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THE LIFE-HISTORY OF *HEMEROBIUS STIGMA*, STEPH.

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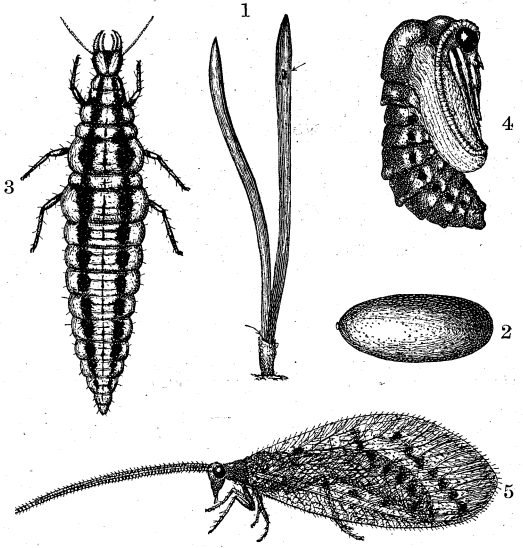
As there have been several records recently of *Hemerobius stigma* being taken in the early part of the year, the following short account of the life-history of this insect may be of interest.



Hemerobius stigma, Steph.—Fig. 1: Pair of pine needles showing positions in which eggs are laid (indicated by arrows), natural size. Fig. 2: Egg, × 30. Fig. 3: Larva, × 6. Fig. 4: Pupa, × 6. Fig. 5: Imago, × 4.

Hemerobius stigma is perhaps one of the most variable of all the brown lacewings, one form common in summer having warm brown wings practically devoid of markings, while the other extreme has greyish-brown, much spotted wings. The last form is in my experience the only one found in winter, but during the warmer months all varieties may be taken. The species is easily captured by beating conifers. On falling into the tray the insects either feign death, bending the antennæ with the legs under the body, or they may jump about for a second or two with a peculiar hopping motion, finally walking away and taking to flight. They are not strong flyers, and are rarely long on the wing. The adults feed on aphids, honey-dew, etc., and, in some cases observed, live for at least eight weeks.

On emergence from the cocoon the eggs in the ovaries are not fully developed and egg-laying does not commence for three or four days, sometimes a week. Eggs are laid singly, attached by their sides to a surface, but sometimes in groups of up to seven in number. The favourite positions are (1) a quarter of an inch from tip of pine needle on inner flat face of same; (2) under the scaly wrapping at the base of a pair of needles and hidden from view. In the first case the female crawls up the needle until the tip is reached; then, on finding she can go no further, the egg is deposited at her body's length from the tip. Less often eggs are laid anywhere on the twigs and needles.

Description of egg.—Size ·7 mm. × ·3 mm. Elongate oval, rounded at both ends, but varying slightly in shape. The surface is smooth, broken by many small granular pits. At the micropylar end of the egg is a small white knob. Colour yellowish white when first laid, but in about six days (at 60° F.) colour darkens to orange brown, and a day or so before hatching the eyes of embryo are visible as black dots through the shell at the micropylar end. Average length of egg stage is 9 days at 60° F., or 27 to 36 days in winter at 45° F. approximately.

The larva makes its escape by a small irregular rent in the egg-shell, and is at first of a pale yellowish colour. In two or three days the head markings appear, sometimes also markings on the body, but these latter are usually only visible in the second instar.

Description of third instar larva.—Body almost naked, fusiform, cream-coloured, pale brown or pink, with two longitudinal chocolate-coloured bands. Head dirty white with a brown wedge-shaped central mark widening from behind forwards. Sides of head brown. Eyes black. Antennæ blackish, as also are labial palpi. Jaws dark coloured, brown or blackish, composed of mandibles and maxillæ united to form a tube through which juices of victims are sucked. Body colour is variable, usually creamy white. There is a fine median dorsal dark brown or black longitudinal line, a pair of dorso-lateral longitudinal chocolate-coloured bands, which may be continuous or interrupted at each segment or barely visible. Generally there is also a lateral brown line on each side. Embedded in the dorso-lateral bands of the three thoracic segments are paired shiny greyish-brown sclerites—attachments for muscles. The legs are smoky white in colour, black at the knees; tarsi also darker.

Length of larva when full fed about 7 mm. There are three larval instars.

Contrary to general opinion* the larvæ of *Hemerobius do not* cover themselves with skins; the habit is, however, characteristic of some species of *Chrysopa.*

* McLachlan, 'Mon. Brit. Neur. Plan.,' p. 175, 1868, and 'Cambridge Nat. Hist. Insecta,' pt. i, p. 468.

It is impossible to give, in a brief note such as this, sufficient details to distinguish the larva of *H. stigma* from that of other species. The present description would answer almost as well for larvæ of such distinct species as *H. humuli* and *H. lutescens*; but of course these larvæ are rarely found on pines. Colour in Hemerobiid larvæ is extremely variable, being due largely to the colour of internal organs.

During the greater part of the year larvæ may be found on pines, where they feed on aphids, leaf hoppers, and mites, piercing these with their jaws and sucking out the juices. The larva runs actively with a slight side-to-side motion of the head, the tip of abdomen being used as an additional leg. When at rest it has a habit of lying stretched out along a needle with its head towards the base. The period of larval life varies from 22 to 28 days with with an average temperature of 65° F., or 46 to 50 days with a temperature averaging 50° F. When full fed a crevice in the bark or between two needles is sought out and here a loose cocoon of silk is spun, the anal extremity being used as a spinneret.

The cocoon, as in other Hemerobiids, is quite a loose structure of elongate oval shape. In from eight to ten days after spinning the pupa is disclosed. This is at first of a yellowish colour, the eyes and back being brown. All the characters of the adult are now visible, the legs held close together ventrally, the wing rudiments at the sides and the antennæ lying over these and curling ventrally. In from one and a half to three weeks, according to temperature, the pupa has darkened wholly to a deep brown colour, and from now onwards the imago may emerge any day. In summer emergence takes place very shortly after this darkening, but in cold weather the pupa may rest for weeks in this condition or may even pass the winter as such. This is, in fact, the stage in which the coldest weather is passed, but a warm spell even in December or January will cause the appearance of the adult fly.

The pupa struggles for a time within its cocoon, the legs and antennæ being now free, then tearing an irregular hole with its mandibles, it emerges and crawls on to a suitable support. Here the pupal skin is cast and the insect commences adult life. Pairing takes place in a day or so, usually at night, the insects being of nocturnal habits mainly.

Eggs may be laid directly they mature, but in winter only on warm days; these then hatch according to the prevalent temperature, as has been shown.

We see then that this species is really on the wing all the year round in a normal season. At no period have I found its food completely absent, species of *Lachnus* and *Eulachnus*, besides various Psocids, being always procurable, even in the hardest of winters.

Bibliography of the Neuropterida

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