

NOTE

Larvae and Oviposition of Hermes Copper (Lepidoptera: Lycaenidae)¹

Daniel A. Marschalek² and Douglas H. Deutschman

Biology Department, San Diego State University, San Diego, California 92182-4614 USA

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Hermes copper, *Lycaena hermes* (Edwards), is a rare species, geographically restricted to the foothills of San Diego Co., CA, and a few isolated populations in Baja California, Mexico (Thorne 1963, J. Res. Lep. 2: 143 - 150). Habitat loss due to human population growth has been a concern for almost 80 yrs (Wright 1930, Trans. San Diego Soc. Nat. Hist. 6: 1 - 40) and most recently resulted in an unsuccessful petition to list Hermes copper under the Endangered Species Act (USFWS 2006, Fed. Reg. 71: 44,966 - 44,976). Very little research regarding the biology of Hermes copper is present in the literature, and the few published studies focus mainly on the adult stage (Thorne 1963; Marschalek and Deutschman 2008, J. Insect Cons. 12: 97 - 105). This likely resulted from the failure of earlier researchers to find adequate numbers of larvae, including Comstock and Dammers (1935, Bull. S. Cal. Acad. Sci. 34: 124 - 126), admitting that searches over several years ended unsuccessfully. Our recent research investigated the reproductive cycle of Hermes copper including systematic searching for the larval stages in the field and describing female oviposition in the field and in captivity.

We searched for Hermes copper larvae visually and using a beating sheet on spiny redberry, *Rhamnus crocea* Nuttall, plants, the only known larval host. Larval searches started 14 April and continued until adults appeared, 16 May in 2003 and 12 May in 2004, at Crestridge and Rancho Jamul Ecological Reserves (for site descriptions, see Marschalek and Deutschman 2008). No Hermes copper larvae were found in 2003 or 2004, with approx. 60 and 140 redberry plants surveyed, respectively. Comstock and Dammers (1935) and Thorne (1963) were both able to obtain at least one larva from beating the host plant (28 April and 24 May, respectively) indicating that larvae should have been present during our searches. It appears that Ballmer and Pratt (1988, J. Res. Lep. 27: 1 - 80) were able to obtain larvae, but collection and ecological data are lacking.

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²Address inquiries. Current address: Department of Entomology, 445 Russell Labs, 1630 Linden Drive, University of Wisconsin, Madison, WI 53706-1598 USA (email: marschalek@wisc.edu).

During our searches, larvae of 2 other Lepidoptera species were found foraging on redberry. The most common was *Itame guenearia* (Packard), of which several larvae of twig-like appearance were found on individual plants. The foraging pattern of this species consists of feeding on one side of the leaf, starting near the base and working toward the apex. This results in a distinct curve-shape missing from the leaf, which is confirmed by rearing larvae to adults. Adults were regularly seen on redberry plants during 2004 surveys. *Argyrotaenia franciscana* (Walsingham) larvae also were found foraging on spiny redberry plants. In captivity the larvae fed and pupated within leaves attached together with silk.

We explored oviposition sites by inducing captive females to oviposit eggs on clippings from larger spiny redberry shrubs or seedlings. Three captive females oviposited a total of 23 eggs (1, 9 and 13), with 22 on redberry clippings and 1 on the glass of the aquarium. Thirteen were on the current year's new growth on a branch below a leaf petiole, 3 at the base of a second branch (2 had leaves present), 2 on a branch with no other structure and 1 on a leaf blade. Another 3 eggs fell off prior to or during inspection of the clippings. Eggs were not found with 2 females placed with potted spiny redberry seedlings.

A female in the field was observed in behavior similar to ovipositing, although oviposition was not observed. The butterfly flew slowly less than 0.25 m above the ground through vegetation, and then landed on a small (about 0.5 m tall) redberry shrub. While walking on the spiny redberry plant, the female would touch the tip of the abdomen on the stem about every 1 sec, in a repetitive motion. This continued for 1 - 2 min. The individual then flew to another spiny redberry plant, which was much larger (about 2 m tall) again continuing to probe with her abdomen tip. However, at one point she spent about 5 sec at the base of 2 branches. She repeated this behavior on a third redberry plant. This flight pattern and behavior was not observed at any other time during the 2004 and 2005 flight seasons despite about 1000 adult sightings.

In this note, we elaborate on the life cycle of this rare endemic butterfly. Although we were able to induce oviposition, we were unable to locate larvae in the field. This attests to the difficulty in working with the larval stage, resulting in limited knowledge concerning the autecology of Hermes copper. Because adults are relatively mobile and rely on a common nectaring source, conservation efforts targeted at this species are likely to center upon the habitat requirements for larvae. As a result, conservation of this species requires an improved understanding of host choice, oviposition, and larval behavior.