

**PREDATORS AND PARASITES OF APHIDS FROM NORTH WEST
AND WESTERN HIMALAYA III. TWENTYFIVE SPECIES OF
COCCINELLIDAE (COLEOPTERA : INSECTA) FROM
GARHWAL AND KUMAON RANGES**

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INTRODUCTION

The coccinellids or ladybird beetles are regarded as a significant component in the whole complex of factors utilizable in pest management (Hodek, 1973). Most of the previous works reveal the stray records of different coccinellids in association with their prey and fail to exhibit the real association. The reported polyphagy of many coccinellids, as Hodek (1959) also pointed out, may result from the failure of investigators to distinguish between acceptability and suitability of their food. About three decades ago, Thompson (1951) warned that the accumulation of such inaccurate information will lead to a faulty decision in biocontrol programme.

The present communication is the first consolidated report of aphidophagous coccinellid through an extensive survey in the Garhwal and Kumaon ranges of western Himalaya over a period of 3 years (1982-'85). An analysis of data reveals that 25 species of coccinellids prey upon 52 species of aphids infesting 45 different host plants. Among them, 6 are newly recorded as aphidophagous species from India (denoted by * mark) and 8 from western Himalaya (denoted by **mark). The host plants of aphids are given in parenthesis.

MATERIAL AND METHODS

During field survey, coccinellid larvae, pupae and adults found in association with the aphid colony were collected from several localities of Garhwal and Kumaon ranges of western Himalaya (Fig. 1). These were brought to the field laboratory at Joshimath c 1875 meters (Garhwal), Uttar Pradesh and were kept in separate round plastic containers (8 x 5 cms) with adequate specific aphid species (mostly apterous viviparous females and nymphs) on fresh leaves/stems in case of adults and larvae and without aphids in case of pupae. Adequate moisture was maintained through wet-cotton pads placed within the containers. The open mouth of the containers were tightly closed by nylon nets. Adults emerged from the pupae were subsequently placed within the containers having specific aphid species on plant material. The prey aphids and the plant material were renewed at regular intervals (usually after 24 hrs.).

Observations were made everyday whether the coccinellid adults and larvae really feed on the specific aphid species or not. Unless there is feeding and/or breeding experiments, such observations were discontinued after about a week. Coccinellid adults and larvae that were collected in aphid association but do not feed on that aphid species in the laboratory condition were excluded from the present list.

SYSTEMATIC ACCOUNTS

Family COCCINELLIDAE

Subfamily CHILOCORINAE

Tribe CHILOCORINI

1. ** *Chilocorus rubidius* Hope*Prey aphid* : *Micromyzodium filicium* David (*Cheilanthes* sp.).*Season* : August.*Habitat* : Herbage.*Locality* : Hanumanchatti, Lambagar (Garhwal).

Adult of this coccidophagous species were noted to feed on aphids in the area of study which also supports earlier records from India (Raychaudhuri *et al.*, 1979; Ghosh and Raychaudhuri, 1982).

Tribe PLATYNASPINI

2. ** *Platynaspis saundersi* Crotch

Prey aphids : *Aphis gossypii* Glover (*Cucurbita* sp.), *A. kurosawai* Takahashi (*Artemisia vulgaris*), *Cavariella aegopodii* (Scopoli) (*Salix tetrasparma*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris* sp), *Melanaphis* nr. *aurandinariae* (Takahashi) (*Pyrus pashia*), *Sappaphis* sp. (*Cotoneaster obtusus*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

Season : May-July.*Habitat* : Cropfield, orchard, herbage.*Locality* : Bargaon, Gobindghat, Helong, Joshimath, Karnaprayag, Pulnagaon, Ra-bigaon, Sakri, Salnagaon, Tapaban, Urgam (Garhwal), Khati (Kumaon).

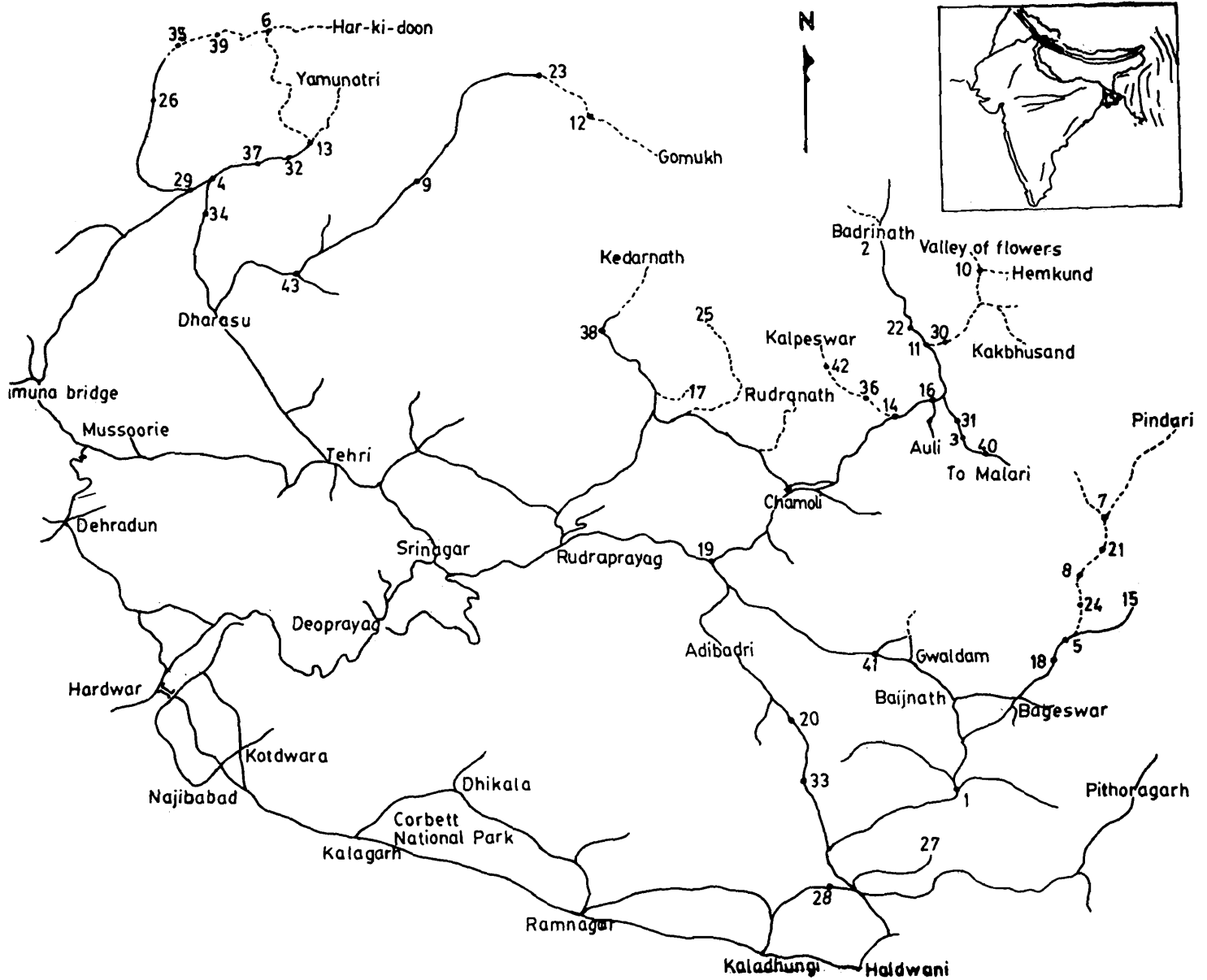
This is the only representative of aphidophagous Platynaspini in India. Previously it was reported once from Kalimpong preying on an unidentified aphid (Rao, 1969).

Subfamily COCCINELLINAE

Tribe COCCINELLINI

3. *Adalia tetraspilota* (Hope)

Prey aphids : *Aphis kurosawai* Takahasi (*Artemisia vulgaris*), *Brachycaudus helichrysi* (Kaltenbach) (*Prunus persica*), *Callaphis juglandis* (Goeze) (*Juglans regia*), *Capitophorus carduinus* (Walker), *C. eleagni* (del Guercio) (*Cnicus wallichii*), *Cavariella*



aegopodii (Scopoli) (*Salix tetrasperma*), *Chromaphis juglandicola* (Kaltenbach) (*Juglans regia*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Liosomaphis himalayensis* Basu (*Berberis asiaticum*), *Hyalopterus pruni* (Geoffroy) (*Prunus persica*), *Macrosiphum rosae* (Linnaeus) (*Rosa* sp.), *M. (Sitobion) miscanthi* (Takahashi) (*Triticum aestivum*), *M. (S.) rosaeiformis* Das (*Rosa* sp.), *Melanaphis* nr. *aurandinariae* (Takahashi) (*Pyrus pashia*), *Mollitrichosiphum* sp. (*Alnus nepalensis*), *Myzus dycei* Carver (*Urtica dioica*), *Myzus sorbi* Bhattacharya and Chakrabarti (*Sorberia tomentosa*), *Prociphilus* sp. (*Lonicera quinquelocularis*).

Season : March - July.

Habitat : Cropfield, herbage, orchard, tree.

Locality : Joshimath, Rana, Tapaban (Garhwal); Dawali (Kumaon).

This is the only aphidophagous *Adalia* species, so far recorded from India (Rao, 1969, Verma and Chowdhuri, 1975).

4. **Aiolocaria hexaspilota* (Hope)

Prey aphid : *Lachnus salicis* Chakrabarti and Raha (*Salix babylonica*).

Season : October.

Habitat : Garden.

Locality : Joshimath (Garhwal).

5. **Calvia punctata* (Mulsant)

Prey aphid : *Myzus dycei* Carver (*Urtica dioica*).

Season : July.

Habitat : Roadside herbage.

Locality : Joshimath (Garhwal).

6. *Calvia* sp.

Prey aphid : *Mollitrichosiphum* sp. (*Alnus nepalensis*).

Season : July.

Habitat : Tree.

Locality : Joshimath (Garhwal).

7. *Coccinella septempunctata* L.

Prey aphids : *Aphis rubi elliptici* Stroyan and Nagaich (*Rubus ellipticus*), *Brachycaudus helichrysi* (Kaltenbach) (*Erigeron* sp., *Prunus persica*), *Brevicoryne brassicae* (L.) (*Brassica campestris*, *B. oleracea*), *Cavariella aegopodii* (Scopoli) (*Salix tetrasperma*), *C. indica* Maity and Chakrabarti (*S. babylonica*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Eutrichosiphum* sp. (*Quercus* sp.), *Hayhurstia atriplicis* (L.) (*Chenopo-*

dium album), *Hyalopterus pruni* (Geoffroy) (*Prunus persica*), *Liosomaphis himalayensis* Basu (*Berberis asiaticum*), *Lipaphis erysimi* (Kaltenbach) (*Brassica campestris*, *B. oleracea*, *Raphanus sativus*), *Macrosiphum rosae* (L.) (*Rosa* sp.), *M. (Sitobion) miscanthi* Takahashi (*Triticum aestivum*), *M. (S.) rosaeiformis* Das (*Rosa* sp.), *Melanaphis* sp. (*Pyrus pashia*), *Melanaphis* sp. (*Bambusa* sp.), *Myzocallis polychaetus* David (*Quercus* sp.), *Myzus dycei* Carver (*Urtica dioica*), *M. sobi* Bhattacharya and Chakrabarti (*Sorberia tomentosa*), *Phorodon cannabidis* Passerini (*Cannabis sativa*), *Prociphilus* sp. (*Lonicera quinquelocularis*), *Rhopalosiphum maidis* (Fitch) (*Triticum aestivum*), *Sappaphis* sp. (*Cotoneaster obtusus*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.), *Taoia indica* (Ghosh and Raychaudhuri) (*Alnus nepalensis*), *Takecallis himalayaensis* Chakrabarti (*Bambusa* sp.), *Uroleucon sonchi* (L.) (*Sonchus arvensis*).

Season : March - October.

Habitat : Cropfield, garden, orchard, roadside herbage, tree.

Locality : Datmeer, Ghangaria, Helong, Jhopra, Joshimath, Madmaheswar, Sakri, Taluka (Garhwal); Dhakuri, Khati, Mukteswar, Nainital (Kumaon).

8. ***C. transversalis* Thunberg

Prey aphids : *Brevicoryne brassicae* (L.) (*Brassica campestris*, *B. oleracea*, *Raphanus sativus*), *Macrosiphum (S.) miscanthi* Takahashi (*Triticum aestivum*).

Season : April - May.

Habitat : Cropfield.

Locality : Joshimath (Garhwal).

This species is collected for the first time from temperate region. Previously this was known from Andhra Pradesh, Karnataka and West Bengal (Rao, 1969, Nath and Sen, 1976, Joshi *et al.*, 1979, Ghosh *et al.*, 1981).

9. *Coelophora sexareata* (Mulsant)

Prey aphid : *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

Season : September.

Habitat : Herbage.

Locality : Joshimath, Mouri (Garhwal).

10. ** *Exochomus uropygialis* (Mulsant)

Prey aphids : *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Prociphilus* sp. (*Lonicera quinquelocularis*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

Season : May - July.

Habitat : Orchard, roadside herbage.

Locality : Gongotri, Joshimath, Lanka (Garhwal).

11. ** Halyzia sanscrita Mulsant

Prey aphids : *Avecennina indica* Chakrabarti and Maity (*Prunus cornuta*), *Capitophorus formosartemisiae* (Takahashi) (*Artemisia vulgaris*), *Chaitophorus kapuri* H.R.L. (*Populus ciliata*), *Cinara* sp. (*Pinus excelsa*), *Mollitrichosiphum* sp. (*Alnus nepalensis*), *Pemphigus mordvilko* Cholodkovsky (*Populus ciliata*), *Prociphilus* sp. (*Lonicera quinquelocularis*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

Season : May - August.

Habitat : Herbage, tree.

Locality : Badrinath, Govindghat, Joshimath, Lambagarh, Sayanachatti (Garhwal).

Though known to be mycophagous (Hodek, 1973), this coccinellid has been observed to feed and breed on the following aphids - viz., *Mollitrichosiphum* sp. (*Alnus nepalensis*) and *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

12. Harmonia eucharis (Mulsant)

Prey aphids : *Brachycaudus helichrysi* (Kaltenbach) (*Anaphalis marginata*, *Prunus amygdalus*, *P. domestica*, *P. persica*), *Chaitophorus kapuri* H.R.L. (*Populus ciliata*), *Cinara* sp. (*Pinus excelsa*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Hayhurstia atriplicis* (L.) (*Chenopodium album*), *Hyalopterus pruni* (Geoffroy) (*Prunus persica*), *Liosomaphis himalayensis* Basu (*Berberis asiaticum*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*), *Macrosiphum rosae* (L.) (*Rosa* sp.), *Pemphigus matsumurai* Monzen (*Populus ciliata*), *Phorodon cannabis passerini* (*Cannabis sativa*).

Season : March - September.

Habitat : Garden, orchard, roadside herbage, tree.

Locality : Helong, Joshimath, Lambagarh, Rabigaon, Sakri, Taluka, Thorali (Garhwal); Khati (Kumaon).

13. *H. sedecimnotata (Fabricius)

Prey aphids : *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Mollitrichosiphum* sp. (*Alnus nepalensis*).

Season : May - July.

Habitat : Orchard, tree.

Locality : Joshimath, Rabigaon (Garhwal).

14.** Harmonia (Leis) dimidiata (Fabricius)

Prey aphids : *Cavariella indica* Maity and Chakrabarti (*Salix babylonica*), *Cinara* sp. (*Pinus excelsa*), *Epipemphigus imaicus* (Cholodkovsky) (*Populus ciliata*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*), *Phorodon cannabis* Passerini (*Cannabis sativa*).

Season : April - May, September - October.

Habitat : Orchard, roadside harbage, tree.

Locality : Joshimath (Garhwal).

15. *Hippodamia (Adonia) variegata* (Goeze)

Prey aphids : *Aphis clematidis* Koch (*Clematis buchaniana*), *A. kurosawai* Takahashi (*Artemisia vulgaris*), *Aphis* sp. (*Boerhaavia diffusa*), *Brachycaudus helichrysi* (Kaltenbach) (*Erigeron bonariensis*), *Brevicoryne brassicae* (L.) (*Brassica campestris*), *Capitophorus formosartemisiae* (Takahashi) (*Artemisia vulgaris*), *Liosomaphis himalayiensis* Basu (*Berberis asiaticum*), *Lipaphis erysimi* (Kaltenbach) (*Brassica campestris*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*), *Macrosiphum (Sitobion) miscanthi* Takahashi (*Triticum aestivum*), *Melanaphis* nr. *aurandinariae* (Takahashi) (*Pyrus pashia*), *Myzus dycei* Carver (*Urtica dioica*), *M. Sorbi* Bhattacharya and Chakrabarti (*Sorberia tomentosa*), *Rhopalosiphium maidis* (Fitch) (*Triticum aestivum*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

Season : March - May, August.

Habitat : Cropfield, orchard, harbage.

Locality : Joshimath, Karnaprayag, Monsoona, Sonprayag (Garhwal); Kausani, Loharkhet (Kumaon).

16.* *Lioadalia* nr. *luteopicta* Mulsant

Prey aphid : *Cavariella* sp. (*Chaerophyllum acuminatum*).

Season : August.

Habitat : Herbage.

Locality : Ghangaria (Garhwal).

This beetle species also occurs on balsam woolly aphid, *Adelges piceae* in India (Rao *et al.*, 1971).

17. *Menochilus sexmaculatus* (Fabricius)

Prey aphids : *Aphis kurosawai* Takahashi (*Artemisia vulgaris*), *Cavariella indica* Maity and Chakrabarti (*Salix babylonica*), *Epipemphigus imaicus* (Cholodkovsky) (*Populus ciliata*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*, *M. sanborni* (Gillette) (*Chrysanthemum* sp.), *Macrosiphum (Sitobion) miscanthi* Takahashi (*Triticum aestivum*), *Phorodon cannabis* Passerini (*Cannabis sativa*), *Prociphilus* sp. (*Lonicera quinquelocularis*).

Season : May - July, September - October.

Habitat : Cropfield, herbage, tree.

Locality : Joshimath, Kalimath, Uttar Kashi (Garhwal); Kausani, Kapkot, Khati, Turturia-bridge (Kumaon).

18. ** *Micraspis discolor* (Fabricius)

Prey aphid : *Capitophorus eleagni* (del Guercio) (*Cnicus wallichii*).

Season : June.

Habitat : Herbage.

Locality : Joshimath (Garhwa)

19. * *Oenopia billieti* (Mulsant)

Prey aphids *Macrosiphum rosae* (L.), *M. (Sitobion) rosaeiformis* Das (*Rosa* sp.), *Myzus sorbi* Bhattacharya and Chakrabarti (*Sorberia tomentosa*), *Prociphilus* sp. (*Lonicera quinquelocularis*), *Sappaphis* sp. (*Cotoneaster obtusus*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

Season : May - July.

Habitat : Garden, roadside herbage.

Locality : Joshimath, Uttar Kashi (Garhwal); Dawali, Khati (Kumaon).

20. *O. kirby* Mulsant

Prey aphids : *Aphis kurosawai* Takahashi (*Artemisia vulgaris*), *Cavariella aegopodii* (Scopoli) (*Salix tetrasperma*), *C. indica* Maity and Chakrabarti (*Salix babylonica*), *Capitophorus formosartemisiae* (Takahashi) (*Artemisia vulgaris*), *C. eleagni* (del Guercio) (*Cnicus wallichii*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Liosomaphis himalayensis* Basu (*Berberis asiaticum*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*) *M. sanborni* (Gillette) (*Chrysanthemum* sp.), *Macrosiphum rosae* (L.), *M. (Sitobion) rosaeiformis* Das (*Rosa* sp.), *Mollitrichosiphum* sp. (*Alnus nepalensis*), *Myzus dycei* Carver (*Urtica dioica*), *Phorodon cannabis* Passerini (*Cannabis sativa*).

Season : May - October.

Habitat : Garden, orchard, herbage, tree.

Locality : Joshimath, Sayanachatti, Uttar Kashi (Garhwal); Almora, Dhakuri, Kausani, Nainital, Ranikhet (Kumaon).

Ghosh, Debnath and Chakrabarti (1986) studied development of this species on *Capitophorus formosartemisiae*, *Brevicoryne brassicae*, *Eriosoma lanigerum* and *Macrosiphum (Sitobion) rosaeiformis*.

21. *O. sauzeti* Mulsant

Prey aphids : *Aphis gossypii* Glover (*Cucumis* sp.), *A. kurosawai* Takahashi (*Artemisia vulgaris*), *Brachycaudus helichrysi* (Kaltenbach) (*Prunus persica*), *Capitophorus eleagni* (del Guercio) (*Cnicus wallichii*), *Capitophorus formosartemisiae* Takahashi (*Artemisia vulgaris*), *Cavariella aegopodii* (Scopoli) (*Salix tetrasperma*), *C. indica* Maity and Chakrabarti (*Salix babylonica*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Hayhurstia atriplicis* (L.) (*Chenopodium album*), *Hyalopterus pruni* (Geoffroy) (*Prunus persica*), *Liosomaphis himalayensis* Basu (*Berberis asiaticum*, *Berberis* sp.), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*), *Macrosiphoniella sanborni* (Gillette) (*Chrysanthemum* sp.), *Macrosiphum rosae* (L.), *M. (Sitobion) rosaeiformis* Das (*Rosa*

sp.), *Malanaphis* nr. *aurandinariae* (Takahashi) (*Pyrus pashia*), *Mollitrichosiphum* sp. (*Alnus nepalensis*), *Myzus dycei* Carver (*Urtica dioica*), *Phorodon cannabis* Passerini (*Cannabis sativa*), *Shinji orientalis* (Mordvilko) (*Pteris* sp.).

Season : April - October.

Habitat : Cropfield, orchard, garden, roadside herbage, tree.

Locality : Barkot, Gobindghat, Helong, Joshimath, Karnaprayag, Monsoona, Rari, Sakri, Sayanachatti, Taluka, Uttar Kashi (Garhwal); Bharari, Dhakuri, Kapkot, Kausani, Khati, Nainital (Kumaon).

This species is widely distributed throughout the Himalayan ranges of India. In 1968, a good number of this beetle were sent to New Zealand to control cabbage and cereal aphids but failed to establish there (Rao *et al.*, 1971). Ghosh, Debnath and Chakrabarti (1986) studied the development of this species on the following aphids viz., *Capitophorus formosartemisiae*, *Brevicoryne brassicae*, *Eriosoma lanigerum*, *Macrosiphum* (*Sitobion*) *rosaeiformis*.

22. *Oenopia* sp.

Prey aphids : *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*), *Rhopalosiphoninus* sp. (*Elsholtzia fruticosa*).

Season : July.

Habitat : Herbage.

Locality : Joshimath, Syanachatti (Garhwal); Khati (Kumaon).

23. ** *Pania luteopustulata* (Mulsant)

Prey aphids : *Brachycaudus helichrysi* (Kaltenbach), *Brevicoryne brassicae* (L.) (*Brassica campestris*), *Cavariella aegopodii* (Scopoli) (*Salix tetrasparma*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*), *M. sanborni* (Gillette) (*Chrysanthemum* sp.), *Macrosiphum rosae* (L.) (*Rosa* sp.), *M. (Sitobion) miscanthi* Takahashi (*Triticum aestivum*), *M. (S.) rosaeiformis* Das (*Rosa* sp.), *Myzus dycei* Carver (*Urtica dioica*), *M. sorbi* Bhattacharya and Chakrabarti (*Sorberia tomentosa*), *Phorodon cannabis* Passerini (*Cannabis sativa*), *Prociphilus* sp. (*Lonicera quinquelocularis*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.).

Season : May - July, September - October.

Habitat : Cropfield, garden, roadside herbage, tree, orchard.

Locality : Joshimath, Nanugoan, Taluka (Garhwal).

Ghosh, Debnath and Chakrabarti (1986) studied the development of this species on the following aphid species viz., *Capitophorus pseudoartemisiae*, *Brevicoryne brassicae*, *Eriosoma lanigerum*, *Macrosiphum* (*Sitobion*) *rosaeiformis*.

24.* *Synharmonia signatella* (Mulsant)

Prey sphid *Melanaphis* sp. (*Bambusa* sp.).

Season : July.

Habitat : Tree.

Locality : Taluka (Garhwal).

Subfamily SCYMNINAE

Tribe SCYMNINI

25. *Scymnus* spp.

Prey aphids : *Aphis craccivora* Koch (*Vigna* sp.), *A. gossypii* Glover (*Cucurbita* sp.), *A. kurosawai* Takahashi (*Artemisia vulgaris*), *A. ruborum* Börner (*Rubus ellipticus*), *A. verbasci* Schrank (*Verbascum thapsus*), *Brachycaudus helichrysi* (Kaltenbach) (*Prunus persica*), *Brevicoryne brassicae* (L.) (*Brassica campestris*), *Capitophorus formosartemisiae* (Takahashi) (*Artemisia vulgaris*), *Eriosoma lanigerum* (Hausmann) (*Pyrus malus*), *Lipaphis erysimi* (Kaltenbach) (*Brassica oleracea*), *Macrosiphoniella pseudoartemisiae* Shinji (*Artemisia vulgaris*), *M. sanborni* (Gillette) (*Chrysanthemum* sp.), *Macrosiphum rosae* (L.) (*Rosa* sp.), *Melanaphis* nr. *aurandinariae* (Takahashi) (*Pyrus pashia*), *Rhopalosiphum maidis* (Fitch) (*Zea mays*), *Shinjia orientalis* (Mordvilko) (*Pteris* sp.), *Toxoptera citricidus* (Kirkaldy) (*Citrus* sp.), *Uroleucon sonchi* (L.) (*Sonchus arvensis*).

Season : April - October.

Habitat : Cropfield, garden, herbage, orchard.

Locality : Helong, Joshimath, Nanugoan, Rabigaon (Garhwal); Almora, Kapkot, Khati (Kumaon).

DISCUSSION

Most coccinellids are active fliers and able to move about in search of suitable hosts. In fact, the tendency to disperse or migrate from areas where hosts are not available sometimes substantiate their effectiveness in preventing pest outbreaks. Coccinellid aggregation in mountains e.g., *Coccinella septempunctata*, *Hippodamia* species (Mani, 1962) have been noticed and perhaps after the hibernation when predator population in the field is very less, these predators migrate towards the pest population sites. Thus, the preservation of these hibernating sites of the predators are also important. The similar orientation pattern of adult and larval stages of any predatory beetle further compensate the time lag in population synchronisation of prey and predators.

With regard to their prey utilization pattern, *C. septempunctata* (26) ranks the top followed by *Oenopia sauzeti* (21), *Adalia tetraspilota* (18) and others. Further, members of subfamily Aphidinae are much more prone to predation by coccinellids followed by Pemphiginae, Drepanosiphinae, Greenideinae and Chaitophorinae. Pronounced predatory activity is noticed during the spring-summer months when large number of coccinellids appear from their hibernation quarters. This period also coincides with the period of abundance of aphid prey.

Though George (1957) noticed that *Brevicoryne brassicae* was avoided by coccinellids for waxy covering on the former's body, in our study we observed that as many as five coccinellid species are predaceous on this aphid. Similarly, *Eriosoma lanigerum*, another aphid species with similar waxy body covering was found to be predated by at least 11 coccinellid species. *Hyalopterus pruni* was seen to be predated upon by *A. tetraspilota*, while *A. decempunctata* (Dixon, 1958) and *A. bipunctata* (Hawkes, 1920) immediately reject it. Our observation which is also in conformity with Hodek (1959) shows that this aphid seems to be the essential food for *C. septempunctata*. Since, *H. pruni* generates the population in summer, the coccinellids can ingest the wax at higher temperature. We could get abundance of *Platynaspis saundersi* and its descendant larvae predated at least on 8 aphid species, though its aphidophagous nature has been questioned by Hodek (1973). Similarly, *Halyzia sanscrita*, a mycophagous species, exhibits aphidophagous habit in the present area of study.

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SUMMARY

This paper reports 25 species of coccinellids as predators of 52 species of aphids, infesting 45 different host plants from Garhwal and Kumaon ranges of western Himalaya, India. Among them, 6 species are newly recorded as predators of aphids from India and 8 from western Himalaya.

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