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Influence of Time of Sowing and Weather Factors on the Infestation of Leafminer *Aproaerema modicella* Deventer and Yield in Rainfed Groundnut.

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An experiment was conducted during rainfed season (khariff) 1979 with TMV 7 and TMV 10 groundnut varieties, to study the influence of weather factors on the infestation of leafminer and its influence on the yield of groundnut. In both the varieties, the maximum and minimum temperature exhibited a negative correlation with the infestation. The infestation exhibited a negative correlation with the yield. Among the two varieties, TMV 7 was more effected for the same unit of variation in weather factors or infestation. Earlier sowing immediately after the receipt of monsoon rains, but in any case not later than first week of August will be ideal for avoiding the infestation and for getting increased yield.

The leafminer *Aproaerema modicella* Deventer which was once a minor pest on groundnut, has now assumed a major importance in almost all the groundnut growing areas of the Tamil Nadu State. The caterpillar mines into leaflets, folds them, later web together adjacent leaflets and feed on the tissues. In severe cases of infestation, the crop presents a burnt up appearance and the photosynthetic activity is impaired, resulting in yield loss ranging from 30% to 36% (Lewin *et al.*, 1973). Manipulating time of sowing within certain limits is adopted as one of the strategies under the integrated control programmes. With this object in view, an experiment was conducted during the rainfed season (khariff) 1979 with TMV 7 and TMV 10 groundnut varieties at the Oilseeds Experiment Station, Tindivanam. Attempts were also made, to fix up the influence of time of sowing and weather factors on the incidence of this pest.

MATERIAL AND METHODS

Fifteen weekly sowings of TMV 7 and TMV10 varieties were taken up with two replications in plots of 4.5 x 4.5 m adopting a spacing 30 x 10 cm for TMV 7 and 30 x 20 cm for TMV 10. The weekly sowings were taken up from 7.6.'79 to 13.9.'79. The percentage of infestation of leafminer on leaflet basis, was estimated four times at fifteen days interval, starting from the 20th day of sowing. From each plot, ten plants were selected at random and from each selected plant the affected leaflets in the top twenty leaflets were counted. The percentage infestation was calculated from the total number of leaflets viz., 200

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and the affected leaflets. The infestation of leafminer estimated for each sowing in the final count was correlated with the mean weather factors that prevailed during the fifteen days prior to the final count. Partial regression analysis was made to estimate the quantum of contribution made by each factor.

RESULTS AND DISCUSSION

i) *Time of sowing on the infestation and yield*: The data on the infestation of leafminer and yield for different times of sowing in respect of both the varieties are furnished in Table 1. There exist a definite relationship between the time of sowing and infestation as well as yield, as revealed by the highly significant differences in incidence and yield due to different times of sowing. Appreciably lower infestation and increased yield was observed in TMV 7 when sown in the first week of July to first week of August. The later sowings resulted in increased infestation and markedly decreased the yield when compared to very early or very late sowings. In the case of TMV 10 variety, lower infestation and increased yield was observed in the sowings taken up from third week of July to first week of August. Lewin *et al.* (1979) reported that yields of TMV 2 groundnut were high and incidence low in the crop sown on 7th July and 22nd July in a study conducted over a period of four years in a fairly low incidence level ranging from 4.5 to 14.1 per cent.

ii) *Infestation with weather factors*: The regression coefficients worked out to assess the relationship between the infestation and weather factors are furnished in Table 2. With regard to TMV 7, the maximum and minimum temperature individually showed a negatively significant association with the infestation. The combined effect of maximum and minimum temperature ($Y = 200.4-2.7470x_1-3.4938x_2$) showed a significant association with the infestation. In other words, a decrease in maximum and minimum temperature will result in increased infestation. In the rainfed season, the maximum and minimum temperature progressively decreased as the age of the crop increased and hence a late sown crop will get severly affected at the early phase of the crop growth. The combined effect of relative humidity and maximum temperature ($Y = 886.02-4.6139x_1-14.1182x_2$) exerted a highly significant association. The combined effect of relative humidity and minimum temperature ($Y = 827.05-2.9733\ x_1-22.6155\ x_2$) also exerted a highly significant association.

With regard to TMV 10, all the weather factors studied individually showed a poor correlation with the infestation. It may, however, be observed that maximum temperature minimum temperature and relative temperature differences exhibited a negative relationship with the infestation while morning relative humidity and rainfall showed a positive relationship as in the case of TMV 7 variety. The combied

effect of relative humidity and maximum temperature ($Y = 863.8 - 4.6408\ x_1 - 13.4102\ x_2$) and relative humidity and minimum temperature ($Y = 790.98 - 3.0085\ x_1 - 21.0423\ x_2$) showed a highly significant association with the infestation. Hence late sowing of this variety will be conducive for the severe infestation by this pest.

It is also observed that the degree of influence of all the weather factors is more in TMV 7 variety (as seen by the lower R value) than in TMV 10 variety. That TMV 7 is greatly affected due to greater infestation by leafminer than TMV 10 variety for the same unit of variation in the weather factors.

iii) Yield with infestation : The regression coefficients worked out to estimate the relationship between the yield of groundnut and leafminer infestation indicated that in both the varieties the infestation exerted a highly significant negative correlation with the yield; the 'r' values being -0.8358 and -0.6490 for TMV 7 and TMV 10 respectively. Every one per cent increase in the infestation will result in a reduction of 12.83 kg/ha of dried unpicked pods in the case of TMV 7 variety, whereas the reduction will be 6.84 kg/ha in the case of TMV 10 variety. Here also, it could be concluded that TMV 7 variety is more affected due to the infestation than TMV 10 variety. Lewin *et al.* (1979) also found that leaf miner incidence is negatively correlated with yield in the case of TMV 2 variety.

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Table 1. Effect of leafminer infestation on yield of groundnut.

Date of sowing	TMV 7		TMV 10	
	Infestation T.V.	Yield kg/ha	Infestation T.V.	Yield kg/ha
7-6-79	19.2	518.5	22.4	382.7
14-6-79	30.9	298.8	30 8	407.4
21-6-79	30.7	397.5	31.3	439.5
28-6-79	34.3	276.5	35.3	481.5
5-7-79	18.9	802 5	17.7	395.1
12-7-79	17.5	449.4	15.6	232.1
19-7-79	20.3	864.2	18.9	777.8
26-7-79	12.6	828.9	13.5	933.3
2-8-79	15.2	1037.0	13.5	518.5
9-8-79	17 7	1037.0	15.0	506.2
16-8-79	31.8	259.3	31.8	606.2
23-8-79	44 3	271.6	42.5	345.7
30-8-79	50.4	148.2	49.1	283.9
6-9-79	50.8	111.1	46.6	121.8
13-9-79	58.4	79.0	54.6	126.4
C. D (P=0.01)	6.8	272.5	9.9	337.8

T. V=Transformed values

TABLE 2 Correlation coefficients between infestation and weather factors

Factors				r value	
				TMV 7	TMV 10
Infestation	(Y)	X	Morning R.H.	0.2260 N.S.	0.1430 N.S.
Infestation	(Y)	X	Maximum temperature	−0.5541 *	−0.4873 N.S.
Infestation	[Y]	X	Minimum temperature	−0.5354 *	−0.4642 N.S.
Infestation	[Y]	X	relative temperature differences	−0.5015 N.S	−0.4457 N.S.
Infestation	[Y]	X	rainfall	−0.1537 N.S	0.0979
Infestation	[Y]	X	Relative humidity and maximum temperature	0.8431 **	0.8433 ** [R]
Infestation	[Y]	X	Relative humidity and minimum temperature	0.7161 **	0.6949 ** [R]
Infestation	[Y]	X	Maximum temperature and minimum temperature	0.5615 *	0.4915 N.S. [R]