In : Resurgence of Sucking Pests (Ed. S. Jayaraj) Proceedings of National symposium, TNAU, Coimbatore. pp. 73-77.

MOHAN. L, D. THANGARAJ, M. MOHANSUNDARAM and S. JAYARAJ. 1988. Outbreak of the green house white fly **Trialeurodes vaporariorum** West wood in the Nilgiris. Madras agric. J. 75(10) : 368-70.

MOR. U, and A. MARAN. 1984. Paper presented in the 3rd meeting on white flies on field crops and vegetables. Israel.

RATAUL. H.S., and SINGH, 1974. Control of soybean yellow mosaic virus in soybean **Glycine max.** L. by controlling the vector white fly, **Bemisia tabaci** Genn. Punjab. J. Res. 11 : 73-76.

SIDHU. A.S, A.K. DHAVAN and K. SINGH. 1979. Testing of new chemicals for the control of cotton pests. Pesticides 13 : 7-11.

VAISHAMPAYAN. S, and M. KOGAN. 1980. Sampling white flies on soybean. In : Sampling methods in Soybean Entomology. Springer-verlag. pp. 305-311.

Madras Agric. J. 79, (6) : 321 - 326 June 1992
https://doi.org/10.29321/MAJ.10.A01763

RELATIONSHIP BETWEEN THE PHEROMONE TRAP CATCHES OF PECTINOPHORA GOSSYPIELLA AND SPODOPTERA LITURA THEIR FIELD INFESTATION AND LARVAL POPULATION

N. MUTHUKRISHNAN and M. BALASUBRAMANIAN[1]

ABSTRACT

Studies conducted to find out the relationship between the pheromone trap catches field infestation and larval population revealed that there was a positive direct relationship between the trap catches, field infestation and larval population of Pectinophora gossypiella (Saund.) and Spodoptera litura (F.). From the regression equation fitted for P. gossypiella it is clear that a pheromone trap catch of 22.5 adults/trap/week would cause about 27.5% boll damage after two weeks. similarly, a pheromone trap catches of 22.5 months/trap/week would cause about 23.0 larvae/50 bolls after three weeks. For S. litura it was observed that a pheromone trap catch of 161.5/trap week would cause about 52.5% leaf damage after four weeks.

1. Centre for Plant Protection Studies Tamil Nadu Agricultural University - Coimbatore.

KEY WORDS : Pheromone trap catches, Pink bollworm, Prodenia, filed infestation, larval population.

Following the identification of the sex pheromones and the development of effective monitoring and trapping system, the need for determining the relationship among pheromone trap catches, egg and larval population in the field and crop damage has emerged to facilitate the commercial utilization of pheromones and also to develop forecasting system for important crop pests (Sundaramurthy, 1986). In India the studies on the association of pheromone trap catches of **Pectinophora gossypiella** Saund (PBW) and **Spodoptera litura** (F.) (TCW) with their field infestation was reported earlier (Ingram, 1980; Page et al., 1984; Karuppuchamy and Balasubramanian, 1986 and Krishnaiah, 1986). The results by the investigations made on the relationship of trap catches and field infestation of larvae are presented in the table.

MATERIALS AND METHODS

The experiment was conducted during 1986-87 winter season at Tamil Nadu Agricultural University, Coimbatore. The replicated observations on field infestation and larval population of PBW and TCW were taken from unprotected plots of size $80m^2$ at weekly interval. Pink bollworm infestation was assessed by sampling 50 balls from randomly 10 plants from 45 DAS for 13 weeks. The population of larvae was also numbered from picked bolls. For TCW infested leaves in percentage was recorded from randomly selected five plants along with larval population from top, middle bottom leaves (Balasubramanian, 1980).

Four ICRISAT model phenomena traps at 25 m apart were installed for each pest in the nearby cotton area of 6500 m^2. Gossyplure and Pherodin SL were used for monitoring PBW and TCW respectively and were fixed in the traps in alternate position to maintain a distance of 60 m, between similar and disimilar lures. The lures were replaced once in 15 days and the trap catches were recorded at weekly interval.

Regression analysis was used to relate the trap catches with field infestation and larval population. While relating, the mean trap catch of a particular week was subjected to correlation with mean field infestation and larval population that occured during the same week, one, two and three weeks after the trap catch. The equations with high 'r' values were considered for the study (Tingle and Mitchell, 1981).

RESULTS AND DISCUSSION

The data revealed that there were six peaks of PBW noticed from the first week of November 1986 to the third week of February 1987 (when crop was 60-172 days old). The boll infestation by PBW ranged from 4.00 to 30.6% and also showed four peaks and was maximum at the first week of January. The larval population varied from 1.7

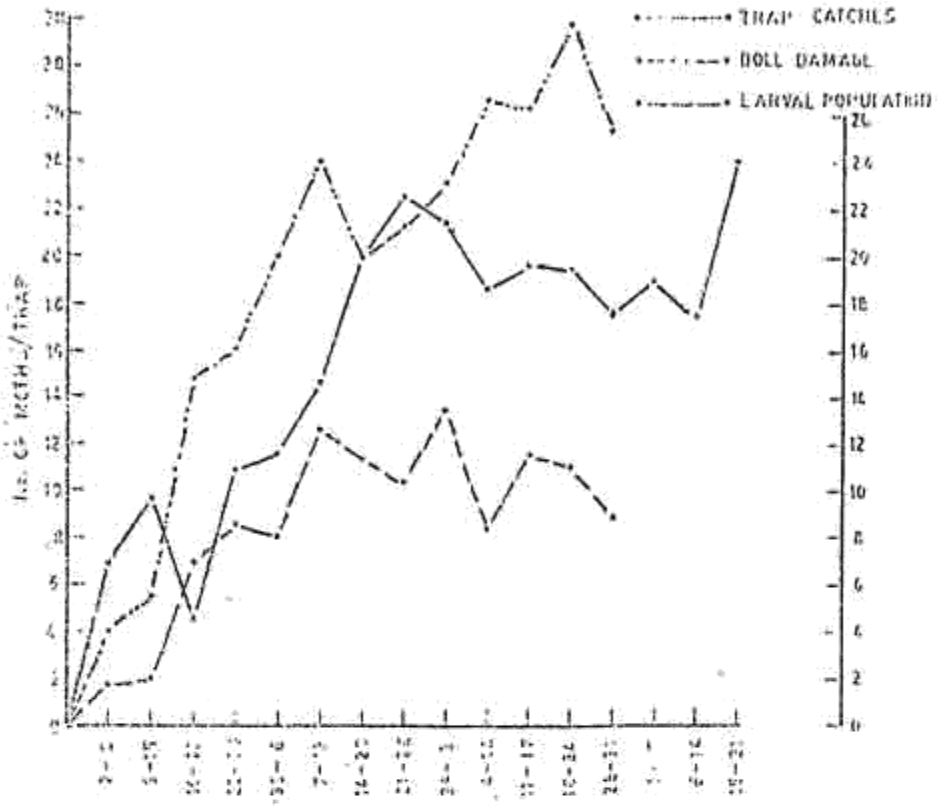
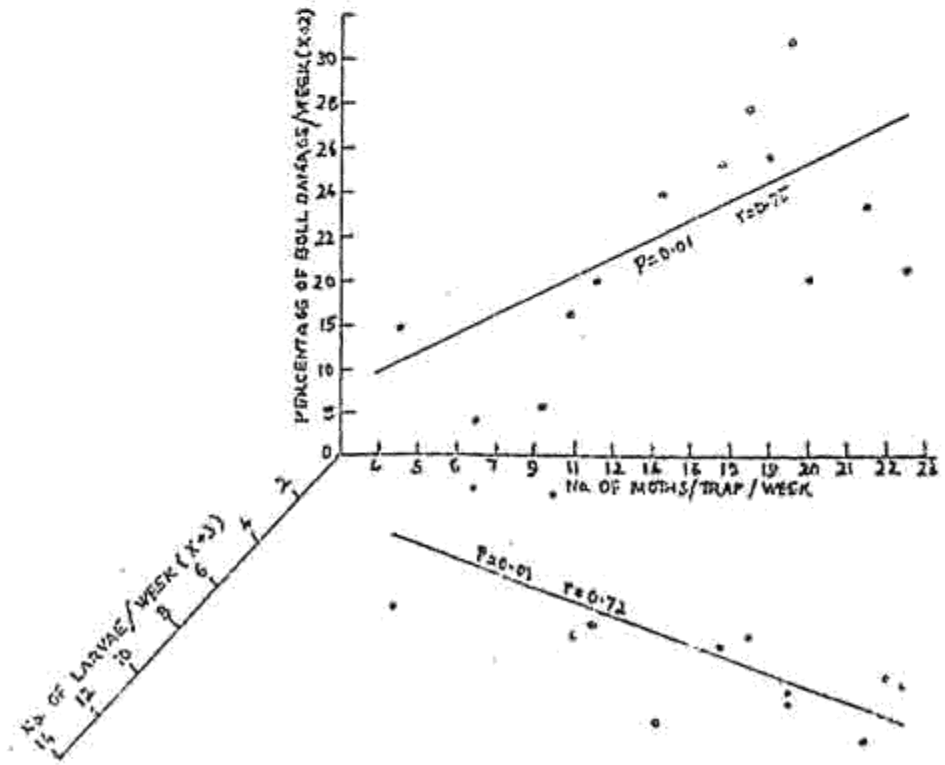


Fig.1.
RELATIONSHIP BETWEEN TRAP CATCHES, FIELD INFESTATION AND LARVAL POPULATION OF P. gossypietta



RELATIONSHIP BETWEEN TRAP CATCHES OF P. gossypially FIELD INFESTATION AND LARVAL POPULATION

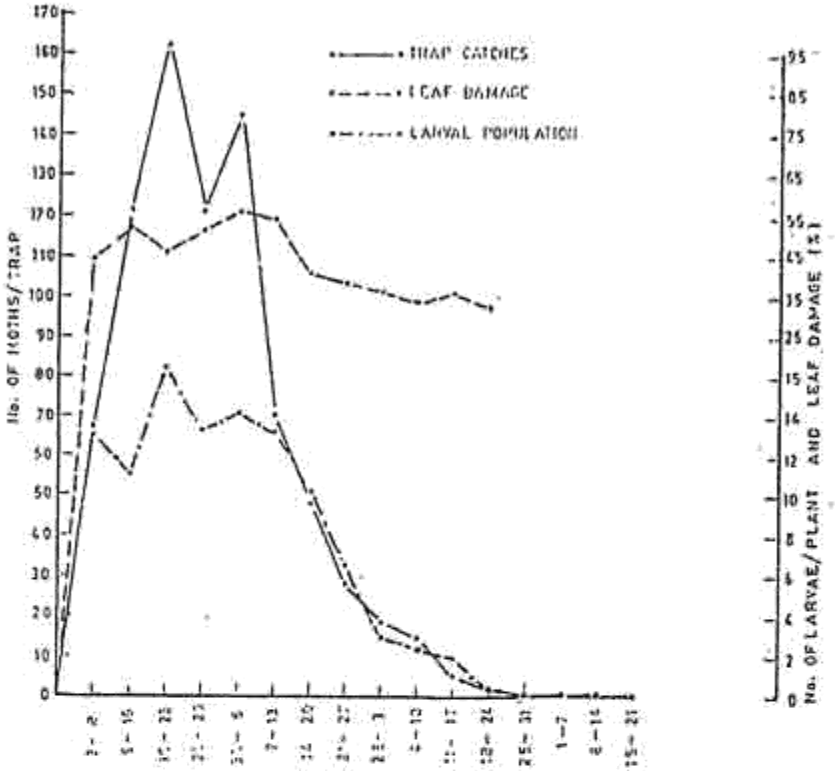
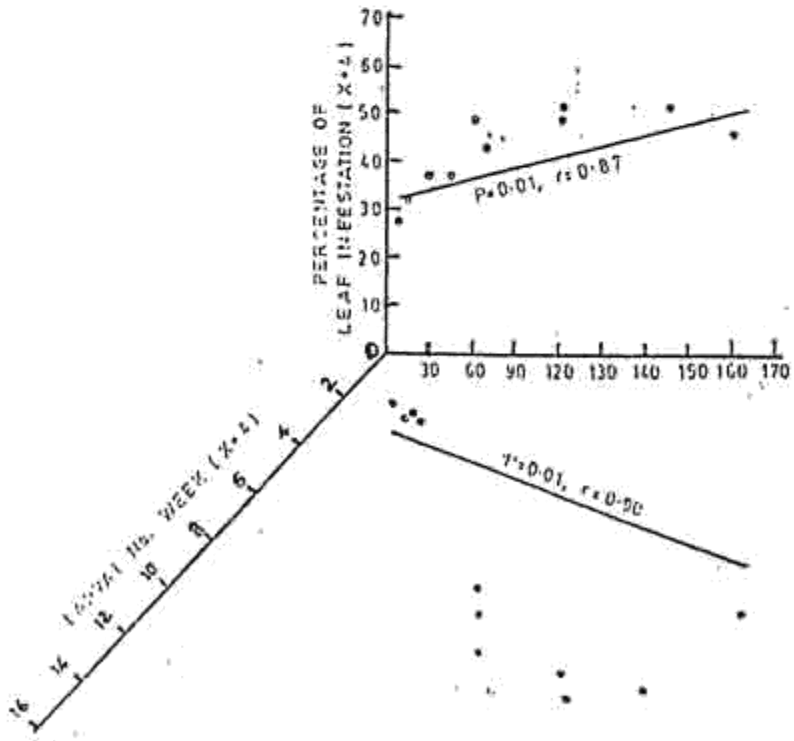


Fig.2.

RELATIONSHIP BETWEEN TRAP CATCHES, FIELD INFESTATION AND LARVAL POPULATION OF S. litura



RELATIONSHIP BETWEEN TRAP CATCHES OF S. litura FIELD INFESTATION AND LARVAL POPULATION

to 13.3 and there were also four peaks (Fig. 1).

From the fitted regression equations, a direct positive relationship between the trap catches and boll infestation that occured two weeks after the trap catch was observed. The trap catches also had the direct positive correlation with the larval population that occurred three weeks after the trap catch. The regression equations are

$Y = 4.52 + 1.01 x$ for boll infestation (Fig. 1)

$Y = 1.84 + 0.46 x$ for larval population (Fig. 1)

The results thus indicated that an increase in the trap catch of PBW by one unit, would increase the boll infestation and larval number by 1.01 and 0.46 times respectively.

There were only two peaks noticed, first in the last week of November and second in the first week of December. The leaf damage varied from 20.5 to 51.6% with two peaks. The larval population ranged from 1.3 to 16.7% during the crop stage, but maximum during the third week of November (Fig. 2). The trap catch of a particular week was positively correlated with the leaf damage and larval population that occurred three weeks after the trap catch. The prediction equations viz.,

$Y = 31.89 + 0.41 x$ for the leaf damage (Fig. 2) and

$Y = 2.74 + 0.09 x$ for the larval counts (Fig. 2).

Thus revealed that an increase in the trap catch by one unit would increase the leaf damage by 0.41 times and larval population by 0.09 times.

During the period of observations moth catches increased gradually from October and was related to the larval population in the field, in turn resulted in the infestation of bolls. Thus from the regression equation it is clear that a pheromone trap catch of 22.5 adults/trap/ week would generate 23.0 larvae/50 bolls after three weeks. The results also are in confirmity with Ingram (1960) that a mean trap catch of 8-9 months of PBW reported 10% level of boll damage, ten days later. Page et al., (1984) also reported that a mean trap catch of 10-20 months per night was associated with subsequent damaged infestation within two to three weeks. Karuppuchamy and Balasubramanian (1986) found a direct positive relationship between trap catches and larval infestation that occurred two weeks after the trap catch.

The size of the TCW moth catch increased from first week of November and was related to the larval population in the field, which then caused the leaf damage. From the regression equation, it is observed that a pheromone trap catch of 161.5/trap/week would cause about 52.5 per cent left damage after four weeks. Similarly Krishnaiah (1986) had reported a catch of 160 males/ trap/night reckoned as the threshold level from which the pest population would reach economically injury level in a

weeks time in blackgram grown in rice fallows.

The results obtained in the present study were based on single crop data. In addition more data are needed to predict the damage of TCW since it is highly polyphagous and our cropping systems are also so varied. Overlapping of generations within a farming system is found to occur thereby different stages of same crop, presence of alternate hosts etc. may limit the correctness of forewarning methods (Balasubramanian, 1986).

REFERENCES

BALASUBRAMANIAN, M (1980) Economic threshold of the tobacco cutworm **Spodoptera litura** Fb. cotton. In : **Symposium on Economic Threshold of key Pests and Use of Synthetic Pyrethroids on cotton.** Nagpur, Sep. 10-20, 1980, pp. 33-34.

BALASUBRAMANIAN, M. (1986). Integrated Pest and Disease Management. The need of the day. In : **Pest and Disease Management** (Ed. Jayaraj, S.) Tamil Nadu Agricultural University, Coimbatore, pp.243-248.

INGRAM, W.F. (1980). Studies of pink bollworm **Pectinophora gossypiella** on sea island cotton in Barbados. **Tropical Pest Management,** 26 : 118-137.

KARUPPUCHAMY, P. and BALASUBRAMANIAN, M. (1986). Trapping the cotton pink bollworm, **Pectinophora gossypiella.** Paper presented in 'Proceedings of the III Oriental Entomology Symposium', University of Kerala, Kariavattom, Feb. 21-24, 1984, pp. 55-64.

KRISHNAIAH, K. (1986). Studies on the use of pheromone for the control of **Spodoptera litura** (F.) on blackgram grown in rice fallows. **Indian J. Plant Prot.,** 14 : 43-46.

PAGE, F.D., M.P. MODINI and STONE, M.F. (1984). Use of pheromone trap catches to predict damage by pink spotted bollworm larvae in cotton. In : **Pest Control : recent advances and future prospects.** South Australian Govt. Printer, pp. 68-73.

SUNDARAMURTHY, V.T. (1986). Insect management in cotton system. In : Pest and Disease Management. (Ed. Jayaraj, S.), Tamil Nadu Agricultural University, Coimbatore, pp. 189-194.

TINGLE, F.C. and MITCHELL, E.F. (1981). Relationship between trap catches of male tobacco budworm larval infestation and damage levels in tobacco. **J. Econ. Entomol.** 74 : 437-440.