



Table S1. Weekly rainfall at two locations in northern Ghana during 2020 and 2021.

Interval after planting	Rainfall					
	Nyankpala			Tanina		
	Planting date			Planting date		
Days	mm					
2020	May 20	June 3	June 17	June 17	July 1	July 15
0–14	35	136.7	117.1	37.6	79.1	37.6
15–28	136.7	117.1	202.6	78.3	37.6	39.7
29–42	117.1	202.6	105.6	38.4	169.6	43.5
43–56	202.6	105.6	31.8	39.7	43.5	152.4
57–70	105.6	31.8	179.6	43.5	139.3	203.4
71–84	31.8	179.6	147.2	127.9	216.5	81.1
85–98	131.5	147.2	69.5	214.9	81.1	57.4
99–112	160.4	69.5	151.6	90.9	57.4	0.0
113–126	104.4	151.6	79.3	60.6	0.0	0.0
2021	May 28	June 18	July 2	May 27	June 12	June 24
0–14	104.6	86.4	63.8	69.3	16.3	134.3
15–28	95.9	63.8	29	46.0	135.0	61.2
29–42	200.5	29	118.1	134.3	63.9	129.0
43–56	77.4	118.1	117.4	61.2	131.5	142.6
57–70	37.1	117.4	167.1	129.0	145.9	156.0
71–84	164.7	167.1	25.7	142.6	178.9	178.8
85–98	179.2	24.9	49.4	156.0	148.8	31.1
99–112	57.5	50.2	27.5	178.8	36.5	50.6
113–126	29.2	27.5	6.3	31.1	43.1	68.0

Treatment factors included three levels of planting date (referred to as early, mid).

Table S2. Planting dates at three locations in northern Ghana during 2020 and 2021.

Planting schedule in the cropping cycle	Planting date					
	2020			2021		
	Fumesua	Nyankpala	Tanina	Fumesua	Nyankpala	Tanina
Early	May 28	May 20	June 17	June 11	May 28	May 27
Mid	June 18	June 3	July 1	June 26	June 18	June 12
Late	July 2	June 17	July 15	July 12	July 2	June 24

Table S3. Sample calculation of economic return associated with harvest, shelling, and production costs.

Peanut yield (kg/ha)		Cost of production inputs (\$/ha)								
		Gross economic return (\$/ha) ^a	Harvest cost (\$0.075/kg unshelled)	Shelling cost (\$0.075/kg shelled)	Base cost production cost	Fertilizer	Improved pest management			Economic return (\$/ha) ^b
Un-shelled	Shelled						Additional weeding	Local potassium soaps	Total cost	
2,000	1,300	1,560	150	98	145	0	0	0	393	1,167
2,000	1,300	1,560	150	98	145	0	50	10	453	1,107

2,000	1,300	1,560	150	98	145	148	0	0	541	1,019
2,000	1,300	1,560	150	98	145	148	50	10	601	959

^aPrice set at \$1.2/kg shelled peanut at a shell out rate of 65%. ^bEstimated economic return calculated by subtracting total cost associated with harvest and production from gross economic return.

Table S4. Analysis of variance for peanut yield, net return, pest reaction, and pod damage as influenced by planting date, pest management practice, cultivar, applied fertilizer, and harvest date.^a

Source of variation	Pod yield	Net re-turn	Millipede	White grub	Wireworm	Termites	Canopy de-foliation	Aphid ^b	Rosette ^c	Scarred pods	Penetrated pods
Planting Date (PD)	*	*	*	*	NS	NS	*	NS	*	*	NS
Pest management practice (PM)	*	*	*	*	*	*	*	*	*	*	*
Cultivar (CU)	*	*	*	*	*	*	*	*	*	*	*
Fertilizer (FE)	*	*	*	*	*	*	*	*	*	*	*
Harvest Date (HD)	NS	NS	*	*	*	*	*	NS	NS	*	*
PD × CU	NS	NS	NS	*	NS	NS	*	NS	NS	*	NS
PD × FE	*	*	NS	NS	NS	NS	*	*	NS	*	NS
CU × PM	NS	NS	*	*	*	*	NS	*	*	*	*
FE × PM	NS	NS	*	*	*	*	*	*	*	*	*
CU × FE	*	*	*	*	*	*	*	*	*	*	*
PD × HD	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS
PM × HD	NS	NS	NS	*	*	*	*	NS	NS	*	*
CU × HD	NS	NS	NS	*	NS	*	*	NS	NS	*	*
FE × HD	NS	NS	NS	NS	NS	*	NS	NS	NS	*	*
CU × FE × PM	NS	NS	*	NS	NS	*	*	NS	*	*	*
PD × CU × PM	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS
PD × FE × PM	NS	NS	NS	NS	NS	NS	*	*	NS	*	NS
PD × CU × FE	NS	NS	NS	NS	NS	NS	NS	NS	NS	*	NS
CU × FE × HD	NS	NS	NS	NS	NS	*	*	NS	NS	*	*
PD × CU × HD	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS
PD × FE × HD	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS
CU × PM × HD	NS	NS	NS	NS	NS	NS	NS	NS	NS	*	NS
FE × PM × HD	NS	NS	NS	NS	NS	*	NS	NS	NS	*	*
PD × CU × FE × PM	NS	NS	NS	NS	NS	NS	*	NS	*	NS	NS

CU × FE × PM × HD	NS	NS	NS	NS	NS	NS	*	NS	NS	*	NS
PD × CU × PM × HD	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS
PD × CU × FE × HD	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS
PD × CU × FE × PM × HD	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS

^aData are pooled over 6 site-year combinations in 2019 and 2020. ^bOrdinal scale of 0 to 9 where: 0 = no aphids present/no infestation; 1 = early instar nymphs present/few individual aphids (0–100); 3 = early and late instar nymphs and adults spread on most stems/few isolated colonies (101–300); 5 = aphids spread on all stems and new trifoliolate leaves/several small colonies (301–600); 7 = high density of aphids on all stems and 50–80% trifoliolate leaves covered with aphids/large isolated colonies (601–1000); and 9 = plants overwhelmed by aphids with > 80% covered/large contentious colonies (> 1000). ^cOrdinal scale where: 1 = resistant with no symptom; 2 = very slight leaf symptoms; 3 = slight leaf symptoms but still negligible; 4 = 50% symptoms on leaves; 5 = all leaves with symptoms of chlorosis; 6 = 25% stunting; 7 = 50% stunting; 8 = > 50% stunting with few pods; and 9 = > 50% stunting and no pods.