agronomy

Supplementary Materials:

Table S1. Background information on the measured soybean cultivars

Soybean cultivars	Abbreviation	Pods habit	Plant-type	Growth period	Mature stages	Origin
Guixia 1	GX1	Determinate	Convergent	93	Early maturity	Guangxi, China
Guixia 3	GX3	Determinate	Convergent	95	Early maturity	Guangxi, China
Huaxia 6	HX6	Determinate	Convergent	100	Early maturity	Guangdong, China
Huaxia 9	HX9	Determinate	Convergent	99	Early maturity	Guangdong, China
Gogqiudou 4	GQ4	Determinate	Convergent	139	Late maturity	Sichuan, China
Gogqiudou 5	GQ5	Determinate	Convergent	139	Late maturity	Sichuan, China
Gogqiudou 8	GQ8	Determinate	Convergent	127	Late maturity	Sichuan, China
GX5104-1	GX5104-1	Determinate	Convergent	104	Medium maturity	Sichuan, China
Nandou 12	ND12	Determinate	Convergent	105	Medium maturity	Sichuan, China
Nandou 20	ND20	Determinate	Convergent	139	Late maturity	Sichuan, China
Nandou 25	ND25	Determinate	Convergent	134	Late maturity	Sichuan, China
Nandou 27	ND27	Determinate	Convergent	137	Late maturity	Sichuan, China
CD5226	CD5226	Determinate	Convergent	103	Medium maturity	Sichuan, China
F14168-182	F14168-182	Determinate	Convergent	100	Medium maturity	Sichuan, China
F14119-130	F14119-130	Determinate	Convergent	110	Medium maturity	Sichuan, China

Table S2. Variability analysis on agronomy traits of the fifteen soybeans under maize-soybean relay intercropping

Agronomy traits	Range	Minimum	Maximum	Mean	SE	SD	CV, %
Yield	1286.0	1379.0	2665.0	1750.3	83.0	321.5	18.4
EP	40.7	57.0	97.7	79.5	3.1	12.1	15.2
SN	79.1	87.3	166.4	131.3	5.8	22.4	17.1
UnitW	11.2	17.7	28.9	23.3	0.9	3.4	14.4
FN	244.2	114.6	358.8	262.4	19.1	73.9	28.2
FA	134.1	15.4	149.5	58.1	10.2	39.6	68.0
FAR	34.2	7.5	41.7	21.1	2.6	10.2	48.1
PN	219.7	94.7	314.4	188.1	16.0	62.0	32.9
PA	27.9	13.3	41.2	20.0	2.1	8.1	40.6
PAR	16.5	5.5	22.0	11.4	1.2	4.5	40.0

[1]. SE: Standard error, SD: Standard deviation, CV, %: Coefficient of Variation. EP: effective pods; SN: seed number; UnitW: 100-seed weight; FN: flower number, FA: flower abscission, FAR: flower abscission rate, PN: pod number, PA: pod abscission, PAR: pod abscission rate.

Table S3 Eigenvectors of leading principal components.

Traits	Principal components		
	PC1	**PC2**	**PC3**
Yield	0.294	-0.040	-0.284
EP	0.338	-0.191	0.479
SN	0.367	-0.375	0.247
UnitW	-0.263	0.120	-0.295
FN	0.011	-0.548	-0.315
FA	-0.273	-0.467	0.154
FAR	-0.321	-0.350	0.313
PN	0.288	-0.289	-0.509
PA	-0.298	-0.287	-0.245
PAR	-0.497	-0.018	0.054
Eigenvalue	3.325	2.706	1.739
Percentage of Variance (%)	33.252	27.065	17.394
Cumulative (%)	33.252	60.316	77.710

[1]. EP: effective pods; SN: seed number; UnitW: 100-seed weight; FN: flower number, FA: flower abscission, FAR: flower abscission rate, PN: pod number, PA: pod abscission, PAR: pod abscission rate.

Table S4. Classification result of soybean cultivar.

Clusters	**Soybean cultivars**							
High-yielding	GX3	ND12						
Mid-yielding	GQ4	GQ5	GX1	ND25	ND20			
Low-yielding	HX9	ND27	F14119-130	GQ8	HX6	CD5226	F14168-182	GX5104-1

[1]. HYC: high-yielding cultivar, LYC: low-yielding cultivar, MYC: middle-yielding cultivar.

Table S5. Mean value of agronomic traits of High-yielding, Mid-yielding and Low-yielding soybean.

Clusters	Cultivars (N0.)	Yield (kg ha^{-1})	EP (N0.)	SN (No.)	UnitW (g)	Flower abscission characters			Pod abscission characters		
						FN (No.)	FA (No.)	FAR (%)	PN (No.)	PA (No.)	PAR (%)
High-yielding	2	2281.7	81.9	148.2	22.7	321.3	27.7	8.7	296.0	17.8	6.4
Mid-yielding	8	1704.3	85.5	139.4	22.0	235.7	56.0	22.2	164.8	15.6	9.8
Low-yielding	5	1611.4	68.8	111.7	25.6	281.5	73.7	24.3	182.1	28.0	15.9

[1]. EP: effective pods; SN: seed number; UnitW: 100-seed weight; FN: flower number, FA: flower abscission, FAR: flower abscission rate, PN: pod number, PA: pod abscission, PAR: pod abscission rate.