

SELECTION OF SUITABLE INTERCROPS TO RAINFED SORGHUM IN-VERTISOL

T. N. BALASUBRAMANIAN¹, J. G. ROBINSON², V. RAVIKUMAR³, and
R. S. BINDUMADAVA RAO⁴

To assess the best intercrop of pulses in sorghum and also to work out the economics and LER, experiments were conducted at Cotton and Millets Experiment Station, Kovilpatti from 1979 to 1982. As intercrop, lab-lab and redgram were found to reduce the grain yield of sorghum at this tract while blackgram, greengram and cowpea were found to have no depressing effect on the yield. Maximum LER, was recorded by the treatment sorghum + cowpea followed by sorghum + blackgram with highest net return per hectare.

Sorghum is grown widely under rainfed conditions both in red and black soils. The yield of sorghum is mainly determined by the distribution of rainfall. Introducing a companion crop will eliminate the risk of total failure of this crop and provide complimentary effects in yield and income. Hence a study was undertaken to assess the best intercrop for sorghum as well as to find out the effect of different intercrops on the economics and yield.

MATERIALS AND METHODS

Intercropping studies in sorghum with pulses were conducted in drylands

at Cotton and Millets Experiment Station, Kovilpatti, from 1979 to 1982 in *rabi* season (October-January) in vertisol. The treatments were as in Table II.

The experiment was laid out in randomised block design with three replications. CSH 6 sorghum was raised as a test crop. A fertilizer dosage of 40 kg N and 20 kg P₂O₅ per hectare was applied except pure crop of pulses, where 20 kg N and 40 kg P₂O₅ ha was applied. The amount of rainfall received during the cropping season is furnished in Table I. Sorghum was grown in paired rows (30+60cm).

Table I. Rainfall received during the crop growth period (mm)

| Month (1) | 1979-80 (2) | 1980-81 (3) | 1981-82 (4) | 1982-83 (5) |
|--------------|----------------|----------------|----------------|----------------|
| October | 180.3(9) | 71.0(8) | 170.7(12) | 218.6(10) |
| November | 614.0(17) | 164.7(11) | 22.3(4) | 110.7(12) |
| December | 28.4(2) | 30.7(1) | 72.1(5) | 56.1(3) |
| January | — | — | — | — |
| February | — | 1.7 | — | — |
| March | 8.4(1) | — | 6.8(1) | — |
| | 831.1(29) | 268.1(20) | 271.9(22) | 385.4(25) |

Figures in parenthesis denote number of rainy days.

- 1) Assistant Agronomist, 2) Crop Agronomist, 3) Professor and Head,
4) Joint Director of Agriculture (Research) Cotton and Millets Experiment Station, Kovilpatti-627 701.

x 15 cm. and intercropped with pulses at 2:1 ratio. Sole crop of pulses were grown with a spacing of 30 x 10 cm. except redgram for which a spacing of 60 x 30 cm. was adopted. For working out returns/ha market-price of Rs. 1.25/kg. for sorghum and Rs. 3/kg. for pulses was taken.

RESULTS AND DISCUSSION

The results of the experiments revealed the best performance of cowpea

as intercrop in sorghum during 1979-81 while during 1981-82 and 1982-83 blackgram and greengram were found to record maximum net return of Rs. 2350/- and Rs. 1723q/ha respectively. This indicates the suitability of cowpea as intercrop both under high and low rainfall among the pulses studied while in normal rainfall season either blackgram or greengram was found to be the best. The pooled mean data on the grain yield of sorghum (Table 2.) indicated that, sorghum yield was affected when

Table II. Yield and other particulars

| | | Mean of four years | | | | |
|----------------|-------------------------------|-----------------------------|-----------------------------|-------------------------|--------------------|--------------|
| (1) | (2) | Sorghum grain yield (kg/ha) | Sorghum straw yield (kg/ha) | Intercrop yield (kg/ha) | Net income (Rs/ha) | LER |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| T ₁ | Sorghum (sole) | 2087 | 5374 | — | 1471 | — |
| T ₂ | Sorghum + Blackgram | 2317 | 5567 | 169 | 1976 | 1.35 |
| T ₃ | Sorghum + Lablab or Greengram | 1413 2609 (2011) | 5465 | 288 (203) | 1548 | 1.08 1.28 |
| T ₄ | Sorghum + Cowpea | 2194 | 5281 | 200 | 1931 | 1.36 |
| T ₅ | Sorghum + Redgram | 2013 | 5236 | 83 | 1461 | 1.14 |
| T ₆ | Blackgram (sole) | — | — | 525 | 814 | — |
| T ₇ | Lablab or greengram (sole) | — | — | 960 (713) | 1045 | — |
| T ₈ | Cowpea (sole) | — | — | 617 | 1158 | — |
| T ₉ | Redgram (sole) | — | — | 463 | 638 | — |
| | SE | 69.25 | 279.63 | — | 450.31 | — |
| | CD P=(0.05) | 213.36 | 861.58* | — | NS | — |

* Significant in respect of years of study alone.
Fig. in parantheses are greengram yields as intercrop.

lab-lab or redgram were grown as intercrop, while blackgram, greengram and cowpea were found to increase the grain yield of sorghum. The reduction in sorghum grain yield due to intercropping of redgram and lab-lab

was mainly due to their competition. The LER value indicated higher intercropping efficiency for sorghum + cowpea followed by sorghum + blackgram. The above finding is in conformity with the findings of Andrews (1974) who

reported that sorghum + cowpea mixtures recorded better yield without any adverse effect on the base crop. Kunasekaran *et. al.* (1980) also reported a high net profit in sorghum by intercropping with blackgram which was ascribed to the beneficial effects of legume on the base crop. The available N content of soil as well as the uptake of N by sorghum grain were maximum under sorghum + blackgram combination. This may be the probable reason for the better performance of sorghum and cowpea, and sorghum and blackgram combination. The mean data on net income also revealed that sorghum + blackgram combination recorded a maximum net return of Rs. 1976/- per

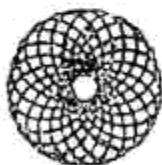
ha. followed by sorghum + cowpea which recorded a net income of Rs 1931/- per ha. From the results of the experiments conducted, it can be concluded that sorghum + blackgram or sorghum + cowpea combination was found to record maximum net income and LER. So in rainfed black soils, blackgram or cowpea can be intercropped in sorghum.

REFERENCES

- ANDREWS, D. J. 1974. Response of sorghum varieties to intercropping. *Experimental Agriculture* 10: 57-63.
- KUNASEKARAN, V., R. JAYARAMAN, S. R. CHOWDAPPAN and U. S. SREERAMULU. 1980. Intercropping in rainfed sorghum. *Madras agric. J* 67: 816-11.

M/s. RAMACHANDRA PESTICIDES PRIVATE LIMITED

Regd. Off : 23, IV Main Road, New Tharagupet,
BANGALORE - 560 002.



Formulators of :

B. H C., D. D. T. Malathion.,
Endosulfan (Ramfan) . Carboryl (Ramvin)..
Ramcop. Ramsulf (Wettable sulphur)..
Sulphur dust., Ramfix., Copper sulphate Etc.'

Factory :

27. New Timberyard Layout,
Mysore Road,
BANGALORE-560 026.