Research Paper :

Reaction of natural enemies on insect pests of sunflower

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SUMMARY

The extensive and intensive surveys were made during summer, rainy and winter sown sunflower crop at three stages *viz*., one, two and three months old crop to evaluate the natural enemies of sunflower pests in central plain zone of U.P. Two parasitoids *viz*., *Trichogramma* sp. and *Telenomus* sp. were observed to parasitise the eggs of cutworm and extent of parasitisation was observed 8-12 and 3-10 per cent, respectively. Larval parasitoids include *Microcentrus collaris, Microplitis similes, Apanteles* sp. and *Microbracon* sp. Their extent of parasitisation varied from 3 to 12 per cent. One predator, *Dorylus labiatus* was also found feeding voraciously on the larvae of cutworm. The natural enemies *viz*., *Brumus suturalis, Coccinella septumpunctata, Menochiles sexmaculata, Chrysoperla carnea* and *Mantis religiosa* were recorded as predators of white fly and jassids. *Trichogramma chilonis* was noticed to parasitise the eggs of *H. armigera* in rainy season and peak parasitisation (50-55 per cent) was observed in winter sunflower.

Key words : Sunflower, Parasitoids and White fly

Sunflower (*Helianthus annuus* L.) is an important oilseed crop. Due to its wide adaptability, it is cultivated in all the major crop growing areas in the season. In India, more than fifty insects species have been reported infesting sunflower crop of which some are like leaf defoliators, grasshopper, termites, various sucking insects like jassids, thrips, whitefly and bugs etc. In U.P., sunflower is known to suffer heavy losses from ravages of termite and cutworm as soil insects, jassids, thrips, whiteflies as sucking insects and tobacco caterpillar, Bihar hairy caterpillar and gram pod borer as defoliators. It is well known fact that natural enemies (parasitoids and predators) act as important bio- agents in suppressing the pest population in nature. This sort of story will be a noble and truthfully approach in modern concept of IPM which is gaining much importance in the present concept. The present investigations will also minimize the indiscriminate use of chemical pesticides and shall check the hazardous ill effect on human beings, non target organism and other live forms including aquatic as well as terrestrial animals.

MATERIALS AND METHODS

In present study an intensive survey was undertaken to record the natural enemies of sunflower insect pests in three stages of crop *viz*., one, two and three months old crop from the areas where sunflower is grown commercially in large scale in districts of U.P. The areas were thoroughly surveyed to record the natural enemies of various pests attacking sunflower at its different stages of growth since sowing to harvesting the crop in all the three cropping seasons of summer, rainy and winter.

The experimental and observational site was selected at Crop Research Farm, Kalyanpur of C.S.A. University of Agriculture and Technology, Kanpur. Observations were recorded on natural enemies in experimental as well as farmer's field of sunflower to study the various parasites and predators and their extent of parasitisation. The specimens were examined to record the diagnostic symptoms of diseased insect pests.

RESULTS AND DISCUSSION

It is evident from Table 1 that the highest (8 to 12 per cent) egg parasitisation by *Trichogramma* sp. and 3 to 10 per cent by *Telenomus* sp. were recorded on cutworm (*Agrotis ipsilon*) during summer and winter season sunflower grown in different agro-ecological zone of central U.P. The larval parasitoids, *Microcentrus collaris, Microplits similes, Apanteles* sp. and *Microbracon* sp.

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Table 1: Natural enemies of major insect pests of summer, rainy and winter seasons sunflower

Sr. No.	Name of insect	Scientific name	Egg	% of parasitisation	Larval	% of parasitisation	Pupal	% of parasitisation	Predators
1.	Cutworm	*Agrotis ipsilon* Rott	*Trichogramma* sp.	8-12	*Microcentrus collaris*	5-8	-	-	*Dorylus labiatus*
			Telenomus sp.		*Microplitis similes*	10-12	-	-	
				3-10	*Apanteles* sp.	3-9	-	-	
					Microbracon sp.	3.5-7.0	-	-	
2.	White fly and Jassid	*Bemisia tabaci* Genn.	-	-	-	-	-	-	*Brumus suturalis*, *Coccinella septumpunctata*, *Menochiles sexmaculata*, *Chrysoperla carnea*, and *Mantis religiosa*
		Amrasca biguttula biguttula Ishida	-	-	-	-	-	-	
3.	Capitulum borer	*Helicoverpa armigera*	*Trichogramma chilonis*	50-65	*Campoletis chloridae*	20-70	-	-	*Chrysoperla carnea*, *Menochiles sexmaculata*, *Predatory bug* (*Cantheconidatia furcellata*), Spider
					Apanteles ruficrus	30-35	-	-	

have been observed to parasitise the larvae of cutworm up to extent of 5-8, 10-12, 3-9, and 7.0 per cent, respectively. The parasitisation was initiated in second week after sowing and reached to its peak in fourth week after sowing in summer and winter season crop. While one of the predator, *Dorylus labiatus* was observed predating on larvae of cutworm. The third week of March registered rather its severe attack due to high population of cutworm in the field of summer season sown crop. Chandla *et al.* (1998) concluded that *A. ipsilon* was parasitised by a number of parasitoids *viz*., *Microcentrus collaris*, *Microplitus similes Apanteles* sp. and *Microbracon* sp. ranging from 3.8 to 42.5 per cent parasitisation on *A. ipsilon* infesting potato crop.

During the present course of investigation, *Dorylus labiatus* has over been recorded predating up on the larvae of *A. ipsilon*. It is worth mentioning here that this predator is new record to predate on the larvae of *A. ipsilon*. On the basis of available literature, it appears that there is very rare and scanty information on record against this predator.

Seasonal species of Coccinellids (*Coccinella septumpunctata, Brumus suturalis, Menochiles sexmaculata),* Chrysopids (*Chrysoperla carnea*) and Dicteopteran (*Mantis religiosa*) were recorded as predators of whitefly and jassids during the course of present research work. It was also noticed that they were predating up on the sucking pests of sunflower crop in all the cropping seasons of summer, rainy and winter. Kumar and Singh (2009) reported that the combination of *Verticillium licani, Chrysoperla carnea* and Methyl-o-demeton reduces the aphid infestation and increases the yield in mustard. The predation by these predators have also been reported by Lakshminarayana and Bhatt (1996) who noticed that the population abundance (predators) keeps the pest population even at a level of check, thereby encouraging the concept of integrated management strategy, which is dire need of the day.

Highest (50-65 per cent) eggs of *Helicoverpa armigera* were parasitized by *Trichogramma chilonis* in winter season crop. While accounting larval parasitoids, *Campoletis chloridae* and *Apanteles* sp. have been observed parasitising the larvae of *H. armigera*. The parasitoid, *C. chloridae* first emerged in fourth week of December and larval parasitisation (20-70 per cent) was observed in third week of January. The occurrence of parasitisation was rather consistently parallel to the build up of pest population. *Apanteles* sp. caused maximum (30-35 per cent) parasitisation. The peak activity of pupal parasitisation was recorded in January (10-21 per cent). It is concluded that there is positive correlation in

population build up of larvae and extent of parasitisation. As regard predators, *Chrysoperla carnea*, *Menochiles sexmaculata*, spiders and predatory bug, *Cantheconidaia furcellata* were recorded predating up on the larvae *of H. armigera*. *Chrysoperla carnea* preyed up on the eggs and small larvae of capitulum borer. The population of these predators was in abundance in winter and summer while lesser population was recorded in rainy season crop. Verma *et al*. (1998) observed higher eggs parasitisation (80.6 per cent) by *Telenomus chilonis* on *H. armigera*. Similar results were also observed by Bhatt *et al*. (2009) who reported parasitoids and predators of *H. armigera* in vegetable ecosystems of Kashmir valley.

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