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Agriculture Protection Board
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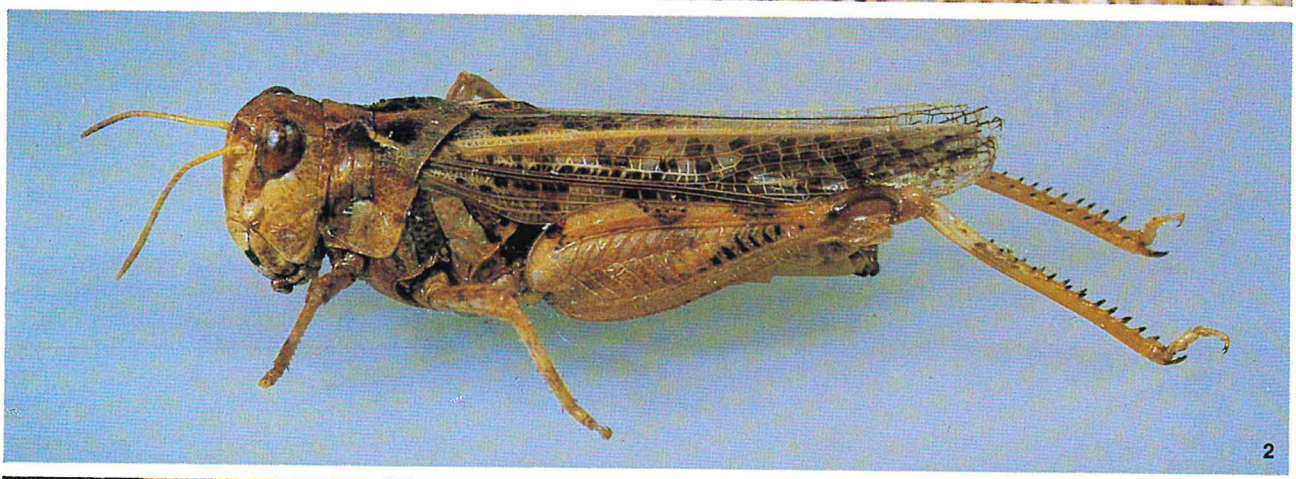
LOCUSTS and GRASSHOPPERS



1. Australian Plague Locust 2. Small Plague Grasshopper 3. Australian Plague Locust Nymph 4. Egg pod and eggs

LOCUSTS & GRASSHOPPERS
Grasshoppers are amongst the most destructive of insects. They are usually large insects with hind limbs adapted for jumping and a shield-like structure (Pronotum) covering the thorax. All are normally vegetarians. They have a simple metamorphosis. The young resemble their parents at hatching, changing only slightly at each moult from nymph to adult. Locusts differ from grasshoppers only in their social habits. They form massive swarms which migrate under certain conditions, causing severe damage to crops and pastures.
In Western Australia, two species, the Australian plague locust *(Chortoicetes terminifera)* and the Small plague grasshopper *(Austroicetes cruciata)* are declared animals (vermin).

THE SMALL PLAGUE GRASSHOPPER *(Austroicetes cruciata)* The small plague grasshopper is the most important pest grasshopper in W.A. It causes damage in the drier margins of the wheatbelt between the 250mm and 340mm isohyets. It is also found in scattered areas throughout the winter rainfall districts of the whole of southern Australia.

Description:
The female small plague grasshopper is from 2 to 3 cm long and mottled brown in colour. The males are smaller with mottled light and dark brown forewings. Mature males develop a bright yellow tinge to the legs and body. The hind wings of both sexes are clear and transparent with no markings, unlike the Australian plague locust.

Life history:
Eggs are laid in the spring on bare compacted ground. The egg pods hold about 20 eggs. Pods have a well defined firm wall and are buried about 5-10 cm deep. Up to ten bright yellow males cluster around each egg-laying female. The eggs survive over summer and hatch the following winter when stimulated by cold winter rains. Only one generation is produced each year.
After hatching the hoppers eat mainly grass, including cereals but will attack broadleafed plants when hungry. They form loose bands which may migrate for several kilometres in search of food. Under suitable conditions they become adult in 5-6 weeks and start laying eggs about 10 days later. Adults may survive as long as green feed is readily available.

Susceptible areas:
The distribution of the small plague grasshopper is limited inland by the incidence of droughts, which causes high mortality amongst young hoppers and adults by depriving them of green feed.
Within the susceptible area they avoid timber and scrubby vegetation. Egg laying is confined to compact bare soils or open annual pasture. Sandy soils and self-mulching soils (rare in W.A.) are avoided, but may be invaded during migration.
Outbreak years tend to follow years of intermediate rainfall—adequate to provide green feed for hoppers to mature and lay eggs, but not so wet as to cause epidemics of fungal diseases. Damage is most noticeable during dry years when the pasture has less chance to recover.

AUSTRALIAN PLAGUE LOCUST *(Chortoicetes terminifera)* The Australian plague locust survives in small numbers in the dry interior of the continent. If rain falls at the right time of year, the population expands quickly and if two wet years follow each other, numbers build up rapidly. They then enter a gregarious phase and prepare to migrate. Swarms fly down-wind to the agricultural areas of New South Wales, and South Australia. They then settle, laying eggs from December to May. In W.A. insect groups are already resident in agricultural areas and may build up and swarm given appropriate conditions.

Description:
Adult Australian plague locusts vary in colour from green to brown. They may be distinguished from other insects and grasshoppers by the hind wings, which are transparent with a black spot on each tip, and the shanks of the hind leg which are bright scarlet. These insects are larger than the small plague grasshopper. Females average about 3 cm in body length compared to 2.5 cm for the males.

Life cycle:
Eggs are laid in beds in bare ground. The female drills a hole about 5 cm deep and deposits a pod of 30-50 eggs at the bottom. She covers this with about 1 cm of dry white frothy foam, which aids hopper emergence. Egg densities may reach up to 1 pod per square cm.
Males congregate round egg-laying females making a clicking noise. Females mate again soon after egg laying and may lay up to four pods at fortnightly intervals before death. Winter laid eggs remain dormant in the soil for several months. Hatching takes place only when the soil is moist and the temperature above 15°C. These conditions occur in many parts of W.A. in spring. The hoppers are flightless and may spend up to two weeks on the egg beds.
If numbers build up, they form dense bands which march together in the same direction.
The hoppers moult five times during growth; at each moult the wing buds expand until the adult emerges with fully functioning wings. This process takes from four to six weeks, but the locusts do not become sexually mature for a further two weeks, or longer, in the absence of green feed.
Bands of immature hoppers may cover a few square metres to many hectares. Sometimes bands merge to form larger groups. The activity of the bands vary with air temperature, the density of the vegetation and their age. After the first moult, hoppers move up to 50 m per day increasing to 400 m at the fifth moult. During cold weather bands are sluggish and eat little, while in very hot weather they march rapidly without feeding. After the final moult, locusts start to fly. After one or two days they may fly up to 50 m above the ground, and travel 10 to 20 km downwind. They do not fly when the wind speed exceeds 25-35 km/hr or the air temperatures fall below 17°C. Daytime flights generally start about four hours after dawn and end in the early evening when temperatures fall to 19-23°C. Progress is slow as individuals usually stop to feed intermittently before rejoining the swarm. Long distance flights usually take place at night when air temperature exceeds 18°C at sunset. Mass take-off at dusk typically occurs when warm air currents precede the passage of a cold front. This may result in downwind travel of up to 500 km.
The preferred food of these insects is green grass but other plants may be eaten when grass is scarce. Most damage to vegetation occurs in the area of egg beds, but swarms may cause sudden severe damage in areas remote from the hatching point. Each locust will eat about its own weight of green food every day—swarms of locusts in Africa have been recorded weighing up to 50,000 tonnes.
If adults do not obtain green feed within about twelve weeks of the final moult, they usually die without becoming sexually mature.
Predators and diseases have little impact on locusts because of the vast numbers of individuals and the spasmodic appearance of swarms.
Other grasshoppers which are not declared but which occasionally cause damage are the wingless grasshopper, the yellow-winged locust, spur throated locust and long-horned grasshoppers. These species rarely cause serious damage in W.A. although localised outbreaks may damage gardens and plantations.

For advice on locust and grasshopper recognition and control, contact the Agriculture Protection Board, Telephone (09) 367 0111 or any country office of the Agriculture Protection Board or the Department of Agriculture.