

First Records of Coccinellid Beetles (Coccinellidae) from the Haridwar, (Uttarakhand), India

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ABSTRACT.– A survey of predatory and mycophagous Coccinellid beetles (Coleoptera: Coccinellidae) was conducted at four sites, representing four different ecosystems and altitudes ranging between 210 to 305 m within the Haridwar district, India, over a period of two years (July 2005 to June 2007). A total of 3502 adult Coccinellid specimens were collected and identified to 31 species, of which 19 species were recorded for the first time from within the Haridwar. These 19 newly recorded species belonged to 16 genera of four tribes and three subfamilies. The following 16 species belonged to the sub family Coccinellinae and tribe Coccinellini: *Adalia decempunctata* (Linnaeus), *Anegleis cardoni* (Weise), *Cheilomenes sexmaculata rufafasciata* (Fabricius), *Coelophora 9-maculata* (Mulsant), *Coelophora ramosa* (Olivier), *Harmonia dimidiata* (Fabricius), *Hippodamia variegata* (Goeze), *Hippodamia* sp., *Illeis cincta* (Fabricius), *Megalocaria dilatata* (Fabricius), *Micraspis discolor* (Fabricius), *Micraspis vineta* (Fabricius), *Phrynocaria* sp., *Propylea dissecta* (Mulsant), *Halyzia sanscrita* (Mulsant) and *Psyllobora bisoctonata* (Mulsant). Two species occurred in the subfamily Chilocorinae and tribe Chilocirini: *Brumoides suturalis* (Fabricius) and *Chilocorus nigrita* (Fabricius) and only one species *Rodolia sexnotata* (Mulsant) represented the Noviini tribe of the subfamily Coccidulinae.

KEY WORDS: New record, Coccinellid beetles, Coccinellidae, Coleoptera, predatory

INTRODUCTION

Coccinellids or ladybirds, are members of family Coccinellidae, and are amongst the most familiar beetles known variously as ladybirds (generic English, Australian and South African), ladybugs (North American).

The family name comes from its type genus, *Coccinella*. Most of them have bright shining colors with a pattern of spots or patches against a contrasting background. Many appear to be distasteful to birds, and their conspicuous appearance is an example of aposematic warning coloration (Moreton, 1969).

Numerous species of coccinellids are predators and major biological control

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agents of hemipteran pests such as aphids, mealybugs and scale insects, as well as thrips (Thysanoptera) and mites (Acarina) in all parts of the world (Moreton, 1969; Hawkeswood, 1987; Majerus, 1994). Some are specific in their food choice, whilst many are polyphagous. The introduction of the vedalia ladybird, *Rodolia cardinalis* Mulsant, from Australia into California in 1888 to control the cottony cushion scale, *Icerya purchasi*, which threatened the citrus industry, is widely regarded the most successful instances of biological pest control by coccinellids (Majerus, 1994). However, as with most native introductions, other species such as introduction of *Harmonia axyridis* and *Coccinella septempunctata* into North America and Canada, results in the rapid out competition and displacement of native coccinellids, with the introduced species becoming pest in their own right.

The family Coccinellidae comprises some 5,200 described species worldwide (Hawkeswood, 1987). A survey of the available literature (Table 1) revealed only a few studies on the species composition of coccinellid beetles in India with no specific mention about the previous records from the Haridwar region. However, Poorani (2002 b) has listed 400 species of Coccinellids from Indian subregion, which includes the erstwhile state of Uttar Pradesh including the Uttarakhand.

Omkar and Bind (1993) have reported 6 species of coccinellids from Lucknow region of central U.P., to this Omkar and Bind (1995, 1996) added 17 new species, whilst Omkar and Pervez (1999, 2000, 2002) further added 17 more species from the same region. Poorani (2003) recently reported a new species *Telsimia flavo-*

maculata from Karnataka, India, which given the parsity of detailed study of coccinellids in this region, illustrates the potential of novel biodiversity still awaiting discovery. Indeed, the coccinellid fauna of the Indian subcontinent is rich and diverse, but remains very poorly studied as compared to those from other zoogeographical regions of the world. The objective of this study was to investigate the species composition of coccinellid beetles within the Haridwar district of the Uttarakhand, India.

MATERIALS AND METHODS

Study area:

The present study was carried out in the Haridwar district, which is situated at 29° 59' 30" to 30° 0.5' 0.0" N latitude and 78° 04' 38" to 78° 15' 30" E longitude. The study area shows three distinct seasons winter, summer and monsoon. Winter season continues from November to February and the days are moderate and nights are very cold with freezing frost during winter months. The summer season is from March to June, with a maximum temperature of up to 42 °C during the day time. The monsoon season starts from July and continues until about the second week of October. The maximum rainfall occurs during this period and correspondingly a high humidity was noticed. During our study period, 1035 ± 65 mm of rainfall was recorded, which was the average of rainfall recorded across all the four sample sites during study period, the maximum of which was during the monsoon season. The collection of adult coccinellids were carried out from four different types of ecosystems

TABLE 1. Earlier reports on Coccinellid predators from India

S. No.	Author	No. of species reported	Area
1.	Subramanian, T.V., 1923	01	South India
2.	Aiyar, T.V.R., 1942	01	South India
3.	Kapur, A.P., 1948	12	
4.	Puttarudriah, M. and Channabasavanna, G. P., 1953	53	Mysore State, India
5.	Usman, S. and Puttarudriah, M., 1955	48	Mysore State, India
6.	Kapur, A. P., 1972	17	Goa, India
7.	Pajni, H.R. and Singh, J., 1982	30	Chandigarh, India
8.	Pajni, H. R. and Varma, S., 1985	25	Chandigarh, India
9.	Canepari, C., 1986	36	India and Nepal
10.	Bhagat and Masoodi, 1988	4	Kashmir, India
12.	Singh, T. and Singh, V.K., 1990	4	Himanchal Pradesh
13.	Omkar and Bind, R. B., 1993	6	Uttar Pradesh, India
14.	Omkar and Bind, R. B., 1995	7	Uttar Pradesh, India
15.	Omkar and Parvez, A., 1999	10	Lucknow region, Uttar Pradesh, India
16.	Omkar and Parvez, A., 2000	7	Lucknow region, Uttar Pradesh, India
17.	Sathe and Bhosale, 2001	21	Maharashtra State, India
18.	Poorani, J., 2002a	01	Karnataka, India
19.	Poorani, J., 2002b	400	Indian subregion
20.	Poorani, J., 2003	01	Karnataka, India
21.	Kandiben, M., Rahuraman, S. and Ganapathy, N., 2005	07	Madurai, Tamil Nadu, India

viz., mixed orchards, agriculture field, herbal garden and a forest at Rajaji National Park, which were located at slightly different altitudes. Figure 1 and Table 2 show the altitude and location of all the four sample sites.

Sampling Method:

Sampling of adult coccinellid beetles was conducted at an interval of 30 days from July 2005 to June 2007. The insects were collected by a "Sweep sampling Method", as per Gadakar et al., (1990). Other methods, based upon visual encounters, like aspirator and hand picking were also used depending upon the type of habitats sampled.

Preservation and identification of specimens:

The collected insects were transferred into jars containing ethyl acetate soaked cotton. These jars were brought to the laboratory and the insects were stretched and pinned. These were oven dried at 60 °C for 72 hours in order to preserve them and then set into wooden boxes and labeled according to their systematic position. Each specimen was tagged with the information about host plants, locality and date. To protect the specimens from the insect pests, naphthalene tablets were added to collection boxes. The adult specimens of each species were carefully studied for all details under binocular microscope. The insects were separated into different species with the help of available keys (Omkar and Bind, 1993, 1995, 1996; Omkar and Pervez, 1999,



FIGURE 1. Map of district Haridwar, Uttarakhand, India showing the location of different study sites.

2000; Poorani, 2002b). The insects, which could not be identified in the laboratory, were sent to the Northern Regional Station of Zoological Survey India, Dehradun and the Entomological Section of Forest Research Institute, Dehradun. Whenever necessary, help of the scientists from the Entomology Division of IARI, New Delhi, were also taken.

RESULTS

From a total of 3502 samples collected and examined, a total of 31 distinct species or morphospecies awaiting species confirmation of coccinellid beetles were recorded from the four different study sites in the Haridwar district (Uttarakhand state),

TABLE 2. Locations and altitudes of collection sites.

S. No.	Ecosystems	Locations	Altitude
1.	Mixed orchards	Gurukul Narson Town (29° 50' N to 77° 53' E)	210.0 m
2.	Agriculture	Roorkee Town (29° 51' N to 77° 53' E)	235.0 m
3.	Garden	G.K. University Haridwar (29° 58' N to 78° 13' E)	249.5 m
4.	Forest	Haridwar Range of Tibdi forest (29° 50' N to 78° 10' E)	305.0 m

India. Out of these 31 (morpho) species, 17 species and two separate morphospecies were recorded in this district for the first time. (Table 3).

Species Composition:

During the study period, we recorded six species from the orchard ecosystem, 14 from the agricultural ecosystem, 13 from the garden ecosystem and 10 from the forest ecosystem. *Micraspis discolor* Fab. and *Illeis cincta* Fab. were the most common species and were found in all study sites. The other commoner species recorded during the study period included *Brumoides suturalis* Fab., *Rodolia sexnotata* Mul., *Anegeleis cardoni* Weise, *Hippodamia* sp. and *Micraspis vincta* Fab. Eight species of coccinellid beetles viz., *Chilocorus nigritus* Fab., *Adalia decempunctata* Linn., *Cheilomenes sexmaculata ab rufafasciata* (Fabricius), *Coelophora 9-maculata* (Mul.), *Hippodamia variegata* (Goeze), *Propylea dissecta* (Muls.), *Halyzia sanscrita* (Muls.), *Psyllobora bisoctonotata* (Muls.) were recorded from only two study sites. Four species of coccinellid beetles viz., *Coelophora ramosa* (Olivier), *Harmonia dimidiata* (Fab.), *Megalocaria dilatata* (Fab.) and *Phrynocaria* sp. were recorded

from only one study site. The descriptions of these 19 newly recorded to this district species are given below:

Subfamily Chilocorinae
Tribe Chilocorini

1. *Brumoides* (= *Brumus*) *suturalis*
(Fabricius)

The adult beetle is oval in shape, about 4.0 mm long and 2.6 mm broad across the mid elytra. The head is brown in color with a pair of prominent black eyes. The eyes are slight covered by pronotum when the head is retracted. The elytra are brownish yellow except at their apical, basal and lateral margins. There is a median longitudinal black stripe at the apex of the elytra. Besides, there is a lateral longitudinal black stripe on each elytra starting from the humoral angle.

2. *Chilocorus nigrita* (Fabricius)

The bright black colored and medium sized beetle about 5.0 mm long and 3.9 mm broad across the middle elytra. The adults were found inhabiting and feeding on colonies of the aphids: *Lipaphis erysimi*, *Brevicoryne brassicae*, *Myzus persicae* and *Aphis nerii* on different crop plants.

Subfamily Coccidulinae
Tribe Noviini

3. *Rodolia sexnotata* (Mulsant)

This is an oval shaped medium sized ladybeetle, measuring about 5.0–5.5mm in length and 4.0–4.5mm in width. The color of the ladybeetle is dark brownish with the rough elytra. The adults were found feeding on mango mealybugs.

Subfamily Coccinellinae
Tribe Coccinellinae

4. *Adalia decempunctata* (Linnaeus)

This is an oval shaped small sized ladybeetle, measuring about 4.0–4.5 mm in length and 3.5–4.0 mm in width. The color of the ladybeetle is light brownish with the smooth elytra. The adults were found in mixed orchards of mango and guava.

5. *Anegleis* (or *Micraspis*) *cardoni*
(Weise)

It is oval in shape and measures about 4.0–5.0 mm in length and 3.5–4.5 mm in width. The elytra are bright pinkish yellow in color with one black median stripe at the joint of both the elytra and two linear markings on each elytron; the anterior end of outer one is inwardly curved whereas the inner one is outwardly curved posteriorly. Besides there is one small rounded black spot towards the posterior end of each elytron.

6. *Cheilomenes* (= *Menochilus*) *sexmaculata ab rufafasciata* (Fabricius)

The adult beetle is about 5.0–5.2 mm in length and 3.7–4.0 mm in width across the middle elytra. Head is dark brown, eyes black and antennae brown. The elytra are dark brownish with two black spots towards the proximal end of each elytron. The one third part of each elytron is black towards the distal end. *C. sexmaculata ab rufafasciata* is also a predator of aphids. The adults were found feeding on cotton and mustard aphids and also some other aphid species found on herbal plant in the garden ecosystem.

7. *Coelophora 9-maculata* (Mulsant)

The beetle is oval, small sized about 3.5–4.0 mm in length and 2.5–3.0 mm in width across the middle of the elytra. The head bears two black colored spot laterally attached with each other centrally. The thorax is creamish red in color, which possesses large black spot. The elytra are creamish red in color with three black spots on each elytron. The anterior spot arises from inner side of elytra by a narrow stalk which extends into a roughly triangular lateral lobe terminating anteriorly as a narrow black arm toward the mid-anterior extremity of each elytron. The middle spot arises from the inner side of each elytron by a narrow stalk, which terminates on lateral side by a clubbed lobe. Third spot is located at posterior end of each elytron.

8. *Coelophora ramosa* (Olivier)

Medium sized beetle, about 5.0 mm in length and 3.5 mm in width across the middle of the elytra. The black head bears colored biting and chewing type mouth-parts with a pair of fine clubbed antennae. The thorax, elytra, anterior spot, middle spot and third spot are all as per *Coleophora 9-maculata* as described above.

9. *Harmonia dimidiata* (Fabricius)

The beetle is oval, large sized about 7.5–8.0 mm in length and 7.0–7.5 mm in width across the middle of the elytra. The head bears two small black colored spots. The elytra are black in the posterior two third portion and dark reddish in the anterior part.

10. *Hippodamia* (= *Adonia*) *variegata* (Goeze)

The adult beetle is oval in shape, about 4.0–4.5 mm in length and 2.5–3.0 mm in width across the middle elytra. The body color is creamish red. The brown head bears a pair of prominent black eyes. Two spots are present towards the anterior portion of the elytra one on each elytron and both spots are connected with each other by a black horizontal strip which swells in the middle at the joint of two elytra to form another black spot at the junction. This middle spot is extended by a black line anteriorly up to the thorax and posteriorly up to a spot situated at the junction of both elytra toward the posterior extremity. Besides these markings two more black spots (one on each elytron) are situated on the dorsolateral aspect towards the posterior portion of elytra.

11. *Hippodamia* sp.

The adult beetle differs from *H. variegata* above in being slightly smaller at about 4.0 mm in length and 2.5 mm in width across the middle elytra and with a body color of creamish orange.

12. *Illeis* (= *Thea*) *cincta* (Fabricius)

The adult beetle is about 5.2 mm long and 4.0 mm broad across the middle elytra. The head is yellowish in color with a pair of prominent black eyes. Two spots are situated on the dorsolateral aspects of posterior margin of the thorax. The thorax and elytra are shiny yellowish in color.

TABLE 3. Taxonomic composition of Coccinellidae in four study sites of District Haridwar during 2005-07. (Species with * are new records)

S. No.	Coccinellidae Species	Study sites in Haridwar			
		S-1	S-2	S-3	S-4
(A).	Subfamily CHILOCORINAE				
(I)	Tribe Chilacorini				
1.	<i>Brumoides suturalis</i> (Fabricius)*	-	59	32	24
2.	<i>Chilocorus nigrita</i> (Fabricius) *	-	-	141	114
(B).	Subfamily COCCIDULINAE				
(II)	Tribe Noviini				
3.	<i>Rodolia sexnotata</i> (Mulsant)*	137	-	72	70
4.	<i>Rodolia</i> sp.	50	-	30	24
(C)	Subfamily COCCINELLINAE				
(III)	Tribe Coccinellini				
5.	<i>Adalia decempunctata</i> (Linnaeus)*	-	-	-	33
6.	<i>Anegleis cardoni</i> (Weise) *	45	-	15	-
7.	<i>Cheilomenes sexmaculata</i> (Fabricius)	17	169	132	26
8.	<i>Cheilomenes sexmaculata ab rufafasciata</i> (Fabricius)*	-	-	28	-
9.	<i>Coccinella septumpunctata</i> (Linnaeus)	31	201	80	38
10.	<i>Coccinella septumpunctata var divaricata</i> (Olivier)	-	29	18	-
11.	<i>Coccinella</i> sp.	-	05	09	-
12.	<i>Coccinella transversalis</i> (Fabricius)	40	144	85	31
13.	<i>Coelophora 9-maculata</i> (Mulsant)*	-	-	17	-
14.	<i>Coelophora ramosa</i> (Olivier)*	-	-	-	12
15.	<i>Harmonia dimidiata</i> (Fabricius) *	-	-	45	12
16.	<i>Hippodamia variegata</i> (Goeze)*	-	-	37	-
17.	<i>Hippodamia</i> sp.*	-	-	12	21
18.	<i>Illeis cincta</i> (Fabricius)*	22	66	17	22
19.	<i>Megalocaria dilatata</i> (Fabricius) *	-	-	-	38
20.	<i>Micraspis discolor</i> (Fabricius)*	29	194	72	44
21.	<i>Micraspis vincta</i> (Fabricius)*	18	67	32	-
22.	<i>Micraspis</i> sp.	-	28	25	-
23.	<i>Oenopia sauzeti</i> (Mulsant)	-	34	29	-
24.	<i>Phrynocaria</i> sp.*	-	-	-	90
25.	<i>Propylea dissecta</i> (Mulsant)*	-	36	19	-
(IV)	Tribe Psylloborini				
26.	<i>Halyzia sanscrita</i> (Mulsant)*	45	-	-	-
27.	<i>Psyllobora bisoconotata</i> (Mulsant)*	-	72	60	-
(D).	Subfamily EPILACHNINAE				
(V)	Tribe Epilachnini				
28.	<i>Epilachna</i> sp. (Chevrolat)	-	126	35	37
29.	<i>Epilachna</i> (Chevrolat) <i>vigintipunctata</i>	-	82	29	-
30.	<i>Henosepilachna vigintipunctata</i> (Fabricius)	-	32	11	-
31.	<i>Henosepilachna</i> sp. (Li)	-	12	-	14
TOTAL		434	1356	1082	630

S-1 = Site no. 1 (Mixed Orchards), S-2 = Site no. 2 (Agricultural Field), S-3 = Site no. 3 (Garden), S-4 = Site no. 4 (Forests)

13. *Megalocaria dilatata* (Fabricius)

This large coccinellid is oval in shape, measuring about 11.0 mm in length and 10.5 mm in width. The beetle is bright brown in color and ten black spots are present on its elytra, five spots per elytron, arranged in three rows i.e., 1:2:2 fashion.

14. *Micraspis* (= *Verania*) *discolor* (Fabricius)

Adults measure about 4.5 mm in length and 3.0 mm in width. The color of the elytra is yellowish red with two small rounded black spots on each elytron: one towards the proximal end and the other towards the distal end.

15. *Micraspis vincta* (Gorham)

Adults are oval measuring about 4.5–5.0 mm in length and 3.5–4.0 mm in width. The creamish white pronotum bears distinct black patches; two dot shaped patches towards the proximal end and two almost triangular ones towards the distal end. There is a triangular curved line, almost across the mid-dorsal line on each red colored elytron, starting approximately from the proximal end and continuing up to the distal end. It has a close morphological resemblance with *Micraspis discolor* (Fabricius) with respect to the patches over the pronotum and the elytra color.

16. *Phrynocaria* sp. (Timberlake)

An oval, relatively large beetle measuring about 6.0 mm in length and 5.0 mm in width. The color is shiny brown/red with smooth elytra. This species was found feeding on different species of aphids.

17. *Propylea dissecta* (Mulsant)

Adults measure 4.5 to 4.8 mm in length and 5.0 mm in width are attractive bright red colored aphidophagous beetle having a pair of prominent black spots on the posterior side of the elytra.

Tribe Psylloborini**18. *Halyzia sanscrita* (Mulsant)**

Adults show bright brownish yellow coloration and measures 5.0–5.5 mm in length and 4.0–4.5 mm in width. A single yellow colored thin line runs from the anterior to the posterior end of each elytra. On both sides of this line, several yellow colored oval shaped spots are present. This beetle was found feeding on citrus plants.

19. *Psyllobora bisoctonotata* (Mulsant)

Adults are oval in shape, measuring about 3.0–3.5 mm in length and 2.4–3.0 mm in width and are white or creamish in color with sixteen black spots present the two elytra as eight spots on each elytron, arranged in four rows i.e., 2:3:2:1 fashion.

DISCUSSION AND CONCLUSION

The results of this study suggest that the coccinellid community structure in four study sites with different ecosystems and altitudes differs greatly. The number of species found in the orchards was much lower compared to agricultural, garden and forest ecosystem. However, with only one example (study site) of each ecosystem and altitude setting being studied no clear and firm conclusions can be drawn with respect to either altitude or ecosystem type upon coccinellid biodiversity, species distribution

and abundance. Rather these interesting trends set the field for further future study. Nevertheless, this study does establish that the minimal level of biodiversity of coccinellids in the Haridwar district is much higher than expected from prior reports in other states and districts within India. Thus in addition to the total of 31 species, which represents approximately 7% of the total number of Indian coccinellid species, the presence of 19 (61%) previously unrecorded species of coccinellid beetles in this district in just four different study sites, and the separation of species between sites suggests that this region may have a diverse and rich fauna of coccinellid beetles. Of these 19 newly recorded (for the Haridwar district) coccinellid species, nine (*B. suturalis*, *C. nigrita*, *A. cardoni*, *C. ramosa*, *H. variegata*, *I. cincta*, *M. discolor*, *M. vincta* and *P. bisohtonata*) have been reported from the Lucknow region of Central U.P., India (Omkar and Bind, 1993, 1995, 1996; Omkar and Pervez, 1999, 2000), whilst *H. variegata* was reported from Kashmir region, India (Bhagat and Masoodi, 1988). In this study, it was found that *I. cincta* and *M. discolor* were found in all four study sites in the Haridwar district.

Whether this represents that Haridwar has a particular high coccinellid biodiversity or simply reflects the relatively poor level of systematic surveys across the Indian subcontinent is also unclear. Historically, from the initial work by Subramaniam (1923), Aiyar (1924) and Kapur (1948), Puttarudriah and Channabasavanna (1953) listed 67 coccinellid species for India belonging to 23 genera of eight tribes and five sub families. Similarly, Usman and Puttarudriah (1955) recorded 48 species of predaceous coccinellids from the Mysore

state, to which Kapur (1972) further added 17 species to this family.

The recording of 30 coccinellid species from Chandigarh, belonging to 18 genera (Pajni and Singh, 1982) and 25 coccinellid species scattered across 15 genera from the Chandigarh region (Pajni and Varma, 1985) are in keeping with the result of 31 species of coccinellids recorded from the four different study sites in the Haridwar district of this report, but in contrast are from studies involving a larger and more diverse ecosystems. Likewise, although, Canepari (1986) studied 36 species of coccinellids from museums these were likely to have been collected throughout Northern India and Nepal. Perhaps more on a par is the report of 21 species of Coccinellid beetles feeding on aphids and several soft bodied homopterous pests of agricultural and forest plants from Maharashtra (Sathe and Bhosale, 2001), whilst within one ecosystem the diversity seen at any one of the four sites in this report is in accord with seven species of predatory coccinellids in an irrigated rice ecosystem at Madurai, Tamil Nadu (Kandibane et al., 2005). In stark contrast, lies the report of only four species of coccinellids (*C. undecimpunctata*, *A. tetraspilota*, *H. variegata* and *S. gracilis*) from Kashmir (Bhagat and Masoodi, 1988), whilst only six or 7 species of coccinellids from agricultural and horticultural plants (Omkar and Bind, 1993, 1995) in the Lucknow district and 10 or 7 coccinellid species from within the Lucknow region of Central Uttarpradesh (Omkar and Pervez, 1999, 2000) is also rather low as compared to this report. However, Poorani (2002 b) has given an annotated checklist of the family coccinellidae for the Indian subregion, which lists 400 species, under 79

genera, 22 tribes and five subfamilies. The areas covered in her study include 25 states of India and some neighboring countries. Out of the 31 species reported in the present study 12 species (*Rodolia* sp., *C. sexmaculata*, *C. septumpunctata*, *C. septumpunctata* var *divaricata*, *Coccinella* sp., *C. transversalis*, *Micraspis* sp., *O. sauzeti*, *Epilachna* sp., *E.* (Chevrolat) *vigintiopunctata*, *H.vigintiopunctata*, *Henosepilachna* sp.) have been included in this list and are mentioned to be distributed throughout the India.

Consistent with the notion of incomplete biodiversity assessment across India and a potentially much higher actual biodiversity, are the reports of two new coccinellid species, *Oenopia adelgivora* P. and *Telsimia flavomaculata*, from Karnataka (Poorani, 2002a, 2003) and four new species from the genus *Epilachna* Chevrolant (*E. shilliensis*, *E. convexata*, *E. septemocellata* and *E. crecentomaculata*) from Shilli Himachal Pradesh (Singh and Singh, 1990).

Regardless, due to the tremendous increase of population pressure in the natural areas of the Haridwar district, specially during last four years with increasing industrialization, the chances of disturbances and loss of natural habitats in this district are high, which may result in changes in the species composition and abundance of the coccinellid community. Further surveys are clearly needed of those areas that were not covered in this study to fully evaluate the predatory coccinellid fauna of the Haridwar district.

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