OPEN ACCESS

International Journal of Applied Sciences and Biotechnology

ISSN 2091-2609

Indexing and Abstracting

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CODEN (Chemical Abstract Services, USA): IJASKD

Vol-3(3) September, 2015

Available online at:
http://www.ijasbt.org
&
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SEM-Biotech Publishing

Impact factor*: **1.422**
Scientific Journal Impact factor#: **3.419**
Index Copernicus Value: **6.02**
IBI Factor 2015**: **4.19**

*Impact factor is issued by Universal Impact Factor. Kindly note that this is not the IF of Journal Citation Report (JCR).
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M. Poudel et al. (2015) Int J Appl Sci Biotechnol, Vol 3(3): 443-445
DOI: 10.3126/ijasbt.v3i3.13137

ISSN (Online): 2091-2609
DOI Prefix: 10.3126/ijasbt

International Journal of Applied Sciences and Biotechnology (IJASBT)

Research Article

CORRELATION OF TRAITS AFFFECTING GRAIN YIELD IN WINTER MAIZE (*ZEA MAYS* L.) GENOTYPES

M. Poudel[1], H.K. Paudel[2] and B.P. Yadav[3]

[1]Gokuleshwar Agriculture and Animal Science College / Tribhuvan University, Baitadi, Nepal
[2]Agriculture and Forestry University, Rampur, Chitwan, Nepal
[3]Nepal Agricultural Research Council, Regional Agriculture Research Station, Parwanipur, Nepal

Corresponding author's e-mail: muktipoudel8@gmail.com

Abstract

The research was conducted under RCBD with three replication to study the inter relationships among traits affecting yield and its affecting character at National Maize Research Programme (NMRP), Rampur, Nepal in 2013. The eleven inbreeds line of maize variety at winter season in 2013 were evaluated for estimation yield and its affecting character. For efficient selection of grain yield, it is necessary to know relation of yield of maize and its morphological traits which are influencing on the grain yield. One of the objectives of this paper was to determine interrelationship between traits and the yields. Correlation coefficients among traits showed that yield was positively and highly significantly related with number of kernel rows per ear (0.788), number of kernels per row(0.571), ear girth(0.516), plant height(0.498), hundreds kernels weights(0.444) and significantly related with other character. .Number of Kernels rows per ear, number of kernels per row, plant height could be the important selection criteria in improving open pollinated maize varieties for high grain yield.

Key words: correlation coefficient; maize; yield

Introduction

Maize-an important cereal crop, cultivated throughout the world, is of significant importance for countries like Nepal, where rapid increase in population have already out stripped the available food supplies.Maize has a very high yield potential than any other cereals and thus is popularly known as the 'queen of cereals' (Usharani *et al.*, 2014). Information on genotypic and phenotypic correlation coefficients among various plant traits helps to ascertain the degree to which these are associated with economic productivity. The suitability of maize to diverse environments is unmatched by any crop as the expansion of maize to new areas and environment still continues, as it has a range of plasticity. It is grown from latitude 580 N to 400 S, from sea level to higher than 3000 m altitude and in areas receiving yearly rainfall of 250 to 5000 mm (Downsell *et al*., 1996). Most of the area under this crop is however in the warmer parts of temperate regions and in humid subtropical climate. Highest production is in area having the warmest month isotherms from 21°C to 27°C and a frost free season of 120 to180 days. It is the second most important staple food crop both in terms of area and production after rice in Nepal. According to the report of Agri-Business Promotion and Statistics Division (ABPSD) (2011/2012), it is grown in 906253 hectare of land with an average yield of 2281 kg/ha. It occupies about 29.31% of the total cultivated agricultural land and shares about 26.05% of the total cereal production in Nepal (ABPSD, 2011/2012). It is produced in three distinct agro-climatic zones within Nepal, the terai and inner terai (below 900m), the mid-hills (900-1800) and the high-hills (above 1800m). The proportion of maize area consists of about 68.28% in mid-hills followed by21.6% in terai and 10.12% in high-hills (ABPSD, 2011/2012). In Chitwan, it is grown in 20660 hectare of land with the productivity of 2539 kg/ha (ABPSD, 2011/2012).Selection of the character to improve the yield is not so easy because of many dependent and independent factor are acting upon them, therefore it is essential to choose a factor which helps to increase yield of maize. The present work have been done with an objective to correlate the grain yield in winter maize.

Materials and Methods

The experiment material consist of 11 genotypes of maize collected from research station including check. The Inbred lines were provided by NMRP, Rampur. Standard agronomic practices were used to provide adequate nutrition and kept the plots disease free. Each plot consisted of a row 5 m long with inter and intra row plant spacing of 0.75 × 0.25 m, resulting in a population density of 53,000 plants ha¹. Area of individual plots in each replication was 15 m². RCBD design with three replications is used in this experiment. The genotypes were allocated randomly to the

11 Plots of each replication. The mean data were analyzed using different statistical procedure like MS-Excel, MSTAT SPSS and MINITAB.

Results and Discussion

The inter relationship of quantitative characters with yield determinate efficiency of selection in breeding programmes. It merely indicates the intensity of association. Phenotypic correlation reflects the observed relationship, while genotypic correlation underline the true relationship among characters. Selection procedures could be varied depending on the relative contribution of each (Table 1).

Yield yield was positively and highly significantly related with number of kernel rows per ear traits like number of kernel rows per ear, number of kernel per row, ear girth, plant height, hundred kernels weight and yield has positive and significant correlation with ear length and SPAD chlorophyll. Most yield determining traits were Number of kernel rows per ear followed by Number of kernel per row, ear girth, plant height and hence simultaneous selection for this character might bring an improvement to grain yield per plant. Similar result were reported by prakash *et al.* 2006. Numbers of kernels per row and kernel rows per ear have a positive correlation with grain yield which is also reported by Kashiani *et al.* 2010

In present study, yield and plant height was positive and significant relation with each other. This was supported by Kashiani *et al.* (2010). The study revealed that ear height was positively associated with grain yield**.** Similar results were reported by Gautam *et al.* (1999). Present results indicated that ear girth and grain yield was positive correlation with each other, as also indicated by Kashiani and Saleh, 2010).

Present study indicated that days to silking and tasseling had positive correlation with grain yield which is also proved Nawar *et al.* (1991).

Similarly in accordance with our results, plant height was positively correlated with ear height. Same finding was reported by Bello *et al.* (2010). Ear height was positively correlated with days to 50% silking .similar finding were obtained by El-Nagouly *et al.* (1983). Ear girth was indicated to have positive genetic correlation with grain yield which is supported by Kashiani *et al.* (2010). Results of present study shows number of grains per row was positively and highly correlated with **grain yield.** Similar results was reported by Prasanna, *et al.*, (2001).

Hundred grain weight was positively correlated with grain yield was in accordance the result of Gautam *et al.* (1999) and Prakash *et al.* (2006).

Table 1: Correlation of grain yield in various maize genotypes

	DTT	DTS	PH	EH	SPAD	EG	NKRE	NKR	EL	HKW	YPP
DTT	1	.971**	-.001	.284	-.136	.197	.402*	.413*	.604**	.132	.086
DTS		1	.084	.387*	-.075	.190	.421*	.424*	.609**	.132	.125
PH			1	.631**	.348*	.282	.069	.171	.380*	.489**	.498**
EH				1	.532**	.207	.090	.150	.211	.431*	.305
SPAD					1	.234	.105	.261	-.031	.150	.400*
EG						1	.484**	.507**	.443**	.520**	.516**
NKRE							1	.618**	.446**	.265	.788**
NKR								1	.625**	.358*	.571**
EL	.								1	.492**	.427*
HKW										1	.444**
YPP											1

**= correlation is significant at the 0.01 level (two-tailed), *= correlation is significant at the 0.05 level (two-tailed)

[DTT= Days to 50% tasseling, DTS= Days to 50% silking, PH= Plant height, EH= Ear height, SPAD= SPAD chlorophyll, EG= Ear girth, NKRE=Number of kernel rows per ear, NKR= Number of row ear-1, EL= Ear length HKW=Hundred kernels weight, and YPP (kg/ha)= Yield per hectare.]

Conclusion

Thus, selection for genotypes with number of kernel rows per ear, number of kernel per row, ear girth, plant height, and hundred kernels weight helps improvement in grain yield per plant.

Acknowledgement

This research was conducted at National Maize Research Program, Rampur, Chitwan, Nepal. Authors are grateful to Scientist of NMRP Mr.Chitra Bahadur Kunwar for providing the seed of the maize genotypes included in this study and research field.

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