

CRUDE PROTEIN AND CRUDE FIBRE CONTENT OF FODDER GRASSES AS INFLUENCED BY LEGUME INTERCROPPING AND PHOSPHORUS APPLICATION

Mixed cropping of protein rich leguminous plants with widely adaptive fodder grasses is an accepted practice for the production of high tonnage and high quality fodder. Application of chemical fertilizers is another important measure adopted in forage production for improving the yield and quality of herbage. The importance of nitrogen in grass production is well known. Phosphorus is vital in legume nutrition. For the development of tropical pastures, it is necessary to study the effect of phosphorus on the quality of the main tropical legumes (Andrew and Robins, 1969). Since protein content and cell wall constituents of the plant are the most important factors that affect quality and intake of fodder, the quantity of these components has a great bearing on the feeding value of forages grown under different levels of phosphorus.

Thairu (1972) reported that the nitrogen content of a mixture of desmodium and setaria is considerably higher than that of setaria grass grown alone without added nitrogen. The nitrogen component was increased by 10 to 25 per cent due to association with legumes. Singh and Sogani (1968) reported that growing of jowar alone had least crude protein and more crude fibre contents while fodder from a mixture of jowar and cowpea in the ratio of 3:1 had a high content of crude protein and moderate content of crude fibre. Increasing the proportion of legume in the fodder tended to increase the crude protein but reduced crude fibre contents.

To assess the beneficial effects of legume intercropping in the quality of fodder and to study the effect of graded doses of phosphorus on the protein and fibre contents of fodder, an experiment was conducted in the Instructional Farm, attached to the College of Agriculture, Vellayani during the year 1979-80. The experiment was laid out with 27 treatment combinations; 3 grasses (guinea grass, staria grass and congo signal), 3 cropping patterns (no intercropping, intercropping with *Stylosanthes quianensis*, intercropping with *Centrosema pubescens*) and 3 levels of phosphorus (80, 120, 160 kg P_2O_5 /ha). The design of the experiment was 3^3 partially confounded factorial experiment. The soil was red loam with a pH of 4.9 analysing 0.138 per cent total N, 0.0017 per cent available P and 0.0023 per cent available K. Grass slips were planted @ 3 slips/hill at a spacing of 40 x 20 cm. Rhizobium treated seeds of *stylosanthes* and *centrosema* were dibbled in between the grass rows.

The analytical results of the data (Table 1) revealed that there was a significant increase in the crude protein content of grasses due to legume intercropping. Intercropping with *centrosema* produced maximum crude protein content of 9.26 per cent followed by *Stylosanthes* intercropping (8.63 percent). Increased protein content of

Table 1
Crude protein and crude fibre content of fodder grasses as influenced by legume
intercropping and phosphorus application

Treatments	Crude protein %				Crude fibre %			
	Guinea grass	Setaria grass	Congo signal	Mean	Guinea grass	Setaria grass	Congo signal	Mean
<i>Intercropping patterns</i>								
No intercropping	8.41	8.19	7.71	8.10	33.49	32.34	30.85	32.23
<i>Stylosanthes quianensis</i>	9.07	8.25	8.58	8.63	32.41	31.87	28.65	30.98
<i>Centrosema pubescens</i>	9.41	9.46	8.91	9.26	32.54	30.63	28.21	30.46
<i>Phosphorus level</i>								
80 kg P ₂ O ₅ /ha	9.22	8.43	8.54	8.73	32.11	31.17	29.42	30.90
120 kg P ₂ O ₅ /ha	9.30	9.36	8.23	8.96	32.57	30.91	28.18	30.55
160kg P ₂ O ₅ /ha	9.37	8.13	8.44	8.31	33.76	33.75	29.10	32.20
Mean	8.96	8.63	8.40		32.81	31.61	29.23	
Phosphorus levels, kg/ha								
<i>Intercropping patterns</i>	80	120	160	Mean	80	120	160	Mean
No intercropping	8.22	8.45	7.64	8.10	32.31	30.38	32.99	32.23
<i>Stylosanthes quianensis</i>	8.73	8.77	8.39	8.63	30.46	30.97	32.48	30.98
<i>Centrosema pubescens</i>	9.25	8.62	8.91	9.26	29.93	30.30	31.13	30.46
Mean	8.73	8.99	8.31		30.90	30.55	32.20	
	CD (0.05) for marginal means 0.592				CD (0.05) for marginal means 0.185			
	CD (0.05) for combinations 1.025				CD (0.05) for combinations 0.321			

the associated grasses may be due to increased N uptake by grasses in legume inter-cropped plots. Lower rates of nitrogen transfer from legumes to non-legumes over periods of six months to 2 years was observed by Henzell (1962). Phosphorus levels had no significant influence in increasing the crude protein content of grasses which show that the lowest level of phosphorus tried is sufficient to produce optimum protein content.

In the case of crude fibre content significant reduction was noted due to intercropping. The lowest value of crude fibre content was noted in grasses grown mixed with centrosema (30-46 per cent) which was significantly superior to all other treatments. This may be due to utilization of carbohydrates for the synthesis of protoplasm rather than for thickening the cell wall with higher nitrogen content. Black (1968) observed that succulency is related to the protoplasm of the cell.

The effect of phosphorus levels in reducing the crude fibre content was significant. Application of phosphorus at the rate of 120 kg P_2O_5 /ha recorded the lowest value of crude fibre content (30.55 per cent). Increased application of phosphorus improved the quality of forages and above 120 kg P_2O_5 /ha there was no response. This shows that 120 kg P_2O_5 /ha is sufficient for attaining succulence and above which the strength of the straw increases which leads to the increase in fibre content (Tisdale and Nelson, 1956).

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സംഗ്രഹം

ഗിനി, സിറോറിയ, കോംഗോസി GO^2 നൽ എന്നീ മൂന്നിനം പുൽവർഗ്ഗ ഫോഡർ വിളകളും സ്റ്റൈറോലോസാന്തസ്, സെൻട്രോസീമ എന്നീ രണ്ടിനം പയറുവർഗ്ഗ ഫോഡർ വിളകളും ഇടകലർത്തി വ്യത്യസ്ത അളവിൽ ഫോസ്ഫറസ് വളം നൽകി ഒരു പരീക്ഷണം നടത്തിനോക്കിയപ്പോൾ പയറുവർഗ്ഗച്ചെടികൾ ഇടകലർത്തി നടുന്നതുമൂലം പച്ച പുല്ലിലുള്ള മാംസ്യംശം വർദ്ധിച്ചതായും നാരിന്റെ അംശം കുറഞ്ഞതായും കണ്ടു. ഫോസ്ഫറസ് വളത്തിന്റെ അളവ് കൂടിയതനുസരിച്ച് നാരിന്റെ അംശം കുറഞ്ഞതായും കണ്ടു പിടിക്കപ്പെട്ടു.

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