

New distributional record of buff coconut mealybug (*Nipaecoccus nipae*) in Kerala, India

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Abstract The buff coconut mealybug, *Nipaecoccus nipae* (Maskell) (Pseudococcidae: Hemiptera), was recorded on tender feeder roots of coconut seedlings at Kayamkulam, Kerala, India. *N. nipae* was not located on any other arboreal parts of palm including foliage. This is a new distributional record of the pest in Kerala, South India. The concealed nature of the pest on underground feeder roots of coconut seedlings warrants thorough examination at the seedling distribution point of coconut seedlings in order to prevent the spread of this pest to other free zones of the country. Re-emergence of the pest is reported in India after a time gap of 100 years.

Keywords *Cocos nucifera* · Feeder roots · Monitoring · Re-emerging pest

Species invasions constitute a principal component of global change, given that they cause habitat degradation, extinction of native flora and fauna, changes in ecosystem functioning and thereafter facilitation of subsequent invasions (D'Antonio *et al.* 2001). In coconut, three important species of mealybugs are

reported from India, viz., *Palmicultor palmarum* Ehrhorn, *Pseudococcus cocotis* Maskell and *Pseudococcus longispinus* Targ. *P. palmarum* generally colonizes on spear leaves, *P. cocotis* on spadix, inflorescence and inner perianth and *P. longispinus* on leaves and floral parts. Severe infestation in adult palms results in poor nut set, shedding of buttons and drying of the spadix. Infestation on seedlings leads to failure of heart leaf development and in severe cases death of the seedling has been occasionally reported (Rajan *et al.* 2010). *Pseudococcus microadonidam* and *Planococcus lilacinus* are the other mealybug species reported to infest coconut (Mohandas & Remamony 1993). Nair (1978) reported the infestation of coconut root mealybug *Rhizoecus* sp. in sandy soils, leading to discoloration at the feeding site and drying up of shoots.

In the present scenario, where climate change is becoming a major concern for agriculture, outbreak of sucking pests is well documented on a variety of crops. We report here the first incidence of buff coconut mealybug, *Nipaecoccus nipae* (Maskell) (Pseudococcidae: Hemiptera), on roots of coconut seedlings at Kayamkulam (9° 8'N latitude; 76° 30'E longitude), Kerala, India (Fig. 1). In a total of 10,000 seedlings of different genotypes, viz., Chowghat Orange Dwarf, Chowghat Green Dwarf, Malayan Green Dwarf, West Coast Tall (WCT) and Dwarf x Tall hybrids, we could find a congregation of this mealybug colony on a WCT seedling of about 8–10 months in age. It was observed neither on adult coconut palms nor on seedlings of other varieties during our investigation. Identity

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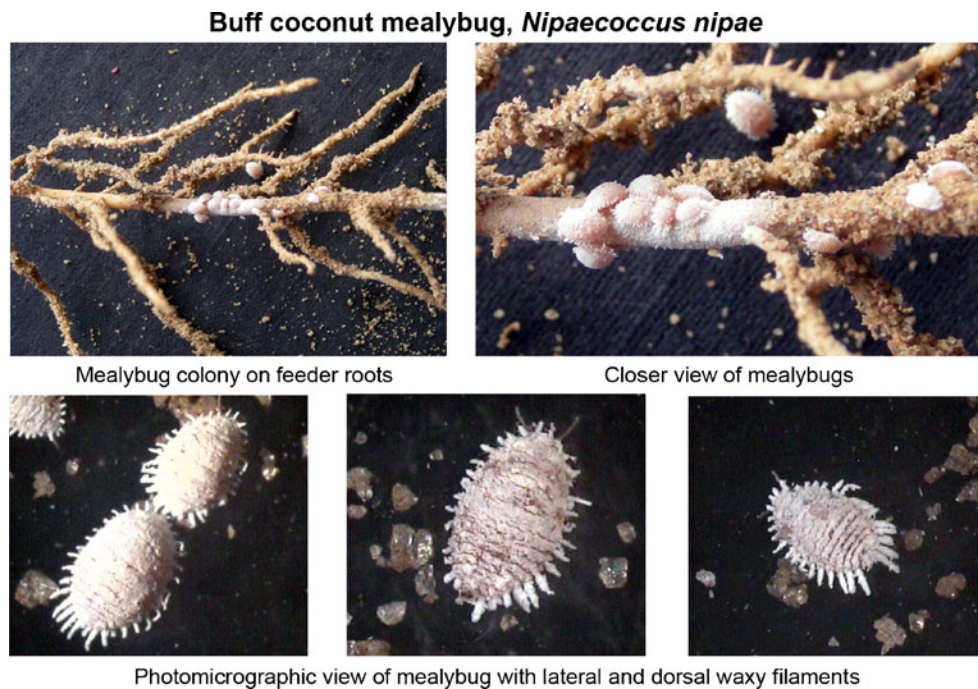


Fig. 1 Buff coconut mealybug, *Nipaecoccus nipae*

was confirmed based on the descriptions of Howard *et al.* (2001). Although occurrence of *N. nipae* was previously reported from Bengal, East India (Green 1908), this is a new distributional record of the pest in Kerala, South India. Re-emergence of the pest is also indicated after a century (CPCRI 2011). It was previously disclosed from North, Central and South America, Europe, Asia, Oceania and Africa (Miller *et al.* 2007; Williams 2004). *N. nipae* was originally described from *Nypa fruticans* in Demerara, Guyana (Maskell 1893). In Florida, Howard *et al.* (2001) gave an account of *N. nipae* feeding on the roots of coconut palm. Occurrence of buff coconut mealybug, *N. nipae*, in the Philippines was reported for the first time both as a new faunal record as well as a new pest of economically important agricultural crops, mainly coconut and various fruit and ornamental crops, and forest species including some native palms. It was observed in a wide array of host plants belonging to 20 families, 47 genera and 71 species, of which 17 species are new hosts (Lit *et al.* 2006).

Nipaecoccus nipae attacks more than 53 plant species belonging to 14 plant families including a wide array of palm species, *viz.*, nipa palm, *Nypa fruticans*; coconut palm, *Cocos nucifera*; pygmy palm, *Phoenix roebelenii*; California fish palm, *Washingtonia filifera*; parlor palm, *Chamaedorea elegans*; Queen palm,

Syagrus romanzoffiana; Ketina palm, *Howea* spp.; lady palm, *Raphis* spp.; Washington palm, *Washington robusta*; areca palm, *Areca* sp.; oil palm, *Elaeis guineensis*; sugar palm, *Arenga saccharifera*; and windmill palm, *Chamaerops excelsa* (Espinosa *et al.* 2010).

In our investigation, tender feeder roots of coconut seedlings were found infested by *N. nipae* and associated with a white fungal mat. The exact role of the fungus is not understood. However, the species was not located on the foliage of coconut or other arboreal parts of the palm. It is often restricted on aerial parts and roots of containerized palms kept out of doors in Florida. In Guadeloupe, *N. nipae* was routinely noticed on coconut palm in plantations and on leaves of several tropical fruit tree species, but was not considered as a pest of economic importance (Balachowsky 1957). The occurrence of *N. nipae* as a common pest of ornamental palms of various species in glasshouses in the temperate regions of North America and Europe primarily feeding on *Howea* spp. has been reported (McKenzie 1956). The concealed nature of the pest on underground feeder roots of coconut warrants thorough examination at the seedling distribution point in order to prevent the spread of the pest to other free zones of the country.

Adult females are 1.5–2.5 mm long, oval in shape and reddish-brown in color, covered by thick orange wax with 10–12 pairs of marginal pyramid-shaped wax filaments. The dorsal surface of the body also contains conspicuous waxy filaments. Posterior abdominal segments are found to be as large as lateral cerarian setae without dorsal oral-collar tubular ducts. Each abdominal cerarii has two widely spaced conical setae and a few associated trilocular pores. Ventral multilocular pores are present on segments V, VI, VII and VIII arranged in a single row on each segment. Dorsal ovisac is absent with 10–12 pairs of broad lateral wax filaments. Males are oblong and smaller than females. Males develop in very thin white cottony wax cocoons prior to their emergence as adults. Although it is very difficult to distinguish the male and females during the first two instars, the third instar conspicuously differentiates between the sexes, through distinct morphological features. The presence of multilocular disc pores on the abdomen and oral collar tubular ducts medially and sub-medially is a key identification feature of *N. nipae* (Espinosa *et al.* 2010; Howard *et al.* 2001; Williams 2004).

Regular monitoring allows detection of subterranean pests before economic damage is obvious, allowing improved control. All concealed parts, including the undersurface of leaves, stems, roots, etc., in the case of unrooted seedlings are to be thoroughly inspected, and disinfested before being introduced into a new area. *Scymnus* sp. and *Pullus* sp. (Coccinellidae: Coleoptera) and *Spalgus epius* (Lycaenidae: Lepidoptera) are the successful natural enemies reported on coconut mealybugs from Kerala, India (CPCRI 1995). Careful and timely intervention with systemic insecticides could be a better option during an epidemic outbreak and at this time it has to be effectively monitored through surveillance in coconut nurseries.

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