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Survey Of Scale Insects (Hemiptera: Coccoidea) Of Ornamental Plants From Kashmir Valley

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Abstract: ***A survey was conducted on the prevalence of scale insects on ornamental plant species in Kashmir. 12 species of scale insects Aspidoitus sp, Chionaspis furfura, Coccus hesperidum, Hemiberlesia, Eulecanium coryli, Diaspidiotus sp. Parthenolecanthium, Pulvinaria sp., Lepidosaphes sp, Parlatoria sp, Octapidiotus, Quadraspidiotus sp were collected belonging to two families- Diaspididae and Coccoidae, from 11 host plants Populus, Prunus, Cichorium, Rosa,Salix, Juglans,Cydonia, Cotonester,Cretaegus, Cedrus, Malvus which belonged to 5 families Saliaceae, Rosaceae, compositae, Juglandaceae and Pinaceae were recorded. In addition, we describe the injury caused by scale insects on ornamental plants.***

Keywords: Scale insect diversity, Scale/plant associations, and Floricultural pests

I. INTRODUCTION

Scale Insects or coccids, commonly known as bark-lice belong to the super family Coccoidea and order Homoptera. They have been found to attack large number of host plants, including economically important species from different localities of Kashmir valley. Scale insects have been found to infest different types of vegetation in the valley. The scale insects have been collected from different ecological habitats, localities and altitudes. These are mainly phytophagous, damaging a number of plant species belonging to different families. Scale insects attack not only the wild plants but also the cultivated ones.

Scale insects (Superfamily Coccoidea) stand out as important pests among insects that feed on ornamental plants (De Lotto, 1976; Deklen, 1965). They cause damage to plants directly by sucking their sap, and indirectly by injecting toxic salivary secretions, transmitting pathogens, attracting ants, and encouraging the development of sooty-mold (Zahradník, 1990). Besides their impact on the commercial value of ornamental plants, these insects also affect urban landscapes. Many species are serious pests of agricultural, horticultural, silivicultural and forestry importance, including medicinal and green house plants.

Recent publications include Bergmann & Alexandre (1995) and Imenes and Alexandre (1996); they discuss the occurrence of pests, diseases, and forms of control in roses *(Rosa* sp.) and Chrysanthemums *(Cilzrysarzthemum* sp.), respectively. Favero (1996) describes some pests of flowers, ornamental foliage, and orchids and gives methods of control, and Imenes and Bergmann (2000) characterize the principal pests of ornamental plants including some scale insect-plant interactions and provide information on control strategies. The objective of this study was to survey scale insect-plant interactions in ornamental plants in Kashmir. In addition, we classified the species of scale insects according to their host specificity and characterized host-plant injury caused by scale insects.

II. MATERIALS AND METHODS

Weekly, random samples of live scale insects were collected, infesting different host plant species, occurring in different ecological habitats and at different altitudes of Kashmir valley. The minimum equipment required for the field collection of coccids included, a pair of stout scissors,

forceps, brush, polythene bags of different sizes, rubber bands and a field lens.

The scale infested parts of the host plants were cut and kept in polythene bags. They were tied with rubber band and carried to laboratory for rearing. The rearing of large coccids was done in specimen jars. The adult coccids were preserved either with infested part of the host plant or scales removed from the plant and mounted on a card board strip for further examination.

In the laboratory, scale insects were collected from host plants with brushes and were stored in vials filled with 70% alcohol. They were mounted on microscope slides according to the technique described by Granara de Willink (1990).Scale insects were identified with a compound light microscope using keys Granara de Willink (1999) and Hodgson (1994) for Coccidae. Most of the scale insects were sent to specialists for confirmation of final identifications. Categorization of scale insect host-plant specificity was based in large part on classic definitions, in which "polyphagous" is used for species that live on a variety of non-related plants, i.e., plants from different families and, "oligophagous" is defined as species that live on a reduced number of non-related host plants. We defined "monophagous" as species that feed on one or more plants of the same family

III. RESULT AND DISCUSSION

12 species of scale insects *Aspidoitus sp, Chionaspis furfura, Coccus hesperidum, Hemiberlesia, Eulecanium coryli, Diaspidiotus sp. Parthenolecanthium, Pulvinaria sp., Lepidosaphes sp, Parlatoria sp, Octapidiotus, Quadraspidiotus sp* were collected belonging to two families- Diaspididaae and Coccoidae, from 11 host plants *Populus, Prunus, Cichorium, Rosa, Salix, Juglans, Cydonia, Cotonester, Cretaegus, Cedrus, Malvus* which belonged to 5 families Saliaceae, Rosaceae, compositae, Juglandaceae and Pinaceae were recorded (Table 1).

Based on host-plant information provided in Morrison (1952), Vernalha (1953), Silva et al. (1968), Ben-Dov (1993, 1994), Ben-Dov et al. 2001, and Williams and Granara de Willink (1992), 13 of the scale-insect species are polyphagous, 5 are oligophagous, and 3 are monophagous (Table 1).

Most samples of scale insects were collected from plants growing in pots or narrow flower beds in the shade (indoors) or semi-shade (under nursery netting, trees, or open porches). In larger flowerbeds where these pests were found, they appeared in small numbers. Dense scale-insect populations were observed on the majority of host plants. Most infested plants showed symptoms such as dried or shrivelled leaves; in a small number of cases flowers or fruit were aborted and leaves were deformed. Chlorosis of leaf tissue was detected mainly on hosts infested by species of Diaspididae.

Our work is in accordance with the reports elsewhere. *Eriococcus carnpinensis* (Eriococcidae), described by Hempel (1937), and *Acutaspis oliverai* (Diaspididae), described by Lepage and Giannotti (1942), are recorded from Brazil only, and *Orthezia molinarii* (Ortheziidae) and *Phenacoccus similis* (Pseudococcidae), previously were recorded by Morrison (1952) and Williams and Granara de Willink (1992), respectively, only in Argentina. *Kuwanaspis bambusicola* (Diaspididae), collected from *Balnbusa gracilis,* is a monophagous species. According to Ben-Dov (1990), this species has been reported from species in only two genera of bamboo, *Bambusa* and *Dendrocalamus.*

In our study sooty-mold was found frequently on plants infested by species of Diaspididae and Coccoidae. Similar reports are from the study conducted in Brazil by Peronti *et al*, (2001) where a large amount of sooty mold was found on *Nectandra megapotamica* infested by *Nipaecoccus nipae* (Pseudococcidae) and on *Schefflera arboricola* and *S. actinophylla* infested by *Orthezia* sp. (Ortheziidae).

Similarly withered and dead plants observed during present study have also been reported by Peronti *et al*, (2001) where *Cordilyne terminalis* were observed infested by *P. longispinus* (Pseudococcidae) as were plants of *Asparagus dendriflorus* and *Murraya exotica* infested by *Pinnaspis strachani* (Diaspididae), and *Saintpaulia ionantha* infested by *Phenacoccus similis* (Pseudococcidae).

In conclusion of present study the plants were apparently negatively impacted because of direct and indirect damage caused by these insects. In most cases, it was not possible to determine the extent of the ultimate destruction caused by these insects because most infested hosts were treated in some way to protect them from extensive damage.

S.No	Species	Family	Host Plant	Plant species
1	*Aspidoitus*	Diaspididae	*Populus*	Saliaceae
2	*Chionaspis furfura*	Diaspididae	*Prunus*	Rosaceae
3	*Coccus hesperidum*	Coccoidae.	*Cichorium; Rosa*	compositae Rosaceae
4	*Diaspidiotus sp.*	Diaspididae	*Juglans regia Salix sp*	Juglandaceae Salicaceae
5	*Eulecanium coryli*	Coccoidae.	*Cydonia oblonga Cotoneaster sp Prunus sp. Salix*	Rosaceae Rosaceae Rosaceae Salicaceae
6	*Hemiberlesia*	Coccoidae.	*Populus*	Rosaceae
7	*Parthenolecanthium*	Coccoidae	*Cretaegus*	Rosaceae
8	*Pulvinaria sp.*	Coccoidae	*Populus*	Rosaceae
9	*Lepidosaphes sp*	Diaspididae	*Salix*	Salicaceae
10	*Parlatoria sp*	Diaspididae	*Cedrus*	Pinaceae
11	*Octapidiotus*	Diaspididae	*Rosa indica*	Rosaceae
12	Quadraspidiotus sp	Diaspididae	*Cydonia Malvus Populas Prunus Salix*	Rosaceae Rosaceae Rosaceae Rosaceae Salicaceae

Table 1: showing species of scale insects belonging to two families collected with host plants and their families

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