

EFFECT OF INTERCROPPING ON THE INCIDENCE OF GROUNDNUT LEAF MINER, *Aproaerema modicella* DEVENTER (GELECHIIDAE : LEPIDOPTERA)

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ABSTRACT

A field experiment was conducted to study the effect of various intercrops on the incidence of groundnut leaf miner, *Aproaerema modicella* Deventer, at Gandhi Krishi Vignana Kendra (GKVK), University of Agricultural Sciences (UAS), Bangalore during 1994 kharif season. The study indicated that the incidence of leaf miner was reduced and pod yield was increased under intercropping combinations compared to monocropping of groundnut. The lesser leaf miner incidence and higher groundnut pod yield was recorded in groundnut + sorghum, groundnut + maize and groundnut + cowpea intercropping systems.

KEY WORDS: Groundnut, Leaf miner, Intercropping, Incidence

The major constraints in the production of groundnut in India is the infestation of many insect pests, among which the leaf miner, *Aproaerema modicella* Deventer popularly called as 'Sural poochi' has assumed economically damaging proportions in the recent years, particularly in Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra. The infestation occurs throughout the rainy season and also in summer. However, in India the major groundnut areas coming under rainfed conditions suffer maximum damage. The pest initially appears as a leaf miner causing short

blister likemines, but as feeding advances, the larvae fold the leaflets and feed within, as a result, the leaf lets turn brownish, shrivel and dry up. Severely infested crops give a burnt appearance causing appreciable yield loss ranging from 15 to 76 per cent (Tejkumar 1979; Anon, 1986).

Chemical control measures are being recommended with success, but high cost is the limiting factor. The worldwide awareness of safe environment provided impetus to foster non-chemical pest management strategies. Of these,

Table 1 : Incidence of leaf miner (*Aproaerema modicella*) (larval population/10 plants) in intercropping system of groundnut during kharif 1994.

Treatment Number	Treatments	Days after sowing						
		40	50	60	70	80	90	100
T ₁	Groundnut alone	22.66	2.25	1.09	1.76	78.66	45.66	102.00
T ₂	Groundnut + Redgram	12.66	1.26	0.70	1.46	63.66	33.00	76.66
T ₃	Groundnut + Cowpea	7.00	1.17	0.70	1.09	60.33	25.66	57.00
T ₄	Groundnut + Soybean	8.00	1.64	0.87	1.55	64.66	34.66	78.00
T ₅	Groundnut + Castor	17.66	2.16	0.70	1.38	77.33	36.00	81.33
T ₆	Groundnut + Sunflower	8.66	1.46	0.70	1.46	64.00	27.33	65.00
T ₇	Groundnut + Maize	12.33	1.38	0.70	1.17	59.66	28.00	56.33
T ₈	Groundnut + Sorghum	8.00	1.49	0.70	0.99	56.66	13.66	40.66
T ₉	Groundnut + Niger	12.00	1.58	0.70	1.46	72.00	35.66	89.66
SEm		1.62	0.36	0.14	0.30	12.27	6.16	12.96
F at 5%		*	NS	NS	NS	NS	NS	NS
C.D. at 5%		4.92	-	-	-	-	-	-

* = Significant at 5% (P = 0.05)

NS = Non-significant

intercropping has been an important component and constitutes the most practical oriented approach. Intercropping can affect the microclimate of the agro ecosystem and ultimately produce on unfavourable environment for pests. The present investigations were carried out to find out the effect of intercropping in the management of groundnut leaf miner, the results of which were presented in this paper.

MATERIALS AND METHODS

A field experiment was conducted during 1994 kharif season with the groundnut variety JL-24 at Regional Research Station, Gandhi Krishi Vignana Kendra (GKVK), University of Agricultural Sciences, (UAS) Bangalore. The experiment was laid out in a randomized complete block design (RCBD) with nine treatments replicated three times in a plot size of 6 m x 5 m. TTB-7 redgram, TVX-994 cowpea, CSH-1 sorghum, Hannigere castor and local niger were used for intercropping with groundnut.

The treatments consisted of growing one row of redgram after every eight rows, two rows of cowpea after every four rows, two rows of soybean after every four rows, two rows of sunflower after every ten rows, two rows of maize after every six rows, two rows of sorghum after every six rows, one row of castor after every 10 rows and two rows of niger after every six rows of groundnut. Sowing was done during the month of July 1994. All agronomic practices from sowing to harvesting as recommended in the package of practices, UAS, Bangalore were followed.

Observations on the incidence of leaf miner were made by recording the number of larvae in 10 randomly selected plants in each replication. The top 20 opened leaflets of groundnut from the central axis were examined, the affected leaflets were counted and the per cent infestation was calculated. Observations were recorded at 10 days interval on the incidence of leaf miner.

RESULTS AND DISCUSSION

a) Larval Population

The larval population was less under intercropping combinations compared to monocropping of groundnut. The larval population appeared only after four weeks of sowing, continued to build up and attained peak after 100 days of sowing (Table 1 and Fig. 1). The population

was significantly lower in the intercropping systems when compared with monocrop of 22.66 per 10 plants in 40 days after sowing. Lower larval population was observed in groundnut grown with cowpea, soybean and sorghum. The population sharply declined in 50 days after sowing. The drop in population was mainly due to completion of first generation of leaf miner larvae when they undergo for pupation. The population was continued to build up during 70 days after sowing and reached to a maximum in 100 days after sowing. The maximum population was recorded in monocropping (102/10 plants) and less population was recorded in groundnut + sorghum (40.66/10 plants) followed by groundnut + maize (56.33/10 plants) and groundnut + cowpea (57.00/10 plants) intercropping system in 100 days after sowing (Table 1 and Fig. 1).

b) Per cent infestation

The per cent leaf let infestation was significantly higher in groundnut monocropping. However, the lower per cent infestation was observed after 40 days of sowing in groundnut + sorghum (11.33 percent) and in groundnut + cowpea (15.00 percent) intercropping. The maximum infestation was observed in case of groundnut + redgram (22 per cent) followed by groundnut + niger (19.33 per cent) intercropping. The infestation declined from 50 to 60 days after sowing, continued to build up again and attained its maximum infestation in 100 days after sowing. However, significantly lower infestation was recorded during the same period in groundnut + sorghum (54.66 per cent) and groundnut + cowpea (54.66 per cent) intercropping (Table 2 and Fig. 1).

c) Pod yield

The maximum pod yield was recorded in groundnut + sorghum (2099.79 kg/ha) and groundnut + maize (1981.28 kg/ha) intercropping systems. Lower yield was recorded in monocropping (1295.73 kg/ha) and slightly higher yield in groundnut + niger intercropping system. However, there was no significant difference in yield between the treatments (Table 3).

The present observations showed that, the lesser leaf miner incidence and higher groundnut pod yield was recorded in groundnut + sorghum, groundnut + maize and groundnut + cowpea intercropping systems. Logiswaran and Mohana

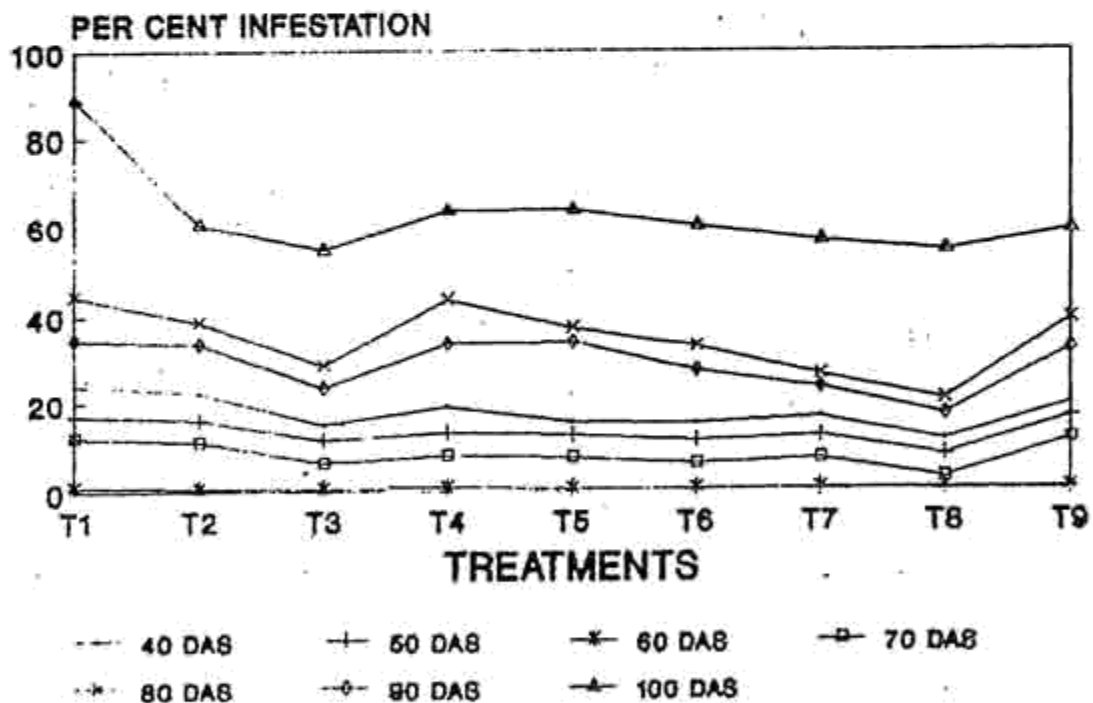
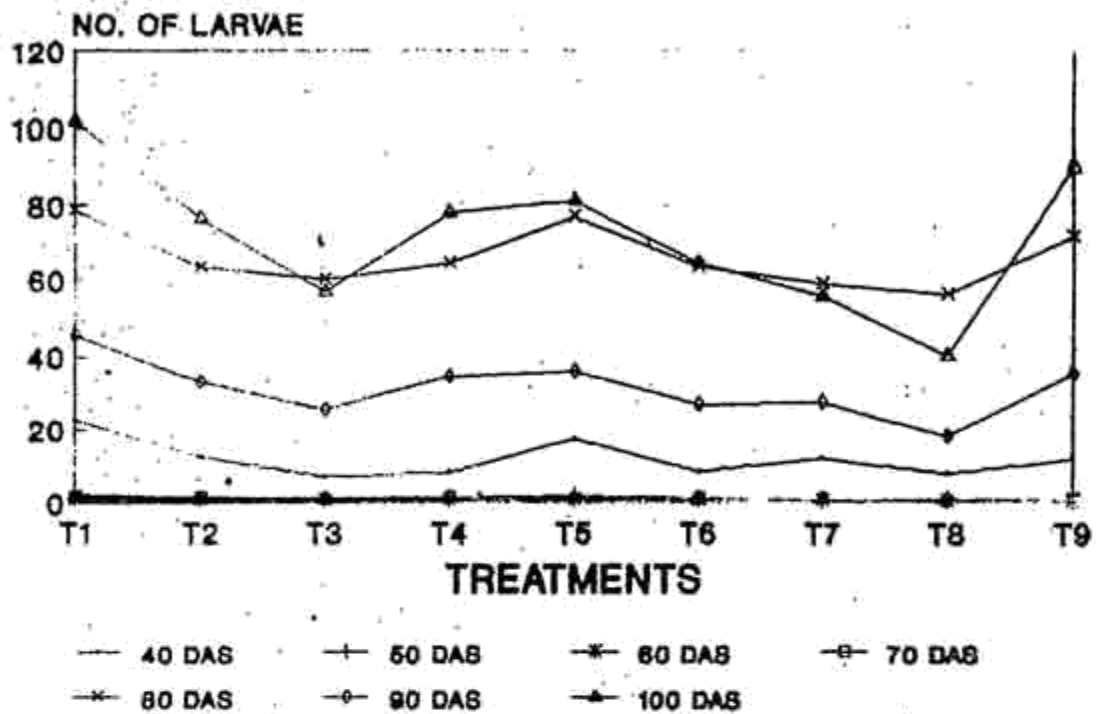


Fig. 1 : Leaf miner incidence in different intercropping systems

Sundaram (1985) reported that intercropping groundnut with cowpea or black gram at 3:1 ratio was beneficial in reducing the leaf miner incidence as well as in increasing the yield. It was also reported that the intercrop of groundnut with cowpea showed much lesser attack of leaf miner

as compared to the monocrop of groundnut (Sivasubramanian and Palaniswamy, 1984). In groundnut + pearl millet and groundnut + sorghu intercropping systems, the highest percentage parasitization was observed (Kennedy *et al.*, 1990; Murali Baskaran and Thangavelu, 1990).

Table 2 : Per cent infestation of leaf miner (*Apraerema modicella*) in intercropping system of groundnut during kharif 1994.

Treatment Number	Treatments	Days after sowing						
		40	50	60	70	80	90	100
T ₁	Groundnut alone	24.00	17.00	1.09	12.00	44.66	34.66	89.33
T ₂	Groundnut + Redgram	22.00	16.00	0.70	11.00	38.66	33.66	60.66
T ₃	Groundnut + Cowpea	15.00	11.33	0.70	6.33	28.66	23.33	54.66
T ₄	Groundnut + Soybean	19.00	13.00	0.87	8.00	43.66	33.66	63.66
T ₅	Groundnut + Castor	15.66	12.66	0.70	7.66	37.33	34.00	64.00
T ₆	Groundnut + Sunflower	15.33	11.33	0.70	6.33	33.00	27.33	60.33
T ₇	Groundnut + Maize	16.66	12.33	0.70	7.33	26.33	23.33	57.00
T ₈	Groundnut + Sorghum	11.33	8.00	0.70	3.00	20.33	17.00	54.66
T ₉	Groundnut + Niger	19.30	16.33	0.70	11.33	39.00	32.00	59.33
SEm		2.14	2.49	0.14	2.49	5.40	4.82	4.88
F at 5%		*	NS	NS	NS	NS	NS	*
C.D. at 5%		6.50	-	-	-	-	-	14.82

* = Significant at 5% (P = 0.05)

NS = Non-significant

The present study revealed that the lesser incidence of leaf miner and higher pod yield was recorded in groundnut + sorghum, groundnut + maize and groundnut + cowpea intercropping systems. This may be perhaps due to the feeding inhibition of odors from these non host plants and also due to the increased activity of parasites in these intercropping systems.

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Table 3 : Mean leaf miner incidence and pod yield.

Treatments	Mean No. of larvae/ 10 plants	Leaflets affected (%)	Mean yield (kg/ha)
Groundnut alone	36.29	31.82	1295.73
Groundnut + Redgram	27.05	26.09	1629.01
Groundnut + Cowpea	21.85	20.00	1810.73
Groundnut + Soybean	27.05	25.97	1499.53
Groundnut + Castor	30.93	24.57	1418.17
Groundnut + Sunflower	24.08	22.05	1655.39
Groundnut + Maize	22.79	20.52	1981.28
Groundnut + Sorghum	18.16	16.43	2099.79
Groundnut + Niger	30.43	25.42	1314.46
SEm			255.30
CDat 5%			NS

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