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## A survey of ladybird beetles (Coleoptera: Coccinellidae) in Hatkanangale tehsil of Kolhapur district

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### Abstract

The current survey was conducted to find out ladybird beetle fauna from various sampling sites of 12 villages in Hatkanangale tehsil of Kolhapur district. The present investigations entitled "Survey, distribution and diversity of ladybird beetles in Kolhapur district" were carried out during January 2019 to June 2019 at 12 villages in Hatkanangale tehsil of Kolhapur district. An extensive survey of predatory ladybird beetles (Coleoptera: Coccinellidae) was conducted in the 12 villages in Hatkanangale tehsil of Kolhapur district, in eight different crops which were widely grown in this area, over a period of 6 months (January 2019 to June 2019). A total of 685 specimens of coccinellids were collected from 12 villages and localities having different climatic and cropping patterns. The present study was carried out to describe the coccinellid fauna from the Hatkanangale tehsil of Kolhapur district region. The aim of this study was to explore, identify and prepare inventory of predatory coccinellid species in the Kolhapur district region, which will be helpful for the future researchers working on predatory coccinellid species of this region. According to the results, 5 species belonging to *Coccinellinae* tribes and *Coccinellini* subfamily were recorded as *Cheilomenes sexmaculata* (F.), *Coelophora bissellata* (M.), *Coccinella transversalis* (F.), *Illeis cincta* (F.), *Harmonia octomaculata* (F.) which were all belonging to family coccinellidae and all are predominantly aphidophagous species.

**Keywords:** ladybird beetle, coccinellidae, hatkanangale tehsil, Kolhapur

### Introduction

Ladybird beetle belongs to the family Coccinellidae of the order Coleoptera. They are more or less distributed worldwide and can be found from seacoast to alpine pastures, however many tribes are restricted to particular biogeographically regions. About 6000 species under 490 genera of Coccinellidae are known worldwide. Family Coccinellidae is further classified into six subfamilies namely; Chilocorinae, Coccinellinae, Coccidulinae, Scymninae, Sticholotidinae and Epilachninae. Ladybird beetles are mostly considered beneficial because of their predatory activity and help in regulating pest populations of soft bodied insects like aphids, jassids, etc. However, members of its subfamily Epilachninae are phytophagous and are pests of important agricultural crops belonging to the family Fabaceae and Compositae. A ladybird may eat aphids equal to its body weight every day (Khalid *et al.*, 2017) <sup>[10]</sup>.

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 (Joshi and Sharma, 2008) <sup>[7]</sup>.

### Materials and Methods

The present investigation was aimed on "Survey, distribution and diversity of ladybird beetles in Kolhapur district". The research was undertaken in Kolhapur district during the year 2019-2020. For this study, ladybird beetles were collected from 12 villages in Hatkanangale tehsil of Kolhapur district and eight crop ecosystems *viz.*, maize, sorghum, wheat, lucerne, sugarcane, groundnut, brinjal, cabbage.

The material required for collecting coccinellids are, hand pickings, insect collecting net, glass test tube, setting board, insect killing bottle, forceps, entomological pins, cotton plug, small

hair brush, naphthalene balls etc.

The collection of beetles was done by insect collecting nets, hand picking, glass test tubes, from various crop in the village of Kolhapur district. They were brought to department and

killing was done by using chloroform. Pinning and dry was done and stored in insect collecting box by keeping the naphthalene balls inside.

**Table 1:** Location of survey

Tehsil	Name of villages	Crops
Hatkanangale	Atigre	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Ambap	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Ghunaki	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Rukadi	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Talsande	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Alate	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Hatkanangale	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Halondi	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Herle	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Male	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
	Nagaon	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage
Mangaon	Maize, Wheat, Sorghum, Groundnut, Lucerne, Sugarcane, Brinjal, Cabbage	

### Identification of Specimens

The collected specimens were got taxonomically identified from Dr. Poorani, J. Principal Scientist, National Bureau of Agricultural Important Resources (NBAIR), Bangalore and NRC For Banana (ICAR) Tiruchirappalli, Tamil Nadu, India.

### Results and Discussion

During the present investigations survey of twelve villages in Hatkanangale tehsil from Kolhapur district was done. The survey was conducted in twelve villages viz., Atigre, Ambap, Ghunaki, Rukadi, Talsande, Alate, Hatkanangale, Halondi,

Herle, Male, Nagaon and Mangaon in 8 different crops viz., maize, wheat, sorghum, lucerne, groundnut, sugarcane, brinjal and cabbage in the year 2019-20. According to the observations, 5 species belonging to 1 tribes and 1 subfamilies were recorded. i.e. *Cheilomenes sexmaculata*, *Coelophora bissellata*, *Coccinella transversalis*, *Illeis cincta*, *Harmonia octomaculata* were found belonging to family Coccinellidae and all are predominantly aphidophagous species. The collection was made from *Kharif* and *rabi* season by conducting survey from the different crops and their ecosystem.

**Table 2:** Species compositions of predatory ladybird beetles in twelve villages from Hatkanangale tehsil of Kolhapur district

Sr. No	Family	Sub Family	Tribe	Species Collected	No. of specimens collected
1	Coccinellidae	Coccinellinae	Coccinellini	<i>Cheilomenes sexmaculata</i> (F.)	293
2				<i>Coelophora bissellata</i> (M.)	123
3				<i>Coccinella transversalis</i> (F.)	72
4				<i>Illeis cincta</i> (F.)	183
5				<i>Harmonia octomaculata</i> (F.)	14

Similar survey work was carried out by Mayadunnage *et al.* (2000) an extensive survey of predatory coccinellid beetles (Coleoptera: Coccinellidae) was conducted in the vegetable grown areas of the Mid country, Sri Lanka. A total of 2682 specimens of coccinellids were collected. Fifteen different species belonged to 12 genera of four tribes and three subfamily were recorded. Cotes *et al.* (2010) [4] made survey the aim of this survey is to faunistically describe ladybird beetle assemblages from the canopies of olive orchards in southern Spain, The total number of coccinellids collected was 481; they belonged to 9 genera and 13 species. Abbas *et al.* (2013) [1] collected 2204 specimens of coccinellids belonging to four subfamily viz., Coccinellinae (n = 2076), Chilocorinae (n = 122), Epilachninae (n = 03) and Scymninae (n = 03) as well as twelve species. Khan *et al.* (2007) [11] who also made survey of predatory coccinellid beetles (Coleoptera: Coccinellidae) which was conducted in the Chitral District, Pakistan, over a period of 7 months (April through October, 2001). A total of 2600 specimens of Coccinellids were collected from 12 different localities having altitudes from 1219.40 – 2651.63 m. Twelve different species belonging to 9 genera of 3 tribes and 2 subfamily were recorded. Two subfamilies, viz., Coccinellinae (Latreille, 1807) and Chilocorinae (Mulsant, 1846) were identified.

Rahat Ullah *et al.*, (2012) who also made a survey in District Dir Lower, over a period of two years and collected specimens of coccinellid beetles from four major localities viz., Maidan, Jandool, Timergara and Adenzai. Identification of these beetles showed that 14 different species in 12 genera belonging to subfamily Coccinellinae, Chilocorinae, Scymninae and Epilachninae are present in the selected area. Similar survey work was carried out by Aslan and Uygun (2005) [3] reported aphidophagous coccinellid (Coccinellidae: Coleoptera) species in cultivated and uncultivated fields. This study yielded 33 coccinellid species feeding upon 59 aphid species. Kedar *et al.*, (2011) [9] who made similar surveys on coccinellids predators associated with solenopsis mealybug, *Phenacoccus solenopsis* Tinsley, infesting cotton and other host plants in and around Hissar, Haryana revealed that six species of coccinellids. Romabai Devi *et al.* (2013) made an extensive survey on biodiversity and abundance of predators on cruciferous crops was assessed for a period of two consecutive years (2009-2010). Zahoor *et al.* (2003) reported that total of 8119 specimens of coleopterous insects were captured out of which 4972 were the coccinellids representing 22 species. In crop area, a total of 2756 specimens were collected, in which 2027 were the coccinellids. Rahat Ullah *et al.* (2011) studied the diversity, distribution and host

importance of ladybird beetles collected from District Dir Lower, Pakistan. A survey was conducted in the District Dir Lower over a period of two years. Specimens of coccinellid beetles were collected from Maidan, Jandool, Timergara and Adenzai. Sharma *et al.* (2015) all the four agro-climatic zones of Himachal Pradesh varying from subtropical to dry-temperate conditions were surveyed for the diversity of predatory coccinellids from March 2011 to November 2013. Hussain *et al.* (2018) studied that the biodiversity and distribution of coccinellid beetles (Coleoptera: Coccinellidae), samples were collected from rainfed and irrigated fields of Gujrat, Punjab, Pakistan during 2015-2016. Khormizi *et al.* (2013) <sup>[12]</sup> also reported same results as eleven species of ladybird beetles were recorded belonging to three different tribes (Chilocorini, Coccinellini and Scymnini), and three subfamily, Coccinellinae (Latreille 1807), Chilocorinae (Mulsant 1846) and Scymninae (Mulsant 1846) of the Coccinellidae family. Hayat and Khan (2013) <sup>[5]</sup> collected fifty one species from 6 subfamilies in the study area. Further, there were thirty seven species of ladybird beetles in district Mirpur, twenty nine in district Kotli and forty one in district Bhimber, Pakistan. The present findings are in conformity with the findings of earlier workers. Kandibane *et al.* (2006) <sup>[8]</sup> recorded a total of eight species of coccinellids (ladybird beetles) in rice ecosystem during kharif 2000. In partially weeded plot, all the eight species were present, where as in weeded plot, five taxa were recorded. Ali and Rana (2012) <sup>[2]</sup> made an extensive survey which has been conducted in farmer's field of cauliflower at three districts (Mathura, Agra and Ferozabad) of Uttar Pradesh in experimental year 2009-10 and 2010-11. Vinoth kumar (2013) <sup>[16]</sup> resulted that among the coccinellids, *Cheilomenes sexmaculatus*, *Coccinella transversalis*, *Brumoides suturalis*, *Harmonia octomaculata* and *Microspiadis colour* were predominant during crop season and they have significant positive correlation with the population of brown plant hopper and green leafhopper.

### Conclusion

*Cheilomenes sexmaculata* was found to be the most diverse species as it was collected from selected villages in Hatkanangale tehsil of Kolhapur district and almost in all the crops and *Harmonia Octomaculata* was observed to be least diverse in crop ecosystem recording only in vegetable. During the sampling period, 5 different species of ladybird beetle were recorded indicating good species diversity from selected villages in Hatkanangale tehsil of Kolhapur district. *Cheilomenes sexmaculata* was the most predominant species, whereas *Harmonia Octomaculata* noticed to be least prevailing species from from selected villages in Hatkanangale tehsil of Kolhapur district.

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