

LACEWINGS

G. D. HEATHCOTE

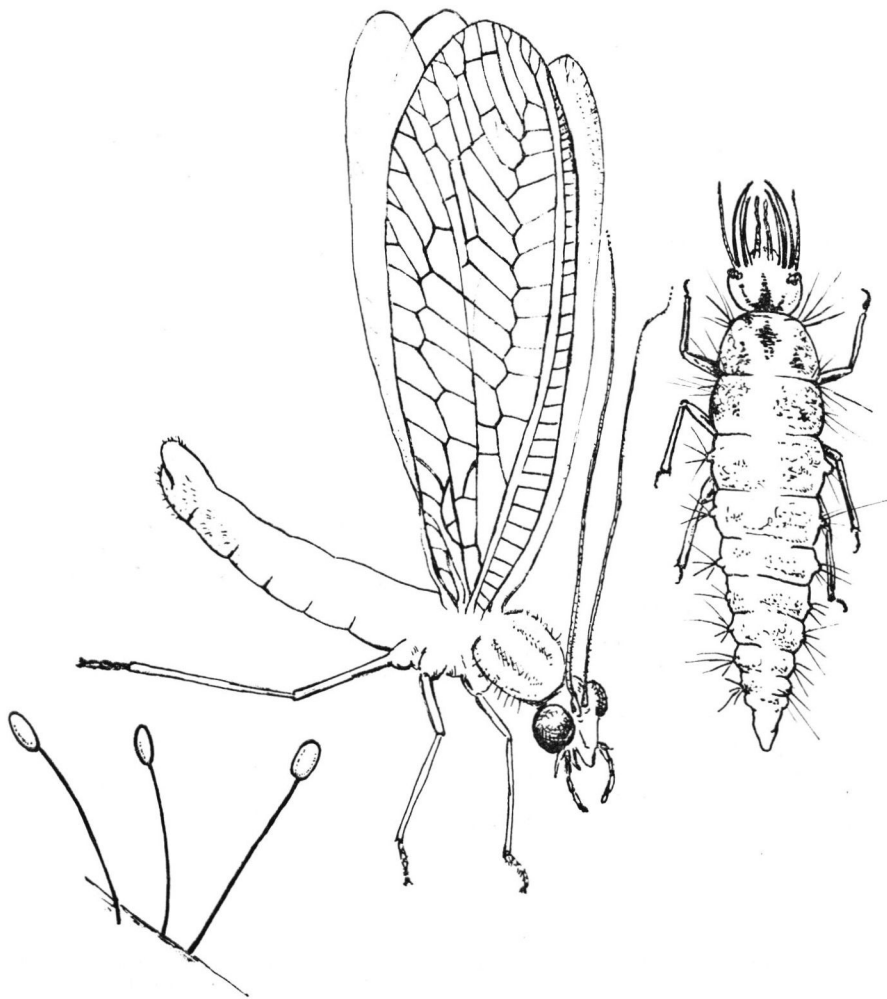
LACEWINGS, or "golden-eyes" as they are sometimes called, are moderately large, soft-bodied insects that are of great beauty and interest although they are seldom seen, or do not receive more than a casual glance from most people. This is partly because they fly mostly at twilight, and often drop to the ground rather than fly when disturbed by day, but they are often seen around window frames in late autumn and are easily recognised because of their large, transparent, membranous wings. Their bodies are green or yellow and they have very large compound eyes that are bright, shining, golden-yellow in life. Their principal food consists of aphids (greenfly), so they can be considered as beneficial to farmers and gardeners.

Lacewings belong to the insect order Neuroptera, and the green or yellow lacewings to the genus *Chrysopa* of the family Chrysopidae. There are twelve species of *Chrysopa* in Britain (Fraser, 1959). The wings of the adult have a characteristic arrangement of small veins, and they are held over the abdomen like a roof when at rest. Adult lacewings have biting mouthparts and eat aphids and other insects, but they live longer in the presence of aphid "honeydew" than when feeding on aphids alone, and so this sugary substance must form part of their normal diet. Pairing takes place at night, and they lay stalked eggs on the underside of leaves or on the bark of trees. First a silken thread is exuded, then as this hardens an oval egg is laid on the top of the stalk. After about two weeks the egg hatches to produce an active, elongated larva with short robust legs and prominent, curved, sucking jaws. A larva of *Chrysopa carnea* Steph. may eat between 77 and 584 aphids during its development (Wiackowski and Dronka, 1966). The larvae of several species are covered with warty tubercles with bristles on which plant debris, shed skins, etc. are stuck to provide camouflage. When fully-grown, the larva spins a cocoon and pupates. The adult that emerges has only small wing pads, but these soon expand into their full size, although the wings may remain white and opaque for many hours, or even for a few days.

When we are checking the numbers of aphids on sugar-beet plants at Broom's Barn Experimental Station we often find lacewing eggs or larvae, but in most years they appear to be too few in East Anglia to play a major part in controlling aphid pests. For example, in 1972, when aphids were few on sugar-beet plants, we found only one egg on more than 300 beet plants (that had not been treated with insecticide) examined during June to August, and none on a similar number of plants in 1971. Even when beet plants are heavily infested with aphids, as in a crop near

Whittington in early August, 1970 (in this instance infested with black aphids, *Aphis fabae* Scop.), lacewings may be few. There was only one larva and two eggs on the twenty plants checked, although ladybirds (coccinellid beetles) which were also feeding on the aphids, were abundant.

Lacewings are caught in insect traps at Broom's Barn occasionally, but they are generally few. However, many were



trapped in early October, 1970. For example, from 12th to 13th October, forty-three were caught in a light trap and thirty-nine in a large suction trap, and from 13th to 14th October, seventy-four were caught in the suction trap and five in the light trap. These traps are operated as part of the Rothamsted Insect Survey (Taylor *et al.* 1972), and the lacewings caught are recorded by Dr. J. Bowden. Throughout 1972 in contrast, only nine lacewings were caught by the suction trap and twenty-three by the light trap. Most (84%) were *Chrysopa carnea*, but *C. ventralis* Curtis and *C. phyllochroma* Wesmael were also trapped in 1972. In addition, brown lacewings (family Hemerobiidae) such as *Kimminsia subnebulosa* (Stephens) were sometimes trapped, but they were less numerous than green lacewings. Yellow sticky traps (which attract many day-flying insects but only catch night-flying insects due to impaction by the wind) caught few lacewings. On average, during the months May to October the sticky traps in open fields at Broom's Barn caught only five lacewings each year (the numbers ranging from nought to nine per trap during the years 1960 to 1972). Some were caught during each month, but most during July (Heathcote, 1969).

Although my experience during the past ten years in eastern England has been that naturally-occurring lacewings play only a small part in controlling the numbers of aphids on field crops, it is sometimes suggested that they could be reared artificially and released as "biological control" agents. There is more chance of success under the controlled conditions of a glasshouse than in the open. Scopes (1969) found that young *C. carnea* larvae controlled the aphids on glasshouse chrysanthemums at a ratio of one lacewing larva to fifty aphids, and larger chrysopid larvae at a ratio of one to two hundred aphids. In Maine, U.S.A., Shands, *et al.* (1972 a and b) had only partial success in controlling aphids on potatoes when large numbers of chrysopid larvae (i.e. 88,100 per acre) were released or eggs (55,000 viable eggs per acre) were sprayed on the foliage. Mass rearing of lacewings is not easy because the larvae are cannibalistic, but Ridgway, Morrison and Badgley (1970) published details of a rearing technique using individual cells and feeding the larvae on the eggs of a grain moth. However, even when rearing and mass release techniques have been improved, I can see little likelihood of biological control of aphids by *Chrysopa* replacing the use of the efficient insecticides that are already available in Britain.

References

- Fraser, F. C. (1959). Mecoptera, Megaloptera and Neuroptera. *Handbooks for the Identification of British Insects* 1, (Parts 12 and 13) 40pp. *R.Ent. Soc. Lond.*

- Heathcote, G. D. (1969). Notes on some plant bugs and predators of aphids caught on sticky traps in sugar beet fields in southern England, 1965-1968. *Institut International de Recherches Betteravières*, **4**, 25-29.
- Ridgway, R. L., Morrison, R. K. and Badgley, M. (1970). Mass rearing of a green lacewing. *J. econ. Ent.*, **63**, 834-836.
- Scopes, N. E. A. (1969). The potential of *Chrysopa carnea* as a biological control agent of *Myzus persicae* on glasshouse chrysanthemums. *Ann. appl. Biol.*, **64**, 433-439.
- Shands, W. A., Simpson, G. W. and Storch, R. H. (1972a). Insect predators for controlling aphids on potatoes. 3. In small plots separated by aluminum flashing strip-coated with a chemical barrier and in small fields. *J. Econ. Ent.*, **65**, 799-805.
- Shands, W. A. and Simpson, G. W. (1972b) (as above). 4. Spatial distribution of introduced eggs of two species of predators in small fields. *J. Econ. Ent.*, **65**, 805-809.
- Taylor, L. R. et al. (1972). Rothamsted Insect Survey. *Rep. Rothamsted Exp. Stn. for 1971*, **1**, 204-209.
- Wiäckowski, S. K. and Dronka, L. (1966). "From laboratory studies on the golden-eyed lacewing—*Chrysopa carnea* Steph." (In Polish.) *Polskie Pismo Ent. (B)* 75-80.

*Dr. G. D. Heathcote, Broom's Barn Experimental Station, Higham,
Bury St. Edmunds, Suffolk.*
