SCIENTIFIC NOTE
Supernumerary Molts in the First Instar of *Diachasmimorpha tryoni* (Cameron) (Hymenoptera: Braconidae: Opiinae)[1]

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ABSTRACT. Supernumerary molts involving as many as 3 head capsule exuviae of the morphological first instar larvae of *Diachasmimorpha tryoni* (Cameron) were observed in the host puparium of the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann). This phenomenon was frequently observed when parasitization occurred in early stage host larvae.

The first larval instar of *Diachasmimorpha tryoni* (Cameron), as in many solitary endoparasitic Opiinae (Hymenoptera: Braconidae), is characterized by a distinct, heavily sclerotized, prognathous head that bears a pair of sickle-shaped mandibles capable of wide movement and quick action for maceration of host tissues and elimination of competitors in the same host (Pemberton and Willard 1918 a; Lawrence 1988 a). However, the three later instars do not have a distinct sclerotized head region like that of the first instar, and bear soft-translucent mandibles (Pemberton and Willard 1918 b; Clausen et al. 1965).

Normally, the opiine first instar feeds and grows, but the first larval molt is delayed until the host has initiated its larval-pupal metamorphosis (Pemberton and Willard 1918 b; Lawrence and Hagendron 1986).

While determining the rates of superparasitism in the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann), we found a head capsule of a morphological first stage larva of *D. tryoni*, contained within an exuvial head capsule also of that stage (Fig. 1). This phenomenon was observed on several occasions and involved as many as 3 first instar head capsule exuviae, especially when first and second instars of the Mediterranean fruit fly were exposed to oviposition by *D. tryoni*. Because development of opiine parasitoids is closely tied to events associated with molting processes of their hosts (Cals-Usciati 1975; Lawrence 1982; Lawrence et al. 1976, 1978; Lawrence and Hagendron 1986), we speculate that peaks of host ecdysteroid, or its metabolites (20-OH-ecdysone), in the presence of juvenile hormone, while initiating the molt from one larval instar to the next, may promote an unscheduled molt in first instar *D. tryoni* exposed to this hormonal milieu. Thus, a head capsule of a first instar *D. tryoni* that molts synchronously with its host should be found in the second instar host if oviposition occurred during the first stadium. If a second instar host is attacked, then

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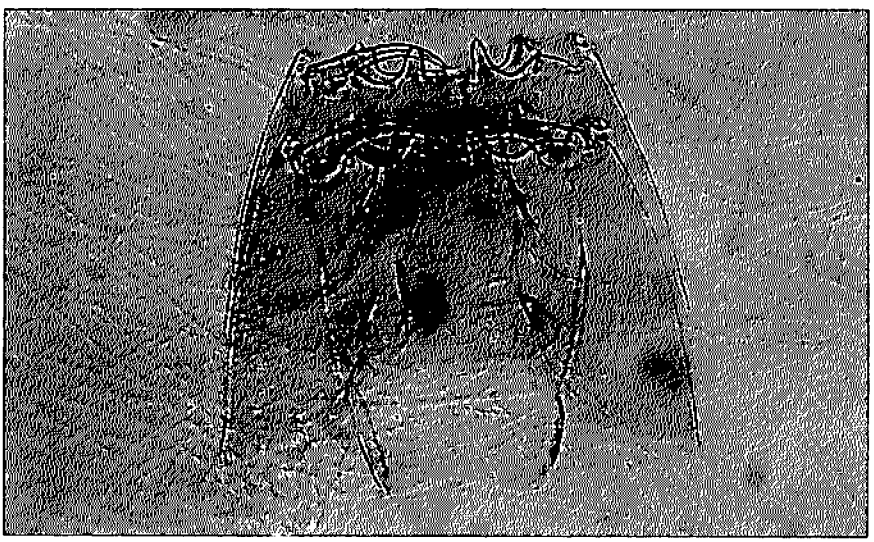

FIGURE 1. Heavily sclerotized head capsule and sickled shaped mandibles of first instar *Diachasmimorpha tryoni* (Cameron) within exuviae of the earlier first instar larva is evidence for the ability of larvae to undergo supernumerary molts.

a first instar head capsule of the parasitoid should be found in the third instar host.

We further hypothesize that the amount of host hormones necessary to initiate puparium formation may signal to the parasitoid first instar larva to initiate its development and to molt to the second instar. Whether the parasitoid can do that directly (i.e., using host hormones) or indirectly (i.e., using its own hormones) is unknown (Lawrence and Hagendron 1986). However, in the related opiine *Diachasmimorpha longicaudata* (Ashmead) the first larval instar may be able to sequester ecdysteroids from the host hemolymph to develop to the second instar (Lawrence 1988 b). Careful laboratory experiments are needed to confirm this phenomenon.

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