

**FIRST RECORD OF PREDATORY LADYBIRD BEETLES (COLEOPTERA: COCCINELLIDAE)  
FROM THE NASHIK DISTRICT, (MAHARASHTRA), INDIA.**

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**ABSTRACT**

Present studies highlights the status of diversity of predatory ladybird beetles (Coleoptera: Coccinellidae) from Nashik district, Maharashtra, (India). 300 specimens were collected from ten talukes of Nashik district, particularly Dindori, Vani, Kalwan, Deola, Satana, Malegoan, Niphad, Sinnar, Triambkeshwer and Yeola. In total 16 species were recorded belong to 13 genera of 6 tribes and 5- subfamilies. The subfamily Coccinellinae represented by 9 species viz. *Illis cincta* (Fabricius), *Coccinella septempunctata* (Linn.), *Coccinella transversalis*, *Cheilomenses sexmaculata* (Fabricius), *Psyllobora bisoctonotata*, *Anegleis cardoni* (Weise), *Hippodamia variegata* (Goeze), *Hippodamia convergens* and *Pseudaspidimerus trinotatus* (Thunberg). The subfamily Sticholotidinae contains two species viz. *Pharoscyrnus flexibilis* (Mulsant) and *Pharoscyrnus horni* (Weise). One species belongs to the subfamily Scymninae the *Scymnus (=Pullus) latemaculatus*. Two species belongs to the subfamily Chilocorinae, the *Chilocorus nigrita* (Fabricius) and *Brumoides saturalis* (Fabricius). Two species from to the subfamily Coccinellinae the *Propylea dissecta* (Mulsant) and *Micraspis discolor* (Fabricius). The present studies reveals that the ladybird beetles showed good diversity from different talukes of the Nashik district and they are predatory on pest such as Aphids, Mealy bugs and Aleroid flies (white flies) of different Agricultural crops and vegetables of this region.

**KEYWORDS:** Biocontrol agent, Coccinellidae, Diversity, Nashik District.

**INTRODUCTION**

Indiscriminate use of synthetic pesticides in agriculture to control the insect pests resulted in the pollution of environment thereby threatening the target and non- target animals. Hence, instead of the pesticides, today biological agents are applied for the control of the agricultural pest. Among these, Coccinellid beetles (Coleoptera) have great importance as biological controlling agent.

Ladybird beetles (Family: Coccinellidae) are well known and widely distributed group of insects. The family name comes from its genus, *Coccinella*. The family Coccinellidae, belongs to the superfamily Cucujoidea and suborder Polyphaga (Kovar, 1996; Hunt et al., 2007, Rai et al. ,2002). The adult beetles are small to medium sized, oval, convex, often brightly coloured red, orange, black, yellow, brown and variously spotted. Many species of coccinellids are major biocontrol agents of pests such as aphids, mealybugs, mites, whiteflies and feeds on mildew or pollens in all parts of the world (Moreton, 1969; Hawleswood, 1987; Majerus, 1994; Hodek, 1970). The cottony cushion scale *Icerya parhais* is a pest of citrus, is effectively controlled by the beetle *Rodalia cardinalis* from Australia (Majerus, 1994). In India the same insect pest was controlled on nilgiris by the introduction of *Rodalia cardinalis* from Australia. Habitat patterns of *C.septempunctata* in a diverse agricultural landscape studied by Maredia et al. (1992) and measuring and modelling dispersal (Van der WW et al., 2000).

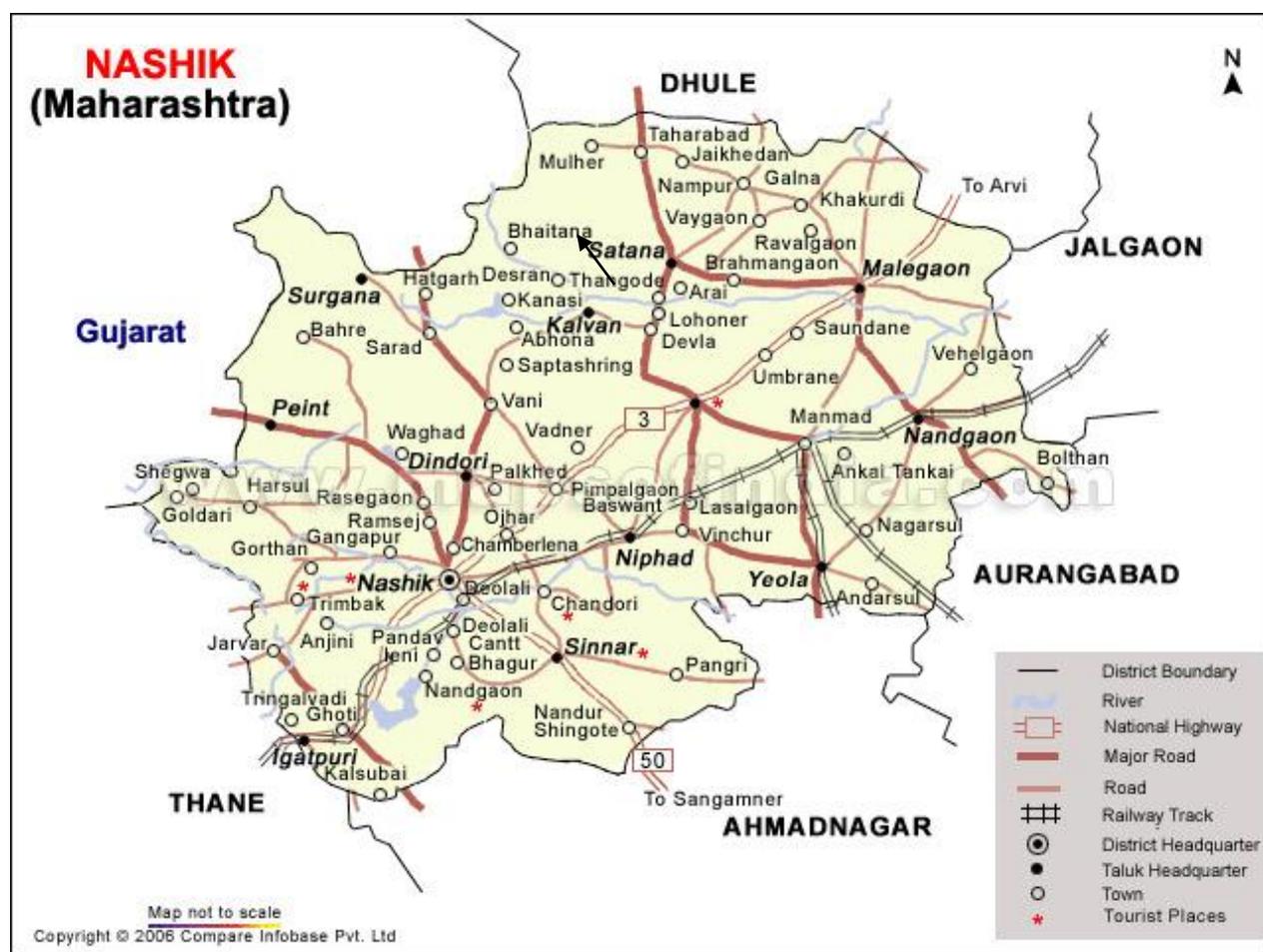
The family Coccinellidae comprises 5,200 described species worldwide (Hawles-wood, 1987). Omkar & Bind (1993) have reported 6 species of ladybird beetles from Lucknow region then Omkar & Bind (1995, 1996) added 17 new species. Omkar & pervez (1999, 2000, 2002) further reported 17 more species from the same region. Poorani (2002b) has listed 400 species of ladybird beetles from India subregion and Poorani (2003) also reported new species *Telsimia flavomaculata* from Karnataka, India.

The objective of this study was to investigate the species composition of coccinellid beetles from the Nashik district (M.S.), India and create awareness among the peoples about the importance of ladybird beetles as a biocontrol agent.

The Nashik district is the well-known for the cultivation of variety of crops like Grapes, Cotton, bananas, sugarcane, cauliflower, cabbage, maize, wheat, etc. Western region is mainly a tribal hilly areas covered with the variety of forest. This variety of flora invites many insect pests of agricultural crops and vegetables, which causes heavy toll to them. A survey of the available literature revealed less information on the species composition of coccinellid beetles in India with no specific about the previous record from the Nashik district.

**Location:**

The present study was carried out at Zoological Research Laboratory, P.G.Department of Zoology, K.T.H.M. College, Nashik-2 having Latitude 19.9942<sup>0</sup> N, Longitude 73.7972<sup>0</sup> E. Depicts location of talukes of Nashik district.



(Source by Google: <http://nashik.nic.in/htmldocs/distmaps.htm>)

**Figure 1: Location map of Nashik District in Maharashtra State (India)**

## MATERIALS AND METHODS

The studies were conducted to observe the diversity of coccinellids beetles from Nashik District (Maharashtra). The adult beetles were collected by hand picking method from different localities of 10 talukas of Nashik district in early morning and evening. Each locality was repeatedly sampled throughout year (November 2012 to October 2013). The adult beetles of each species were preserved, stored and used for identification. Each specimen was tagged with the information about host plants and locality. Some beetle are reared at laboratory condition and released in K.T.H.M. campus associated with agricultural area.

## RESULTS AND DISCUSSION

Among 300 collected specimens from Dindori, Vani, Kalwan, Deola, Satana, Malegoan, Niphad, Sinner, Trimbakeshwer and Yeola. 16 species were recorded from Nashik district in first time. Identification of beetles showed that they belong to 13 genera of 6 tribes and 5- subfamilies from this area. Detailed description of identified Ladybird Beetles is described here.

### 1. *Coccinella septempunctata* (Plate: I.1)

The adult beetle is relatively large, 7-8 mm in length, and 4.0-6.6 mm in width, form oval, strongly convex. Head is black in colour, with a pair of semicircular frontal spots, one on either side of inner margin of eyes. Pronotum is black, with a pale yellow or white anterolateral spot. Ground colour and elytra red, orange or yellow, elytral pattern in typical form with seven black spots ;one common spot around scutellum, and three on each elytron, with small whitish patches on either side of scutellum. Ventral side more or less completely black. Last visible abdominal segment with a median bunch of hairs in males. Post-coxal plates on abdominal ventrite one incomplete with an associate oblique line.

**Host Plants:** These beetles are predator on aphids infesting grasses, pea, cowpea, potato, corn leaf, wheat leaf, *Arachis hypogea*, *Vigna radiata* (*Fabaceae*) and many vegetable plants.

**Seasonal occurrence and distribution:** They were abundant in August to December as compared to other surveyed months, and distributes widely in Deola, Kalwan, Sinnar, Vani and Nashik region.

### 2. *Cheilomenes sexmaculata* (Plate:I.2)

Adult is also known as six- spotted zigzag beetle with medium size 3.3-6.2 mm in length, and 3.0-5.3 mm in width. Body outline broadly oval to subrounded, dorsum moderately convex and shiny. The head and elytra are dark brownish coloured. Ground colour orange, light red, yellow or pinkish with markings in the typical form: head with a black marking in posterior half, pronotum with a T-shaped median marking connected to a broad black band along posterior margin; elytra with six black maculae including two zigzag lines and a posterior black spot, sutural line with a narrow to moderately broad black stripe.

**Host Plants:** The adult beetles were found on grasses, maize, cotton, all cereals plants, *Arachis hypogea* and many vegetable crops. The adult beetles were found feeding on yellow aphids on *Calotropis*, cotton and maize plant and also some other aphid species found on herbal plant in the garden.

**Seasonal occurrence and distribution:** They were active almost throughout the year in Nashik district (Deola, Kalwan, Sinnar, Vani) with many generations.

### 3. *Hippodamia convergens* (Plate : I.3)

The adult beetle measures 4-7 mm long and 4-6 mm in width. It is narrow, elongate, oval, and weakly convex. Head is yellow with a black transverse marking. Pronotum black with white anterolateral margins and a pair of median eyes, sometimes fused together. Scutellum is black coloured. Body colour is orange or red, with whitish/creamy

yellow areas adjacent to scutellum and thirteen black spots are present on elytra, one postscutellar spot and six on each elytron. Ventral side more or less completely black.

**Host Plants:** They were found in green grasses, vegetable crops and feed on some brownish aphid species present on herbal plant in the garden.

**Seasonal occurrence and distribution:** The specimens were active almost throughout the year in Deola, Vani, Sinnar, Kalwan talukes Nashik district, with many generations.

#### 4. *Hippodamia variegata* (Plate: I.4)

The adult beetle measures 4-7 mm long. Body is narrow, elongate, oval, and weakly convex. Head is yellow with a black transverse marking. Pronotum black with white anterolateral margins and a pair of median eyes, sometimes fused together. Scutellum is black coloured. Beetle colour is orange or red, with whitish/creamy yellow areas adjacent to scutellum and nine black spots are present in elytra, one postscutellar spot and four on each elytron. Ventral side more or less completely black.

**Host Plants:** They were found in Green grasses, Wheat, sorghum, alfalfa, vegetables, greenhouse crops, orchard crops, and most crops attacked by aphids, vegetable crops and also predatory on some aphid species present on herbal plant in the garden.

**Seasonal occurrence and distribution:** They were active almost throughout the year in Deola, Vani, Kalwan, Niwane, Satana in Nashik district, with many generations.

#### 5. *Coccinella transversalis* (Plate: I.5)

The adult beetle is 3.8-6.7 mm in length and 3.3-5.5 mm in width. The adult beetle is elongate oval, convex. Head black with a pair of creamy yellow, subtriangular frontal spots, one on either side of inner margins of eyes. Pronotum black, anterolateral corners light cream. Scutellum black. Elytra bright carmine red or orange or yellow, with an oval subscutellar spot, a large trilobed spot on humeral callus, a transverse band at apical third not reaching lateral margin, and three smaller apical spots-one sutural and two lateral, usually fused to form a transverse marking; sutural line with an irregular black stripe.

**Host plant:** They were found in green grasses, vegetable crops, cotton plant, rice, cowpea, cabbage, wheat and aphid infested grasses.

**Seasonal occurrence and distribution:** They were active almost round the year in Deola, Kalwan, Nashik talukas, with many generations. It is most active during July- November month.

#### 6. *Illeis cincta* (Fabricius) (Plate: I.6)

It is yellow coloured beetle. The adult beetle is 5.2 mm long and 4 mm broad across the middle elytra. Form elongate oval, moderately convex. Head pale yellow to creamy yellow coloured. Eyes separated by more than one eye width. Pronotum with a pair of median black spots on posterior margin; anterior and lateral margins transparent, lateral margins slightly upturned. Elytra bright lemon yellow coloured. Ventral side more or less uniformly yellowish.

**Host Plants:** This beetles were found in green grass, *Sesamum indicum* (Family: Pedaliaceae), *Luffa cylindrical* (Family: Cucurbitaceae) and *Momordica charantia* (Family: Cucurbitaceae)

**Seasonal occurrence and distribution:** These specimens were distributed in Deola and Nashik region, active almost throughout the year, with many generations.

**Plate I**



**I. 1 *Coccinella septempunctata***



**I. 2 *Cheilomenes sexmaculata***



**I. 3 *Hippodamia convergens***



**I. 4 *Hippodamia variegata***



**I. 5 *Coccinella transversalis***



**I. 6 *Illeis cincta***



**I. 7 *Psyllobora bisoctonotata***



**I. 8 *Anegleis cardoni***

### 7. *Psyllobora bisoctonotata* (Plate: I.7)

The adult beetle is whitish in colour. The adult beetle is 5.4 mm long and 3 mm broad. Body convex, oval, and cream or yellowish in colour basally, each marked with eight black spots.

**Host Plants:**The specimens were observed feeding on the powdery mildew *Phyllactinea corylea* infesting the leaves of *Dalbergia sissoo* Roxb. (Leguminosae). It is also present on powdery mildew infesting plants.

**Seasonal occurrence and distribution:** They active during throughout the year in many generations. Seen distributed on all parts of the plants in certain parts when occupied only the leaves with powdery mildew especially on the lower surface. They was recorded in Nashik and Deola region.

### 8. *Anegleis cardoni* (Plate: I.8)

The adult is measures upto 3.50-3.75 mm length and 3.25-3.50 mm width, and round, strongly convex in shape. Ground colour pale cream to lustrous yellow / lemon yellow. Pronotum with a pair of triangular markings on posterior margin and a pair of small, transverse markings in the middle. Scutellum minute, triangular and black. Each elytron with a pair of thin black stripes, outer one anteriorly bent inwards and inner one posteriorly bent outwards and a small circular spot near apex; sutural line with a black stripe; outer margins of elytra very narrowly black. Ventral side uniform pale yellow. Postcoxal line on abdominal ventriteone.

**Host Plants:**They were found on *Michelia champaca* (Magnoliaceae) and predacious on aphids, mealybugs, scales and whiteflies. Associated with aphids, mealybugs and scales infesting cabbage and other crucifers, brinjal, wheat, peas, tomato, neem, and several other plants.

**Seasonal occurrence and distribution:** The specimens of *Anegleis cardoni* were found in Nashik taluka. Their populations being high during January-March.

### 9. *Pseudaspidimerus trinotatus* (Thunberg) (Plate:II.1)

The adult beetle is small, orange- yellow coloured. Body outline is oblong oval, moderately convex. Dorsal side variable, uniform orange-yellow. Three spots are present on elytra. Ventral side reddish brown, metaventrite and abdominal ventrite one often darker reddish brown. Antenna short, nine-segmented. Head with gena shortly extending over eyes. Prosternal process raised and at a plane higher than rest of prosternum, rectangular. Anterior margin of mesoventrite shallowly emarginate. Abdomen with six visible ventrites.

**Host Plants:** They were found on *Callotropis* plant. Aphidophagous. Commonly found in association with aphid species such as *Aphis nerii*, *Aphis spiraecola*, *Aphis gossypii* and other aphids on nerium, cotton, sugarcane, etc.

**Seasonal occurrence and distribution:**They were active in Nashik region. It is active in October month in Nashik.

### 10. *Pharoscygnus flexibilis* (Plate: II.2)

The adult beetle is measures 1.80-2.20 mm in length, width 1.40-1.85 mm. It is broad oval, moderately convex. Head and pronotum are reddish or yellowish brown coloured. Elytra are reddish or pale yellowish brown coloured with four or five black spots, which are fused.

**Host Plants:**They were found on *Callotropis* plant, *Hibiscus rosasinensis*, and vegetable crops and also found on some aphid and mealybug species present on herbal plant.

**Seasonal occurrence and distribution:** They were active in Vani region with many generations.

**11. *Pharoscymnus horni* (Plate: II.3)**

Length 2.00 - 2.20 mm, width 1.70-1.90 mm. These beetle is round, strongly convex, dorsal side densely pubescent. Ground colour dark brown, each elytron with a pair of reddish/orange yellow spots, anterior spot subquadrate and larger, posterior spot roundish. Ventral side uniformly dark brown. Head quadrate, clypeal margin narrowly extending laterally over eyes, eyes not emarginate around antennal insertions.

**Host Plants:**They were found on plant, *Hibiscus rosasinensis*, scale insects infesting sugarcane, black pepper, tea, guava, cactus, tobacco, mango, date palm, vegetable crops and also found in some aphid and mealybug species present on herbal plant in the garden.

**Seasonal occurrence and distribution:** They were active in Nashik region. *Pharoscymnus horni* is abundant, distributed in Nashik.

**12. *Scymnus (Pullus) latemaculatus* (Plate: II.4)**

It is a small brown coloured beetle. It's length is 1.6-2.0 mm and width is 1.3-1.5 mm. It is short oval, moderately convex. Head is yellowish, slightly darker towards apex in female. Pronotum dark brown or black, sides and anterior margin paler, reddish brown. Scutellum is black in coloured. Elytra is dark brown/black, with two pairs of orange yellow spots.

**Host Plants:**They were found on *Callotropis* plant, *Hibiscus rosasinensis*, vegetable crops and also found to on some aphid and mealybug species present on herbal plant.

**Seasonal occurrence and distribution:** They were active almost throughout the year in Nashik region with many generations.

**13. *Chilocorus nigrata* (Fabricius) (Plate:II.5)**

The adult beetle is black coloured. Its length is 3.2-4.0 mm; width 2.9-3.9 mm. The adult beetle is sub rounded, almost hemispherical and strongly convex. Head dull orange yellow. Pronotum dark pitchy brown to black in middle, paler on sides, anterolateral flaps orange yellow. Elytra black, shiny, with fine punctations. Ventral side including legs and inner margins of elytral epipleura orange yellow to yellowish brown, outer margins of epipleura pitchy brown to black.

**Host Plants:**They were found on *Callotropis* plant, sugarcane, vegetable crops infected with some aphid and mealybug species. Recorded on numerous hosts, infesting coffee, arecanut, coconut, citrus, neem, bamboo, mango, castor, brinjal, sugarcane, *Morinda tinctoria*, *Nerium indicum*, *Cassia corymbosa*, *Thevetia*, etc.

**Seasonal occurrence and distribution:**They were found in Nashik region with many generations. The specimens of *Chilocorus nigrata* is reported in September to November month. It is a native of the Indian subcontinent and the most widespread species of this genus. It has been successfully introduced for the biological control of scale insects.

**14. *Brumoides suturalis* (Plate: II.6)**

*Brumoides suturalis* is about 4.0 mm in length and width 2.7 mm. The adult beetle is oval in shape. Head is brown in colour with a pair of black eyes. Scutellum is black. Elytra are shiny white to creamy yellow or brownish yellow coloured, with three black stripes one on each elytron.

**Host Plants:**They were found in vegetable crops, *Leucaena leucocephala* (Fabaceae) infested with aphid species on herbal plant.

**Seasonal occurrence and distribution:** They were abundant in September to November. These species were distributed in Deola, Kalwan and Satana region.

Plate II



II.1 *Pseudaspidimerus trinotatus*



II.2 *Pharoscymnus flexibilis*



II.3 *Pharoscymnus horni*



II.4 *Scymnus latemaculatus*



II.5 *Chilocorus nigritia*



II.6 *Brumoides suturalis*



II.7 *Propylea dissecta*



II.8 *Micraspis discolor*

**15. *Propylea dissecta* (Mulsant) (Plate: II.7)**

Adult beetle measures about 4.5 to 4.8 mm in length and 5.0 mm in width. They are attractive bright red, yellow, orange coloured. They are having a pair of prominent black spots on the posterior side of the elytra. Some specimen of *Propylea dissecta*, are without spots on elytra. Antenna are short, head is black in colour, on ventral side of the beetle black line is present.

**Host plant:**The adult beetle were found in green grasses, vegetable crops, cotton plant, rice, cowpea, cabbage, wheat field and in aphid infested grasses.

**Seasonal occurrence and distribution:** They were active almost throughout the year in Nashik region, Deola, Kalwan in Nashik district, with many generations and most active during July- November month.

**16. *Micraspis discolor* (Fabricius) (Plate: II.8)**

*Micraspis discolor* is measure about 4.5 mm in length and 3.0 mm in width. The color of the elytra is yellowish red without spot on elytra. Head is black coloured but white line is present in the middle region of the head. Antenna is short.

**Host plant:** The adults beetle were found in green grasses, vegetable crops, cotton plant, rice, cowpea, cabbage, wheat and also present in aphid infested grasses.

**Seasonal occurrence and distribution:** They were active throughout the year in Deola, Kalwan in Nashik district, with many generations. Adult beetle *Micraspis discolor* is most active during July- November month.

## CONCLUSION

Sixteen species from 13 genera belonging to sub-families Coccinellinae, Sticholotidinae, Scymninae, Chilocorinae and Coccidulinae existed in the Nashik district. The species were identified as, *Coccinella septempunctata*, *Cheilomenses sexmaculata*, *Hippodamia convergens*, *Hippodamia variegata*, *Coccinella transversalis*, *Illeis cincta* (Fabricius), *Psyllobora bisoctonotata*, *Chilocorus nigrita* (Fabricius), *Propylea dissecta* (Mulsant), *Micraspis discolor* (Fabricius) complex, *Brunoides suturalis*, *Anegleis cardoni*, *Pseudaspidimerus trinotatus* (Thunberg), *Pharoscymnus flexibilis*, *Scymnus (Pullus) latemaculatus*, *Pharoscymnus flexibilis*. Most of the collected species were aphid-loving predators.

## ACKNOWLEDGMENT

The authors are greatly thankful to Principal, Dr. D. M. Dhondge, K.T.H.M. College, Nashik –422 002, for providing all necessary research facilities during the tenure of research work.

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