associated with chlorophyll synthesis. Increased leaf biomass due to treatments as recorded in the present study is well supported by increased photosynthetic efficiency (soluble proteins) as reported in green gram (Chandra Babu *et al.*, 1988). Co- ordinated increase in vegetative plant growth indicates that balanced partitioning of photosynthates between plant growth and foliage yield through regulation of chloroplast development (Gausman *et al*, 1985). Regulation of vegetative growth by DCPTA appears to involve the regulation of chlorophyll biogenesis and increased soluble protein as evidenced in spinach and sugarbeet (Keithly and Yokoyama, 1988). It is inferred that the use of growth regulators like DCPTA has a substantial role in maintaining assimilatory surface area with increased chlorophyll coupled with high functional ability.

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ROPE DISPENSER FORM OF GOSSYPLURE AND INSECTICIDES ON PREDATORS IN COTTON ECOSYSTEM

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ABSTRACT

Studies with PBW-Rope dispenser form of gossyplure @ 78g a.i/ha in cotton ecosystem revealed that population of *Menochilus* sp. and spiders (Thomicidae) was more in PBW-Rope dispenser treated plots when used alone. When alternated with either fenvalerate or monocrotophos on the basis of ETL recorded more of *Menochilus* sp. than spiders. However, application of monocrotophos after the PBW-Rope dispenser was less toxic to both coccinellids and spiders. Fenvalerate spray once in 15 days reduced the coccinellids and spiders and when sprayed on the basis of ETL, was more toxic to spiders than to coccinellids.

KEY WORDS : Gossyplure, Rope Dispenser, Insecticide, Cotton

Synthetic sex pheromones can be used in integrated pest management programmes. Gossyplure (1:1 mixture of 7.11-hexa decadienyl acetate) a synthetic sex pheromone against *Pectinophora gossypiella* (Saund.) at low concentration was effective (Balasubramanian *et al.*, 1978; Flint *et al.*, 1979; Hubner *et al.*, 1981; Flint and Markle, 1984). The efficacy of hollow fibres, laminated flakes and microencapsulated form of gossyplure was as effective as insecticides for pink bollworm control (Critchley *et al.*, 1985). A new polyethylene tube dispenser containing gossyplure at higher quantity (68-78 mg) (PBW-Rope dispenser) was effective (Flint *et al.*, 1985). Besides the direct effects, indirect effects of gossyplure on parasitoids and predators were also reported (Critchley *et al.*, 1985; Chen *et al.*, 1986) However, studies are meagre with PBW- Rope dispenser form of gossyplure. The indirect effects of PBW-Rope dispenser on predator complex in cotton ecosystem were studied in comparison with fenvalerate.

MATERIALS AND METHODS

To ascertain the efficacy of PBW-Rope dispenser in comparison with insecticides on predator complex (*Menochilus* sp. and Thomicid spiders), a field experiment with MCU 5 cotton was conducted during summer season at the Agricultural Research Station, Bhavanisagar, during 1987. There were eight treatments with a control in a randomized block design, replicated three times. The plot size was 120 m^2. The spacing adopted was 75 x 30 cm.

In the scheduled, economic threshold level (ETL) and other treatment plots, green bolls were sampled for pink bollworm damage and whenever exceeded the ETL of 10 per cent, spraying with monocrotophos and fenvalerate was done. The spray fluid used was 500 l/ha. The dispenser containing 96% (Z,Z) and (Z,E) isomers of 7,11, -hexadecadienyl acetate in a ratio of 49:51 received from Shinetsu chemicals company Limited, Tokyo, Japan was used in the study. The dispensers were placed around the main stem of individual plant and secured with a double twine in such a way that the dispenser remained 25-30 cm above ground level during the subsequent plant growth The dispensers were replaced once in 60 days. Total number of adults and grubs of both coccinellids and spiders was counted in each plant at the rate of three plants per row and two rows per plot at weekly interval. The data were transformed in to x + 0.5 values and statistically analysed. Duncans, Multiple Range Test (DMRT) was used to partition the means into significant ranges (Gomez and Gomez, 1976).

RESULTS AND DISCUSSION

Coccinellids *(Menochilus sp.)*

Higher population of *Menochilus* sp. was observed during the study period. The mean number of coccinellids among treatments varied from 2.61 to 10.51 (Table 1). Fenvalerate when applied once in 15 days and in combination with rope dispenser reduced the coccinellid population significantly. PBW-Rope dispenser when used alone recorded 7.79 when followed by either monocrotophos or fenvalerate on ETL basis recorded 6.7 and 8.4 coccinellids respectively.

Thomicid spiders

The population of spiders was more than coccinellids throughout the season. The mean population of spiders varied from 7.3 to 19.38 (Table 1). Fenvalerate when sprayed once in 15 days reduced the spider population by 63.28 per cent. However, spraying fenvalerate based on ETL was less harmful to spiders. The PBW-Rope dispenser when followed either with

Table 1. Effect of rope dispenser form of gossyplure on insect predator of cotton ecosystem.

Treatments	Coccinellids*		Spiders	
	Mean population (No/plant)	Reduction (%)	Mean population (No/plant)	Reduction (%)
Fenvalerate 20 EC @ 75 g a.i/ha once in 15 days	2.61^{c}	75.17	7.30^{d}	63.28
Fenvalerate 20 EC @ 75 g a.i/ha based on ETL (on 68 and 105 DAS)	6.06^{ab}	42.34	10.36^{cd}	47.89
Gossyplure rope dispenser (on 45 and 105 DAS)	7.79^{a}	25.88	13.94^{ab}	29.88
Gossyplure rope dispenser + monocroptophos 36 WSC @ 216 g a.i/ha once in 15 days	8.31^{a}	20.93	11.85^{bc}	40.39
Gossyplure rope dispenser + fenvalerate 20 EC @ 78 g. ai/ha once in 15 days	3.73^{bc}	64.51	8.55^{cd}	56.99
Gossyplure rope dispenser + monocrotophos 36 WSC @ 216 g.a.i/ha based on ETL (75 DAS)	6.70^{a}	36.30	8.88^{cd}	55.33
Gossyplure rope dispenser + fenvalerate 20 EC @ 75 g a.i/ha based on ETL (75 DAS)	8.40^{a}	20.10	13.24^{bc}	33.40
Control (No gossyplure or insecticides)	10.51^{a}	-	19.38^{a}	-
SEM	0.15		0.15	

* Mean of 11 weeks observations

Means in a column not followed by a common letter are significantly different at 1% level (DMRT)

monocrotophos or fenvalerate spray once in 15 days reduced the spider population by 40.39 per cent and 56.99 per cent respectively. When fenvalerate and monocrotophos were sprayed in the PBW-Rope dispenser plots on the basis of ETL, 13.24 and 8.88 adults were recorded respectively.

The results indicate that the population of coccinellids and spiders was high in treatments which received the PBW-Rope dispenser alone or alternated with insecticides. Scheduled spray of insecticides reduced the coccinellids and spiders. Critchley *et al.*, (1985) and Chen *et al.*, 1986) reported that predatory insects *viz.*, coccinellids, *Paederus, Scymnus* and *Orisus* were more in fields treated with microencapsulated, laminated flakes and hallow fibre forms or gossyplure compared to insecticide treated plot. The results of study agree with the above findings.

Gossyplure was considered as an innocuous chemical (Kydoneius and Beroza, 1982) had no detrimental effect on natural enemies. The continuous release of pheromone at controlled rate and non-exposure of them areas to insecticides might be the reason for more of coccinellids and spiders in pheromone treated plots when used alone. Besides, control of aphids, leaf hoppers, and bollworms by the natural enemies could be possible and this is an advantage over insecticides. Pheromone application also provides relief from chemical stress on the plants and ecosystem (Bajikar and Sarode, 1986). Use of gossyplure in rope dispenser form conserves the natural enemies *viz.*, *Menochilus* sp. and thomicid spiders indicating thereby that it could be a component of integrated pest management in cotton.

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