

Supplementary Information for Scientific Selection: A Century of Increasing Crop Varietal Diversity in U.S. Wheat

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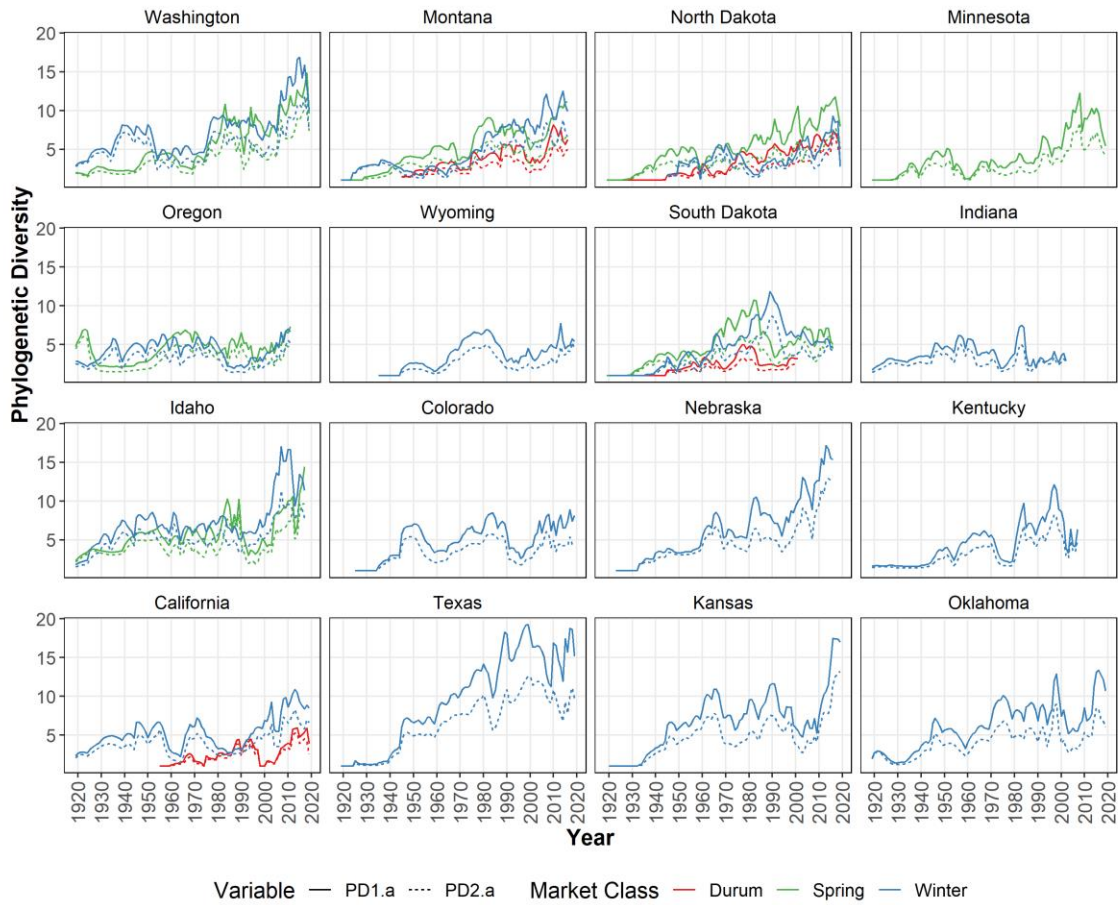


Fig. S1. Comparing phylogenetic diversity indexes of order 1 and 2 for major U.S. wheat producing states, 1919-2019.

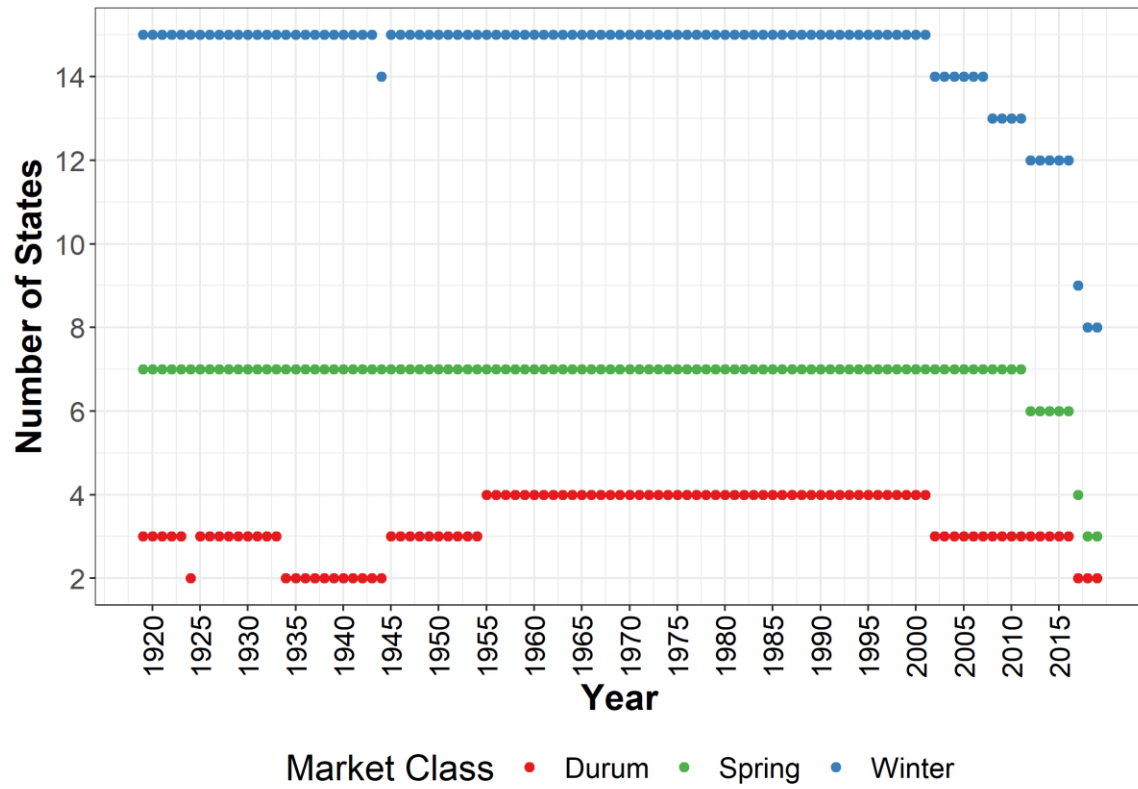


Fig. S2. Total number of states with state-level area-by-variety data available for U.S. wheat, 1919-2019.

Notes: The number of states reported here include interpolated data to fill in missing years when possible. Data availability for more recent years dropped significantly, especially after 2016.

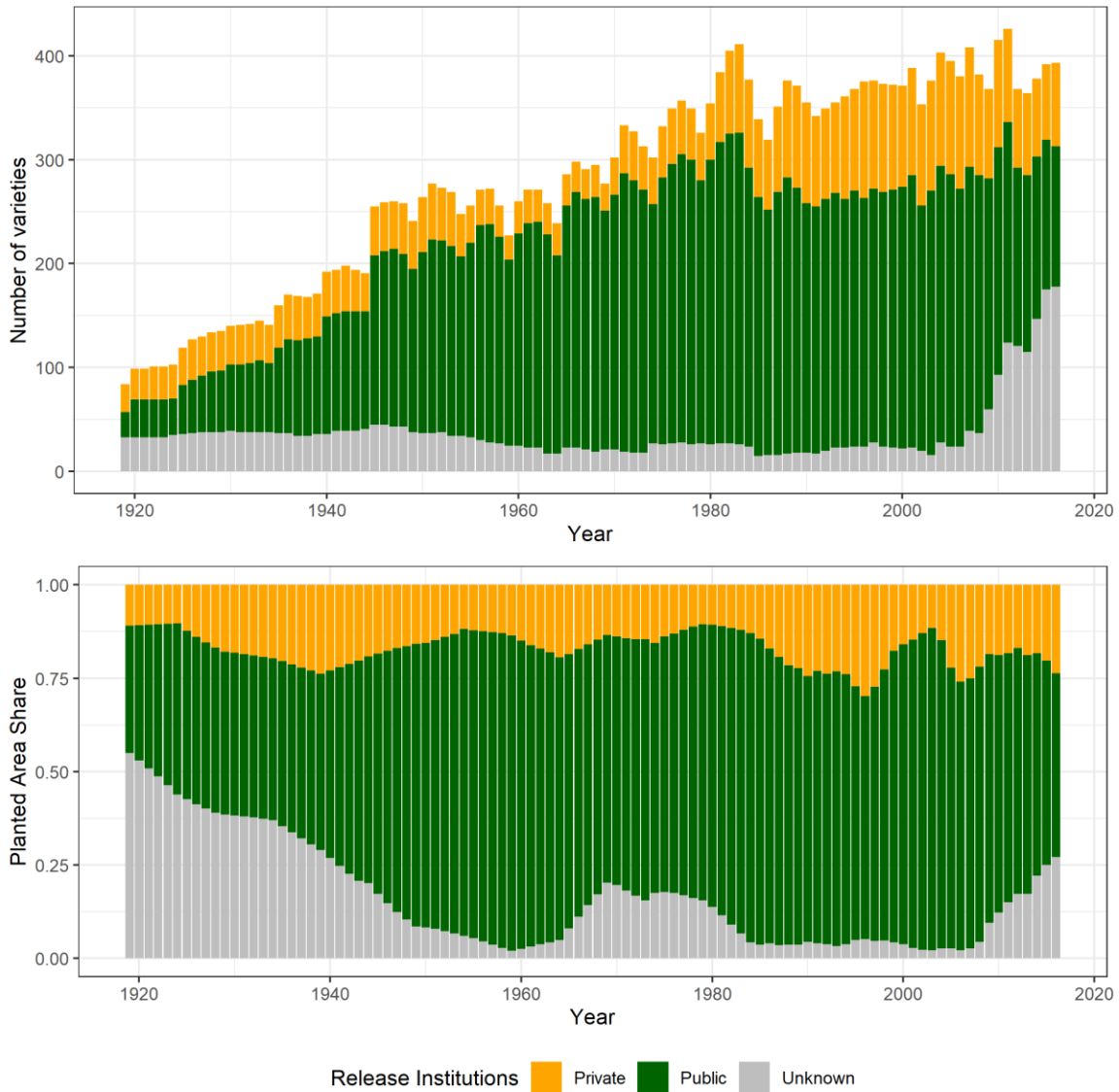


Fig. S3. Number of varieties and planted area share by releasing institutions for U.S. wheat, 1919-2016.

Notes: The numbers reported in this figure only include available data collected by authors in selected states. The “Unknown” category include varieties without releasing institution information. Data availability for more recent years dropped significantly, especially after 2016.

Table S1. Summary of selected prior wheat diversity studies.

Studies	Number of varieties	Spatial and Temporal Extent	Taxonomy-informed Diversity Measures			Taxonomy-blind Diversity Measures	Spatial / Temporal Dynamic Measures
			Pedigree-based	Phenotypic traits	Molecular marker ¹		
Cox et al. (1)	Between 60 and 262 depending on year	U.S. winter wheat states (1919-1984)	COP (area weighted)	- ²	-	-	Time trend of COP
Murphy et al. (2)	110	U.S. winter wheat states	COP	-	-	-	-
Kim and Ward (3)	22	North America	COP	-	RFLP	-	-
Brennan and Byerlee (4)	not specified	Regions in Argentina, Australia, Brazil, Mexico, Netherlands, New Zealand Pakistan, U.S. (1970-1986)	-	-	-	Varietal area and age	Time trend of varietal area and age
Chen et al. (5)	45	25 varieties from U.S. 20 varieties from China, Pakistan, India, Iraq, Hungary, Austria, Yugoslavia	-	-	STS	-	-
Souza et al. (6)	57	Two regions: the Yaqui Valley, Mexico (1972-1991) and the Punjab Province of Pakistan (1978-1990)	COP (area weighted)				5-yr temporal diversity change in COP

Barbosa-Neto et al. (7)	112	U.S. midwest	COP	-	RFLP	-	-
van Beuningen and Busch (8)	270	North America	COP	-	none	-	-
Barrett et al. (9)	43	U.S. Pacific Northwest	COP	-	AFLP	-	-
Hartell et al. (10)	18	Pakistan	COP	-	-	Varietal area and age	Time trend of varietal area and age
Corbellini et al. (11)	40	Central and South Europe	COP	-	RFLP, AFLP	-	-
Almanza-Pinzón et al. (12)	70	32 accessions from CIMMYT 38 accessions from 15 countries	COP	-	AFLP, SSR	-	-
Marić et al. (13)	14	Croatia	COP	Yes ³	RAPD	-	-
Fufa et al. (14)	30	U.S. Northern Great Plains	COP	Yes ³	SSR, SRAP	-	-
Chao et al. (15)	43	U.S.	none	-	SSR	-	-
Fradgley et al. (16)	454	U.K.	Kinship	-	SNP	-	-
Sthapit et al. (17)	320	U.S. Pacific Northwest (1900-2019)	-	-	SNP	Varietal area	Time trend of varietal area

¹Abbreviations for different molecular markers: AFLP (amplified fragment length polymorphism); RAPD (random amplified polymorphic DNA); RFLP (restriction fragment length polymorphism); SNP (single nucleotide polymorphisms); SRAP (sequence related amplified polymorphism); SSR (simple sequence repeats); STS (sequence tagged sites).

²Dash (-) indicates such measures were not used.

³Marić et al. (2004) includes 12 morphological traits; Fufa et al. (2005) includes 5 morphological traits and 4 end-use quality traits

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