

Production Potential of Cereal-Legume Forage Crop Mixture Grown in Rotation

S. RAMAKRISHNAN¹, V.S. SHANMUGASUNDARAM², G.S. THANGAMUTHU³ and Y.B. MORACHAN⁴

An experiment to find out the best combination of cereal legume forage crops grown in rotation as compared to the continuous grass cultivation, revealed that sorghum-cowpea mixture followed by maize-cowpea successively, and maize-cowpea grown in all the three rotations were found to be more productive and economical, than guinea grass grown continuously. In one year 96.31 and 94.41 t/ha of green fodder were obtained respectively from the above two rotations, with a net return of Rs. 5,835/- and Rs. 5010/- from them.

The Dairy Farming can be made more paying by growing crossbred animals and feeding them with sufficient amount of nutritive fodder in the daily ration. This can be achieved by having a proper planned crop rotation with cereal legume mixtures so as to have a continuous flow of supply round through the year (Rakib, *et al.* 1960). Singh and Gautam (1972) have brought out the possibility of improving the fodder quality by growing cereal legume mixture of berseem and napier grass. With this objective in view an experiment was laid out to assess the production potential of commonly cultivated cereal legume mixtures as well as the perennial guinea grass grown in rotation and to find out the profitability of these forage rotations.

MATERIALS AND METHODS

A field trial was laid out in Tamil Nadu Agricultural University Farm at Coimbatore from 1972 to 1975. Randomized Block Design replicated six times

was adopted. The details on crop rotations adopted, the varieties used and the cultural practices followed are given in Table I. The plot size adopted was 100 Sq.M. Green fodder yield of the cereal legume mixture from each crop sequence was recorded and guinea grass was given 8-10 cuts around the year and the weight of green grass was also recorded. After each harvest, the field was well prepared and the fertilizers as per the schedule (Table I) was applied and lines were marked and the seeds sown. The crop was irrigated as and when required. Proper plant protection measures were taken. Cost of cultivation for each crop sequence was worked out and the net return per unit area was calculated.

RESULTS AND DISCUSSION

The green fodder yield from each crop sequence and the guinea grass recorded at every harvest is presented in Table II. It is evident that the second

1 - 4 : Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore - 641 003.

TABLE I. Crop sequence varieties and cultural practices adopted

Rotation	Variety	Seed rate	Fertilizer schedule	Spacing
Maize + cowpea followed by maize + cowpea, maize-cowpea	Maize-F2 generation of Ganga-5, cowpea - Co.1	50 kg/ha	N-P-K 60-40-20 kg/ha for each rotation	3 lines of maize-alternated with 1 line of cowpea spaced at 25 cm between rows.
Jowar + cowpea Maize + cowpea Maize + cowpea	Maize+cowpea as above, Jowar - Co.11	50 kg/ha	N-P-K 60-40-20 kg/ha for each rotation	3 lines of jowar alternated with 1 line of cowpea spaced at 25 cm between rows
Jowar + cowpea Jowar + cowpea Jowar + cowpea	Maize + cowpea as above, Jowar-Co.11	50 kg/ha	N-P-K 60-40-20 kg/ha for each rotation	3 lines of jowar alternated with 1 line of cowpea spaced at 25 cm between rows
Guinea grass 8-10 cents year round	Local	12000 to 15000 slips/ha	N-P-K 60-40-20 kg/ha initially and 50 kg/ha N after every cutting	70 cm between rows and 40 cm between slips

TABLE II. Green forage yield in t/ha

Crop period	No. of days	Rotation I	Rotation III	Rotation III	Rotation IV
17.7.72 — 15.9.72	59	36.17	56.82	54.74	36.08
28.10.72 — 19.12.72	52	35.15	27.38	16.49	13.81
12.2.73 — 28.3.73	45	33.01	35.33	16.72	9.95
14.6.73 — 14.8.73	60	49.15	37.83	36.70	15.20
23.8.73 — 23.10.73	60	42.66	42.35	26.96	18.03
12.11.73 — 24.1.74	70	20.83	21.70	17.83	9.96
20.6.74 — 10.8.74	51	32.16	28.56	27.50	28.10
23.8.74 — 23.10.74	60	20.78	25.23	23.93	9.58
11.11.74 — 31.1.75	80	13.36	13.78	8.92	8.10
Total		283.27	288.98	229.79	48.81
Mean		31.67	32.10	25.53	16.53
	S.E.	= 2.01			
	C.D. (1%)	= 6.23			

TABLE III. Economics of growing cereal-legume fodder mixture in rotation

	Rotation I (Rs.)	Rotation II (Rs.)	Rotation III (Rs.)	Rotation IV (Rs.)
Total cost of cultivation/ha	12,000	10,800	9,900	8,400
Total net return/ha	15,030	17,505	12,030	11,130
Net income/ha/year	5,010	5,835	4,010	3,710
Per day production in kg/ha	527	538	427	277
Net return (Rs./day/ha)	13.78	15.98	10.98	10.16

rotation (sorghum-cowpea followed by maize-cowpea successively) and the first rotation (maize-cowpea grown continuously in the three crop sequence) significantly recorded higher cereal-legume fodder viz., 288-98 t/ha and 283.25 t/ha respectively, than the third rotation (sorghum-cowpea continuously) and the perennial guinea grass with 8-10 cuts round the year. The latter recorded only 229.79 t/ha and 148.81

t/ha respectively. Sarma and Rathi (1974) have reported that cowpea grown mixed with napier in Zaid (summer) and kharif seasons, gave good yields when cut at an interval of 35 days. The results obtained in this trial are in conformity with the above findings and due to the admixture of cowpea with cereals the nutritive value of the forages has been considerably enhanced the fodder can be arranged to

be harvested round through the year. The per day production of fodder from each of these rotations and net return per day are presented in Table III. It is seen that per day the green fodder output was 538 kg/ha in the case of second rotation, 527 kg/ha in the case of first rotation, 427 kg/ha in the case of third and 277 kg/ha of guinea grass. The net return per day was accordingly higher in the second and first rotation viz., 15.98 rupees and 13.78 rupees and far less i.e., Rs.10.98 and Rs.10.16 respectively for rotation III and guinea grass. From all the aspects the second and first rotation, sorghum cowpea followed by maize-cowpea and maize-cowpea and maize-cowpea grown in all the three sequences can very well profitably be adopted for a continuous supply of nutritious fodder throughout the year from an unit area. It should be so planned that in every dairy farm or in a small farmer's holding with few cows, continuous supply of fodder is

ascertained by proper crop planning sequences of legume cereal mixture.

Instead of raising only annual cereal fodder varieties, fodder-cowpea can be mixed and grown to increase the nutritive value of fodder so as to maintain healthy cattle in the dairy farms.

REFERENCES

- RAKIB, A., A.K. DABADGHAO and R. MUKHERJI. 1970. Studies on the effect of feeding important fodders and forage crops on rumen metabolism and efficiency of milk production. Annual Report of Indian Grass Land and Fodder Research Institute, Jhansi.
- SINGH, H.K. and O.P. GAUTAM. 1972. Effect of cropping system, plant population and levels of nitrogen and phosphorus on green fodder yield of hybrid napier and tetraploid berseem. Paper presented in the Workshop on Multiple Cropping held at Hissar.
- SARMA, V.S. and K.S. RATHI. 1974. Exploring the possibilities of inter-cropping in Pusa Giant Napier. *Madras agric. J.* 9 : 911-13.