NOTES ON THE BIOLOGY OF STURMIA INCOMPTA  
(VAN DER WULP) AND WINTHEMIA CITHERONIAE  
SABROSKY  
(DIPTERA: LARVAEVORIDAE)

Constance Nicholas Patton

At eleven o'clock on the morning of October 10, 1955, I watched a female Sturmia incompta (Wulp) deposit eggs on a fourth instar larva of Pholus fasciatus Sulzer. The host was smaller and brighter than average and probably was newly molted. The eggs apparently were of the membranous type, with fully developed larvae, and were easily seen when first deposited. Later that same afternoon, after eclosion of the larvae, the chorion shrivelled considerably and were easily detached from the host integument.

Presumably the parasites immediately began burrowing through the floor of their chorion into the host, for the caterpillar thrashed about in an attempt to crush the maggots with its mandibles. The fly also had appeared to annoy the larva, and only her agility enabled her to avoid the larva.

On October 16, the host larva went into the soil. Four days later the host, in moribund condition, had developed a putrid odor, and several holes were apparent in its integument. It had not transformed to the pupal stage.

The soil was sieved on October 31, and the parasite pupae, grouped together, were brushed lightly with a camel's hair brush to remove dirt before storage. Immediately, the flies began emerging, and expanded normally. The stimulus to emergence may have been provided by the cleaning process, although this had not been the case in numerous other rearings.

An interesting variation in this instance was the parasites' emergence from the larval host rather than from the pupal stage. This might be attributed to the eggs having been laid on a young host, or to variations caused by laboratory rearings.

Eleven adults were reared, the life cycle from egg to adult requiring 21 days.

Normally, the parasites overwinter as small larvae, probably second instar, associated with the tracheae near a spiracle in the host pupa.

In October, 1954, numerous Pholus fasciatus larvae were collected on evening primrose (Jussiaea sp.). They pupated shortly thereafter and appeared normal throughout the winter.

On March 1, 1955, one of the pupae which had wriggled normally ten days before was examined again. It had split at the junction of the thorax with the abdomen and was devoid of body contents. The parasite puparia, 20 in number, were found grouped near the escape aperture, with their spiracles pointing into the air space surrounding the host pupal case. On March 16, fifteen flies emerged. The remaining puparia were examined several days later and found to contain fully formed dead imagos.

1 Garden City, Michigan.
A mature *Eacle ismerialis* larva was collected on November 7, 1955, from pine. It had 25 oblong, macrotypes eggs glued to segments 2, 7 and 8. The larva fed sparingly and went into the ground on November 10. Five days later, it had transformed into a perfect, vigorous pupa.

The cast larval skin was examined, and most of the eggs had hatched, eclosion being accomplished through a split at one end on a horizontal plane.

On the morning of November 18, the pupa was dead, and two splits were observed between abdominal segments. Parasite larvae were seen through the splits, all of them pointing toward the posterior end of the pupa. They were immersed in decomposing body contents of the host. Their spiracles were in contact with the air space near the aperture.

Most larvae were still feeding on November 20, but several were disturbed by my probing and crawled down into the soil immediately. By noon of the following day, all parasites had entered the soil.

The host pupal case contained remains of at least three larvae and single and "community" funnels. These community funnels were formed by the junction at their origin of several individual funnels. They are unique in this respect among those I have observed.

Fly puparia were scattered throughout the soil, mostly in the area directly below the host pupa.

On December 5, six male *Winthemia citheroniae* Sabrusky emerged. The following day, three additional males and four females emerged. Since only 13 of the parasites completed pupation and emergence, approximately 50 per cent must have perished from such causes as failure to hatch before the host transformed, starvation, overcrowding, or perhaps from contact with the molting fluid of the host.