



A taxonomic review of the Margarodoid genus *Stigmacoccus* Hempel (Hemiptera: Sternorrhyncha: Coccoidea: Stigmacoccidae), with some details on their biology

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Abstract

Stigmacoccus is an unusual scale insect genus from Central and South America that has been little studied. It belongs to the family Stigmacoccidae within the archaeococcoid group of genera which used to comprise the family Margarodidae (Morrison, 1927) but which are now considered to represent at least 9 families. The present paper describes or redescribes the adult females, adult males, cyst stages and crawlers of the three known species (*S. asper*, *S. garmilleri*, and *S. paranaensis*), plus the prepupa of *S. garmilleri* and *S. paranaensis*, and (briefly), the pupa of *S. paranaensis*. It is considered that the female has two cyst stage instars; the number in the male is uncertain. Adult female *S. asper* and *S. paranaensis* appear to have groups of loculate pores on the walls of the vagina. A lectotype for *S. asper* is designated. In addition, cyst stages of three further undescribed species are described (but not formally named) and illustrated. Some observations on the biology and life cycle are also included. The honeydew of *Stigmacoccus* species has been shown to be an important energy source for overwintering passerine birds which defend this resource. A summary of our present knowledge is presented, including how the honeydew is eliminated (through a long anal tube) and details are given with regard to rates of honeydew flow, sugar concentration, cyst densities and annual timing of peak flows. The annual life cycle, as far as it is known, is discussed. It is concluded that this honeydew could be economically important as a source of sugar for honey production but this would need to be carefully managed to maintain an ecological balance.

Key words: morphology, immature stages, neotropics

Introduction

The genus *Stigmacoccus* was introduced by Hempel in 1900 to take his new species *S. asper*. Since that time, there have been few references to *Stigmacoccus* in the literature (see Ben-Dov, 2005), most adding little to the original description, although Morrison (1927) placed it in the tribe Stigmacoccini, subfamily Xylococcinae, family Margarodidae and later (Morrison, 1928) redescribed it. Not until 1995 was another species (*S. garmilleri* Foldi) added to the genus (Foldi, 1995), while a further species was added in 2006 (*S. paranaensis* Foldi: Foldi, 2006). *Stigmacoccus* belongs to the margarodoid group of genera, all of which share such characters as: (i) abdominal spiracles generally present in all stages; (ii) adult males usually with compound eyes; (iii) absence of a flat anal ring with pores and setae in the female stages; (iv) adult male nearly always with a simple, 10-segmented antenna, and (v) penial sheath of adult male almost entire or merely cleft at apex. However, this group of taxa are now considered to belong to at least 9 separate families, and the Stigmacoccini was recently raised to family status (Hodgson & Foldi, 2006). In their preliminary phylogenetic analysis of the archaeococcoid families based on adult male morphology, Hodgson and Foldi (2004) found Xylococcidae sister to all other margarodoid families (*sensu* Hodgson & Foldi, 2006) except Margarodidae and Matsucoccidae, with *Stigmacoccus* sister to Kuwaniidae, Callipappidae, Marchalinidae, Monophlebidae and Coelostomidiidae.

Quite a large amount of material of a then undescribed species was collected in Brazil in 1998 by G. Motana. During the study of this material, it became clear that little was known about the morphology of the various instars of *Stigmacoccus* and so it was decided to describe/redescribe all stages, providing keys for their