



ARC-DOA LOCUST FACT-SHEET SERIES.

RED LOCUST

Nomadacris septemfasciata (Serville)

Order Orthoptera

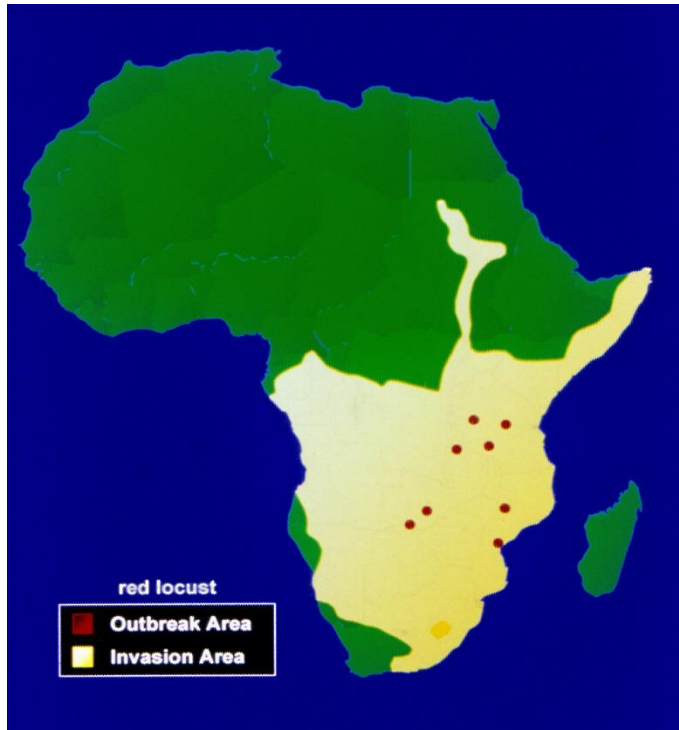
Family Acrididae

Other common names

rooisprinkaan (A); vermelho gafanhotos (P)

Origin and distribution

Indigenous to grassland areas below 2000m throughout much of Africa south of the Sahara, Madagascar, Mauritius and Reunion islands. Main outbreak areas confined to treeless grasslands with impeded drainage or seasonal flooding in Tanzania (Lake Rukwa, Iku Katavi, Wembere and Malagarasi grasslands) and northwest Zambia (Mweru wa Ntipa valley). Other minor outbreak areas are in the Kafue Flats in Zambia, the lake Chilwa grasslands in Malawi, the Buzi River floodplains in Mozambique and the Caprivi strip grasslands in northern eastern Namibia. Plagues escaping from the recognized outbreak areas can invade much of southern, central and eastern Africa. Swarming populations may persist in suitable reception areas, such as in sugarcane plantations in KwaZulu Natal, South Africa and in Swaziland. High density populations can sometimes be found mixed with African migratory locust outbreaks in grasslands in northern Botswana and Caprivi in Namibia.



Outbreak and invasion area of the red locust

Identification

The red locust has a pronounced phase polymorphism with two main phases, the solitary (grasshopper), and the gregarious (swarm) phase, with both the nymph stage and adult stage very different in appearance and behaviour between the extreme phases. The swarming phase is the most commonly recognized. This large locust species has a distinctive small, pointed, throat spur (prosternal tubercle), which is curved backwards.

Egg: sausage-shaped, about 8mm in length and 1,5mm in diameter, laid in batches (eggpods) with the top part covered with a layer of froth (plug) which hardens.

Nymph (hopper stage): the hoppers show a wide range of colouring, with solitary hoppers predominantly green/brown, and gregarious hoppers orange/yellow and black. The bright yellow colouring on the lateral sides of the pronotum, and the conspicuous black band on the hind femur, are distinctive features of the late instar gregarious red locust hopper.



Gregarious red locust hopper. © ARC

Adult: solitarious phase adults' range in size from 45-74mm (females) and 47-56mm (males). The most distinguishing characteristic is the seven oblique dark brown bands on the forewings. The hind wings are semi-transparent, and older adults become rose coloured or sometimes purple in the basal area. There is a clear white/cream band running along the dorsal and lateral parts of the head, pronotum, and edges of the forewings. Young adults are reddish brown. Gregarious adults have brown/red coloration, which becomes deeper and redder with age.



Solitarious phase red locust adult female. ©ARC



Gregarious adult red locust. ©ARC. Collected from swarm invasion at Pretoria North, 1996.

Host plants

Polyphagous feeders, but feed predominantly on the floodplain grasses.

Damage

Both nymphs and adults feed on a wide variety of plants. Hopper bands damage natural grasslands and surrounding crops. Migrating adult swarms can cause severe damage to cereal crops (maize, millet, sorghum, wheat), as well as sugarcane which can be defoliated leaving only the mid-rib. A wide range of fruit and vegetable crops have reportedly been damaged by migrating swarms in East and Central Africa.

Pest status

The red locust is a major plague locust species, with three major plagues recorded in the last 150 years. The most recent plague lasted from 1930 to 1944 and threatened food security all over southern and eastern Africa. The red locust is considered a serious national pest in most of the affected countries, with a number of governments contributing to the International Red Locust Control Organization for Central and Southern Africa (IRLCO-CSA), based in Ndola, Zambia, which is responsible for the monitoring and control of outbreak populations. In southern Africa, swarms emanating

from the Buzi-Gorongosa floodplains in Mozambique during 1996, invaded Zimbabwe, South Africa and Swaziland. Some migrating swarms reached as far south as Pretoria north before being controlled with spray aircraft.

Red locust swarm over Braamfontein, Johannesburg, in 1934. ©ARC



Life history

There are three life forms, namely eggs, nymphs (hoppers), and flyers (adults). Under field conditions, red locusts only have one generation per year (univoltine). The female lays 2-3 eggpods at the beginning of the rainy season (November-December), containing between 20-195 eggs (solitarious) or 20-100 eggs (gregarious) per pod. Eggs are only laid in moist soil and egg development is continuous, taking about 30 days (18-54 days) under field conditions. Solitarious hoppers go through seven (7) instars, while gregarious hoppers go through 6 instars, with an average moult interval of 10 days and an average total hopper development of 2 months (60 days). Fledging

usually begins in February and can continue to May, depending on temperatures. The adults remain immature (reproductive diapause) for about six months during the dry winter months and mature eggs with rising humidity levels at the start of the next rainy season. Gregarization is initiated by adult locusts that are forced to congregate on patches of unburnt grass during the dry season burning, which then oviposit as groups next to these patches at the start of the wet season. In dry years more extensive burning results in increasing patchy vegetation leading to concentration of maturing adults and dense oviposition. The concentrated hatching of the hoppers then initiates gregarious band formation. The hoppers are almost 'semi-aquatic' in habit and clamber amongst the flooded vegetation as loose masses which bask at the top of the grass during the morning and then descend into the vegetation during the heat of the day. Fledging adults concentrate into loose swarms at margins of the grasslands, which dry out in April-June. These swarms coalesce and after a few weeks the dense and strong flying adult swarms migrate during the day and are displaced downwind away from the outbreak areas. Dense and fast-flying swarms then disperse over southern Africa, flying during the day and roosting in trees at night.

Natural enemies

Predators and parasites are well studied in the Rukwa outbreak area, causing high mortality of eggs (predatory fly larvae, e.g. *Stomorhina lunata*, *Wohlfahrtia pachytyli*, and *Systoechus spp.*, *Scelio sp.* parasitic wasps and various opportunistic beetle larvae). Mortality of hoppers is caused by various ants, predatory and parasitic flies, parasitic wasps and a range of bird species). High natural mortality caused by entomopathogenic fungal outbreaks (probably *Entomophthora grylli*) have been regularly reported amongst first instar hoppers. Adults are also attacked by fungal pathogens, as well as by various birds. However, natural enemies seem to have little overall effect on the development of large outbreaks. Recorded predators – web spiders, asilid flies, dragonflies, bush crickets, white stork, starling, lark, sacred ibis, kite, avocet, crow, European swallow, meerkat, jackal, scorpions, and lizards.

Management

Effective monitoring and preventive control of this locust is essential before fledgling swarms can aggregate and leave the outbreak areas. Once swarms escape from the remote and relatively small outbreak areas an uncontrolled plague situation can rapidly develop, posing a serious threat to the food security of the southern African region. Only gregarious red locust hopper bands and adult swarms are controlled, and these are regularly monitored in the main outbreak areas by the IRLCO-CSA. The small outbreak areas comprise <0.1% of the area of the potential swarm invasion area of 8 million km². During the past 50 years, control has been undertaken by aerial application of the organophosphate insecticide, fenitrothion ULV, to gregarious concentrations of fledglings and late instar hopper bands. However, the Green Muscle® myco-insecticide bioproduct, which is an oil suspension of conidia of the *Metarhizium anisopliae* var. *acidum* fungal pathogen, has also been used in control operations. The Green Muscle® provides a more host-specific method of control that is environmentally friendly in the ecologically sensitive floodplain grasslands with their rich biodiversity.

Monitoring

In the IRLCO-CSA member countries, local farmers/citizens report the presence of bands or swarms to their nearest government officer, who then informs the IRLCO-CSA (Zambia) of the pest situation. IRLCO-CSA issues a regular 'Migratory pest situation and forecast report' within member countries. In South Africa, farmers should inform their nearest Agricultural Extension Officer, who will then organize control teams and equipment. Roosting swarms can only be effectively treated by spray aircraft.

Control

Within the remote and often inaccessible flooded grassland outbreak areas of the red locust, the control of hopper bands and roosting or flying swarms can only be undertaken with a fixed-wing aircraft with fitted spray booms. Sometimes a spray helicopter (i.e. Bell Jet Ranger 3) is also used. The application of broad-spectrum organophosphate insecticide is the only effective control method, although the Green Muscle® myco-insecticide will hopefully become more available in future for application

in the environmentally sensitive outbreak areas. Once swarms escape from the outbreak areas they have to be tracked down and then sprayed with insecticide while roosting on the tops of trees using aircraft, which is a very difficult and expensive exercise.

Further reading

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