

RESEARCH PAPER

Status of major insect pests of guava in Dharwad and Gadag districts of Karnataka

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**Abstract:** To study the insect abundance, a roving survey was carried out during July- December 2023 in major guava growing areas of Dharwad and Gadag districts of Karnataka at monthly interval. During the roving survey conducted in two districts, the major pest species which includes tea mosquito bug, *Helopeltis antonii*; mealy bug, *Ferrisia virgata* (Cockerell); spiralling whitefly, *Aleurodicus dispersus* (Russel); and fruit fly, *Bactocera correcta* were majorly documented. Also identified some of the natural enemies that play a vital role in mitigating the population of these pests. The result of the experiment showed that highest infestation of all the insect pests (sucking pests and fruit fly) were recorded in Gadag district compared to Dharwad district except for tea mosquito bug showing maximum incidence in Dharwad district.

**Key words:** Guava, Natural enemies, Sucking pests, Survey

Introduction

Guava, *Psidium guajava* L. is a climacteric fruit originated in Tropical America has been cultivated widely in many countries in the world. In India it was introduced early in seventeenth century. It belongs to the family Myrtaceae and is a major source of Vitamin A, B and C and also contains high amounts of calcium and pectin (Anita *et al.*, 2012). Guava is an important fruit crop commercially cultivated and it claims to be the 4<sup>th</sup> most important fruits in area and production after mango, banana and citrus. It is eaten as such or as cooked and used for making jam and jelly. Due to its high calorific value, guava fruit is an excellent choice for the middle income group peoples and hence it is also called as "Poor man's apple".

India is the largest producer of guava in the world having an area of about 307 thousand ha with a production of 4516 thousand million tonnes (First advance estimates). The largest producer is Uttar Pradesh (983.59 thousand tonnes) followed by Madhya Pradesh (776.75 thousand tonnes) and Bihar (434.41 thousand tonnes). Karnataka having an area of 7.18 thousand ha with 140.23 thousand million tonnes of production and 19.52 million tonnes ha<sup>-1</sup> productivity. The total area under guava fruit crop in Dharwad district accounts for 563 ha with a production of 10191 metric tonnes (Anon., 2019). The most important commercially grown varieties in Dharwad district are Lucknow-49, Allahabad Safeda and Navalur Local. Among them Lucknow-49 is very popular.

Various insect species causes damage to guava in different regions of the world and their abundance vary with geographical locations, availability of food sources and the season of the year. As many as 80 insect pests have been reported on guava. Of these, the most important are sucking pests which includes mealy bug (*F. virgata* Cockerell), tea mosquito bug (*H. antonii*), and in some regions spiralling whiteflies (*A. disperses* Russel) are the primary reasons for the hindrance for the guava production, where both nymphs and adults will suck the sap from the leaves, twigs, flowers and also attacks fruits where the

infested fruits will turn into uneven shapes with poor yields and quality.

Apart from sucking pests, fruit flies (*Bactrocera* spp.) also cause a major loss, where the maggots bore inside the fruits and start feeding on the soft pulp. The attack of these pests causes several effects including fruit quality and its production. Seasonal incidence of any insect pest provide knowledge on relationship between weather factors and insect abundance. It indicates the farmers of a particular area or region about management programmes of the sucking pest.

Material and methods

Roving survey was conducted at monthly intervals from July to December to know the status of sucking pests in the farmer fields of Northern Karnataka. The survey was conducted in two districts - Dharwad and Gadag, two talukas from each district and two villages from each taluka were selected and in each village two orchards were surveyed for the pest incidence.

The incidence of major sucking pests on guava was recorded at monthly intervals on five randomly selected plants in the orchard. The observations were made on total number of affected and healthy parts *viz.*, young leaves, flower buds and fruits of the plants for mealy bug, tea mosquito bug, spiralling whitefly and fruit fly. The occurrence of natural enemies was also recorded simultaneously.

In an orchard five plants were randomly selected and five branches in each plant was observed for mealybug on the basis of number of mealybugs per leaf, number of mealybugs per twig and mealybugs per fruit using magnifying lens directly in the field. For tea mosquito bug, observation recorded as number of affected leaves per branch, number of affected flower buds per branch and number of affected fruits per branch.

The data obtained was converted into per cent damage using following formula,

$$\text{Per cent damage} = \frac{\text{No. of young leaves/ flower buds/fruits}}{\text{No. of young leaves/flower buds/fruits}} \times 100$$

Whereas observation on spiralling whitefly like number of whiteflies (nymphs and adults) per leaf, number of egg mass per leaf was taken and per cent leaf infestation was calculated using the formula,

$$\text{Per cent incidence} = \frac{\text{Number of leaves infested}}{\text{Total number of leaves examined}} \times 100$$

For fruit fly observation, 10 ripen fruits were randomly collected from each branch separately with label and brought to the laboratory. To assess the maggots population in each fruit, fruits were cut in to two halves by sharp knife and maggots were counted from each half. Observations were made as number of maggots per fruit and per-cent fruit damage calculated as,

$$\text{Per cent incidence} = \frac{\text{Number of fruits infested}}{\text{Total number of fruits examined}} \times 100$$

## Results and discussion

Among all insect pests recorded during the survey period in both the districts, incidence and abundance of major insects are described below.

### Tea mosquito bug, *Helopeltis antonii* Signoret

The incidence of tea mosquito bug exhibited the peak infestation in Dharwad district, recording 10.94, 6.59 and 12.74 per cent on young leaves, flower bud and fruit respectively, succeeding the incidence observed in Gadag district (8.77, 6.76 and 12.44 per cent on young leaves, flower bud and fruit respectively) (Table 1 and Fig. 1). The current findings are consistent with the findings of Anandkumar (2022) who also noted the highest infestation levels on guava in the Dharwad district.

### Mealy bug, *Ferrisia virgata* Cockerell

The highest mean population of mealy bug was observed in the Gadag district by recording 4.84 mealy bug per leaf, 3.46 mealy bug per twig and 6.40 mealy bug per fruit whereas the Dharwad district which had a lower count of 3.88 mealy bug per leaf, 2.06 mealy bug per twig and 5.86 mealy bug per fruit (Table 1 and Fig.1). These results are similar to the findings of Mani (2005) who reported the mealy bug as the dominant species causing major damage to guava in Karnataka and Tamil Nadu.

### Spiralling whitefly, *Aleurodicus disperses* Russel

Among the two districts observed, Gadag district recorded the maximum mean population of spiralling whitefly with 8.38 whiteflies per leaf, 3.97 egg masses per leaf and 46.61 per cent leaf infestation whereas the Dharwad district which had a lower count of 6.74 whiteflies per leaf, 3.34 egg masses per leaf and 44.16 per cent leaf infestation (Table 1 and Fig.1). These findings are in line with reports by Mani (2005) and Duradundi *et al.* (2020), who reported the high level of incidence in Gadag district compared to the incidence in Dharwad district.

Table 1. Status of major insect pests of guava in Dharwad and Gadag district of Karnataka during 2023

Districts	Taluk	Village	Sucking pests										Fruit fly	
			Tea mosquito bug			Mealybug			Spiralling whitefly					
			Young leaves damage (%)	Flower bud damage (%)	Fruit damage (%)	No.of mealybug/ leaf	No.of mealybug/ twig	No.of mealybug/ fruit	No. of egg mass/ leaf	No. of spiralling whitefly / leaf	Leaf infestation (%)	No. of maggots/ fruit	Fruit damage (%)	
Dharwad		Navalur	10.77	6.25	11.60	3.63	1.99	5.67	3.27	7.01	44.14	4.01	40.21	
		Garag	11.12	6.92	13.88	4.13	2.14	6.05	3.41	6.48	44.18	3.24	34.52	
Gadag	District mean	10.94	6.59	12.74	3.88	2.06	5.86	3.34	6.74	44.16	3.62	37.36		
	Nargund		10.07	6.84	13.42	4.56	3.06	6.03	3.16	8.23	46.10	4.13	45.68	
	Konnur		7.47	6.68	12.46	5.12	3.86	6.78	4.10	8.54	47.12	4.73	49.25	
	District mean	8.77	6.76	12.44	4.84	3.46	6.40	3.97	8.38	46.61	4.43	47.46		
	Mean		9.85	6.67	12.84	4.23	2.76	6.13	3.65	8.76	45.38	4.02	42.21	

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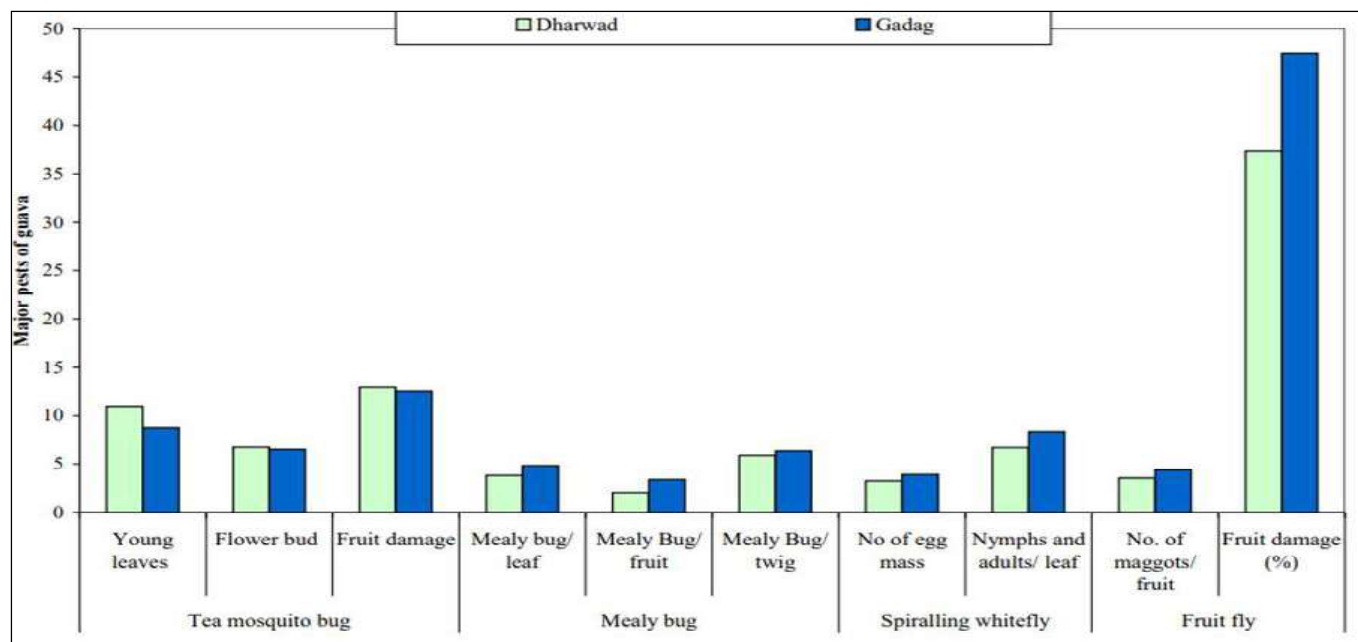


Fig 1. Status of major insect pests of guava in Dharwad and Gadag districts of Karnataka during 2023

Table 2. Status of natural enemies of guava in Dharwad and Gadag district of Karnataka during July-December 2023

Dharwad district					
Taluk	Village	Month	Mean number of predators/ branch		
			Spiders	Coccinellids	Reduviids
DHARWAD	Navalur	July	0.20	0.10	0.00
		August	1.10	0.40	0.00
		September	1.13	0.56	0.11
		October	1.40	1.20	0.10
		November	0.80	0.90	0.06
		December	0.15	0.46	0.10
		Mean	0.79	0.60	0.06
	Garag	July	0.34	0.18	0.00
		August	0.52	0.80	0.03
		September	1.15	1.26	0.01
		October	1.25	1.35	0.14
		November	1.32	0.40	0.18
		December	0.90	0.16	0.11
		Mean	0.93	0.69	0.78
	District mean		0.86	0.64	0.42
Gadag district					
Taluk	Village	Month	Mean number of predators/ branch		
			Spiders	Coccinellids	Reduviids
NARGUND	Nargund	July	0.25	0.10	0.00
		August	0.30	0.50	0.00
		September	1.01	0.86	0.11
		October	1.30	0.90	0.10
		November	1.20	1.10	0.26
		December	0.10	0.56	0.10
		Mean	0.89	0.67	0.09
	Konnur	July	0.11	0.15	0.00
		August	1.17	0.80	0.10
		September	1.38	1.16	0.08
		October	0.30	1.30	0.14
		November	1.85	1.20	0.06
		December	1.60	0.56	0.13
		Mean	1.06	0.86	0.85
	District mean		0.97	0.76	0.47

### Fruit fly, *Bactrocera correcta*

The Gadag district shown the highest incidence of fruit fly with 4.43 maggots per fruit and 47.46 per cent fruit damage whereas the Dharwad district which had a lower count of 3.62 maggots per fruit and 37.36 per cent fruit damage (Table 1 and Fig.1). The present findings are in accordance with the results of Ukey *et al.* (2013), who opined that *Bactrocera dorsalis* was dominant in the guava orchard at Ahmednagar district of Maharashtra.

### Natural enemies

Within the villages observed in the Dharwad district, the prevalence of natural predators such as spiders, coccinellids, and reduviids exhibited notable variations. The overall district mean population of spiders, coccinellids, and reduviids was highest in Gadag district, with densities of 0.97, 0.76, and 0.47 individuals per branch, respectively. In contrast, the lowest mean population of these natural predators was observed in Dharwad district with 0.86, 0.64, and 0.42 individuals per branch, respectively (Table 2). These predators also play a crucial role in the natural control of *Helopeltis* spp. in the cashew ecosystem. According to Saroj *et al.* (2016), the main predators of *Helopeltis* include spiders, reduviids, mantids, and ants, which supports the present findings.

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### Conclusions

During the roving survey conducted in two districts namely, Dharwad and Gadag, the major pest species which includes tea mosquito bug, *Helopeltis antonii*; mealybug, *Ferrisia virgata* (Cockerell); spiralling whitefly, *Aleurodicus dispersus* (Russel); and fruit fly, *Bactrocera correcta* were majorly documented. The incidence of sucking pests such as mealy bug, spiralling whitefly, and fruit fly were highly recorded in Gadag district when compared to Dharwad district on guava crop whereas tea mosquito bug incidence was observed more in Dharwad district. The survey also identified some of the natural enemies that play a vital role in mitigating the population of these pests, which include predators like reduviid bugs, and coccinellids such as, *Illeis cincta* and *Coccinella transversalis*. Additionally, some spiders like *Telamonia dimidiata* were encountered as part of the guava ecosystem.

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