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Sheep blowflies

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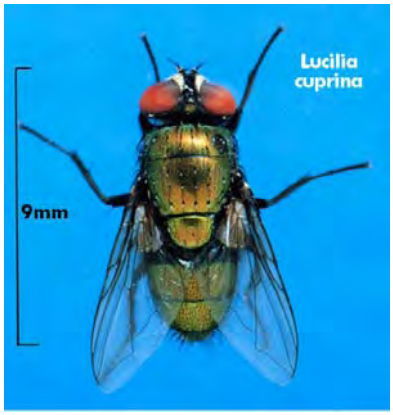
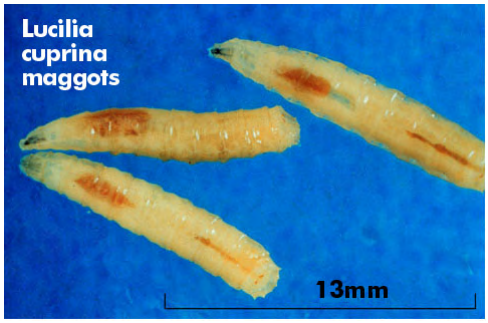
The Australian sheep blowfly *Lucilia cuprina*

The Australian sheep blowfly is the major pest blowfly species in Australia. It is responsible for initiating over 90 per cent of all flystrike. The adult fly is metallic green/bronze in colour. Body length is 9 mm.



Lucilia adult

The larvae (maggots) of *Lucilia* are smooth and cream coloured. When full size they are about 13 mm long. This species has developed resistance to several classes of insecticides including organochlorins, organophosphates and benzoylphenyl urea insect growth regulators.



Lucilia maggots

The size of adult flies and the reproductive potential of the females are determined by the amount of food consumed by maggots. In carcasses where most blowfly maggots feed, *Lucilia* is a poor competitor in the race to consume enough food to complete development, compared to native brown blowflies. *Lucilia* has adapted to this poor performance by becoming an obligate parasite of sheep, that is, it breeds almost exclusively on sheep, virtually free of competitors. By the time other species are attracted to a strike the *Lucilia* maggots have a winning lead.

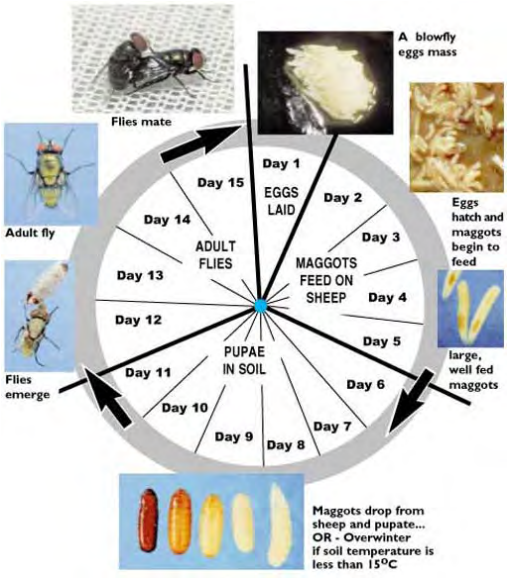
From the day they emerge from the ground male blowflies are sexually mature. Females, however, must consume a protein meal to develop eggs. Until they have eaten this meal – which may come from carcass juices, strikes or even protein-rich dung – females won't accept a mate. Both sexes require carbohydrate for energy and water which they get from plant nectar and blossoms.

Once mated, the females search for susceptible sheep. They will be attracted to sheep odours and particularly fleece-rot damage in damp fleece. Full-size flies may lay up to 250 eggs into the fleece. Flies have evolved to lay in groups to minimise desiccation of eggs. Depending on temperature, eggs hatch in 8–24 hours. Maggots crawl down the wool staple to the weeping skin surface or feed in lumpy wool or dags. The maggots feed for 3–5 days during which time they moult (shed their skin) twice as they grow. Newly hatched maggots are not capable of abrading a sheep's skin, but after the first moult (about 18 hours after hatching) are capable of aggravating the skin and causing nutritious serum to exude. Maggots nearing full size can cause large, red-raw strike wounds.

Fully-fed maggots drop from the sheep and enter a wandering stage. This usually occurs at night in sheep camps. When ready to pupate they usually burrow only 1–4 cm into loose soil. If soil temperature is below about 15ºC or if the soil is wet, maggots contract but do not pupate. This stage is called the pre-pupa. *Lucilia* over-winters as pre-pupae. If conditions that favour flystrike persist into the cooler months, larvae may continue to drop into the soil for quite a few weeks but only develop to the pre-

pupa stage. Although they may differ considerably in age, as the soil warms in spring larval development will come into synchrony. Pupation then occurs. Internally this is a reorganisation of tissues to form the adult fly, but from the outside it is a hardening and darkening of the larval skeleton to form a barrel-shaped pupa. The 'over-wintering' population will emerge all together as adult blowflies in mid- to late spring. If the over-wintering population of flies encounter susceptible sheep, the next generation of flies will be more numerous. If conditions remain suitable for flystrike these flies will produce a flywave. Under favourable temperature conditions adult flies emerge from the pupa case around sunrise in 6–10 days. Newly-emerged flies climb up grasses to harden their skins and expand their wings.

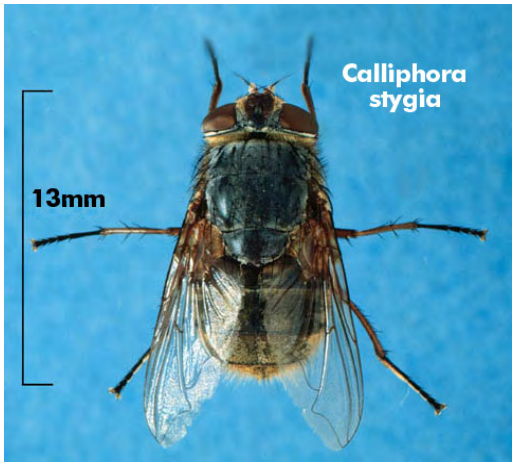
Under optimal conditions (around 28ºC) the egg to adult time may be 11–12 days and mortality during this time is negligible. If, however, maggots drop from the sheep in late autumn/early winter, they will overwinter in the soil and not emerge until spring. Consequently, the egg to adult duration may exceed three months. During this time mortality due to drowning in waterlogged soil, freezing, parasitism by minute wasps, or predation by beetles, birds, ants and mice, may exceed 90 per cent.



Life cycle of Lucilia cuprina

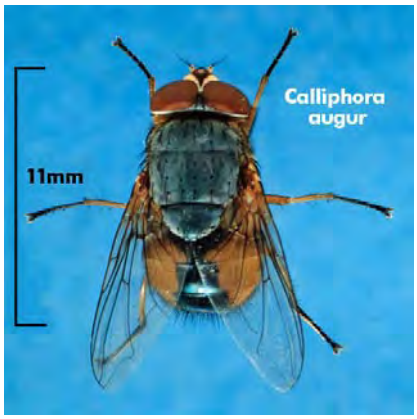
Other common blowflies that may strike sheep in New South Wales

Calliphora stygia. The eastern golden-haired blowfly is a native brown blowfly that prefers cooler conditions. It occurs in largest numbers in spring and autumn, but may be found on sunny days in winter as well. It disappears during the heat of summer. Although this species mainly breeds in carcasses, it can be troublesome in spring – especially in daggy sheep or on ewes with lambing stain. Body length is 13 mm.



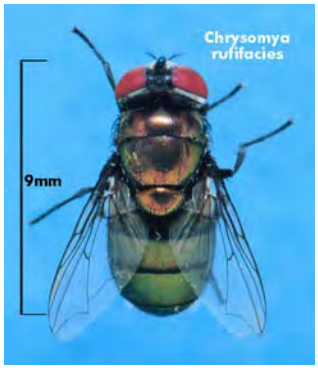
Calliphora stygia

Calliphora augur. The lesser brown blowfly is another mostly brown species. It has a metallic blue shield on its abdomen. It occurs mostly in summer. Females lay live young capable of feeding immediately. It breeds mostly in carcasses but will lay into wounds, weeping eyes, etc. The closely related *Calliphora dubia* occurs in the west of Australia but has extended its range into NSW as well. It is almost identical to *Calliphora augur* and has similar habits. Body length for both is 11 mm.



Calliphora augur

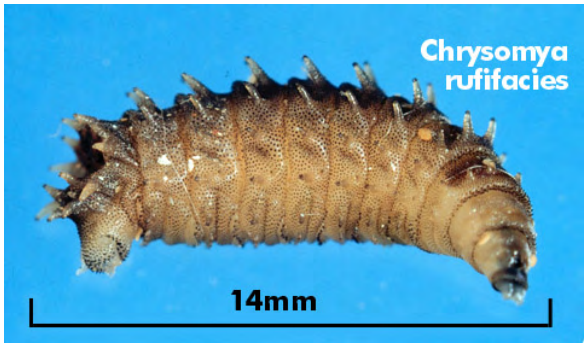
Chrysomya rufifacies. The green hairy-maggot blowfly is a secondary blowfly species. This means it normally does not strike sheep or blow carcasses until primary maggots, like *Lucilia* or *Calliphora*, are



Chrysomya rufifacies

already feeding. The adult fly is metallic green but can be distinguished from *Lucilia* by the broad bands on its rounder abdomen and by its black front legs.

The larvae or 'hairy maggots' appear dark and have sharp spines over much of the body and are 14 mm long when full size. These maggots repel primary maggots and will actively feed on them in carcasses. By doing this they help to control *Lucilia* and so can be regarded as beneficial flies. However, on sheep, they can cause extensive damage not only to the skin but also to the underlying tissue of struck sheep. By the time these larvae reach full size on sheep the animal has been struck for more than a week – initially by *Lucilia*, but then by *Chrysomya*.



Chrysomya rufifacies larva

The very similar, but smaller, *Chrysomya varipes* fulfils a similar role.

Ch. rufifacies is 9 mm from head to abdomen.

The relative sizes of these common flies are illustrated below.

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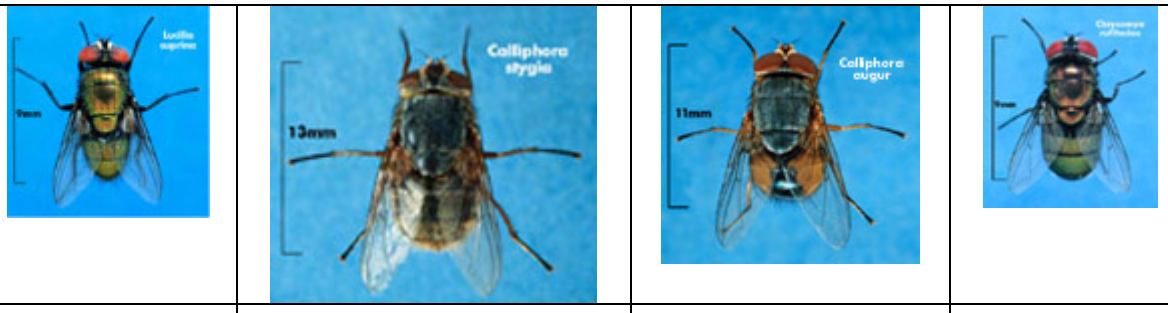

Lucilia cuprina	*Calliphora stygia*	*Calliphora augur*	*Chrysomya rufifacies*
APPROXIMATE RELATIVE SIZES			