SUPPORTING INFORMATION

Supplemental Table S1. List of materials used in the study.

Collection/ Accession code	Variety/ Accession name	Source	Subspecies	Cluster	Material type
GSOR653430	AR-01-1096	United States, Arkansas	*AUS*	UWR	weedy rice
GSOR653417	AR-1994-11D	United States, Arkansas	*AUS*	UWR	weedy rice
GSOR653424	TX-1995-TX4	United States, Texas	*AUS*	UWR	weedy rice
GSOR653420	LA-1995-LA3	United States, Louisiana	*AUS*	UWR	weedy rice
GSOR653421	MS-1995-MS4	United States, Mississippi	*AUS*	UWR	weedy rice
GSOR653432	MO-01-1098	United States, Missouri	*indica*	UWR	weedy rice
GSOR653422	AR-1995-StgB	United States, Arkansas	*indica*	UWR	weedy rice
TWR392	TWR392	Taiwan	*indica*	TWR	weedy rice
TWR297	TWR297	Taiwan	*indica*	TWR	weedy rice
TWR421	TWR421	Taiwan	*indica*	TWR	weedy rice
TWR229	TWR229	Taiwan	*indica*	TWR	weedy rice
TWR277	TWR277	Taiwan	*indica*	TWR	weedy rice
TWR427	TWR427	Taiwan	*indica*	TWR	weedy rice
TWR150	TWR150	Taiwan	*indica*	TWR	weedy rice
TWR419	TWR419	Taiwan	*indica*	TWR	weedy rice
TWR228	TWR228	Taiwan	*indica*	TWR	weedy rice
TWR415	TWR415	Taiwan	*indica*	TWR	weedy rice
TWR302	TWR302	Taiwan	*indica*	TWR	weedy rice
TWR295	TWR295	Taiwan	*indica*	TWR	weedy rice
TWR301	TWR301	Taiwan	*indica*	TWR	weedy rice
TWR270	TWR270	Taiwan	*indica*	TWR	weedy rice
TWR268	TWR268	Taiwan	*indica*	TWR	weedy rice
TWR69	TWR69	Taiwan	*indica*	TWR	weedy rice
TWR261	TWR261	Taiwan	*indica*	TWR	weedy rice
TWR243	TWR243	Taiwan	*indica*	TWR	weedy rice
TWR366	TWR366	Taiwan	*indica*	TWR	weedy rice
TWR20	TWR20	Taiwan	*indica*	TWR	weedy rice
TWR250	TWR250	Taiwan	*indica*	TWR	weedy rice
TWR67	TWR67	Taiwan	*indica*	TWR	weedy rice
TWR378	TWR378	Taiwan	*indica*	TWR	weedy rice
TWR253	TWR253	Taiwan	*indica*	TWR	weedy rice
TWR68	TWR68	Taiwan	*indica*	TWR	weedy rice
TWR42	TWR42	Taiwan	*indica*	TWR	weedy rice
TWR242	TWR242	Taiwan	*indica*	TWR	weedy rice
TWR74	TWR74	Taiwan	*indica*	TWR	weedy rice
TWR75	TWR75	Taiwan	*indica*	TWR	weedy rice
TWR381	TWR381	Taiwan	*indica*	TWR	weedy rice
TWR371	TWR371	Taiwan	*indica*	TWR	weedy rice
TWR420	TWR420	Taiwan	*indica*	TWR	weedy rice
TWR244	TWR244	Taiwan	*indica*	TWR	weedy rice
TWR428	TWR428	Taiwan	*indica*	TWR	weedy rice
TWR3	TWR3	Taiwan	*indica*	TWR	weedy rice
TWR123	TWR123	Taiwan	*indica*	TWR	weedy rice

TWR272	TWR272	Taiwan	*indica*	TWR	weedy rice
TWR58	TWR58	Taiwan	*indica*	TWR	weedy rice
TWR240	TWR240	Taiwan	*indica*	TWR	weedy rice
TWR77	TWR77	Taiwan	*indica*	TWR	weedy rice
TWR158	TWR158	Taiwan	*indica*	TWR	weedy rice
TWR391	TWR391	Taiwan	*indica*	TWR	weedy rice
TWR160	TWR160	Taiwan	*indica*	TWR	weedy rice
TWR369	TWR369	Taiwan	*indica*	TWR	weedy rice
TWR16	TWR16	Taiwan	*indica*	TWR	weedy rice
TWR61	TWR61	Taiwan	*indica*	TWR	weedy rice
TWR400	TWR400	Taiwan	*indica*	TWR	weedy rice
TWR235	TWR235	Taiwan	*indica*	TWR	weedy rice
TWR60	TWR60	Taiwan	*indica*	TWR	weedy rice
TWR245	TWR245	Taiwan	*indica*	TWR	weedy rice
TWR251	TWR251	Taiwan	*indica*	TWR	weedy rice
TWR163	TWR163	Taiwan	*indica*	TWR	weedy rice
TWR175	TWR175	Taiwan	*indica*	TWR	weedy rice
TWR183	TWR183	Taiwan	*indica*	TWR	weedy rice
TWR197	TWR197	Taiwan	*indica*	TWR	weedy rice
TWR218	TWR218	Taiwan	*indica*	TWR	weedy rice
TWR220	TWR220	Taiwan	*indica*	TWR	weedy rice
TWR195	TWR195	Taiwan	*indica*	TWR	weedy rice
TWR182	TWR182	Taiwan	*indica*	TWR	weedy rice
TWR171	TWR171	Taiwan	*indica*	TWR	weedy rice
TWR31	TWR31	Taiwan	*indica*	TWR	weedy rice
TWR33	TWR33	Taiwan	*indica*	TWR	weedy rice
TWR169	TWR169	Taiwan	*indica*	TWR	weedy rice
TWR201	TWR201	Taiwan	*indica*	TWR	weedy rice
TWR199	TWR199	Taiwan	*indica*	TWR	weedy rice
TWR188	TWR188	Taiwan	*indica*	TWR	weedy rice
TWR191	TWR191	Taiwan	*indica*	TWR	weedy rice
TWR213	TWR213	Taiwan	*indica*	TWR	weedy rice
TWR303	TWR303	Taiwan	*indica*	TWR	weedy rice
TWR190	TWR190	Taiwan	*indica*	TWR	weedy rice
TWR179	TWR179	Taiwan	*indica*	TWR	weedy rice
TWR180	TWR180	Taiwan	*indica*	TWR	weedy rice
TWR187	TWR187	Taiwan	*indica*	TWR	weedy rice
TWR181	TWR181	Taiwan	*indica*	TWR	weedy rice
TWR194	TWR194	Taiwan	*indica*	TWR	weedy rice
TWR114	TWR114	Taiwan	*indica*	TWR	weedy rice
TWR92	TWR92	Taiwan	*indica*	TWR	weedy rice
TWR117	TWR117	Taiwan	*indica*	TWR	weedy rice
TWR350	TWR350	Taiwan	*indica*	TWR	weedy rice
TWR140	TWR140	Taiwan	*indica*	TWR	weedy rice
TWR93	TWR93	Taiwan	*indica*	TWR	weedy rice
TWR238	TWR238	Taiwan	*indica*	TWR	weedy rice
TWR408	TWR408	Taiwan	*indica*	TWR	weedy rice

TWR407	TWR407	Taiwan	*indica*	TWR	weedy rice
TWR337	TWR337	Taiwan	*indica*	TWR	weedy rice
TWR79	TWR79	Taiwan	*indica*	TWR	weedy rice
TWR312	TWR312	Taiwan	*indica*	TWR	weedy rice
TWR316	TWR316	Taiwan	*indica*	TWR	weedy rice
TWR335	TWR335	Taiwan	*indica*	TWR	weedy rice
TWR135	TWR135	Taiwan	*indica*	TWR	weedy rice
TWR21	TWR21	Taiwan	*indica*	TWR	weedy rice
TWR329	TWR329	Taiwan	*indica*	TWR	weedy rice
TWR113	TWR113	Taiwan	*indica*	TWR	weedy rice
TWR357	TWR357	Taiwan	*indica*	TWR	weedy rice
TWR100	TWR100	Taiwan	*indica*	TWR	weedy rice
TWR178	TWR178	Taiwan	*indica*	TWR	weedy rice
TWR353	TWR353	Taiwan	*indica*	TWR	weedy rice
TWR143	TWR143	Taiwan	*indica*	TWR	weedy rice
TWR5	TWR5	Taiwan	*indica*	TWR	weedy rice
TWR313	TWR313	Taiwan	*indica*	TWR	weedy rice
TWR311	TWR311	Taiwan	*indica*	TWR	weedy rice
TWR423	TWR423	Taiwan	*indica*	TWR	weedy rice
TWR372	TWR372	Taiwan	*indica*	TWR	weedy rice
TWR370	TWR370	Taiwan	*indica*	TWR	weedy rice
TWR397	TWR397	Taiwan	*indica*	TWR	weedy rice
TWR101	TWR101	Taiwan	*indica*	TWR	weedy rice
TWR387	TWR387	Taiwan	*indica*	TWR	weedy rice
TWR95	TWR95	Taiwan	*indica*	TWR	weedy rice
TWR375	TWR375	Taiwan	*indica*	TWR	weedy rice
TWR226	TWR226	Taiwan	admix	TWR	weedy rice
TWR210	TWR210	Taiwan	admix	TWR	weedy rice
TWR305	TWR305	Taiwan	admix	TWR	weedy rice
TWR227	TWR227	Taiwan	admix	TWR	weedy rice
TWR211	TWR211	Taiwan	admix	TWR	weedy rice
TWR36	TWR36	Taiwan	admix	TWR	weedy rice
TWR414	TWR414	Taiwan	admix	TWR	weedy rice
TWR35	TWR35	Taiwan	admix	TWR	weedy rice
Taichung-sen-glutinous 2	Taichung-sen-glutinous 2	Taiwan	*indica*	IND	cultivated rice
NPGC93A03000	Taichung-shien 10	Taiwan	*indica*	IND	cultivated rice
NPGC93A01300	Dee-geo-woo-gen	Taiwan	*indica*	IND	cultivated rice
GSOR301259	Sundensis	Kazakhstan	*indica*	IND	cultivated rice
GSOR301065	IR 8	Philippines	*indica*	IND	cultivated rice
GSOR301133	Shai-kuh	China	*indica*	IND	cultivated rice
GSOR301303	BR24	Bangladesh	*indica*	IND	cultivated rice
GSOR301094	Leung Pratew	Thailand	*indica*	IND	cultivated rice
GSOR301015	Binulawan	Philippines	*indica*	IND	cultivated rice
GSOR301194	Radin Ebos 33	Malaysia	*indica*	IND	cultivated rice
NPGC93A01398	Sanpei	Taiwan	*indica*	IND	cultivated rice

NPGC93A02970	Shuang-chiang-tsao-1	Taiwan	*indica*	IND	cultivated rice
NPGC93A01216	Pai-ko-tsao-tzu	Taiwan	*indica*	IND	cultivated rice
NPGC95A00039	O-loan-chu	Taiwan	*indica*	IND	cultivated rice
Tai-shien2	Tai-shien2	Taiwan	*indica*	IND	cultivated rice
NPGC93A01360	Taichung-native1	Taiwan	*indica*	IND	cultivated rice
NPGC93A01404	Tien-lai	Taiwan	*indica*	IND	cultivated rice
NPGC93A01305	Wu-chan	Taiwan	*indica*	IND	cultivated rice
NPGC10A00756	Hua-lou	Taiwan	*indica*	IND	cultivated rice
NPGC93A01359	I-kung-pao	Taiwan	*indica*	IND	cultivated rice
NPGC93A01210	Pai-mi-fen	Taiwan	*indica*	IND	cultivated rice
Taichung-shien 2	Taichung-shien 2	Taiwan	*indica*	IND	cultivated rice
Taichung-shien 17	Taichung-shien 17	Taiwan	*indica*	IND	cultivated rice
NPGC95A00068	Taichung sen glutinous 1	Taiwan	*indica*	IND	cultivated rice
Taichung 65	Taichung 65	Taiwan	temperate *japonica*	TEJ	cultivated rice
GSOR312007	Tainung 67	Taiwan	temperate *japonica*	TEJ	cultivated rice
GSOR301164	Nipponbare	Japan	temperate *japonica*	TEJ	cultivated rice
GSOR301052	Geumobyeo	South Korea	temperate *japonica*	TEJ	cultivated rice
GSOR301177	Bul zo	South Korea	temperate *japonica*	TEJ	cultivated rice
GSOR301352	Shirogane	Japan	temperate *japonica*	TEJ	cultivated rice
GSOR301253	Maratelli	Italy	temperate *japonica*	TEJ	cultivated rice
GSOR301047	Early wataribune	Japan	temperate *japonica*	TEJ	cultivated rice
GSOR301271	Patna	Morocco	temperate *japonica*	TEJ	cultivated rice
GSOR301110	Oro	Chile	temperate *japonica*	TEJ	cultivated rice
Tainan11	Tainan11	Taiwan	temperate *japonica*	TEJ	cultivated rice
Nakamura	Nakamura	Japan	temperate *japonica*	TEJ	cultivated rice
NPGC95A04995	Chianan8	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC95A04926	Hsinchu56	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC95A05139	Tainan5	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC95A05156	Kaohsiung139	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC95A05174	Taichung189	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC95A05179	Taikeng2	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC93A01005	Taikeng8	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC95A05181	Taikeng9	Taiwan	temperate *japonica*	TEJ	cultivated rice
Taikeng14	Taikeng14	Taiwan	temperate *japonica*	TEJ	cultivated rice
Taitung30	Taitung30	Taiwan	temperate *japonica*	TEJ	cultivated rice
Taichung192	Taichung192	Taiwan	temperate *japonica*	TEJ	cultivated rice
NPGC01A00439	Tainung71	Taiwan	temperate *japonica*	TEJ	cultivated rice

Supplemental Table S2. Summary of methodological approaches evaluated in this study.

Variable	Trait	Cluster	Collection		Phenotype Description	Equipment/ Method Reference
			Year	Season		
RT8M	Seed storability	Seedbank	2018	Second	Seed germination percentage after 8 months storage	[23]
RT12M	Seed storability	Seedbank	2019	First	Seed germination percentage after 12 months storage	[23]
PHS40	Seed preharvest sprouting	Seedbank	2019	Second	Germination percentage at 40th day after rice heading	[27]
PHS54	Seed preharvest sprouting	Seedbank	2019	Second	Germination percentage at 54th day after rice heading	[27]
ML	Mesocotyl length	Seedling	2018	Second	Mesocotyl length	[21]
SL	Seedling shoot length	Seedling	2018	Second	Seedling shoot length	[21]
RA	Root surface area	Seedling	2018	Second	Root surface area	[22]
FS_HD	Heading date	Growth	2018	First	Heading date	[23]
SS_HD	Heading date	Growth	2018	Second	Heading date	[23]
FS_LAI	Leaf area index	Growth	2018	First	Leaf area index	[24]
SS_LAI	Leaf area index	Growth	2018	Second	Leaf area index	[24]
FS_PH42d	Plant height	Growth	2018	First	Plant height in 42 days after transplanting	[23]
SS_PH28d	Plant height	Growth	2018	Second	Plant height in 28 days after transplanting	[23]
FS_PH84d	Plant height	Growth	2018	First	Plant height in 84 days after transplanting	[23]
SS_PH77d	Plant height	Growth	2018	Second	Plant height in 77 days after transplanting	[23]
FS_SN	Spike number	Yield	2018	First	Spike number	[23]
SS_SN	Spike number	Yield	2018	Second	Spike number	[23]
FS_GNT	Number of total grains	Yield	2018	First	Number of total grains	[23]
SS_GNT	Number of total grains	Yield	2018	Second	Number of total grains	[23]
FS_FER	Fertility rate	Yield	2018	First	Fertility rate	[23]
SS_FER	Fertility rate	Yield	2018	Second	Fertility rate	[23]
FS_SHA	Seed shattering	Yield	2018	First	Seed shattering rate	[25]
SS_SHA	Seed shattering	Yield	2018	Second	Seed shattering rate	[25]
GL	Grain length	Grain	2018	First	Grain length	[26]
GW	Grain width	Grain	2018	First	Grain width	[26]
GLW	Grain length-to-width ratio	Grain	2018	First	Grain length-to-width ratio	[26]
HC	Hull color	Grain	2018	First	Hull color	[23]

Supplemental Table S3. Correlation coefficient matrix of 27 target traits derived from Taiwan weedy rice and 3 rice populations. Correlation coefficient is showed in the lower left and significant level is in the upper right.

PCA	Cluster	Trait†	RT8M	RT12M	PHS40	PHS54	ML	SL	RSA	FS‡ HD	SS HD	FS LAI	SS LAI	FS PH42d	SS PH28d	FS PH84d	SS PH77d	FS SN	SS SN	FS GNT	SS GNT	FS SPFer	SS SPFer	FS SHA	SS SHA	GL	GW	GLW	HC
V	Seedbank	**RT8M**	NA	<0.001	0.001	<0.001	0.014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.089	0.514	0.770	0.761	<0.001	<0.001	<0.001	<0.001	0.188	0.007	0.001	0.078	0.219	<0.001	0.008	0.965
	Seedbank	**RT12M**	0.719§	NA	0.005	0.001	0.785	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.086	0.322	0.206	0.201	0.005	<0.001	<0.001	<0.001	0.130	0.010	0.382	0.083	0.013	<0.001	0.001	0.320
	Seedbank	**PHS40**	0.260	0.215	NA	<0.001	0.000	<0.001	<0.001	0.182	0.032	0.004	0.007	0.506	0.127	0.496	0.836	0.031	0.957	0.064	0.010	0.072	0.712	0.253	0.251	0.028	0.059	0.004	<0.001
V	Seedbank	**PHS54**	0.321	0.256	0.707	NA	0.000	<0.001	<0.001	0.348	0.176	<0.001	<0.001	0.034	0.904	0.313	0.403	<0.001	0.150	0.001	<0.001	<0.001	0.777	0.430	0.984	0.003	0.187	0.002	<0.001
V	Seedling	**ML**	-0.186	0.021	-0.373	-0.456	NA	0.069	<0.001	0.042	0.836	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	0.001	0.219	0.003	<0.001	0.002	0.019	0.537	0.348	<0.001	<0.001	<0.001	<0.001
V	Seedling	**SL**	0.619	0.593	0.384	0.382	-0.139	NA	<0.001	0.002	0.006	<0.001	<0.001	0.921	<0.001	0.010	0.011	<0.001	<0.001	<0.001	<0.001	0.063	0.006	0.002	0.007	0.063	<0.001	0.014	0.567
V	Seedling	**RA**	0.573	0.458	0.400	0.453	-0.361	0.762	NA	<0.001	0.022	<0.001	<0.001	0.110	0.108	0.443	0.850	<0.001	<0.001	<0.001	<0.001	0.007	<0.001	0.001	<0.001	0.440	0.002	0.227	0.099
	Growth	**FS_HD**	0.394	0.457	-0.102	0.072	-0.155	0.230	0.266	NA	<0.001	<0.001	0.004	<0.001	0.002	0.475	0.051	0.085	0.098	0.042	<0.001	0.149	0.003	0.993	0.705	0.002	0.003	0.003	0.070
V	Growth	**SS_HD**	0.324	0.447	-0.164	-0.104	0.016	0.208	0.175	0.678	NA	<0.001	0.792	0.142	0.002	0.090	0.418	0.003	<0.001	<0.001	<0.001	0.928	0.005	0.971	0.422	0.002	<0.001	<0.001	0.013
	Growth	**FS_LAI**	0.352	0.250	0.217	0.383	-0.359	0.287	0.348	0.335	0.297	NA	<0.001	0.004	0.233	<0.001	0.234	<0.001	0.039	<0.001	<0.001	0.026	0.333	0.416	0.674	0.015	0.995	0.048	<0.001
V	Growth	**SS_LAI**	0.365	0.331	0.204	0.275	-0.215	0.334	0.316	0.220	0.020	0.292	NA	0.000	0.019	0.573	0.774	0.061	0.486	0.090	0.056	0.264	0.870	0.010	0.068	0.708	0.218	0.653	0.005
	Growth	**FS_PH42d**	-0.130	-0.131	-0.051	-0.161	0.486	0.008	-0.122	-0.448	-0.112	-0.219	-0.272	NA	<0.001	<0.001	<0.001	0.688	0.969	0.976	0.004	0.288	<0.001	0.928	0.764	0.127	0.025	0.013	<0.001
	Growth	**SS_PH28d**	0.050	0.076	0.117	0.009	0.355	0.273	0.123	-0.229	-0.229	-0.091	0.179	0.562	NA	<0.001	<0.001	0.900	0.681	0.479	0.269	0.288	0.022	0.175	0.332	0.001	0.000	<0.001	0.001
	Growth	**FS_PH84d**	-0.022	0.097	0.052	0.077	0.301	0.195	0.059	-0.055	0.130	0.285	0.043	0.522	0.514	NA	<0.001	0.489	0.870	0.092	0.452	0.122	0.005	0.425	0.736	0.564	0.301	0.931	0.013
V	Growth	**SS_PH77d**	0.023	0.098	-0.016	-0.064	0.476	0.193	-0.015	-0.149	0.062	-0.091	0.022	0.657	0.694	0.731	NA	0.275	0.745	0.638	0.407	0.564	<0.001	0.471	0.510	0.153	<0.001	0.001	<0.001
	Yield	**FS_SN**	0.295	0.215	0.165	0.299	-0.263	0.374	0.397	0.132	0.223	0.298	0.143	0.031	-0.010	0.053	0.084	NA	0.343	<0.001	0.341	0.170	-0.081	0.425	0.192	0.390	0.209	0.785	0.182
	Yield	**SS_SN**	0.440	0.420	-0.004	0.110	-0.094	0.326	0.295	0.127	0.272	0.158	0.053	0.003	-0.032	-0.013	0.025	<0.001	NA	0.004	<0.001	0.343	0.007	0.266	0.006	0.949	0.005	0.252	0.090
	Yield	**FS_GNT**	0.322	0.285	0.142	0.263	-0.228	0.359	0.415	0.155	0.264	0.383	0.130	0.002	-0.054	0.129	0.036	0.804	0.217	NA	0.367	0.082	-0.064	0.696	0.189	0.279	0.310	0.574	0.391
V	Yield	**SS_GNT**	0.550	0.517	0.196	0.335	-0.312	0.349	0.396	0.316	0.304	0.366	0.146	-0.220	-0.085	-0.058	-0.064	<0.001	0.748	<0.001	NA	0.186	0.002	0.185	0.728	0.077	0.116	0.285	0.002
	Yield	**FS_FER**	0.101	0.116	0.138	0.300	-0.232	0.142	0.206	0.110	-0.007	0.170	0.086	-0.081	-0.081	0.118	-0.044	0.105	0.073	0.133	0.101	NA	0.044	0.147	0.061	0.006	0.007	0.001	0.073
	Yield	**SS_FER**	-0.207	-0.195	0.028	0.022	0.179	-0.210	-0.292	-0.227	-0.211	-0.074	0.013	0.318	0.174	0.214	0.347	0.292	-0.204	0.408	-0.234	0.568	NA	<0.001	<0.001	0.077	0.210	0.220	0.697
	Yield	**FS_SHA**	0.261	0.067	-0.088	-0.061	-0.047	0.239	0.247	-0.001	0.003	0.062	0.195	-0.007	0.104	0.061	0.055	0.061	0.085	0.030	-0.102	0.111	-0.322	NA	0.560	0.769	0.003	0.163	0.384
V	Yield	**SS_SHA**	0.135	0.133	-0.088	-0.002	-0.072	0.204	0.295	0.029	0.062	0.032	0.140	-0.023	0.074	0.026	0.051	0.012	0.208	0.013	0.027	0.427	-0.263	<0.001	NA	0.749	0.103	0.396	0.957
V	Grain	**GL**	0.094	0.189	-0.168	-0.228	0.444	0.142	0.059	0.239	0.232	-0.185	0.029	0.117	0.245	-0.044	0.109	-0.066	-0.005	-0.083	-0.135	-0.210	-0.135	0.023	0.025	NA	<0.001	<0.001	<0.001
V	Grain	**GW**	-0.391	-0.357	0.144	0.101	-0.334	-0.305	-0.237	-0.222	-0.359	0.000	-0.094	-0.171	-0.273	-0.079	-0.326	-0.096	-0.213	-0.078	-0.120	0.205	0.096	-0.227	-0.125	-0.472	NA	<0.001	<0.001
	Grain	**GLW**	0.202	0.243	-0.216	-0.239	0.477	0.187	0.092	0.222	0.318	-0.151	0.035	0.189	0.293	0.007	0.249	-0.021	0.088	-0.043	-0.082	-0.251	-0.094	0.107	0.065	0.894	-0.790	NA	<0.001
V	Grain	**HC**	0.003	0.076	-0.304	-0.417	0.548	0.044	-0.126	-0.138	0.188	-0.309	-0.213	0.422	0.251	0.190	0.389	-0.102	0.130	-0.066	-0.232	-0.137	0.030	0.067	0.004	0.366	-0.438	0.530	NA

† RT8M and RT12M, seed germination percentage after 8 and 12 months storage (seed storability); PHS40 and PHS54, germination percentage at 40th and 54th day after rice heading (seed preharvest sprouting); ML, Mesocotyl length; SL, seedling length; RA, root surface area; HD, heading date; LAI, leaf area index; PH28d, PH42d, PH77d, PH84d, plant height in 28 days, 42 days, 77 days and 84 days after transplanting, respectively; SN, spike number; FER, fertility rate; SHA, seed shattering rate; GNT, number of total grain; GL, grain length; GW, grain width; GLW, grain length-to-width ratio; HC, hull color.

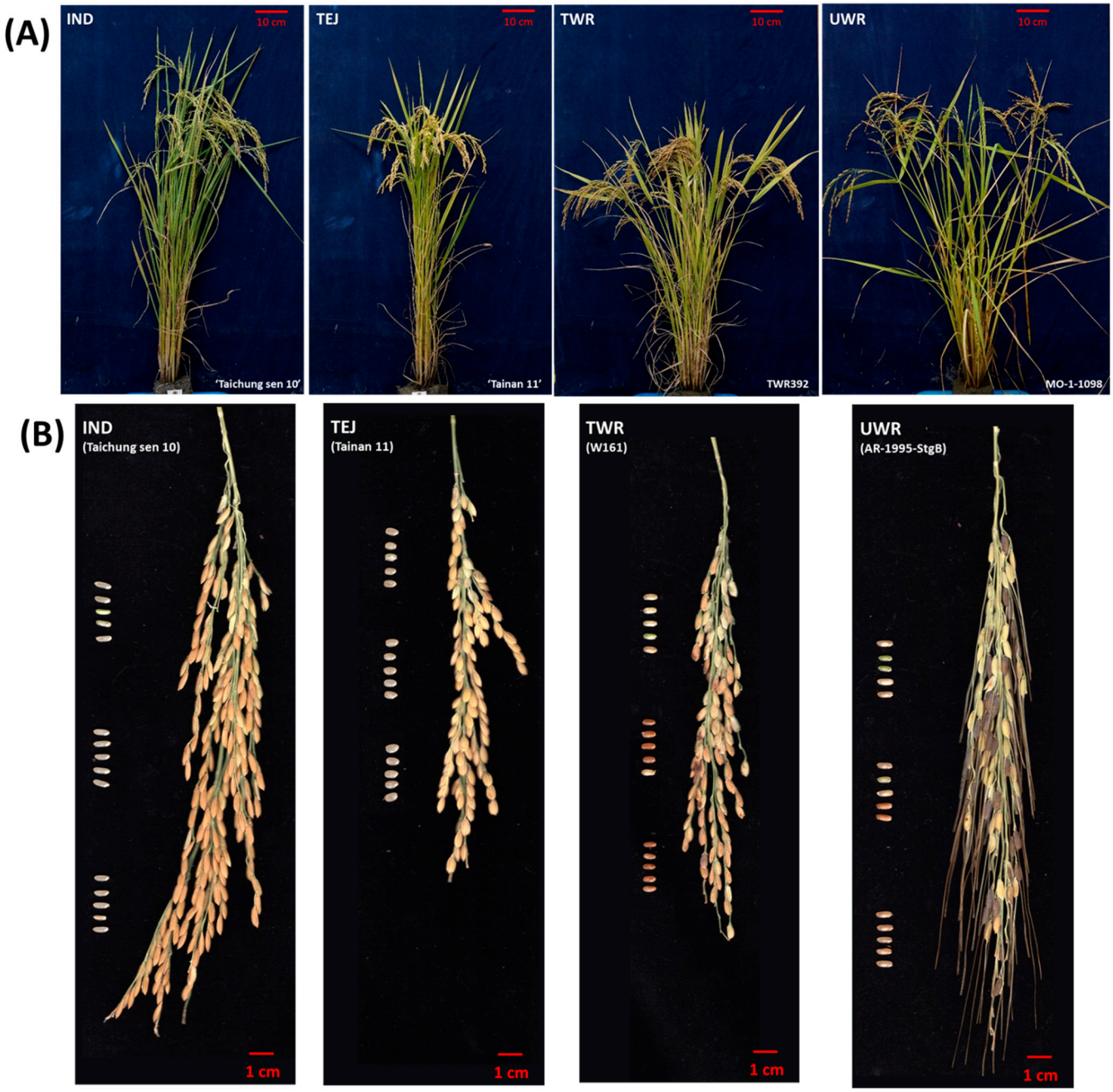
‡ FS, first cropping season; SS, second cropping season.

§ Degree of correlation: 1, perfect; ≥0.5, high; between 0.3 and 0.5, moderate; <0.3, low.

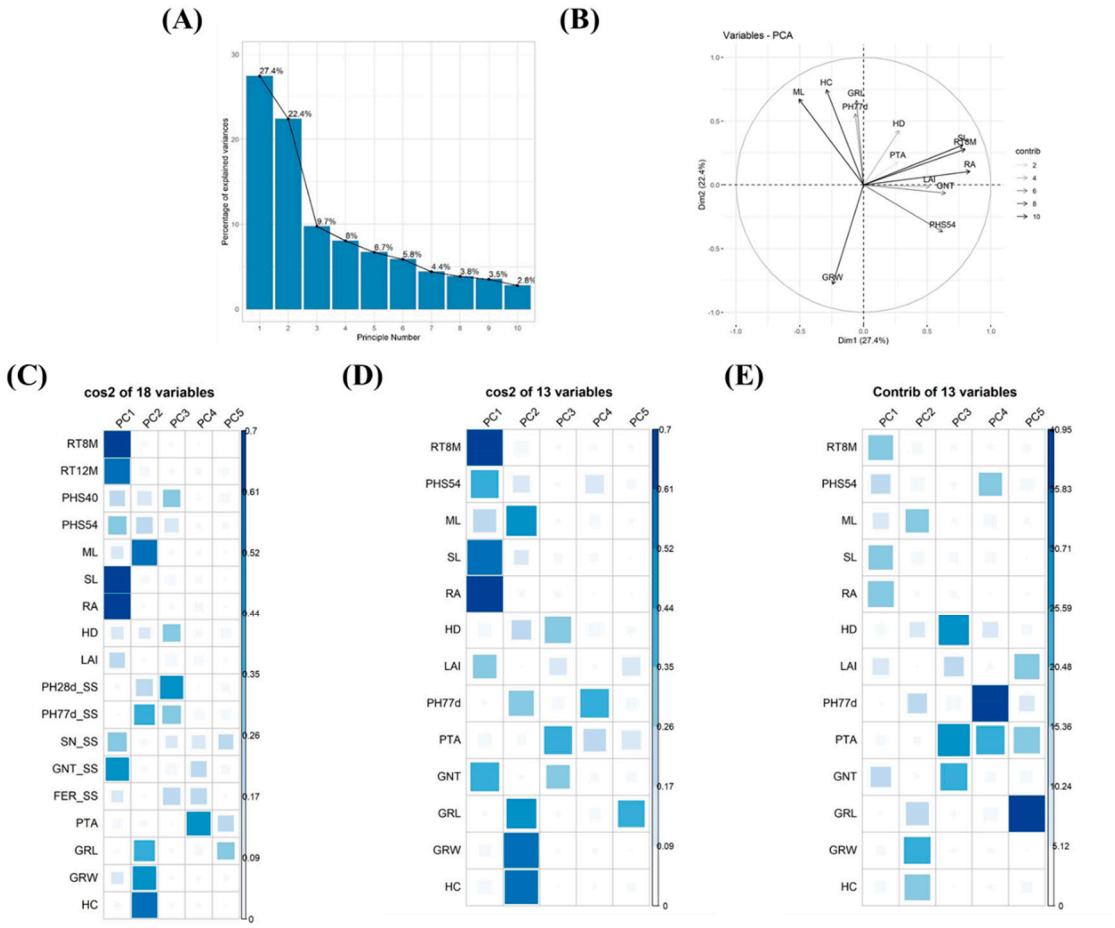
Supplemental Table S4. The principal analysis of Taiwan weedy rice population and 3 check rice populations was conducted on the 13 traits.

Cluster	Variable†	Components				
		Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5
Seedbank	RT8M	0.42	-0.16	0.08	-0.07	0.09
	PHS54	0.33	0.22	-0.07	0.39	-0.19
Seedling	ML	-0.27	-0.39	-0.07	0.20	-0.08
	SL	0.41	-0.18	-0.15	0.15	-0.01
	RA	0.44	-0.06	-0.10	0.00	-0.02
Growth	HD	0.15	-0.25	0.52	-0.26	0.16
period	LAI	0.27	0.01	-0.33	-0.06	-0.43
	PH77d	-0.03	-0.33	-0.22	0.62	0.26
Yield	SHA	0.14	-0.10	-0.55	-0.49	0.45
	GNT	0.34	0.04	0.46	0.14	0.19
Grain	GRL	-0.03	-0.39	0.06	-0.21	-0.64
appearance	GRW	-0.13	0.46	-0.04	0.08	0.03
	HC	-0.15	-0.44	0.01	0.06	0.17
Eigenvalue		1.89	1.71	1.12	1.02	0.93
Proportion of variance		27%	22%	10%	8%	7%
Cumulative proportion		27%	50%	60%	68%	74%

† RT8M, seed germination percentage after 8 months storage (seed storability); PHS54, germination percentage at 54th day after rice heading (seed preharvest sprouting); ML, Mesocotyl length; SL, seedling length; RA, root surface area; HD, heading date; LAI, leaf area index; PH77d, plant height in 77 days after transplanting; PTA, panicle threshability; GNT, number of total grain; GRL, grain length; GRW, grain width; HC, hull color.



Supplemental Figure S1. Morphological characteristics of Taiwan weedy rice and 3 rice populations, (A) rice plant, (B) rice spike and brown rice collected from the front, the middle and the end of the rice spike. The brown rice with different pericarp color showed the variation of maturity of grains on the rice spike.



Supplemental Figure S2. The principal components analysis among Taiwan weedy rice and 3 populations. (A) Screen plot for 13 targeted variables showing percentage of explained variance in the top 10 principal components. (B) Principal component analysis plot on the correlation circle for 13 targeted variables. Visualization of cos2 of (C) 18 variables and (D) 13 targeted variables in top five principal components. Cos2 indicates the quality of representation of variables on factor map, a high cos2 means a good representation of the variable to the PCs on the principal component. (E) Visualization of the contributions of 13 targeted variables in top five principal components. The larger the value of the contribution, the more the variable contributes to the PCs.