

RESEARCH NOTES

Natural Enemies of Scale Insects in Kashmir Valley, India

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Earlier records of predators and parasitoids of scale insects of Kashmir Valley were given by Zaka-ur-Rab (1983) and Masoodi and Trali (1987) respectively. Recently, Bhagat *et al.* (1991) and Ramzan *et al.* (1991) reported several species of coccids from this region. The present survey was conducted by random sampling method during 1985-86. The scale insect-infested materials were brought to the laboratory from the fields in different localities. The samples were kept in spacious jars / bottles or in glass tubes for emergence of natural enemies. Parasitoids

and predators were collected and preserved for identification.

The survey revealed a total of 7 species of predators (Coccinellidae) and 4 species of hymenopteran parasitoids. (Aphelinidae) attacking 5 species of scale insects, damaging 8 species of fruit and forest trees belonging to 4 different families (Table 1). The parasitoid, *Aphytis lingnanensis* Compere and predators viz., *Chilocorus bijugus* Mulsant, *C. rubidus* Hope, *Coccinella* -7-punctata Linnaeus and *Coptosoma* sp. are recorded for the first time from Kashmir Valley. Besides, new coccid

Table 1. Parasitoids and predators of some scale insects

Natural Enemies	Scale Insect Species	Host Plant
I. Parasitoids (Aphelinidae)		
1 <i>Aphelinus</i> sp.	<i>Pulvinaria inconspigua</i> <i>Eulecanium coryli</i>	<i>Celtis australis</i> <i>Prunus armeniaca</i>
2. <i>Aphytis lingnanensis</i>	<i>Quadraspidiotus perniciosus</i> <i>Parthenolecanium corni</i>	<i>Malus pumila</i> <i>Viburnum foetans</i>
3. <i>Aphytis paramaculicornis</i>	<i>Q.perniciosus</i>	<i>Malus pumila</i>
4. <i>Prospaltella perniciosi</i>	<i>Q.perniciosus</i>	<i>M.pumila</i>
II. Predators (Coccinellidae)		
1. <i>Chilocorus bijugus</i>	<i>E.coryli</i> <i>Q. perniciosus</i>	<i>Prunus domestica</i> <i>Pyrus communis</i>
2. <i>Chilocorus rubidus</i>	<i>E.coryli</i> , <i>Q.perniciosus</i>	<i>P.armenica</i> <i>M.pumila</i>
3. <i>Coccinella</i> -7-punctata	<i>E.coryli</i> <i>Lepidosaphes salicina</i>	<i>Cydonia oblonga</i> <i>Salix alba</i>
4. <i>Coccinella</i> -11-punctata	<i>E.coryli</i>	<i>C.oblonga</i>
5. <i>Coccinella undecimpunctata</i>	<i>Q.perniciosus</i>	<i>M.pumila</i>
6. <i>Coccinella</i> sp.	<i>Q.perniciosus</i>	<i>P.communis</i>
7. <i>Coptosoma</i> sp.	<i>Q.perniciosus</i>	<i>P.communis</i>

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host records of various species of predators and parasitoids, with observations on seasonal occurrence and population densities of these natural enemies were made.

1. *Aphytis* spp. : Hymenopteran parasites viz., *Aphytis lingnanensis* Compere and *A. paramaculicornis* DeBach and Rosen were obtained from the scale *Quadraspidiotus perniciosus* (Comstock) on apple tree, *Malus pumila*, collected in Srinagar, Handwara and Pattan during June. *A. lingnanensis* was also collected from the coccid, *Parthenolecanium corni* (Bouche) in Srinagar in May on the plant, *Viburnum foetans*. These hymenopteran parasites were able to reduce the scale populations to a certain extent in these localities.
2. *Aphelinus* sp. : Only a few adults of *Aphelinus* sp. were obtained from the coccid, *Pulvinaria inconspiqua* Danzig on *Celtis australis* at Kokernag in June and from *Eulecanium coryli* (Linnaeus) on the plant, *Prunus armeniaca* during late spring to summer in many places at Srinagar and Pattan.
3. *Chilocorus* spp. : *C. bijugus* Mulsant was found in high population density, attacking huge infestations of scale insect, *E. coryli* on the fruit tree, *Prunus domestica* at many localities in district Srinagar during late spring to summer. *C. bijugus* was also observed on *Q. perniciosus* infesting *Pyrus communis* at Harvan during late summer. *C. rubidus* Hope was noticed in many orchards of Srinagar on *Q. perniciosus* and *E. coryli* damaging fruit trees viz., *M. pumila* and *P. armeniaca* respectively during late spring to summer.
4. *Coccinella* spp. : Four species of *Coccinella* viz., *C. -7-punctata* Linnaeus, *C. 11-punctata*, *C. undecimpunctata* Linnaeus and *Coccinella* sp. were found on the scale insects of Kashmir Valley. *C. -7-punctata* and *C-11-punctata* were found to check the natural populations of the scale insect, *E. coryli* at a number of places in district Srinagar during late spring to summer season. The population of *Q. perniciosus* was suppressed to a lesser extent by *C. undecimpunctata* during summer. Besides,

Coccinella sp. was found on *Q. perniciosus* infesting *Pyrus communis* in a few places during late summer. *C-7-punctata* was found feeding on Oystershell scale insect, *Lepidosaphes salicina* (Borchsenius) on *Salix alba* during summer at many localities in Gurez Valley of Kashmir.

5. *Coptosoma* sp. : The coccinellid beetle, *Coptosoma* sp. was found to feed on *Q. perniciosus* on fruit trees, *M. pumila* and *P. communis* in many orchards of various districts of Kashmir Valley during summer.
6. *Prospaltella perniciosus* Tow. The samples of *Q. perniciosus* collected from apple trees in different districts yielded *Prospaltella perniciosus* Tow. in large numbers. The population density of this parasite was high during summer and this parasite was found to play a significant role in suppressing the San Jose Scale population in Kashmir orchards.

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KEY WORDS : Scale insects, parasites, predators

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