Indian J. Pl. Genet. Resources 9(1): 105-108, 1996

EVALUATION OF GENETIC RESOURCES OF EGYPTIAN CLOVER (*TRIFOLIUM ALEXANDRINUM* L.)

R.N. Arora, R.S. Khatri, D.S. Jatasra, G.P. Lodhi and N.K. Thakral

Department of Plant Breeding, Forage section,
CCS HAU, Hisar 125 004 (Haryana)

Five hundred and fifty three germplasm accessions of Egyptian clover, commonly known as *berseem (Trifolium alexandrinum* L.) collected from various parts of India were evaluated for quantitative attributes of green and dry matter yield. Limited amount of variability was observed for various characters. All the characters were significantly and positively correlated with green and dry fodder yield. Plant height had maximum direct effect and indirect effect via green fodder yield. A few lines namely HFB 163, 188 and 155 were better in both green fodder yield/plant and dry matter yield/plant, whereas genotypes HFB 158, 173 and 136 possessed desirable height and HFB 260, 214 and 209 possessed high number of tillers/plant. Their use in breeding programmes to develop ideal plant types in Egyptian clover has been discussed.

Key words : Egyptian clover, *Trifolium alexandrinum* biodiversity, germplasm evaluation

Evaluation of genetic resources for economically important attributes is one of the most essential and useful step for initiating breeding programme for bringing genetic improvement in any crop species. In Egyptian clover, an important fodder crop of northern India and other subtropical countries, systematic evaluation of germplasm has not been reported. Accordingly, the available germplasm of 553 accessions of Egyptian clover maintained at Haryana Agricultural University were evaluated and the results are presented in this paper.

MATERIALS AND METHODS

Five hundred and fifty three berseem accessions collected from different parts of major berseem growing states of India viz., Punjab, Haryana and Uttar Pradesh were grown during *rabi* 1991-92 at the experimental farm of Forage Research Section, Department of Plant Breeding, Chaudhary Charan Singh Haryana Agricultural University, Hisar in an augmented block design with one check namely *mescavi*. Each accession was raised in a single row of 3 m length. The distances between and within rows were kept at 30 and 10

cm, respectively. Every 44 accessions were followed by one check to constitute one block. Normal cultural practices were followed. Observations were recorded on three competitive and randomly selected plants from each accession including check on quantitative characters like plant height (cm), number of tillers per plant, green fodder yield per plant (g) and dry matter yield per plant (g). Mean, range of variation, coefficient of variation, correlation and path coefficient were worked out. The germplasm lines were also categorised as per their variation present for various characters.

Table 1. Mean, range and coefficient of variation for fodder characters in *berseem* germplasm

Character	Mean value		Range of variation		C.V. (%)	No. of accessions below/above the mean value of check variety		Superior germplasm lines
	Germplasm	Check	Minimum	Maximum		Below	Above	
Green Fodder yield/plant (g)	45.9± 0.62	51.6± 5.18	5.0 (HFB 278)	113.3 (HFB 163)	32.0	399	154	HFB 163, 188, 155, 187, 189, 233, 234, 40, 41, 154, 157, 162, 164, 191
Dry Matter yield/plant(g)	11.3 ± 0.16	11.9± 1.21	1.7 (HFB 278)	23.3 (HFB 163,188)	33.3	295	258	HFB 163, 188, 155, 426, 434, 445, 461
Plant height (cm)	46.3 ± 0.26	47.9 ± 1.69	21.0 (HFB 487)	62.0 (HFB 158)	13.0	312	241	HFB 158, 173, 135, 140, 40, 9, 188, 538, 25, 154, 153, 162
Tillers/plant	14.9 ± 0.21	17.3 ± 1.80	3.7 (HFB 21)	42.3 (HFB 260)	33.9	393	160	HFB 260, 214, 209, 252, 203, 208, 439, 440, 155, 305, 213, 441, 304, 308, 187, 193, 306, 41

RESULTS AND DISCUSSION

Mean, range and percent coefficient of variation and number of accessions below/above the check value are given in Table 1. The highest coefficient of variation was observed for number of tillers per plant (33.9%) followed by dry matter yield per plant (33.3%) and green fodder yield per plant (32.0%), whereas the lowest coefficient of variation was recorded for plant height (13.9%). The range of variation for green fodder yield per plant was from 5.0 g (HFB 278) to 113.3 g (HFB 163) and the average green fodder yield per plant was 45.9 ± 0.62 as compared to check having 51.6 ± 5.18 9 per cent. The dry matter yield which is the ultimate objective for improvement in any fodder crop was found to vary from 1.7 g (HFB 278) to 23.3 g (HFB 163 and 188) and the mean value of all the germplasm lines for this character was 11.3 ± 0.16 h as compared to check cultivar having mean value 11.9 ± 1.21 g. The range of variation for plant height and number of tillers per plant was from 21.0 cm (HFB 487) to 62.0 cm (HFB 158) and 3.7 (HFB 21) to 42.3 (HFB 260), respectively. The average plant height and number of tillers per plant was 46.3 ± 0.26 cm and 14.9 ± 0.21 as compared to check variety having mean value as 47.9 ± 1.69 cm and 17.3 ± 1.80, respectively. These results indicated narrow variability in the existing germplasm. Efforts should be made to enhance the genetic variability through mutation breeding as has been done and suggested by Jatasra *et al* (1987) and Shukla and Patil (1988) and through polycross progeny testing procedure (Singh *et al.*, 1988). Thus, the variability created through mutation could be exploited for further improvement of *berseem* whereas, gain from the base population for fodder and seed yield in *berseem* could be realized utilizing family selection (Bakheit, 1988).

Correlation analysis (Table 2, 3) revealed that all the characters showed

Table 2. Correlation coefficients in *berseem* germplasm

Characters	Tillers/plant	Green Fodder yield/plant	Dry Matter yield/plant
Plant height	0.182*	0.512*	0.838*
Tillers/plant		0.591*	0.548*
Green Fodder Yield/Plant			0.794*

*Significant at P = 0.05

significant and positive association with green and dry fodder yield and these results corroborate the findings of Sidhu and Mehndiratta (1976), Jatasra (1981) and Shukla and Patil (1988) in this crop. Therefore, selection for dry matter improvement in berseem should be based mainly on plant height and tiller number per plant. Some of the best and diverse genotype amongst those given in Table 1 could be utilized in studying genetics of fodder yield and other

Table 3. Direct (diagonal) and indirect effects of dry matter yield components in *berseem* germplasm.

Characters	Plant height	Tillers/plant	Green Fodder Yield/Plant	Correlations with dry matter yield
Plant height	0.623	0.043	0.172	0.838*
Tillers/Plant	0.113	0.237	0.198	0.548*
Green fodder yield/Plant	0.319	0.140	0.335	0.794*

Residual Effect : 0.286

related characters which is lacking in *berseem* and further to exploit this information and also to utilize the promising genotypes to evolve high fodder yielding genotypes in Egyptian clover.

REFERENCES

Bakheit B.R. 1988. Selection for seed yield in Egyptian clover (*Trifolium alexandrinum* L.) *Forage Res.* **14** : 39-48.

Jatasra D.S. 1981. Components of green fodder and dry matter yields in Egyptian clover. *Forage Res.* **7** : 163-168.

Jatasra D.S., R.S. Khatri and A.K. Chhabra. 1987. Effect of gamma rays on germination, root length and shoot length in Egyptian clover. *Forage Res.* **13** : 9-14.

Sidhu B.S. and P.D. Mehndiratta. 1976. Genetic analysis of factors influencing forage yield in berseem. *Indian J. agric. Sci.* **46** : 168-170.

Singh A.K., S.N. Misra and J.S. Verma. 1988. Polycross progeny test performance in berseem. *Forage Res.* **14** : 77-82.

Shukla G.P. and B.D. Patil 1988. Radiation induced quantitative variation and selection indices in Egyptian clover. *Forage Res.* **14** : 55-58.