

EFFECT OF DIFFERENT MAIZE-LEGUME MIXTURES ON THE QUALITY OF FORAGE UNDER GRADED LEVELS OF NUTRITION*

Cereal fodders mainly supply carbohydrate while legumes provide appreciable amounts of protein. A suitable proportion of both is necessary to supply a balanced diet to the cattle. Though the quality of maize and different legumes has been studied under the monocropping system, it was not studied in a mixture. Hence the present investigation was undertaken to find out the quality of different maize legume fodder mixtures and to select a suitable combination under different levels of nutrition.

The experiment was conducted in the Agricultural College Farm, Vellayani, Kerala during the rainy season of 1980. The soil was red loam with a total nitrogen content of 0.05 per cent, available phosphorus 19.6 ppm, available potassium 11.2 ppm and pH of 5.6. The trial was laid out in a randomised block design replicated thrice. The treatments consisted of factorial combinations of three legumes as intercrops in maize viz., cowpea, velvet bean and blackgram and five fertilizer levels i.e., 80:40:40, 100:50:50, 120:60:60, 140:70:70 and 160:80:80 kg N, P_2O_5 and K_2O/ha and a pure crop of maize with fertilizer levels as per Package of Practices Recommendations of Kerala Agricultural University, 1979 (120:60:40 kg N, P_2O_5 and K_2O/ha). Representative samples were drawn and analysed for crude protein and crude fibre following the procedure described by Simpson *et al.* (1965) and A. O. A, C (1975). The results obtained are given in Table 1.

Crude protein yield of maize was increased significantly by the application of fertilizers. The maximum yield was recorded by the application of 140:70:70 kg N, P_2O_5 and K_2O/ha and it was significantly superior to 80:40:40 and 100:50:50. Ahmed and Gunasena (1979) also reported increased crude protein yield with increase in doses of N. The different legumes did not show any significant effect on the crude protein yield of maize.

The legumes varied significantly in their crude protein yield and velvet bean gave the highest yield. High dry matter production together with comparatively higher content of crude protein would have been the reason for increased protein yield by this crop. However, the effect of graded levels of nutrients was not significant.

Among the crop associations, the maximum total crude protein yield was obtained from maize velvet bean association (Table 2). Singh and Relwani (1978) had also reported a higher total protein yield with maize velvet bean association. The highest level of fertilization i.e., 160:80:80 kg N, P_2O_5 and K_2O/ha recorded the maximum mean crude protein yield. The interaction between crop combination and fertilizer levels was significant (Table 2). Maize-cowpea mixture gave the maximum crude protein yield at 120:60:60 while maize-blackgram gave the maximum at 140:70:70 and maize-velvet bean at 160:80:80 kg N, P_2O_5 and K_2O/ha .

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Table 1

Yield of dry matter, crude protein and crude fibre of component crops and crop mixtures under different levels of nutrition

	Dry matter yield (t/ha)			Crude protein yield (kg/ha)			Crude fibre yield (t/ha)		
	Maize	Legume	Maize + legume	Maize	Legume	Maize + legume	Maize	Legume	Maize + legume
<i>Crop mixtures</i>									
Maize+cowpea	4.1	2.0	6.1	380.0	272.1	652.1	1.3	0.6	2.0
Maize + velvet bean	4.8	2.3	7.2	418.0	375.0	793.0	1.5	0.7	2.3
Maize + black gram	5.2	0.6	5.8	430.2	101.0	531.3	1.6	0.1	1.8
Maize alone	5.0	—	5.0	412.2	—	412.1	1.6	—	1.6
CD (0.05)	0.69	NS	0.69	NS	52.26	93.97	0.21	0.10	0.43
<i>Fertilizer levels</i>									
N. P ₂ O ₅ and K ₂ O/ha									
80:40:40	3.8	1.4	5.3	332.1	203.5	535.7	1.2	0.4	1.7
100:50:50	3.9	1.5	5.5	327.3	226.6	554.0	1.2	0.5	1.7
120:60:60	4.6	1.7	6.3	323.0	286.5	709.5	1.4	0.5	2.0
140:70:70	5.8	1.6	7.4	484.8	256.2	741.1	1.8	0.5	2.3
160:80:80	5.5	1.8	7.4	479.7	274.0	753.7	1.7	0.6	2.3
CD (0.05)	0.89	NS	0.90	92.72	NS	12.31	0.27	NS	0.28

Table 2

Total crude protein and crude fibre yield of crop mixtures, at different levels of fertilizers

	Crude protein yield (kg/ha)				Crude fibre yield (t/ha)			
	Maize + cowpea	Maize + velvet bean	Maize + black gram	Mean	Maize + cowpea	Maize + velvet bean	Maize + black gram	Mean
<i>Fertilizer level</i>								
<i>N, P₂O₅, K₂O/ha</i>								
80:40:40	545.3	661.4	400.4	535.7	1.7	2.1	1.2	1.7
100:50:50	851.8	652.4	457.4	554.0	1.6	2.0	1.5	1.7
120:60:60	799.0	793.3	536.2	709.5	2.0	2.3	1.7	2.0
140:70:70	652.9	902.0	668.4	741.1	2.3	2.4	2.3	2.3
160:80:80	711.8	955.6	593.9	753.7	2.2	2.6	2.2	2.3
Mean	652.1	793.0	531.3		2.0	2.3	1.8	
Control				412.1				1.6
CD (0.05) for legume mean	=	93.97			CD (0.05) for legume mean	=	0.43	
CD (0.05) for fertilizer mean	=	12.31			CD (0.05) for fertilizer mean	=	0.28	
CD (0.05) for interaction and/control	=	210.12			CD (0.05) for interaction and/control	=	0.49	

The crude fibre yield of maize was significantly influenced by the legumes. The association with blackgram resulted in higher crude fibre yield of maize while cowpea recorded the least. The high dry matter yield of maize in this association might have contributed to the higher crude fibre yield. The fertilizer level at 140:70:70 gave the highest crude fibre yield of maize but was on par with 160:80:80 kg N, P₂O₅ and K₂O/ha and was significantly superior to the others. Velvet bean recorded the maximum crude fibre yield but was on par with cowpea. These were significantly superior to blackgram.

When the total crude fibre yield is taken into account, the intercropped legumes and levels of fertilizers and their interaction had significant effects (Table 2). Maize grown with velvet bean at the highest level of fertilization recorded the maximum crude fibre yield and all maize-legume associations at the higher three levels of fertilization were significantly superior to the pure crop of maize,

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മക്കച്ചോളവും പയറുവർഗ്ഗ വിളകളുമായി ഇടകലർത്തി വിവിധ അളവുകളിൽ വളം ചേർത്തു കൃഷി ചെയ്യുമ്പോൾ അവയിൽ നിന്നു ലഭിക്കുന്ന കാലിത്തീറയുടെ ഗുണം നിർണ്ണയിക്കുന്നതിനായി ഒരു പരീക്ഷണം വെള്ളായനി കാർഷിക കോളേജിൽ നടത്തുകയുണ്ടായി. മക്കച്ചോളവും വെൽവെറുബീനും ഇടകലർത്തി ഹെക്ടറിന് 160:80:80 എന്ന തോതിൽ പാകൃഷ്ണകം, ഭാവഹം, കഷാരം എന്നിവ ചേർത്തപ്പോഴാണ് ഏറ്റവും കൂടിയ അളവിൽ പ്രോട്ടീനും ക്രൂഡ് ഫൈബറും ലഭിച്ചത്.

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