

- NEMASTOTHY, K. K. 1983. The tarsonemid species occurring in Hungary (Acar: Tarsonemidae) *Novenyredelem*. 19 (5) : 19a-202
- PATIL, G. and M. D. Dethle. 1979. Chemical control of chilli thrips and mites *Pestology* 3 (10) : 30-31.
- PATEL, J. R., R. C. PATEL and P. R. AMIN. 1983. Effect of Systemic insecticides of thrips and mites and its relation of leaf curl disease of Chilli. *Gujarat Agric. Res. J.*, 8 (2) : 129.
- VAISSAYRE, M. 1982. Observations relating to the economic impact of acarionus caused by *Polyphagotarsonemus latus* (Banks) in cotton crops. *Tropics* 37 (3) : 313-314.
- YANG AND CHEN. 1982. A Study on *Polyphagotarsonemus latus* (Banks) *Kunchong Zhishi* 19 (2) : 24-26.

<https://doi.org/10.29321/MAJ.10.A02188>

Madras Agric. J. 74 [8 & 9] 355-359 August & September, 1987

STUDIES ON INTERCROPPING IN GROUNDNUT

N. ASOKARAJA, A. CHAMY and SP. PALANIAPPAN

A field experiment was conducted on inter-cropping in groundnut during monsoon seasons of 1983 and 1984 and summer seasons of 1984 and 1985 at the Agricultural Research Station, Bhavanisagar for comparing six intercropping systems with pure groundnut as a means of increasing overall net returns without serious reduction to the groundnut yields. The yield of groundnut was higher with redgram as intercrop at 2.25 m apart than with cotton or maize. During monsoon seasons intercropping system involving groundnut+cotton at 1.5m apart gave higher net income (Rs. 6868/ha) than pure groundnut (Rs. 6134/ha). During summer seasons groundnut+redgram at 2.25 m apart gave higher net income (Rs. 6608/ha) than pure groundnut (Rs. 6482/ha). Maize as intercrop was found to reduce the groundnut yields and the net income to a greater extent compared to other intercrops.

Groundnut is an important dry-land crop in Tamil Nadu. It is more often grown in mixture than in pure stands. The emphasis on intercropping in groundnut is justified because it

can provide greater yield advantages compared to sole cropping. Groundnut+redgram system is commonly prevalent in drylands since groundnut makes a rapid canopy coverage of

ground and uses the resources more efficiently. Intercropping is not a traditional practice in irrigated lands. But there is a growing awareness that every unit of land should be intensively cultivated and crop intensification is certain to bring greater returns with assured irrigation. With this view, a study in intercropping in groundnut under irrigation has been carried out.

MATERIALS AND METHODS

Experiments on intercropping in groundnut were conducted in Agricultural Research Station, Bhavanisagar during monsoon seasons of 1983 and 1984 and summer seasons of 1984 and 1985 to study the comparative performances of six intercropping systems (3 different intercrops - red gram, cotton and maize each at two different population levels viz. intercrops rows at 1.5 mt. and 2.25 mt. apart) vs. groundnut raised as a pure crop under irrigation. The experiments were laid out in a Randomised Blocks Design with three replications. The spacing for the base crop was 2.25x15 cm in pure stands and 15x15 cm in intercropping treatments. The plant spacing for intercrops within the row was 45 cm (for cotton and redgram) and 30 cm for maize. The spacing between the rows were 1.5 mt and 2.25 mt as per treatments. The population of cotton and redgram at 1.5 mt. and 2.25 mt. inter-row spacing were 14814 and 9877 plants/ha respectively and in case of maize population was 22,222 and 14,814

plants/ha respectively. The varieties grown were groundnut (CO.1) redgram (CO.4/CO 5), cotton (MCU.7) and maize (CoH 1). The recommended dose of fertilizer at 18 : 35 : 53 kg NPK/ha were applied to the base crop. No other fertilizer was applied to the intercrops separately.

RESULTS AND DISCUSSION

There were differences in pod yield of groundnut in intercropping systems, however the differences were not statistically significant (Table 1). Pure crop of groundnut has established its supremacy by producing higher pod yields both in monsoon and summer seasons. Groundnut in pure stands had adequate spacing viz., 22.5 x 15cm. suffered no competition for moisture, nutrients and light availability etc., resulting in higher number of pods per plant and ultimately contributed to higher yields.

The yield of groundnut in intercropping systems was generally reduced in but to varying degrees depending on intercrops tried. Maize as intercrop at 1.5m apart has reduced the groundnut yields to a greater extent (28.6 to 38.2% reduction than pure groundnut yields). Faster rate of growth of maize in early stages might have suppressed the growth of groundnut by competing for soil moisture, nutrients and light availability through better crop canopy coverage. This is in accordance with the findings of Azab (1968). The yield of groundnut was not so adversely affected

Table 1 Yield of groundnut (CO-1) in the intercropping system

Treatments	Yield of groundnut pods (dry) in kg/ha			
	July 83	January 84	July 84	January 84
T ₁ Groundnut in solid stands	1872	1262	1790	2393
T ₂ Groundnut+redgram at 1.5 m apart	1395	1018	1673	2020
T ₃ Groundnut+redgram at 2.25 m apart	1752	1227	1778	2331
T ₄ Groundnut+cotton at 1.5m apart	1862	1141	1470	1927
T ₅ Groundnut+cotton at 2.25 m apart	1462	1186	1678	2020
T ₆ Groundnut+Maize at 1.5m apart	1157	883	1187	1709
T ₇ Groundnut+Maize at 2.25 m apart	1723	1186	1610	1953
S. E.	394	286	274	244
CD P=0.05	N. S	N. S	N S	N.S

due to intercropping of maize at 2.25 m apart. This was due to comparatively lesser population of maize to exert competition to groundnut.

The groundnut yield was least affected due to intercropping of redgram at 2.25 m in both summer and monsoon seasons of 1984 and in summer 1985. The yield reduction ranges from 0.7% to 2.8% only compare to sole cropping. Redgram is of slow growing nature in early stages and has very little competition with groundnut. Roots of redgram are comparatively deeper and could tap nutrients in deeper layers of soils and hence groundnut suffered relatively lesser competition for nutrients as well as soil moisture in this intercropping system. Number of rows of redgram was also less in this

treatment (2.25 m apart) which resulted in lesser hinderance to the growth of groundnut. Similar findings were reported by Appadurai and Selvaraj (1974) wherein groundnut was the major component with 5 to 6 rows to one row of redgram, almost full yield of groundnut and 30% yield of redgram are obtained. Also in ICRI SAT, Hyderabad, redgram was raised in 135 cm rows with 5 close rows (22.5 cm) of groundnut in between. Plant population levels were at sole crop optimum levels for both the components and the yield averaged 82% of sole groundnut plus 86% of sole redgram, an yield advantage of 67% obtained (Willey *et al.*, 1981).

Cotton as intercrop in groundnut at 1.5 m apart has reduced the yield

Table 2 Yield of intercrops.

Treatments	Yield (kg/ha)			
	July 83	January 84	July 84	January 85
T ₁ Groundnut pure	—	—	—	—
T ₂ Intercrop redgram (CO.4/CO.5) at 1.5 m apart	224	**	307	215
T ₃ Intercrop redgram (CO.4/CO.5) at 2.25 m apart	108	**	203	157
T ₄ Intercrop cotton (MCU. 7) at 1.5 m apart	400	324	230	248
T ₅ Intercrop cotton (MCU. 7) at 2.25 m apart	270	186	188	186
T ₆ Intercrop Maize (CoH.1) at 1.5 m apart	472	376	406	556
T ₇ Intercrop Maize (CoH.1) at 2.25 m apart	378	258	298	369

** No economic yield was obtained

a. means alone furnished, Not statistically analysed due to reduced number of d. f.

of groundnut upto 20%, but it was only 15.6% when cotton rows were spaced at 2.25 m apart. Cotton had little competition with groundnut due to its slow growth in early stages. However, the yield reduction by cotton was not to the extent of maize.

Yield of intercrops :

The yield of redgram ranged from 215 to 307 kg/ha in different seasons (Table 2) wherein redgram rows were spaced at 1.5 m. apart. Whereas redgram at 2.25 m. apart yielded 108 to 293 kg/ha. Cotton as intercrop could yield from 230 to 400 kg/ha of kapas in different seasons where cotton rows were spaced at 1.5 m apart. When cotton rows were kept at 2.25 m apart the yield range was 186 to 270 kg of kapas per hectare.

When maize was intercropped at 1.5 m in between groundnut rows, the yield varied from 376 to 556 kg of grains per hectare in different seasons. The yield range of maize was from 258 to 378 kg/ha when it was spaced at 2.25 mt. apart.

Economics of intercropping systems in groundnut :

In monsoon seasons, among the different intercropping systems tried, groundnut grown in association with cotton at 1.5 m apart has given the higher net income (Rs. 6868/ha) and return per rupee invested (2.12) (Table 3). This was due to the higher monetary value of cotton kapas which has well compensated the yield reduction in groundnut. Next to this system, the net income was higher

Table 3 Economics of groundnut based intercropping system at Bhavanisagar

Treatments	Cost of Cultivation Rs/ha		Gross income Rs/ha.		Net income Rs/ha.		Return per rupee invested	
	Monsoon 1983, 84	Summer 1984, 85	Monsoon 1983, 84	Summer 1984, 85	Monsoon 1983, 84	Summer 1984, 85	Monsoon 1983, 84	Summer 1984,85
T ₁	5764	5350	11898	11832	6134	6482	2.06	2.21
T ₂	6046	5502	11476	10585	5430	5083	1.89	1.92
T ₃	5948	5406	12356	12094	6408	6608	2.07	2.23
T ₄	6121	5776	12989	11879	6868	6103	2.12	2.05
T ₅	6045	5663	11740	11637	5695	5974	1.94	2.05
T ₆	5926	5506	8787	9551	2861	4045	1.48	1.73
T ₇	5878	5425	11622	10996	5744	5571	1.97	2.02

in groundnut with redgram at 2.25 m (Rs. 6408/ha) and the return per rupee invested was 2.07. There was least net income (Rs. 2,861/ha) and return per rupee invested (1.48) where groundnut was raised with maize as intercrop at 1.5 m apart. Lesser monetary value of maize grain could not compensate the loss in income from groundnut due to its yield reduction.

In summer seasons groundnut grown with redgram at 2.25 m. apart has given higher net income (Rs.6608/ha) and return per rupee invested (2.23). The yield reduction in groundnut due to intercropping of redgram was very low and the additional income from redgram grain yield has contributed to higher net income in this season. Next to redgram intercropping system, pure groundnut has recorded more net income (Rs. 6482/ha) and return per rupee invested (2.21). This was due to yield redu-

ction in groundnut by other intercrops which failed to compensate the loss in income.

The above study suggests that groundnut can be grown with redgram at 2.25 m apart or cotton at 1.5 m apart as intercrops for higher net return per unit area.

REFERENCES

- APPADURAI, R. and K. V. SELVARAJ, 1974. A note on groundnut-redgram mixture in Lower Bhavani Project area Madras agric. J. 61 : 803-804.
- AZAB, Y. E. A. 1968. Applied economic research on field food crops in Northern Ghana. FAO No. TA-2596 pp. 5-8.
- WILLEY, R. W., M. R. RAO and M. NATARAJAN 1981. Traditional cropping systems with pigeonpea and their improvement. In Proc. Int. Workshop on Pigeonpeas 15-19 Dec. 1980. ICRIAT, Hyderabad Vol. I, pp. 11-25