A Review :

Role of *Cassia occidentalis* L. in Encourging the Population of *Trichogramma* Wasps

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International Journal of Plant Protection, Vol. 2 No. 2 : 284-286 (April to September, 2009)

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Key words : Progress, Development, *Hirsutella thompsonii*

The impact of *Cassia occidentalis* L. a waste land weed of middle Gujarat region was assessed as interspersing with cotton crop to enhance the population of *Trichogramma* wasps and thereby to reduce the bollworm incidence. Results revealed that the *C. occidentalis* attracted large number of white coloured butterfly, *Catopsilia pyranthe* (Pyralidae: Lepidoptera) to deposit their eggs. These eggs in turn were heavily parasitized by *Trichogramma* wasps which act as reservoir for the parasitoid. When cotton crop interspersed with *C. occidentalis* (6 : 1) as one of the components of Bio-Intensive Pest Management (BIPM) module along with planting of maize @ 10 % plants evaluated during 3 successive seasons *i.e.* 2005-06 to 2007-08 revealed that it enhanced the egg-parasitism due to *T. chilonis* wasps. This habitat manipulated treatment was compared with the treatment of insecticidal application and untreated check. Results concluded that the habitat modified plots exhibited 16.90% egg parasitism as against 4.93 and 10.33% in case of insecticidal treated and untreated plots, respectively. Enhancement of bollworm egg-parasitism due to *T. chilonis* resulted into reduction in bollworms damage and thereby increased the seed cotton yield.

Accepted :
July, 2009

Insect pest problems originated with the origin of agriculture. Each species of insect has their own natural enemies. The natural enemies have been employed in suppression of insect pest problems for centuries. It includes parasitoids, predators and pathogens which play vital role in "Biological control". The Biological control is perhaps one of the oldest methods of pest management. It is ecofriendly approaches of pest management and widely used in Integrated Pest Management (IPM) strategy developed for many insect pests in different agro-ecosystems.

Biological Control involves introduction of exotic biotic agents (For combating accidentally introduced insect pests, mites and weeds), augmentation of biotic agents and conservation of the existing or introduced biotic agents. Of the three approaches of biological control, the conservation is one of the most important approach and is gaining increasing now-a-days because of its feasibility and easy to adopt by ordinary farmers. It is defined as the actions to preserve and increase natural enemies by environmental manipulation. It is a kind of habitat manipulation which favour the natural enemies for its survival and effective suppression of insect pests. Conservation of natural enemies is nothing but it is the modification of environment to suit the natural enemies. There are many agricultural practices that have the potential to enhance the functional biodiversity which in turn helps in conservation as well as to encourage the activity of many potential biocontrol agents. Increasing plant diversity includes wild plants which can act as reservoir for the natural enemies (Patel and Yadav, 1991).

Enhancement of natural enemy population in cotton by habitat manipulation has been extensively studied at Ludhiana (Punjab), Warangal (Andhra Pradesh) and Anand (Gujarat) during the kharif season of 2005-06 (Anon. 2006 a) and 2006-07 (Anonymous, 2007 a). Cowpea and marigold were used at Ludhiana and Warangal, whereas *Cassia Occidentalis* L. was used at Anand to modified the habitats of beneficial fauna in order to enhance their activity and thereby to reduce the damage caused by insect pests in cotton crop. Results of these trials concluded that the population of natural enemies in habitat manipulated plots was relatively higher over the treatment of insecticidal application as well as untreated check.

The mottled emigrant white coloured butterfly, *Catopsilia pyranthe* (Lepidoptera:

Pieridae) occurs on Negro coffee (*Cassia occidentalis* L.) and Indian senna (*Cassia angustifolia* Vahl.) in Gujarat (Patel *et al.*, 1987). The females of *C. pyranthe* laid more number of eggs on *C. occidentalis* (17.62 eggs/ plant) than *C. agustifolia* (1.11 eggs/plant) indicating its preference for the former (Patel and Yadav, 1991). The *C. occidentalis* is a waste-land and field border weed which attracts females of *C. pyranthe* for egg-deposition. According to Yadav *et al.* (2001), the abundance of butterfly *C. pyranthe* is found round the year which deposited large number of eggs on *C. occidentalis*. These eggs in turn are heavily parasitized by *Trichogramma* wasps, which is a potential egg-parasitoid of several lepidopterous pests. The eggs laid by *C. pyranthe* act as reservoir for *Trichogrmma* wasps. Khatri and Amardeep

Fig. : *Catopsilia pyranthe*

Fig. : *Trichogramma* wasp

Fig. : *Cassia occidentalis* L.

(1990) reported that the larvae of *C. pyranthe* were found feeding on leaves of *C. occidentalis* in South Andaman in March-April, 1989. Seasonal abundance of the pierid, *C. pyranthe* in fields of senna and negro coffee has been studied by Patel and Yadav (1991) at Anand, Gujarat during the rainy and winter seasons of 1983-84 and 1984-85. Similarly, the population dynamics of *C. pyranthe* on *Cassia fistula* and *C. occidentalis* have been studied by Baruah *et al.* (1993) in Assam during 1990-91 and revealed the movement of population from old leaves of *C. fistula* to *C. occidentalis* in July. The larvae of *C. pyranthe* in their fifth instar consumed the most of *C. occidentalis*. Yadav and Anand Jha (2003) from Gujarat reported that the natural populations of *Trichogramma chilonis* and *T. achaea* were very high on the alternate host, *C. pyranthe*, which preferred *C. occidentalis* for ovipositing. Earlier, Yadav and Anand Jha (2003) reported that interspersing *C. occidentalis* with cotton Hybrid-8 at a ratio of 1:3 resulted in very high population of *T. chilonis* and *T. achaea* which later shifted to cotton and caused appreciable reduction in the population of the cotton bollworm, *Earias vittella* Fab. Enhancement of natural enemies in cotton H-10 by habitat manipulation has been studied at Anand Agricultural University, Anand during three successive *kharif* seasons (2005-06 to 2007-08). Results revealed that when cotton was interspersed with *C. occidenatalis* (6:1 *i.e.* six rows of cotton alternated with one row of *C. occidentalis*) as one of the component of Bio-Intensive Pest Management (BIPM) module along with planting of maize @ 10 % plants suppressed the incidence of cotton bollworms at substantial level. Data on egg parasitism due to *T. chilonis* (Table 1) indicated that the habitat modified plots exhibited maximum (15.12 to 18.04 with an average of 16.90 % as against 4.93 and

Table 1: Impact of habitat manipulation on egg-parasitism due to *T. chilonis* in cotton crop

Year	Egg-parasitism (%)		
	Habitat manipulation	Insecticidal application	Untreated control (Check)
2005-06	17.54	4.99	10.50
2006-07	18.04	5.24	10.75
2007-08	15.12	4.55	9.75
Av.	16.90	4.93	10.33

10. 33 % in case of insecticidal treated and untreated plots, respectively (Anonymous, 2006b, 2007b and 2008). Least percentage of parasitism in insecticidal sprayed plots implies the detrimental effect of insecticides on *T. chilinis*. Realizing the importance of this valuable plant in pest management, the cotton growers of middle Gujarat region are advised for interspersing of *C. occidentalis* with cotton (6:1).

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