



Insect pests of *Ocimum sanctum* Linn. in Karnataka

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ABSTRACT: Survey conducted on *Ocimum sanctum* Linn. growing in Karnataka revealed the infestation of 16 species of insect pests. Of these, eleven are new records on *O. sanctum* in Karnataka state. © 2022 Association for Advancement of Entomology

KEY WORDS: Tulsi, new pest record

Ocimum sanctum Linn. commonly known as tulsi, the queen of herbs, is one of the holiest and most cherished of many healing and healthy giving herbs of the orient. The herb is used externally as an antiseptic to treat skin infections, spots *etc.*, and juice of the plants is used to treat insect bites and ringworm and the juice is dropped into the ear to treat earaches (Priyabrata *et al.*, 2010). The main components of basil essential oil are linalool, camphor, 1, 8 cineole and germacren-D (Daneshian, 2013). The herb has the ability to lower blood sugar levels (Khan *et al.*, 2015) and the essential oils from the leaf have shown antimicrobial activity (Goyal and Kaushik, 2011). For centuries, the dried leaves of *O. sanctum* have been mixed with stored grains to repel insects (Biswas and Biswas, 2005). The leaf extract has fungicidal, insecticidal antibacterial, antifeedant and larvicidal activities (Sathe and Sathe, 2014). In spite of its medicinal importance several pests comprising of species of insects, mites and plant pathogens damage this plant in all agro-ecosystems (Gahukar, 2017).

Extensive survey was conducted to know the incidence of insect pests of tulsi during August 2017

to August 2019 which includes monthly surveys in the gardens of medicinal plants maintained at Institute of Wood Science and Technology (IWST), Bangalore; Tirumala Tirupati Devasthanam (TTD), Malleshwaram and Kadu Malleshwara temple, Malleshwaram and biannual surveys in the gardens of Foundation for Rural Health Tradition (FRLHT), Bangalore; Indian Institute of Horticultural Research (IIHR), Bangalore, University of Agricultural Sciences, GKVK, Bangalore and Art of Living campus, Kanakpura. Also, roving survey was conducted in the medicinal plant gardens in Bagalkot, Belagavi, Dharwad, Gadag and Raichur. The nature of damage by insects found feeding on *O. sanctum* was observed. The adult and immature stages of the insects were collected and reared in the entomology laboratory of Forest Protection division at Institute of Wood Science and Technology, Bengaluru and were identified with the help of taxonomic experts.

The survey revealed the occurrence of 16 species of insects representing three orders *viz.*, Hemiptera, Lepidoptera and Coleoptera infesting *O. sanctum* in Karnataka. It comprises of five species of

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defoliators and eleven species of sap suckers (Table 1). The larvae of *Hyposidra talaca* (Walker) scrape the chlorophyll content of leaves and make pin holes and often leading complete defoliation. The symptom of prominent holes in the leaves was visible by the feeding of the adults of curculionids *Blosyrus inequalis* Boh and *Leptomias* sp., while semicircular notches on the margin of leaves in 'U' shaped manner were visible by the feeding of *Mylloceris viridanus* (Fab.) and *M. undecimpustulatus* (Fab.). The infestation of sapsuckers often leads to yellowing of leaves and premature defoliation and in severe cases death of plants. The dominance of sap suckers on tulsi agrees with the reports of Sathe and Sathe (2014), Kumari and Srinivas (2018) and Triveni *et al.* (2018). Among these sucking pests, *Cochliochila bullita* (Stal.) (Plate 1A) and *Nephococcus viridis* (Green) (Plate 1B) were economically important as their infestation often leads to the death of plants (Sajap and Peng, 2010). Adults fed on tender shoots of the herb causing them to wilt and eventually die and, in many instances, nymphs and adults feed, gregariously on the leaves, leaving tiny black spots of excrement on the upper surface of the leaves

(Dhiman and Jain, 2010). Nymphs and adults of aphids, *Aphis craccivora* Koch were found congregating on succulent stems and under surface of leaves and flowers of tulsi (Shelly and Singh, 2004; Sathe and Sathe 2014). Curling and crinkling of leaves and flowers which become shiny and sticky due to honey dew excreted by the aphids and growth of sooty mold are the common symptoms of infestation by aphids. But in our study *A. craccivora* (Plate 1C) were found to feed on various parts of the tulsi viz., flower bud, leaves. The adults of *Icerya aegyptica* (Douglas) (Plate 1D), a white colour giant mealy bug with tubular outgrowths all over the body were recorded on this plant. Desapping due to sap suckers, the branches dried and the plants withered (Nilamudeen and Nandakumar, 2012). The nymphs of *Clovia* sp. (Plate 1F), commonly known as spittlebugs are best known for their plant sucking nymphs which encase themselves in foam in springtime. This characteristic spittle production is associated with the unusual trait of xylem feeding but they do very little damage to plants. The symptoms of infestation by other insect pests are negligible.

Table 1: Insects infesting on *O. sanctum* in Karnataka

Defoliators
Lepidoptera: Geometridae — <i>Hyposidra talaca</i> (Walker)*
Coleoptera: Curculionidae –
<i>Blosyrus inequalis</i> Boh.*, <i>Leptomias</i> sp.*, <i>Mylloceris viridanus</i> (Fab.)*, <i>M. undecimpustulatus</i> (Fab.)
Sucking pests - Hemiptera
Aphididae — <i>Aphis craccivora</i> Koch
Pseudococcidae — <i>Nipaecoccus viridis</i> (Green)*
Pentatomidae — <i>Carbula scutellata</i> (Distant)*
Coreidae — <i>Cletus</i> sp.*
Cercopidae — <i>Clovia</i> sp.*
Tingidae — <i>Cochliochila bullita</i> (Stal.)
Rhyparochromidae — <i>Dieuches</i> sp.*
Monophlebidae — <i>Icerya aegyptiaca</i> (Douglas), <i>I. purchasi</i> Maskell
Ortheziidae — <i>Insignorthezia insignis</i> (Browne)*
Coccidae — <i>Parasaissetia nigra</i> (Nietner)*

* reported for the first time on *O. sanctum* in Karnataka

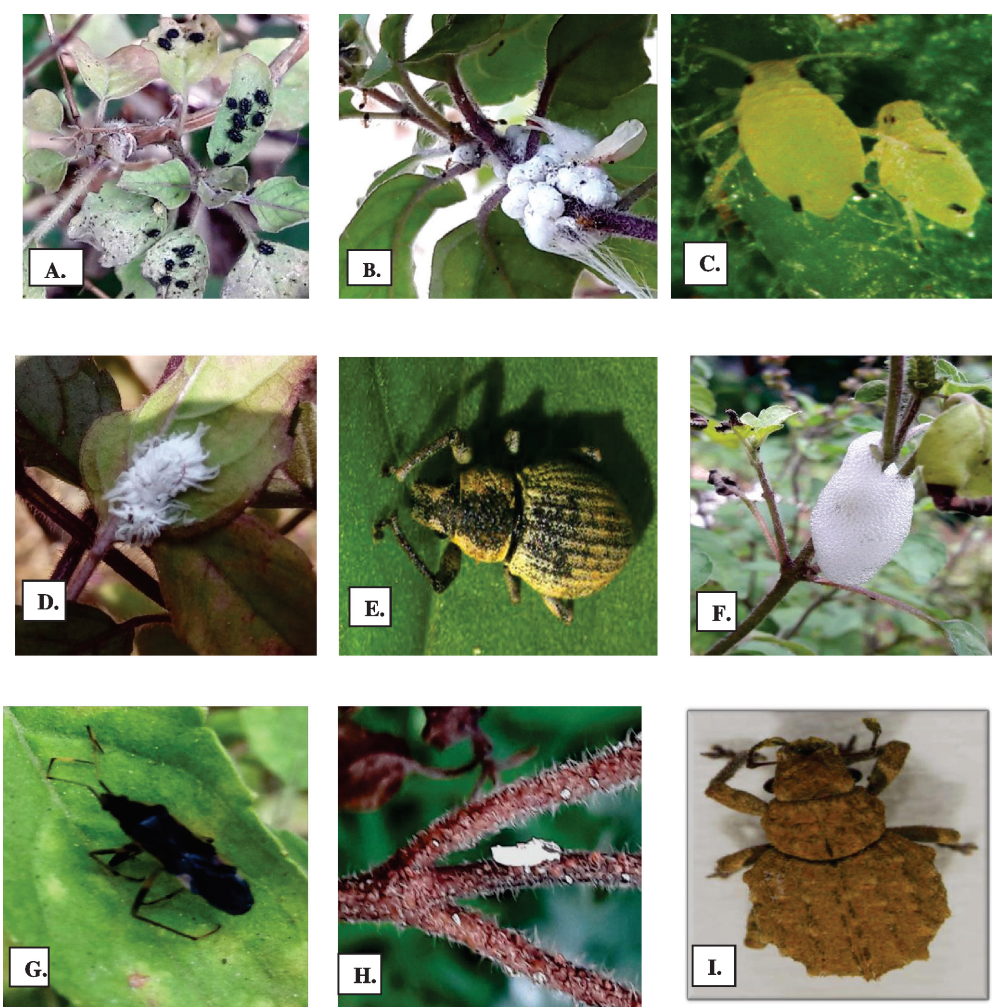


Plate 1. Insect pest of *O. sanctum*

A. *Cochlochila bullita* B. *Nipaecoccus viridis* C. *Aphis craccivora*
 D. *Icerya aegyptiaca* E. *Blosyrus inequalis* F. *Clovia* sp.
 G. *Dieuches* sp. H. *Insignorthezia insignis* I. *Leptomias* sp.

Among the sixteen species recorded on tulsi, eleven species viz., *Nipaecoccus viridis* (Green), *Blosyrus inequalis* Boh (Plate 1E.), *Clovia* sp. (Plate 1F), *C. scutellata*, *Cletus* sp., *Dieuches* sp. (Plate 1G.), *Insignorthezia insignis* (Browne) (Plate 1H), *Leptomias* sp. (Plate 1I.), *Myllocerus viridanus* (Fab.), *Hyposidra talaca* (Walker) and *Parasaissetia nigra* (Nietner) are first report for Karnataka. *H. talaca* is known to infest 45 host plants (Roy *et al.*, 2017), and *P. nigra* on 453 host plants (Vijay and Suresh, 2013 and Joshi *et al.*, 2017; <https://scalenet.info/catalogue/>).

Insignorthezia insignis (Browne) is polyphagous (Varshney, 1992) infesting 175 plants (<https://scalenet.info/catalogue/>), and sandalwood (Sundararaj, 2011), and Lamiaceae plants like *Clerodendrum*, *Fragrant clerodendron* in Ethiopia (Fita and Wagari, 2018).

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REFERENCES

- Biswas N. P. and Biswas A. K. (2005) Evaluation of some leaf dusts as grain protectant against rice weevil, *Sitophilus oryzae* (Linn.). *Journal of Ecology of Environment* 23: 485-8.
- Daneshian M. (2013) Evaluation of Basil (*Ocimum basilicum* L.) essential oil content and yield under different plant densities and nitrogen levels. *Journal of Medicinal Plants and By-Products* 2: 159-162.
- Dhiman S. C. and Jain S. (2010) Seasonal occurrence and damage of *Eusarcocoris capitatus*, a pest of *Ocimum sanctum*. *Annals of Plant Protection Sciences* 18(2): 498-499.
- Fita T. and Wagari M. (2018) Occurrence, Distribution, Severity and Future Threats of Lantana bug, *Orthezia insignis* Browne (Homoptera: Ortheziidae) in East Harerge Zone, Ethiopia. *International Journal of Trend in Research and Development* 5(5): 11-31.
- Gahukar R.T. (2017) Pest and disease management in important medicinal plants in India: A review. doi: 10.1016/j.nfs.2017.02.001.
- Goyal P. and Kaushik P. (2011) In vitro Evaluation of Antibacterial Activity of Various Crude Leaf Extracts of Indian Sacred Plant, *Ocimum sanctum* L. *British Microbiology Research Journal* 1(3): 70-78.
- <https://scalenet.info/catalogue> (accessed on 25th February, 2022).
- Joshi S., Rameshkumar A. and Mohanraj P. (2017) New host-parasitoid associations for some coccids (Hemiptera: Coccoidea) from India. *Journal of Entomological Research* 41(2): 177-182.
- Khan I. A., Ashfaq S., Rasheed Akbar S. H., Habib K., Fayaz W., Saeed M., Farid A., Ali I., Alam M. and Shah RA. (2015) Population dynamics of insect pests and their natural enemies on okra, *Hibiscus esculentus* L. (Malvales: Malvaceae), in Peshawar, Pakistan. *Journal of Entomology and Zoology Studies* 3(6): 88-90.
- Kumari S. M. H. and Srinivas M. P. (2018) Pests attacking medicinal and aromatic plants in India: A review. *Journal of Entomology and Zoology Studies* 6(5): 201-205.
- Nilamudeen M. and Nandakumar C. (2012) First records of *Icerya aegypticum* (Dgl.) and *Icerya seychellarum* (Westw.) on *Ocimum tenuiflorum* L. in Kerala. *Insect Environment* 18(1&2): 3.
- Priyabrata P., Pritishova B., Debajyoti D., Sangram K.P. (2010) *Ocimum sanctum* Linn. A reservoir plant for therapeutic applications: An overview, *Pharmacognosy Reviews* 4(7): 95-105.
- Roy S., Das S., Handique G., Mukhopadhyay A. and Muraleedharan N. (2017) Ecology and management of the black inch worm, *Hyposidra talaca* Walker (Geometridae: Lepidoptera) infesting *Camellia sinensis* (Theaceae): A review. *Journal of integrative agriculture* 16(10): 2115-2127.
- Sajap A.S. and Peng T.L. (2010) The lace bug, *Cochlochila bullita* (Stal.) (Heteroptera: Tingidae), a potential pest of *Orthosiphon stamineus* Bentham (Lamiales: Lamiaceae) in Malaysia. *Insecta* 1: 5.
- Sathe T.V. and Sathe N.T. (2014) Research Paper Zoology Fecundity, Life Tables and Intrinsic Rate of increase in Lace Bug, *Cochlochila bullita* (Stal.), A pest of medicinal plant, tulsi, *Ocimum sanctum* L. in Maharashtra, India. *Zoology* 3(4): 198-200.
- Shelly G. and Singh R. (2004) Aphids on medicinal plants in north east India (Insecta: Homoptera: Aphididae). *Records of the Zoological Survey of India* 102 (Part 1-2): 169-186.
- Sundararaj R. (2011) Biological control of insect pests of Indian sandalwood, *Santalum album* L., an imperative in the present scenario. In: *Insect Pest Management, A Current Scenario* (Ed.) Dunston P. Ambrose. Director, Entomology Research Unit, St. Xavier's College, Palayamkottai Tamil Nadu India. pp. 259-269.
- Triveni B., Jagadish K. S., Devika Rani, Vasundhara M., Narayanaswamy K. C. and Jemla Naik D. (2018) Biology and morphological description of *Ocimum* tingid, *Cochlochila bullita* (Stal) (Heteroptera: Tingidae), an important pest of Camphor tulsi, *Ocimum kilimandscharicum* Gurke in Karnataka, India. *International Journal of Chemical Studies* 29: 36.
- Varshney R. K. (1992) A checklist of the scale insects and mealybugs of south Asia. *Records of Zoological Survey of India, Occasional paper* No.139: 152 pp.
- Vijay S. and Suresh S. (2013) Bio-efficacy of certain insecticides and *Beauveria bassiana* against coccids in flower crops. *Journal of Bio pesticides* 6(2): 96-100.