Annals of Arid Zone 36(2): 169-171, 1997

Short Communication

# Path Analysis of Grain Yield in Pearl Millet

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In crop improvement program, it is desirable to have information on character associations as the selection for one character may result in improvement of other positively correlated traits. However, greater emphasis is required to be given on selection for more than one character at a time. Yield, being a complex trait with low heritability, is dependent upon several component traits which may have higher heritability estimates. Simple correlations do not give an insight into the true biological relationships of these traits with yields. The present investigation was, therefore, carried out to study the correlations and path analysis for assessing the traits for use in selection of grain yield.

Forty two accessions from world collection maintained at ICRISAT, Hyderabad, were used for the present investigation. The accessions were evaluated in *kharif*, 1994, in randomized block design with six replications, keeping distance of 50 cm between rows and 15 cm between plants within row. Five randomly selected plants were taken from each replication for recording the data on days to 50% flowering, plant height, stem thickness, spike exertion, spike length, spike thickness, 500-grain weight and grain yield per plant. Correlation coefficients were estimated according to Johnson *et al.* (1955), while path coefficient analysis was carried out following Dewey and Lu (1959).

The analysis of variance revealed significant differences among accessions for all the characters studied, indicating existence of sufficient genetic variability in the material. Correlation coefficients indicated that most of the characters showed positive associations with grain yield. However, days to 50% flowering had negative correlation with grain yield. A negative association between grain yield and days to 50% flowering was also reported by Tyagi *et al.* (1980). Positive and significant correlation between plant height and days to 50% flowering was also observed. Stem thickness was found to be positively associated with spike exertion, spike thickness and grain yield. Spike exertion and spike thickness also showed positive and significant correlation with each other and with 500-grain weight and grain yield per plant. The 500-grain weight exhibited significant and positive association with grain yield. Our results on correlation in pearl millet are in agreement with the results

*Table 1. Correlation coefficients, direct (diagonal) and indirect effects of various characters on grain yield in core collection for pearl millet*

| Charactrers | Days to 50% flowering | Plant height | Stem thickness | Spike exertion | Spike length | Spike thickness | 500-grain weight | Correlation with grain yield |
|---|---|---|---|---|---|---|---|---|
| Days to 50% flowering | -0.355 | 0.003 | 0.0769 | -0.0525 | -0.0084 | 0.0232 | -0.0484 | -0.36* |
| Plant height | -0.130 | 0.003 | 0.0754 | 0.0431 | 0.0041 | 0.0548 | 0.0017 | 0.06 |
| Stem thickness | -0.109 | 0.009 | 0.2509 | 0.1386 | 0.0077 | 0.1474 | 0.0254 | 0.46** |
| Spike exertion | 0.055 | 0.0008 | 0.1040 | 0.3344 | 0.0180 | 0.1290 | 0.0643 | 0.71** |
| Spike length | 0.049 | 0.0004 | 0.0324 | 0.1003 | 0.0601 | 0.0201 | 0.0231 | 0.29 |
| Spike thickness | -0.034 | 0.0014 | 0.1535 | 0.1790 | 0.0050 | 0.2409 | 0.0522 | 0.60** |
| 500-grain weight | 0.138 | 0.0001 | 0.0512 | 0.1728 | 0.0111 | 0.1009 | 0.1246 | 0.60** |
| Grain yield (g) | | | | | | | | |

* Significant at 5% level. ** Significant at 1% level.

of earlier investigators (Raj *et al.*, 1994; Diz and Schank, 1995).

The analysis of path-coefficient revealed that of the eight characters, the spike exertion showed highest (0.33) positive direct effect on grain yield, followed by stem thickness and spike thickness (Table 1). The negative association between days to 50% flowering and grain yield was largely due to the direct influence of days to 50% flowering itself. The positive association between plant height and grain yield was mainly through stem thickness and spike thickness. Stem thickness and spike thickness had positive direct effect on grain yield. This was largely contributed by indirect influence of spike thickness and spike exertion. It was interesting to note that the estimates of direct effect of spike exertion on grain yield was maximum. The indirect effects via all other traits were also positive. Though spike length had positive direct effect on grain yield, it was more indirectly influenced by spike exertion, stem thickness, 500-grain weight and spike thickness. Indirect contribution of spike exertion, spike thickness and days to 50% flowering were evident in 500-grain weight and grain yield relationship. Similar findings were reported by Kumar and Dahiya (1993), Raj *et al.* (1994), Diz and Schank (1995). The combined results of correlation and path analysis revealed that days to 50% flowering, stem thickness, spike exertion, spike thickness and 500-grain weight were the most important characters associated with grain yield in pearl millet. Therefore, it is suggested that these characters should be considered in selection programme for pearl millet improvement.

## References

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