

Table S1. Soybean cultivars analyzed in the current study and their Maturity Groups (MG), regions, *E* allele combinations and the tested year.

Cultivar	Region	MG	<i>E</i> allele combinations	Tested year
16Pin10	Middle	III	<i>e1-ase2-nsE3-HaE4</i>	2017
16Pin3	Middle	III	<i>E1E2-dlE3-HaE4</i>	2017
HN0901	Middle	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
HN1030	Middle	III	<i>E1E2-inE3-MiE4</i>	2018
SK43	Middle	III	<i>E1e2-nsE3-MiE4</i>	2017
Andou109	Middle	III	<i>E1e2-nsE3-HaE4</i>	2018
Andou5240	Middle	II	<i>E1E2-dlE3-MiE4</i>	2017
Andou6023	Middle	III	<i>E1e2-nsE3-HaE4</i>	2018
Andou6271	Middle	II	<i>e1-ase2-nsE3-HaE4</i>	2017
Cangdou09Y1	Middle	III	<i>e1-asE2-inE3-HaE4</i>	2018
Cangdou11	Middle	III	<i>E1e2-nsE3-HaE4</i>	2018
Daoqiu17	Middle	III	<i>E1e2-nsE3-HaE4</i>	2017
Daoqiu6	Middle	III	<i>E1E2-dlE3-MiE4</i>	2018
Fandou1301	Middle	IV	<i>E1e2-nsE3-HaE4</i>	2017
Han13-109	Middle	III	<i>E1E2-dlE3-HaE4</i>	2018
Han15-296	Middle	II	<i>E1e2-nsE3-MiE4</i>	2017
Han15-685	Middle	II	<i>E1E2-dlE3-MiE4</i>	2017&2018
Handou5	Middle	III	<i>e1-asE2-inE3-MiE4</i>	2017&2018
Huadou21	Middle	III	<i>E1e2-nsE3-MiE4</i>	2018
Huadou23	Middle	II	<i>E1e2-nsE3-MiE4</i>	2017
Huayu2	Middle	III	<i>E1e2-nsE3-MiE4</i>	2018
JiJ14085	Middle	III	<i>E1e2-nsE3-MiE4</i>	2017
JiJ14110	Middle	III	<i>E1e2-nsE3-HaE4</i>	2017
Ji16-08	Middle	III	<i>E1e2-nsE3-MiE4</i>	2017

Jinke3	Middle	III	<i>El e2-nsE3-HaE4</i>	2017&2018
Jinyi53	Middle	III	<i>E1E2-inE3-HaE4</i>	2017&2018
Kedou18	Middle	II	<i>El e2-nsE3-HaE4</i>	2018
Kedou27	Middle	III	<i>E1E2-dlE3-HaE4</i>	2018
Kedou30	Middle	II	<i>El e2-nsE3-MiE4</i>	2017
Lu0305-1	Middle	III	<i>E1E2-dlE3-MiE4</i>	2017
Lu0540-4	Middle	III	<i>e1-asE2-inE3-MiE4</i>	2018
LuLh284	Middle	III	<i>E1E2-inE3-HaE4</i>	2018
Luo1304	Middle	III	<i>El e2-nsE3-HaE4</i>	2017
Luo1337	Middle	III	<i>El e2-nsE3-HaE4</i>	2018
Luo5901	Middle	III	<i>El e2-nsE3-MiE4</i>	2017
Pudou561	Middle	III	<i>El e2-nsE3-MiE4</i>	2017
Pudou793	Middle	III	<i>El e2-nsE3-MiE4</i>	2017&2018
Qindou220	Middle	II	<i>E1E2-dlE3-MiE4</i>	2018
Shangdou1701	Middle	III	<i>E1E2-dlE3-HaE4</i>	2017
Shengdou20	Middle	III	<i>E1E2-dlE3-MiE4</i>	2018
Shengdou21	Middle	III	<i>E1E2-dlE3-HaE4</i>	2018
Shengdou7	Middle	III	<i>El e2-nsE3-MiE4</i>	2017
Shengdou8	Middle	III	<i>El e2-nsE3-MiE4</i>	2017
Shi1179	Middle	III	<i>E1E2-inE3-HaE4</i>	2017&2018
Shi16S379	Middle	III	<i>e1-asE2-inE3-HaE4</i>	2018
Shi273	Middle	III	<i>E1E2-dlE3-HaE4</i>	2017
Wandou912	Middle	III	<i>El e2-nsE3-MiE4</i>	2017
Wandou913	Middle	III	<i>El e2-nsE3-HaE4</i>	2017
Wansu0922	Middle	IV	<i>El e2-nsE3-MiE4</i>	2017
Wansu1015	Middle	III	<i>El e2-nsE3-MiE4</i>	2017

Wansu132	Middle	II	<i>E1e2-nsE3-MiE4</i>	2018
Zhang15234	Middle	II	<i>E1e2-nsE3-HaE4</i>	2017
Zhang16175	Middle	II	<i>E1e2-nsE3-HaE4</i>	2017&2018
Zhang1677	Middle	II	<i>E1E2-dlE3-HaE4</i>	2018
Zhonghuang105	Middle	II	<i>e1-asE2-inE3-HaE4</i>	2018
Zhonghuang320	Middle	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Zhonghuang78	Middle	III	<i>E1E2-dlE3-MiE4</i>	2017
Zhongzuo11-11	Middle	III	<i>E1e2-nsE3-MiE4</i>	2017&2018
Zhongzuo11-54	Middle	III	<i>E1e2-nsE3-MiE4</i>	2017&2018
Zhongzuo11-719	Middle	II	<i>E1e2-nsE3-HaE4</i>	2017&2018
Zhou09094-3-4	Middle	III	<i>E1e2-nsE3-HaE4</i>	2017
Zhou11121-3-1-2	Middle	II	<i>E1E2-dlE3-HaE4</i>	2017&2018
Zhou12102-4	Middle	III	<i>E1E2-inE3-HaE4</i>	2018
Weidou12	Middle、North 、South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Fandou13	Middle、 South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Hedou44	Middle、 South	II	<i>E1E2-dlE3-HaE4</i>	2018
Luo1419	Middle、 South	III	<i>E1e2-nsE3-MiE4</i>	2017&2018
Luodou7901	Middle、 South	IV	<i>E1E2-dlE3-HaE4</i>	2018
14B2548	North	II	<i>e1-asE2-inE3-HaE4</i>	2017
HN1018	North	III	<i>e1-asE2-inE3-HaE4</i>	2017
HN1029-1	North	III	<i>E1e2-nsE3-HaE4</i>	2017
HN2018	North	III	<i>E1e2-nsE3-HaE4</i>	2018
Andou1498	North	II	<i>E1e2-nsE3-HaE4</i>	2017
Andou6223	North	III	<i>E1e2-nsE3-HaE4</i>	2018
Cangdou0605	North	III	<i>E1e2-nsE3-HaE4</i>	2017
Cangdou09Y2	North	III	<i>E1E2-inE3-HaE4</i>	2017

Cangdou1123	North	III	<i>E1E2-inE3-MiE4</i>	2018
Cangdou1312	North	III	<i>E1e2-nsE3-HaE4</i>	2018
Daoqiu37	North	III	<i>E1e2-nsE3-MiE4</i>	2018
Fandou17	North	III	<i>E1E2-dlE3-HaE4</i>	2018
Fendou98	North	I	<i>e1-ase2-nsE3-HaE4</i>	2017
Han13-429	North	III	<i>e1-asE2-inE3-HaE4</i>	2017
Han15-324	North	III	<i>E1E2-dlE3-MiE4</i>	2017&2018
Han16-139	North	III	<i>E1E2-dlE3-MiE4</i>	2018
Huadou30	North	III	<i>E1E2-dlE3-HaE4</i>	2018
Ji16-13	North	III	<i>E1E2-dlE3-MiE4</i>	2017
Jidou12	North	II	<i>E1e2-nsE3-MiE4</i>	2017&2018
Jinyi57	North	III	<i>E1E2-dlE3-HaE4</i>	2017&2018
Jinyi59	North	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Kedou13	North	III	<i>E1e2-nsE3-MiE4</i>	2017
Kedou26	North	III	<i>E1e2-nsE3-MiE4</i>	2018
Kedou31	North	III	<i>E1e2-nsE3-MiE4</i>	2017&2018
Langlunxuan2	North	II	<i>E1e2-nsE3-MiE4</i>	2017&2018
Langlunxuan1	North	II	<i>E1e2-nsE3-HaE4</i>	2017
Lu0315-9	North	III	<i>E1e2-nsE3-MiE4</i>	2017
Lu0540-6	North	III	<i>e1-asE2-inE3-MiE4</i>	2018
Luo1407	North	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Luo1408	North	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Shanda1	North	III	<i>E1e2-nsE3-MiE4</i>	2017
Shengdou103	North	III	<i>E1E2-dlE3-HaE4</i>	2018
Shi11893	North	III	<i>E1E2-dlE3-HaE4</i>	2018
Shi12503	North	III	<i>E1E2-dlE3-HaE4</i>	2018

Shi501	North	III	<i>e1-asE2-inE3-HaE4</i>	2017
Zhonghuang102	North	III	<i>E1e2-nsE3-MiE4</i>	2018
Zhonhpin1184	North	II	<i>E1E2-dlE3-HaE4</i>	2018
Zhongpin16067	North	III	<i>E1E2-inE3-MiE4</i>	2018
Zhongzuo08-08	North	II	<i>E1e2-nsE3-MiE4</i>	2017&2018
Zhongzuo10-732	North	III	<i>E1e2-nsE3-MiE4</i>	2017
Zhongzuo10-783	North	III	<i>E1E2-dlE3-MiE4</i>	2018
Zhongzuo11-58	North	II	<i>E1e2-nsE3-MiE4</i>	2017&2018
Zhongzuo12-1251	North	III	<i>E1E2-dlE3-MiE4</i>	2018
ZhongzuoJ141085	North	II	<i>e1-asE2-inE3-HaE4</i>	2017
ZhongzuoJ14558	North	II	<i>e1-asE2-inE3-HaE4</i>	2017
ZhongzuoJ161087	North	III	<i>e1-asE2-inE3-HaE4</i>	2018
ZhongzuoJ16118	North	III	<i>E1E2-dlE3-HaE4</i>	2018
Luo4904	North , Middle South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Ji1708	North , Middle , South , Northwest	III	<i>e1-asE2-inE3-HaE4</i>	2018
Andou331	North , Northwest	II	<i>E1e2-nsE3-MiE4</i>	2017&2018
Ji16-06	North , Northwest	III	<i>e1-asE2-inE3-MiE4</i>	2017
Suik46	North , Northwest	III	<i>E1e2-nsE3-MiE4</i>	2017
Zhonghuang103	North , Northwest	III	<i>E1e2-nsE3-MiE4</i>	2018
Lu0126	North , Northwest , Middle, South	III	<i>e1-asE2-inE3-HaE4</i>	2017&2018
Shi773	North , South	III	<i>e1-asE2-inE3-MiE4</i>	2017&2018

Zhonghuang203	North , South	III	<i>E1E2-dlE3-MiE4</i>	2017&2018
Ji1702	North , South, Middle	III	<i>E1E2-inE3-HaE4</i>	2018
Suik45	North , South, Middle, Northwest	III	<i>E1e2-nsE3-MiE4</i>	2017
GZ11-295	Northwest	III	<i>E1E2-inE3-HaE4</i>	2017
HN0801	Northwest	III	<i>E1E2-inE3-HaE4</i>	2018
Andou6021	Northwest	III	<i>e1-asE2-inE3-MiE4</i>	2017
Andou6215	Northwest	III	<i>E1E2-dlE3-HaE4</i>	2017
Han13-25	Northwest	III	<i>E1E2-inE3-MiE4</i>	2017
Han14-34	Northwest	II	<i>E1E2-inE3-HaE4</i>	2017&2018
Handou16	Northwest	II	<i>e1-asE2-inE3-HaE4</i>	2018
Ji16-12	Northwest	III	<i>e1-asE2-inE3-MiE4</i>	2017
Jindou19	Northwest	III	<i>e1-asE2-inE3-HaE4</i>	2017
Jinke6	Northwest	IV	<i>e1-asE2-inE3-MiE4</i>	2017&2018
Jinqing1	Northwest	V	<i>E1E2-inE3-HaE4</i>	2017&2018
Longhuang3	Northwest	III	<i>e1-asE2-inE3-MiE4</i>	2017
Longzhonghuang6 06	Northwest	III	<i>e1-asE2-inE3-HaE4</i>	2018
Longzhonghuang6 07	Northwest	II	<i>e1-asE2-inE3-HaE4</i>	2018
Lu0413-3	Northwest	III	<i>E1e2-nsE3-MiE4</i>	2017
Ninghuang135	Northwest	III	<i>E1E2-dlE3-MiE4</i>	2018
Ninghuang29	Northwest	III	<i>E1E2-inE3-HaE4</i>	2018
Shi083	Northwest	II	<i>e1-asE2-inE3-HaE4</i>	2018
Shi335	Northwest	III	<i>E1E2-dlE3-HaE4</i>	2018
Zhonghuang106	Northwest	I	<i>E1E2-dlE3-MiE4</i>	2018

Zhongzuo131	Northwest	III	<i>E1E2-dlE3-MiE4</i>	2017
ZhongzuoJ13162	Northwest	I	<i>e1-asE2-inE3-HaE4</i>	2017
ZhongzuoJ13319	Northwest	I	<i>E1e2-nsE3-MiE4</i>	2017
ZhongzuoJ15017	Northwest	II	<i>E1E2-inE3-MiE4</i>	2018
ZhongzuoJ16857	Northwest	III	<i>e1-asE2-inE3-HaE4</i>	2018
Fendou103	Northwest , Middle	III	<i>E1E2-inE3-HaE4</i>	2017&2018
Fendou104	Northwest , Middle	III	<i>E1E2-inE3-HaE4</i>	2018
Fendou99	Northwest , Middle	III	<i>E1e2-nsE3-HaE4</i>	2017
Shangdou1310	Northwest , Middle	III	<i>E1e2-nsE3-HaE4</i>	2018
Shangdou161	Northwest , Middle	III	<i>E1e2-nsE3-HaE4</i>	2018
Ji1701	Northwest , North , South, Middle	II	<i>E1E2-inE3-HaE4</i>	2018
Shi788	Northwest , South	III	<i>e1-asE2-inE3-HaE4</i>	2017&2018
Andou115	South	IV	<i>E1e2-nsE3-HaE4</i>	2017&2018
Andou5451	South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Daoqiu16	South	III	<i>E1e2-nsE3-MiE4</i>	2017
Daoqiu21	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Daoqiu30	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Daoqiu32	South	III	<i>E1e2-nsE3-HaE4</i>	2018
Fandou14	South	III	<i>E1E2-inE3-HaE4</i>	2018
Fandou1510	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Fandou9	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Fu1702	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Fu1710	South	III	<i>E1E2-dlE3-HaE4</i>	2017
Han13-99	South	III	<i>E1e2-nsE3-MiE4</i>	2017&2018

Han617	South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Huadou22	South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Huadou24	South	III	<i>e1-asE2-inE3-HaE4</i>	2017
Huadou35	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Huadou4	South	IV	<i>E1E2-inE3-MiE4</i>	2017
Huayu1	South	II	<i>E1E2-dlE3-MiE4</i>	2018
Huayu3	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Huai16-22	South	II	<i>E1E2-dlE3-MiE4</i>	2017&2018
Huai16-33	South	I	<i>E1E2-dlE3-MiE4</i>	2017
JiJ14109	South	III	<i>E1E2-dlE3-MiE4</i>	2017
JiJ14165	South	III	<i>E1E2-dlE3-MiE4</i>	2017
Ji16-J10	South	III	<i>e1-asE2-inE3-HaE4</i>	2017
Kedou14	South	II	<i>E1e2-nsE3-HaE4</i>	2017&2018
Kedou28	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Kedou6	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Liudou104	South	III	<i>E1e2-nsE3-MiE4</i>	2017
Liudou106	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Liudou108	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Liudou109	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Lu0305-2	South	III	<i>E1E2-dlE3-HaE4</i>	2017
Lu0540-7	South	III	<i>e1-asE2-inE3-MiE4</i>	2018
Luo1305	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Luo16112	South	III	<i>E1e2-nsE3-HaE4</i>	2018
Nannong1504	South	III	<i>E1E2-dlE3-HaE4</i>	2017
Nannong1608	South	III	<i>E1E2-dlE3-MiE4</i>	2017
Nannong1609	South	III	<i>E1e2-nsE3-MiE4</i>	2017&2018

NannongG177	South	III	<i>E1e2-nsE3-HaE4</i>	2018
NannongG178	South	III	<i>E1e2-nsE3-MiE4</i>	2018
ShangdouH28	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Shengdou13	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Shengdou17	South	III	<i>E1E2-dlE3-HaE4</i>	2017&2018
Shengdou22	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Shengdou23	South	II	<i>E1E2-dlE3-MiE4</i>	2018
Shengdou24	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Shengdou26	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Shengdou4	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Shi1064	South	III	<i>E1E2-inE3-HaE4</i>	2017
Shi1415	South	III	<i>E1E2-inE3-HaE4</i>	2017
Suik47	South	III	<i>E1E2-dlE3-MiE4</i>	2017
Tianyikedou1717	South	IV	<i>e1-asE2-inE3-HaE4</i>	2018
Wandou0954	South	IV	<i>E1E2-dlE3-HaE4</i>	2017
Wandou21160	South	II	<i>E1E2-dlE3-MiE4</i>	2017
Wandou905	South	III	<i>E1E2-dlE3-MiE4</i>	2017
Wandou919	South	IV	<i>E1E2-inE3-HaE4</i>	2018
Wandou920	South	III	<i>E1e2-nsE3-HaE4</i>	2018
Wansu013	South	III	<i>E1E2-inE3-HaE4</i>	2018
Wansu061	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Wansu1117	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Wansu1120	South	II	<i>E1E2-inE3-HaE4</i>	2017
Weidou13	South	III	<i>E1E2-inE3-MiE4</i>	2017
Xu0118-9	South	III	<i>E1E2-dlE3-MiE4</i>	2018
Xu0366-9	South	II	<i>E1E2-dlE3-MiE4</i>	2017

Xu9601-2B	South	III	<i>e1-asE2-inE3-HaE4</i>	2017
Yongmin3	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Yongmin6	South	IV	<i>E1E2-inE3-MiE4</i>	2018
Zhang15283	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Zhang15339	South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Zhongdou4901	South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Zhongdou5701	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Zhongdou5901	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Zhonghuang13	South	III	<i>E1e2-nsE3-MiE4</i>	2017&2018
Zhonghuang309	South	III	<i>E1E2-inE3-HaE4</i>	2017
Zhonghuang321	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Zhongzuo10-24	South	II	<i>E1e2-nsE3-MiE4</i>	2017&2018
Zhongzuo10-43	South	II	<i>E1E2-inE3-MiE4</i>	2017&2018
Zhongzuo11-516	South	III	<i>E1e2-nsE3-HaE4</i>	2018
Zhongzuo11-817	South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Zhou11005-10-4-6	South	III	<i>E1e2-nsE3-HaE4</i>	2017
Zhou11017-18	South	III	<i>E1E2-dlE3-HaE4</i>	2018
Zhou11019-2-1	South	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Hedou34	South, Middle	III	<i>e1-asE2-inE3-HaE4</i>	2017
Hedou40	South, Middle	III	<i>E1e2-nsE3-MiE4</i>	2017&2018
Huadou3	South, Middle	III	<i>E1E2-dlE3-MiE4</i>	2018
Ji16-J16	South, Middle	III	<i>e1-asE2-inE3-HaE4</i>	2017
Luo1330	South, Middle	III	<i>E1e2-nsE3-HaE4</i>	2017&2018
Shangdou1712	South, Middle	III	<i>E1e2-nsE3-HaE4</i>	2017
Zhonghuang104	South, Middle	III	<i>E1E2-dlE3-MiE4</i>	2018
Zhonghuang319	South, Middle	III	<i>E1e2-nsE3-HaE4</i>	2017&2018

Zhonghuang73	South, Middle	III	<i>E1E2-inE3-HaE4</i>	2017
Ji1707	South, Northwest , Middle	III	<i>E1E2-inE3-HaE4</i>	2018
Qindou2017	Middle	III	<i>E1E2-inE3-MiE4</i>	2018

Table S2. The latitude and longitude of locations in the current study.

Location	Region	Latitude	Longitude
Baoding	North	38°49'N	115°27'E
Cangzhou	North	38°16'N	116°49'E
Changping	North	40°10'N	116°13'E
Dezhou	North	37°27'N	116°19'E
Fenyang	North,Northwest	37°15'N	111°46'E
Gaoping	North	35°49'N	112°52'E
Gaoshang	North	37°56'N	114°42'E
Langfang	North	39°32'N	116°40'E
Shijiazhuang	North	38°7'N	114°31'E
Shunyi	North	40°13'N	116°33'E
Taiyuan	North,Northwest	37°46'N	112°34'E
Fuping	Middle	34°44'N	109°10'E
Handan	Middle	36°33'N	114°31'E
Huayin	Middle	34°36'N	109°57'E
Jinan	Middle	36°42'N	117°4'E
Linfen	Middle	36°6'N	111°31'E
Luoyang	Middle	34°38'N	112°28'E
Puyang	Middle	35°45'N	115°1'E
Weifang	Middle	36°42'N	119°8'E

Yangling	Middle	34°15'N	108°3'E
Yongji	Middle	34°55'N	110°24'E
Yuncheng	Middle	35°2'N	110°58'E
Zhengzhou	Middle,South	34°47'N	113°40'E
Fuyang	South	32°55'N	115°47'E
Heze	South	35°19'N	115°29'E
Huaian	South	33°36'N	119°0'E
Jining	South	35°27'N	116°34'E
Longkang	South	33°6'N	116°52'E
Luohe	South	33°35'N	114°0'E
Shangqiu	South	34°26'N	115°40'E
Suzhou	South	33°37'N	116°58'E
Xuzhou	South	34°16'N	117°17'E
Zhoukou	South	33°38'N	114°34'E
Changzhi	Northwest	36°12'N	113°8'E
Huining	Northwest	35°42'N	105°0'E
Shenmu	Northwest	39°21'N	110°50'E
Wuwei	Northwest	37°55'N	102°36'E
Yanan	Northwest	36°34'N	109°28'E
Yongning	Northwest	38°15'N	106°14'E
Zhenyuan	Northwest	35°31'N	107°27'E
Zhongning	Northwest	37°28'N	105°41'E
Zizhou	Northwest	37°36'N	110°2'E

Table S3. Primers for *E1-E3* genotyping.

Gene	Primer Name	Primer Sequence	Purpose	Allele
<i>E1</i>	E1_as_FAM	AAAGGGAGCAGTGTCAAAAGAAGAC	KASP (E1-SNP-as)	C
	E1_as_VIC	AAAGGGAGCAGTGTCAAAAGAAGAG		G(wildtype)
	E1_as_Reverse	GTTAGAGGCTTCGCATATGGTGGWTT		
<i>E2</i>	E2_ns_FAM	CCCATCAGAGGCATGTCTTATGA	KASP (E2-SNP-ns)	A(wildtype)
	E2_ns_VIC	CCCATCAGAGGCATGTCTTATGT		T
	E2_ns_Reverse	CTGTTTTGTTCTCTAGTGGACTCA		
<i>E2</i>	E2ex9564_FAM	GCAGCATATTTCCCCATAAT	KASP (E2-in SNP E2-dl)	A
	E2ex9564_VIC	GCAGCATATTTCCCCATAAC		G (wildtype)
	E2ex9564_Reverse	TGCTGTATGTTAACAGGTGC		
<i>E3</i>	E3_08557FW	TGGAGGGTATTGGATGATGC	Genotyping for InDel	
	E3_09908RV	CTAAGTCCGCCTCTGGTTTCAG		
	E3Ha_1000RV	CGGTCAAGAGCCAACATGAG		
<i>E4</i>	E4_kes_FAM	AACAAATTCAGAGATATCATACCCATCT	KASP (E4-SNP-kes)	A(wildtype)
	E4_kes_VIC	AACAAATTCAGAGATATCATACCCATCA		T
	E4_kes_Reverse	GCAGCTTAGTAAAATTCTTGATGACTCAG		