea Biomass Growth with Stress Values for Mokwa 2019

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	23.43	28.18	66.8700	0.85	409	0.0028	0.8793	0.9743	0.5391	0.3801	0.3725	0.0257	0.1207	0.4609
2	22.7	27.93	68.7800	0.85	409	0.0032	0.9528	1.0000	0.5406	0.4949	0.4850	0.0000	0.0472	0.4594
3	23.05	26.27	78.3800	0.85	409	0.0037	0.9773	1.0000	0.5311	0.6577	0.6445	0.0000	0.0227	0.4689
4	22.66	29.44	79.8000	0.85	409	0.0043	0.8425	0.7943	0.5364	0.6841	0.6704	0.2057	0.1575	0.4636
5	22.65	26.91	44.2900	0.85	409	0.0050	0.9853	1.0000	0.5587	0.5357	0.5250	0.0000	0.0147	0.4413
6	21.32	29.97	72.8600	0.85	409	0.0059	0.9033	0.7186	0.5341	0.9023	0.8842	0.2814	0.0967	0.4659
7	23.1	29.04	48.3000	0.85	409	0.0069	0.8395	0.8514	0.5587	0.6822	0.6685	0.1486	0.1605	0.4413
8	22.68	28.48	88.5900	0.85	409	0.0081	0.9130	0.9314	0.5278	1.5004	1.4704	0.0686	0.0870	0.4722
9	22.21	28.9	84.4000	0.85	409	0.0094	0.9168	0.8714	0.5311	1.6849	1.6512	0.1286	0.0832	0.4689
10	21.51	27.94	85.3700	0.85	409	0.0109	0.9817	1.0000	0.5320	2.1149	2.0726	0.0000	0.0183	0.4680
11	22.26	28.07	74.2300	0.85	409	0.0126	0.9753	0.9900	0.5364	2.1397	2.0969	0.0100	0.0247	0.4636
12	21.82	28.37	89.3900	0.85	409	0.0147	0.9858	0.9471	0.5271	2.9696	2.9102	0.0529	0.0142	0.4729
13	22.15	28.98	50.8000	0.85	409	0.0171	0.9153	0.8600	0.5459	1.8913	1.8535	0.1400	0.0847	0.4541
14	22.76	29	95.8300	0.85	409	0.0200	0.8680	0.8571	0.5271	3.8173	3.7410	0.1429	0.1320	0.4729
15	22.55	29.22	97.7000	0.85	409	0.0233	0.8673	0.8257	0.5285	4.5541	4.4630	0.1743	0.1327	0.4715
16	22.71	30.66	115.0200	0.85	409	0.0274	0.7472	0.6200	0.5230	5.3768	5.2692	0.3800	0.2528	0.4770
17	22.99	30.58	103.7600	0.85	409	0.0323	0.7323	0.6314	0.5293	5.6604	5.5472	0.3686	0.2677	0.4707
18	23.28	29.15	91.8400	0.85	408	0.0377	0.8178	0.8357	0.5258	6.4081	6.2799	0.1643	0.1823	0.4742
19	22.4	29.88	82.3700	0.85	408	0.0440	0.8290	0.7314	0.5285	6.8356	6.6989	0.2686	0.1710	0.4715
20	22.69	30.73	101.9800	0.85	408	0.0516	0.7435	0.6100	0.5264	8.8595	8.6823	0.3900	0.2565	0.4736
21	23.88	29.76	73.3600	0.85	408	0.0605	0.7270	0.7486	0.5377	7.4575	7.3083	0.2514	0.2730	0.4623
22	23.17	29.58	73.7900	0.85	408	0.0704	0.7938	0.7743	0.5341	9.4743	9.2848	0.2257	0.2063	0.4659
23	23.18	29.19	103.5600	0.85	408	0.0817	0.8222	0.8300	0.5258	15.7371	15.4223	0.1700	0.1778	0.4742
24	23.05	29.83	101.8500	0.85	408	0.0949	0.7840	0.7386	0.5235	17.0562	16.7151	0.2614	0.2160	0.4765
25	22.93	28.66	69.7900	0.85	408	0.1092	0.8807	0.9057	0.5391	15.5696	15.2583	0.0943	0.1193	0.4609
26	22.37	28.68	91.8500	0.85	408	0.1252	0.9213	0.9029	0.5285	24.0772	23.5957	0.0971	0.0787	0.4715
27	22.16	29.94	87.0900	0.85	408	0.1437	0.8425	0.7229	0.5278	23.9290	23.4504	0.2771	0.1575	0.4722
28	23.18	29.39	80.4400	0.85	408	0.1647	0.8073	0.8014	0.5341	24.5619	24.0706	0.1986	0.1927	0.4659
29	22.26	30.73	112.7900	0.85	408	0.1883	0.7757	0.6100	0.5220	36.9992	36.2593	0.3900	0.2243	0.4780
30	22.99	29.12	96.8000	0.85	408	0.2138	0.8418	0.8400	0.5264	39.4355	38.6468	0.1600	0.1583	0.4736
31	23.43	28.23	80.8800	0.85	408	0.2411	0.8755	0.9671	0.5320	39.0683	38.2870	0.0329	0.1245	0.4680

Table A63 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2019

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.08	28.54	87.7000	0.85	408	0.2707	0.8785	0.9229	0.5278	47.3367	46.3900	0.0771	0.1215	0.4722
33	22.96	30.29	85.6400	0.85	408	0.3040	0.7563	0.6729	0.5311	44.9635	44.0643	0.3271	0.2438	0.4689
34	22.73	30.96	100.1100	0.85	408	0.3398	0.7233	0.5771	0.5246	55.5033	54.3932	0.4229	0.2767	0.4754
35	23.16	28.48	85.6600	0.85	408	0.3750	0.8770	0.9314	0.5285	64.0444	62.7635	0.0686	0.1230	0.4715
36	22.62	29.93	84.6700	0.85	408	0.4125	0.8088	0.7243	0.5293	64.3116	63.0254	0.2757	0.1912	0.4707
37	23.24	29.27	87.6200	0.85	408	0.4508	0.8118	0.8186	0.5302	73.1105	71.6483	0.1814	0.1882	0.4698
38	23.23	30.15	113.0500	0.85	408	0.4904	0.7465	0.6929	0.5240	93.2714	91.4060	0.3071	0.2535	0.4760
39	24.06	31.08	118.5800	0.85	408	0.5319	0.6145	0.5600	0.5220	87.0098	85.2696	0.4400	0.3855	0.4780
40	23.82	30.5	109.7000	0.85	408	0.5715	0.6760	0.6429	0.5246	95.6203	93.7079	0.3571	0.3240	0.4754
41	24.01	30.5	99.4100	0.85	408	0.6100	0.6617	0.6429	0.5240	90.4448	88.6359	0.3571	0.3383	0.4760
42	23.81	30.42	98.4900	0.85	408	0.6464	0.6827	0.6543	0.5230	97.7710	95.8156	0.3457	0.3173	0.4770
43	24.12	27.62	90.7200	0.85	408	0.6782	0.8695	1.0000	0.5264	121.1260	118.7035	0.0000	0.1305	0.4736
44	23.53	28.14	95.8900	0.85	408	0.7079	0.8747	0.9800	0.5246	133.9635	131.2842	0.0200	0.1253	0.4754
45	22.12	29.15	122.2400	0.85	408	0.7350	0.9048	0.8357	0.5220	182.5034	178.8533	0.1643	0.0952	0.4780
46	22.56	29.99	97.4400	0.85	408	0.7609	0.8088	0.7157	0.5278	136.1099	133.3877	0.2843	0.1912	0.4722
47	23.59	27.86	103.3800	0.85	408	0.7836	0.8912	1.0000	0.5271	163.6645	160.3913	0.0000	0.1088	0.4729
48	22.77	28.01	89.1800	0.85	409	0.8036	0.9415	0.9986	0.5302	155.9935	152.8736	0.0014	0.0585	0.4698
49	22.43	29.38	56.9300	0.85	409	0.8223	0.8642	0.8029	0.5459	96.3070	94.3808	0.1971	0.1358	0.4541
50	22.73	29.95	79.9100	0.85	409	0.8393	0.7990	0.7214	0.5311	124.0900	121.6082	0.2786	0.2010	0.4689
51	23.4	29.16	105.1200	0.85	409	0.8542	0.8080	0.8343	0.5251	166.1467	162.8238	0.1657	0.1920	0.4749
52	22.28	30.82	85.7700	0.85	409	0.8676	0.7675	0.5971	0.5302	132.0312	129.3906	0.4029	0.2325	0.4698
53	22.99	28.41	91.2900	0.85	409	0.8787	0.8950	0.9414	0.5320	166.5381	163.2074	0.0586	0.1050	0.4680
54	22.57	27.5	81.6400	0.85	409	0.8880	0.9948	1.0000	0.5320	167.2866	163.9409	0.0000	0.0052	0.4680
55	22.98	27.39	53.6500	0.85	409	0.8962	0.9722	1.0000	0.5422	110.5314	108.3208	0.0000	0.0278	0.4578
56	21.92	29.26	93.8200	0.85	409	0.9036	0.9115	0.8200	0.5251	176.9458	173.4069	0.1800	0.0885	0.4749
57	22.55	28.86	101.1700	0.85	409	0.9101	0.8943	0.8771	0.5251	188.5354	184.7647	0.1229	0.1057	0.4749
58	22.69	28.9	108.0400	0.85	409	0.9157	0.8807	0.8714	0.5246	199.3021	195.3160	0.1286	0.1193	0.4754
59	23.02	28	78.8800	0.85	409	0.9205	0.9235	1.0000	0.5330	155.8375	152.7207	0.0000	0.0765	0.4670
60	22.69	28.25	98.2200	0.85	409	0.9246	0.9295	0.9643	0.5278	194.2633	190.3780	0.0357	0.0705	0.4722
61	22.9	30.8	120.4100	0.85	409	0.9284	0.7225	0.6000	0.5230	184.1843	180.5006	0.4000	0.2775	0.4770
62	23.53	29.12	88.4800	0.85	409	0.9316	0.8012	0.8400	0.5271	151.7963	148.7604	0.1600	0.1988	0.4729

Table A64. Cowpea Biomass Growth with Stress Values for Mokwa 2020

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	21.19	30.63	120.2300	0.85	411	0.0028	0.8635	0.6243	0.5216	0.6677	0.6544	0.3757	0.1365	0.4784
2	21.87	30.82	104.7900	0.85	411	0.0032	0.7983	0.5971	0.5230	0.6349	0.6222	0.4029	0.2017	0.4770
3	23.51	30.63	116.9300	0.85	411	0.0038	0.6895	0.6243	0.5216	0.7234	0.7090	0.3757	0.3105	0.4784
4	23.98	28.55	76.3600	0.85	411	0.0045	0.8102	0.9214	0.5352	0.6698	0.6564	0.0786	0.1898	0.4648
5	22.75	30.73	109.9400	0.85	411	0.0053	0.7390	0.6100	0.5220	1.0134	0.9931	0.3900	0.2610	0.4780
6	23.87	30.26	85.5100	0.85	411	0.0063	0.6902	0.6771	0.5330	0.8906	0.8728	0.3229	0.3098	0.4670
7	22.58	25.96	63.2600	0.85	411	0.0073	0.9513	1.0000	0.5556	1.0907	1.0689	0.0000	0.0487	0.4444
8	22.39	29.79	92.3000	0.85	411	0.0085	0.8365	0.7443	0.5264	1.5551	1.5240	0.2557	0.1635	0.4736
9	22.73	26.76	75.3400	0.85	411	0.0099	0.9830	1.0000	0.5377	1.7633	1.7280	0.0000	0.0170	0.4623
10	22.1	26.05	40.9100	0.85	411	0.0114	0.9383	1.0000	0.5880	1.1487	1.1257	0.0000	0.0617	0.4120
11	21.03	29.8	95.2500	0.85	411	0.0132	0.9378	0.7429	0.5258	2.7827	2.7270	0.2571	0.0622	0.4742
12	22.28	29.77	82.5000	0.85	411	0.0155	0.8463	0.7471	0.5330	2.5820	2.5303	0.2529	0.1537	0.4670
13	22.83	28.74	107.8400	0.85	411	0.0181	0.8823	0.8943	0.5258	4.0530	3.9719	0.1057	0.1177	0.4742
14	23.17	28.26	61.7600	0.85	411	0.0211	0.8927	0.9629	0.5556	2.8950	2.8371	0.0371	0.1073	0.4444
15	22.33	28.9	51.5500	0.85	411	0.0246	0.9078	0.8714	0.5528	2.8472	2.7902	0.1286	0.0922	0.4472
16	21.96	28.24	90.2200	0.85	411	0.0285	0.9850	0.9657	0.5311	6.0156	5.8953	0.0343	0.0150	0.4689
17	22.01	30	77.5900	0.85	411	0.0332	0.8492	0.7143	0.5391	5.2866	5.1809	0.2857	0.1508	0.4609
18	22.74	27.44	49.0900	0.85	410	0.0384	0.9865	1.0000	0.5621	4.6221	4.5296	0.0000	0.0135	0.4379
19	22.08	26.92	85.3300	0.85	410	0.0441	0.9667	1.0000	0.5311	8.5444	8.3735	0.0000	0.0333	0.4689
20	21.56	30.06	105.9500	0.85	410	0.0513	0.8785	0.7057	0.5240	11.0548	10.8338	0.2943	0.1215	0.4760
21	23.44	28.06	30.7000	0.85	410	0.0595	0.8875	0.9914	0.5621	4.0266	3.9460	0.0086	0.1125	0.4379
22	22.54	25.91	71.2700	0.85	410	0.0679	0.9483	1.0000	0.5422	11.0027	10.7827	0.0000	0.0517	0.4578
23	22.18	27.73	92.3300	0.85	410	0.0780	0.9970	1.0000	0.5406	17.1528	16.8098	0.0000	0.0030	0.4594
24	21.3	30.38	102.0200	0.85	410	0.0901	0.8740	0.6600	0.5271	18.7153	18.3410	0.3400	0.1260	0.4729
25	22.26	31.34	97.7300	0.85	410	0.1048	0.7300	0.5229	0.5285	17.2723	16.9269	0.4771	0.2700	0.4715
26	23.09	28.4	79.5200	0.85	410	0.1204	0.8883	0.9429	0.5352	20.1110	19.7088	0.0571	0.1117	0.4648
27	22.39	29.46	91.1300	0.85	410	0.1381	0.8612	0.7914	0.5278	25.2885	24.7827	0.2086	0.1388	0.4722
28	22.51	30.25	87.0000	0.85	410	0.1586	0.7930	0.6786	0.5320	25.7287	25.2141	0.3214	0.2070	0.4680
29	22.93	29.66	91.4900	0.85	410	0.1813	0.8057	0.7629	0.5271	31.1376	30.5148	0.2371	0.1943	0.4729
30	23.12	28.76	79.7000	0.85	410	0.2058	0.8590	0.8914	0.5364	33.4136	32.7453	0.1086	0.1410	0.4636
31	22.86	28.99	81.6200	0.85	410	0.2327	0.8613	0.8586	0.5341	38.6103	37.8381	0.1414	0.1387	0.4659

Table A64 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2020

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	22.83	30.75	59.0900	0.85	410	0.2634	0.7315	0.6071	0.5422	27.2897	26.7439	0.3929	0.2685	0.4578
33	23.05	29.12	87.1700	0.85	410	0.2951	0.8372	0.8400	0.5285	50.3167	49.3104	0.1600	0.1628	0.4715
34	22.47	29.23	63.7200	0.85	410	0.3283	0.8725	0.8243	0.5391	43.4903	42.6205	0.1757	0.1275	0.4609
35	22.44	31.12	106.3200	0.85	410	0.3652	0.7330	0.5543	0.5264	66.2208	64.8964	0.4457	0.2670	0.4736
36	23.59	31.55	124.7300	0.85	410	0.4054	0.6145	0.4929	0.5216	67.6923	66.3384	0.5071	0.3855	0.4784
37	22.8	28.88	95.8800	0.85	410	0.4426	0.8740	0.8743	0.5278	86.5204	84.7900	0.1257	0.1260	0.4722
38	22.01	28.51	45.5900	0.85	410	0.4788	0.9610	0.9271	0.5556	51.5102	50.4800	0.0729	0.0390	0.4444
39	21.89	28.68	107.8400	0.85	410	0.5150	0.9572	0.9029	0.5246	123.2578	120.7926	0.0971	0.0428	0.4754
40	21.37	30.83	98.2000	0.85	410	0.5526	0.8350	0.5957	0.5251	105.1766	103.0731	0.4043	0.1650	0.4749
41	23.07	29.55	92.8600	0.85	410	0.5897	0.8035	0.7786	0.5285	102.7957	100.7397	0.2214	0.1965	0.4715
42	22.47	29.46	74.9500	0.85	410	0.6247	0.8553	0.7914	0.5364	94.9412	93.0424	0.2086	0.1447	0.4636
43	22.93	28.26	58.0200	0.85	410	0.6572	0.9108	0.9629	0.5480	84.1145	82.4322	0.0371	0.0892	0.4520
44	22.44	30.33	105.5100	0.85	410	0.6893	0.7923	0.6671	0.5240	133.4495	130.7805	0.3329	0.2077	0.4760
45	22.9	30.05	83.3500	0.85	410	0.7193	0.7787	0.7071	0.5302	109.4059	107.2178	0.2929	0.2213	0.4698
46	23.83	28.55	63.5500	0.85	410	0.7464	0.8215	0.9214	0.5406	93.1089	91.2467	0.0786	0.1785	0.4594
47	23	26.55	65.7500	0.85	410	0.7690	0.9850	1.0000	0.5364	118.0835	115.7219	0.0000	0.0150	0.4636
48	21.95	29.72	88.5700	0.85	411	0.7911	0.8747	0.7543	0.5271	144.7099	141.8157	0.2457	0.1253	0.4729
49	22.77	31.05	90.2000	0.85	411	0.8122	0.7135	0.5643	0.5258	123.1092	120.6470	0.4357	0.2865	0.4742
50	22.45	29.02	105.2600	0.85	411	0.8297	0.8898	0.8543	0.5251	182.8028	179.1467	0.1457	0.1102	0.4749
51	20.69	31.17	113.7300	0.85	411	0.8455	0.8605	0.5471	0.5240	194.2241	190.3396	0.4529	0.1395	0.4760
52	23.43	31.95	101.0800	0.85	411	0.8609	0.5965	0.4357	0.5258	101.3068	99.2807	0.5643	0.4035	0.4742
53	23.47	28.57	112.0200	0.85	411	0.8730	0.8470	0.9186	0.5230	194.0351	190.1544	0.0814	0.1530	0.4770
54	22.48	29.88	87.5500	0.85	411	0.8837	0.8230	0.7314	0.5293	150.9777	147.9581	0.2686	0.1770	0.4707
55	21.98	30.15	101.3000	0.85	411	0.8929	0.8403	0.6929	0.5264	179.2190	175.6346	0.3071	0.1597	0.4736
56	22.3	29.02	87.4200	0.85	411	0.9008	0.9010	0.8543	0.5302	168.5000	165.1300	0.1457	0.0990	0.4698
57	22.28	28.36	97.4500	0.85	411	0.9075	0.9520	0.9486	0.5251	198.0397	194.0789	0.0514	0.0480	0.4749
58	21.73	30.58	93.0500	0.85	411	0.9136	0.8267	0.6314	0.5302	166.9067	163.5686	0.3686	0.1733	0.4698
59	22.05	31.82	118.0200	0.85	411	0.9191	0.7097	0.4543	0.5225	156.6607	153.5274	0.5457	0.2903	0.4775
60	23.05	31.44	102.3000	0.85	411	0.9238	0.6632	0.5086	0.5246	142.7978	139.9418	0.4914	0.3368	0.4754
61	23.6	28.42	95.0100	0.85	411	0.9276	0.8485	0.9400	0.5258	176.1150	172.5927	0.0600	0.1515	0.4742
62	22.52	30.11	108.6600	0.85	411	0.9309	0.8028	0.6986	0.5235	190.4031	186.5951	0.3014	0.1972	0.4765

Table A65. Cowpea Biomass Growth with Stress Values for Mokwa 2021

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
1	22.71	30.6	81.2700	0.85	413	0.0028	0.7517	0.6286	0.5364	0.4180	0.4096	0.3714	0.2483	0.4636
2	22.6	25.51	47.0200	0.85	413	0.0032	0.9370	1.0000	0.5528	0.3573	0.3502	0.0000	0.0630	0.4472
3	22.45	28.01	82.3000	0.85	413	0.0037	0.9655	0.9986	0.5406	0.7335	0.7189	0.0014	0.0345	0.4594
4	21.87	27.97	79.4100	0.85	413	0.0043	0.9947	1.0000	0.5377	0.8414	0.8246	0.0000	0.0053	0.4623
5	22.26	28.25	96.4100	0.85	413	0.0050	0.9617	0.9643	0.5278	1.1285	1.1059	0.0357	0.0383	0.4722
6	22.5	29.46	119.8300	0.85	413	0.0059	0.8530	0.7914	0.5230	1.4448	1.4159	0.2086	0.1470	0.4770
7	22.76	28.56	88.9500	0.85	413	0.0069	0.9010	0.9200	0.5278	1.3358	1.3090	0.0800	0.0990	0.4722
8	22.37	29.7	90.1800	0.85	413	0.0081	0.8448	0.7571	0.5293	1.4930	1.4631	0.2429	0.1553	0.4707
9	22.62	28.37	98.6900	0.85	413	0.0094	0.9257	0.9471	0.5285	2.0845	2.0429	0.0529	0.0743	0.4715
10	22.51	28.92	115.3600	0.85	413	0.0110	0.8927	0.8686	0.5225	2.7135	2.6592	0.1314	0.1073	0.4775
11	23.4	29.06	102.0200	0.85	413	0.0129	0.8155	0.8486	0.5278	2.5993	2.5473	0.1514	0.1845	0.4722
12	23.7	26.78	99.6200	0.85	413	0.0150	0.9640	1.0000	0.5285	3.4915	3.4217	0.0000	0.0360	0.4715
13	23.06	28.7	97.8800	0.85	413	0.0175	0.8680	0.9000	0.5258	3.5917	3.5198	0.1000	0.1320	0.4742
14	22.26	29.83	95.6200	0.85	413	0.0205	0.8432	0.7386	0.5271	3.9992	3.9192	0.2614	0.1568	0.4729
15	23.34	28.1	113.8600	0.85	413	0.0239	0.8920	0.9857	0.5251	5.8518	5.7347	0.0143	0.1080	0.4749
16	22.76	28.55	81.2200	0.85	413	0.0278	0.9017	0.9214	0.5341	4.9976	4.8977	0.0786	0.0983	0.4659
17	22.07	30.69	128.7700	0.85	413	0.0326	0.7930	0.6157	0.5211	7.9676	7.8082	0.3843	0.2070	0.4789
18	23.22	30.31	93.9200	0.85	413	0.0383	0.7353	0.6700	0.5278	6.4129	6.2847	0.3300	0.2648	0.4722
19	23.93	29.37	89.9900	0.85	413	0.0449	0.7525	0.8043	0.5258	7.3458	7.1989	0.1957	0.2475	0.4742
20	22.63	29.2	85.0200	0.85	413	0.0522	0.8628	0.8286	0.5320	9.3641	9.1768	0.1714	0.1372	0.4680
21	23.11	27.17	79.5500	0.85	413	0.0602	0.9790	1.0000	0.5330	11.4860	11.2563	0.0000	0.0210	0.4670
22	22.27	27.42	86.5600	0.85	413	0.0691	0.9897	1.0000	0.5341	14.5382	14.2474	0.0000	0.0103	0.4659
23	22.19	28.42	89.1700	0.85	413	0.0796	0.9543	0.9400	0.5271	16.4112	16.0830	0.0600	0.0457	0.4729
24	22.98	29.76	77.1600	0.85	413	0.0924	0.7945	0.7486	0.5320	13.8502	13.5732	0.2514	0.2055	0.4680
25	22.8	29.69	120.9100	0.85	413	0.1068	0.8132	0.7586	0.5220	25.2105	24.7063	0.2414	0.1868	0.4780
26	22.54	30.03	116.9100	0.85	413	0.1232	0.8073	0.7100	0.5220	27.9208	27.3624	0.2900	0.1927	0.4780
27	23.27	29.91	98.0000	0.85	413	0.1422	0.7615	0.7271	0.5293	25.8240	25.3075	0.2729	0.2385	0.4707
28	23.63	31.08	79.6900	0.85	413	0.1644	0.6468	0.5600	0.5311	20.6970	20.2830	0.4400	0.3532	0.4689
29	23.03	30.03	120.1800	0.85	413	0.1881	0.7705	0.7100	0.5216	41.7838	40.9481	0.2900	0.2295	0.4784
30	23.73	26.55	82.1700	0.85	413	0.2120	0.9790	1.0000	0.5341	41.8901	41.0523	0.0000	0.0210	0.4659
31	23.03	29.14	88.6300	0.85	413	0.2397	0.8372	0.8371	0.5302	43.3647	42.4974	0.1629	0.1628	0.4698

Table A65 Continuation. Cowpea Biomass Growth with Stress Values for Mokwa 2021

Dap	minT	MaxT	Rad	RETo	CO2	F_sol	F_temp	F_heat	F_water	Simple	CGRCM	Hs_value	Ts_value	Ds_value
32	23.15	27.59	106.9500	0.85	413	0.2683	0.9445	1.0000	0.5251	65.4427	64.1338	0.0000	0.0555	0.4749
33	21.97	30.07	127.2700	0.85	413	0.3002	0.8470	0.7043	0.5211	77.5388	75.9881	0.2957	0.1530	0.4789
34	23.65	28.51	84.6200	0.85	413	0.3341	0.8380	0.9271	0.5293	57.6702	56.5168	0.0729	0.1620	0.4707
35	22.49	30.07	108.9000	0.85	413	0.3702	0.8080	0.7043	0.5230	78.3276	76.7611	0.2957	0.1920	0.4770
36	22.84	30.73	121.8400	0.85	413	0.4087	0.7323	0.6100	0.5220	87.5288	85.7782	0.3900	0.2677	0.4780
37	24.07	30.78	118.9800	0.85	413	0.4497	0.6363	0.6029	0.5225	81.7869	80.1512	0.3971	0.3638	0.4775
38	23.86	31.24	96.7100	0.85	413	0.4913	0.6175	0.5371	0.5251	70.8563	69.4392	0.4629	0.3825	0.4749
39	23.67	27.11	58.3400	0.85	413	0.5277	0.9415	1.0000	0.5459	72.7599	71.3047	0.0000	0.0585	0.4541
40	22.52	29.29	101.1900	0.85	413	0.5646	0.8642	0.8157	0.5258	119.3722	116.9848	0.1843	0.1358	0.4742
41	23.24	30.15	106.2700	0.85	413	0.6021	0.7457	0.6929	0.5235	114.8704	112.5730	0.3071	0.2543	0.4765
42	23.07	30.87	110.3400	0.85	413	0.6386	0.7045	0.5900	0.5240	119.6241	117.2317	0.4100	0.2955	0.4760
43	22.13	29	92.5500	0.85	413	0.6703	0.9153	0.8571	0.5258	137.2749	134.5294	0.1429	0.0847	0.4742
44	21.85	30.36	105.8000	0.85	413	0.7010	0.8342	0.6629	0.5240	149.0914	146.1095	0.3371	0.1658	0.4760
45	22.35	30.27	108.7000	0.85	413	0.7298	0.8035	0.6757	0.5235	153.4338	150.3651	0.3243	0.1965	0.4765
46	23.94	30.21	92.5600	0.85	413	0.7573	0.6887	0.6843	0.5264	116.8728	114.5354	0.3157	0.3113	0.4736
47	23.35	29.8	128.6900	0.85	413	0.7816	0.7637	0.7429	0.5216	184.2343	180.5496	0.2571	0.2363	0.4784
48	23.06	29.1	101.4500	0.85	413	0.8027	0.8380	0.8429	0.5251	164.7944	161.4985	0.1571	0.1620	0.4749
49	23.02	29.73	120.1000	0.85	413	0.8219	0.7938	0.7529	0.5230	188.4315	184.6628	0.2471	0.2063	0.4770
50	23.78	30.93	120.4800	0.85	413	0.8400	0.6467	0.5814	0.5216	156.9776	153.8380	0.4186	0.3533	0.4784
51	23.01	32.45	125.0000	0.85	413	0.8561	0.5905	0.3643	0.5220	105.8547	103.7376	0.6357	0.4095	0.4780
52	24.03	29.77	114.0800	0.85	413	0.8695	0.7150	0.7471	0.5235	170.7142	167.2999	0.2529	0.2850	0.4765
53	22.63	30.72	99.3400	0.85	413	0.8809	0.7488	0.6114	0.5246	158.0564	154.8952	0.3886	0.2512	0.4754
54	23.09	30.85	103.4700	0.85	413	0.8910	0.7045	0.5929	0.5258	157.0340	153.8933	0.4071	0.2955	0.4742
55	23.4	32.12	128.9800	0.85	413	0.9001	0.5860	0.4114	0.5216	128.7172	126.1428	0.5886	0.4140	0.4784
56	22.69	32.62	104.9600	0.85	413	0.9078	0.6017	0.3400	0.5246	89.6492	87.8562	0.6600	0.3983	0.4754
57	23.6	29.8	99.8600	0.85	413	0.9141	0.7450	0.7429	0.5246	164.0375	160.7567	0.2571	0.2550	0.4754
58	24.15	30.98	104.6000	0.85	413	0.9197	0.6153	0.5743	0.5240	142.6164	139.7640	0.4257	0.3847	0.4760
59	23.2	32.69	124.8000	0.85	413	0.9245	0.5582	0.3300	0.5207	97.7450	95.7901	0.6700	0.4418	0.4793
60	23.02	31.17	124.1300	0.85	413	0.9284	0.6858	0.5471	0.5203	189.0922	185.3104	0.4529	0.3142	0.4797
61	23.4	30.21	120.8800	0.85	413	0.9317	0.7293	0.6843	0.5211	196.8188	192.8825	0.3157	0.2707	0.4789
62	22.89	31.78	117.0900	0.85	413	0.9346	0.6497	0.4600	0.5220	150.4023	147.3943	0.5400	0.3503	0.4780

Table A66. Cowpea Yield for Makurdi 2018 - 2021

YEAR	Observed Yield(kg/ha)	SIMPLE(kg/ha)	CGRCM(kg/ha)
2018	1532	1855.4	1632.5
2019	1547	1787.4	1642.5
2020	1577	1763.9	1670.8
2021	1591	2026.1	1689.7

Table A67. Cowpea Yield for Mokwa 2018 - 2021

YEAR	Observed Yield(kg/ha)	SIMPLE(kg/ha)	CGRCM(kg/ha)
2018	1785	1589.8	1669.2
2019	1888	1692.8	1777.5
2020	1577	1652.2	1619.1
2021	1536	1719.5	1685.1

Table A68. Units of Data and Results Presented on Tables A1 to A65

SN	Description	Unit
1	Daily Minimum Temperature(minT)	^{o}C
2	Daily Maximum Temperature (MaxT)	^{o}C
3	Radiation (Rad)	^{o}C
4	Referenced Evapotranspiration RETo	mm
5	CO2	PPM
6	F_sol	Dimensionless[0,1]
7	F_temp	Dimensionless[0,1]
8	F_heat	Dimensionless[0,1]
9	F_water	Dimensionless[0,1]
10	SIMPLE(Cumulative Biomass)	kg/ha
11	CGRCM(Cumulative Biomass)	kg/ha
12	Hs_value	Dimensionless[0,1]
13	Ts_value	Dimensionless[0,1]
14	Ds_value	Dimensionless[0,1]
15	Plant Available Water (PAW)	mm
16	Referenced Evapotranspiration (RETo)	mm

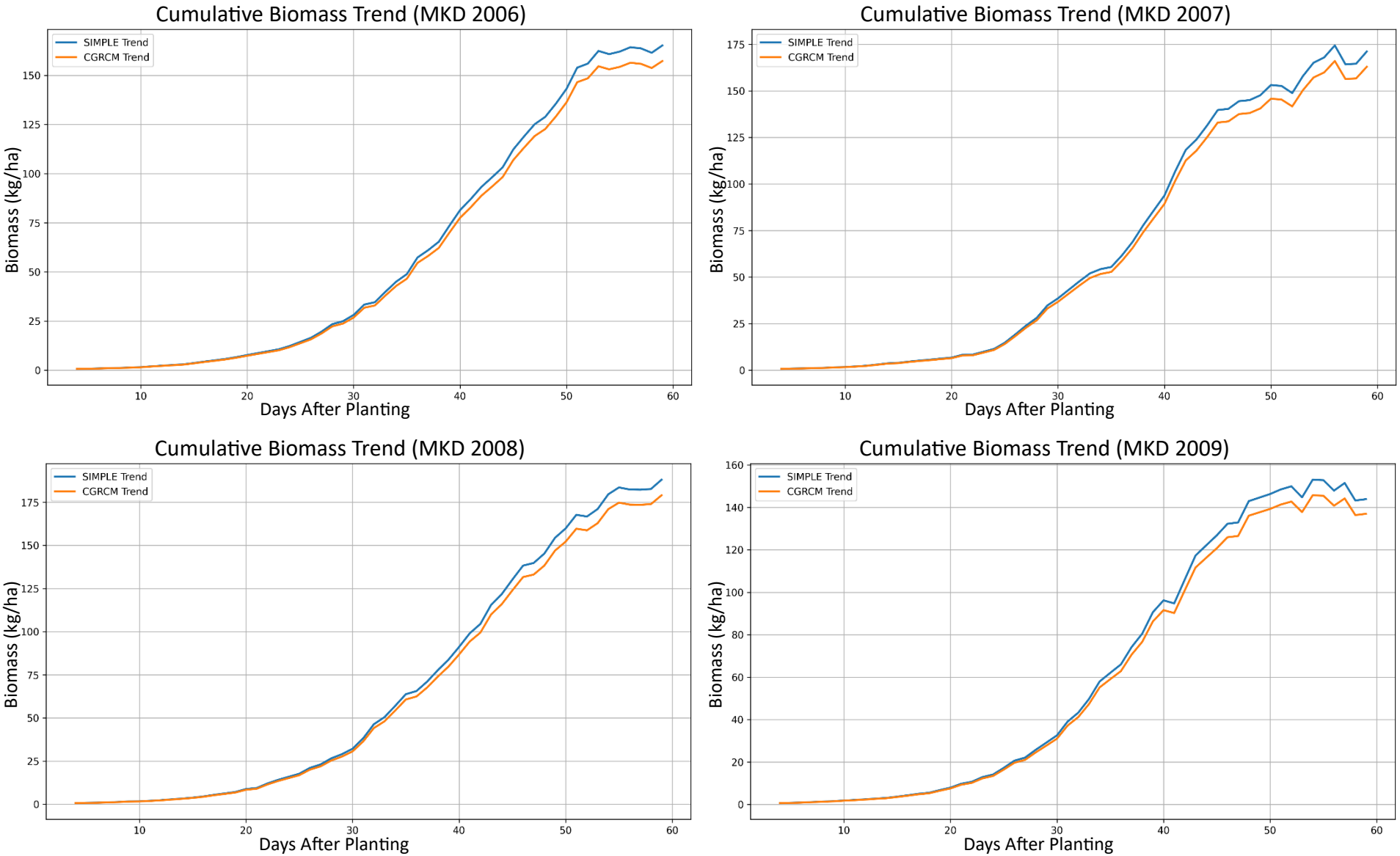
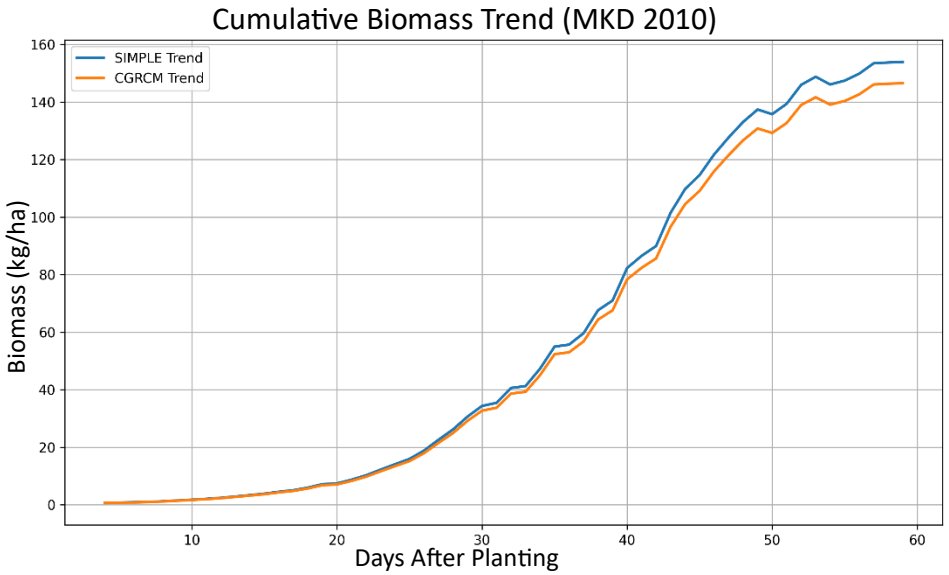
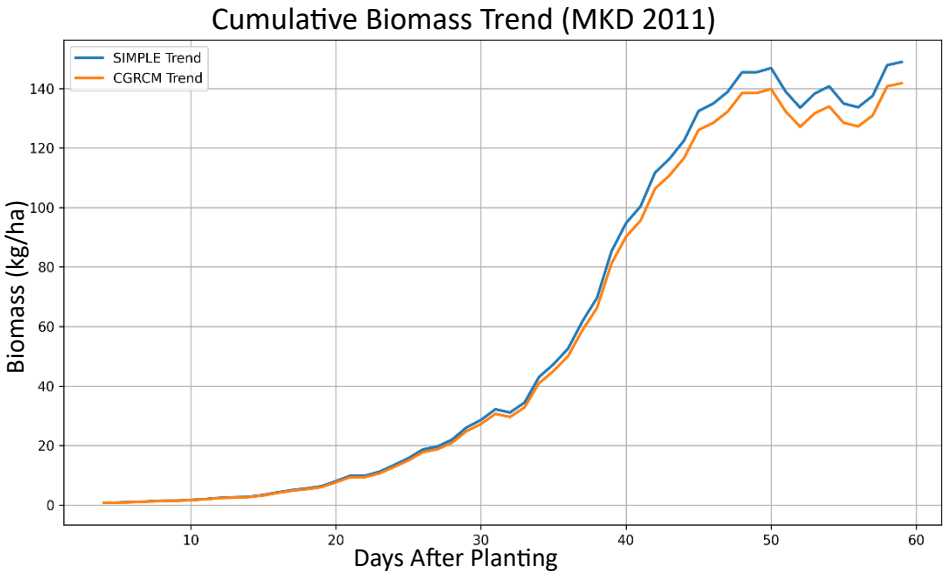
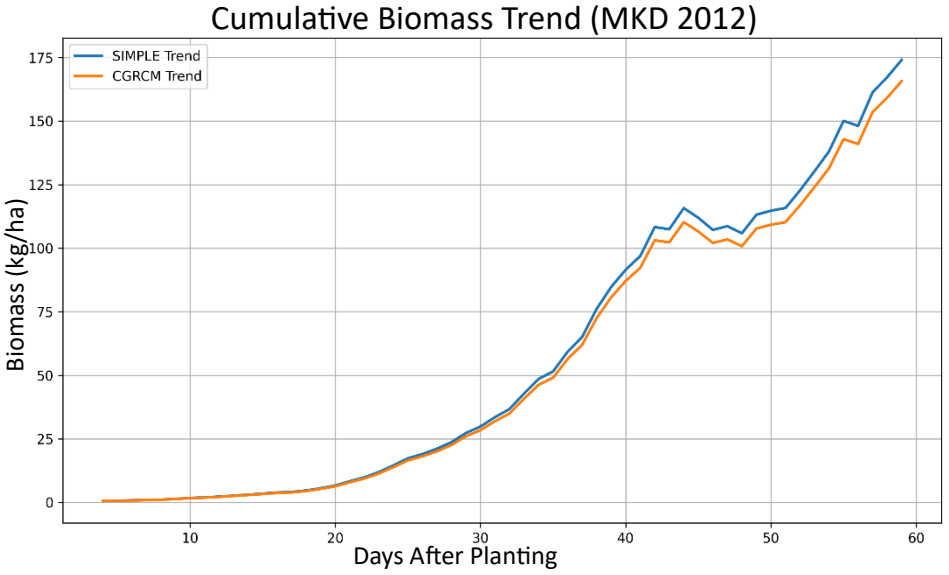


Figure A1. Cumulative Biomass Trend for Makurdi 2006 - 2009







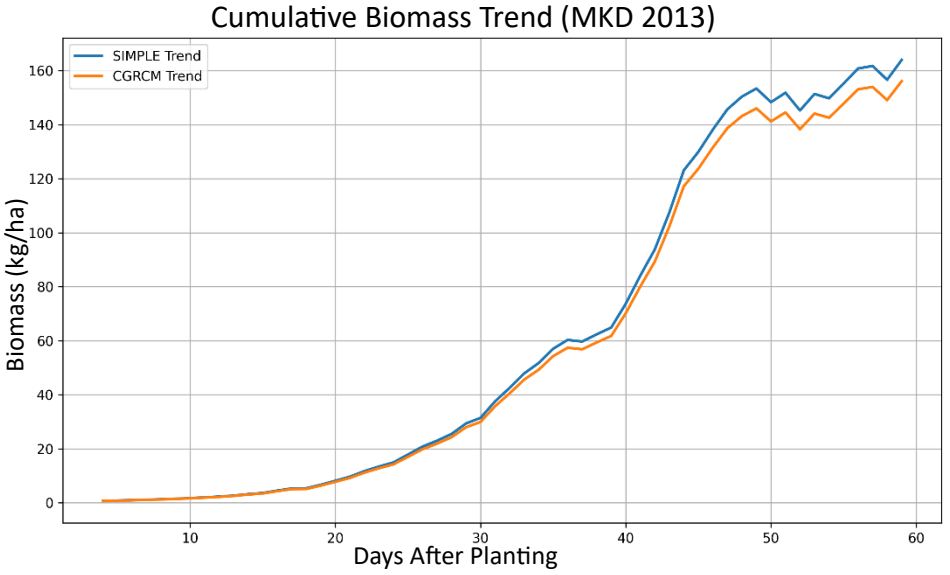


Figure A2. Cumulative Biomass Trend for Makurdi 2010 - 2013

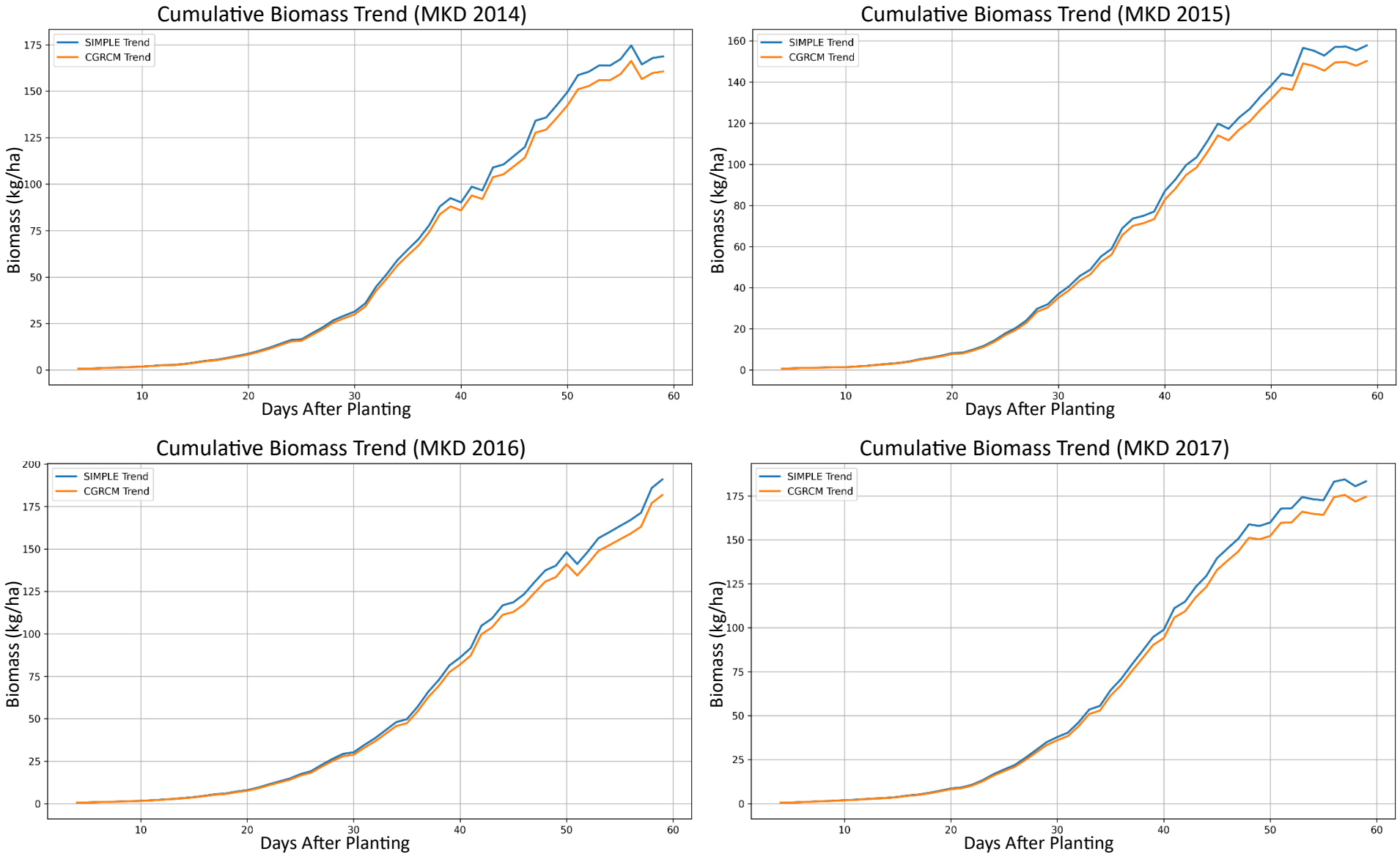


Figure A3. Cumulative Biomass Trend for Makurdi 2014 and 2017

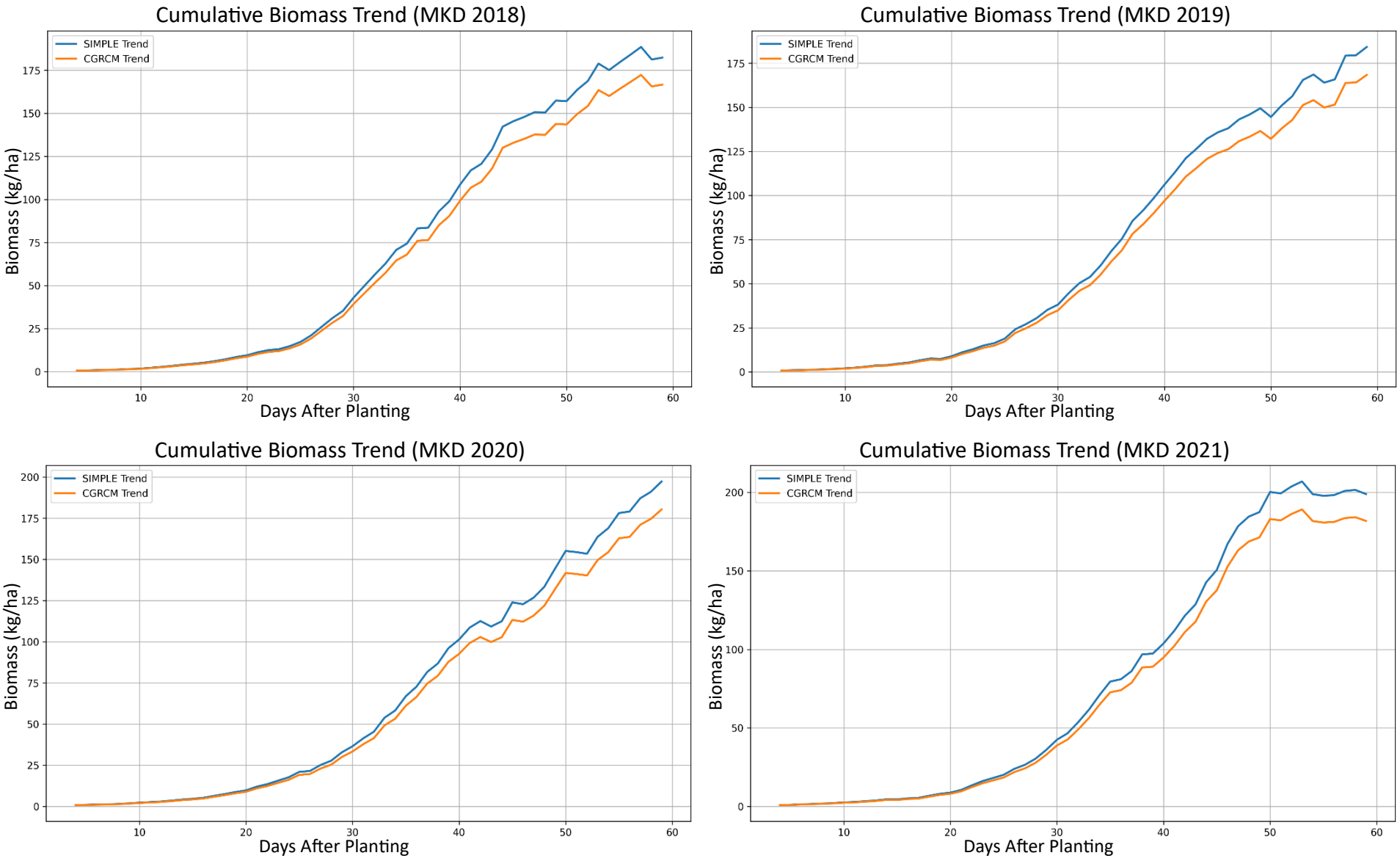
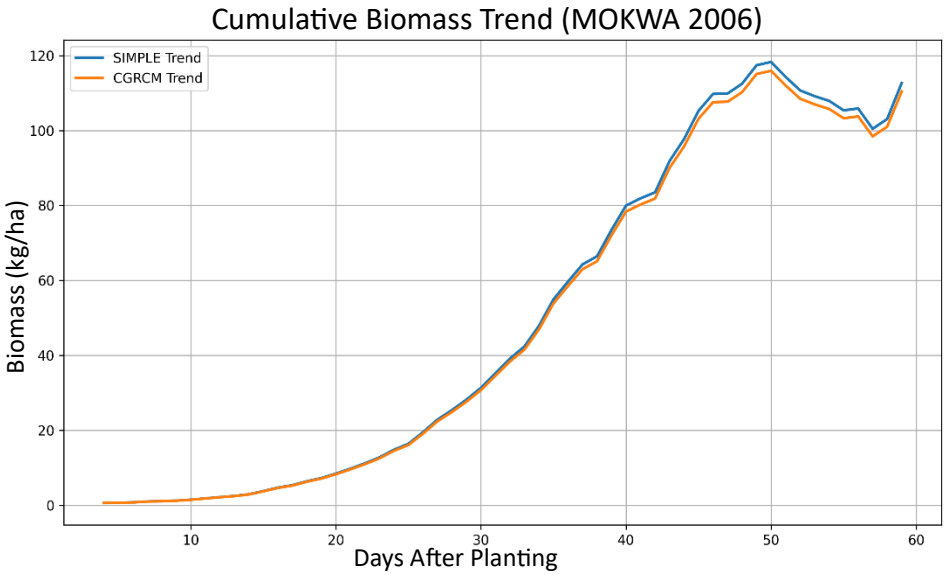
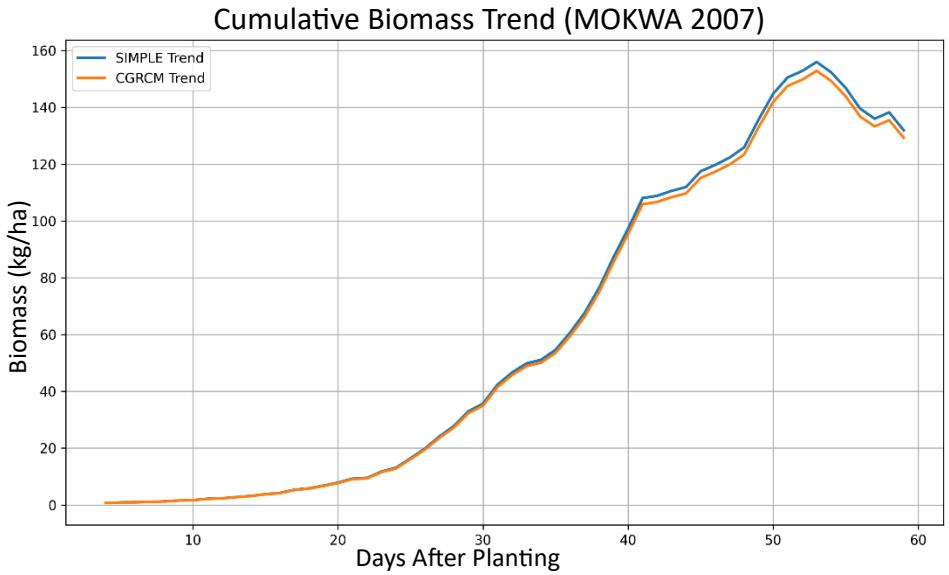
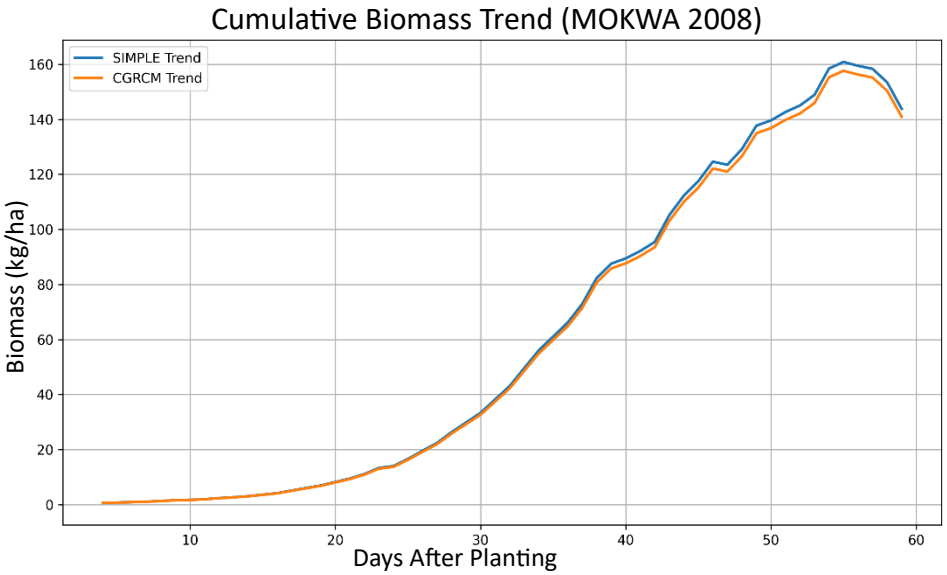


Figure A4. Cumulative Biomass Trend for Makurdi 2018 - 2021







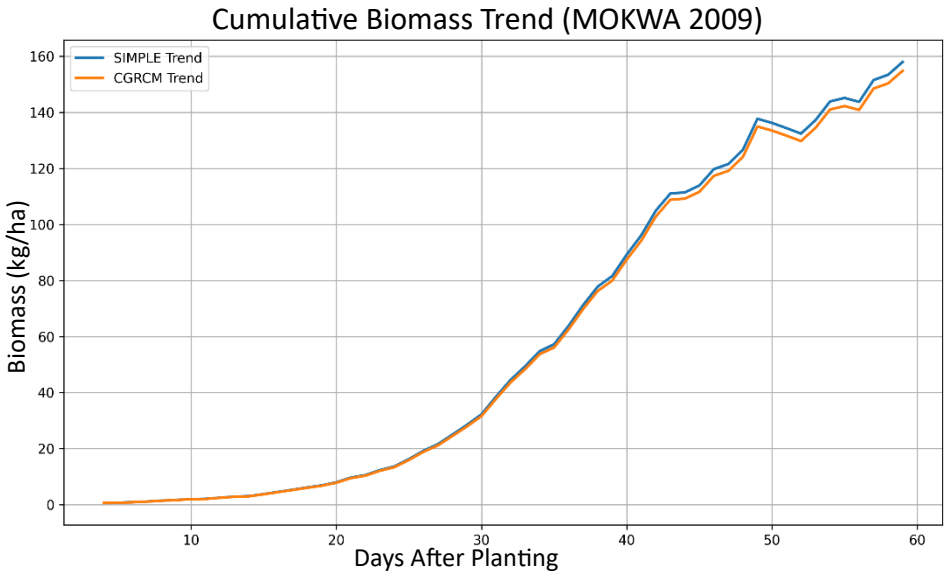


Figure A5. Cumulative Biomass Trend for Mokwa 2006 - 2009

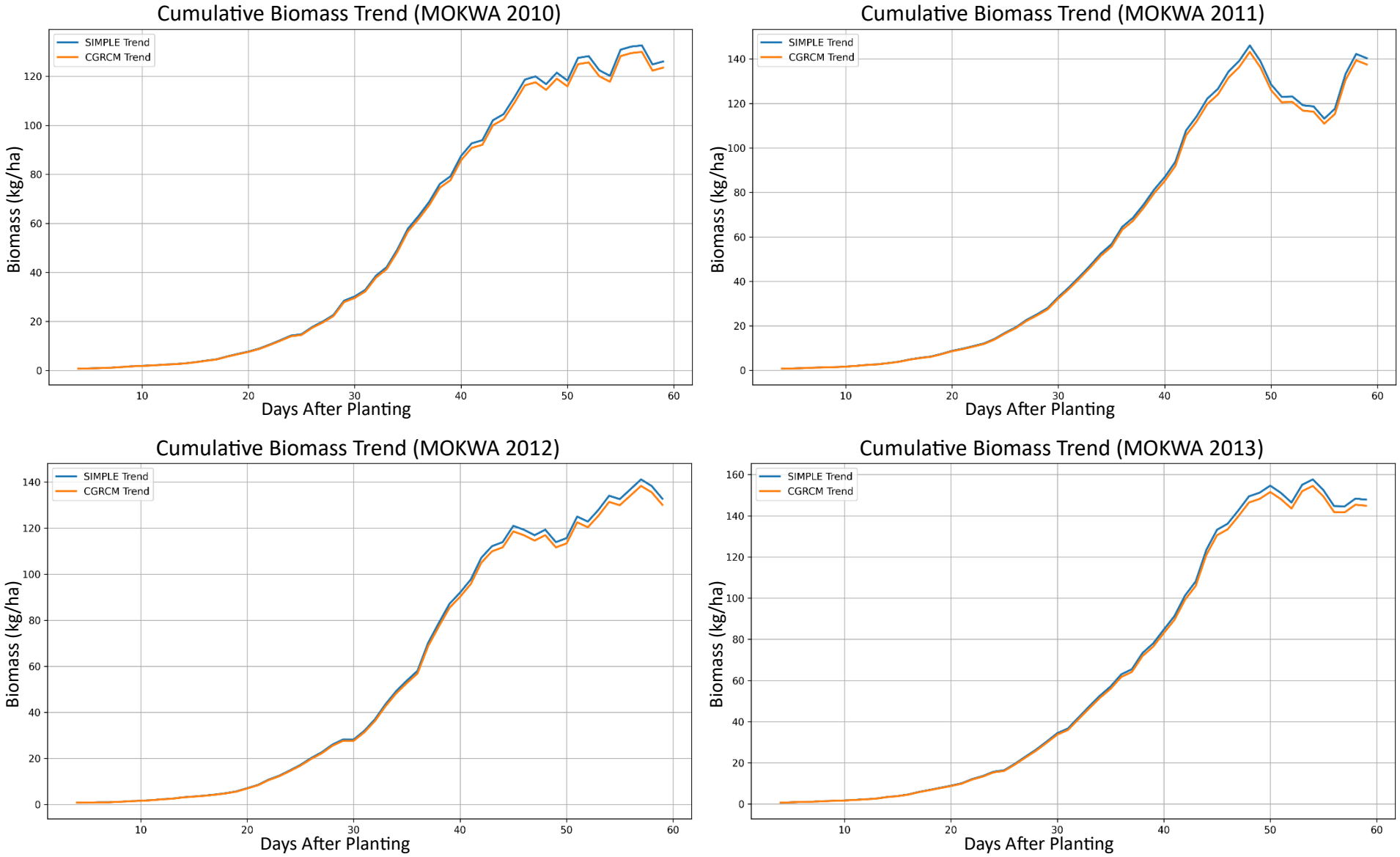
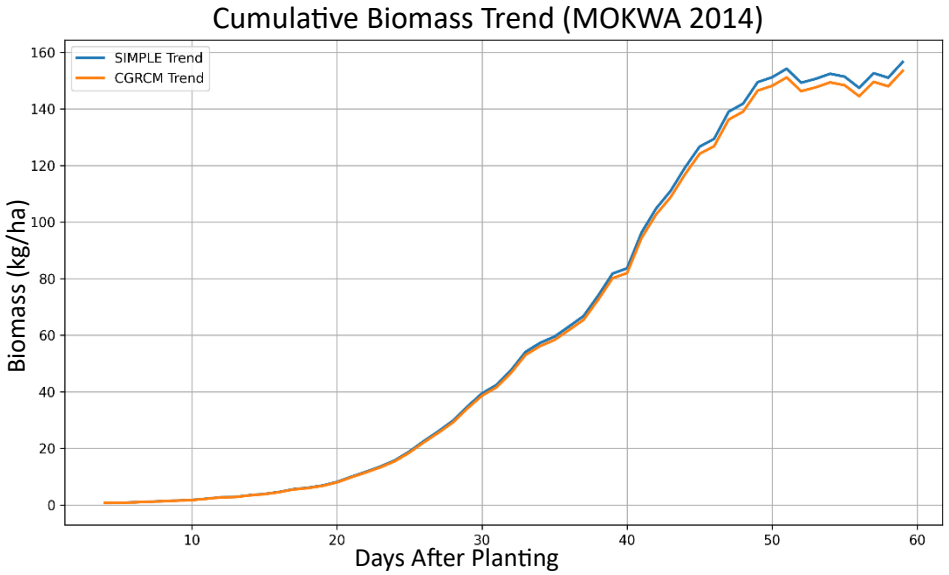
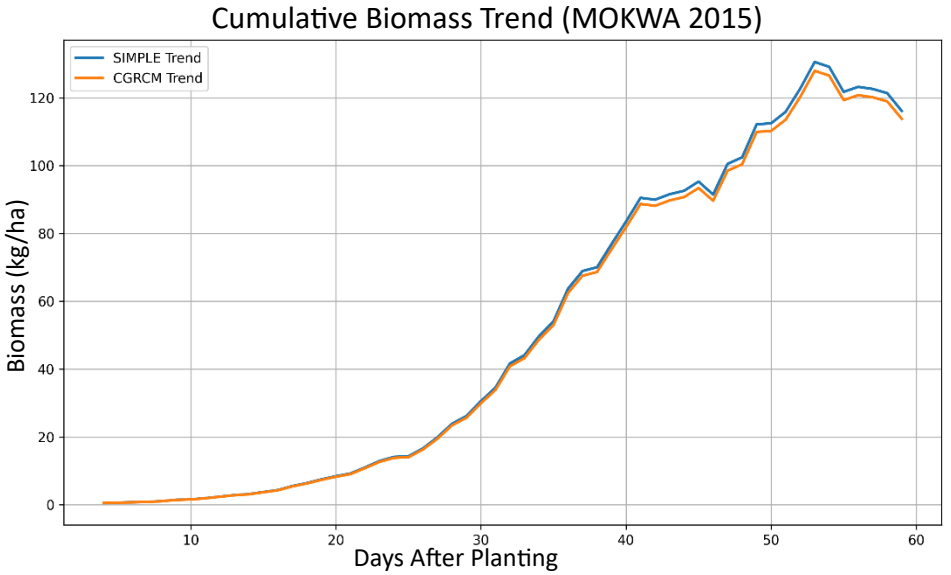
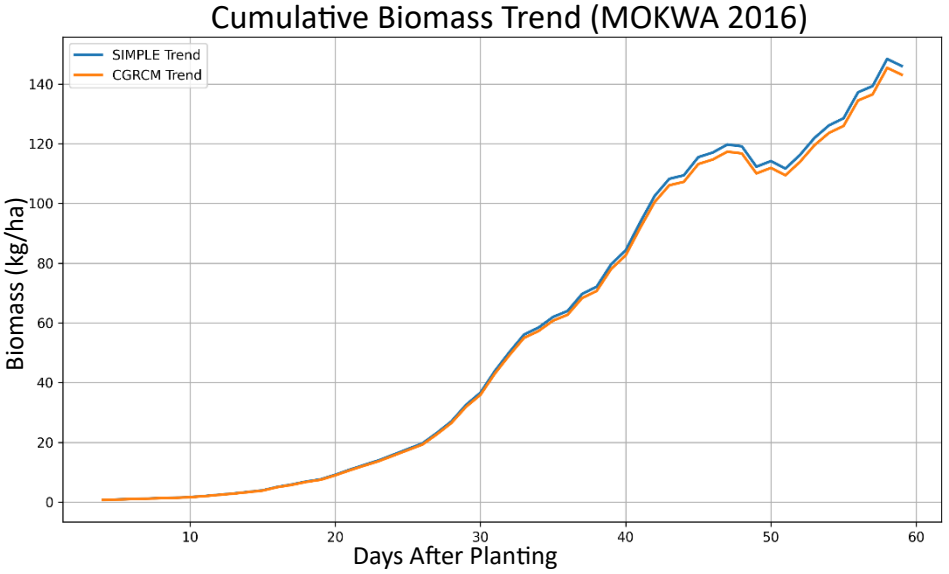


Figure A6. Cumulative Biomass Trend for Mokwa 2010 – 2013







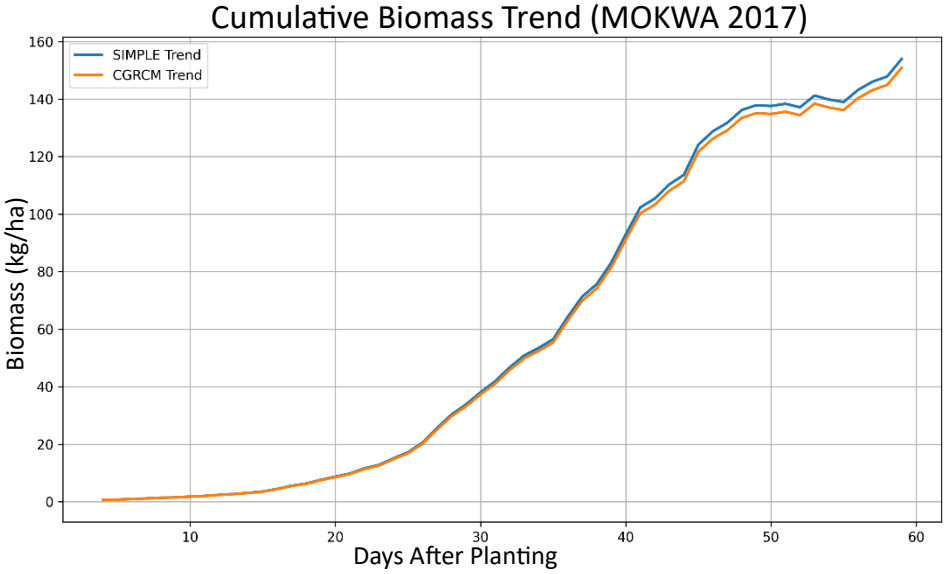


Figure A7. Cumulative Biomass Trend for Mokwa 2014 – 2017

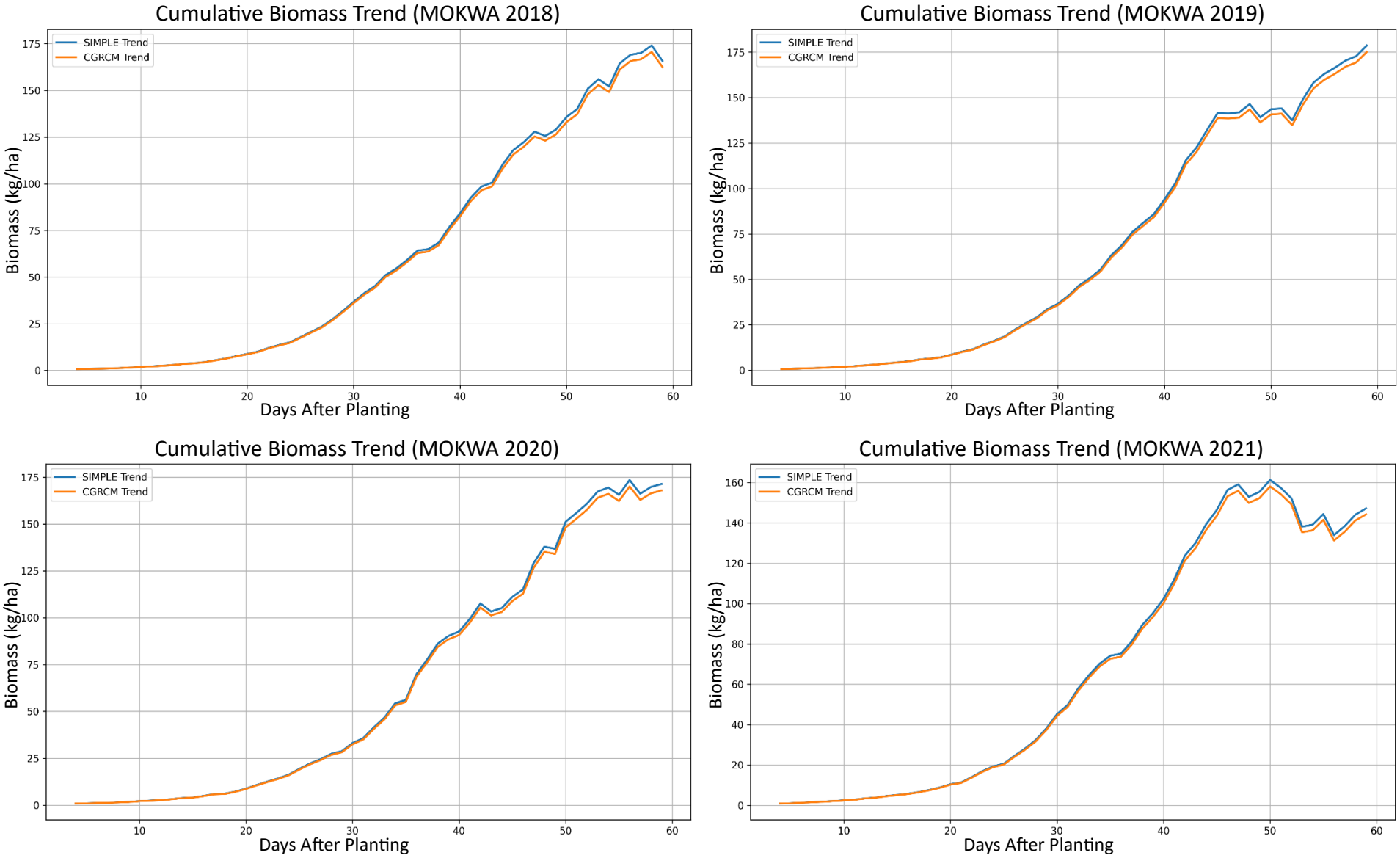


Figure A8. Cumulative Biomass Trend for Mokwa 2018 - 2021