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Three new species of *Coccobius* Ratzeburg (Hymenoptera, Aphelinidae) and redescription of *C. abdominis* Huang and *C. furviflagellatus* Huang from China

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Abstract

Three new species of *Coccobius* Ratzeburg (Hymenoptera: Aphelinidae) are described from China, *Coccobius bimaculatus* Wang, Huang & Polaszek **sp. nov.**, *Coccobius jinshanensis* Wang, Huang & Polaszek **sp. nov.** and *Coccobius leptocerus* Wang, Huang & Polaszek **sp. nov.** *Coccobius abdominis* Huang 1994 and *Coccobius furviflagellatus* Huang 1994, originally described in Chinese, are redescribed in English and illustrated by macrophotography based on newly collected material. All five species were reared from Diaspididae (Hemiptera) scale insects on bamboo. Both the male of *C. furviflagellatus* and the diaspidid host association of *C. abdominis* and *C. furviflagellatus* are recorded for the first time.

Keywords: new species, scale insects, Diaspididae, parasitoids

Introduction

The genus *Coccobius* (Hymenoptera: Aphelinidae) is an important group of natural enemies of Diaspididae (Hemiptera) scale insects. Hayat (1984) listed many of the recorded diaspidid hosts of *Coccobius* species. The potential value of *Coccobius* has already been demonstrated in biological control of certain diaspidid pests (Peck 1963; Williams & Greathead 1990), especially in China where *C. azumai* Tachikawa was introduced from Japan into southern China against the pine scale *Hemiberlesia pitysophila* Takagi, a severe pest of pine trees. Pine scale was effectively controlled by *C. azumai* in Guangdong province during 1989–1994 (Xie *et al.* 1997) and in Fujian province during 2002–2004 (Wang *et al.* 2004).

Coccobius is a medium-sized genus of Aphelinidae with 92 described species (Noyes 2013; Wang *et al.* 2014). Hayat (1983) placed *Physcus* Howard, *Encyrtophyscus* Blanchard and *Physculus* Jasnosh in synonymy with *Coccobius*. Hayat (1984) later provided a significant species review in which the 58 species known at that time were listed, comments given on host associations and distributions, and a key given for recognition of the cosmopolitan species. Since then more than 30 new species have been described, including Chinese species by Huang (1994) and Wang *et al.* (2014), southern African species by Prinsloo (1995), Indian species by Hayat (1998) and Hayat & Khan (2010, 2012), Mexican species by Myartseva (2000), and Transcaucasian species by Japoshvili & Karaca (2010). Several additional species have also been described by Yasnosh & Mustafaeva (1992), Myartseva (1995), Evans & Pedata (1997), and Pedata (1999).

The *Coccobius* fauna of China currently includes 19 species, of which 16 species were described originally as new from China: two by Compere & Annecke (1961), ten by Huang (1994), one by Wang *et al.* (2014), and three newly described here.

In addition to the three new species described here, two previously described species, *C. abdominis* Huang 1994 and *C. furviflagellatus* Huang 1994 are redescribed in English based on newly collected material and illustrated by macrophotography. All five treated species were reared from diaspidid scale insects on bamboo. The

brown to dark brown; antennal radicle and base of F1 dark brown; scape, pedicel, remainder of F1, F2 pale yellow; F3 and clava pale yellow to brownish yellow; mandible with three distinct, pointed teeth; and F1 subequal in length to (1.06× as long as) F2, and F2 longer than F3. In *C. odonaspidis* the head and mesosoma are shining black, the metasoma is pale yellow with sharply defined black bands on either side from the base to the spiracles; the antennal radicle, scape and clava are black (lighter towards the tips), F1 is black, and the remainder of the antennae is pale yellowish white; the mandible has two teeth and a truncation; and F1 is distinctly longer than F2 and F2 is subequal in length to F3.



FIGURES 57–58. Diaspidid scale associated with *Coccobius leptocerus*. 57, host diaspidid scale in leaf sheath of bamboo; 58, host mummy after *C. leptoceras* emergence.

In the key to Chinese species given by Wang *et al.* (2014), *C. leptocerus* keys to couplet 5, but can be readily distinguished from all other Chinese species by the following: the mandible with three distinct, pointed teeth; antennal funicle segments being distinctly longer and slender, especially F1 and F2, as well as the different body colour and different antennal colour pattern.

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