

# Stink bugs (Hemiptera: Heteroptera: Pentatomidae) and Plant association in Kolhapur district of Northern Western Ghats.

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**Abstract:** Plant feeding stink bugs sucks sap and may cause wilting, distortion, or stunting of shoots. In all, 23 species of stink bugs were reported on 36 plant species in Kolhapur district. The *Catacanthus incarnatus* was associated with 8 plant species and *Plautia crossota* was found to be associated with 7 plant species, while *Halyomorpha halys* and *Nezara viridula* were reported on 6 plant species each. Remaining stink bug species were associated with plant species in the range of 1 to 4 plant species. Among 36 reported plant species, *Lantana camara* hosts maximum 4 stink bug species, while *Mangifera indica*, *Syzygium cumini*, *Strobilanthes callosa*, and *Morus alba* hosts 3 stink bug species each. Remaining plant species were associated with 1 or 2 stink bug species each. Data of the present study will help to formulate control strategies against these economically important crops as well as forest pests.

**Index Terms:** Stink bugs, Plants, association, Kolhapur.

## I. INTRODUCTION

Insects and plants share ancient association that dates from the Carboniferous, some 300 million years ago and among insects, many species of plant-feeding Hemiptera are considered serious agricultural and horticultural pests (Gullan and Cranston 2010). Almost, half of the insect species are phytophagous and thus depend on the plants for their food requirements. The members of the sub-family Pentatominae of the family- Pentatomidae (stink bugs) exclusively plant feeders, feed on both cultivated and non-cultivated plants (Panizzi and Lucini 2017). The intimate association between various insects, including phytophagous stink bugs and their host plants in the Western Ghats is poorly understood. This lack of knowledge inhibits the further scientific investigation. Hence, in the present investigation, efforts have been taken to study the phytophagous stink bugs and their association with the plants in Kolhapur district.

## II. MATERIAL AND METHODS

The random sampling stink of bugs was done during 2014-2016 from different localities of Kolhapur district. The specimens were sampled by hand picking method, preserved dry and photographed. Simultaneously, plant parts of the plants on which stink bugs sited were also collected. The identification of stink bugs was done by following the literature of Distant (1902, 1908, 1918) and Salini and Viraktmath (2015). The identification of plants was done with the help of plant taxonomists at Department of Zoology, Shivaji University, Kolhapur.

## III. RESULTS AND DISCUSSION

A total of 23 species of phytophagous stink bugs were reported on 37 plant species. The results obtained on the association between stink bugs and plants are shown in Table 1 and also presented in the form tree diagram (Figure 1). The stink bug *Catacanthus incarnatus* was found to be associated with a maximum number (8 plant species) followed by *Plautia crossota* on 7 plant species. *Halyomorpha halys* and *Nezara viridula* were associated with 6 plant species each. The *Antecia cruciata* was associated with 4

plant species, while *Bagrada picta* with 3 plant species. Among all reported plant species, *Lantana camara* hosts maximum 4 stink bugs species viz. *H. halys*, *Tolumnia latipes*, *Aeschrocoris ceylonicus* and *Piezodorus rubrofasciatus*. On *Morus alba*, *Syzgium cumini* and *Mangifera indica* 3 species (each) of stink bugs were reported. The remaining plant species were found to be associated with 1 or 2 species each. Among all the reported stink bug species, *N. virudula* and *H. halys* were reported on *Arachis hypogaea* (Groundnut), *Glycine max* (Soybean) and *Solanum lycopersicum* (Tomato plants) and rest of stink bug species were mostly associated with herbs, shrubs and trees in the study area.

The ability of the phytophagous insect to locate a host plant depends on so many factors. The stink bugs find their preferred host plants, spend only part of their lifetime and rest of the time they feed on other less-preferred or find overwintering sites for partial hibernation (Panizzi and Lucini 2017). During the present study it has been observed that out of 23 stink bug species, 14 reported on only one plant species and 9 species on 2 to 8 plant species. It doesn't mean that the 14 species are monophagous and 9 species are polyphagous in nature because all these species were not observed in feeding condition. Some of these species might have taken shelter or migrated from host plant to other plants for other purposes. Hence, in the present communication, instead of claiming to report plant species as a host plant, it is written as the associated plant. According to Panizzi & Lucini (2017), associated plants are those on which bugs may feed on, use as shelter, but the nymphs unable to develop into adults and host plants are the plants on which bugs feed and completes the entire life cycle. In accordance with the above principle, Somaniotto & Panizzi (2015) reported that *N. virudula* has been recorded on 70 different plant species in the Neotropics, of which 29 species are reported as host plants; the remaining 41 species are considered to be associated plants. Similarly, Todd (1981) reported that *N. virudula* is a polyphagous and has 30 host plants. Hence, it is difficult to assess the host plants of stink bugs unless and until the observation of feeding is made. The record of multiple associated plants during the study may be due to the scarcity of suitable food plants during a certain period of times; in that case, stink bugs need to migrate in search of the alternate plant for their survival.

As the phytophagous stink bugs are sap suckers of agricultural crops, cultivated plants and also forest plants, the studies on stink bug and plant association will be useful not only to improve Integrated Pest Management (IPM) programs but also to know, which species more likely to associate with a particular plant.

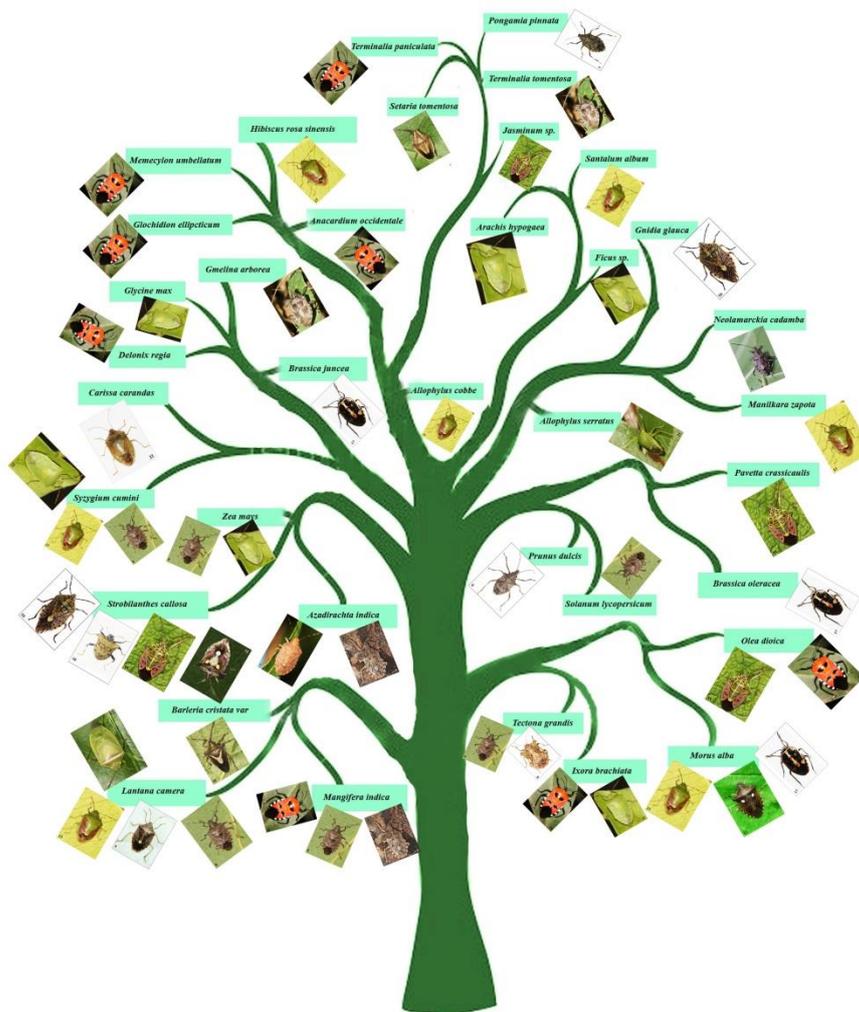
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**Figure 1. Tree diagram showing sink bugs and their associated plants.**

Stink bugs: 1.*Erthesina fullo*, 2.*Halys dentatus*, 3.*Aeliomorpha lineaticollis*, 4.*Dalpada* sp., 5.*Tipulparra pseudoversicolor*, 6.*Eupaleopoda concinna*, 7.*Niphe subferruginea*, 8.*Halyomorpha halys*, 9.*Tolumnia latipes*, 10.*Aeschrocoris ceylonicus*, 11.*Carbula scutellata*, 12.*Carbula biguttata*, 13.*Plautia crossota*, 14.*Antestia cruciata*, 15.*Gynenica affinis*, 16.*Agonoscelis nubila*, 17.*Bagrada picta*, 18.*Degonetus serratus*, 19.*Catacanthus incarnatus*, 20.*Nezara viridula*, 21.*Glaucias dorsalis*, 22.*Bathycycoelia indica*, 23.*Piezodorus rubrofasciatus*.

**Table 1. Stink bugs and their associated plants in Kolhapur district.**

Sr.No.	Stink Bug	Associated Plant
1	<i>Erthesina fullo</i>	<i>Terminalia tomentosa, Gmelina arborea</i>
2	<i>Halys dentatus</i>	<i>Azadirachta indica, Mangifera indica</i>
3	<i>Aeliomorpha lineaticollis</i>	<i>Setaria tomentosa</i>
4	<i>Dalpada sp.</i>	<i>Neolamarckia cadamba</i>
5	<i>Tipulparra pseudoversicolor</i>	<i>Pongamia pinnata</i>
6	<i>Eupaleopoda concinna</i>	<i>Prunus dulcis</i>
7	<i>Niphe subferruginea</i>	<i>Azadirachta indica</i>
8	<i>Halyomorpha halys</i>	<i>Lantana camara, Syzygium cumini, Mangifera indica, Solanum lycopersicum, Tectona grandis, Zea mays.</i>
9	<i>Tolumnia latipes</i>	<i>Lantana camara</i>
10	<i>Aeschrocoris ceylonicus</i>	<i>Strobilanthes callosa</i>
11	<i>Carbula scutellata</i>	<i>Barleria cristata</i>
12	<i>Carbula biguttata</i>	<i>Morus alba</i>
13	<i>Plautia crossota</i>	<i>Lantana camara, Morus alba, Allophylus cobbe, Hibiscus rosa sinensis, Syzygium cumini, Santalum album, Manilkara zapota</i>
14	<i>Antestia cruciata</i>	<i>Olea dioica, Strobilanthes callosa, Pavetta crassicaulis, Jasminum sp.</i>
15	<i>Gynenica affinis</i>	<i>Barleria cristata</i>
16	<i>Agonoscelis nubila</i>	<i>Strobilanthes callosa, Gnidia glauca</i>
17	<i>Bagrada picta</i>	<i>Morus alba, Brassica juncea, Brassica oleracea</i>
18	<i>Degonetus serratus</i>	<i>Tectona grandis</i>
19	<i>Catacanthus incarnatus</i>	<i>Glochidion ellipticum, Ixora brachiata, Olea dioica, Memecylon umbellatum, Delonix regia, Mangifera indica, Terminalia paniculata, Anacardium occidentale</i>
20	<i>Nezara viridula</i>	<i>Ixora brachiata, Ficus sp, Glycine max, Arachis hypogaea, Syzygium cumini, Zea mays</i>
21	<i>Glaucias dorsalis</i>	<i>Allophylus serratus</i>
22	<i>Bathycyrtus indica</i>	<i>Carissa carandas</i>
23	<i>Piezodorus rubrofasciatus</i>	<i>Lantana camara</i>