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RESEARCH ARTICLE

Incidence of *Illeis cincta* (Fabricius) on Powdery Mildew of *Dalbergia sissoo* and *Xanthium strumarium*

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Abstract

Powdery Mildew is a widely distributed and more destructive disease in nature. Chemical control of fungal pathogens is a routine method for management of this disease. One cannot rely on chemical control permanently as it is not ecofriendly. Nature has solved this problem by providing biocontrol agents. During routine survey of powdery mildew disease from a World Heritage Site – Kas Plateau, (Dist-Satara, M.S, India) mycophagous behavior of *Illeis cincta* on *Dalbergia sissoo* and *Xanthium strumarium* has been reported in natural conditions. The bionomics of *Illeis cincta* with powdery mildew has been discussed in this paper. Larval stages of *I. cincta* are voracious feeders of anamorphs of powdery mildew disease than that of adults. Increase in natural population of mycophagous insect may help in reduction of anamorphs of powdery mildew. This will definitely lower down further spread of disease.

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Introduction

Fungal diseases are frequent and mostly affect crop production in fields. Members of order Erysiphales cause a disease known as powdery mildew. This fungal pathogen colonizes both faces of leaves; initial whitish areas of irregular shape and subsequent coating cover the entire surface causing white powdery mildew growth. This infestation causes defoliation of plants [1]. Chemical control is practiced on a large scale for the management of this disease. However this practice often becomes uneconomical and inefficient because the frequent application of these products has caused the emergence of resistant populations of fungi to fungicides. There is tendency of consumers to prefer healthy products without residue of agrochemicals. This trend combined with other factors, leads to the development of research and technologies of biological control of pathogens. The predacious insects of family – Coccinellidae order – Coleoptera are commonly known as ladybird beetles. 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 warning coloration [2, 3].

These beetles have extremely diverse habitat and remain throughout the year, particularly active in post-rainy season. They are commonly found feeding on various powdery mildews caused by *Ovulariopsis* (Anamorph of *Phyllactinia dalbergiae*) and *Oidium xanthami*. Numerous species of Coccinellids are predators and biological control agents of hemipteran pests such as aphids, mealy bugs and scale insects, as well as thrips (Thysanoptera) and mites (Acarina) in all parts of the world [4, 5]. The majority of beetles are useful because of their predaceous nature. The other Coccinellids are predators of a variety of pests viz., aphids, leafhoppers, scale insects, mealy bugs, mites and other soft bodied insects [6, 7]. The family Coccinellidae comprises 5,200 described species worldwide. 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 [8]. The objective of this study is to investigate the feeding behavior of *Illeis cincta* on anamorph stages of powdery mildew disease of *Dalbergia sissoo* (Fabaceae) and *Xanthium strumarium* (Asteraceae).

Material and Methods

Study area:

World Heritage Site- Kas Plateau, (Dist-Satara, Maharashtra state India) 17° 50' and 18° 11' North latitude and 73.67 and 73.97' East longitude at 696 m MSL. It has an area of 10 sq. km. During the field work an insect feeding on anamorphs of powdery mildew infected leaves was observed. The specimens were reared in the laboratory and identity was confirmed by using standard literature and expert entomologists. The feeding behavior and life cycle of this insect was studied. With the help of DEC 2000 eyepiece camera capturing Image pro Ver. 6.0. Various life cycle stages of feeding insect in natural habitat were photographed using stereo binocular microscope.

Observations:

It was observed that the mycophagous insect was identified and confirmed as *I. cinacta*. In the months of September and October (2012) population of this mycophagous insect was found to be abundant as the disease was also found in an epidemic proportion almost infecting every leaf. As disease disappeared the insect population also disappeared. This clearly indicates the definite correlation between fungal pathogen and mycophagous insect. The feeding behavior of larvae and adults was observed throughout the day but more specific to morning and evening hours of the day. However to protect from heat and temperature of sun both use to hide on lower surface of leaf. The larval stages are found to be more voracious feeder than adults.

Life Cycle:

Eggs: Creamy white, round, minute in a group of 10-15 glued on lower surface of leaves. Eggs last for one week, with cent percent hatching. The eggs become gray black before hatching (Fig: 1 a) and have about three days incubation period.

Larvae: There are four instars (Fig: 1 b-f), pale yellow, very active and voracious feeder, with three pairs of legs and four rows of minute dots. Body is covered with minute few hairs. Body is completely dusted with conidia of powdery mildew disease. Three pairs of prominent spots are present on thoracic segments which are larger and brighter than the rest of spots. Larvae may act as a source of spread

of this disease. Full grown mature larva enters in pupation after two weeks.

Pupa: Pale yellow with black spots matures to adult within a week (Fig: 1, g).

Adult: The adult is 4-5mm in length and 3-3.6mm in width it is elongate oval convex faint yellow appears to be shielded beetle. Head not easily visible. A pair of black spot appears on pronotum. Eyes are prominent, antenna are long, segments longer than broad with a loosely jointed three segmented club, last segment spatulate. Anterior and lateral margins are transparent, lateral margins are slightly upturned, ventral side yellow. Female is comparatively larger than male (Fig.:1 h, i). Adult survives for a couple of weeks. A life cycle completes within four weeks. Under favorable condition larval period and adult period extends for another week. In a season three to four generations are observed.

Result and Discussion

The mycophagous behavior of different Coccinellidae is reported by many workers [9, 10, 11]. *I. cinacta* belongs to family – Coccilinidae and shows mycophagous behavior on powdery mildew disease of *D. sissoo* and *X. strumarium*. Of the four stages of grubs mature and prepupal (third and fourth) stages show maximum mycophagy rather than first and second stage. The conidial mass around these stages has been cleared off by grubs (Fig: 1, e, f). The adults show comparatively little less mycophagous behavior. As far as feeding potential is concerned the life cycle stages can be ranked as follows: third, fourth, adults, second and first. Adults were seen on the all parts of the plants while grubs were gathered on the leaves affected with powdery mildew disease. Mycophagous behavior of *I. cinacta* on powdery mildew of *D. sissoo* and *X. strumarium* may lead to its utilization as a biocontrol agent of powdery mildew disease. In recent surveys, the mycophagous behavior of the same insect has been observed on powdery mildew disease of *Cucurbita maxima*.



Fig. 1:- *Illeis cincta* a: Eggs, Larval stages feeding on anomorph stages of powdery mildew; b: 1st instar larva c:2nd instar larva, d:3rd instar larva e: Full grown larva, f: Pre-pupation larva, g: Pupa, h: Mating, i: Adult.

References

1. Soylu, S., Yigit, A. and Shtienberg, D. 2002. Feeding of mycophagous ladybird, *Psyllobora bisoctonotata*, on powdery mildew infested plants. IOBC proceedings of the 7th working group meeting, Kusadasi, Turkey, 25(10): 183-184.
2. Moreton, B.D., 1969. *Ladybirds and spider mites*. In: Beneficial insects and Mites. Her Majesty, Stationary Office London. Ministry of Agriculture, Fisheries and Food. Bulletin 20: 15-20.
3. Ahmad, M., Younis, G. and Ali, N. 2003. Biology of the Coccinellid *Psyllobora* (*Thea*

- bisoctonotata* Muls.) (Coleoptera: Coccinellidae) a predator of powdery mildew fungi. Proceedings of the 8th Arab Congress of Plant Protection, Elbeida city, Libya.
4. Hawkeswood, T., 1987. Beetles of Australia. Augus and Robertson, Sydney, Australia.
 5. Majerus, M.E.N., 1994. *Ladybirds*. Harper Collins London, pp: 359.
 6. Solomon, M.E. 1949. The natural control of animal populations. *Journal of Animal Ecology*, 18:1-35.
 7. Omkar and R.B. Bind, 1996. Records of aphid natural enemies complex of Uttar Pradesh. V. The coccinellids. *Journal of Advance Zoology*, 17: 44-48.
 8. Krisnakumar, R. and Maheswari P. 2002. Coccinellid predators on powdery mildew of mulberry. *Insect Environment*, 8:3,133-134.
 9. Masatoshi, T., Sasaki, Y., Sato, C., Iwakuma, S., Isozaki, A. and Tamura, M. 2000. Seasonal host utilization of mycophagous ladybird *Illeis koebelei* (Coccinellidae: Coleoptera) *Japanese Journal of Applied Entomology and Zoology*, 44:89-94.
 10. Prasad, R. and Rai, M. 1988. New record of a mycophagous beetle, *Thea cinacta* Fabr., on Powdery mildew of linseed. *Farm Science Journal*, 3(1): 89-90.
 11. Patankar, N.V., Mittal, V., Kumar, R. and Ramanmurthy, V.V. 2009. Can *Psyllobora bisoctonotata* and *Illeis cincta* (Coccinellidae: Coleoptera) be advocated for biological control of powdery mildews? *Indian Journal of Agricultural Sciences*, 79(6):488-490.
