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THE NEST AND LARVA OF *DIPLOPLECTRON BRUNNEIPES*  
(CRESSON) (HYMENOPTERA: SPHECIDAE)

Howard E. Evans<sup>1</sup>

ABSTRACT.— *Diploplectron brunneipes* (Cresson) makes a shallow nest in compact clay-sand containing at least two cells. It is provisioned with immature Heteroptera. The larva resembles that of *Astata* in a general way but differs in several particulars.

Wasps of the genus *Diploplectron* escape frequent detection because of their small size (4-7 mm) and secretive behavior. For many years the genus was poorly understood, but in 1972 there appeared two important papers: Parker presented a revision of the 15 New World species, with notes on the biology of 4 of them; and Kurczewski published a fairly detailed study of the nesting behavior of one of these (*D. pegloui* Krombein). The present paper includes brief observations on a previously unstudied species, *D. brunneipes* (Cresson), as well as the first description of a larva of this genus. The latter is of some importance, as knowledge of the larvae of this subfamily (Astatinae) has previously been based only on the genus *Astata*, and there are some discrepancies in the published information on that genus.

These observations were made along the shores of Terry Lake, just north of the city of Fort Collins, Colorado. *D. brunneipes* was not uncommon during July and August 1974, especially in strips of bare, flat soil on top of a bank bordering the beach proper. A number of females were seen walking and flying about low vegetation, apparently hunting. Only one nest was found. This was located in the center of a bare strip of rather hard-packed sandy clay. On 24 July a female was seen walking in a circuitous path holding a small bug in her mandibles. After a few moments she plunged into a small, open hole having a diameter of 2.5 mm and having no evidence of a mound of soil around it.

The female was captured when she emerged from this hole a few minutes later. The burrow was found to penetrate the soil at about a 60 degree angle with the surface. Two cells were located, at depths of 5.5 and 6.5 cm, the two cells being 4 cm apart and about 9 cm from

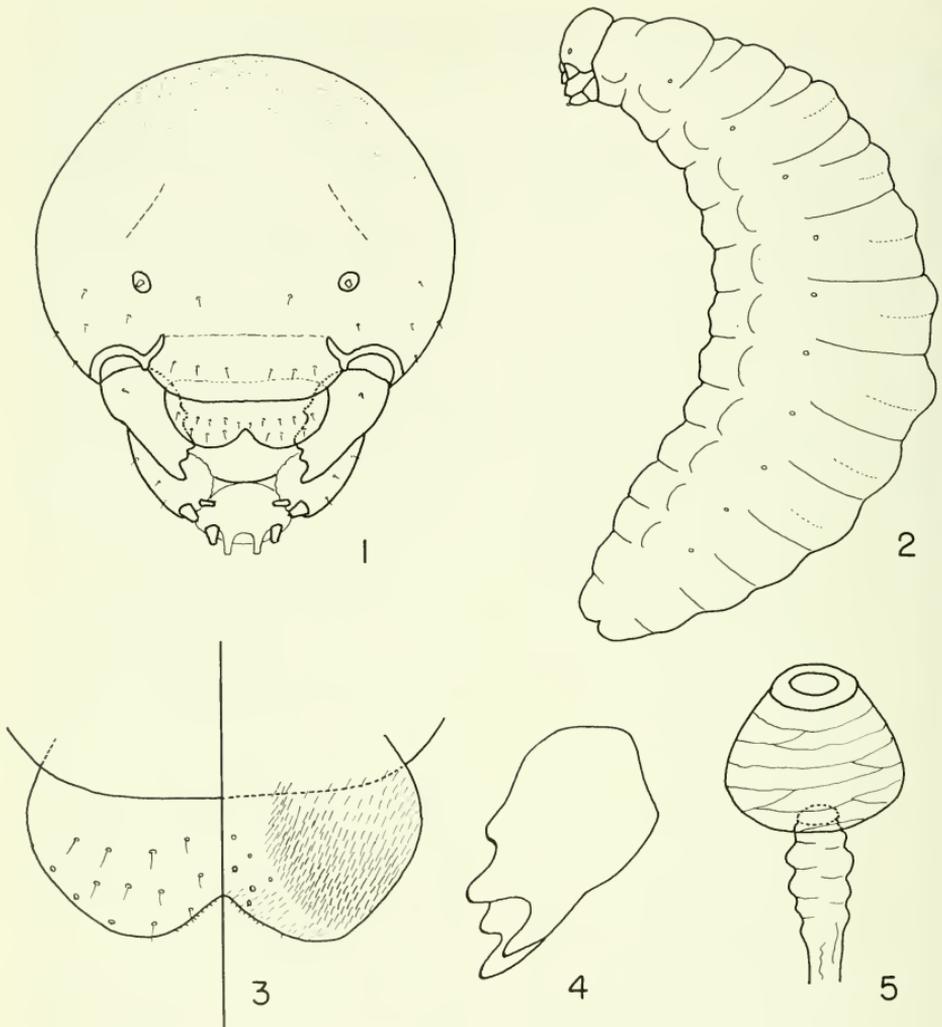
the entrance. Each cell contained 6 immature bugs, *Uhleriola floralis* (Uhler) (Lygaeidae) [det. J. A. Slater] and a small larva, one of which was reared to maturity and is described below. Both of these cells had been closed off with a barrier of sand. Since the wasp had just brought in prey, there must have been a cell in the course of being provisioned (or prey stored in the burrow), but this was not found. The cells were broadly elliptical, measuring about 3 x 4 mm. The bugs, all approximately the same instar, were in some cases on their backs, in other cases on their sides.

DESCRIPTION OF LARVA

Length (measured in usual curved position) 6.2 mm; maximum width 2.3 mm; maximum height (4th abdominal segment) 2.4 mm. Body fusiform, middle segments somewhat humped dorsally, 4th abdominal segment more humped than any other; anus terminal and supraanal and subanal lobes equally developed (Fig. 2). Pleural lobes rather weakly developed; division of segments into dorsal annulets indistinct posterior to middle of body. Integument smooth and glistening, under high power seen to have a very few minute setae, chiefly on the dorsum and pleural lobes of the more anterior segments, also sparse, minute spinules on parts of the venter and pleura. First pair of spiracles slightly larger than the others; atrium somewhat pear shaped, sparsely lined with anastomosing ridges; peritreme distinct; opening into subatrium simple, unarmed (Fig. 5).

Head 0.9 mm wide, 0.7 mm high (exclusive of labrum) (Fig. 1). Head largely unpigmented, except mandibles and pleurostomal thickenings brownish; center of front with paired, small depressions; parietal bands very weak. Antennal orbits elliptical, papillae only slightly longer than wide at base. Head with only a very few

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Figs. 1-5. *Diploplectron brunneipes*, maturedible, ventral (posterior) aspect; 5, anterior thorax; 1, head; 2, body, lateral view; 3, labrum and spiracle, high magnification (left side) and epipharynx (right side); 4, man-

small setae. Labrum 0.33 mm wide, with a strong V-shaped median emargination; surface with about 20 small setae, also with a few small marginal sensilla, mainly laterally; epipharynx with 6 strong sensillae surrounding the emargination and some weaker ones basal of these, otherwise clothed with very fine spinules except medially (Fig. 3). Mandibles stout, with 5 strong teeth, one of them ventral of the most apical tooth (Fig. 4); upper surface with a single minute seta. Maxil-

lae short, directed mesad, inner surface roughened but not distinctly spinulose; galeae very much more slender than palpi. Hypopharynx inconspicuous and evidently not spinulose. Labium without setae or spinules, spinnerets blunt, considerably exceeding the palpi.

#### DISCUSSION

The nest of *D. brunneipes* closely resembles that of *D. peglowi* Krombein, as

described by Parker (1972) and Kurczewski (1972), although evidently in flatter and more compact soil than that species usually occupies. The angle of the burrow, depth and size of the cells, and open nest entrance are similar in the two species, as are the type of prey and manner of prey carriage.

The larva is basically similar in structure to that of *Astata* as described by Evans (1958), although differing in some details from descriptions provided by earlier workers. The paired spinnerets, humped fourth abdominal segment, terminal anus, short antennal papillae, stout mandibles, mesally directed maxillae, and smooth integument together clearly define the Astatinae as distinct from other subfamilies. One other feature that I used to define the subfamily, the presence of numerous setae on the mandibles, does not hold up, and it represents an important difference between the larvae of *Astata* and *Diploplectron*. Other differences include the 5-toothed mandibles of *Diploplectron*, the sparser head setae, and the lack of conspicuous labral sensory cones.

The larva of *Astata* feeds in an inverted position in the cell, the egg having been

laid on the ventral side of a bug placed with its dorsum upward in the bottom of the cell (Evans, 1957). I had assumed that the humped 4th abdominal segment represented a pseudopod that assisted the larva in feeding in this unusual position. However, the species of *Diploplectron* place the bugs in the cell in various positions, and according to Kurczewski (1972) the bug bearing the egg is found either on its side or with its venter upward. Of course the middorsal hump may still serve to assist the larva in pushing itself about from prey to prey, though it seems less suitably adapted for this type of feeding.

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