

### LARVAL MANDIBLE OF *CARGIDA PYRRHA* (NOTODONTIDAE)

**Additional key words:** morphology, retinaculum, Costa Rica.

The mandible of *Cargida pyrrha* (Druce) was characterized as having three large, truncated retinacula based on last-instar larvae collected near the end of their feeding phase (Godfrey, G. L. 1984, *J. Lepid. Soc.* 32:88-91). The mandibular specimens appeared to be worn, but the absence of other collections of larval *C. pyrrha* prevented further study. D. H. Janzen (pers. comm.) suggested that the truncated retinacula of *C. pyrrha* may be used to crush excised leaf tissue. A refined picture of the mandible's functional morphology became possible with the collection of a third-instar larva of *C. pyrrha* in Cañon del Tigre, Santa Rosa National Park, now part of Guanacaste National Park, Guanacaste Province, Costa Rica, on 10 June 1986. The sharpness of the edges on the retinacula and distal teeth indicated that the mandibles were unworn. As expected, the distal teeth are more angulate than earlier described. Especially noteworthy is a very distinct, dorsally directed, angular extension of the dorsalmost retinaculum (Fig. 1). When the mandible is fully closed, this extension is directed posteriorad. This suggests that, in addition to having a possible crushing function, the dorsalmost retinaculum may also help move food material toward the pharynx during mandibular adduction. In an unworn state, the last-instar mandible should be morphologically and functionally similar. This assumption partially is supported by the larval mandible of *Crinodes besckei* Hübner, which also has distinct retinacula that are similar morphologically from the third through fifth (=final) instars (Godfrey, G. L., J. S. Miller & D. J. Carter 1990, *J. New York Entomol.*

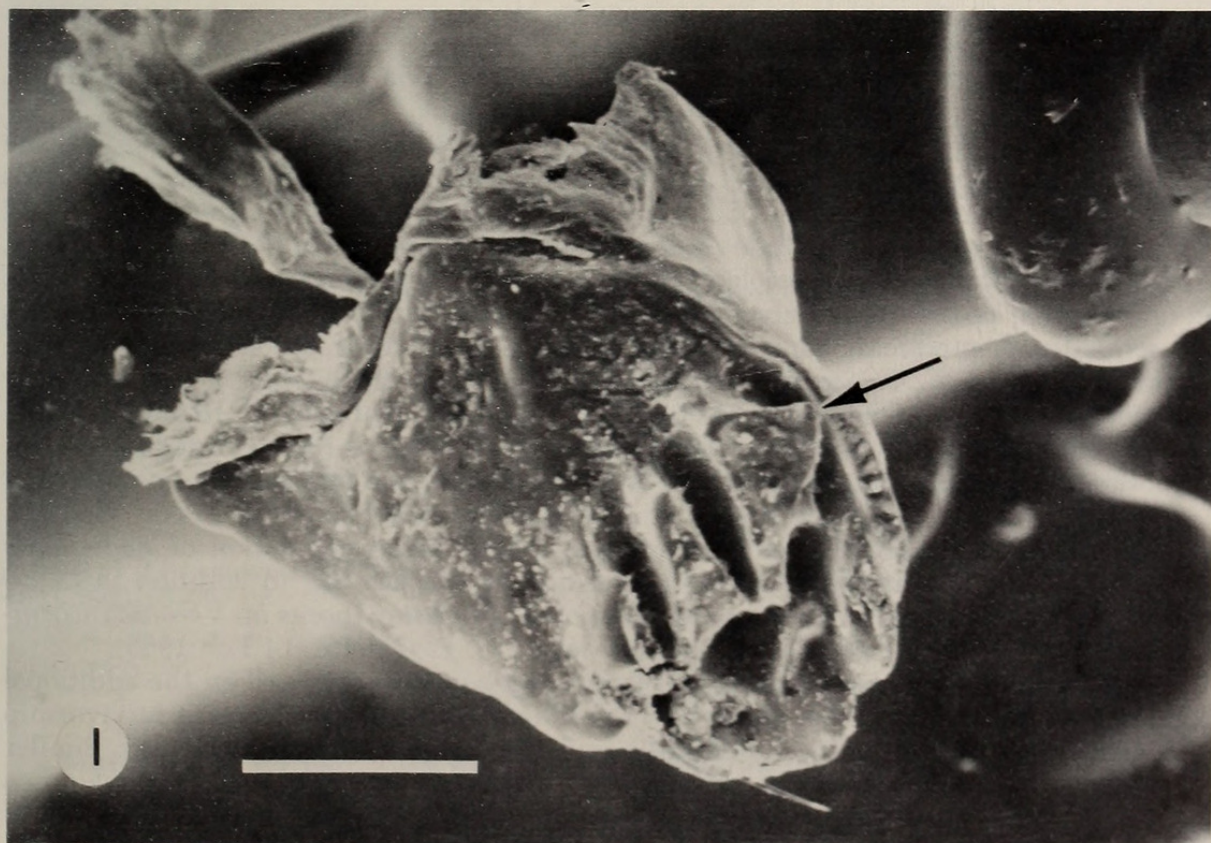


FIG. 1. Scanning electron micrograph showing medial view of third-instar larval mandible of *Cargida pyrrha* (scale bar = 0.25 mm). Pointer shows dorsalmost retinaculum.



Soc. 97:172–197). The observed third-instar larva of *Cargida pyrrha* was found clinging to a rock in the middle of a steep, eroded jeep trail, apparently having been dislodged or washed there from its host by torrential rains that recently had ended. Attempts to locate feeding larvae of *C. pyrrha* in the area were futile, so no additional specimens or hostplant information were gathered.

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#### DIETARY BREADTH IN *EUPHYDRYAS GILLETTII* (NYMPHALIDAE)

**Additional key words:** *Lonicera*, *Pedicularis*, *Valeriana*, *Veronica*, hostplants.

Ever since J. A. Comstock (1940, Bull. S. Calif. Acad. Sci. 39:111–113) reported its hostplant to be *Lonicera involucrata* (Rich.) Banks (Caprifoliaceae), *Euphydryas gillettii* (Barnes) has been thought to be monophagous. My observations over the past decade, however, have revealed oviposition by *E. gillettii* on several additional plant species. Here I report these observations, along with an evaluation of dietary breadth of this butterfly in light of hostplant choice in other *Euphydryas*.

These reports are based on observed oviposition or discovery of egg masses on the plants, not simply on larval feeding; thus, they differ from other reported hostplant records for *E. gillettii*, such as those in J. A. Scott (1986, The butterflies of North America, Stanford Univ. Press, 583 pp.), which include records of feeding by wandering post-diapause larvae. Although the following new hostplants differ in growth form (shrub or perennial), all are in families that possess iridoid glycosides (M. D. Bowers, pers. comm.). These compounds are sequestered, producing unpalatability (Bowers, M. D. 1981, Evolution 35:367–375; Gardner, D. R. & F. R. Stermitz 1988, J. Chem. Ecol. 14:2147–2168), and also may function as feeding and ovipositional stimulants. The additional records are the following. E. H. Williams and M. D. Bowers (1987, Am. Midl. Nat. 118:153–161) reported infrequent oviposition (1–4% of all egg masses) in a Wyoming population on *Valeriana occidentalis* Heller (Valerianaceae). A field survey of *E. gillettii* populations (Williams, E. H. 1988, J. Lepid. Soc. 42:37–45) revealed extensive use in an Idaho population of *Pedicularis groenlandica* Retz. (Scrophulariaceae) and *Lonicera caerulea* L., in addition to *L. involucrata*. Furthermore, an alpine population of *E. gillettii* oviposits on *Veronica wormskjoldii* Roem. & Schult. (Scrophulariaceae) (letter, C. F. Gillette, 14 Feb 1985).

Feeding experiments have shown that larvae survive and grow well on the additional hostplants. Williams and Bowers (*op. cit.*) found no significant difference in survivorship and growth of larvae on *V. occidentalis* and the usual host *L. involucrata*. Similar experiments showed no difference among *L. involucrata*, *L. caerulea*, and *P. groenlandica* as hostplants for larvae from the population that uses all three (Table 1). The use of alternative hostplants is therefore not simply ovipositional error.

Although individual populations are locally specialized, all other *Euphydryas* species whose basic ecology is known, including Eurasian as well as North American species, oviposit on several plant species each. The *minimum* number of plant genera (species)





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