RESEARCH NOTES

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A Note on the Population Fluctuations of Rice Gall Midge and Yellow Stem Borer in Warangal Region of Andhra Pradesh, India

On rainy season rice crop, gall midge, *Orseolia oryzae* Wood Mason and Yellow stem borer, *Scirpophaga incertulas* Walker are regular insect pests in Warangal region. As a part of basic studies in ecological aspects of these two pests an attempt was made to correlate the important weather factors like temperature, rainfall and humidity of crop season (July-November), pre-season (June - August) and off season (March-June) with light trap catches and field incidences, recorded at the Agricultural Research Station, Warangal. The periodical field data of these two pests on a susceptible variety and light trap catches of 1980 season alone were compared with the temperature, rainfall as well as key mortality factors like parasatization.

In all the seasons under study (1972-'80) gall midge catches were high between second fortnight of September and first fortnight of November whose activity on field crop starts three weeks earlier than the catches. as under favourable conditions the life cycle takes 20-23 days (Liaumsang *et al* 1968 and Anon 1976). There was no significant correlation (r=0.391) between catches at light and field level incidence in the shape of silver shoots. This may be due to interference of rains on the light trap catches as predicted by Prakasa Rao (1975). This clearly showed that the utility of the light trap estimate tha populations is limited to fair weather periods. The fluctuations in the field incidences in different seasons were also not attributable to the abiotic factors like temperature, humidity and rainfall individually whose correlation value (r) was — 0 49, 0.08 and 0.02 respectively. This may be due to interference and involvment of various factors like parasatization and other mortality factors of the pest. The high parasatization due to *Platygaster sp.*, on larvae of gall fly was closely related to the field incidence levels and population at light trap, as seen on the crop of 1980 season (Table II). The egg-larval parasite *Platygaster sp.*, attack was as high as 100 per cent during second half of of November month. The peak incidence of midge, 1.09 per cent in October coincided with the low parasatization of September last week and high light trapcatches of October first part. The increase of parasite activity resulted in the decline of the pest at field level. The rainfall of August month (298 mm) and temperatures in between 31.6 and 23.1°C of maximum might have contributed for the build up of the pest. By the time the parasatization reached 100 per cent the pest declined to a

TABLE I Gall midge and stem borer in relation to weather factors

Year	Gall Midge		Yellow stem borer			Crop season				Pre-season				Off season			
	Field incidence (SS%)	Trap Catches (thousands)	Field incidence DH %	Field incidence WE %	Trap Catches (thousands)	Rainfall (mm.)	Max. Temp. °C	Mini Temp. °C	RH %	Rainfall (mm.)	Maxi. Temp. °C	Mini. Temp. °C	RH %	Rain. fall (mm.)	Maxi. Temp. °C	Mini Temp °C	RH %
1972	24.0	43.89	21.0	2.0	24.7	431.3	32.5	22.6	75.8	371.0	34.9	25.8	65.6	140.7	39.0	25.6	64.5
1973	39.2	74.13	18.0	4.1	32.8	739.3	30.4	20.8	83.2	493.2	33.0	23.7	81.0	106.5	39.1	25.9	72.2
1974	17.4	0.99	7.8	1.5	4.2	590.3	31.6	22.2	79.2	354.9	33.7	25.2	78.6	126.4	38.4	25.2	74.0
1975	15.4	1.84	9.9	12.3	21.5	1488.3	31.0	22.1	88.0	599.2	33.0	24.7	84.6	116.6	38.6	25.5	77.7
1976	13.8	27.83	6.9	5.2	34.9	1055.0	32.0	23.3	80.0	980.1	33.0	24.8	77.7	94.0	38.6	24.8	62.0
1977	12.4	23.16	46.9	27.0	731.5	427.6	33.6	22.4	—	371.7	34.4	24.5	—	190.3	35.4	24.8	—
1978	10.2	35.66	29.9	33.9	257.5	695.7	31.6	23.4	—	932.7	31.0	25.1	—	415.0	37.3	25.3	—
1979	12.1	5.82	47.7	27.0	139.6	497.6	30.7	23.1	—	293.8	30.4	24.8	—	275.7	36.4	24.0	—
1980	23.0	67.89	32.0	15.0	59.1	500.8	32.5	22.5	—	617.9	33.0	23.8	—	259.6	38.2	24.9	—

SS = Silver Shoots; DH = Dead hearts; WE = White ears

TABLE II Gall midge and stem borer in relation to weather and key mortality factors on 1980 Crop

Date	Days after planting	Field incidence		Light trap Catches		Weather factors			Parasatization		
		SS %	DH/WE %	Gall midge	Stem borer	Rainfall (mm.)	Maxi. Temp. °C	Mini. Temp. °C	Gall midge (Larva/Pupa)	Stem borer Egg	Stem borer Larva/Pupa
August	Nursery	—	—	744	2,127	298.5	31.6	23.1	—	—	—
15-9-80	20	0.7	3.0	1,235	12,857	46.0	31.1	34.6	15.0	36.0	10.0
24-9-80	30	1.3	12.3	1,792	13,638	20.6	32.9	24.5	31.9	66.6	36.3
3-10-80	40	5.6	14.1	4,517	7,125	0.0	32.4	24.7	73.0	86.7	56.0
14-10-80	50	10.9	6.2	14,274	7,716	0.0	33.8	23.2	89.6	81.8	46.8
24-10-80	60	8.9	5.5	3,648	8,390	0.0	35.0	21.4	51.6	83.9	58.3
3-11-80	70	8.9	7.6	10,320	15,533	0.0	34.2	20.1	90.0	77.7	12.0
14-11-80	80	2.5	6.1	7,431	12,914	0.0	33.1	19.7	88.0	72.7	40.0
24-11-80	90	2.6	6.7	81	1,893	0.0	32.8	21.4	100.0	75.0	8.0
4-12-80	100	0.4	12.5	25	280	0.0	30.8	16.8	87.8	75.0	15.6
14-12-80	110	0.1	14.9	84	338	0.0	30.1	16.1	87.5	7.1	4.8

level of 2.6 per cent and 81 nos., in field and at light trap respectively.

Field incidence of borer on the rainy season crop showed a conspicuous increase from 1976 onwards (from 7% to 47%). This change was not attributable to any weather factor of the season. Here also there was only partial correlation between light trap catches and borer damage on the crop. Usually its activity starts as early as September and ends in December. Two clear cut broods were noticed in the first season as evidenced by increase of damage (on 1980 crop) after a gay of two months. The activity of stem borer egg parasities *Trichoor-amma sp., Tetrastichus sp.,* and pupal parasite like *xanthodimpla sp.,* and larval disease causing micro-organisms played crucial role in borer activity rather than weather factors individually, as seen on the crop of 1980.

The decline of rice gall midge and increase of yellow stem borer attack both at early and late phases of crop in this region was closely related to the spread of gall midge resistant strains like Surekha (W13400) and Phalguna (RPW 6-17), the derivetives of Siam. 29 parent, which is highly susceptible to borer (Anon, 1979). Hence the study gives a clue that factors like parasite and predator activity and change of cultivation practices play considerable role along with cumulative effects of weather factors on the activity of field pests.

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