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Evaluation of S_1 Maize (*Zea mays* L.) Families for Green Fodder Yield

Syed Sadaqat Mehdi* and Muhammad Ahsan
Department of Plant Breeding and Genetics *Directorate of Advanced Studies,
University of Agriculture, Faisalabad-38040, Pakistan

Abstract

The experiment was carried out to evaluate the best one hundred S_2 families for green fodder yield and other plant traits to select superior families for further inter-crossing. The S_1 families were found different for green fodder yield per plant and number of leaves per plant. The values of coefficients of variation were found to be high for green fodder weight per plant (18.34%). These results indicate that there was more variability among S_2 lines for green fodder weight per plant. Green fodder weight was positively and highly significantly correlated with number of leaves per plant and plant height. However, it is concluded from the results that green fodder weight can be used as selection criteria while selecting superior S_1 maize families.

Introduction

Maize (*Zea mays* L.) is an important kharif fodder crop, adaptable to widely varying climatic and soil conditions. It is extensively grown in the irrigated and rainfed areas of Punjab. The staggered planting of maize from February to September helps cope with the fodder scarcity problems faced in May-June and October-November (Chaudhry, 1994). Its nutritious fodder is relished by all kinds of livestock especially milch animals. Maize is a cash crop for growers, as around cities it is widely grown for sale as green fodder. Significant variation exists for nutritional quality traits of the stover and whole-plant forage in maize (Wolf *et al*., 1993). Differences in the rate of dry matter accumulation in different parts of the plant are related to changes in morphological structure. However, peak yield of green herbage occurs at the beginning of milky ripeness (Kirilov and Naidenov, 1990).

The production of maize fodder crop per acre is very low in Pakistan as compared to many other countries of the world. This is because, very little attention has been paid in the past to the improvement of maize as fodder crop. An adequate and regular supply of nutritious fodder is needed in Pakistan for livestock production in order to meet the requirements of milk, meat, butter and other products for human population. The objective of the experiment was to evaluate the best one hundred S_1 families for green fodder yield and other plant traits to select superior families for further inter-crossing.

Materials and Methods

One hundred S_0 maize families were used for field evaluation. These were selected from five hundred S_1 families at seedling stage. The experiment was conducted under normal field conditions in the research area of Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad on March 3,1998. One hundred S_o families were raised in 4 blocks and each block was assigned with 25 S_0 families. The experiment was conducted in a modified randomized complete block design with two replications. Ten seeds per family per line were sown in two lines by keeping row-to-row and plant-to-plant distances of 30 and 15 cm, respectively. Water was applied to the crop when required and was not a limiting factor for growth: Other normal cultural practices were applied to the crop throughout its growing period.

The experiment was harvested for green fodder weight per plant (g) when the 50 percent of the plants in each row initiated tasseling on May 25, 1998. Ten garded plants from each family were selected and data were recorded for number of leaves per plant and plant height (cm). For each family 500 g green fodder sample was taken from chopped fodder and left to dry. Thereafter completely dried samples were weighed again to determine the dry matter content. Data were analyzed for the analysis of variance technique (Steel and Torrie, 1980). Thereafter simple correlation coefficients were estimated by using the method of Kwon and Torrie (1964). Mean and coefficients of variation (CV%) were also calculated for each indicated plant trait.

Results and Discussion

In case of number of leaves per plant and plant height, coefficients of variation (CV %) magnitudes were found lower (8.95 and 10.96 %, respectively) among S_1 maize families. It was also found lower in case of dry fodder weight (CV = 11.96 %). However the values of CV (%) for green fodder weight per plant was found to be higher (18.34). These results indicate that there was more variability among S, maize lines for green fodder weight per plant. Therefore, green fodder weight per plant variability may be more useful in selecting the superior families for further inter-crossing. Ayub *et al*. (1998) reported significant differences among maize cultivars for plant height, fresh fodder yield and some other agronomic traits. Green fodder weight was positively and highly significantly correlated with number of leaves per plant and plant height. There was also positive and highly significant linear correlation between number of leaves per plant and plant height. However, there was no correlation found between

Table 1: Pooled means ± standard deviation and CV% for some plant traits among one hundred S_1 maize families under field conditions

Traits	Pooled mean	CV%
Green fodder weight per plant (g)	370.94 ± 68.02	18.34
Dry fodder weight (g)	145.37 ± 17.39	11.96
Plant height (cm)	141.55 ± 15.51	10.96
Number of leaves/plant	10.06 ± 0.90	8.95

Table 2: Correlation coefficients for some indicated traits among one hundred S_1 maize families under field conditions

Traits	Green fodder Weight per plant (gm)	Dry fodder weight (g) plant	No. of leaves/
Dry fodder weight (g)	0.094NS		
No. of leaves/plant	0.577**	0.069NS	
plant height (cm)	0.551**	0.130NS	0.370**

N.S = Significant
** = Significant at 1 percent level of significant

Table 3: Mean for some indicated plant traits of selected twenty out of one hundred S_1 maize families under normal field conditions

S_1 families	Green fodder weight/plant (q)	Dry fodder weight (g)	Plant height (cm)	Number of Leaves per plant
1	455.0	152.6	145.0	11.3
2	425.0	163.0	129.3	11.0
3	465.0	148.5	148.7	11.3
4	507.5	173.5	155.0	11.0
5	580.0	141.6	193.5	11.5
6	495.0	135.0	161.0	12.0
7	437.5	145.2	153.0	11.5
8	575.0	162.3	181.2	12.3
9	452.5	169.5	156.2	11.3
10	475.0	143.2	169.2	11.4
11	420.0	146.7	157.7	10.0
12	480.0	134.5	145.2	10.7
13	425.0	144.9	133.7	10.0
14	462.5	170.9	163.9	10.5
15	410.0	171.9	153.8	1Q.2
16	507.5	173.8	173.7	11.5
17	410.0	134.9	136.5	9.2
18	442.5	158.5	161.3	10.8
19	432.5	136.2	141.5	10.6
20	412.5	140.1	155.3	11.3
Pooled mean ± S.E	463.5 ± 11.1	152.3 ± 3.19	155.7 ± 3.54	10.97 ± 0.16

dry fodder weight and any other studied parameter (Table 2). Rehman *et al*. (1992) reported highly significant relationship between dry matter yield and plant height in maize, However, it is concluded from the results that green fodder weight can be used as selection criteria while selecting superior S_1 families in maize. A greater improvement was noticed in selected twenty S_1 families (Pooled mean = 463.5 g) (Table 3) than one hundred S_1 families (Pooled mean = 370.9 g) (Table 1) for green fodder weight per plant. In case of plant height and number of leaves per plant, an improvement in means was also found for selected twenty S_i families (Table 3) than one hundred S_1 families (Table 1).

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