New records of the parasitic wasp *Dinocampus coccinellae* (Hymenoptera: Braconidae) and its hosts in South Africa

I.A. Minnaar¹, R. Shinner¹, S. Van Noort²,³ & S. Clusella-Trullas¹*

¹Centre for Invasion Biology, Department of Botany and Zoology, Stellenbosch University, Private Bag XI, Stellenbosch, 5602 South Africa
²Natural History Department, Iziko South African Museum, P.O. Box 61, Cape Town, 8000 South Africa
³Department of Zoology, University of Cape Town, Private Bag, Rondebosch, 7701 South Africa

*Author for correspondence. E-mail: sct333@sun.ac.za*


*Dinocampus coccinellae* Schrank (Hymenoptera: Braconidae) is a solitary endoparasitoid of ladybird beetle species (Coccinellidae) from the subfamily Coccinellinae (Obrzycki 1989; Majerus 1997). The wasp has a cosmopolitan distribution, encompassing all continents except for Antarctica, and mostly occupying the Holartic temperate areas with the exception of several southern hemisphere countries (Ceryngier et al. 2012). It is known to parasitize at least 55 host species, mainly from Eurasia, Great Britain and North America (Majerus 1997; Yu et al. 2011).

*Dinocampus coccinellae* is a multivoltine species over most of its range and displays thelytokous parthenogenesis, producing mostly females (Majerus 1997; Davis et al. 2006). Its life history is fairly well documented (e.g. Majerus 1991, 1997; Ceryngier et al. 2012). Briefly, wasps use olfactory and visual cues to first locate a coccinellid host (mostly adults), then insert the ovipositor into the host and lay a single egg (Orr et al. 1992; Al Abassi et al. 2001; Davis et al. 2006; Saito & Bjørnson 2013). A single larva will develop inside the host even if the latter has been parasitized multiple times (Ceryngier et al. 2012). The larva feeds on trophic cells (teratocytes), the host’s body fat and gonads (Kadono-Okuda et al. 1995; Geoghegan et al. 2000; Firlej et al. 2007) and takes ~20 days (at 25 °C) to develop through three instars within the host’s abdomen (Obrzycki 1989; Maure et al. 2011; Ceryngier et al. 2012). The fully-developed final instar exits from the host and spins a cocoon between the host’s legs (Davis et al. 2006; Maure et al. 2011). The ladybird then grasps the cocoon and remains partially paralysed throughout the parasitoid’s pupation period (Maure et al. 2011). The manipulation of the host, acting as a cocoon bodyguard, likely results from the secretion of chemical substances by the larva which affects the host’s neurochemistry. The wasp can incur both benefits via decreased predation and costs as the host manipulation behaviour lowers fecundity, at least in the short-term (Maure et al. 2011). The cocoon remains attached to the ladybird until the wasp emerges, and most hosts die thereafter (Maure et al. 2011).

Here, we report new distributional data for *D. coccinellae* (Fig. 1; voucher specimens SAM-HYM-P046381 and SAM-HYM-P046382 deposited in the Iziko South African Museum, Cape Town) originating from individuals that emerged from field-collected ladybird beetles in Stellenbosch, Western Cape Province, South Africa (33°49.634’S 18°47.711’E). Three species native to South Africa (*Cheilomenes lunata* Fabricius, *Adalia flavomaculata* DeGeer and *Exochomus flavipes* Thunberg), the alien species (*Hippodamia variegata* Goeze) and the invasive species (*Harmonia axyridis* Pallas) were found to be parasitized by *D. coccinellae*. The three native ladybirds are new reported hosts for *D. coccinellae*, although the parasitoid had previously been reared from these and other ladybird beetle species in South Africa, but not reported in the literature: *E. flavipes* collected from KwaZulu-Natal in 1948 (specimen in Iziko South African Museum (SAMC); SAM-HYM-P005554), *C. lunata* collected from Gauteng in 1962 and the Free State in 1963–1964 (specimens in National Collection of Insects, Pretoria (SANC), Ac.DB 127), *A. flavomaculata* collected from the Free State in 1964–1966 (specimens in SANC, Ac.DB 128) and *H. variegata* from Gauteng in 1986 (specimens in SANC, Ac.Bi.308).

From a total of 545 ladybird beetle specimens collected in Stellenbosch and its surroundings from March to May 2013, *D. coccinellae* showed the highest rate of emergence from *A. flavomaculata* (*n* = 37 beetles; 11 % parasitoid emergence rate), followed by *H. variegata* (*n* = 78 beetles; 9 % parasitoid emergence), *C. lunata* (*n* = 68 beetles; 4 % parasitoid emergence), *E. flavipes* (*n* = 35 beetles; 3 % parasitoid emergence) and *H. axyridis* (*n* = 276 beetles; 0.01 % parasitoid emergence).