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TO STUDY THE MORPHOLOGICAL CHARACTERIZATION OF MAIZE

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ABSTRACT

The world's most important grain and industrial crop, maize (Zea mays L.), is grown on more than 160 million ha of land across continents using a variety of ecologies and management techniques. The highest of the cereal food crops, maize contributes more than 800 million tonnes annually to the world's food supply. It is now essential to create inbreds with high seed yield potential for the effective seed production of single cross hybrids due to the reorientation toward the development of single cross hybrids in maize. The main objectives of conventional inbred line creation for maize are selection for grain production and self-pollination, with ear-to-row being the most popular technique. The presence of desirable genes and gene complexes in the base population is a direct determinant of how excellent inbreds are. Thus, selecting a foundation population to produce exceptional inbreds is crucial in maize breeding efforts. In breeding operations, populations with a restricted genetic background arising from maize single cross hybrids have been preferred to open pollinated kinds. Since single cross hybrids have been evaluated in multiple situations, a large number of loci with fixed favorable alleles are associated with high yield. As base populations for new inbred development in maize, elite line synthetics/composites, experimental varieties, heterotic populations, and land races are also used in addition to single cross hybrids. There aren't many studies comparing the usefulness of various base populations for identifying potential inbred parents, though.

KEY WORDS: Morphological Characterization, Maize, Potential Inbred Parents,

INTRODUCTION

Zea mays L., 2n=20, a member of the Maydeae tribe of the Poaceae grass family, is a native of Mexico. Although it is a tropical crop, it has excelled at adapting to temperate situations, producing significantly more. It is cultivated between latitudes 580 N and 400 S, from sea level to elevations greater than 3000 m, and in regions with annual rainfall ranging from 250 to 5000 mm. The world's most important grain and industrial crop, maize, is now grown on more than 160 million acres across all continents using a variety of ecologies and management techniques. The highest of the cereal food crops, maize contributes more than 800 million tonnes annually to the world's food supply. China comes ranked second among nations that cultivate maize, with the United States accounting for 35% of global maize production. With a peak productivity of more than 10 tonnes/ha in the USA, maize is more or less the major driver of the agricultural economy and is more than twice as productive as the global average of 5.3 tonnes/ha.

Next to rice and wheat, maize is the third-most significant food crop in India. According to the Directorate of Maize Research (2013), it is grown over an area of 8.67 million ha, producing 22.26 million tonnes at a productivity of 2.56 tonnes/ha. By 2025, 42 million tonnes of maize are anticipated to be needed in India, 21% of which will be used for food (Sain Dass et al., 2009). The All India Coordinated Maize Improvement Project, launched in 1957 by the Indian Council of Agricultural Research as a component of the National Agricultural Research System, marked the beginning of a systematic maize improvement program in India. This has had a tremendous impact on the growth of maize in the nation. The production of composites, Double, and Three Way cross hybrids played a significant role in increasing maize productivity during the 1980s and 1990s. The first single cross hybrid, known as "Paras," was created and released in 1996 at the Punjab Agricultural University in Ludhiana. Despite the fact that this hybrid was unable to reach farmers' fields because of production issues with hybrid seeds, it opened the door for extensive single cross hybrid development in the nation, which has received the majority of attention over the past 15 years. The average productivity has increased by 73 kg/ha/year due to the large-scale growth of single cross hybrids, which is 2-3 times more than the productivity increase seen between 1950 and 2000. It is well known that crossovers between parents with different genetic profiles exhibit more heterosis than crosses between parents who are closely related. Inbred lines from different stocks likely to be more productive than crosses of inbred lines from the same variety, according to several research on maize. It is now possible to select the genetically diverse parents for hybrid creation thanks to the quantification of genetic diversity through biometric techniques. The D2 statistic, is one of the effective methods for determining genetic divergence. The D2 statistic assesses the level of diversity and establishes the relative contribution of each component character to the overall divergence, in addition to assisting in the selection of diverse parents for hybridization.

RESEARCH METHODOLOGY

The current analysis was conducted at the Genomic Resources Laboratory.

COLLECTION OF SAMPLES

During the growing season, samples of S. inferens were taken from four distinct host plants, including maize, rice, sugarcane, and sorghum. Each location yielded at least 20 live larvae. S. inferens' several life phases are displayed.

DIVERSITY ANALYSIS IN INBREDS DERIVED FROMDIFFERENT BASE POPULATIONS

The experiment was conducted at the R&D Farm, in kharif season using a 12 × 12 basic lattice design with two replications. The farm's coordinates are 212 meters above sea level and 11.5990 North 78.5980 East, respectively.

The experimental field was well-equipped to produce a quality crop. Application rates for inorganic fertilizers were 135 kg N, 62.5 kg P_2O_5, and 50 kg K_2O/ha. Just before sowing, a full dose of P_2O_5 and K_2O were administered as a basal dose, whereas N was applied in three splits.

OBSERVATIONS RECORDED

The data were replicated on 19 characters and recorded, as described below. The treatment mean for each replication was calculated using the average value of 5 randomly selected plants for each accession.

1. Days to 50% tasseling: Calculated as the number of days between planting and when 50% of the plants have flowered.

2. Days to 50% silking: The number of days from sowing to when 50% of the plants have emerged with silks

3. The difference between days to 50% silking and days to 50% tasseling is used to calculate the anthesis-silking interval.

4. Plant height (cm): Measured from the ground to the base of the tassel after the milk stage.

5. Ear height (cm): The distance from the ground to the node that holds the topmost ear following the milk stage, measured in centimeters.

6. Leaf count: The total number of leaves each plant has after flowering.

7. Leaf length (cm): The distance in centimeters from the ligule to the tip of the leaf that covers the topmost ear after flowering.

8. Leaf width (cm): The breadth of the leaf, measured in centimeters, that covers the highest ear halfway down its length.

9. Tassel length (cm): The distance in centimeters from the tassel's base to the main axis following the milk stage.

10. Total number of tassel branches: The tassel has a total of branches following the milk stage.

11. Ear length (cm): The distance in centimeters between the base and the tip of the ear.

12. Ear circumference (cm): Measure the diameter of the ear in centimeters.

13. The number of rows in the middle of the topmost ear that are straight.

14. Number of kernels/row: The number of grains in each row of the ear's kernels.

15. The total number of grains in an ear was calculated by multiplying the number of rows with the number of kernels.

16. Days to maturity: Counted from the time of seeding until 75% of the plants have fully dried husk.

17. Weight of 100 randomly selected kernels, adjusted to a 15% moisture content, stated in grams.

RESULTS AND DISCUSSION

MEANS OF INBREED PERFORMANCE

Tables present the mean performance of 144 inbreds with respect to all characters.

Days to 50 percent maturity

54.5 to 68 days was observed to reach 50% tasseling. With 54.5 days to 50% tasseling, FI-4 was the earliest inbred, followed by FI-18 and FI-38 with 55 days to 50% tasseling. FI-11 was extremely late, taking 68 days to reach 50% tasseling, followed by FI-10 and FI-113, which required 66.5 and 65.5 days respectively.

Days to 50% silking

Observations on days to 50% silking revealed a range of 55,5 to 70,0 days, with FI-116 obtaining the lowest value and FI-11 the highest. The inbreds FI-18, FI-124, and FI-129 were discovered to be early with 56 days to 50% silking, whereas FI-10 and FI-113 were discovered to be extremely late with 67.5 and 68.5 days to 50% silking, respectively.

Anthesis – Silking interval (ASI)

The anthesis – silking interval variation ranged from 0 to 4 days. In 11 of the 144 inbreds, anthesis and silking occurred on the same day: FI-21, FI-23, FI-24, FI-57, FI-66, FI-115, FI-116, FI-120, FI-124, and FI-129. FI-3 had the longest interval between anthesis and silking at 4 days, followed by FI-12, FI-62, and FI-64 0077ith 3.5 days.

Maturity days

The range of days to maturity was between 90 and 129. FI-115 was the earliest maturing inbred, maturing in 90 days, followed by FI-50, FI-71, FI-75, FI-116, and FI-117, which all required 92 days to maturity. The inbred FI-96 was extremely late, ripening in 129 days, while FI-113 matured in 128 days.

Height of plants

The plant height ranged from 95.9 to 191.2 centimeters with a high degree of variability. The shortest inbreds were FI-40 (95.9 cm), FI-73 (98.1 cm), and FI-45 (99.8 cm), while the tallest ones were FI-97 (191.2 cm), FI-139 (187.7 cm), and FI-88 (189.2 cm).

Ear Height

The ear height of the inbreds varied significantly, ranging from 42,6 to 107,7 cm. The inbred with the lowest ear placement was FI-129 (42.6 cm), followed by FI-26 (43.4 cm) and FI-143 (43.7 cm). Inbreds FI-88 (107.6 cm), FI-95 (107.3 cm), FI-87 (97.8 cm), and FI-97 (97.8 cm) exhibited higher ear placement.

Ear Length

The observed ear length ranged from 9.9 to 21.2 centimeters. Among the examined inbreds, FI-106 had the shortest ears at 9.9 cm, followed by FI-81 and FI-129 at 10.5 cm and 11.4 cm, respectively. FI-11 had the longest ears at 21,2 centimeters, followed by FI-88 at 20,4 cm and FI-93 at 19,6 cm.

Ear Girth

The ear circumference also demonstrated substantial variation, ranging from 10.9 to 16.2 cm. The ear circumferences of FI-97 (16.2 cm), FI-53 (15.7 cm), and FI-54 (15.7 cm) were notably large. In contrast, FI-18 (10.9 cm), FI-17 (11.2 cm), and FI-14 (11.7 cm) had comparatively small ears.

Length of a Tassel

The length of the fringe varied from 21.8 to 37.5 cm among the inbreds. FI-131 had the shortest tassel at 21.8 centimeters, followed by FI-81 and FI-25 at 22.3 cm and 22.7 cm, respectively. FI-20 had the longest tassels at 37.5 centimeters, followed by FI-76 and FI-121 at 36.5 cm and 35.8 cm, respectively.

Number of tassels branches

Variability in the number of tassel branches in the subject material ranged from 3.0 to 15.3. Lowest number of tassel branches were recorded in FI-132 (3.0) followed by FI-2 (3.15) and FI-104 (3.3). FI-67 had the most tassel branches (15.3), followed by FI-15 (13.8) and FI-11 (13.15).

Table-1: Mean performance of inbreds for flowering, plant, ear and tassel characters

Sl. No	Inbred no	Days to 50% tasselling	Days to 50% silking	ASI	Days to maturity	Plant height (cm)	Ear height (cm)	Ear length (cm)	Ear girth (cm)	Tassel length (cm)	No. of tassel branch.
1	FI-1	60.5	62.5	2.0	109.0	127.0	53.8	13.3	14.5	34.9	4.0
2	FI-2	58.5	60.0	1.5	101.0	105.4	52.2	14.4	12.9	34.3	3.2
3	FI-3	58.5	62.5	4.0	109.0	141.8	64.4	13.1	15.3	30.3	9.8
4	FI-4	54.5	57.0	2.5	98.0	138.6	71.6	15.2	13.9	32.4	8.3
5	FI-5	59.0	61.0	2.0	106.0	123.9	62.4	15.3	14.8	35.1	4.8
6	FI-6	57.5	60.0	2.5	94.0	137.3	64.0	14.2	13.1	32.1	4.1
7	FI-7	57.5	58.5	1.0	96.5	109.1	57.5	15.6	13.4	28.2	6.0
8	FI-8	57.0	59.5	2.5	92.5	152.2	84.7	15.1	13.5	24.3	9.7
9	FI-9	62.5	64.5	2.0	109.0	138.8	56.1	14.0	13.2	25.8	5.0
10	FI-10	66.5	68.5	2.0	115.0	183.7	85.9	17.7	14.6	30.0	10.8
11	FI-11	68.0	70.0	2.0	116.5	165.5	75.5	21.2	12.1	30.8	13.2
12	FI-12	63.5	67.0	3.5	109.5	164.7	73.1	16.0	13.9	23.5	13.0
13	FI-13	61.5	63.5	2.0	113.5	152.1	76.3	17.3	13.1	29.9	9.3
14	FI-14	61.0	62.5	1.5	100.5	147.9	75.5	16.0	11.7	31.4	4.3
15	FI-15	60.0	62.0	2.0	97.0	108.1	53.4	13.3	13.5	30.7	13.8
16	FI-16	58.0	60.0	2.0	97.5	109.2	49.1	13.2	13.0	27.5	12.8
17	FI-17	57.5	59.5	2.0	102.0	146.5	77.4	14.9	11.2	26.6	9.8
18	FI-18	55.0	56.0	1.0	93.5	138.3	64.8	14.3	10.9	25.6	7.7
19	FI-19	61.0	62.5	1.5	112.5	163.9	78.2	15.1	11.9	28.3	11.0
20	FI-20	58.5	60.0	1.5	106.5	113.5	51.0	14.8	14.0	37.5	8.1
21	FI-21	61.0	61.0	0.0	101.5	131.9	54.5	14.0	14.1	35.4	9.0
22	FI-22	60.0	62.0	2.0	100.5	132.7	69.9	13.4	13.4	25.8	11.2
23	FI-23	60.5	60.5	0.0	98.0	151.7	67.0	11.5	13.4	28.4	6.5
24	FI-24	59.5	59.5	0.0	101.5	151.7	66.4	14.2	13.8	25.7	9.3
25	FI-25	60.5	62.5	2.0	105.5	154.5	73.9	13.9	14.2	22.7	10.5
26	FI-26	59.5	61.5	2.0	101.5	101.1	43.4	13.8	14.0	25.7	7.1
27	FI-27	61.5	63.5	2.0	112.0	104.7	44.7	14.2	12.5	26.0	9.5
28	FI-28	62.0	64.0	2.0	113.0	141.1	65.0	15.2	14.5	27.6	9.0

29	FI-29	60.5	63.5	3.0	113.0	130.3	70.8	17.1	13.4	30.9	3.8
30	FI-30	62.5	64.5	2.0	112.0	127.5	59.3	14.4	12.9	23.6	6.0
31	FI-31	61.0	62.5	1.5	106.0	138.1	52.5	14.4	13.6	27.0	3.8
32	FI-32	62.5	64.5	2.0	112.5	130.5	56.6	14.9	14.1	23.9	4.8
33	FI-33	59.5	61.5	2.0	101.5	120.6	64.6	14.7	14.4	31.3	7.2
34	FI-34	60.0	61.5	1.5	101.5	113.1	56.3	13.1	13.0	24.1	11.0
35	FI-35	62.5	64.5	2.0	105.5	128.8	70.2	14.6	15.1	28.3	8.5
36	FI-36	63.0	64.5	1.5	102.5	106.8	56.4	17.7	13.6	33.4	11.0
37	FI-37	63.5	65.5	2.0	101.5	115.4	58.4	15.2	14.5	31.2	12.0
38	FI-38	55.0	57.0	2.0	93.5	114.6	52.8	15.0	13.1	30.7	9.7
39	FI-39	59.0	60.5	1.5	95.0	140.1	72.1	14.3	13.6	34.1	7.5
40	FI-40	63.5	66.0	2.5	103.5	95.9	47.1	16.0	14.9	35.1	9.7
41	FI-41	61.0	63.0	2.0	96.5	106.9	53.9	15.6	13.5	33.4	8.0
42	FI-42	64.5	66.5	2.0	99.0	118.3	62.0	13.0	13.9	31.6	6.1
43	FI-43	59.5	60.0	0.5	95.0	106.7	49.4	12.8	13.1	30.7	6.7
44	FI-44	62.0	64.0	2.0	100.5	113.1	58.8	13.2	13.8	30.5	10.0
45	FI-45	60.0	61.0	1.0	94.0	99.8	50.8	13.4	13.7	33.1	8.8
46	FI-46	58.5	60.0	1.5	95.5	108.9	59.9	15.2	14.0	29.1	9.0
47	FI-47	59.0	60.0	1.0	98.5	116.8	61.2	13.8	14.5	28.5	11.0
48	FI-48	62.5	64.0	1.5	99.0	121.0	56.5	16.0	15.4	33.0	10.5
49	FI-49	62.5	64.5	2.0	104.0	126.1	65.3	15.2	13.8	26.6	10.5
50	FI-50	57.5	59.0	1.5	92.0	126.0	63.9	15.8	12.2	31.5	11.0
51	FI-51	60.5	61.5	1.0	95.0	107.6	50.0	14.6	13.5	31.4	8.5
52	FI-52	58.0	60.0	2.0	93.0	112.7	49.1	13.8	12.9	33.7	7.1
53	FI-53	61.5	63.5	2.0	110.5	145.0	77.6	15.0	15.7	28.4	7.7
54	FI-54	60.5	63.0	2.5	97.0	152.3	73.6	15.3	15.7	32.5	10.2
55	FI-55	62.5	63.5	1.0	100.5	145.7	74.4	15.3	13.6	29.1	9.8
56	FI-56	60.5	62.0	1.5	96.0	146.2	73.4	15.2	14.1	27.7	10.5
57	FI-57	58.5	58.5	0.0	92.5	116.2	57.0	16.1	13.0	29.7	9.5
58	FI-58	62.5	65.5	3.0	114.5	152.3	74.6	13.8	14.1	30.0	9.8
59	FI-59	62.5	63.5	1.0	102.0	146.9	86.2	14.0	14.8	30.0	8.8
60	FI-60	61.0	61.0	0.0	96.0	119.4	52.9	14.3	12.1	26.9	7.5
61	FI-61	63.0	65.5	2.5	109.0	156.6	73.8	14.4	13.8	29.9	8.2
62	FI-62	58.0	61.5	3.5	103.5	134.1	63.2	14.9	13.7	28.9	6.3
63	FI-63	60.0	62.5	2.5	110.0	130.1	58.6	15.5	13.6	28.8	10.3
64	FI-64	56.5	60.0	3.5	96.5	141.7	70.7	14.9	13.3	29.2	12.9
65	FI-65	59.0	61.0	2.0	106.0	123.3	57.8	14.2	14.1	32.7	6.0
66	FI-66	58.0	58.0	0.0	94.0	121.4	52.7	14.8	12.9	28.1	10.8
67	FI-67	61.0	63.5	2.5	101.0	116.0	57.1	13.1	13.7	28.1	15.3
68	FI-68	57.5	60.5	3.0	101.5	122.0	53.5	14.8	13.6	27.6	11.8
69	FI-69	56.5	59.5	3.0	94.5	113.7	61.0	14.6	13.3	31.4	6.7
70	FI-70	58.5	60.0	1.5	96.5	141.9	55.5	12.5	14.1	27.9	8.2
71	FI-71	59.0	61.0	2.0	91.5	153.0	75.6	12.1	13.0	29.6	10.2
72	FI-72	61.5	63.5	2.0	94.0	148.6	69.0	12.5	14.7	29.1	8.0
73	FI-73	59.0	61.0	2.0	98.0	98.1	56.4	11.5	14.6	23.1	9.0

74	FI-74	59.5	60.0	0.5	95.5	149.6	66.7	14.7	13.6	26.8	5.8
75	FI-75	59.5	61.5	2.0	92.0	151.5	78.2	12.5	13.2	29.1	8.7
76	FI-76	57.0	58.5	1.5	92.5	147.3	69.5	14.9	12.4	36.5	7.8
77	FI-77	57.0	60.0	3.0	101.5	148.9	44.4	16.9	13.7	31.9	7.0
78	FI-78	59.0	61.0	2.0	95.5	132.3	44.5	12.9	13.0	32.0	4.7
79	FI-79	62.0	64.5	2.5	111.0	128.7	57.0	13.2	14.0	28.1	7.4
80	FI-80	60.5	63.0	2.5	110.0	147.0	66.0	14.8	14.1	31.9	4.2
81	FI-81	56.5	58.5	2.0	95.5	124.2	59.8	10.5	13.8	22.3	5.8
82	FI-82	61.5	63.5	2.0	104.5	129.9	64.1	13.8	13.5	30.8	9.3
83	FI-83	58.5	60.5	2.0	102.0	138.3	66.2	12.4	14.2	28.8	6.1
84	FI-84	60.0	62.0	2.0	105.5	171.8	97.2	17.8	12.3	28.8	11.0
85	FI-85	58.5	60.5	2.0	101.5	136.8	61.9	17.5	14.8	28.3	13.0
86	FI-86	61.5	64.0	2.5	105.5	160.0	73.1	17.4	14.0	30.3	5.8
87	FI-87	60.5	62.5	2.0	109.5	177.3	97.8	18.5	13.8	27.6	9.8
88	FI-88	62.5	65.5	3.0	116.5	189.2	107.7	20.4	15.3	29.8	12.0
89	FI-89	58.0	60.0	2.0	101.0	133.1	71.7	16.0	12.7	25.9	7.0
90	FI-90	61.5	63.5	2.0	107.0	142.5	72.7	14.4	15.1	33.4	5.3
91	FI-91	57.0	59.0	2.0	95.5	125.7	58.9	14.8	12.4	31.9	6.8
92	FI-92	59.5	62.0	2.5	112.5	144.7	84.4	15.9	14.3	25.9	8.5
93	FI-93	61.5	63.5	2.0	112.5	143.2	76.4	19.6	14.1	29.4	6.3
94	FI-94	61.0	63.5	2.5	109.5	151.0	68.6	15.7	12.3	25.6	7.7
95	FI-95	63.5	66.0	2.5	115.5	170.3	107.3	16.1	13.8	27.1	11.0
96	FI-96	65.0	66.5	1.5	129.0	163.7	90.2	15.5	14.2	27.7	11.6
97	FI-97	64.5	66.5	2.0	118.0	191.2	97.8	19.1	16.2	28.7	9.5
98	FI-98	61.5	62.5	1.0	107.0	142.3	77.0	14.8	13.1	28.6	10.0
99	FI-99	60.0	62.5	2.5	112.0	136.6	56.4	15.3	12.8	30.5	7.3
100	FI-100	63.5	66.5	3.0	116.5	163.3	78.5	15.7	12.8	30.3	8.8
101	FI-101	57.5	60.0	2.5	96.0	140.7	59.1	13.2	13.8	26.4	5.8
102	FI-102	58.5	60.0	1.5	100.5	118.1	54.7	12.7	11.9	25.8	5.0
103	FI-103	62.0	64.0	2.0	100.0	142.3	74.2	16.1	11.9	30.1	11.5
104	FI-104	56.0	58.0	2.0	101.0	147.6	76.0	18.2	13.6	25.3	3.3
105	FI-105	60.5	62.5	2.0	106.0	177.8	73.2	13.7	13.8	24.7	11.3
106	FI-106	57.0	59.0	2.0	93.5	118.3	45.7	9.9	14.4	23.9	5.1
107	FI-107	56.5	57.5	1.0	105.5	158.6	80.2	19.1	14.2	30.1	12.2
108	FI-108	60.5	63.0	2.5	106.5	158.5	86.8	17.9	14.8	27.9	9.3
109	FI-109	58.5	60.5	2.0	105.5	156.8	84.2	15.8	14.6	24.0	10.7
110	FI-110	58.0	60.5	2.5	106.0	174.9	85.2	18.7	13.2	32.3	8.3
111	FI-111	58.0	60.5	2.5	106.0	171.0	90.3	18.4	13.3	29.7	10.1
112	FI-112	64.0	67.0	3.0	108.0	162.4	81.5	14.9	12.6	27.9	8.2
113	FI-113	65.5	67.5	2.0	127.5	153.1	81.1	16.9	14.1	30.1	10.3
114	FI-114	63.5	66.5	3.0	118.0	129.7	64.3	16.2	14.0	27.8	6.5
115	FI-115	56.5	56.5	0.0	90.0	127.0	59.2	14.9	12.8	27.6	5.2
116	FI-116	55.5	55.5	0.0	92.0	102.9	53.7	12.5	14.1	28.3	7.0
117	FI-117	56.0	57.0	1.0	92.0	114.3	61.9	13.1	12.2	27.6	4.5
118	FI-118	59.5	61.0	1.5	100.5	132.6	63.0	14.0	12.1	27.1	4.0

119	FI-119	58.0	59.5	1.5	96.0	153.4	86.6	17.5	12.1	33.7	4.5
120	FI-120	58.5	58.5	0.0	93.0	149.7	74.3	16.9	12.2	29.6	7.5
121	FI-121	61.0	63.0	2.0	107.0	152.5	72.8	17.2	13.5	35.8	7.8
122	FI-122	59.5	61.5	2.0	96.0	123.6	55.9	12.2	11.8	30.2	5.8
123	FI-123	58.5	61.0	2.5	103.0	115.2	57.9	14.6	14.0	32.9	7.5
124	FI-124	56.0	56.0	0.0	94.5	121.8	56.4	16.4	12.5	29.8	5.6
125	FI-125	59.0	61.5	2.5	97.0	113.8	53.9	13.0	14.0	27.2	8.2
126	FI-126	57.5	60.5	3.0	97.0	135.8	54.3	12.3	14.2	27.8	7.2
127	FI-127	57.5	60.5	3.0	96.0	130.2	58.8	13.0	13.2	28.8	7.2
128	FI-128	58.5	61.0	2.5	106.5	143.9	61.1	15.9	14.0	27.3	7.5
129	FI-129	56.0	56.0	0.0	101.0	104.2	42.6	11.4	13.7	24.1	6.8
130	FI-130	58.5	60.0	1.5	101.5	124.3	57.8	14.0	13.4	26.8	8.0
131	FI-131	57.0	59.0	2.0	108.0	142.4	59.9	13.4	13.0	21.8	6.2
132	FI-132	59.0	60.0	1.0	111.0	145.3	58.4	13.8	13.5	30.2	3.0
133	FI-133	58.5	59.5	1.0	98.0	132.9	65.4	13.4	12.6	30.7	6.3
134	FI-134	56.0	57.5	1.5	95.0	129.4	72.9	13.4	12.9	33.5	5.8
135	FI-135	62.5	64.5	2.0	96.5	133.0	78.1	14.6	14.0	31.5	10.8
136	FI-136	61.0	62.5	1.5	98.0	141.3	87.3	14.3	13.4	31.2	10.8
137	FI-137	55.5	57.0	1.5	96.5	146.3	73.9	15.1	14.1	27.4	9.3
138	FI-138	56.5	58.0	1.5	95.0	169.2	89.0	17.8	14.2	31.2	8.3
139	FI-139	58.5	60.0	1.5	94.5	187.7	85.8	15.1	12.7	25.6	10.6
140	FI-140	58.5	60.5	2.0	96.5	169.0	90.6	15.6	12.6	29.7	8.2
141	FI-141	60.5	62.5	2.0	106.5	158.0	67.9	14.9	13.9	28.0	12.0
142	FI-142	58.5	60.5	2.0	94.0	186.6	92.9	14.8	13.6	27.5	9.0
143	FI-143	56.5	58.5	2.0	101.5	120.6	43.7	14.2	13.6	22.9	11.2
144	FI-144	62.0	65.0	3.0	105.0	104.6	56.3	13.1	14.6	29.6	10.8
	LSD (0.01)	1.6	1.8	1.1	2.2	17.3	13.7	2.2	1.2	4.4	2.7
	LSD (0.05)	1.2	1.4	0.9	1.7	13.1	10.4	1.6	0.9	3.4	2.0

Quantity of foliage per plant

The observed range for total number of leaves per plant was 10.3 to 13.8. FI-2 and FI-23 only had 10.3 leaves per plant, followed by FI-144 and FI-78 with 10.5 foliage per plant. The cultivars with the greatest number of leaves per plant were FI-10 (13.8), FI-56 (13.6), and FI-110 (13.5).

Length of a leaf

The investigated inbreds exhibited a leaf length range of 52,5 to 84,3 centimeters. FI-117 had the shortest foliage at 52.5 cm, followed by FI-66 and FI-73 at 53.0 cm and 54.0 cm, respectively. The foliage of the inbreds FI-11, FI-10, and FI-58 measured 84.3 cm, 81.0 cm, and 78.9 cm, respectively.

Leaf thickness

For leaf width, a range of 6.6 to 11.0cm was observed. The inbreds with the narrowest leaves were FI-117 (6.6 cm), FI-91 (6.9 cm), and FI-127 (7.0 cm). The inbreds FI-85 (11.0 cm), FI-40 (10.6 cm), and FI-144 (10.5cm) had broad leaves.

The quantity of kernel segments

The number of kernel rows was observed to range between 9.8 and 16.7. Among 144 inbreds, FI-54 (16.7), FI-35 (16.6), and FI-67 (16.6) had relatively large numbers of kernel rows. FI-14 (9.8), FI-17 (10.7), FI-18 (10.8), and FI-30 (10.8) reported an extremely small number of kernel rows.

The quantity of grains per row

Among the inbreds, the number of kernels per row varied widely between 15.0 and 32.7. FI-110 had the highest number of kernels per row (32,7), followed by FI-138 and FI-111 with 32,4 and 32,5 kernels/row, respectively. The inbred FI-106 had the lowest yield with 15 seeds per row, followed by FI-3 and FI-105 (17 kernels per row).

The amount of kernels per ear

The number of kernels per ear was highly variable, ranging from 198.1 to 448.7 kernels per ear. FI-143 had the maximum number of kernels per ear with 448.7, followed by FI-138 and FI-88 with 447.1 and 440.6 kernels per ear, respectively. FI-3 and FI-129 had the lowest value of 198.1 kernels/ear.

Seed weight per Hundred

The weight of 100 seeds varied considerably, ranging from 19.8 g to 41.3 g. The 100-seed weights of FI-3, FI-139, and FI-126, which were 41,3, 40.5, and 39.2 g, respectively, revealed very robust seeds. In contrast, FI-22 had the smallest hundred seed weight at 19.8 g, followed by FI-122 and FI-67 with 100 seed weights of 20.3 and 20.9 g, respectively.

Percentage of shelling

The shelling percentage ranged from 63.4% to 89.6%. Among inbreds, FI-32, FI-116, and FI-67 had a higher shelling rate of 89.6 percent. This was closely followed by FI-55 and FI-129, which had respective shelling percentages of 89.5% and 89.2%. FI-11 recorded an extremely low shelling percentage of 63.4%, followed by FI-46 (69.3%) and FI-71 (74.4%).

There was a range of 50,1 to 122,4 g for cereal yield per plant. The inbred FI-109 had the highest cereal yield per plant at 122.4 g, followed by FI-104 (115.4) and FI-110 (114 g). In contrast, FI-71 (50.1 g) yielded the least amount of grain, followed by FI-27 (52.1 g) and FI-11 (52.7 g).

CONCLUSION

Genotype x Environment interactions present a significant challenge in cultivar development and selection for a given region or location. It might be challenging to determine which genotype is the most desired because relative rankings of genotypes frequently change when compared across different regions or settings. Whether the varieties are pure lines, single or double cross hybrids, top crosses, or any other material with which the breeder may be working, this interaction is there. Because environmental conditions differ from year to year and region to area, genotypes that are phenotypically stable are extremely important. One of the key goals of a breeding program is to ensure that selected genotypes exhibit wide adaptation to the specific environment and consistent performance. The evaluation of genetic stability or desirability now gains significance. Plant breeders frequently use the Eberhart and Russell model, which was one of several models available for stability assessment that also included models.

It is now essential to create inbreds with high seed yield potential for the effective seed production of single cross hybrids due to the reorientation toward the development of single cross hybrids in maize. The main objectives of conventional inbred line creation for maize are selection for grain production and self-pollination, with ear-to-row being the most popular technique. The presence of desirable genes and gene complexes in the base population is a direct determinant of how excellent inbreds are. Thus, selecting a foundation population to produce exceptional inbreds is crucial in maize breeding efforts. In breeding operations, populations with a restricted genetic background arising from maize single cross hybrids have been preferred to open pollinated kinds. Since single cross hybrids have been evaluated in multiple situations, a large number of loci with fixed favorable alleles are associated with high yield. As base populations for new inbred development in maize, elite line synthetics/composites, experimental varieties, heterotic populations, and land races are also used in addition to single cross hybrids. There aren't many studies comparing the usefulness of various base populations for identifying potential inbred parents, though.

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