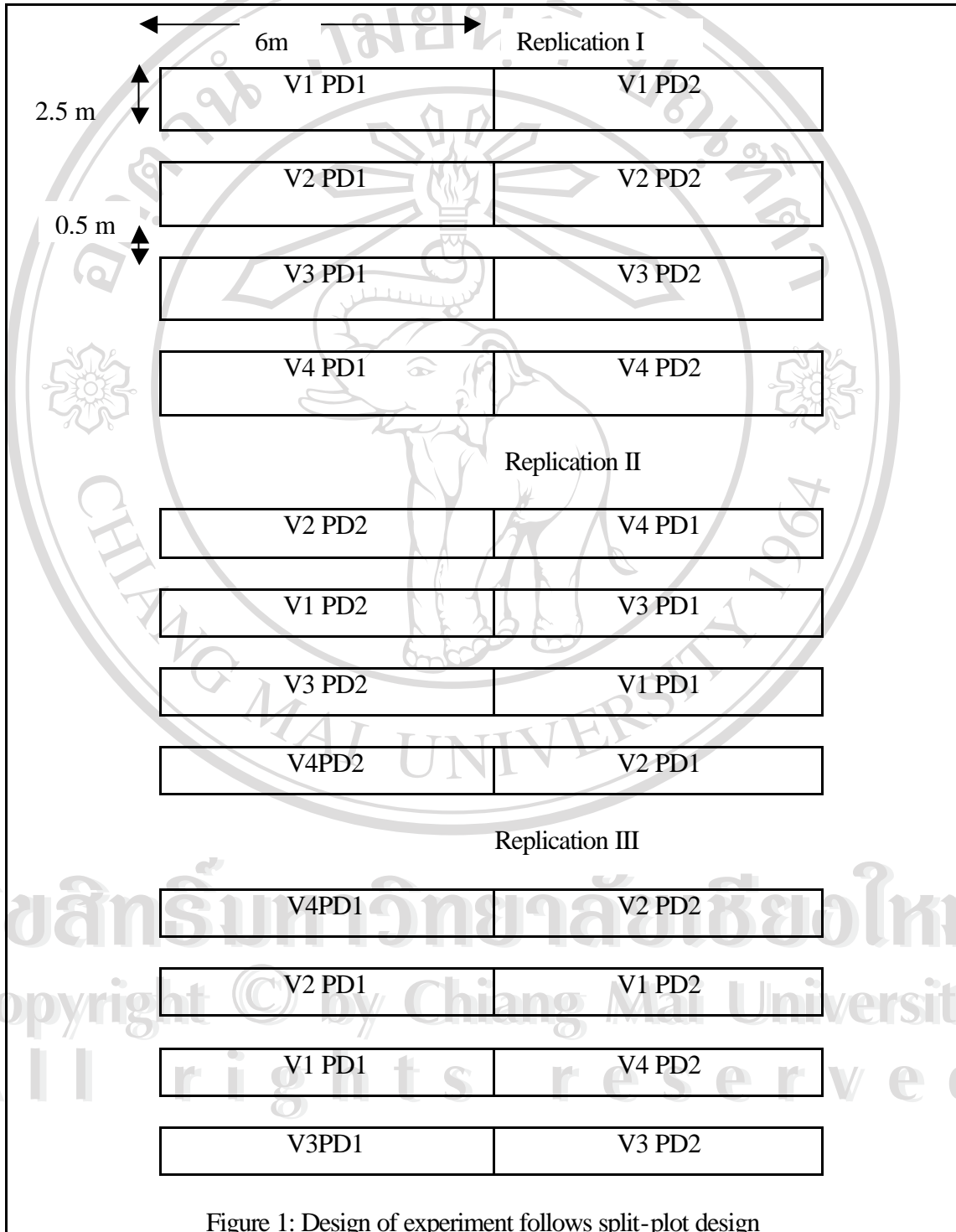


Appendices

Appendix A. Layout of the Experiment.



Appendix B. Data of field experiment

B1. Chemical properties of soil, MCC station field experiment, 2002

Lab.No	Replication		pH	OM	N	P	K
			(1: 1)	(%)		(ppm)	
334	Rep I	2	5.58	1.01	0.061	130.2	56
335		2	5.34	1.03	0.063	132.5	52
336		3	5.64	1.02	0.062	134.5	56
337	Rep II	2	6.03	0.63	0.041	90.3	43
338		2	5.99	0.72	0.048	138.8	46
339		3	6.02	0.70	0.046	130.8	47
340	Rep III	2	5.73	0.94	0.058	129.1	67
341		2	5.77	1.00	0.058	139.3	56
342		3	5.97	0.70	0.045	121.6	56

Source: Soil Lab, MCC, 2002.

B2. LAI of Ak06 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9.00	0.05	0.04	0.01	0.01	0.04	0.03	0.01	0.03
18.00	0.20	0.19	0.16	0.16	0.17	0.16	0.13	0.15
27.00	0.40	0.60	0.40	0.40	0.70	0.60	0.86	0.72
36.00	1.42	1.41	1.38	1.38	1.30	1.50	1.20	1.33
45.00	2.40	2.20	2.00	2.00	1.75	1.65	1.69	1.71
54.00	2.52	2.70	2.40	2.72	1.45	1.40	1.60	1.48
63.00	1.72	1.71	1.68	1.68	1.40	1.60	1.43	1.48
72.00	1.42	1.41	1.38	1.38	0.50	0.70	1.20	0.80

B3. LAI of TN12 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	0.05	0.04	0.01	0.03	0.04	0.03	0.01	0.03
18	0.2	0.19	0.16	0.18	0.17	0.16	0.13	0.15
27	0.4	0.6	0.4	0.47	0.7	0.6	0.86	0.72
36	1.42	1.41	1.38	1.40	1.3	1.5	1.2	1.33
45	2.4	2.2	2	2.20	1.75	1.65	1.69	1.70
54	2.52	2.7	2.4	2.54	1.45	1.4	1.6	1.48
63	1.72	1.71	1.68	1.70	1.4	1.6	1.43	1.48
72	1.42	1.41	1.38	1.40	0.5	0.7	1.2	0.80

B4. LAI of DT84 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	0.05	0.04	0.01	0.03	0.05	0.04	0.01	0.03
18	0.21	0.2	0.17	0.19	0.26	0.25	0.22	0.24
27	0.72	0.71	0.68	0.70	0.4	0.39	0.36	0.38
36	1.72	1.71	1.68	1.70	1.59	1.4	1.52	1.50
45	3	2.81	2.7	2.84	1.8	2.21	2.4	2.20
54	3.22	3.5	3	3.24	1.5	1.71	1.68	1.63
63	2.52	2.51	2.48	2.50	1.52	1.51	1.48	1.50
72	2.12	2.11	2.08	2.10	1.2	1.36	1.4	1.32

B5. LAI of CM60 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	0.05	0.04	0.01	0.03	0.12	0.11	0.08	0.10
18	0.23	0.22	0.19	0.21	0.24	0.23	0.2	0.22
27	0.8	0.71	0.6	0.70	0.64	0.63	0.6	0.62
36	2.02	1.8	2.1	1.97	1.05	1.04	1.01	1.03
45	2.92	2.6	2.81	2.78	1.82	1.81	1.78	1.80
54	3.5	3	3.8	3.43	3.2	2.8	2.7	2.90
63	3.02	3.01	2.98	3.00	2.02	2.01	1.98	2.00
72	2.42	2.41	2.38	2.40	1.52	1.51	1.48	1.50
81	1.9	1.5	1.8	1.73	1.32	1.31	1.28	1.30

B6. Pod weight of AK06 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0
45	40	15	40	32	78	53	78	70
54	530	505	530	522	510	485	510	502
63	1246	1221	1246	1238	900	875	900	892
72	1766	1741	1766	1758	1290	1265	1290	1282
81	1900	2100	1800	1933	1200	1300	1283	1261
93	1800	1905	2056	1920	1000	1258	1487	1248

B7. Pod weight of TN12 in August and September planting date

DAS	August				September			
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	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0
45	39	14	39	31	66	41	66	58
54	469	444	469	461	510	485	510	502
63	1000	1095	1200	1098	910	885	910	902
72	1366	1341	1366	1358	1110	1085	1110	1102
81	1878	1853	1878	1870	1210	1185	1210	1202
93	2000	1871	1900	1924	1000	1320	1210	1177

B8. Pod weight of DT84 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0
45	50	25	50	42	110	85	110	102
54	610	585	610	602	560	535	560	552
63	1360	1335	1360	1352	1310	1285	1310	1302
72	2100	1890	2010	2000	1710	1685	1710	1702
81	2357	2332	2357	2349	2010	1985	2010	2002
93	2231	2332	2357	2307	1800	2000	1989	1930

B9. Pod weight of CM60 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0
45	55	30	55	47	160	135	160	152
54	1110	1085	1110	1102	579	554	579	571
63	2000	2321	2223	2181	1710	1685	1710	1702
72	2663	2638	2663	2655	2310	2285	2310	2302
81	2966	2941	2966	2958	2410	2385	2410	2402
93	3200	2900	2936	3012	2400	2000	2308	2236

B10. Biomass of AK06 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	13	6	12	10	12.1	5.1	11.1	9
18	23	16	22	20	45.6	38.6	44.6	43
27	93	86	92	90	162	155	161	159
36	253	246	252	250	503	496	502	500
45	536	529	535	533	1043	1036	1042	1040
54	1223	1216	1222	1220	1200	1369	1423	1331
63	2519	2512	2518	2516	1663	1656	1662	1660
72	3359	3352	3358	3356	1984	1977	1983	1981
81	3971	3964	3970	3968	2303	2296	2302	2300
96	3200	2996	2756	2984	2100	2356	2150	2202

B11. Biomass of TN12 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	16	9	15	13	13	6	12	10
18	41.6	34.6	40.6	39	45	38	44	42
27	146.6	139.6	145.6	144	143.2	136.2	142.2	141
36	443	436	442	440	435	428	434	432
45	1001	994	1000	998	934	927	933	931
54	1702	1695	1701	1699	1424	1417	1423	1421
63	2300	2187	1900	2129	1700	1621	1672	1664
72	2703	2696	2702	2700	1803	1796	1802	1800
81	2603	2596	2602	2600	2003	1996	2002	2000
96	2600	2400	2502	2501	1626	1919	1850	1798

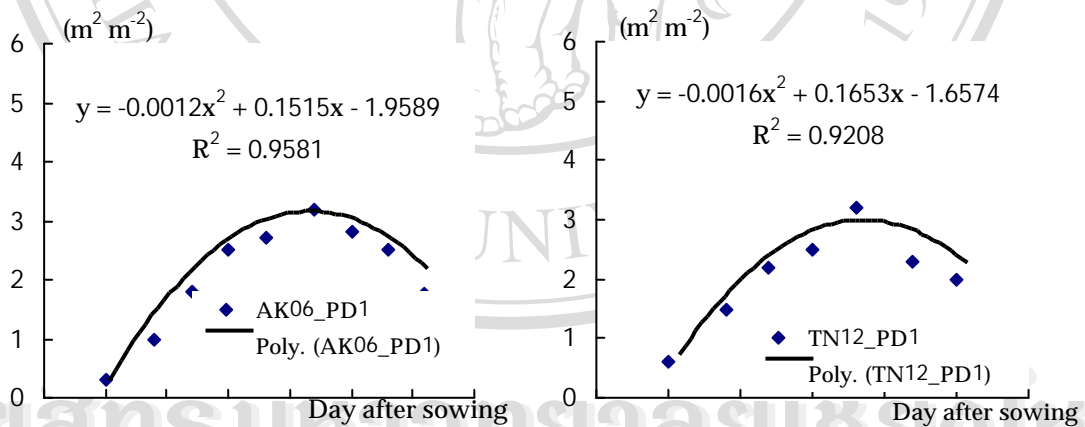
B12. Biomass of DT84 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	24	17	23	21	23	16	22	20
18	62	55	61	59	63	56	62	60
27	241	234	240	238	203	196	202	200
36	893	886	892	890	653	646	652	650
45	1855	1848	1854	1852	1426	1419	1425	1423
54	2517	2510	2516	2514	1903	1896	1902	1900
63	3232	3225	3231	3229	3203	3196	3202	3200
72	5159	5152	5158	5156	3703	3696	3702	3700
81	4503	4496	4502	4500	3587	3580	3586	3584
95	4000	4321	4400	4240	3400	3600	3786	3595

B13. Biomass of CM60 in August and September planting dates

DAS	August				September			
	Rep1	Rep2	Rep3	Mean	Rep1	Rep2	Rep3	Mean
9	28	21	27	25	53	46	52	50
18	144	137	143	141	127	120	126	125
27	264	257	263	261	273	266	272	270
36	887	880	886	884	486	479	485	483
45	1903	1896	1902	1900	1796	1789	1795	1793
54	3103	3096	3102	3100	2303	2296	2302	2300
63	4869	4862	4868	4866	3003	2996	3002	3000
72	4503	4496	4502	4500	3467	3460	3466	3464
81	5103	5096	5102	5100	3603	3596	3602	3600
89	4856	4600	5000	4819	3900	3600	4000	3833
					3500	3800	4200	3833

Fig C1. Maximum of leaf are index in AK06, TN12, DT84 and CM60 in August planting date by using curve fitting



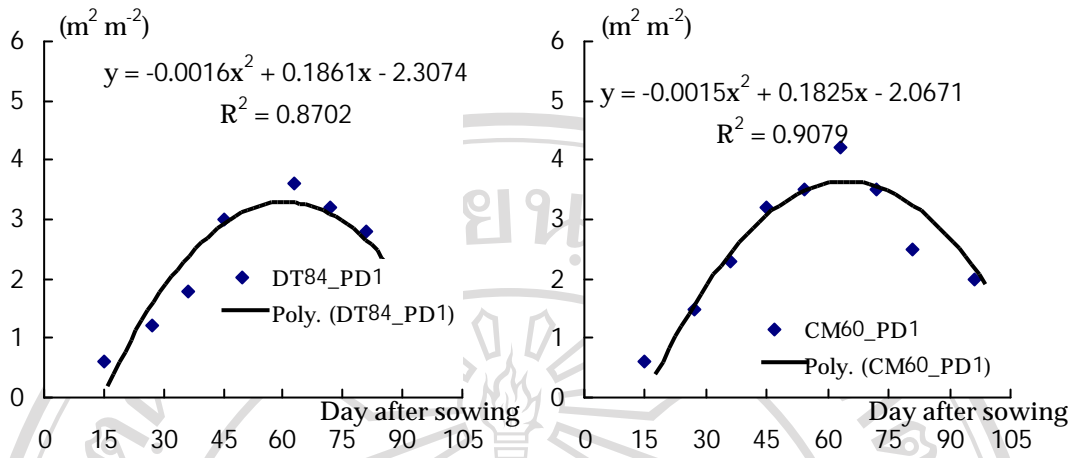
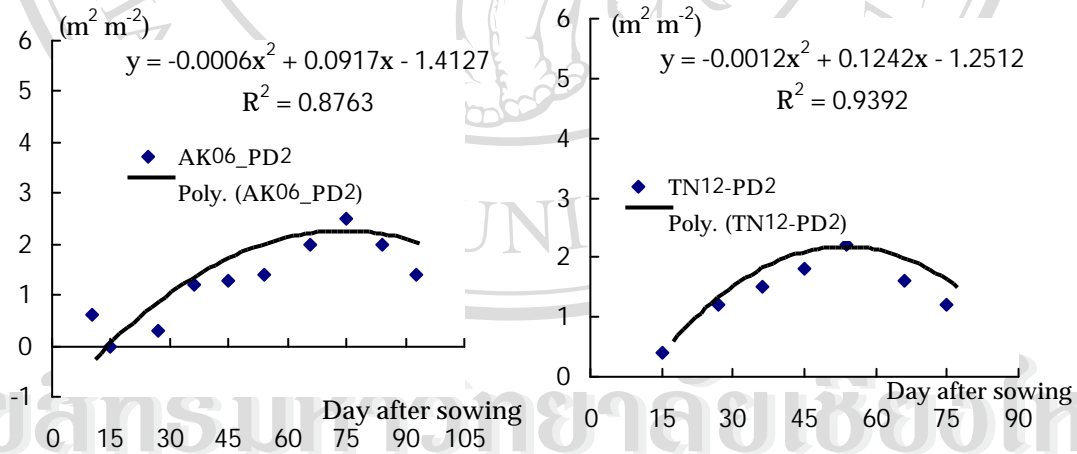
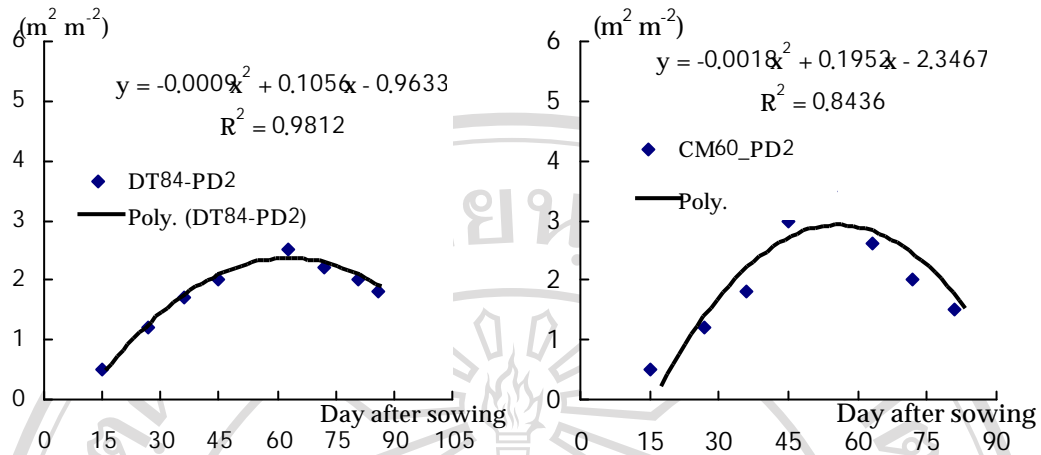


Fig C1. Maximum of leaf are index in AK06, TN12, DT84 and CM60 in September planting date by using curve fitting





Appendix C. ANOVA analysis for field experiment

C1. Analysis of variance table for Leaf area index at R4 stage

SOURCE	DF	SS	MS	F	P
REP (A)	2	0.01751	0.00876	0.25	0.798
PD (B)	1	2.7134	2.7134	78.44	0.0125
A*B	2	0.06918	0.03459		
VAR (C)	3	1.23166	0.41055	18.66	0.0001
B*C	3	1.51996	0.50665	23.03	0
A*B*C	12	0.26401	0.022		
TOTAL	23	5.81572			

C2. Analysis of variance table for Leaf area index at R6 stage

SOURCE	DF	SS	MS	F	P
REP (A)	2	0.14303	0.07152	0.91	0.5225
PD (B)	1	17.4831	17.4831	223.38	0.0044
A*B	2	0.15653	0.07827		
VAR (C)	3	8.09622	2.69874	30.1	0
B*C	3	0.63449	0.2115	2.36	0.123
A*B*C	12	1.076	0.08967		
TOTAL	23	27.5894			

C3. Analysis of variance table for Leaf area index at R8 stage

SOURCE	DF	SS	MS	F	P
REP (A)	2	0.01166	0.00583	0.93	0.5186
PD (B)	1	0.18096	0.18096	28.81	0.033
A*B	2	0.01256	0.00628		
VAR (C)	3	9.80065	3.26688	618.96	0
B*C	3	0.9429	0.3143	59.55	0
A*B*C	12	0.06334	0.00528		
TOTAL	23	11.0121			

C4. Analysis of variance table for Grain weight at final harvest (R8)

SOURCE	DF	SS	MS	F	P
REP (A)	2	1600.08	800.042	1.78	0.3601
PD (B)	1	843750	843750	1874.48	0.0005
A*B	2	900.25	450.125		
VAR (C)	3	174118	58039.4	137.36	0
B*C	3	105491	35163.7	83.22	0
A*B*C	12	5070.33	422.528		
TOTAL	23	1130930			

C5. Analysis of variance table for seed per pod at final harvest (R8)

SOURCE	DF	SS	MS	F	P
REP (A)	2	6.75E-04	3.38E-04	0.03	0.9727
PD (B)	1	0.39527	0.39527	32.93	0.0291
A*B	2	0.02401	0.012		
VAR (C)	3	0.2517	0.0839	12.39	0.0006
B*C	3	0.0497	0.01657	2.45	0.1141
A*B*C	12	0.08125	0.00677		
TOTAL	23	0.8026			

C6. Analysis of variance table for seed m-2 at final harvest.

SOURCE	DF	SS	MS	F	P
REP (A)	2	18480.8	9240.4	1.52	0.3972
PD (B)	1	39768	39768	6.53	0.125
A*B	2	12176.1	6088.03		
VAR (C)	3	3426773	1142258	141.08	0
B*C	3	1341223	447074	55.22	0
A*B*C	12	97156.5	8096.38		
TOTAL	23	4935577			

C7. Analysis of variance table for pod weight at final harvest.

SOURCE	DF	SS	MS	F	P
REP (A)	2	2.08E-06	1.04E-06	0.01	0.9941
PD (B)	1	1.26E-04	1.26E-04	0.72	0.4866
A*B	2	3.52E-04	1.76E-04		
VAR (C)	3	0.00138	4.59E-04	4.74	0.021
B*C	3	1.28E-04	4.27E-05	0.44	0.728
A*B*C	12	0.00116	9.69E-05		
TOTAL	23	0.00315			

Appendix D. Simulation model

Calibration model.

D1. Input soil data in San Sai series for model calibration and testing model

*SI00020001 SCS SA 110 T328 SANSAI
 @SITE COUNTRY LAT LONG SCS FAMILY
 SANSAI THAILAND -0.000 -9.000 SANSAI SERIES
 @ SCOM SALB SLU1 SLDR SLRO SLNF SLPF SMHB SMPX SMKE
 BN 0.13 8.1 0.40 76 1.00 1.00 IB001 IB001 IB001

SLB	SLLL	SDUL	SSAT	SRGF	SBDM	SLOC	SLCL	SLSI	SLHW	SLHB	SCEC
17	0.043	0.168	0.322	0.5	1.65	0.6	1.5	33.5	6.7	6.4	4.8
33	0.056	0.178	0.318	0.5	1.66	0.39	4.5	27.5	7.3	6.8	0.6
48	0.072	0.193	0.327	0.35	1.63	0.09	8	27.5	7	5.9	1.5
90	0.065	0.188	0.327	0.35	1.63	0.39	6.5	29.5	6.8	5.9	1.3
110	0.098	0.22	0.339	0.2	1.59	0.08	14	27	5.5	3.8	3.6

D2. Phenology event of four soybean varieties these used initial Bragg (7).

Variety	Planting date	Anthesis		First pod		First seed		Maturity	
		Sim	Obs	Sim	Obs	Sim	Obs	Sim	Obs
AK06	PD1	28	31	40	46	46	56	84	86
	PD2	27	30	38	37	43	40	81	83
TN12	PD1	28	28	40	36	46	41	84	75
	PD2	27	27	38	31	43	40	81	73
DT84	PD1	28	31	40	38	46	51	84	82
	PD2	27	31	35	40	43	37	81	78
CM60	PD1	28	41	50	38	46	51	84	100
	PD2	27	30	42	42	43	43	81	90

D3. Grain yield, pod weight. Above ground biomass and LAI from calibration model, that used initial Bragg (7)

Variety	Planting date	Grain yield		Pod yield		Biomass		LAI	
		Sim	Obs	Sim	Obs	Sim	Obs	Sim	Obs
AK06	PD1	1434	1656	1816	1820	2178	3000	1.23	2.7
	PD2	980	1056	1233	1273	1681	2200	1	2
TN12	PD1	1434	1527	1816	1686	2178	2500	1.23	2.5
	PD2	980	900	1233	986	1681	1823	1	1.7
DT84	PD1	1434	1804	1816	2347	2178	4250	1.23	3.2
	PD2	980	984	1233	1947	1681	2828	1	2.2
CM60	PD1	1434	1902	1816	3098	2178	4800	1.23	3.8
	PD2	980	1468	1233	2298	1681	3717	1	2.9

D4. Simulated and Observed data of leaf area index for AK06 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0.04	0.03	0.03	0.03
18	0.16	0.18	0.13	0.15
27	0.55	0.47	0.47	0.72
36	1.31	1.40	1.11	1.33
45	1.97	2.20	1.59	1.70
54	1.98	2.69	1.48	1.48
63	1.71	1.70	1.27	1.48
72	1.49	1.40	1.13	0.80

D5. Simulated and Observed data of leaf area index for TN12 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0.03	0.03	0.03	0.02
18	0.18	0.18	0.13	0.15
27	0.47	0.45	0.47	0.76
36	1.40	1.40	1.11	1.30
45	2.20	2.20	1.67	1.71
54	2.54	2.50	1.57	1.48
63	1.70	1.70	1.35	1.45
72	1.40	1.40	1.20	0.80

D6. Simulated and Observed data of leaf area index for DT84 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0.04	0.03	0.03	0.03
18	0.16	0.19	0.13	0.24
27	0.57	0.70	0.48	0.38
36	1.52	1.70	1.30	1.50
45	2.50	2.80	2.10	2.20
54	2.53	3.20	2.00	1.70
63	2.19	2.50	1.72	1.50
72	1.91	2.10	1.53	1.35

D7. Simulated and Observed data of leaf area index for CM60 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0.04	0.03	0.03	0.10
18	0.16	0.21	0.13	0.22
27	0.57	0.70	0.48	0.62
36	1.51	2.00	1.29	1.03
45	2.45	2.70	2.03	1.80
54	2.55	3.40	1.98	2.90
63	2.27	3.00	1.78	2.00
72	2.01	2.40	1.58	1.50
81	1.79	2.00	1.14	1.30

D8. Simulated and Observed data above ground biomass for AK06 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	17	13	15	10
18	49	38.6	42	42
27	171	143.6	162	140.2
36	498	440	487	432
45	1130	998	1067	931
54	1867	1699	1570	1421
63	2481	2191	2034	1670
72	2975	2700	2361	1800
81	3272	2600	2483	2000
96	2826	2500	2066	1823

D9 Simulated and Observed data above ground biomass for TN12 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	17	13	15	10
18	49	38	42	42
27	171	143	162	140
36	498	440	487	432
45	1130	998	1067	931
54	1867	1699	1570	1421
63	2481	2191	2034	1670
72	2975	2700	2361	1800
81	3272	2600	2483	2000
96	2826	2500	2066	1823

D10 Simulated and Observed data above ground biomass for CM60 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	16	21	41	20
18	49	59	175	60
27	185	238	563	200
36	569	890	1252	650
45	1320	1852	3298	1423
54	2164	2514	1867	1900
63	2872	3229	2923	3200
72	3473	5156	3271	3700
81	3968	4500	2782	3584
95	3408	4250	2688	3584

D11. Simulated and Observed data above ground biomass for CM60 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	17	25	14	50
18	50	141	43	124.3
27	185	261	175	270
36	563	884	553	483
45	1298	1900	1221	1793
54	2167	3100	1871	2300
63	2971	4866	2566	3000
72	3682	4500	3079	3464
81	4216	5100	3222	3600
89	3584	4800	2888	3800
			2765	3717

D12 Simulated and Observed data above pod weight for AK06 soybean variety in Aug and Sep planting dates

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	0
45	38	30	84	68
54	570	520	598	500
63	1389	1236	1234	890
72	2064	1756	1530	1280
81	2278	1920	1520	1273
93	2265	1920	1512	1273

D13 Simulated and Observed data above pod weight for TN12 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	0
45	40	29	89	56
54	575	459	591	500
63	1347	1110	1178	900
72	1962	1356	1587	1100
81	2337	1868	1723	1200
93	2454	1886	1716	1200

D14 Simulated and Observed data above pod weight for DT84 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	0
45	45	40	67	100
54	697	600	645	550
63	1592	1350	1404	1300
72	2324	2000	1870	1700
81	2538	2347	1856	2000
93	2524	2347	1847	1947

D15 Simulated and Observed data above pod weight for CM60 soybean variety in Aug and Sep planting dates

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	0
45	45	45	88	150
54	624	1100	634	569
63	1562	2213	1302	1700
72	2347	2653	1917	2300
81	2851	2956	2145	2400
93	2955	3098	2225	2298

D16 Simulated and Observed data grain yield for AK06 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	0
45	0	3	0	10
54	159	120	286	253
63	844	800	888	780
72	1561	1200	1207	1000
81	1799	1656	1207	1056
93	1799	1656	1207	1056

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D17 Simulated and Observed data grain yield for TN12 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	0
45	0	4	0	10
54	131	159	240	200
63	717	690	766	650
72	1376	1200	1205	890
81	1782	1527	1359	900
93	1916	1527	1359	900

D18 Simulated and Observed data grain yield for DT84 soybean variety in Aug and Sep planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	0
45	0	5	0	26
54	230	180	315	200
63	989	856	974	500
72	1764	1653	1472	700
81	2005	1804	1472	854
93	2005	1804	1472	984

D19. Simulated and Observed data grain yield for CM60 soybean variety in August and September planting dates.

DAS	August		September	
	Sim	Obs	Sim	Obs
9	0	0	0	0
18	0	0	0	0
27	0	0	0	0
36	0	0	0	65
45	11	15	18	120
54	146	500	121	380
63	522	900	349	650
72	1032	1300	702	931
81	1484	1700	961	1100
93	1631	1900	1083	1468

D20. Yield and yield components at harvest

Planting dates	Seed yield kg ha ⁻¹	Seed number # m ⁻²	Seeds/pod # pod ⁻¹	1000 seed weight g; dry	Pod weight kg ha ⁻¹	Harvest index
AK06						
PD1	1656.00	950.00	1.77	159.00	1920.00	0.35
PD2	1156.00	867.00	1.50	150.00	1273.00	0.30
Mean	1406.00	908.50	1.64	154.50	1596.50	0.33
TN12						
PD1	1527.00	800.00	1.90	162.00	1886.00	0.38
PD2	1200.00	704.00	1.60	160.00	986.00	0.32
Mean	1363.50	752.00	1.75	161.00	1436.00	0.35
DT84						
PD1	1804.00	1058.00	2.01	158.00	2347.00	0.36
PD2	1209.00	958.00	1.60	155.00	1947.00	0.36
Mean	1506.50	1008.00	1.81	156.50	2147.00	0.36
CM60						
PD1	1560.00	1477.00	1.75	140.00	3098.00	0.52
PD2	1368.00	1077.00	1.55	138.00	2298.00	0.50
Mean	1464.00	1277.00	1.65	139.00	2698.00	0.51

.D21. Result of Model simulation for AK06 and TN12 in August and September planting dates.

VARIABLE	AK06 pd1		AK06 pd2		TN12pd1		TN12 pd2	
	Sim	Obs	Sim	Obs	Sim	Obs	Sim	Obs
Anthesis Date (dap)	28	31	27	30	28	28	27	27
First Pod (dap)	40	46	38	37	40	36	38	31
First Seed (dap)	46	56	43	40	46	41	43	40
Physiological Maturity	84	86	81	83	84	75	81	73
Pod Yield (kg ha ⁻¹ ;dry)	2265	1820	1512	1273	2454	1686	1716	986
Seed Yield (kg ha ⁻¹ ;dry)	1799	1656	1207	1056	1916	1527	1359	900
Shelling Percentage (%)	79.43	54.3	79.8	50.3	78.07	68.5	79.16	58.5
Weight Per Seed (g;dry)	0.14	0.159	0.126	0.15	0.139	0.162	0.134	0.16
Seed Number (Seed/m ²)	1288	950	956	867	1378	800	1013	704
Seeds/Pod	1.9	1.77	1.9	1.5	2.1	1.9	2.1	1.6
Maximum LAI (m ² /m ²)	2.05	2.7	1.6	2	2.18	2.5	1.69	1.7
Biomass (kg/ha) at Anthe	203	-99	201	-99	191	-99	187	-99
Biomass (kg/ha) at Harvest	3069	3000	2324	2200	2826	2500	2067	1823
Stalk (kg/ha) at Harvest	760	-99	768	-99	348	-99	326	-99
Harvest Index (kg/kg)	0.586	0.35	0.519	0.3	0.678	0.38	0.657	0.32
Final Leaf Number	8.88	9	8.11	9	8.88	10	8.11	10
Canopy Height (m)	0.57	0.54	0.51	0.5	0.57	0.53	0.51	0.4
Seed N (kg N/ha)	120	-99	78	-99	127	-99	88	-99
Biomass N (kg N/ha)	133	-99	89	-99	135	-99	95	-99
Stalk N (kg N/ha)	7	-99	7	-99	2	-99	3	-99
Seed N (%)	6.7	-99	6.47	-99	6.61	-99	6.47	-99
Seed Lipid (%)	19.63	-99	19.75	-99	19.82	-99	19.77	-99

D22. Result of Model simulation for DT84 and CM60 in August and September planting dates.

VARIABLE	DT84 pd1		DT84 pd2		CM60 pd1		CM60 pd2	
	Sim	Obs	Sim	Obs	Sim	Obs	Sim	Obs
Anthesis Date (dap)	28	31	28	31	29	41	28	30
First Pod (dap)	41	42	39	35	41	50	39	42
First Seed (dap)	45	51	43	37	41	51	39	43
Physiological Maturity	83	82	81	78	81	95	79	90
Pod Yield (kg ha ⁻¹ ;dry)	2524	2347	1846	1947	2955	3098	2225	2298
Seed Yield (kg ha ⁻¹ ;dry)	2005	1804	1472	984	1631	1902	1083	1468
Shelling Percentage (%)	79.4	67.8	79.7	63.8	55.2	68.1	48.65	67.1
Weight Per Seed (g;dry)	0.14	0.16	0.12	0.16	0.16	0.14	0.171	0.14
Seed Number (Seed/m ²)	1448	1058	1218	958	1027	1477	632	1077
Seeds/Pod	1.95	2.01	1.95	1.6	0.72	1.75	0.53	1.55
Maximum LAI (m ² /m ²)	2.63	3.2	2.16	2.2	2.58	3.8	2.07	2.9
Biomass (kg/ha) at Anthe	206	-99	238	-99	245	-99	237	-99
Biomass (kg/ha) at Harvest	3408	4250	2689	2828	3584	4800	2766	3717
Stalk (kg/ha) at Harvest	832	-99	793	-99	594	-99	510	-99
Harvest Index (kg/kg)	0.59	0.36	0.55	0.36	0.46	0.52	0.391	0.5
Final Leaf Number	8.88	9	8.4	9	9.18	11	8.4	12
Canopy Height (m)	0.57	0.59	0.52	0.5	0.59	0.75	0.52	0.6
Seed N (kg N/ha)	133	-99	96	-99	106	-99	67	-99
Biomass N (kg N/ha)	148	-99	108	-99	132	-99	89	-99
Stalk N (kg N/ha)	8	-99	7	-99	5	-99	4	-99
Seed N (%)	6.65	-99	6.54	-99	6.51	-99	6.21	-99
Seed Lipid (%)	19.7	-99	19.6	-99	20	-99	20.39	-99

Appendix E. Trial model in Thanh Ha, Hoa Binh Viet Nam.

E1. Soil data input for trial model in Thanh Ha farm.

TH00020001 SCS CL 150 Clay Loam										
SITE COUNTRY		LAT LONG		SCS FAMILY						
THANHHA VIETNAM		20.17 105.5		CLAY LOAMDAT						
SALB	SLU1	SLDR	SLRO	SLNF	SLPF	SMHB	SMPX	SMKE		
0.14	11.2	0.40	80	1.00	1.00	IB001	IB001	IB001		
SLB SL	SLLL	SDUL	SSAT	SBDM	SLOC	SLCL	SLSI	SLHW	SCEC	
15 --	0.20	0.31	0.37	1.20	3.17	40.20	29.40	4.80	5.20	
30 --	0.24	0.36	0.38	1.20	2.46	47.00	26.60	4.70	5.40	
60 --	0.22	0.33	0.37	1.30	1.32	46.00	23.20	4.80	3.60	
90 --	0.21	0.32	0.37	1.30	1.22	42.20	27.20	4.80	3.10	
120 --	0.16	0.27	0.36	1.30	0.73	29.80	28.60	5.00	-99.00	
150 --	0.12	0.23	0.35	1.30	0.51	20.40	26.80	4.00	-99.00	

E2. Yield of four soybean varieties from trial model in Thanh Ha , Hoa Binh province (1994 –2001)

Treatment	1994	1995	1996	1997	1998	1999	2000	2001
1PL-DAY 015 AK06	432	503	358	114	594	693	243	217
2PL-DAY 015 TN12	391	429	374	113	634	695	246	219
3PL-DAY 015 DT84	480	524	365	124	663	775	265	218
4PL-DAY 015 CM60	508	216	537	122	785	918	285	437
5PL-DAY 045 AK06	228	991	1102	38	1595	886	344	576
6PL-DAY 045 TN12	225	947	1064	35	1666	832	217	585
7PL-DAY 045 DT84	247	1006	1197	35	1777	990	211	593
8PL-DAY 045 CM60	305	1205	1673	39	2047	1255	390	625
9PL-DAY 075 AK06	837	2463	1674	440	1928	1091	854	701
10PL-DAY 075 TN12	768	2298	1707	479	1947	1202	877	675
11PL-DAY 075 DT84	813	2677	1838	436	2059	1278	901	474
12PL-DAY 075 CM60	1339	3439	2133	502	2484	1251	1194	790
13PL-DAY 105 AK06	2120	4122	2515	1163	2566	2142	1742	534
14PL-DAY 105 TN12	2369	3621	2543	1183	2562	2164	1806	566
15PL-DAY 105 DT84	2151	4232	2516	1232	2594	2163	1752	563
16PL-DAY 105 CM60	2815	4988	2929	1861	2959	2427	2017	810
17PL-DAY 135 AK06	2716	4714	2644	2460	2729	2747	2673	2530
18PL-DAY 135 TN12	2848	4471	2732	2658	2799	2875	2696	2699

19PL-DAY 135 DT84	2821	4803	2797	2589	2889	2745	2800	2678
20PL-DAY 135 CM60	3061	5358	2939	2909	2995	3104	3077	2947
21PL-DAY 165 AK06	2577	3929	2231	2464	2445	2349	2342	2505
22PL-DAY 165 TN12	2664	4092	2347	2683	2585	2463	2388	2707
23PL-DAY 165 DT84	2592	4011	2297	2538	2541	2361	2415	2702
24PL-DAY 165 CM60	2993	4729	2802	2771	2809	2721	2724	2911
25PL-DAY 195 AK06	2054	2896	1885	1965	1900	2042	2059	2045
26PL-DAY 195 TN12	2195	3064	2060	2042	2019	2045	2162	2113
27PL-DAY 195 DT84	2182	3010	1994	2062	2006	2071	2188	2107
28PL-DAY 195 CM60	2493	3579	2355	2470	2337	2441	2494	2586
29PL-DAY 225 AK06	1325	1861	1136	1301	1199	1140	1404	1367
30PL-DAY 225 TN12	1323	1736	1185	1300	1223	1186	1320	1379
31PL-DAY 225 DT84	1386	1839	1236	1229	1286	1317	1391	1436
32PL-DAY 225 CM60	1647	2116	1502	1566	1556	1406	1643	1656
33PL-DAY 255 AK06	891	1523	964	840	918	788	842	817
34PL-DAY 255 TN12	808	1350	903	841	839	765	857	770
35PL-DAY 255 DT84	898	1653	1061	931	945	838	949	837
36PL-DAY 255 CM60	1127	1726	1263	1041	1059	1074	1149	1102
37PL-DAY 285 AK06	870	1131	831	619	570	635	679	728
38PL-DAY 285 TN12	856	941	781	654	595	645	655	749
39PL-DAY 285 DT84	944	1236	863	718	687	686	726	836
40PL-DAY 285 CM60	1089	1175	959	807	815	857	841	971
41PL-DAY 315 AK06	651	1197	594	763	726	642	705	689
42PL-DAY 315 TN12	510	1035	566	738	732	679	674	722
43PL-DAY 315 DT84	692	1325	639	856	825	745	764	766
44PL-DAY 315 CM60	1013	1465	687	862	900	858	768	772
45PL-DAY 345 AK06	620	1641	859	871	826	668	806	700
46PL-DAY 345 TN12	644	1496	881	846	801	754	641	562
47PL-DAY 345 DT84	730	1753	933	968	958	888	731	600
48PL-DAY 345 CM60	820	1982	1106	1174	1072	900	988	856

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