

STRUCTURES EMPLOYED BY *ACTIAS LUNA* (SATURNIIDAE) IN EFFECTING EMERGENCE FROM THE COCOON

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Moths emerging from pupae confined within tough fibrous cocoons have evolved a number of methods to effect a safe exit. In the Saturniidae the polyphemus moth exudes copious quantities of an acidic fluid which softens and dissolves the silken filaments. The cecropia larva constructs its double-walled cocoon with a narrow crimped phalanx which effectively compensates for the smaller amount of fluid secreted by the adult. Observation of a number of emerging moths in the spring of 1966 revealed an unusual method employed by the *Actias luna* imago.

Emergence of the luna moth is a relatively noisy process, periods of activity being accompanied by rhythmic scratching sounds clearly audible at a distance of 20 feet or more in a quiet room. Although the cocoon is extremely tough, the walls are thin and, with good lighting conditions, it is possible to obtain a reasonably distinct view of the contents. It was noted that the head, thorax and wings of the insects were freed from the pupal case prior to the assault on the cocoon and that the scratching sounds appeared to coincide with movements of the undeveloped wings which were alternately raised and lowered. During periods of inactivity (when the wing movement and scratching ceased), the insects were observed to rotate slowly through twenty or thirty degrees, completing from three to five revolutions during the entire emergence sequence. Within five to ten minutes from the commencement of activity two small projections could be discerned apparently arising from the base of the wings and working in unison with them. Moving through a vertical arc of approximately 40–45° the projections seemed to be severing the cocoon filaments with an abrasive action. The final stages of emergence were obscured by the shedding of quantities of fluffy hair-like scales resulting from the pressure of the moth's thorax against the yielding threads.

On emergence the projections were no longer visible nor could they be discovered when the fore wing of a dead specimen was carefully examined. In order to determine the nature and location of the structures, a single specimen was allowed to proceed to the final stages of emergence. It was then placed in the freezer compartment of a household refrigerator where movement was arrested almost immediately.

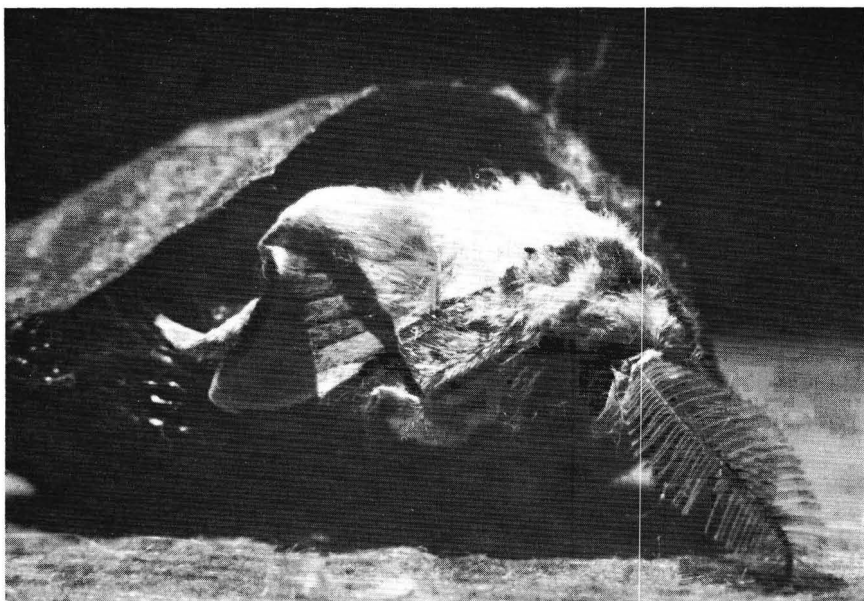


Fig. 1. Cut away cocoon showing *Actias luna* immediately prior to emergence, and the location of thoracic spur used to sever cocoon filaments.

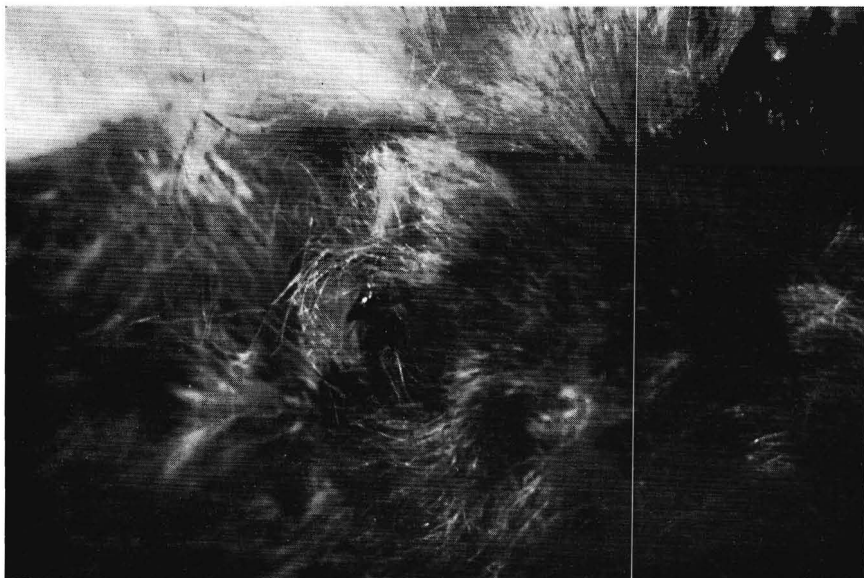


Fig. 2. A magnified view of thoracic spur in cutting position.

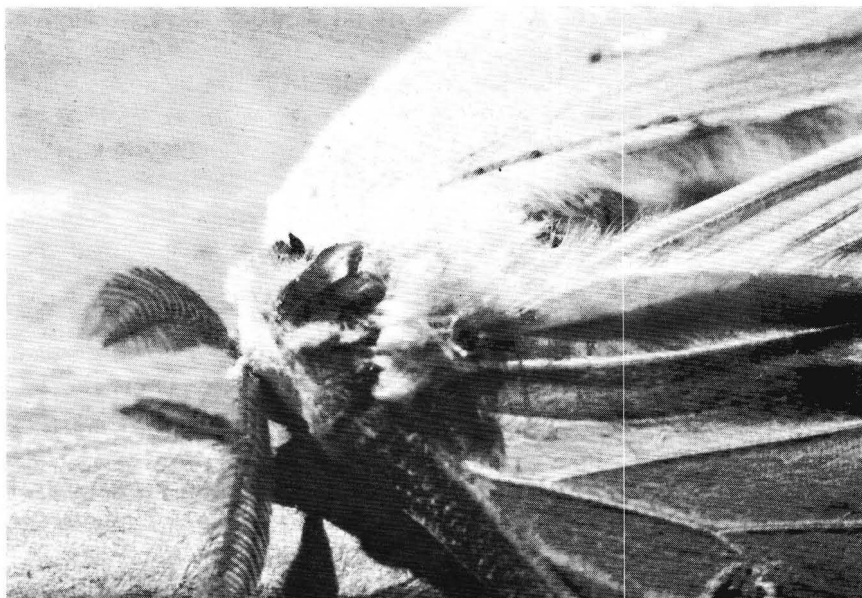


Fig. 3. A magnified view of thoracic spur on fully developed *Actias luna* from which scales have been removed.



Fig. 4. *Actias luna* moth.

After 24 hours the cocoon was removed and one side was carefully cut away with a razor blade exposing the moth within.

Under magnification the structures were observed to comprise extensions of the chitin from the mesothorax and to arise immediately above the junction of the wing from a broad base, tapering slightly towards the middle, and terminating in a thickened spear shaped point, dark brown in colour and highly polished. These projections I have termed "thoracic spurs." In a fully developed moth the "thoracic spurs" (no longer flexible) lie in a horizontal plane and are concealed by the scales of the thorax.

From the foregoing observations it would appear that the adult *Actias luna*, having emerged from the pupal case, employs a pair of "thoracic spurs" to sever the threads of the cocoon with an abrasive cutting action.

NOTES ON LARVAL FOODPLANTS OF SOME SPHINGIDS IN ONTARIO, CANADA

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Since 1963 systematic rearing of caterpillars of sphingids and some other lepidopterous families has been carried out during the summer by the Department of Entomology, Royal Ontario Museum, University of Toronto. In 1963, 1964 and 1966 this was done by our summer field party at the Biological Station of Queen's University, Kingston, Ontario, near Chaffey's Locks, Ontario. In the course of the rearing program it was found that certain species either prefer foodplants other than those recorded in the literature or refuse those which are commonly thought to be preferred. When we take as a guideline the foodplant records of Forbes (1948), Ferguson (1954), and McGugan (1958), then we find the following accord or discord.

Ceratomia amyntor (Huebner). It is commonly thought that this sphingid feeds on elm. Forbes and Ferguson list only "elm". We knew from amateur collectors in Toronto that for some years they used to look for *amyntor* caterpillars on basswood, in addition to elm. Also McGugan has basswood as foodplant in two cases of nineteen. We reared the species in 1966 successfully on basswood. In Chaffey's Locks caterpillars of *amyntor* were found on basswood.

Sphinx gordius Cramer. Forbes lists apple, ash and wax-myrtle, Ferguson blueberry, *Comptonia* and *Myrica* as foodplants. Apple and ash, however, were refused by our caterpillars in 1964. They took only