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## RESEARCH ARTICLE

### PHYTOPHAGOUS INSECTS INFESTING *TABERNAEMONTANA DIVARICATA* LINN. IN KARNATAKA, INDIA

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**Abstract:** Surveys conducted to understand the diversity of phytophagous insects infesting *Tabernaemontana divaricata* in Karnataka revealed the occurrence of 13 species of phytophagous insects which includes 4 species of defoliators and 9 species of sap suckers. Among the insect pests, the infestation of *Parotis marginata* was found to be severe, affecting health and even causing death of plants, requiring cultural as well as plant protection management strategies.

**Keywords:** Insects, Survey, *Tabernaemontana divaricata*

#### INTRODUCTION

Since antiquity, medicinal plants have been in use by human beings for the cure of various ailments. Particularly the Indian systems of medicine, such as Ayurveda, Unani, Siddha, and Ayurvedic, which use medicinal plants, are playing an important role in providing medical care. Even after the advent of modern allopathic medicine, more than 70 percent of the developing world's population depends on traditional medicinal systems (Azaizah *et al.*, 2008). In health care, natural compounds are safer than synthetic ones because they are less likely to develop drug resistance (Raj *et al.*, 2011). India is endowed with a diverse group of medicinal plants, accounting for more than 8000 species, which are being used in more than 10,000 herbal products, resulting in ruthless exploitation and destruction of its natural habitats. As one of the measures to conserve the precious species, their commercial cultivation inadvertently brought the problem of pests and diseases, leading to crop loss of various magnitudes (Mathivanan *et al.*, 2016). *Tabernaemontana divaricata*, also known as crepe jasmine and pinwheel flower, is an ornamental plant from the family Apocynaceae that is easily grown in houses, gardens, or even by the roadside. It is an evergreen and highly useful ethnomedicinal plant that is utilized for various traditional treatment purposes worldwide (Ghosh *et al.*, 2021). It has been used as a medicinal plant for many years and is abundantly found in Indian heritage to worship the god and goddess. The nonalkaloid and alkaloid phytochemical constituents of this plant are well-known for many pharmacological activities

(Gopinath *et al.*, 2011; Pushpa *et al.*, 2012; Poornima *et al.*, 2012; Das *et al.*, 2022). The latex that comes out from the points of laticiferous tissue contains secondary metabolites and proteins (Konno *et al.*, 2011). Medicinal plants, in spite of their medicinal importance, like other plants, suffer from the detrimental effects of insect pest injury, which not only harms the plant but also reduces its therapeutic value (Manjula *et al.*, 2020). Considering this, we conducted surveys on phytophagous insects associated with *T. divaricata* grown in Karnataka, and the findings are presented in this communication.

#### MATERIALS AND METHODS

Surveys were carried out to know the diversity of phytophagous insects infesting on *Tabernaemontana divaricata* in Karnataka. For this purpose roving surveys were conducted in Bangalore and Dharwad from August 2017 to August 2019, covering medicinal plant gardens, parks, and fields. The insects found infesting on *T. divaricata* were collected, brought to the laboratory, and processed for identification. In the case of immature stages, they were reared on *T. divaricata* to the adult stage in the laboratory and were processed for identification. The insects that could not be identified at the institute level were sent to concerned taxonomic experts and got identified.

#### RESULTS AND DISCUSSION

The survey revealed the occurrence of 13 species of insects representing four orders, viz., Hemiptera, Lepidoptera, Diptera, and Thysanoptera, infesting *T.*

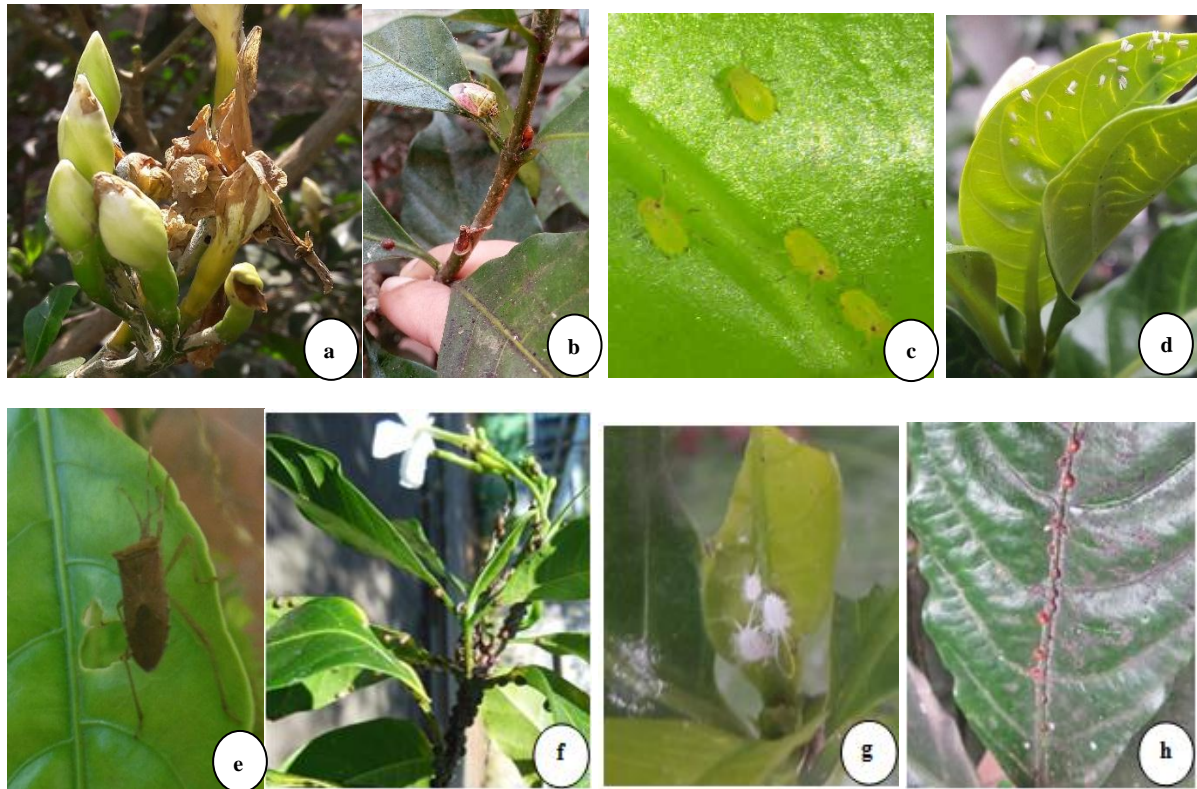
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*divaricata* in Karnataka. It comprises ten species of sap suckers representing Hemiptera, Diptera, and Thysanoptera, while all three species of defoliators are under Lepidoptera. Among the sucking pests, the thrips, viz., *Thrips florum* and *T. hawaiiensis*, are major pests draining the sap from flowers and flower buds (Figure- 1a). They damage the plants by sucking their juices and scraping at flowers and flower buds. Infested flowers and flower buds failed open, splotchy, and silver then dry. *T. florum* is reported to infest *Sesamum indicum* in India, causing a heavy reduction in seed yield (Karuppayyan, 1998), while *T. hawaiiensis* has a large host plant range, including plants and flowers. *Antestiopsis cruciata* (Figure- 1b) is a well-known coffee pest in Asia (Nietner, 1861), mainly on jasmine (Baliga, 1967). *Aphis (Aphis) spiraeicola* (Figure- 1c) is distributed worldwide (Rajendra Singh *et al.*, 2024). *Asialeyrodes indica* (Figure- 1d) is known to breed on 26 host plants, including *T. divaricata*, in India (David *et al.*, 2021). The genus *Cletus* (Figure- 1e) is distributed mainly in the Oriental and Afrotropical regions, and they feed mainly on wild vegetation and are generally host specific (Gupta and Singh, 2013). The other coccid-sucking pests, viz., *Parasaissetia nigra* (Figure- 1f), *Pseudococcus longispinus* (Figure- 1g), and *Saissetia coffeae* (Figure- 1h), are highly polyphagous, infesting plants of economic importance in India (Sundararaj *et al.*, 2008). Among the defoliators, the infestation of *Parotis marginata* was found to be severe affecting health of

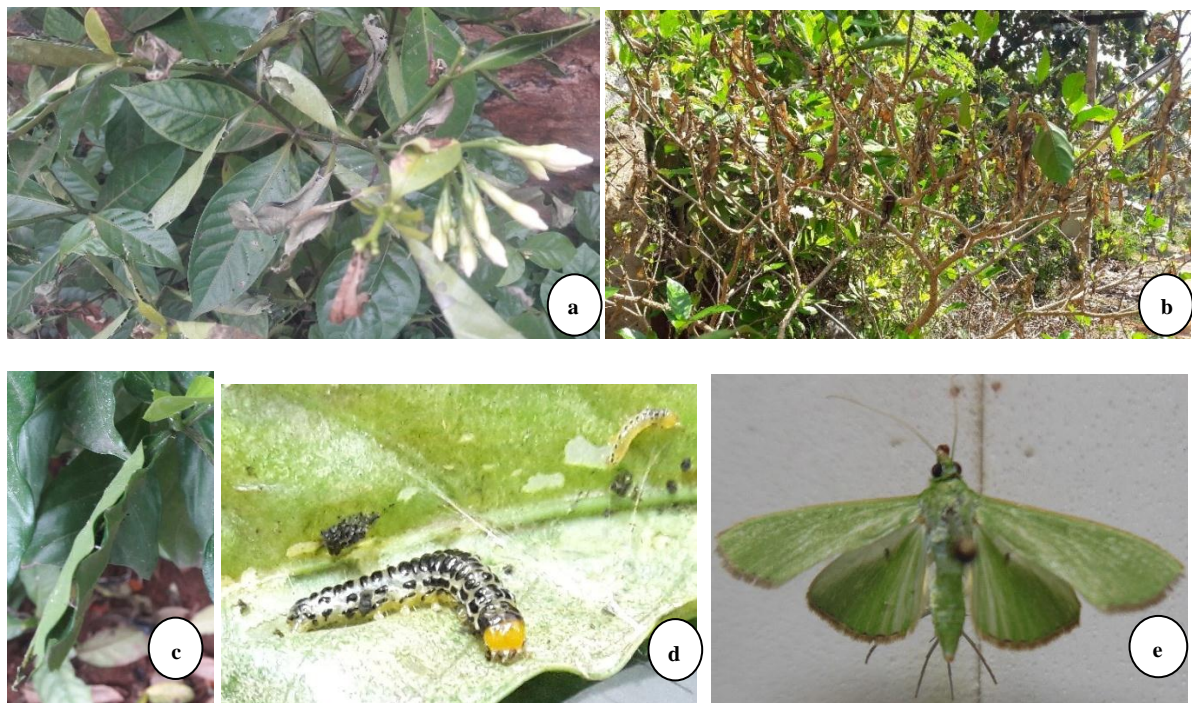
the plants and even causing death. The larvae tie the lateral margin of the entire leaf together with the silk material and feed on the epidermal tissue. In case of the heavy infestation almost all the leaves were affected showing dried and scorching burning effect (Figure- 2a to e) and the plants were dried and died due to the infestation. The heavy damage also required the cultural as well as plant protection management strategy to manage the pest (Dabhi and Bhatt, 2019). The genus *Glyphodes* is one of the most economically important genera, comprising fruit borers, shoot borers, leaf webbers, leaf rollers, etc. *Liriomyza trifolii* is a highly polyphagous pest and a serious threat to horticultural crops (Rai *et al.*, 2023). *Daphnis nerii* is (Figure- 3a-c) reported to breed on *T. divaricata* (Robinson *et al.*, 2010). Among the insect pests, the sap suckers, viz. *Asialeyrodes indica*, *Pseudococcus longispinus* and *Saissetia coffeae* were observed throughout the period of surveys while the rest of the pests were observed occasionally. The study corroborates the fact that insects and their host plants have coevolved and confirms that *T. divaricata* also supports the survival of various phytophagous insects. Nonetheless, by cultivating medicinal plants in balance with the environment, insect biodiversity, and the natural enemies they support, we can guarantee their healthy growth and reap the potential medical benefits.

**Table 1.** Phytophagous insects infesting *T. divaricata*

Sl. No	Insect	Order-Family	Nature of feeding	Locality
1	<i>Antestiopsis cruciata</i> (Fab.)	Hemiptera: Pentatomidae	Sap sucker	Bangalore
2	<i>Aphis (Aphis) spiraeicola</i> Utrecht.	Hemiptera: Pseudococcidae	Sap sucker	Dharwad
3	<i>Asialeyrodes indica</i> Sundararaj & David	Hemiptera: Aleyrodidae	Sap sucker	Bangalore
4	<i>Cletus</i> sp.	Hemiptera: Coreidae	Sap sucker	Bangalore
5	<i>Daphnis nerii</i> L.	Lepidoptera: Sphingidae	Defoliator	Bangalore
6	<i>Glyphodes</i> sp.	Lepidoptera: Pyralidae	Defoliator	Bangalore
7	<i>Liriomyza trifolii</i> (Burgess)	Diptera: <u>Agromyzidae</u>	Defoliator	Bangalore
8	<i>Parotis marginata</i> Hampson*	Lepidoptera: Crambidae	Defoliator	Bangalore
9	<i>Parasaissetia nigra</i> (Nietner)	Hemiptera : Coccidae	Sap sucker	Bangalore
10	<i>Pseudococcus longispinus</i> (TargioniTozzetti)	Hemiptera: Pseudococcidae	Sap sucker	Bangalore
11	<i>Saissetia coffeae</i> (Walker)	Hemiptera : Coccidae	Sap sucker	Bangalore
12	<i>Thrips florum</i> Schmutz	Thysanoptera: Thripidae	Sap sucker	Bangalore
13	<i>Thrips hawaiiensis</i> (Morgan)	Thysanoptera: Thripidae	Sap sucker	Bangalore



**Figure 1.** Sucking pests on *T. divaricata* (a) Symptoms of thrips infestations, (b) *A. cruciata*, (c) *A. (Aphis) spiraecola*, (d) *A. indica*, (e) *Cletus* sp., (f) *P. nigra*, (g) *P. longispinus*, (h) *S. coffeae*



**Figure 2.** *P. marginata* (a and b) Symptoms of infestations, (c) Leaf rolled by the larvae, (d) Larvae, (e) adult





Figure 3. *D. nerii* (a and b) Larvae, (c) adult

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