

Research
Note

Performance of fodder sorghum (*Sorghum bicolor* L.), maize (*Zea mays* L.) and cowpea [*Vigna unguiculata* (L.) Walp.] under sole and intercropping systems

V.H. SURVE, B. TANDEL AND M.K. ARVADIA

See end of the article for authors' affiliations

Correspondence to :

V.H. SURVE

Department of Agronomy,
N. M. College of Agriculture,
Navsari Agricultural
University, NAVSARI
(GUJARAT) INDIA
vaishus_dream@rediffmail.com

ABSTRACT

Field experiments were conducted during summer season 2007 to 2008 at college farm, Navsari campus on clayey in texture soils with different cereal-legume fodders under sole and intercropping systems for getting higher economics. The intercropping of sorghum with cowpea in a row ratio of 2:1 recorded maximum land-equivalent ratio (1.51), gross (Rs 60744/- ha⁻¹) and net (Rs 50031/- ha⁻¹) realization along with higher benefit: cost ratio (5.67).

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Key words : Forage cereal-legume Intercropping, Economics, Land-equivalent ratio

To meet the fodder requirement of huge livestock population in the country, it is hardly possible with present negligible area under forage crops. Availability of green forage to animals is the key to success of dairy enterprises and it is difficult to maintain the health and milk production of the livestock without supply of the green fodder. Availability of green forage to animals is the key to success of dairy enterprises and it is difficult to maintain the health and milk production of the livestock without supply of the green fodder. Green fodder not only helps for easy digestion, but also abundant quantity of the vitamin-'A' and important minerals like Ca and Fe in addition to energy for the animals. Another dimension is to reduce the cost of milk production. The present availability of green fodder is about 513 million tonnes projecting a deficit of 53 per cent and that of dry fodder is around 400 million tonnes against the requirement of 676 millions tonnes (Mukherjee *et al.*, 1998). Cereal-legume intercropping has been recognised as a beneficial system of crop production as well as is one of the potent means of better utilization of resources and higher fodder production per unit area per

unit time. Nimbalkar and Dombale (1983) observed that if certain crops are intercropped with sorghum the combined yield obtained from both crops may be higher without reducing the yield of the main crop. They further observed that sorghum intercropping with blackgram gave the highest monetary returns as compared to sorghum alone.

An experiment was conducted during summer season of 2007 to 2008 at the Farm of the College of Agriculture, Navsari, Gujarat. The soil of the experimental field was clayey in texture, medium in available nitrogen (259 kg ha⁻¹) and phosphorus (30.63 kg ha⁻¹) and fairly rich in available potassium (348 kg ha⁻¹) with pH 7.7. Total 9 treatments consisted of T₁: sole sorghum, T₂: sole maize, T₃: sole cowpea, T₄: sorghum + cowpea 1:1, T₅: sorghum + cowpea 1:2, T₆: sorghum + cowpea 2:1, T₇: maize + cowpea 1:1, T₈: maize + cowpea 1:2 and T₉: maize + cowpea 2:1 in RBD with three replications. The varieties GFS-5, African tall and EC-4216 were used as test crop, respectively for sorghum, maize and cowpea and were sown with 30 cm spacing in row proportion as per

Table 1: Economics and land equivalent ratio (LER) as influenced by various intercropping systems

Treatments	Green fodder yield (t ha ⁻¹)	Dry fodder yield (t ha ⁻¹)	Net realization (Rs. ha ⁻¹)	BCR	LER
T ₁ Sole sorghum	39.76	14.16	36831	4.38	1.00
T ₂ Sole maize	30.04	11.62	25147	3.31	1.00
T ₃ Sole cowpea	22.95	7.09	17192	2.66	1.00
T ₄ Sorghum + cowpea (1:1)	43.25	14.95	41286	4.89	1.26
T ₅ Sorghum + cowpea (1:2)	42.99	14.59	41072	4.91	1.37
T ₆ Sorghum + cowpea (2:1)	50.62	17.41	50031	5.67	1.51
T ₇ Maize + cowpea (1:1)	27.48	9.94	22352	3.10	1.01
T ₈ Maize + cowpea (1:2)	29.60	10.69	24990	3.37	1.09
T ₉ Maize + cowpea (2:1)	38.61	14.08	35613	4.32	1.40
S E. ±	1.78	0.63	-		0.05
C.D. (P=0.05)	5.34	1.90	-		0.15

treatments in first week of march. The seed rate under sole cropping was maintained at 40, 60 and 40 kg ha⁻¹, respectively for sorghum, maize and cowpea. The package of practices recommended for crops were adopted for cultivation of fodders. The economics was worked out considering the current market prices.

The results of the present investigation along with relevant have been presented as under:

Economic feasibility:

The data on economics of different cropping systems of sorghum, maize and cowpea and Prevailing market prices of green forage of different crops and various inputs used in experiment are presented in Table 1.

The data in Table 1 clearly indicated that treatment T₆ sorghum + cowpea (2:1) secured the maximum net realization (Rs 50031/- ha⁻¹) along with higher BCR of 5.67 which was followed by T₅ sorghum + cowpea (1:2) and T₄ sorghum + cowpea (1:1) with Rs. 41072 and 41286 ha⁻¹ net realization, respectively and BCR of 4.91 and 4.89. The results support those of Sharma *et al.* (2008) and Chalka and Nepalia (2005) under cereal + legume intercropping system.

Land-equivalent ratio (LER):

A perusal of data in Table 1 clearly indicated that land equivalent ratio was significantly influenced under various intercropping systems. Treatments T₆ sorghum + cowpea (2:1), T₉ maize + cowpea (2:1) and T₅ sorghum + cowpea (1:2) were statistically at par and recorded higher values of LER compared to other systems. The treatments T₇ maize + cowpea (1:1) and T₈ maize + cowpea (1:2) were statistically at par and recorded lowest values of

LER than other systems. The results support those of Kumar *et al.* (2005) and Sharma *et al.* (2008) under cereal + legume intercropping system.

Authors' affiliations:

B. TANDEL AND M.K. ARVADIA, Department of Agronomy, N.M. College of Agriculture, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

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