Madras Agric. J., 84(9): 541 - 543 September 1997
https://doi.org/10.29321/MAJ.10.A00913

CORRELATION AND PATH COEFFICIENT ANALYSIS IN MULTICUT OATS

ARUN KUMAR and D.N. SINGH
Department of Plant Breeding and Genetics
Birsa Agricultural University
Ranchi 834 006

ABSTRACT

Twenty seven genotypes were studied under multicut system of fodder production. Interrelationship among various characters indicated that green fodder yield had high positive and significant correlation with plant height, culm girth, leaf length-width ratio and dry matter yield at first cut while in second cut culm girth and dry matter yield were found to be positively and significantly correlated with green fodder yield. Path analysis revealed that plant height, tillers/metre and leaves/tiller had positive direct effect on green fodder as well as dry matter yield in the first cut while in second cut only plant height had strong direct effect on green fodder as well as dry matter yield.

KEY WORDS : Correlation, oat, path analysis

Partitioning of the correlation coefficients of forage yield attributes in oats based on single cut taken at 50% bloom stage. The present investigation was undertaken to know the nature of character correlation alongwith path analysis at different cutting stages which would facilitate the selection criteria to develop suitable multicut varieties in oats for forage production at frequent intervals.

MATERIALS AND METHODS

Twenty seven genotypes in multicut oats showing wide range of variation in different forage yield attributes were evaluated in randomised block design at the university fodder farm with three replications in rows 25 cm apart keeping the row length of 4 m in a plot size of 4x3 m. Data were recorded from one m row length from three central rows selected randomly for eight quantitative characters *viz.*, plant height (PH), culm girth (CG), tillers/m, leaves/tiller, leaf length-width ratio (LLWR), leaf-stem ratio (LSK), green fodder yield (GFY) and dry matter yield (DMY) in the first cut. Second cut data were recorded at the 50 per cent bloom stage. Data on each cut were utilised to estimate the phenotypic correlation coefficients and their direct and indirect effects.

RESULTS AND DISCUSSION

Characters attributing to fodder yield were associated variously among themselves at the first and second cut (Table 1). Thus at the first cut, both GFY and DMY had positive and significant correlation with PH, CG and LLWR while leaves/tiller had positive and significant correlation only with DMY. The latter and GFY were also positively and significantly correlated among themselves. Similarly, other positive and significant correlations were recorded for PH with CG, leaves/tiller, LLWR., CG with tillers/metre, leaves/tiller and tillers/m with LSR.

In the second cut, yield altributing characters were however, not well correlated. Thus, GFY was

Table 1. Phenotypic correlation coefficient between fodder yield and its components at the first cut (upper right) and second cut (lower left)

Character	Plant height	Culm girth	Tillers/m	Leaves/tiller	Leaf length width ratio	Leaf stem ratio	Green fodder yield	Dry matter yield
Plant height	-	0.707**	-0.666**	0.229*	0.654**	0.766**	0.694**	0.699**
Culm girth	0.149	-	0.827**	0.361**	0.202	0.702**	0.483**	0.454**
Tillers/m	-0.689**	-0.271*	-	-0.408**	-0.124	0.754**	-0.429**	-0.409**
Leaves/tiller	0.433**	0.068	-0.315**	-	0.145	-0.294**	0.211	0.229*
Leaf length-width ratio	0.539**	-0.128	0.196	-0.211	-	-0.350**	0.367**	0.336**
Leaf stem ratio	0.007	-0.198	0.103	0.088	0.030	-	-0.544**	-0.572**
Green fodder yield	0.156	0.287**	0.047	0.215	-0.186	-0.129	-	0.799**
Dry matter yield	0.391**	-0.251**	-0.281	0.381**	-0.080	-0.028	0.788**	-
50% bloom	0.447**	0.065	-0.495**	0.598**	0.084	0.097	0.175	0.533**

*, ** Significant at 5% and 1% level of probability respectively

Table 2. Direct (in bold) and indirect effects of six quantitative characters on green fodder yield (GFY) and dry matter yield (DMY) in multicut Oats-*First cut*

Character		Indirect effects via different characters						Phenotypic correlation with yield
		Plant height	Culm girth	Tillers/m	Leaves/tiller	Leaf length width ratio	Leaf stem ratio	
Plant height	GFY	0.961	-0.008	-0.161	0.008	-0.164	0.058	0.694**
	DMY	0.576	-0.072	-0.142	0.006	-0.156	0.108	0.699**
Culm girth	GFY	0.679	-0.012	-0.199	0.013	-0.051	0.053	0.483**
	DMY	0.407	-0.102	-0.177	0.011	-0.048	0.099	0.454**
Tillers/m	GFY	0.640	0.009	0.241	-0.014	0.037	0.057	-0.429**
	DMY	-0.384	0.084	0.214	-0.012	-0.029	-0.107	-0.409**
Leaves/tiller	GFY	0.220	-0.004	-0.098	0.035	0.036	0.022	0.211
	DMY	0.132	-0.036	-0.087	0.029	0.034	0.041	0.299*
Leaf length	GFY	0.628	-0.002	-0.029	-0.005	-0.251	0.026	0.367**
	DMY	0.377	-0.020	-0.026	-0.004	-0.239	0.049	0.336**
Leaf-stem ratio	GFY	0.736	0.008	0.182	-0.010	0.088	-0.075	-0.544**
	DMY	-0.441	0.071	0.161	-0.008	0.084	-0.142	-0.572**

Residual : GFY 0.696 DMY = 0.537
effects

positively and significantly correlated only with CG. Similarly, DMY was positively and significantly correlated with leaves/tiller and GFY. DMY was positively and significantly correlated also with 50 per cent floom. Other positive and significant correlations were recorded for PH with leaves/tiller, LLWR, 50 per cent bloom and DMY, CG with GFY, leaves/tiller with DMY and 50 per cent floom, and GFY with DMY. However, negative and significant correlations were recorded for PH and CG with tillers/m, CG with DMY, tillers/m with leaves/tiller and 50 per cent bloom.

When the data of both the cuts were taken together, it was observed that selection based on PH would bring improvement in leaves/tiller, LLWR and DMY at both the cuts.

Paroda (1975) emphasised that improvement in leaf characters would not only help in increasing the dry matter yield but would also increase the palatability and digestibility due to more leafy portion. Further more as expended, CG had positive and significant correlation with GFY which in turn showed good correlation with DMY in both the cuts as reported earlier also by Singh *et al.* (1980) and Bahl *et al.* (1980) in forage oats.

However, negative and significant correlation of PH with tillers/m also indicated that PH increased at the cost of tillers and due to crowding

Table 3. Direct (in bold) and indirect effects of six quantitative characters on green fodder yield (GFY) and dry matter yield (DMY) in multicut Oats-*Second cut*

Character		Indirect effects via different characters						Phenotypic correlation with yield
		Plant height	Culm girth	Tillers/m	Leaves/tiller	Leaf length width ratio	Leaf stem ratio	
Plant height	GFY	0.616	0.037	-0.403	0.049	-0.212	0.001	0.156
	DMY	0.082	-0.003	0.088	-0.021	-0.019	0.003	0.399**
Culm girth	GFY	0.091	0.254	-0.159	0.007	0.050	0.031	0.287**
	DMY	0.012	-0.021	0.034	0.003	0.004	0.009	-0.251*
Tillers/m	GFY	-0.424	-0.069	0.585	-0.036	0.083	-0.016	0.047
	DMY	-0.056	0.005	-0.128	0.015	0.007	0.005	-0.281**
Leaves/tiller	GFY	0.266	0.017	-0.185	0.114	-0.077	-0.014	0.215
	DMY	0.036	-0.001	0.040	-0.048	-0.007	0.004	0.381**
Leaf length	GFY	0.332	-0.032	-0.123	0.022	-0.393	-0.005	-0.186
	DMY	0.044	0.002	0.027	-0.009	-0.036	0.001	-0.080
Leaf stem ratio	GFY	0.004	-0.050	0.060	0.010	-0.011	-0.156	-0.129
	DMY	0.005	0.004	-0.013	-0.004	-0.001	0.049	-0.028

Residual : GFY= 0.811 DMY = 0.441

effect, there was reduction in stem thickness. Narrow stem is, however, a desirable character for forage quality and thus of advantage particularly to grazing type of plants where number of tillers are more important than plant height. Negative correlation between leaves/tiller and tillers/m was attributed to adaptive compensation. The correlations were further partitioned into direct and indirect effects to establish the cause and effect relationship among yield and its component characters. The data (Tables 2, 3) revealed that PH, tillers/m and leaves/tiller had positive direct effect on GFY as well as DMY in the first cut while in the second cut, only PH had strong direct effect on GFY as well as DMY. This indicated that with the improvement in PH, there would be simultaneous improvement in leaf and culm characters. Direct effect of plant height on fodder yield was also reported by Dhumale and Mishra (1979).

Indirect effects of PH through CG and leaves/tiller on GFY were positive in the second cut. Similarly in the first cut, the indirect effect of PH CG on fodder yield through leaves/tiller while of the latter through LLWR were positive but negligible. Contribution of leaves to fodder yield has already been reported in many crops. In DMY, PH and tillers/m had direct effect in the first cut while in the second cut, only the days to 50 per cent floom had direct effect on DMY. Therefore, PH, CG, leaves/tiller and LLWR were the most important characters influencing the fodder yield. Thus, selection of genotypes based on these characters are likely to bring improvement in fodder production in multicut oats.

REFERENCES

BAHL, A., RAO, S.K. and SINGH, C.B. (1988). Association analysis of fodder yield and its components in different environments in Oats. **Crop Improve., 15** : 132-137.

DHUMALE, D.B. and MISHRA, S.N. (1979). Character association between forage yield and its components in Oat. **Indian J. Agric. Sci., 49** : 918-924.

PARODA, R.S. (1975). Leafiness- An important criterion for improvement in yield and quality of forages. **Forage Res., 1** : 145- 149.

SINGH, S.P., YADAV, B.S., THAKUR, G.S., THAKUR and NARSINGHANI, V.G. (1980). Note on correlation coefficient and path analysis studies on fodder Oat. **Indian J. Agric. Sci., 50** : 973- 975.

(Received : February 1996 Revised : May 1997)

Madras Agric. J., 84(9): 543 - 547 September 1997

SOIL FERTILITY STATUS OF KANJAMALAI HILLS, TAMILNADU

P. VASUDEVAN*, D. MUTHUMANICKAM*, R.S. AZHAKIAMANAVALAN* and P. DWRAKAN**

*Horticultural Research Station
Tamil Nadu Agricultural University
Yercaud 636 602
** Botanical Survey of India
Yercaud 636 602

ABSTRACT

Evaluation of nutrient status of Kanjamalai hills of Tamil Nadu reveals that the soils are neutral in reaction, 69 per cent low in N, 100 per cetn low in P and 58 per cent low in K. But the soils are well supplied with Cu, Mn and Fe. The physical properties of the soil is optimum for crop production.

KEY WORDS : Soil fertility, Kanjamalai hills

Salem district spreads ot 8640 sq.km. area/in which Kanjamalai hill is situated 16 km away from Salem town. Kanjamalai form a compact block of hills with steps and slopes lies between 11°30' to 12°0' N and 78°30' E with altitudinal variations from 350 m to 986 m. The Kanjamalai hill range is a bare rocky mountaneous area wiht potentials of medicinal herbs and plants. The atmospheric temperature varies from 21° to 30° C at foot hill to 15° to 25° C at the top. The annual rainfall ranges from 750 and 1200 mm received in different parts of hill and got benefitted from both north east and south west monsoons. The mountaneous range covering an extent of nearly 20 sq.km. is known more appropriately for its sotres of magnetite iron. The iron beds of Kanjamalai are seen in a concentric ellipses forming part of a great synclinal fold. Adequate information on the fertility status of