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NEW RECORDS OF *HORNIA MINUTIPENNIS* RILEY, WITH NOTES
ON ITS BIOLOGY
(COLEOPTERA, MELOIDAE)

By GEORGE E. BOHART¹ and RICHARD B. SELANDER²

INTRODUCTION

Blister beetles of the genus *Hornia* Riley are highly specialized parasites of the bee genus *Anthophora*. In addition to being physogastric, lacking wings, and having rudimentary elytra, these beetles are unique among the New World Nemoznathinae in spending their adult life entirely within the nest of their host. Female beetles (fig. 11) mate, oviposit, and die within the cell which they have occupied as larvae. Males (fig. 10) vacate their cell to search out females. In doing so they tunnel outside of and parallel to the cell series in which they have developed (fig. 8) and enter cells containing female *Hornia* either through a terminal hole made by the female (fig. 7) or through a lateral opening which they themselves excavate. Neither sex feeds in the adult stage. First instar larvae leave the nest and crawl over the ground in the immediate vicinity of the nesting site, frequently maintaining their hold by spinning a silken thread from the anal opening. They subsequently attach themselves to adult bees directly from the ground and are carried into the nests, where they parasitize the next generation of their host, each larva consuming first the egg and then the provisioned food material in the cell.

Because of their peculiar habits, *Hornia* beetles are rarely encountered by collectors, although available evidence indicates that the genus is not particularly rare in nature. The more important works dealing with the genus are Linsley's (1942) revision and the rather complete biological accounts of *H. minutipennis* Riley and *H. boharti* Linsley published by Linsley and MacSwain (1942). The species *H. minutipennis* is one of the most widely distributed blister beetles in North America, ranging across the United States and extending northward into Canada. In the literature *H. minutipennis* has been recorded from California, Montana, Alberta, Colorado, Missouri, District of Columbia, and New York. We are now able to fill a wide distributional gap by recording this species from several localities in Wyoming, Idaho, and Utah. These records are presented below, together with some biological observations made on the species in Utah.

NEW RECORDS

In Wyoming *Hornia* adults have been recovered from cells of *Anthophora occidentalis* Cresson at two localities in the Wind River Basin, Fremont County. The first collection, made at a nesting site 5 miles south of Lander, about 5400

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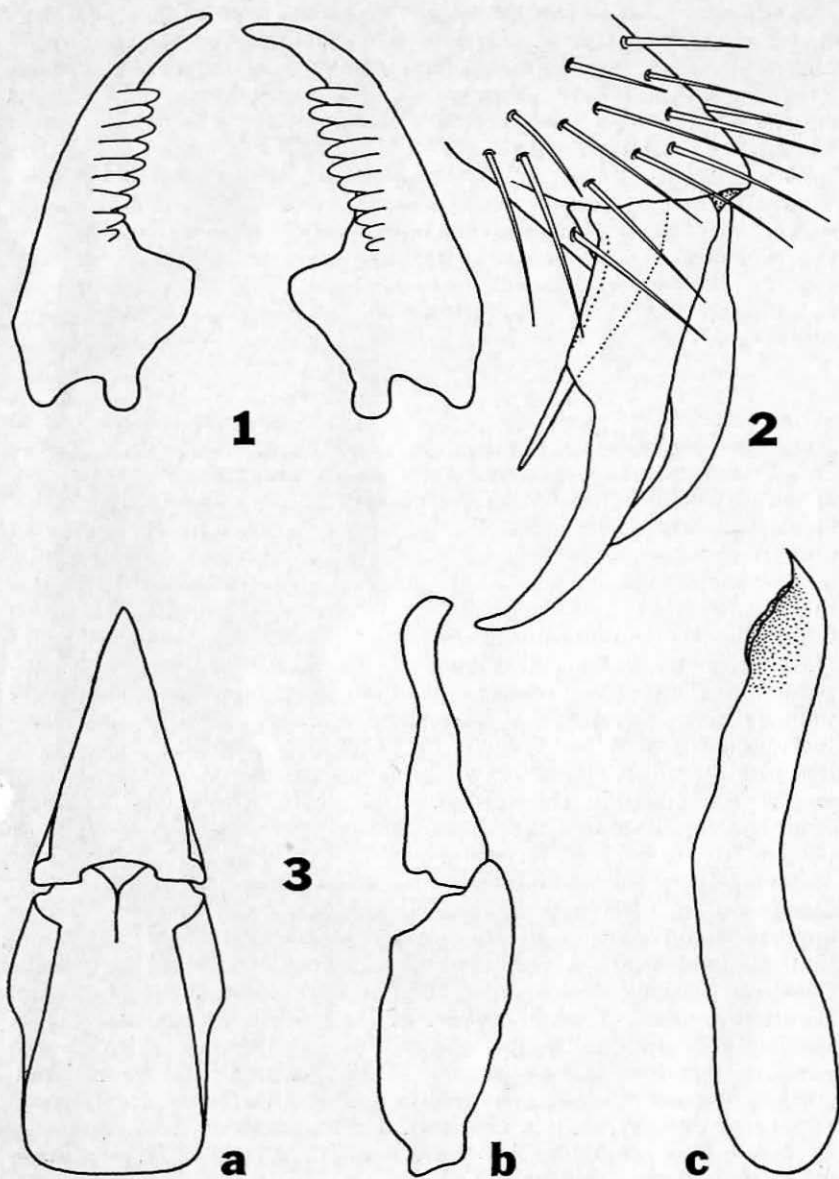
feet, on August 25, 1954, consisted of an adult found dead in an unopened cell. Five other cells examined contained *Hornia* fecal pellets and exuvia, but no living specimens were found. The nest is in a clay bank produced by a road-cut. Abandoned *Anthophora* cells at this site have been used extensively by *Osmia texana* Cresson, a species apparently immune from attack by *Hornia* but parasitized in the same locality by a species of *Nemognatha*. The second collection of *Hornia* in Wyoming was made on the same date as the first, at Pavillion, 5960 feet. At this locality two pupae were removed from *Anthophora* cells found in the bank of a small eroded gully. One of the pupae was injured but the other one developed into a fully colored adult on September 2.

Idaho records of *H. minutipennis* are based on collections made by W. F. Barr, who had intended originally to publish his own records. He collected *H. minutipennis* at three localities. The first of these is near a series of hot springs 9 miles northeast of Mountain Home, Elmore County. Here a single specimen of *Hornia* was found in a cell of *Anthophora bombooides neomexicana* (Cockerell). Cells of *A. occidentalis* from a nesting site several miles south of Lewiston, Nez Perce County, yielded a number of *Hornia*, including larval specimens. The third locality, also in Nez Perce County, is near the summit of Central Grade. According to Dr. Barr, there is some question as to whether the host of *Hornia* at this locality is *A. occidentalis*, *A. b. neomexicana*, or both. Three adult males from the Central Grade nesting site, found dead in cells in August, 1953, were sent to the authors and have been compared with material from Wyoming and Utah. The specimens are in poor condition, but they are apparently identical with Utah and Wyoming specimens.

Working in Utah, we have found *H. minutipennis* parasitizing *A. occidentalis* in six nesting sites. Observations at these sites have been made at irregular intervals since 1949. On several occasions living *Hornia* have been studied in the laboratory, but no intensive rearing program has been attempted.

Three of the *Hornia* localities in Utah are in Cache County, in the northern part of the state. One of the host nesting sites occupies a hard clay layer of a high bank at the mouth of Logan Canyon, 4500 feet, near the campus of the Utah State Agricultural College. The bank faces south, overlooking a large reservoir at a distance of about 100 feet. The site is extensive and apparently quite old, but the population of *Anthophora* is reduced at the present time, occupying only a small part of the available nesting area. The second site is on a west-facing wall of a clay gully about 100 feet from the Hyrum Reservoir, which is some 10 miles southwest of the nesting site in Logan Canyon. The third site occupies a southeastern exposure on a clay bank in an old gravel pit near Hyde Park, a few miles north of Logan. This is an extensive site inhabited by both *A. occidentalis* and *A. b. neomexicana*. Both species are parasitized by the *Hornia*. *Osmia texana*, which nests commonly in the *Anthophora* burrows, is parasitized by *Tricrania stansburyi* (Haldeman) and a species of *Nemognatha* but not by the *Hornia*.

A fourth nesting site of *A. occidentalis* with *Hornia* parasites has been found in central Utah at a locality 16 miles north of Mt. Pleasant in extreme southern Utah County. The site occupies a low clay bank facing a small canal to the west. Again at this locality there is evidence of considerable previous activity on the part of the bee, but the present population is small. When last visited, in 1951, it appeared to be on the verge of extinction.



Hornia minutipennis Riley. Fig. 1, mandibles of first instar larva; fig. 2, hind tarsal claw of adult male; fig. 3, genitalia of adult male: a, tegmen, ventral view; b, tegmen, lateral view; c, median lobe, lateral view.

locked mandibles for a few seconds. Several hours afterward it was apparent that the injured beetle was dying.

Combat between males of the family Meloidae does not seem to have been observed previously, or at least it appears that accounts of such activity have not been published. Members of several genera of Lyttinae which we have observed show no combative tendency at all. However, antagonism between males of several species of *Nemognatha*, *Zonitis*, and *Gnathium* (Nemognathinae) has been observed by the junior author on several occasions. In the case of *Hornia*, where mating takes place in extremely confined quarters, a combative instinct on the part of males may have adaptive significance.

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