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Monitoring of groundnut leaf miner *Aproaerema modicella* (Deventer) with pheromone traps

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Abstract

Groundnut leaf miner, *Aproaerema modicella* (Deventer) belonging to the family Gelechiidae causing considerable yield losses to groundnut crop. An experiment was conducted to The studies on pheromone trap catches of groundnut leaf miner indicated that positive correlation with maximum temperature, morning relative humidity, rainfall, rainy days, sunshine hours while negative correlation with minimum temperature and evening relative humidity. Among the seven weather parameters, minimum temperature (-0.573), evening relative humidity (-0.477) showed significant negative influence on moth catches but morning relative humidity (0.493) showed significant positive influence on moth catches of *A. modicella*.

Keywords: Groundnut leaf miner, weather parameters, pheromone traps, male moths

Introduction

Groundnut (*Arachis hypogaea* L.) belongs to Fabaceae family, commonly known as peanut. The botanical name of groundnut, *Arachis hypogaea* is derived from two Greek words, *Arachis* means a legume and *hypogaea* means below ground, referring to the formation of pods in the soil. Among all oilseed crops, it is one of the most important oil, food and cash crop in our country. It is also called as the 'King' of oilseeds. Groundnut is also called as wonder nut and poor men's cashew nut, is grown under varied soil and climatic conditions during *Kharif* (rainy), *rabi* (winter) and summer seasons in India. The major constraints for low yield in Andhra Pradesh were attributed to poor plant protection measures especially in rainfed groundnut.

The low level of productivity in India is largely because the crop is rainfed, exposed to various abiotic and biotic stresses. An estimated annual loss of Rs. 150 crores in groundnut due to pests has been reported. Among the major pests reported in groundnut, *Aproaerema modicella* Dev., *Helicoverpa armigera* Hubner and *Spodoptera litura* Fabricius are the major defoliators of groundnut.

Material and methods

Pheromone traps were erected in general field of S.V. Agricultural College, Tirupati during *kharif*, 2015. Six delta traps were erected with a diameter distance of 25 m². The traps were tied approximately 30 cm above the crop canopy in a location. The traps were uniformly distributed as evenly as possible over the area, in order to avoid interference. Likewise six traps were erected in different groundnut fields. The data on male moth catches in pheromone traps were counted daily, later moths were removed from traps and the data is correlated with weather parameters i.e. minimum temperature, maximum temperature, morning relative humidity, evening relative humidity, sunshine hours. The daily weather data was compiled as per the standard week wise and leaf miner moth catches were correlated with standard week wise weather data to study the dynamics of moth emergence as well as influence of weather factors on moth emergence per week for estimation of incidence of leaf miner. The lure was changed once in twenty days.

Sticky yellow delta traps (pest-0-Lure insect trap) were used to find out the efficiency of sex pheromone of female leaf miner to attract the male moths. The pheromone traps were obtained from Pheromone Chemicals, Hyderabad. Yellow sticky trap was made up of gallon ice-cream cartons, inside of carton smeared with a thin layer of sticky material to trap male moths.

Results and discussion

Observations on Leaf Miner Moth Catches

During the study period *Aproaerema modicella* male moth catches were observed in delta sticky pheromone traps installed in three groundnut fields (A, B, C) from the moth catches

were recorded beginning of 23rd standard week (4-16 June) to 43rd standard week (23-28, October). A small peak of moth catches was recorded during 25th standard week (18-24 July) and there after highest peak of moth catches was observed

during 39th standard week i.e. 59.3 and very less number of moths collected during 31 standard week (30 July- 5 august) i.e. 5.00 (Table 1).

Table 1: Male moth catches of groundnut leaf miner, *A. modicella* in pheromone traps during *kharif*, 2015-16

	Standard weeks	Temperature		Relative humidity		RF	RD	SSH	GLM
		Max. temp	Min. temp	Mor. RH	Eve. RH				
23	(04-10, June)	41.4	25.10	53.61	33.25	2.30	0	3.90	14.7
24	(11-17, June)	38.4	23.90	49.89	31.15	12.00	1	6.60	14.2
25	(18-24, June)	37.0	24.90	51.58	35.95	6.00	1	1.70	20.8
26	(25, June - 1, July)	35.9	26.10	66.78	36.00	29.70	2	5.20	19.5
27	(02-08, July)	33.3	25.70	59.36	29.50	2.50	1	6.60	13.0
28	(09-15, July)	37.4	26.30	65.23	28.85	7.00	1	6.30	11.7
29	(16-22, July)	37.1	25.70	61.73	30.40	12.00	1	4.60	8.7
30	(23-29, July)	28.2	25.10	55.43	26.65	14.20	2	4.20	6.5
31	(30, July-05, Aug)	36.7	25.10	58.38	28.90	10.20	2	5.00	5.0
32	(06-12, Aug)	34.6	26.70	69.35	30.65	0.00	0	5.70	8.5
33	(13-19, Aug)	35.9	25.00	51.86	30.45	37.00	1	4.46	6.3
34	(20-26, Aug)	35.5	26.10	58.14	30.80	39.20	3	4.36	13.7

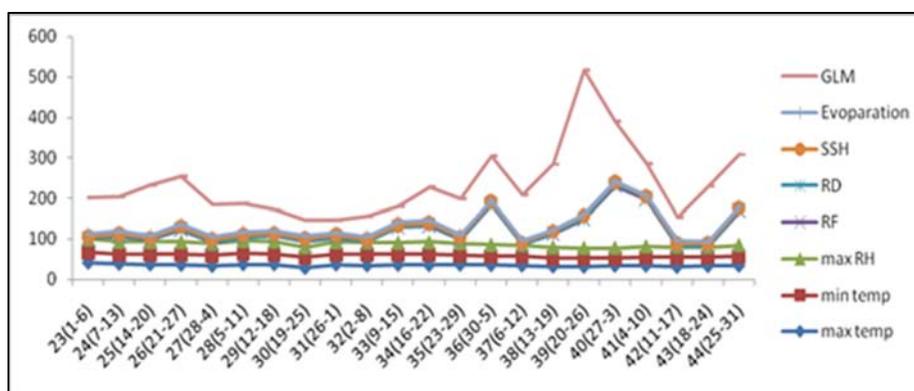


Plate 1: Male moth catches of groundnut leaf miner, *Aproaerema modicella* in pheromone traps during *Kharif*, 2015-16

Correlation studies on groundnut leaf miner pheromone moth catches with weather parameters

Influence of weather parameters like, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, sunshine hours, rainfall and rainy days on moth catches of groundnut leaf miner were carried out during *Kharif*, 2015. Weather parameters like minimum temperature showed negative association with groundnut leaf miner moth

catches. On the contrary, maximum temperature, morning relative humidity, evening relative humidity, sunshine hours, rainfall and rainy days showed positive association with groundnut leaf miner in groundnut. Among the seven weather parameters, minimum temperature (-0.573), evening relative humidity (-0.477) showed significant negative influence on moth catches. Morning relative humidity (0.493), showed positive influence. (Table 2)

Table 2: Correlation of GLM moth catches with weather parameters.

	Temperature		Relative humidity		Rainfall	Rainy days	SSH
	Maximum	Minimum	Morning	Evening			
GLM moth catches	0.258	-0.573*	0.493*	-0.477*	0.340	0.316	0.103

The results of present investigation are in accordance with Narahari Rao (2000) [5] reported that leaf miner moths emerge when there was no rain for more than 21 days during 35-110 days of the cropping period.

The maximum and minimum temperature of pre monsoon period with low relative humidity, followed by continuous rains coupled with high maximum and minimum temperature followed by monsoon break for week are favorable for outbreak of the pest (Dubey. 1995) [2].

Muralikrishna *et al.*, (2009) [4] also studied the influence of various weather parameters on the pheromone trap catches of groundnut leaf miner and also Leaf miner field incidence was correlated with weather parameters starting from one week prior to the notice of field incidence indicated that, evening

relative humidity and trap catches has significant influence on the field incidence. Evening relative humidity, minimum temperature correlated negatively with groundnut leaf miner incidence and sunshine hours and trap catches had a positive correlation with field incidence of groundnut leaf miner.

Devaki *et al.*, (2013) [1] who reported the influence of various weather parameters like maximum, minimum temperature, relative humidity and sunshine hours on groundnut leaf miner moth catches. Among them minimum temperature evening relative humidity showed negative association and maximum temperature, morning relative humidity showed positive influence on moth catches of groundnut leaf miner.

The results of the present study are also in accordance with Logiswaran *et al.*, (1982) [3] who reported that rain fall does

not show any significant influence on leaf miner moth catches of groundnut leaf miner.

Wheatly *et al.* (1989) observed that leaf miner, *Aproaerema modicella* was densely infested on the mostly drought stressed plants of groundnut when leaf surface temperature was highest.

Bagmare *et al.* (1995) reported that, maximum, minimum temperature and sunshine had positive correlation with groundnut leaf miner trap catches while relative humidity, rainfall had negative influence.

References

1. Devaki K, Prathima T, Muralikrishna T, Ramakrishna Rao A, Venkateswarlu U, Suma K. Impact of climate change on incidence of leaf miner *Aproaerema modicella* (Gelichiidae; Lepidoptera) kharif groundnut in Chittoor district of Andhra Pradesh. *Journal of Agromateriology*. 2013; 15(2):209-211.
2. Dubey RC, Ballal AS, Mandal NC, Das Gupta MK, Ghose DC, Mukhopadyay SK *et al.* Influence of weather factor on the groundnut leaf miner attack. *Agro Ecosystem Management*. 1995, 94-96.
3. Logiswaran G, Madhava Rao S, Vasudevan G, Kannan V. Influence of time of sowing and weather factors on the infestation of leaf miner, *Aproaerema modicella* Deventer and yield in rainfed groundnut. *Madras Agricultural Journal*. 1982; 69:359-363.
4. Muralikrishna T, Devaki K, Swarna B, Venkateswarlu U, Reddy KR. Out break of groundnut leaf miner, *Aproaerema modicella* (Deventer) (Gelechidae: Lepidoptera) in kharif 2008 and its management with insecticides. *Journal of Oilseeds Research*. 2009; 26:534-538.
5. Narahari Rao K, Gadgil S, Rao PRS, Savithri K. Tailoring strategies to rainfall variability -the choice of sowing window. *Current Science*, 2000; 78(10):1216-1230.