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COMBINING ABILITY AND TYPE OF GENE ACTION FOR GREEN FODDER YIELD AND IT'S COMPONENTS IN SOME TEOSINTE MAIZE HYBRIDS.

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ABSTRACT

Although there are many forage crops valid in our country but the forage yield of maize (*Zea mays L.*) a fodder crop popular because of its earliness succulence and high yield. It could be increased if the tillering habit of teosinte (*zea mexican*) transferred to maize through hybridization breeding program. In this, investigation three lines of teosinte, which were derived from selection among segregating generations of three crosses. The three lines of teosinte were crossed by three genotypes of maize, inbred line 34 , inbred line 63, from National Maize Research Program and single cross 30k8 (commercial) to produce nine crosses at Serw Agricultural Research station in 2007 growing season. The nine crosses and their parents were evaluated during 2008 and 2009 seasons at Serw Agricultural Research. The studied traits were number of tillers per plant, number of leaves per plant, plant height, leaves weight to stems weight ratio, green fodder yield per plant, dry fodder yield per plant and digestible protein percentage. The data were subjected to biometrical analyses and the obtained results could be summarized in the following:

Significant mean squares for crosses and tester (maize) for all studied traits were observed. Mean squares of line (teosinte) is not significant for all studied traits except for L/S ratio and green fodder yield in the first cut. In addition, mean squares of lines x testers interactions were significant and highly significant in most occasions for all studied traits except for number of tillers per plant and L/S ratio. Years, crosses by years, tester (maize) x years and L x T x Y interaction were significant in most occasions. There was no specific parents exhibited highest mean through the three cuts with respect to most of studied traits. However, line-3 of teosinte , was the best parent for number of tillers per plant , L/S ratio, numbers of leaves per plant , green fodder yield and dry fodder yield per plant through the three cuts. On the other hand, the cross L_1xT_1 followed by L_3xT_1 were the best combinations for green fodder yield per plant as a total of three cuts. In general, the over all means of crosses exceeded their parents except for number of tillers per plant and number of leaves per plant. The parental inbred lines that exhibited desirable general combining ability (GCA) effects were L_1 for number of leaves per plant, L/S ratio and dry fodder yield per plant. In addition, L-2 for dry fodder yield per plant and digestible protein and L-3 for dry fodder yield per plant. Generally, these inbred lines could be recommended for advanced stage of evaluation by teosinte and teosinte x maize program. Line 34(tester-1) was good general combiner for green fodder yield per plant, dry fodder yield per plant and digestible protein percentage while line 63(tester-2) was a good general combiner for number of tillers per plant, number of leaves per plant, green fodder yield per plant, dry fodder yield per plant and digestible protein percentage. The highest SCA effects were observed in the crosses L1xT3, L2xT1, L2xT3 and L3xT1 for dry fodder yield per plant and L1xT1 and L2xT2 for digestible protein percentage. Estimation of general combining ability (σ2GCA) for maize (tester) higher in magnitude than those of (σ2GCA) for teosinte (line) for all studied traits. So that the contribution of maize were higher than the contribution of teosinte for all studied traits. General combining ability variance components (σ2GCA) was larger than that of specific combining ability variance (σ2SCA) for all studied traits indicating that additive genetic variance played

the major role than non-additive gene action in the inheritance of these traits. The variance of general combining ability interaction with years (σ2GCA x Y) was higher than the variance of specific combining ability interaction with years (σ2SCA x Y) for most traits these indicating that additive type of gene action was more affected by environmental conditions than non-additive effects. Significant positive correlations were observed among all studied traits. Therefore, the selection for one of these traits will be associated with the improvement of the other traits during the selection program. In conclusion, from the previous results, it could be recommended that, the best crosses with highest SCA effects should be used as started materials for selection breeding program to important fodder yield components.

INTRODUCTION

Successful development for improving high fodder yield, high percentage of digestible protein, high branches along summer season is based mainly on accurate evaluation of inbred lines under selection and that is a major aim in the national forage research program. In fact, the forage yield of maize a fodder crop popular because of its earliness , succulence and high yield , could be increased if the tillering habit of teosinte could be transferred to maize by hybridization (Chaudhuri and Prasad 1968). Maize is an important cereal fodder crop with high photosynthetic efficiency and fodder becomes available in a short duration, where as teostine is along duration high yielding fodder crop and ability to produce more tillers. Thus to combine the important characteristics of maize and teosinte , hybridization program between these two cereal crops was started in early thirty's India. (Jill and Patil 1985). Maizente is the hybrid of maize and teosinte and as stated it is more succulent, leafy and branched annual having 2-3.5 m height and tillers may range from 3 to 5 and can be planted from March on wards for forage program (Singh, 1975).

On the basis of per day production for green fodder yield maizente (maize x teosinte hybrid) recorder higher production as compared to teosinte entries and maize (Gill and Patill 1985).

The origin of maize is reviewed under the headings (1) corn as product of speciation by domestication, (2) teosinte: an ancestor and probable progenitor of corn (by a-2 stage domestication resulting in multicentres), and (3) isolating mechanisms (Galinat *et al*; 1988)

Shieh *et al* (1995) studied on the tillering, ratooning and some agronomic characteristics in maize, teosinte and their hybrids they found the hybrids had fewer tillers than the teosinte, also maize unable to re grow after being cut while the teosinte and the hybride had the best ratooning ability.

Abd El-maksoud *et al* (1998) revealed that both general and specific combinig ability mean squares were highly significant in most occasions, indicating that both additive and non additive gene action were important in the expression of studied traits in teosinte.

The information about "maizente" (maize x teosinte hybrid) has been given by several authors (Smith *et al* 1984, Abdel-Twab and Rashed 1985, Aulicino and Magoja 1991, Sohoo *et al* 1993, Alan and Sundberg 1994, Jode and James 1996) but all the available information has contributed to the