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Response of *Stylosanthes guainensis* Varieties to Phosphorus Fertilizer Under Rainfed Condition

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Stylosanthes guainensis is a native of Brazil and now it has spread over in many countries of tropics and sub-tropics. It is adapted to wide range of soils in medium to high rainfall areas. However, it prefers warm-humid zone with annual rainfall of 1250 mm or more (Skerman 1977). In India, this legume grows well under sub-humid climatic condition in West Bengal and Bihar, as such this legume has been recommended for improvement of rangelands (Chatterjee *et al*. 1985). However, studies are required to find out suitable varieties of this legume for different agro-climatic condition. Therefore, an experiment was conducted at Central Research Farm of IGFRI, Jhansi to know the comparative performance of two varieties (Schofield and Endeavour) of Brazilian lucerne which were obtained from Australia (CSIRO Brisbane) with three levels of P (0,40 and 80 kg P_2O_5 ha^{-1}) under rainfed conditions.

The soil of the experimental site was sandy clay loam (3.70% silt, 27.38% clay and 68.92% sand). The pH value was 7.8. The total N and O C were 0.066 and 0.495%, respectively. The available P was 10.68 kg ha^{-1}. The experiment was laid out in randomized block design with 4 replications. Basal application of farm yard manure (5 t ha^{-1}) and N (20 kg ha^{-1}) was given at the time of land preparation. Phosphorus in the form of single super phosphate was applied in the furrow and mixed in the soil at the time of sowing . Seeds were sown at the rate of 6 kg ha^{-1} on August 2, 1983 at 50 cm spacing. In 1984, Phosphorus was applied at the onset of monsoon (5th July) after interculture operation. In 1985, data were not recorded due to high mortality of the plants as the average maximum temperature recorded in the months of April, May and June was 43.2, 45.2. and 44.4°C, respectively. In 1983 and 1984 only one cutting was taken in the month of November. Herbage samples of both the years were analysed for nitrogen by micro-kjeldahl method. The rainfall recorded during study period was 728.2 and 839.4 mm with 40 and 45 rainy days, respectively.

Data presented in table 1 revealed that variety Schofield gave significantly higher plant growth and green and dry forage yield compared to variety Endeavour during first year while in second year the differences in production was non-significant. These results indicated that during first year the growth and production of variety Endeavour was poor but in second year the growth and production was quite good and comparable to variety Schofield. The average data of two years showed that variety schofield produced 23.8 and 26.7% higher green and dry forage yield respectively over variety Endeavour.

Application of P did not show any significant response on plant growth in both the years and forage yield during first year. In the second year, application of 40 kg P_2O_5 ha^{-1} gave significant increase in green and dry forage yields over control. However, increase in levels of P from 40 to 80 kg P_2O_5 ha^{-1} did not give significant response on forage yield. Brace and Teitzel (1978) also reported increase in dry matter yield of *S. guianensis* due to application of P only upto 50 kg ha^{-1} in North Queensland. Average data of two years showed that application of 40 kg P_2O_5 ha^{-1}, the green and dry forage yield increased by 13.5 and 14.9%, respectively over control.

In the present study, the average dry matter yield of two years recorded was 4.21 t ha^{-1} while the average yield recorded in different countries such as Fiji, Zambia and North Queensland was 4.18 (Payne *et al*. 1955), 4.60 (Van Rensburg 1967) and 11.0 t ha^{-1} (Gilchrist 1967), respectively. The varia-

Table 1 *Plnat growth, forage production & crude, protetin content of S.guianensis*

Treatments	Plant length (cm)		Forage prduction (t ha^{-1})						Crude protein content (%)		
			Green			Dry					
	1983	1984	1983	1984	Mean	1983	1984	Mean	1983	1084	Mean
Varities											
Endeavour	43.9	120.9	3.47	15.63	9.55	1.59	5.83	3.71	12.94	10.93	11.93
Schofield	60.6	127.9	7.17	16.46	11.82	3.09	6.30	4.70	11.95	10.99	11.47
SEm±	1.3	2.8	0.45	0.60	–	0.22	0.23	–	–	–	–
CD at 5 %	3.9	NS	1.35	NS	–	0.66	NS	–	–	–	–
Levels of P (kg ha^{-1})											
0	49.8	118.8	4.98	14.34	9.66	2.15	5.39	3.77	12.33	10.63	11.48
40	53.1	126.8	5.33	16.59	10.96	2.38	6.28	4.33	12.43	11.37	11.88
80	53.9	127.5	5.73	17.19	11.46	2.49	6.53	4.51	12.55	10.94	11.75
Mean	52.3	124.4	5.32	16.04	–	2.34	6.07	–	–	–	–
SEm±	1.7	3.4	0.57	0.75	–	0.25	0.28	–	–	–	–

tion in yield was due to different agro-climatic conditions prevailing in that area.

Data on crude protein content, showed that in first year, variety Endeavour exhibits slightly higher (12.94%) content compared to variety Schofield (11.95%) while in second year it was at par. Due to application of P the crude proiein content was slightly higher than control in both the years. However, pooled data showed that application of 80 kg P_2O_5 ha^{-1} did not show any beneficial effect over 40 kg P_2O_5 ha^{-1} on the crude proiein content.

Thus it may be concluded that variety schofield was superior in forage production over Endeavour and for getting higher yield 40 kg P_2O_5 ha^{-1} should be applied.

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References

Bruce RC & Teitzel JK 1978 Nutrition of Stylosanthes guianensis on two sandy soils in humid tropical low land environment. *Tropical Grassland.* **12** 39-48

Chatterjee BN, Singh RD & Maiti S 1985 An agronomical appraisal of *Stylosanthes* in Eastern (Sub-Tropical) region of India. *Indian Journal of Range Management* **6** 27-34

Gilchrist EC 1967 A place for Stylo in North Queensland pastures. *Queensland Agriculture* Journal **93** 344 -349

Payne W J A, Laing W I, Miles NS & Mason R R 1955 Fodder and Pasture investigational work at Sigatoka 1949-1953. Fiji *Agricultrue Journal* **26** 38-60

Skerman PJ 1977. *Tropical Forage Legumes*. Food and Agriculture Organisation of the United National, Rome

Van Rensburg H J 1967 *Pasture Legumes and grasses in Zambia*. Government Printer *Lusaka.*

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