



# A New Distribution Record of Invasive Mealy Bug, *Rastrococcus Invadens* (Hemiptera: Pseudococcidae) Infesting Mango (*Mangifera Indica*) from Nagaland, India

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### ABSTRACT

An invasive mealy bug, *Rastrococcus invadens* (Hemiptera: Pseudococcidae) was reported for the first time infesting mango (*Mangifera indica*) trees from Nagaland, India. About 37.63% of total mango trees were found to have mild to high infestation of *R. invadens* (N=93) in Medziphema and adjoining areas of Nagaland state. This mealy bug species was previously recorded from few states of India on different host plants and it was only recorded from Sikkim state of North east India.

## 1. Introduction

Originating from the oriental region, the mango mealy bug, *Rastrococcus invadens* (Hemiptera: Pseudococcidae) is rapidly spreading invasive species; now established in several parts of the world. Till date, it is recorded from Pakistan, India, Bangladesh, Sri Lanka, Thailand, Hong Kong, Singapore, Malaysia, Indonesia, Philippines and Vietnam (Williams, 1986, 1989). *R. invadens* was accidentally entered into to Togo and Ghana during 1980s, and later it spread very rapidly throughout West Africa (Lohr, 1984; Williams, 1986); where the mango production was reduced by 89-100% and citrus production was also significantly reduced (Williams, 1986; Bokonon-Ganta et al., 2002). Now it has been established in Benin, Congo, Ghana, Senegal, Togo (Ben-Dov et al., 2014), Democratic Republic of Congo (Neuenschwander, 1989), Ivory Coast (N'Guetta, 1995), Nigeria and recently in French Guiana (Germain et al., 2015). *R. invadens* is regarded as a quarantine pest for Brazil (list A) and East Africa (list A1) (EPPO, 2014). In India, *R. invadens* has been reported on mango, citrus and many other fruit trees and ornamental plants from Karnataka, Andhra Pradesh,

Maharashtra, Gujrat, Odisha, Uttar Pradesh, Bihar, West Bengal and adjoining parts of Sikkim (CABI, 2015). However, it has not been recorded from other north eastern states of India. Recently we observed the mild to severe infestation of *R. invadens* on mango trees in Medziphema and adjoining areas of Nagaland state. At first, very mild infestation was seen during third week of May 2015 and it turned into severe form on some mango trees at the end of July 2015 (Plate 1). Subsequently, third and fourth author surveyed the adjoining areas viz., Jharnapani (25°45'24"N latitude, 93°50'26"E longitude and altitude of 295m AMSL), Medziphema and SASRD campus of Nagaland University (25°45'53"N latitude, 93°53'04"E longitude and altitude of 310m AMSL) and recorded the incidence and symptoms of *R. invadens* attack on mango and other plants. About 37.63% of total mango trees were found to have mild to high infestation of *R. invadens* (N=93). As per primary scientific literature, this is a first report of *R. invadens* from Nagaland state and new distribution record for this species. Natural parasitism was not at all observed in samples collected from different places, indicating their recent arrival in the locality. Conspicuous and fairly long marginal wax filaments are one of the characteristics of the genus *Rastrococcus* (Plate 2).

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**Plate 1.** Severe infestation of *R. invadens* on mango leaves

The *R. invadens* is very close to *R. spinosus* and hence present identity of the species was established only after their introduction into the Africa (Williams, 1986). Both nymphs and adults damage the host plants by sucking sap and by causing malformation of the developing plant tissues. Besides direct damage, they also excrete the honeydew, which favours the growth of sooty mould (*Capnodium mangiferae*) and ultimately affects the photosynthetic capacity of the plant.



**Plate 2.** Mature female of *R. invadens* settled on the mid rib of the mango leaf

Heavily affected plant parts stop growing and do not produce new leaves or flowers. Infestation of this species mainly occurred on the upper and lower surfaces of the leaves around their midribs (Plate 3 and 4). Mild infestation leads to significant reductions in ash content, crude fibre, sugar levels (Tobih et al., 2002), protein, fat and carbohydrate levels (Pitan et al., 2002); while it destroys the entire host plant in case of serious infestation.

*R. invadens* is highly polyphagous species attacks several host plants belonging to about 28 families. Mango, citrus, banana and ficus are however the main host plants of this



**Plate 3.** Infestation of *R. invadens* on upper and lower surfaces of the mango leaves



**Plate 4.** Infestation of *R. invadens* around the midribs of mango leaf



**Plate 5.** The weaver ant, *Oecophylla smaragdina* Fabricius

species. Besides it is commonly found on *Atrocarpus altilis*, *Plumeria*, *Melicoccus bijugatus*, *Morinda citrifolia*, *Adenium obesu*, *Spondias mombi*, *Nerium oleander* and *Mammea americana* (Ben-Dov et al. 2014). *R. invadens* are considered important because of their fast damaging nature, polyphagy and invasiveness (Miller et al. 2002). The exact reason for its occurrence in Nagaland state is not known; perhaps it could be due to the domestic movement of agricultural commodities or other human activities for its rapid spread within and outside the country. Interestingly, large numbers of weaver ants,

*Oecophylla smaragdina* Fabricius (Hymenoptera: Formicidae) (Plate 5) were found attending *R. invadens* on Mango. Besides, they were also found transferring the nymphs of mealy bugs on other parts of the tree. Kemabonta and Odebllyl (2002) studied the life table of *R. invadens* under different temperature regimes and reported that the optimum temperature for growth and multiplication of this species is 30°C and the lower developmental temperatures for male and female *R. invadens* are 18.0 and 18.7°C, respectively. The mean daily temperature during March-April (mango flowering period) in Nagaland state ranges between 15°C to 28°C (Source: [http://www.kiran.nic.in/archive\\_nagaland.html](http://www.kiran.nic.in/archive_nagaland.html)); which may be favourable for its multiplication in future. Given the ability of this pest species to spread rapidly in short period of time, necessary action should be taken as soon as symptoms start appearing on mango and other host plants. Certain cultural and mechanical practices were found effective against *R. invadens* such as spraying with steady stream of water (high pressure) on the host plant to knock-off mealybugs, rubbing or handpicking of mealybugs from affected plants and destruction of affected plant parts etc. Spraying with Azadirachtin @ 30gm ai/ha is also suggested to reduce infestation of *R. invadens* (Anonymous 2008, Ande and Olowojolu, 1999)

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