

Genetic Resources and Crop Evolution

The *Phaseolus vulgaris* Yellow Bean Collection: Genetic diversity and characterization for cooking time

Rie Sadohara¹, Paulo Izquierdo¹, Filipe Couto Alves², Timothy Porch³, James Beaver⁴, Carlos A. Urrea⁵, Karen Cichy^{1,6}

1. Department of Plant, Soil, and Microbial Sciences, Michigan State University, MI, USA
2. Department of Epidemiology and Biostatistics, Michigan State University, East Lansing, MI, USA
3. Tropical Agriculture Research Station, USDA-ARS, Mayaguez, PR, USA
4. Department of Agroenvironmental Sciences, University of Puerto Rico, Mayaguez, PR, USA
5. Panhandle Research & Extension Center, Scottsbluff, NE, USA
6. Sugarbeet and Bean Research Unit, USDA-ARS, East Lansing, MI, USA

Supplementary Figures and Tables

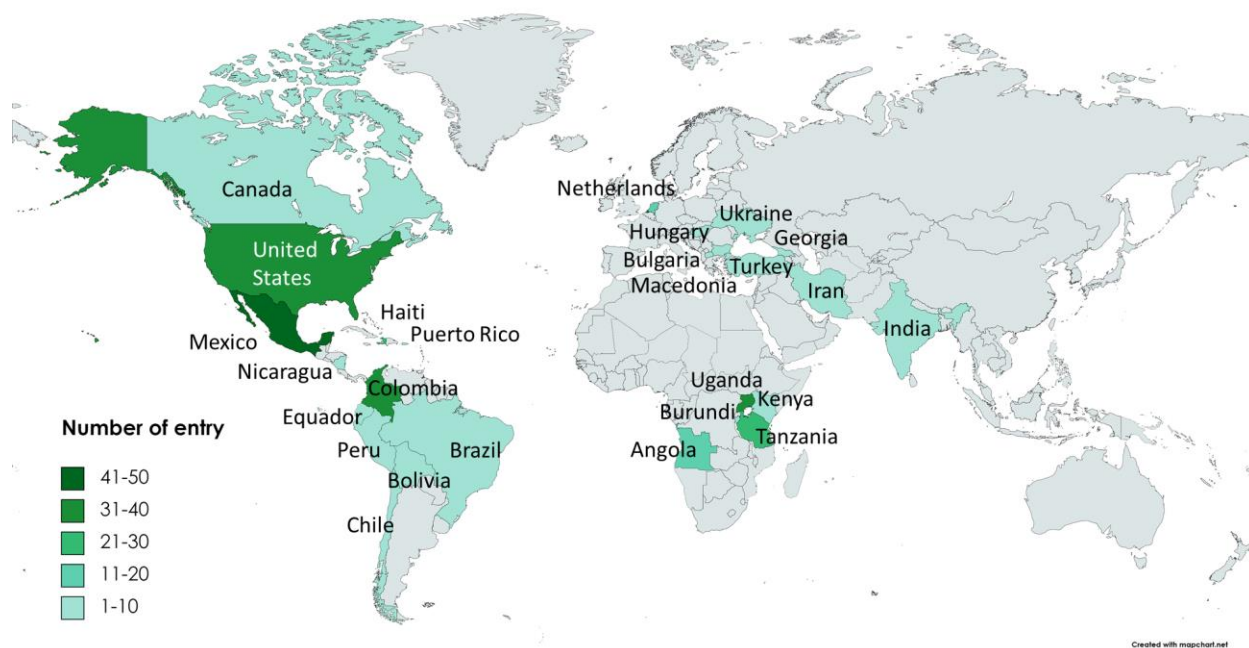


Fig. S1 The origins of the accessions in the yellow bean collection (YBC).

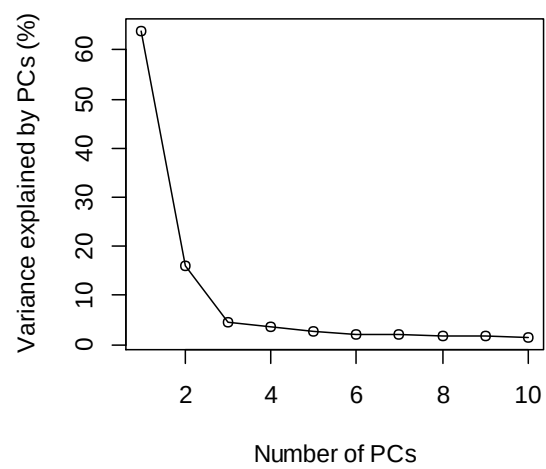


Fig. S2 The variance of the YBC explained by the first 10 principal components.

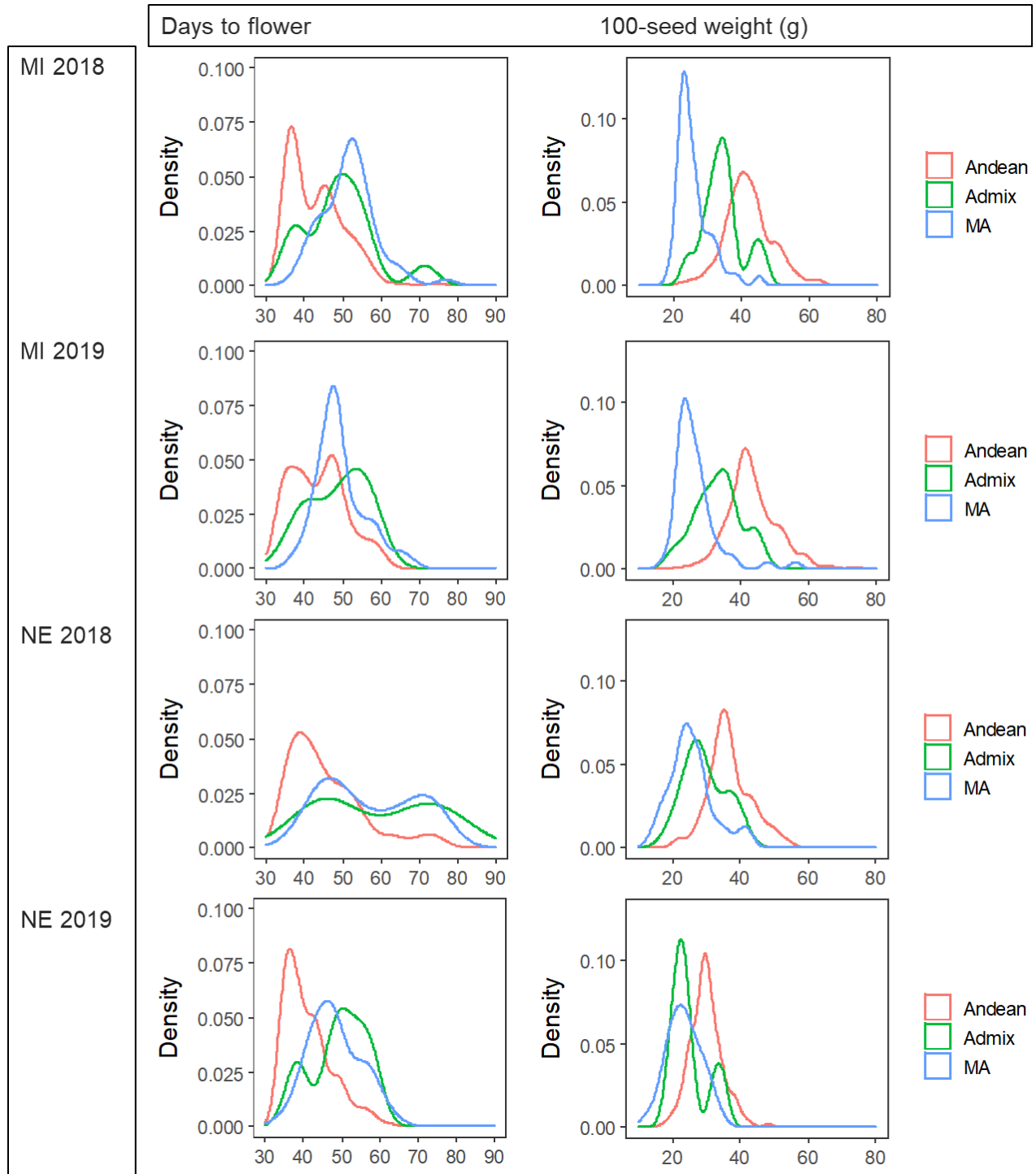


Fig. S4 Density plots of days to flower and 100-seed weight by genepool of the YBC measured in MI and NE in 2018-2019. MA: Middle American.

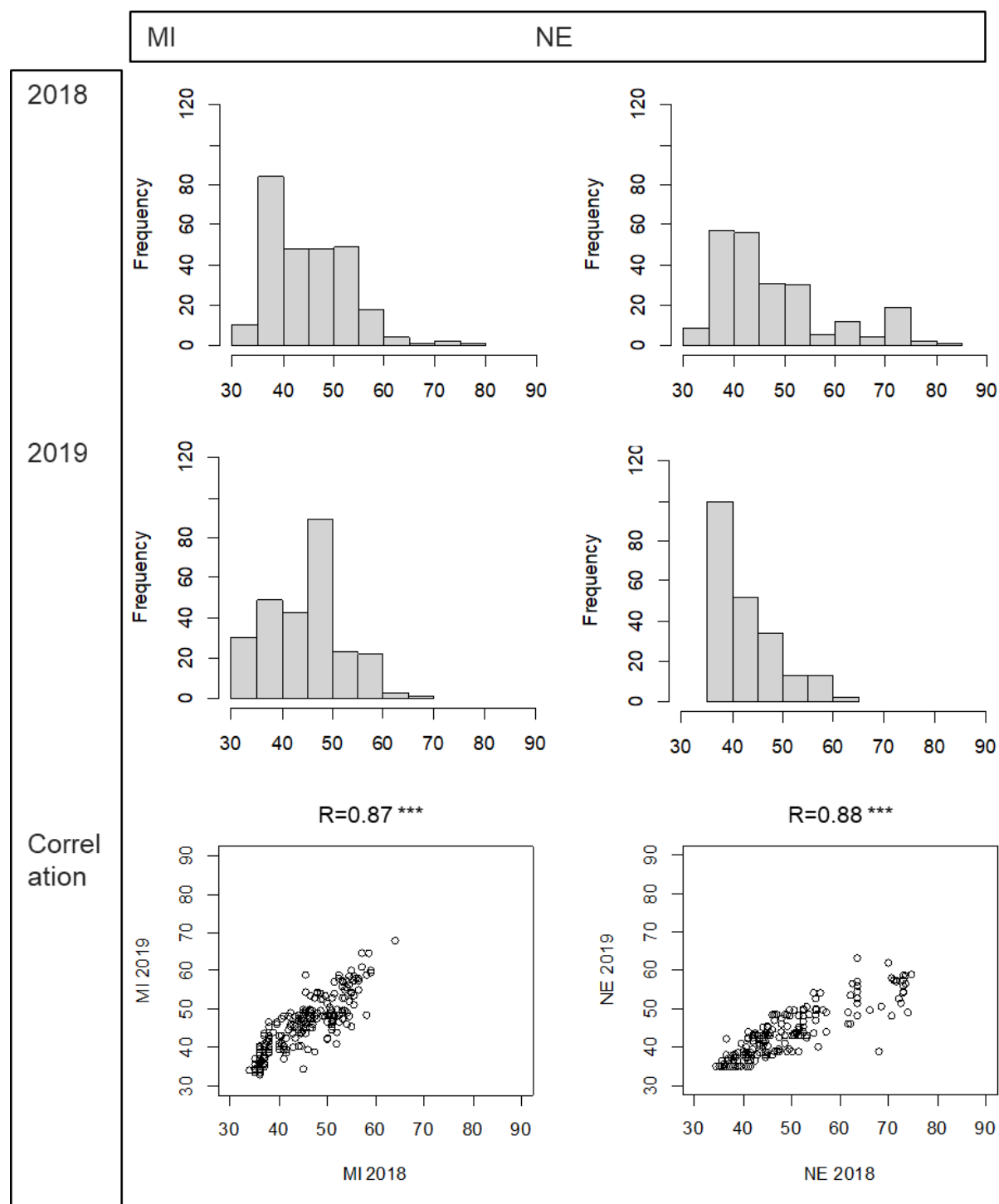


Fig. S5 Phenotypic distribution of days to flower measured in MI and NE in 2018-2019 and the correlation of the 2 years within each environment. (***: $p < 0.001$)

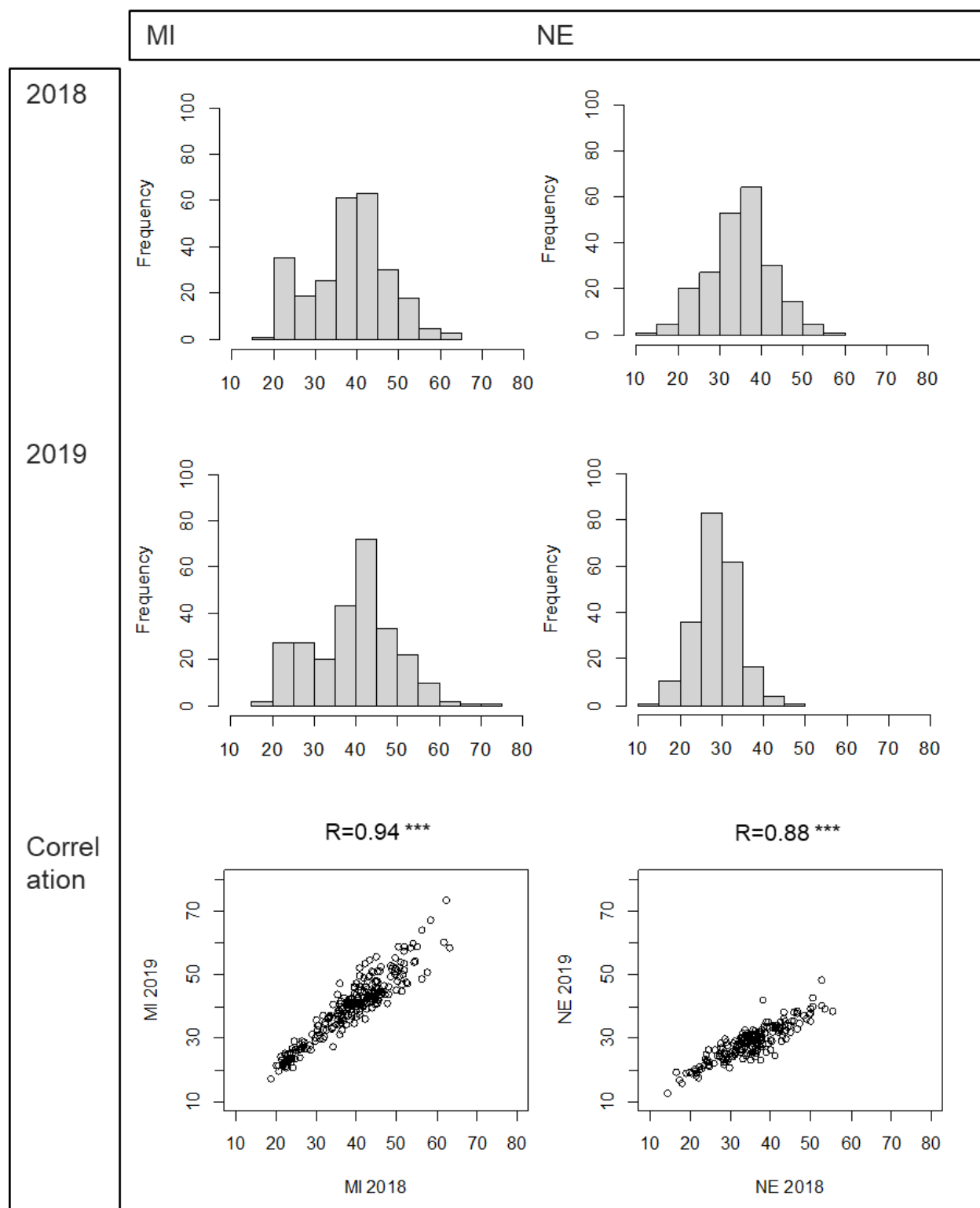


Fig. S6 Phenotypic distribution of 100-seed weight measured in MI and NE in 2018-2019 and the correlation of the 2 years within each environment. (***: $p < 0.001$)

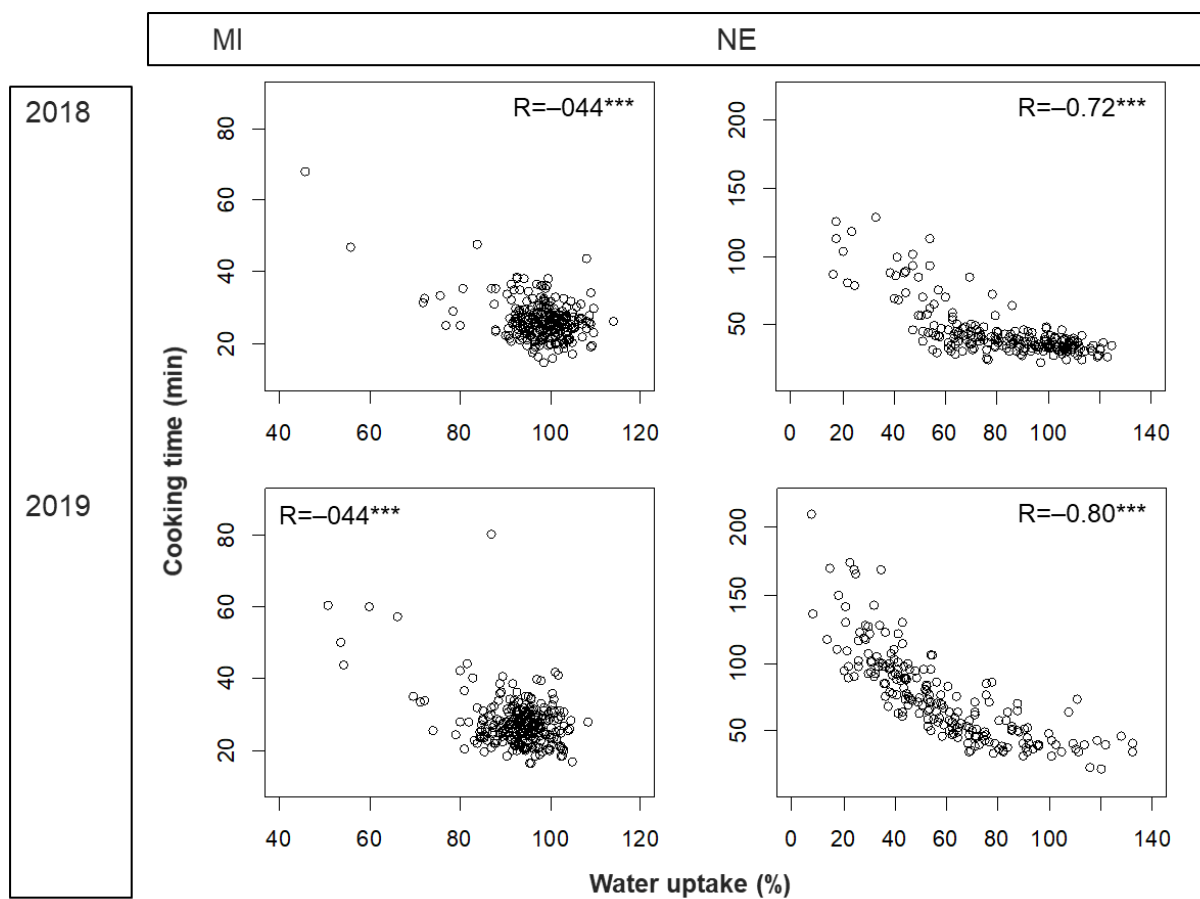


Fig. S7 The distribution of water uptake and cooking time in MI and NE in 2018-2019. (***: $p < 0.001$)

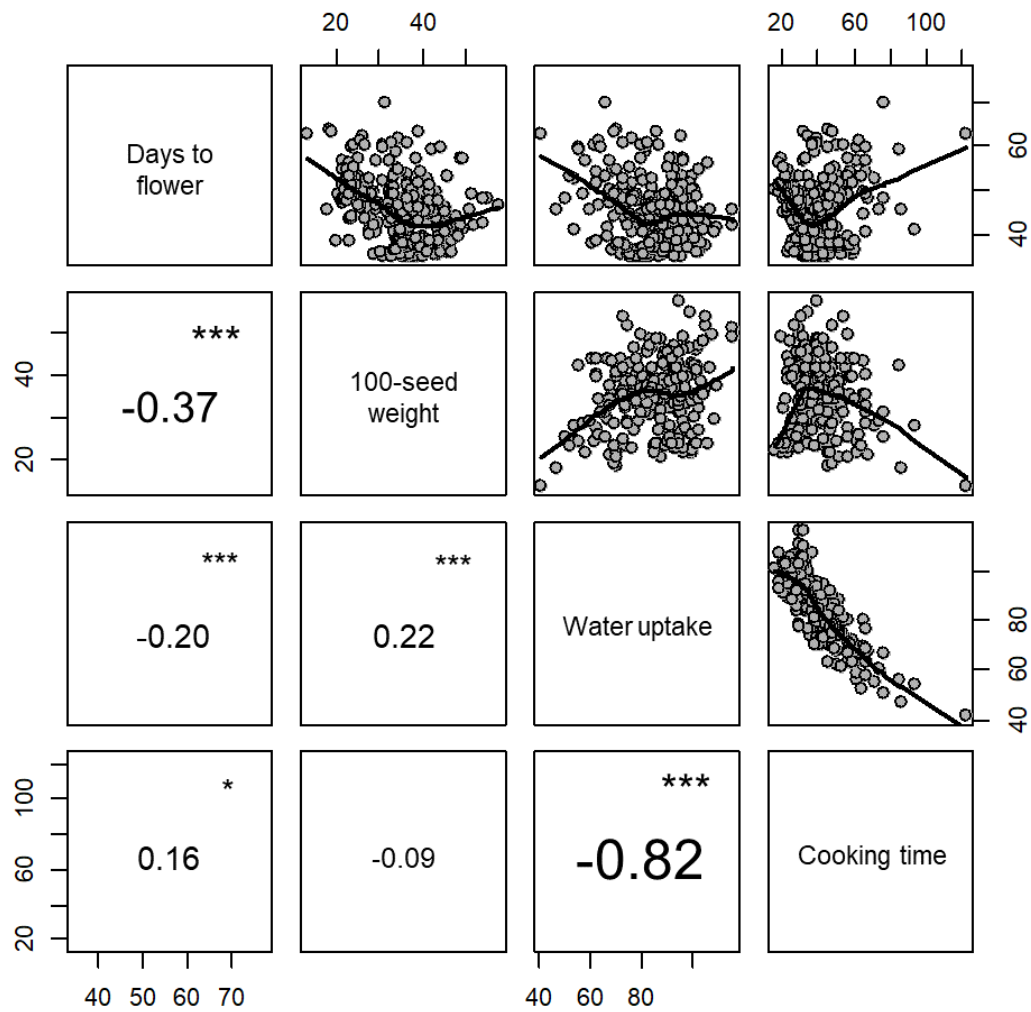


Fig. S8 Pearson correlation coefficients and scattered plots of days to flower, 100-seed weight, water uptake, and cooking time of the YBC (mean of 2 environments and 2 years, *: $p < 0.05$; ***: $p < 0.001$)

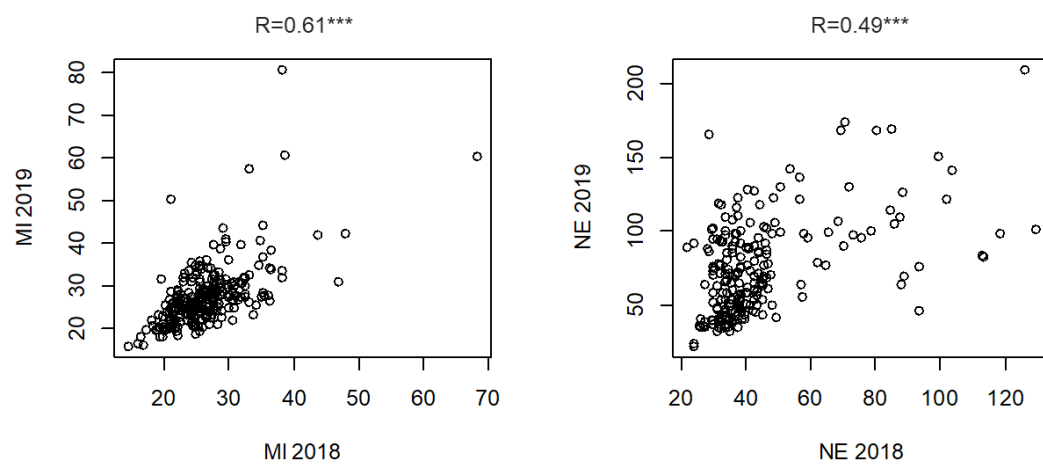


Fig. S9 The correlation of cooking time between the years 2018 and 2019 within each environment. (***: $p<0.001$)

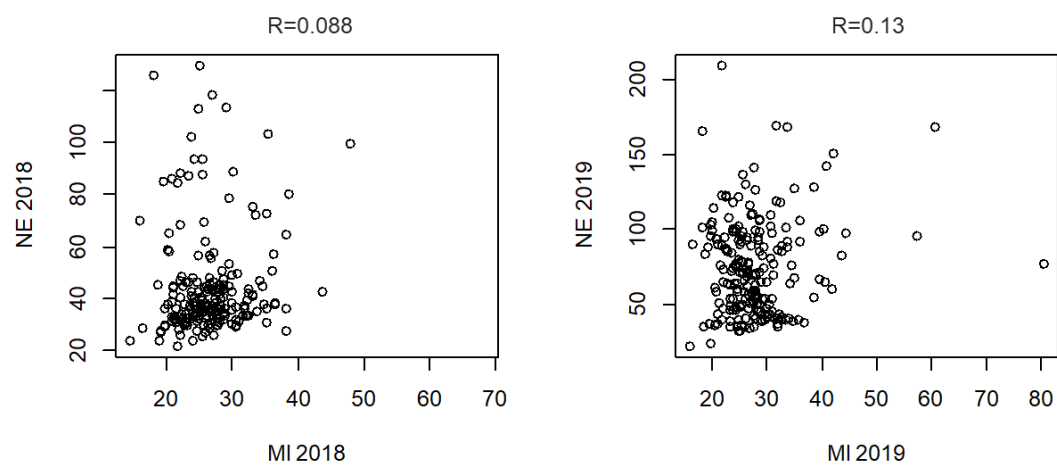


Fig. S10 The correlation of cooking time between the two environments in 2018 and 2019.

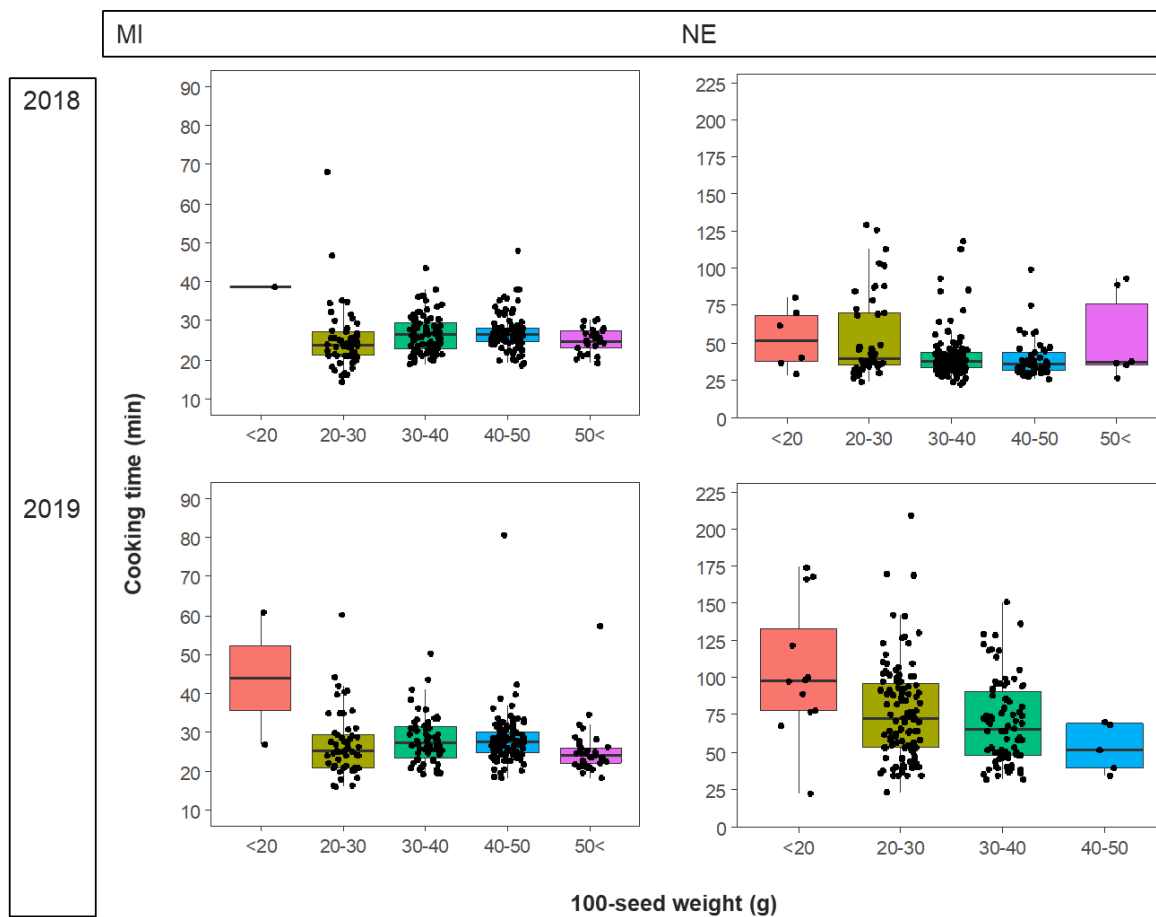


Fig. S11 Seed size (x axis, g/100 seeds) and cooking time in MI and NE in 2018-2019.

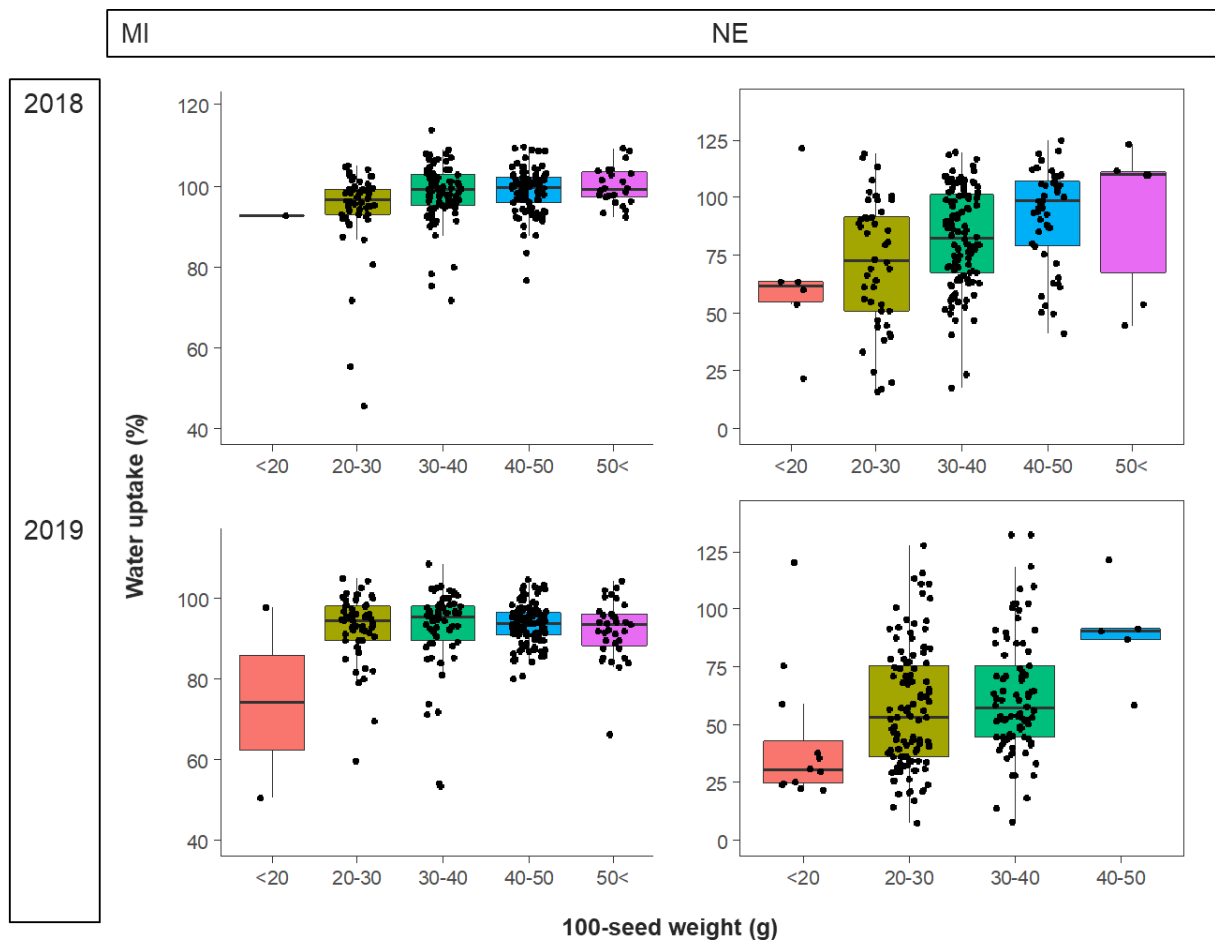


Fig. S12 Seed size (x axis, g/100 seeds) and water uptake in MI and NE in 2018-2019.

Table S1 The control varieties of the YBC.

YBC control ID	ID	Genotype name	Cooking time classification	Country of Origin	Source	Seed type	Genepool
Ctl001	Snowdon	Snowdon	-	United States	MSU ^a	White kidney	Andean
Ctl002	ADP0452 ^b	INIAP425	Fast ^c	Ecuador	Ecuador breeding	White	Andean ^d
Ctl003	ADP0469	PI527521	Fast ^c	Burundi	USGRIN	White	Andean ^d
Ctl004	Merlin	Merlin	-	United States	MSU	Navy	MA ^e
Ctl005	Red Hawk	Red Hawk	-	United States	MSU	Dark Red Kidney	Andean
Ctl006	ADP0367	G23086	Fast ^f	Malawi	ADP	Cranberry	Andean ^d
Ctl007	ADP0434	PR0737-1	Slow ^f	Puerto Rico	ADP	Red mottled	Admix ^d
Ctl008	ADP0436	JB178	Fast ^f	Dominican Republic	ADP	Red mottled	Andean ^d
Ctl009	ADP0515	Katarina, Kibala	Slow ^f	Angola	ADP	Cranberry	Andean ^d
Ctl010	ADP0618	ACElk	Fast ^f	Canada	ADP	Light Red Kidney	Andean ^d
Ctl011	ADP0687	Pink Panther	Slow ^f	United States	ADP	Light Red Kidney	Andean ^d
Ctl012	ADP0680	Clouseau	Moderate ^f	United States	ADP	Light Red Kidney	Andean ^d
Ctl013	RWR2245	RWR2245	-	Rwanda	Katuuramu, Uganda	Red mottled	Unknown
Ctl014	RWR2154	RWR2154	-	Rwanda	Katuuramu, Uganda	Cranberry	Unknown

^aMSU: Michigan State University; ^bADP: Andean Diversity Panel; ^c: Cooking time classification by Cichy et al. (2015b); ^dGenepool information by Cichy et al. (2015a); ^eMA: Middle American; ^f: Cooking time classification by Cichy et al. (2019)

Table S2 The number of YBC lines phenotyped at each environment.

Trait	Environment and year	Andean	Admix	Middle American	Total
Days to flower	MI 2018	194	13	58	265
	MI 2019	192	12	56	260
	NE 2018	182	12	32	226
	NE 2019	175	9	30	214
Seed weight	MI 2018	191	12	57	260
	MI 2019	192	12	56	260
	NE 2018	180	10	31	221
	NE 2019	175	9	31	215
Water uptake, cooking time	MI 2018	191	12	57	260
	MI 2019	191	12	55	258
	NE 2018	177	10	30	217
	NE 2019	171	9	30	210

Table S3 The growth habit (MI, 2018) of the Andean, Admix, and Middle American groups in the YBC (determined at K=2 by STRUCTURE).

	(n)	Determinate		Indeterminate	
		(Count)	(%)	(Count)	(%)
Andean		120	63	70	37
Admix		3	23	10	77
Middle American		4	7	55	93
Total		127	-	135	-

Table S4 The range, mean, and median of water uptake and cooking times of the YBC grown in MI and NE in 2018 and 2019.

Environment - Year	----- Water uptake (%) -----				----- Cooking time (min) -----			
	MI 2018	MI 2019	NE 2018	NE 2019	MI 2018	MI 2019	NE 2018	NE 2019
Range	45-114	51-108	16-125	7-132	15-68	16-80	22-130	22-210
Fold-difference	2.5	2.1	7.7	18.1	4.7	5.0	5.9	9.5
Median	99	94	85	54	26	27	38	71
Mean	98	93	82	59	26	28	44	75
SD	7	8	24	27	6	7	20	33