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Description of a new species of *Anagyrus* Howard (Hymenoptera: Chalcidoidea: Encyrtidae), a promising biological control agent of the invasive Madeira mealybug, *Phenacoccus madeirensis* Green (Hemiptera: Sternorrhyncha: Pseudococcidae)

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Abstract

Anagyrus amnestos sp. n. (Hymenoptera: Encyrtidae), a promising parasitoid of the invasive Madeira mealybug, *Phenacoccus madeirensis* Green (Hemiptera: Pseudococcidae), is described based on material collected from India. This parasitoid was identified as *Anagyrus* sp. nov. nr. *sinope* Noyes & Menezes in recent literature, and was initially collected in Georgia, USA. It was found to be a specific parasitoid of the Madeira mealybug and its biological attributes and potential as a biological control agent of this pest were studied. In what appears to be a case of fortuitous introduction, we detected this parasitoid in large numbers on Madeira mealybugs from the southern Indian state of Karnataka, where the mealybug is a recently introduced invasive pest. In view of its economic importance as a potential biological control agent of the Madeira mealybug, it is formally described and illustrated here. Comparative accounts of the new species *vis-a-vis* its close relatives in India and the Americas are provided.

Key words: *Anagyrus amnestos*, India

Introduction

The Madeira mealybug, *Phenacoccus madeirensis* Green (Hemiptera: Pseudococcidae) is a recently introduced invasive pest in India (Shylesha & Joshi 2012). It is of Neotropical origin and is widely prevalent in the Afrotropical, Australasian, Nearctic, Neotropical, Palearctic and Oriental regions (Ben-Dov 2013). This mealybug continues to invade new areas, including Asian countries such as Pakistan, Vietnam, Philippines, China, Taiwan and Thailand (Muniappan et al. 2009, Muniappan 2011). It is highly polyphagous, attacking 152 plant species in 46 families (Ben-Dov 2013), including many agronomic and horticultural crops in both indoor and outdoor productions. It has the potential to assume serious proportions in India in view of its highly polyphagous nature and absence of effective local natural enemies.

No attempts have been made so far towards classical biological control of *P. madeirensis* in any country where it is an invasive. *Anagyrus loeckii* Noyes & Menezes (in Noyes 2000), a parasitoid introduced as part of classical biological control programmes against the papaya mealybug (*Paracoccus marginatus* Williams & Granara de Willink) in several countries including India, was originally reared on *P. madeirensis*, but it has not been used against *P. madeirensis* anywhere except the USA. Chong & Oetting (2006a, b) identified *Anagyrus* sp. nov. nr. *sinope* Noyes & Menezes (in Noyes 2000) as an effective parasitoid of the Madeira mealybug in the USA. This parasitoid is believed to have originated as a local contaminant of a greenhouse culture of *A. loeckii* established in Georgia, USA, for evaluation against the Madeira mealybug (Chong & Oetting 2006a, 2007a). Chong (2005) had earlier misidentified the same parasitoid as *A. loeckii*, probably as a result of this contamination. Chong & Oetting