



RESEARCH NOTE

New report of fruit infesting gall midge on mango

C. M. KALLESHWARASWAMY^{1*}, P. V. RAMI REDDY² and SHARANABASAPPA¹

¹Department of Entomology, College of Agriculture, University of Agricultural and Horticultural Sciences (UAHS), Shivamogga - 577 225, India

²Division of Entomology and Nematology, ICAR-Indian Institute of Horticultural Research, Hesaraghatta Lake Post, Bengaluru - 560 089, India

* E-mail: kalleshwara@gmail.com

ABSTRACT: A gall midge producing blisters on mango fruits was observed for the first time during 2015 in Shimoga district, Karnataka, India. In the subsequent fruiting season, the infestation was found to spread to other orchards and with upto 18.6% fruit infestation. The number of galls per fruit varied from 12.6 to 35.9 in different days of observation. Only maggots and emergence holes were found in mature fruits. Efforts were made to identify the species but due to complexity of its biology, could not obtain sufficient number of adults and hence could not be identified to species level. Since affected fruits are rendered unsuitable for marketing, the pest is considered a potential threat to mango production. In order to disseminate the information on the occurrence of, in all probability, a new pest species, this research note is prepared.

Keywords: Fruit gall midge, India, mango

Mango, *Mangifera indica* L. (Anacardiaceae) is the fruit crop of Indo-Burma region and widely cultivated in tropical countries. Out of 260 species of insects and mites that have been recorded as major and minor pests of Mango, 87 are fruit feeders, 127 are foliage feeders, 36 feeds on inflorescence, 33 inhabit buds and 25 feeds on branches and trunk (Veeresh, 1989). Among these insect pests, most abundant and destructive are mango hoppers, mealy bug, stem borer, fruit fly, mango nut weevil which play a major role in bringing down the fruit quality and yield. However, sometimes minor pests like gall midges are also found attacking Mango in serious manner in some parts of India (Sankaran and Mjeni, 1985 & 1988). Climate change coupled with changing habitat patterns is expected to trigger the changes in diversity and abundance of arthropods, geographical and temporal distribution of insect pests. During regular survey of orchards for pest incidence in 2015, we had come across the mango fruit gall infestation in a farmers' field at Nallinakoppa village of Shivamogga district Karnataka, India. Further probe based on symptoms and available immature stages on the fruit it was confirmed to be a gall midge and first of its kind to infest mango fruits.

A preliminary survey was also undertaken in and around Shivamogga to understand the severity and distribution of the fruit gall infestation in mango orchards. Data on the per cent infestation, variety, average size of

fruit (in diameter), average number of galls/fruit, number of maggots/fruit and number of emergence holes were recorded at 15 days interval. Further, the infested fruits were collected and kept in small plastic containers (3 dia. X 10 cm height) to collect adults. Illustrations of maggots, pupa and adults of gall midges were given. The infested fruits after laboratory studies were destroyed and disposed.

Preliminary observations indicated that there was a spread of infestation from one orchard to neighboring orchards. Surprisingly, only fruits of Alphonso were infested by gall midge while five other varieties grown in the same orchard remained unaffected. During 2015, the infestation was confined to only one orchard (approximately with 43 trees). However, during 2016, two other neighboring orchards (within a distance of about 1 km) were also found infested with this pest.

During 2015, the number of trees with fruit gall midge infestation were only 2 and it has increased to 8 in the following year (Table 1). During 2016, in the first sampling of fruits at peach size (2.80 cm dia.), there were no signs of gall formation. However in the second sampling, when fruit has grown in size and about to mature, infestation was noticed. On an average, infested fruits per tree varied from 4.30 to 18.75 per cent and 2.50 to 10.10 per cent at different days of sampling during 2015 and 2016, respectively. The infestation was

Infestation of gall midge on mango



Fig. 1. Gall midge infested mango fruits



Fig. 2. Advanced stage of infestation



Fig. 3. Maggot



Fig. 4. Adult (species unidentified)

observed throughout the fruiting season indicating fresh infestation was continuous even though destructive sampling was performed. The illustration of infested fruits, maggots, pupa and adults are given in Plate 1. The number of galls varied from 8.40 to 32.40 and 12.60 to 37.30 during 2015 and 2016, respectively. The number of live maggots per fruit varied from 6.30 to 31.50 and 9.0 to 29.40, during 2015 and 2016, respectively. Number of exit holes recorded was 11.45 in the last sampling period (30.05.2015) during 2015 and varied from 8.30 to 14.50 during 2016.

As only a few adults of midge could be recovered from infested fruits, the correct identity of species could not be established. Sixteen nominal species of gall midges (Diptera: Cecidomyiidae) are known to attack mango in Asia (Uechi *et al.*, 2002). Two genera, *Procontarinia* Kieffer and Cecconi and *Erosomyia* Felt, are particularly associated with mango (Harris and Schreiner, 1992). In India, 12 species of midges representing three genera are known to produce different types of galls on mango

leaves while five species including *Erosomyia indica* Grover and Prasad and *E. mangiferae* Felt are reported to attack mango flowers (Butani 1979; Verhgesse *et al.*, 1988; Chowdhary, 2015). Of about 21 species of gall midges reported and described worldwide (Gagné, 2010; Kolesik, 2013), *Procontarinia frugivora* Gagne was the only fruit infesting gall midge reported on mango so far from Philippines (Gagne and Medina, 2004). Elsewhere, this species was not reported further. This needs to be confirmed whether same or a different species is associated with the present damage. The genus was earlier named *Erosomyia* and now considered synonyms (Gange and Medina, 2004). However it is too early and primitive to make speculations on the possible entry of *P. frugivora* to India. The possibility of one of the leaf infesting midges already present in India shifting its feeding habit to fruits also cannot be ruled out. The preliminary observations indicate that the fruit gall midge is localized but given the commercial importance of mango, both in domestic and export markets, it is

Table 1. Incidence of mango gall midge on Alphonso mango in Nallinakoppa, Shikaripura taluk, Shivamogga district*

2015 fruiting season				2016 fruiting season			
Date of sampling	Trees with gall midge infestation (%)	Infested fruits per tree (%)	Average fruit size (cm)	Date of sampling	Trees showing gall midge infestation (%)	Infested fruits per tree (%)	Average fruit size (cm)
				18.03.2016	0	0	2.80
14.04.2015	4.65	4.30	4.30	05.04.2016	4.65	2.50	4.30
29.04.2015	4.65	15.40	6.60	12.04.2016	11.62	8.20	6.60
13.05.2015	11.62	10.10	10.30	26.04.2016	16.28	12.40	10.30
30.05.2015	16.28	18.75	14.20	14.05.2016	18.60	14.40	14.20
				23.05.2016	15.01	10.10	14.60

Table 2. Number of galls, number of maggots and emergence holes of fruit gall midge on mango

2015				2016			
Date of sampling	Average number of galls per fruit	Average number of maggots per fruit*	Average number of exit holes per fruit	Date of sampling	Average number of galls per fruit	Average number of maggots per fruit*	Average number of exit holes per fruit
14.04.2015	8.40	6.30	-	05.04.2016	12.60	9.0	-
29.04.2015	12.30	18.50	-	12.04.2016	17.40	16.30	-
13.05.2015	27.50	21.40	-	26.04.2016	24.10	18.10	-
30.05.2015	32.40	31.50	11.45	14.05.2016	37.30	26.35	8.30
				23.05.2016	35.90	29.40	14.50

*Average of five fruits

essential to monitor the spread of the pest and contain the same. The species identification is prerequisite to devise specific management strategies. There is a need to identify the species causing this type of damage and also surveying for its occurrence in different parts of India. Removal and destruction of gall infested fruits with insect stages is recommended for its management.

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