



Recent occurrence of *Aphanogmus dictynna* (Waterston) (Hymenoptera: Ceraphronidae) in Kenya — an important hyperparasitoid of the coffee berry borer *Hypothenemus hampei* (Ferrari) (Coleoptera: Curculionidae)

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Abstract

The ceraphronid wasp *Aphanogmus dictynna* (Waterston) was recently recorded in error as an undescribed species of *Aphanogmus*. This species is a primary parasitoid on larvae and cocoons of the bethylid *Prorops nasuta* Waterston, and probably a second bethylid species, *Cephalonomia stephanoderis* Betrem. Both bethylids are primary parasitoids, and important biological control agents, of larvae and pupae of the coffee berry borer *Hypothenemus hampei* (Ferrari). New host and distribution records are provided for *A. dictynna*, as well as a diagnosis and comments on its taxonomic relationships.

Key words: Coffee pests, biocontrol, biological control, hyperparasitism, superparasitism, secondary parasitoid

Introduction

The coffee berry borer *Hypothenemus hampei* (Ferrari) is the most important pest of coffee worldwide (Brun *et al.*, 1995; Damon, 2000; Jaramillo *et al.*, 2006). *Hypothenemus hampei* is native to Africa, but has since spread to coffee-growing regions of Asia and the Americas. Both larvae and adults damage coffee berries, and crop losses can reach 80%, with estimated global crop losses estimated at US\$ 300–500 million (Global Invasive Species Programme, 2008; Vega *et al.*, 2002). Crop losses have been estimated to reduce earnings for more than 20 million rural families globally (Vega *et al.*, 2003). Le Pelley (1968) provides a detailed review of the biology of *H. hampei*, including earlier attempts at its biological control. Chemical control is considered ineffectual, and an integrated approach that includes a combination of fungal pathogens and parasitoid wasps is currently advocated (Global Invasive Species Programme, 2008). In addition to the tetrastichine eulophid parasitoid *Phymastichus coffea* LaSalle, two bethylid wasps *Prorops nasuta* Waterston and *Cephalonomia stephanoderis* Betrem, are the biological control agents of *H. hampei* used currently. *Cephalonomia hyalinipennis* Ashmead is known to attack *H. hampei* under natural conditions in Mexico (Pérez-Lachaud & Hardy, 2001).

Extensive surveys undertaken by the International Centre for Insect Physiology and Ecology (ICIPE), of *P. nasuta* on *H. hampei*, undertaken in Western Kenya from 2006 to 2008, revealed high levels of parasitism by an *Aphanogmus* species. Initially recorded as a new species of *Aphanogmus* (Jaramillo & Vega, 2009) this species has since been identified as *A. dictynna* (Waterston). *Aphanogmus dictynna* was recorded originally (as *Calliceras dictynna*) from Uganda in association with *P. nasuta* and *H. hampei* (Waterston, 1923).

The hyperparasitoid was sent for identification to the United States Department of Agriculture's Systematic Entomology Laboratory in Washington D.C., where the first author originally identified it as a *Ceraphron* species; following consultation with Andy Deans (North Carolina State University), the correct