Apparent Stimulatory Function of Species-specific Male Genitalic Setae in *Aelurus septentrionalis* (Hymenoptera: Tiphiidae)

**WILLIAM G. EBERHARD**

Smithsonian Tropical Research Institute, and Escuela de Biología, Universidad de Costa Rica, Ciudad Universitaria, Costa Rica

Howard Evans was the first to study the details of how male and female genitalia lock together during phoretic copulation in tiphiid and bethylid wasps (Evans, 1969). He found striking differences in the mechanisms that hold males and females together, confirming that phoretic copulation has evolved several times independently in these wasps. The tiphiid subfamily Thynninae, in which phoretic copulation occurs, is widely distributed in Australia and South America. *Aelurus* is the genus with the northernmost distribution (Kimsey, 1996), and its northernmost representative, *A. septentrionalis* Kimsey, is known from Panama and Costa Rica (Kimsey, 1991). Very little is known about the biology of *Aelurus*. Judging by the hosts of related species, they are probably parasites of scarab or other soil-dwelling beetle larvae (Evans, 1969; Kimsey, 1996 and pers. comm.). The male carries the female in flight, but releases her readily when captured; males of *A. septentrionalis* have been collected at lights at night (Kimsey, 1991).

On the sunny morning of 15 June, 2002, during the second month of the wet season, I saw several male *A. septentrionalis* flying and walking on vegetation at the edge of an overgrown coffee field near San Antonio de Escazú, San José Province, Costa Rica (el. approx. 1400 m). Both solitary males and males carrying females were apparently feeding on the upper surfaces of leaves on a low-hanging branch of a tree, perhaps on honeydew. The females dangled apparently immobile, and did not appear to feed. In more than 20 years of entomological observations in this area, I have never seen this conspicuous species on any other occasion. I sprayed three pairs with a freezing spray (ethyl chloride), and succeeded in obtaining one coupled pair, which was immediately fixed in ethyl alcohol and subsequently prepared with standard procedures for examination with a scanning electron microscope. A voucher specimen has been placed in the entomology collection at the University of California at Davis.

**Results and Discussion**

The long, ribbon-like setae on the apical portion of the male paramere, which are typical of rhagigasterines (Kimsey, 1991), were splayed on the sides of the female’s gaster (Fig. 1). These setae are substantially longer in *A. septentrionalis* than in other species of *Aelurus* (Kimsey, 1991) (they are folded in the drawing of the species description of *A. septentrionalis*). There was no corresponding modification of the area of the female gaster near the male’s long setae, suggesting that their species-specific form has a stimulatory rather than a lock-and-key function. In the copulating pair, the male’s parameres were twisted with respect to his body, so that one was more or less ventral and the other more or less dorsal (Fig. 1).

The morphology of the mesh between male and female genitalia in other thynnines has been described in detail in *Dimorphothynnus haemorrhoidalis* (Guerin), *Elaphroptera scoliaeformis* (Haliday), and *E. nigripennis* (Smith) (Evans, 1969; Toro and Carvajal, 1989; Toro and Elortegui, 1994). The male parameres (gonostyli) also embrace the last female tergite in these species, and several functions have been proposed for them. In *D. haemorrhoidalis*, Evans (1969) found that, along with the male’s modified subgenital plate, the parameres participate in a three-sided pincer, which grasps the female’s gaster. Toro and Carvajal (1989) noted that the muscles that move the parameres in *Elaphroptera* are relatively small, apparently ruling out an important role for the parameres in holding the female in this genus. They proposed that the parameres have a sensory function in *E. scoliaeformis*. Toro and Elortegui (1994) proposed that in *E. nigripennis* they might also facilitate alignment or guide the engagement of the other male structures which serve to hold onto the female. These authors did not mention the possibility that the parameres function to stimulate the female. This additional, non-exclusive possibility is consistent with their observations, and with the abundant, rigid pilosity.

Accepted March 8, 2004; Revised 28 May 2004
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