

Notes on the Reproductive Biology of the Parasitoid *Doryctes palliatus* (Cameron) (Hymenoptera: Braconidae) in Hawaii

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Matthews (1974) has mentioned the paucity of observations reported for mating, courtship and behavior in the Braconidae. Accordingly, this paper describes some of these aspects for *Doryctes palliatus* (Cameron), a larval ectoparasite of Hawaiian Cerambycidae.

Doryctes palliatus (Cameron) was described in 1881 as a species of *Monolexis* (Cameron, 1881). Ashmead (1901) mentioned it in Fauna Hawaiiensis, placing it in the genus *Ischiogonus*. Perkins (1913) reported it from Fiji and Beardsley (1961) cited its occurrence on the islands of Kauai, Oahu, Molokai, Maui and Hawaii. *D. palliatus* parasitizes larvae of *Prosopis bankii* (Fabricius) and several species of endemic plagithmysines including the Hawaiian two-lined ohia borer, *Plagithmysus bilineatus* Sharp.

On 7 April 1976, while examining *Plagithmysus bilineatus* galleries in ohia (*Metrosideros collina*) slash in the Puna District of Hawaii, a partially decomposed final instar larva was found in a pupation chamber with 9 *D. palliatus* larvae *in situ*. By the morning of 8 April the larvae had spun cocoons. Later that day we found 4 additional parasitized larvae at Puna. Each of the 5 groups of cocoons was placed in a separate sterilized glass shell vial loosely plugged with cotton. The number of cocoons per larva ranged from 7 to 15 (mean 10.4 ± 2.7). From 19-21 April adult eclosion occurred, with the following results. Adult survival ranged from 66.7 - 100.0% (mean $84.5 \pm 14.2\%$). In 4 of the 5 samples collected only a single male emerged. The sex ratio averaged 1.0 male: 6.0 females.

The emergence sequence for one group of cocoons was recorded as follows. On 20 April a single male emerged at 0900 h. At 1600 h the first female emerged, followed by 3 others at 1700, 1715, and 1716 h. Mating began at 1716 h, followed by apparently random mating with emerged females. Another female emerged at 1720 h. Between 1740 h and 1820 h, the male mated 10 times, occasionally copulating several times in succession with the same female. Mating time ranged from 13-24 sec (mean 17.8 ± 4.3 sec). By 0715 h on April 21, 2 more females had emerged, and the last 3 had emerged by 0840 h.

Courtship and mating was observed at 0900 h on 21 April 1976. The male approached the female from the front, slowly stroking her head and thorax with his antennae. Brief contact involving the maxillary palpi and the prothoracic legs was also observed. After several seconds, the male rotated his body 180° and copulated with the female from the rear.

Doryctes palliatus parasitizes only a small proportion of *Plagithmysus bilineatus* larvae in field populations. Evidence of parasitism is easily obtained once galleries are exposed, since cocoons of *D. palliatus* can be seen in galleries of parasitized larvae. Data collected in our studies with *P.*

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bilineatus at 8 sites on the island of Hawaii indicate low rates of parasitism by this species ranging from 0-4%. Considering the large number of *P. bilineatus* galleries examined (1113), it seems a safe assumption that *D. palliatus* is not a major mortality factor for this cerambycid. The parasite was not found at 5 of the 8 forest sites investigated. The distribution appears to be scattered with a rather broad (300-1300 m) altitudinal range on the island of Hawaii.

The manner by which *D. palliatus* finds its cryptic host larvae is unknown, but recent studies with the braconid, *Coeloides brunneri*, which parasitizes scolytid larvae, have concluded that infrared perception is utilized in host location (Richerson and Borden, 1972).

LITERATURE CITED

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