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The lace bug *Cochlochila bullita* (Stal) (Heteroptera: Tingidae), A destructive pest of medicinal plant, *Ocimum tenuiflorum* L. in Jaipur, India

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Abstract
Ocimum tenuiflorum L. a versatile medicinal herb in the family Lamiaceae, is best known for wide therapeutic applications and its economic importance due to presence of substantial metabolites viz., eugenol and caryophyllene. In Jaipur, this is the first incidence of lace bug *Cochlochila bullita* was reported on *Ocimum tenuiflorum* in natural field conditions during 2015-2016. The infestation pattern mainly results in rolling, withering and drying of leaf tips by piercing-sucking of the cell sap from the supple leaves of tulsi.The damage it caused to *Ocimum* shows that it has an vivid potential as a dominant pest.

Keywords: *Cochlochila bullita*, *Ocimum tenuiflorum*, lace bug, pest, medicinal plant, Jaipur

Introduction
Ocimum tenuiflorum L. otherwise known as holy basil, tulsi, queen of herbs or elixir of life. This small herb is specifically native to India. It is an aromatic medicinal plant in the family Lamiaceae, now widespread as a cultivated herb across the Southeast Asia and tropical countries. In India, the area assessed under *Ocimum* is about 25,000 ha which valued around 250-300 tonnes of oil (Smitha *et al*, 2014) [1]. Many scientific studies have revealed that Tulsi is being used in various clinical conditions like anxiety, chronic cold, fever, snake and scorpion bites with a wide therapeutic applications in bronchial asthma, malaria, arthritis, cataract conjunctivitis, diarrhea, gastric, hepatic, cardiovascular and immunological disorders (Chopra and Nair, 1993) [3]. Economically, tulsi has a substantial number of active metabolites viz., eugenol, caryophyllene, oleanolic acid, ursolic acid, rosmarinic acid, linalool, carvacrol (Rastogi and Mehrotra, 1991) [4]. *Cochlochila bullita* often surveyed throughout the world, has been reported a potential pest of *Ocimum*, in Thailand (Tigvattnanont, 1989) [5]. It has been also reported as a major perilous pest of *Ocimum* in India (Palnswami 1983 [6], Livingstone and Yacoob 1997 [7], Kumar A 2014 [8], Smitha Kumari, 2016) [9]. During the observation, it is evaluated that all phases of life cycle of *C. bullita* reported to infest rolling, withering and drying of leaf tips by piercing-sucking of the cell sap from the soft leaves of *Orthosiphon stamineus* (Sajap and Peng, 2010) [10]. Tulsi is frequently damaged by a dark brown coloured lace bug, *Cochlochila bullita* where its nymph and adults caused impairing the top surface of the leaf from green color to yellowish-purple and wilted growth of a host while leaving a black spots of excrement on the adaxial surface of a leaves (Gliomme, 2014) [11].
This is the first record of *C. bullita* on host plant *O. tenuiflorum*, in Jaipur.

Materials and Methods
1. Distribution of Pest on *Ocimum:* A consistent observations were carried out on tulsi leaves in natural field conditions of Jaipur from 2015 to 2016 at weekly intervals and studies have been documented on selected leaves each from top, middle and bottom portion of the infested *O.tenuiflorum.*
2. (ii)Identification: Samples were collected by hand, preserved in 70% ethanol and taxonomically identified as a Lace bug, *Cochlochila bullita* using a olympus sterobinocular microscope. Photographs were taken with a camera coupled to the same microscope.

Results and Discussion
C. bullita caused drastic depletion of morphological properties of *O. tenuiflorum*. The tingids replicate on fresh leaves mainly during august and september of the same year and as a consequence, the leaves starting curling and rest of the plant will wilt in an accelerated manner.

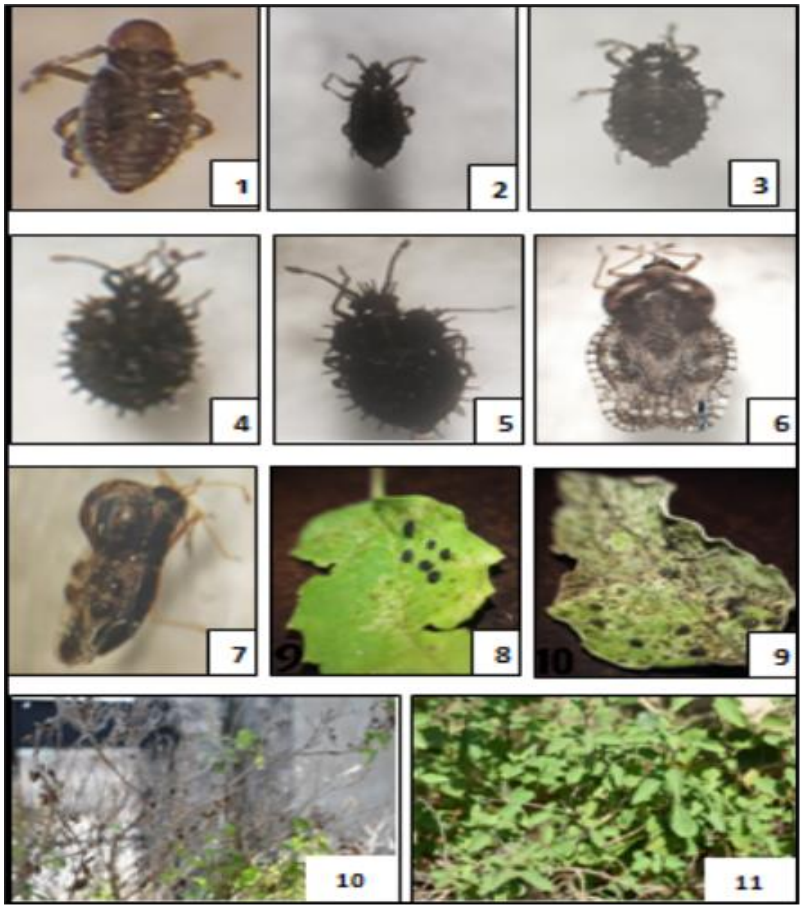

Fig 1-5: Successive nymphal stages of *Cochlochila bullita*., 6. Adult Bug, 7. Lateral view of lace bug, 8-9. Infected leaf, 10. Wilted *Ocimum* plant, 11. Healthy *Ocimum* plant.

Morphologically body of first nymphal stage of *C.bullita* is elongated and subtle brown in colour whereas rest of the instars are balck in colour, spines start developing from second life stage and eventually becomes longer in the consecutive nymphs while adult lace bug has transparent brown colour.

Conclusion

The economic loss and destruction to *O. tenuiflorum* shows that *Cochlochila bullita (*Stal*)* has an intense prospect as a dominant pest.

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