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PATH-COEFFICIENT ANALYSIS OF SOME QUANTITATIVE CHARACTERS IN HUSJ(£D BARLEY

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Correlation and path analysis of grain yield and its components in twelve husked barley strains showed positive association of grain yield with lOOO-grain weight and number of spikelets per spike. However, grain yield was negatively associated with (j~Ys to heading. Peduncle length had maximum direct effect on grain yield. Extrusion length negativelY-if!fluenced grain yield.

Key words: huskectb:arley, path-coefficient analysis, quantitative characters

INTRODUCTION

Cereals have played a significant role in the evolution of humaricivilization. Barley (*Hordeum vulgare* L.) is a member of cereals and is being used as food and feed crop. The yield of barley is fairly low in Pakistan as compared to other agricUlturally advanced countries. The reason for lower yield is lack of research work on this crop. Grain yield in barley is a complex character affected directly or indirectly by every gene present in the plant. Singh *et al.* (1987) observed that yield was significantly correlated with number of fertile tillers, plant height, days to heading and spike length which were found to have high and positive direct effects on yield in barley.

Path-coefficient analysis is one of the reliable statistical techniques which allows to quantify the interrelationships of different components and their direct and indirect effects on grain yield through correlation estimates. Present study was undertaken to evaluate the genetic' variability in different barley accessions and estimate the extent of correlations between different pairs of plant traits to identify the genotypes with desirable combination of traits.

MATERIALS AND METHODS

The experimental material comprised twelve husked barley strains viz. MRF 2, MRF 11, MRF 14, MRF 17, MRF 22, BIVT 6, BIVT 8, BIVT 10, BIVT 12, BIVT 20, BIVT 22 and BIVT 24 which were sown during the Rabi season 1994-95, in the research area of the Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad with the help of Rabi drill in a triplicated randomized complete block design. The distance between row to row was 30 cm and plant to plant 15 cm. Six rows each of 5 meter length served as an experimental plot. Five representative plants from each plot were randomly marked to record the data for days to heading, plant height, extrusion length, peduncle length, number of fertile tillers per meter length, 1aaa-grain weight, number of spikelets per spike, spike length, and spike density.

The analysis of variance and covariance for all the traits was performed according to Steel and Torrie (1980). Duncan's new multiple range test was applied for comparison of means. Correlations were worked out according to the procedure given by Kwon and Torrie (1964). The procedure for path-coefficient analysis was followed as given by Dewey and Lu (1959).

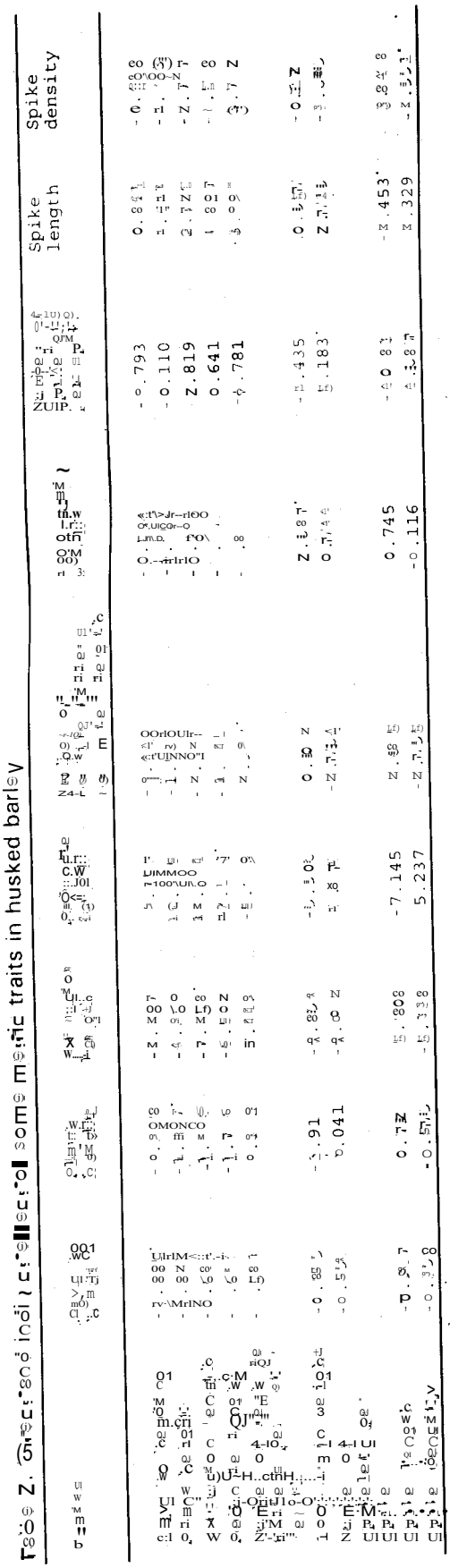
RESULTS AND DISCUSSION

The relationship of plant yield with other characters is shown in Table 1. The correlation of days to heading with grain yield was negative and non-significant. Extrusion length, peduncle length, spike length and spike density had positive but non-significant correlation with grain yield, while number of spikelets per spike had positive and highly significant correlation with grain yield at genotypic level: The lOOO-grain weight also had positive and significant correlation with grain yield, while number of fertile tillers per meter length showed negative and significant correlation at genotypic level with grain yield. Ganusheva (1992) found that grain number per plant and J aaa-main weight had the greatest direct effect on grain weight per plant. Plant height had positive but non-significant correlation at genotypic level witngtaihyie!<;!. Samarrai *et al.* (1987) reported that grai-h"'VIEJI;;; barley was most significantly correlated with plant height.

Table 1. Genotypic and phenotypic coefficients of yield characters in barley

	Days to heading	Plant height(cm)	Extrusion length (cm)	Peduncle length (cm)	Number of fertile tillers per meter length	1000-grain weight (g)	Number of spikelets per spike	Spike length (cm)	[illegible]	Grain yield per length (g)
	1	2	3	4	5	6	7	8	9	10
1. r(g)	1.000	0.[illegible]	0.[illegible]	0.[illegible]	0.610	0.[illegible]	0.161	0.[illegible]	0.[illegible]	-0.[illegible]
r(p)	1.000	0.[illegible]	0.[illegible]	0.[illegible]	0.011	0.[illegible]	0.161	0.[illegible]	0.[illegible]	0.[illegible]
2. r(g)		1.000	0.674	0.[illegible]	0.611	0.[illegible]	-0.021	0.[illegible]	0.[illegible]	0.[illegible]
r(p)		1.000	0.433	0.[illegible]	0.102	0.[illegible]	0.117	0.[illegible]	0.[illegible]	0.[illegible]
3. r(g)			1.000	0.[illegible]	-0.741	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
r(p)			1.000	0.[illegible]	-0.416	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
4. r(g)				1.000	0.[illegible]	0.[illegible]	0.124	0.[illegible]	0.[illegible]	0.[illegible]
r(p)				1.000	0.[illegible]	0.[illegible]	0.119	0.[illegible]	0.[illegible]	0.[illegible]
5. r(g)					1.000	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	-0.[illegible]
r(p)					1.000	-0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
6. r(g)						1.000	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
r(p)						1.000	0.[illegible]	0.[illegible]	0.[illegible]	0.211
7. r(g)							1.000	0.[illegible]	0.[illegible]	0.[illegible]
r(p)							1.000	0.[illegible]	0.[illegible]	0.[illegible]
8. r(g)								1.000	0.[illegible]	0.[illegible]
r(p)								1.000	0.[illegible]	0.[illegible]
9. r(g)									1.000	0.[illegible]
r(p)									1.000	0.101
10. r(g)										1.000
r(p)										1.000

* = at 0.05; ** = at 0.01.



Investigation regarding path-coefficient analysis (Table 2) showed that peduncle length had maximum direct effect on grain yield followed by number of spikelets per spike and number of fertile tillers per meter length, while characters like extrusion length, spike density, days to heading, spike length, 1000-grain weight and plant height had negative direct effect on grain yield. Uzik and Sudyova (1990\ reported that in barley, height was positively related with grain number per ear and grain yield .It is evident from the present study that to evolve barley varieties with ultimate higher grain yield, attention should be focused on selecting plant traits which have positive direct effect on grain yield.

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