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EFFECT OF PHOSPHORUS AND LIME ON THE GROWTH ATTRIBUTES AND YIELD *STYLOSANTHES GRACILIS* SWARTZ*

H. MARIYAPPAN,** P. CHANDRASEKHARAN, AND G. RAGHAVAN PILLAI
College of Agriculture, Vellayani, Kerala.

The leguminous fodder Stylo or Brazilian lucerne *(Stylosanthes gracilis)* is a recent introduction from Brazil which has proved to be a very useful addition to the fodder wealth of tropical India, It is drought tolerant and fairly suited to acidic conditions. Preliminary observational studiesat Vellayani (Anon., 1978) revealed that this crop comes up well in open fields and in coconut gardens in partial shade. The beneficial effect of phosphorus and lime on the growth attributes, green matter and dry matter yields of leguminous fodder crops has been reported earlier (Jones 1974 and Bruce, 1976). The application of lime to fodder grasses to correct the soil pH to 6.6 has recorded higher yield (Anon., 1977). However, the response of graded doses of phosphorus with and without lime on the growth attributes and yield of Stylo is not available under Kerala conditions Hence the present investigation was undertaken to study the effect of phosphorus on the growth attributes, green matter and dry matter yields of *Stylosanthes gracilis* with and without lime.

Materials and Methods

The field experiment was conducted in the red loam soils of the Instructional Farm, College of Agriculture, Vellayani during the year 1977-78 to study the response of graded doses of phosphorus (0, 40, 80, 120 and 160 kg/ha) on the growth attributes, green matter and dry matter yields of 5. *gracilis* with and without lime (0 and 500 kg/ha). The experiment was laid out as a factorial type in Randomised block design with three replications

A uniform dose of farm yard manure at the rate of 5 t/ha was applied and well incorporated into the field. A uniform dose of 20 kg N and 30 kg K_2O/ha was applied as basal dose. The phosphorus levels at the rate of 0, 4G, 80, 120 and 160 kg/ha were given at planting followed by lime application.

The seeds at the rate of 2.5 kg/ha were line sown in well prepared soil at a spacing of 30 cm apart after scarification and covered with a layer r.f 0.5 to 1.0 cm thickness of soil. The crop was weeded twice, A uniform cut was taken at £0 days of crop growth and subsequently four cuts at 90 days intervals followed by three cuts at 45 days intervals were also taken.

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** Present address: Fodder Development Officer, Kerala State Livestock Development and Milk Marketing Board, Mavelikara.

The data relating to growth attributes, viz., height, number of branches, number of leaves and leaf/stem ratio and green and dry matter yields were collected from a sample of 10 plants selected randomly from each plot. The data were statistically analysed and interpreted.

Results and Discussion

Growth Attributes

The direct effect of graded doses of phosphorus and lime on the height of plants and number of branches was not significant. Phosphorus had very little influence in increasing the leaf number, but the application of lime significantly increased this character. Levels of phosphorus and lime did not influence the leaf/stem ratio.

Graded doses of P up to 120 kg/ha and lime at 500 kg/ha showed an increasing trend in the height of the plants, though the rate of increase was not statistically significant. The influence of phosphorus in increasing the height of *S. gracilis* has been reported earlier by Jones (1974). Calcium which play an important role in cell elongation might also have contributed to the slight increase in height.

Production of branches was not influenced by the levels of phosphorus up to 120 kg/ha and by lime application, in spite of the fact that there was an increasing trend with incremental doses of P and an increase with lime treatment over no lime. Liming might have increased the availability of nutrients which ultimately resulted in the slight increase in the number of branches (Chew *et al.*, 1976).

Phosphorus and lime application had no influence in increasing the leaf/stem ratio. However, an increasing trend was noticed with phosphorus up to 120 kg/ha.

Green matter yield

The data on green matter yield presented in Table 1 shows that phosphorus level of 120 kg/ha gave maximum green matter yield and was significant. Though the growth attributes were not significant, significant increase in green matter yield noticed in this study might be their cumulative effect. Generally addition of phosphorus to legumes increases the 9reen matter yield [Henzell *et al.*, 1966]

Dry matter yield

The effect of phosphorus on dry matter yield was significant . The mean value indicates that phosphorus level of 1 20 kg/ha recorded the maximum dry matter yield. Similar results were reported by Rao *et at.* [1954] and Bruce [1976]. Although growth attributes like plant height, number of leaves, number of branches, leaf/stem ratio etc. had shown only an increasing trend by the application of phosphorus, the significant increase in dry matter yield might be the additive effect of the individual growth attributes. Further, application of phosphorus might have helped in increasing the root production resulting in significantly increased dry matter production.

Table 1

Growth attributes, green matter and dry matter yields of *Stylosanthes gracilis* as influenced by different levels of phosphorus and lime

Treatments	Height (cm)	No. of branches	No. of leaves	Leaf/stem ratio	Green matter yield t/ha	Dry matter yield t/ha
Phosphorus kg/ha						
0	29.31	13.56	47.12	1.55	18.162	3.037
40	30.10	14.01	48.23	1.53	19.120	3.220
80	30.60	14-24	50.62	1.63	19,550	3.433
120	32.89	14.72	50.91	1.72	21.668	3.670
160	28.83	13.58	46.37	1.52	18.358	3.371
CD (0.05)	NS	NS	NS	NS	1.978	0.399
Lime levels in kg/ha						
0	29.27	13.62	46.57	1.59	19.209	3.284
500	31.41	14.42	50.72	1 58	19534	3.408
CD (0 05)	NS	NS	3.69	NS	NS	NS

Summary

A field experiment conducted to study the effect of graded doses of phosphorus (0,40, 80, 120 and 160 kg/ha) on the growth attributes, green and dry matter yields of *Stylosanthes gracilis* Swartz with two levels of lime [0 and 500 kg/ha] in the red loam soils of the Instructional farm, College of Agriculture. Vellayani has shown that growth attributes like plant height, number of leaves, number of branches and leaf/stem ratio were not influenced by the application of graded doses of phosphorus except lime which increased the leaf number significantly. Phosphorus at the rate of 120 kg/ha recorded the maximum green matter yield and dry matter production. Although lime level at 500 kg/ha failed to produce significant increase in green matter and dry matter yields, a positive trend was noticed by lime application.

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സംഗ്രഹം

സ്റ്റൈലോസാന്തസ് ഗ്രാസ്സിലിസ് എന്ന കാലിത്തീറ്റച്ചെടിക്ക് വിവിധ തോതിൽ ഫോസ്ഫറസ്സും കുമ്മായവും നൽകുന്നതുമൂലം ചെടിയുടെ പച്ചയായ വസ്തുവിന്റെയും ശുഷ്ക്കവസ്തുവിന്റെയും മൊത്തത്തിലുള്ള ഉൽപ്പാദനവും തീറ്റ വിളവ് ഉൽപ്പാദനത്തിന് സഹായകമായ സസ്യഭാഗങ്ങളുടെ വളർച്ചയും എങ്ങനെ സാധിനിക്കപ്പെടുമെന്നതിനെക്കുറിച്ച് വെള്ളായണി കാർഷിക കോളേജിൽ പഠനം നടത്തുകയുണ്ടായി. 120 കി.ഗ്രാം ഫോസ്ഫറസ് നൽകുന്നതുകൊണ്ട് പച്ചയായ വസ്തുവിന്റെയും ശുഷ്ക്ക വസ്തുവിന്റെയും ഉൽപ്പാദനം വർദ്ധിക്കുന്നതായി കണ്ടു. 500 കി.ഗ്രാം കുമ്മായം നൽകുന്നതുകൊണ്ടും പച്ചയായ വസ്തുവിന്റെയും ശുഷ്ക്കവസ്തുവിന്റെയും ഉൽപാദനം നേരിയ തോതിൽ വർദ്ധിക്കുന്നതായി കാണുകയുണ്ടായി.

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