

**Underling Fundamental Parameters for Defining Maize Essentially-Derived-Varieties of
Inbreds Using High Throughput Genome-wide SNP Markers**

Supplemental Table S1. Accessions of maize inbreds used in this study.

NO	Inbreds ID	Inbred full name	Seed bank ID	Year	Inbred accessions
1	HZ4	Huangzao4	09229-2	2009	HZ4_2009
	HZ4	Huangzao4	16-8487-1	2016	HZ4_2016.1
	HZ4	Huangzao4	160051	2016	HZ4_2016.2
2	Zi330	Zi330	15-5337	2015	Zi330_2015
	Zi330	Zi330	17030	2017	Zi330_2017
3	Ji853	Ji853	160021	2016	Ji853_2016.1
	Ji853	Ji853	16-8489	2016	Ji853_2016.2
4	JiK853	JiK853	5174	2015	JiK853
5	A619Ht	A619Ht	120217	2012	A619Ht
6	A619	A619	120298	2012	A619
7	444	444	IN91	2012	444_2012
	444	444	160122	2016	444_2016
8	B467	B467	N2	2008	B467
9	JiV057	JiV057	16-8482-2	2016	JiV057
10	Jin03	Jin03	120231-2	2012	Jin03_2012
	Jin03	Jin03	160131	2016	Jin03_2016
11	Si287	Si287	N7	2008	Si287
12	DH02	Danhuang02	110121	2011	DH02_2011
	DH02	Danhuang02	160002	2016	DH02_2016
13	J9206	J9206	16-8506	2016	J9206
14	Ji1037	Ji1037	N40	2008	Ji1037
15	JiK287	JiK287	5057	2015	JiK287
16	L269	L269	16*5014	2016	L269
17	S1014	S1014	17S1014	2017	S1014
18	PHP02	PHP02	14*1574	2014	PHP02
19	S2024	S2024	17S2024	2017	S2024
20	Si273	Si273	N27	2008	Si273
21	JiA3301	JiA3301	17*1003	2017	2455

Supplemental Table S2. The incomplete official data on hybrids and their growing area as analyzed inbred as parental lines.

No	Inbreds	Hybrids used as parental lines	Accumulative Growing Area (ha.)
1	Huangzao4(HZ4)	Jingzao7 (Huangzao4 × Luoxi3)	1,945,333
2		Yandan14 (Huangzao4 × MO17)	10,401,333
3		Hudan1 (Huangzao4 × MO17)	3,392,667
4		Huang417 (Huangzao4 × MO17)	2,792,667
5		Handan15 (Huangzao4 × Santuan)	123,333
6		Yedan2 (Ye107 × Huangzao4)	18,003,333
7		Liaoyu5 (Yuanwu02 × Huangzao4)	2,647,333
8		Lainongsi (Huangzao4 × 1029)	70,000
9		Luyuandan8 (Yuanqi123 × Huangzao4)	745,333
10		Yedan4 (U8112 × Huangzao4)	7,210,667
11		Ludan39 (Huaiai141 × Huangzao4)	180,667
12		Shangdan3 (27-263 × Huangzao4)	175,333
13		Zhengdan8 (Huangzao4 × Zheng32)	396,000
14		Yudan8 (Huangzao4 × 3184)	30,667
15		Handan2 (Huangzao4 × Huobai)	648,667
16		Langyu2 (Zigai1 × Huangzao4)	284,000
17		Xingdan1 (Huangzao4 × Xing11)	72,000
18		Hengdan8 (Huangzao4 × CB5)	40,000
19		81159 (29028 × Huangzao4)	121,333
20		Jiyu1 (Huangzao4 × Ji21)	34,000
21		Henong207 (Ai192 × Huangzao4)	36,000
22		Jidan25 (Ping21 × Huangzao4)	8,667
23		Suyu1 (Su80-1 × Huangzao4)	813,333
24		Hudan5 (150 × Huangzao4)	14,000
25		Tongdan26 (Yan4084 × Huangzao4)	90,667
26		Zhongyuandan4 (Yuanfu17 × Huangzao4)	164,667
27		Jidan122 (B73 × Huangzao4)	10,000
28	Zi330	Zhongdan2 (Mo17 × Zi330)	30,331,333
29		Danyu6 (Lv28 × Zi330)	2,336,000
30		Qisandanjiao (77 × Zi330)	1,584,667
31		Jingza6 (Zi330 × Xu052)	2,821,333
32	Ji853	Tiedan4 (Ji63 × Zi330)	2,766,000
33		Shendan3 (Baihe43 × Zi330)	822,667
34		Jidan180 (Ji853 × M017)	2,088,000
35		Jidan342 (Ji1037 × Ji853)	199,333
36	Ji853	Tongji100 (C8605-2 × Ji853)	375,333
37		Jidan261 (W9706 × Ji853)	352,667
38		Jidan517 (JiV022 × Ji853)	586,667
39		Jingke25 (J0045 × Ji853)	70,000
40		Liaodan33 (Liao3180 × Ji853)	122,667
41		Chengyu14 (Chengxi14 × Ji853)	20,667
42		Nongdakemao518 (JND2361 × Ji853)	16,000
43		Qinji53 (Qin3 × Ji853)	unavailable
44		Chengyu10 (Chengxi24 × Ji853)	16,667
45		Leiao1 (L4005 × Ji853)	unavailable
46		Zeyu17 (L0745 × Ji853)	unavailable

47	Jiaer336 (E221 × Ji853)	57,333
48	Liaodan129 (Liao8160 × Ji853)	unavailable
49	Fuyou99 (C7112 × Ji853)	80,667
50	Zhongke2 (CT141 × Ji853)	unavailable
51	Jingke8 (Ji853 × P007)	8,667
52	Zhongdan18 (Ji853 × Zhong4875)	unavailable
53	Chengyu5 (1154 × Ji853)	270,667
54	Jidan303 (7884-7Ht × Ji853)	unavailable
55	Jidan209 (8902 × Ji853)	850,000
56	Jidan321 (Ji921 × Ji853)	126,667
57	Sidan111 (C8605 × Ji853)	unavailable
58	Jidan325 (Ji930 × Ji853)	unavailable
59	Jidan257 (1079-6 × Ji853)	65,333
60	Jidan413 (9681533 × Ji853)	unavailable
61	Jidan515 (JiB93-4 × Ji853)	unavailable
62	Jidan264 (2029 × Ji853)	6,667
63	Jidan35 (A-394 × Ji853)	76,000
64	Jidan711 (Ji9-033 × Ji853)	unavailable
65	Chengyu5 (ZaC546 × Ji853)	18,000
66	Tongyu98 (LH1 × Ji853)	8,667
67	Jixin203 (Ji853 × 9046)	128,667
68	Jixin205 (Ji853 × LH51)	27,333
69	Yifeng10 (M121 × Ji853)	134,667
70	Longfeng2 (241 × Ji853)	99,333
71	Jundan8 (Jun8903 × Ji853)	136,667
72	Zhengda988 (C7112 × Ji853)	unavailable
73	Xinchun18 (Ji853 × 462)	58,000
74	Jiuyu27 (98114 × Ji853)	9,333
75	Zeyu11 (H011 × Ji853)	68,667
76	Chunyu8 (C4641 × Ji853)	unavailable
77	Tongyu99 (LH3 × Ji853)	38,667
78	Gongzhu1 (Ji853 × HN1)	unavailable
79	Tunyu58 (MH251 × Ji853)	unavailable
80	Jiyu301 (GS01 × Ji853)	55,333
81	Denghai6145 (S44625 × Ji853)	unavailable
82	Jidong8 (Ji853 × S20)	8,000
83	Jiangyu417 (3115 × Ji853)	unavailable
84	Hongyu29 (W9813 × Ji853)	218,667
85	Jixin308 (Xin343 × Ji853)	unavailable
86	Tongyu112 (A67 × 853)	unavailable
87	Qindan4 (Ji853 × Qinxi421)	212,000
88	Danyu404 (H185 × Ji853)	unavailable
89	Shuanghe1 (D3011 × Ji853)	unavailable
90	Jinyu61 (T8918 × Ji853)	unavailable
91	Jinshan8 (Jin103 × Ji853)	unavailable
92	444 Sidan19 (444 × MO17)	10,709,333
93	Sizao154 (444 × D801)	unavailable
94	Jidan501 (444 × 351)	8,000
95	Jidan252 (444 × J001)	unavailable
96	Jidan507 (444 × Ji1037)	unavailable
97	Baizao2 (444 × Baiyin896)	unavailable

98		Haoyu19 (444 × Mmei78)	6,667
99		Baidan52 (444 × Bai256)	unavailable
100		Jidan262 (444 × W9706)	unavailable
101		Jiudan57 (444 × 1216)	6,667
102		Longfeng7 (444 × 241)	28,667
103		Changdan529 (444 × WM05)	18,000
104		Jidong31 (444 × D20)	unavailable
105		Jiudan12 (444 × M3)	28,667
106		Tiedan13 (444 × C8605-2)	13,333
107		Xingdan6 (444 × Hu150)	unavailable
108		Jinshan10 (444 × Jinshan1013)	6,667
109		Kehe10 (444 × Ba816)	unavailable
110		Jidan507 (444 × Ji1037)	unavailable
111	B467	Jidan103 (B467 × He344)	58,667
112	Si287	Jidan27 (Si-287 × Si-144)	1,882,667
113		Jidan32 (Si-287 × Hu150)	126,667
114		Jidan92 (Si-287 × Ji1037)	unavailable
115		Jidan18 (Si-287 × JiA034)	unavailable
116		Jidong16 (Si-287 × D22)	72,000
117	DH02(Danhuang02)	Danyu16 (5003 × Danhuang02)	496,000
118	J9206	Jidan137 (C8605 × J9206)	118,667
119	Ji1037	Jidan342 (Ji1037 × Ji853)	199,333
120		Jidan507 (Si-444 × Ji1037)	unavailable
121		Jidan618 (Ji1037 × JiD850)	unavailable
122		Jidan92 (Si-287 × Ji1037)	unavailable
123		Jidan419 (Ji1037 × Ji96815-33)	unavailable
124	JiK287	Jidan502 (JiK287 × JiV022)	unavailable
125	L269	Limin33 (L201 × L269)	215,333
126	JIA3301(2455)	Jidan33 (JiA3301 × JiA3302)	unavailable
127	Si273	Jidan271 (Si-273 × 673)	unavailable
128		Jidan29 (Si-273 × 599-20-1)	99,333
129	434	Sizao121 (434 × C52)	unavailable
130		Sizao6 (434 × 4F1)	622,000
131	JiV057	Jidan550 (JiV079 × JiV057)	unavailable
Total			112,442,667

Note: Official data on growing area of each hybrids were publicly available.

<http://202.127.42.47:6006/home>

Supplemental Table S3. The number of SNP applied into analysis.

Inbred accessions	NO. of SNP using into analysis after filtering		
	RH	GD	EDV
HZ4_2009	35593	—	—
HZ4_2016.1	35629	35588	13068 ^a , 13092 ^b
HZ4_2016.2	35617	35588	—
Zi330_2015	35601	35575	—
Zi330_2017	35616	35575	13068 ^a
Ji853_2016.1	35590	35555	—
Ji853_2016.2	35592	35555	13771 ^c , 13068 ^a
JiK853	35586	—	13771 ^c
A619Ht	35604	35534	13092 ^b
A619	35571	35534	—
444_2012	35544	35444	—
444_2016	35549	35444	13092 ^b , 12119 ^d , 11300 ^e , 34638 ^f , 34527 ^g
B467	35501	—	34527 ^g
JiV057	35546	—	34638 ^f
Jin03_2012	35462	35430	—
Jin03_2016	35577	35430	12119 ^d
Si287	35543	—	13325 ^h , 12119 ^d , 10782 ⁱ , 12681 ^j , 11790 ^k
DH02_2011	35523	35449	—
DH02_2016	35557	35449	11300 ^e
J9206	35466	—	11300 ^e
Ji1037	35610	—	13771 ^c , 13325 ^h
JiK287	35599	—	13325 ^h
L269	35607	—	12681 ^j
S1014	35585	—	12681 ^j
PHP02	35627	—	11790 ^k
S2024	35202	—	11790 ^k
Si273	35609	—	10782 ⁱ
JiA3301	35613	—	10782 ⁱ

Note: RH, residual heterozygosity; GD, genetic drift; EDV, essentially derived variety. The polymorphic SNPs between founder lines of EDV were used as genotyping data for inferring genome contributions.

"a" indicated the number of polymorphic SNPs between HZ4 and Zi330 used in the EDV analysis of Ji853.

"b" indicated the polymorphic SNPs numbers between HZ4 and A619Ht used in the EDV analysis of 444.

"c" indicated the number of polymorphic SNPs between Ji853 and Ji1037 used in the EDV analysis of JiK853.

"d" indicated the number of polymorphic SNPs between 444 and Jin03 used in the EDV analysis of Si287.

"e" indicated the number of polymorphic SNPs between 444 and DH02 used in the EDV analysis of J9206.

"f" indicated the number of SNPs used in the genome comparison between 444 and JiV057.

"g" indicated the number of SNPs used in the genome comparison between 444 and B467.

"h" indicated the number of polymorphic SNPs between Si287 and Ji1037 used in the EDV analysis of JiK287.

"i" indicated the number of polymorphic SNPs between Si287 and Si273 used in the EDV analysis of 2455.

"j" indicated the number of polymorphic SNPs between Si287 and L269 used in the EDV analysis of S1014.

"k" indicated the number of polymorphic SNPs between Si287 and PHP02 used in the EDV analysis of S2024.