



The adult male and male nymphal instars of *Ceroplastes rusci* (Linnaeus) (Hemiptera: Coccoidea: Coccidae)

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Abstract

The morphology of the adult male and male nymphal instars of *C. rusci* are described and illustrated. A key to the adult males of the described *Ceroplastes* and *Waxiella* male species (*Ceroplastes ceriferus* (Fabricius), *C. cirripediformis* Comstock, *C. japonicus* Green, *Waxiella berliniae* (Hall) and *Waxiella* sp.) is provided and their taxonomic affinities discussed.

Key words: *Ceroplastinae*, *Ceroplastes cirripediformis*, *C. ceriferus*, *C. japonicus*, *Waxiella berliniae*, *Waxiella* sp., wax scales

Introduction

The classification of the scale insects (superfamily Coccoidea) is based almost entirely on adult female structure, whilst the morphology of the adult male and nymphal stages of most Coccoidea are poorly known. Whilst a few adult males and other stages had been described prior to the 1960s, it was only then that the first really detailed descriptions of several adult males appeared (Theron, 1958; Ghauri, 1962; Giliomee, 1967; Afifi, 1968). The adult males, unlike neotenic females, are fully mature insects and their large number of morphological characters can therefore be used to show relationships, particularly at the family and subfamily levels (Boratynski, 1971; Hodgson, 2001; Hodgson & Henderson, 2004; Hodgson & Foldi, 2006).

Ceroplastes is a very large genus placed in the subfamily Ceroplastinae or wax scales. From this genus, several controversial genera have been split, most of them presently regarded as synonyms (Hodgson, 1994). Some authors (Gimpel *et al.*, 1974; Ben-Dov, 1993) recognized only *Ceroplastes*, *Vinsonia* and *Waxiella* as separate genera. Qin & Gullan (1995), after a cladistic analysis, concluded that the group is monophyletic and all the wax scales should be classified into the genus *Ceroplastes*. The genus *Vinsonia* was recently synonymized with *Ceroplastes* (Peronti *et al.*, 2008), so that, at present, the subfamily Ceroplastinae only includes two genera: *Ceroplastes*, with 135 species, and *Waxiella*, with 20 species (Ben-Dov *et al.*, 2009). The *Ceroplastes* species have a worldwide distribution (much of this perhaps due to human activity) whereas the species presently included in *Waxiella* are distributed mainly in Africa.

Despite the large number of species in the Ceroplastinae, the adult males of only 5 species have been well described, namely *Ceroplastes ceriferus* (Fabricius), *C. cirripediformis* Comstock, *C. japonicus* Green (Gimpel *et al.*, 1974; Rainato & Pellizzari, 2008), *Waxiella berliniae* (Hall) and *Waxiella* sp., (previously described as *Ceroplastes* species) (Giliomee, 1967).

C. rusci was the first wax scale to be described (Linnaeus, 1758) and is mainly known from the countries surrounding the Mediterranean basin and in Africa. Despite its wide distribution and pest status in many countries, only the adult female is known in detail (Hodgson, 1994; Pellizzari & Camporese, 1994). The adult male and both male and female nymphal instars have been described long ago (Silvestri & Martelli, 1908; Khasawinah & Talhouk, 1964), but these descriptions are inadequate by present day standards. This paper