

Locust: Life cycle and control

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Introduction

During this COVID-19 pandemic, we are facing a new challenge, Different parts of India dealing with locust infestation- As we know this is a voracious feeder on crop and foliage. If we consider our country it has a two centuries experience of dealing with locust. We have a Locust Warning Organization developed 81 years ago, no doubt we can learn lots of lessons about the current situation from our past experiences. During the 19th century our country had experienced devastating attacks by the locust in 1812, 1821, 1843-44, 1863, 1869, 1878, 1889-92 and 1896-97. During this period the British were in charge so they encouraged entomologists to study locust. Until the twentieth century the whole responsibility to control the pest were in the hand of provincial revenue departments. But later local reliance and global cooperation came into existence so the exchange of knowledge and techniques among the different parts of country as well as with other countries increased. During the 1927-29 the locust outbreak was devastating in central and western parts of India there came the need of the Standing Locust Committee in 1929 and the Central Locust Bureau in 1930 a centralized system to collect information about locust and control them.

In 1939 they established the Locust Warning Organization. The need of public participation was felt so villagers were asked to help government if they refuse to do so their claim to remission their tax will not be considered if their crop were destroyed. British officials observe Indian ecology and came on conclusion that birds helps to limit the locust population different birds crows, storks, starlings, peafowls, and rosy starling birds used locust as their food. These reports were also confirmed by certain other countries also, so it become favorable to mention the role of birds in the in the interim

report of Locust Committee of 1929, which made a recommendation of protecting starlings and mynas who serve as a natural predator of locust. These non-chemical methods which were employed earlier and remained relevant to the present day if these methods are practiced along with certain chemical and biological methods the present situation can be combat.

Locust is an international pest. It is a member of Acrididae family. There are 5000 species of grasshoppers out of which those surviving in two phases i.e., solitary and gregarious are known as locust. Mainly 10 species are recognized as locust, from them only four are found in Indian subcontinent.

1. Desert Locust (*Schistocerca gregaria*)
2. Migratory locust (*Locusta migratoria*)
3. Bombay locust (*Nomadacris succincta*)
4. Tree locust (*Anacridium* sp.)

Above all the species mentioned desert locust is the most important pest in India. In India we have anti locust organization both at state as well as Central level.

Phases

Desert locust is found in two different phases which varies in colour, physiology & morphology, and mostly mistaken as different species.

Solitary phase

Nymphs

Their colour may be of different types based on their surrounding vegetation.

Gregarious Phase

Nymphs

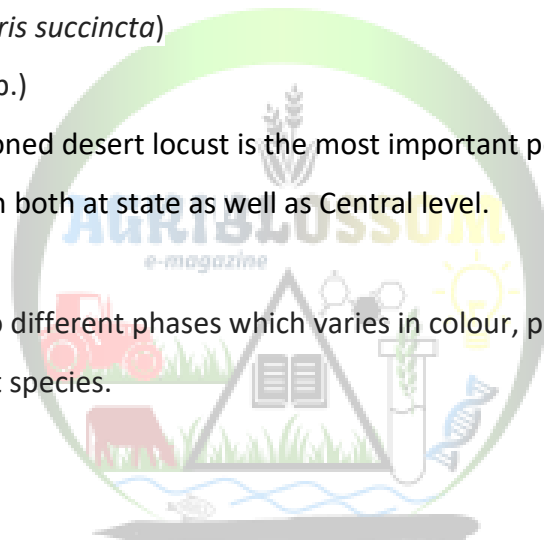
Mostly with black marking may be of yellow or pink colour.

Adults

When emerges they are of pink colour then turn to grey, at sexual maturity yellow colour is prominent. When their population density rises, they become gregarious and migrates in large groups.

They are found in two types of groups

Swarms: contains winged adult



Bands: contains hoppers (Nymph)

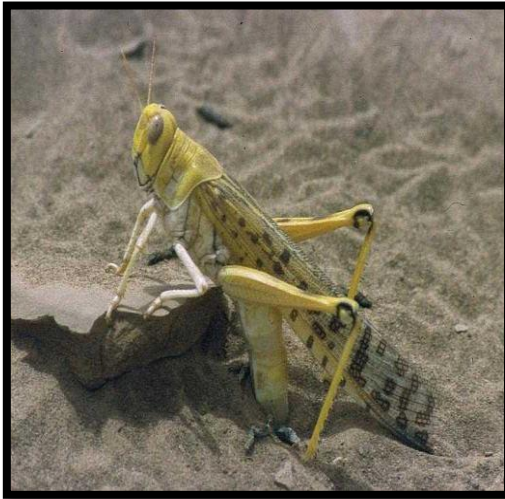


Fig: Adult desert locust

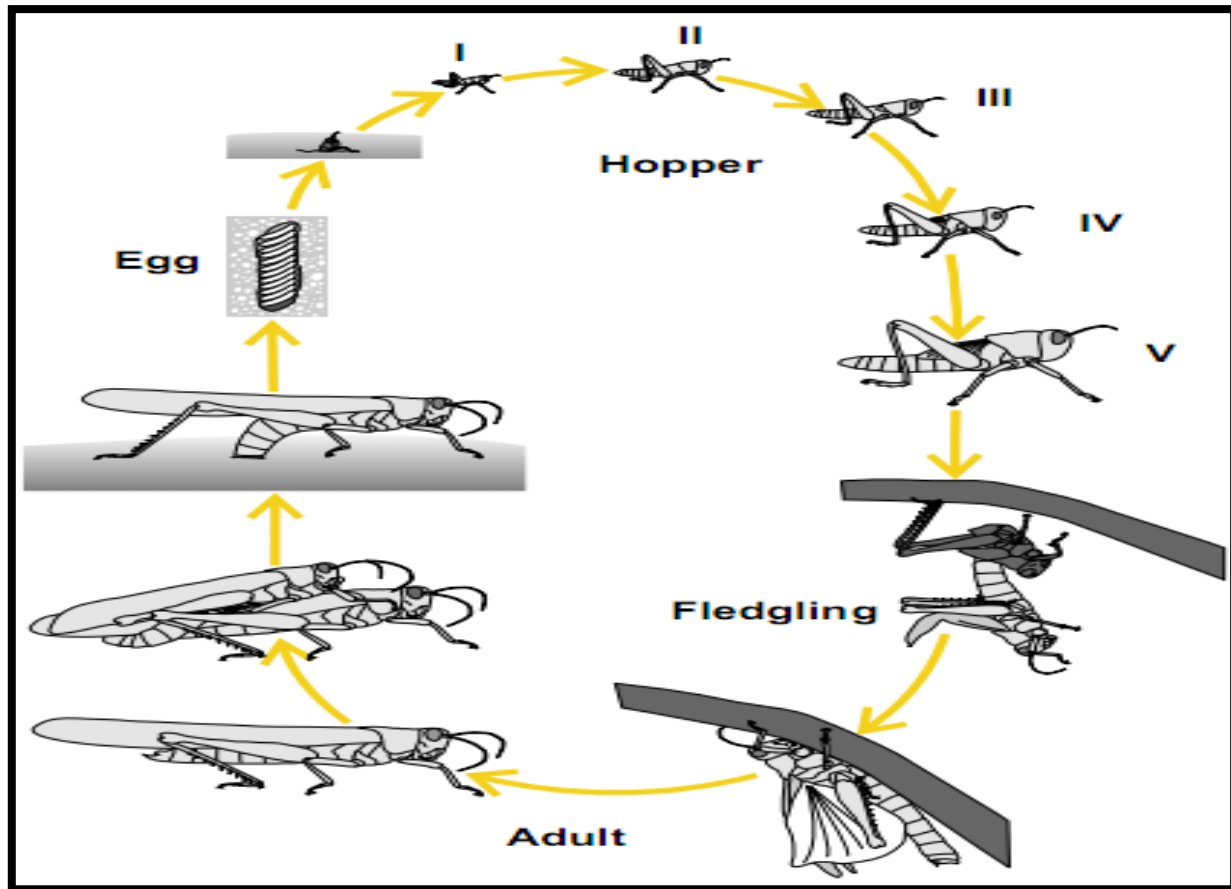


Fig: Egg Mass

Life cycle

There are three stages in its development, egg, Hopper and adult. Mature adults turn yellow and shows less mobility, sluggish in nature they generally cluster on ground where they do mate with mature female by clicking on females back. Young adults have bright pink colour and they are very active feeders and mostly this population damages crop. After the mating female start laying eggs within 8 to 24 hours, they need a damp soil for egg laying purpose. Around 500 eggs are laid by a female in five pools. They bore a hole (2-4 inch Deep) in a damp soil and insert their ovipositor inside it and lay eggs within 1-4 hour. It also secretes a frothy material over eggs which become waterproof on drawing and become very hard (pool).

In a field where oviposition has taken place can be recognized by numerous pencil thickness holes on the ground. Egg period can be 3 to 4 weeks in February - March and 12 to 15 days in May – September. If soil is very dry egg period may Prolong till the next shower of rain. Nymphs are hoppers generally 5 nymphal stages are found in locust. After the egg hatches the nymphs are of light yellow colour which soon turns to black colour (gregarious brood). Nymphs feed on all kinds of vegetation and they form bands nymphal period may prolong for 6 to 8 weeks in spring and 3 to 4 weeks in summer.



Breeding season is generally a summer breeding season and a monsoon breeding season. Among monsoon breeds some can fly westward to Baluchistan, Russia, eastern Arabia many formed in Rajasthan and Sindh may fly to north eastern and Southern India thus captures all parts of India and damages kharif crop. Some swarms over winter in North Western part and become active as the Rabi season comes. During their recession (quiet) period they may extend to a large area around 16 million square kilometers belt extend from Mauritania through Sahara Desert in Northern Africa across the Arabian Peninsula and into North West India. Under favorable environmental condition they form swarms which can move with a speed of 16 to 19 km per hour and 150 to 200 kilometers or more in a day, and invade countries on all sides of the recession area as far in North as Spain and Russia and as far as in South in Nigeria and Kenya, far East as India and South West Asia. Around 60 countries can be affected as large as 32 million square kilometers for covering 20% of earth area.

Control measures

1. Ploughing digging and harrowing of places where eggs are laid
2. Locust scares from loud sounds so create loud sounds by clanging utensils, bursting crackers, playing DJ when they try to land on farm.
3. Bonfires are helpful in attracting the Swarm and killing them.
4. Biopesticides like fungi, bacteria, Neem extract and pheromones can also use to control the locust population but they take longer time around 2 to 10 days. Entomopathogenic fungus *Metarhizium acridum* this species is mostly specialized for short horned grasshoppers from this group locust belongs this is an active ingredient in the biopesticides like green muscle and NOVACARD. Certain natural enemies also serve a good control measure option like parasitoid and predatory wasps parasitoid flies and certain species of beetles. Biopesticides cannot be used to control locust in an emergency situation and there comes the role of chemical pesticides.
5. Chemical pesticides are quick acting and helpful in plague like situation.

Recommended doses by CIRBRC for the control of desert locust

Sl. No.	Chemical	Dose (gram active ingredient per ha.)		Dose of the formulation/ha
		Hoppers	Adults	
1.	Bendiocarb 80% WP	100	100	125 gms
2.	Chlorpyrifos 20% EC	240	240	1.2 litres
3.	Chlorpyrifos 50% EC	240	240	480 ml
4.	Deltamethrin 2.8% EC	12.5	12.5	450 ml
5.	Deltamethrin 1.25% ULV	12.5	12.5	200 ml
6.	Diflubenzuron 25% WP	60	NA	240 gms
7.	Fipronil 5% SC	6.25	6.25	125 ml
8.	Fipronil 2.5% EC	6.25	6.25	216 ml

9.	Lambda cyhalothrin 5% EC	20	20	400 ml
10.	Lambda cyhalothrin 10% WP	20	20	200 gm
11.	Malathion 50% EC	925	925	1.850 litres
12.	Malathion 25% WP	925	925	3.7 Kgs

Toxicity of different Pesticides recommended by CIBRC

Sl. No.	Chemical	Toxicity Triangle	Toxicity Level
1.	Bendiocarb 80% WP	Red	Extremely toxic
2.	Chlorpyriphos 20% EC	Yellow	Highly Toxic
3.	Chlorpyriphos 50% EC	Yellow	Highly Toxic
4.	Deltamethrin 2.8% EC	Yellow	Highly Toxic
5.	Deltamethrin 1.25% ULV	Yellow	Highly Toxic
6.	Diflubenzuron 25% WP	Yellow	Highly Toxic
7.	Fipronil 5% SC	Yellow	Highly Toxic
8.	Fipronil 2.5% EC	Yellow	Highly Toxic
9.	Lambda cyhalothrin 5% EC	Yellow	Highly Toxic
10.	Lambda cyhalothrin 10% WP	Yellow	Highly Toxic
11.	Malathion 50% EC	Blue	Moderately Toxic
12.	Malathion 25% WP	Blue	Moderately Toxic
13.	Fenvalrate 0.4 % DP	Yellow	Highly Toxic

14.	Malathion 5% DP	Blue	Moderately Toxic
15.	Quinalphos 1.5 % DP	Yellow	Highly Toxic

Do

Inform about locust to the agriculture department for local administration.

Note down the date place where the oviposition has been done.

Digging trenches dusted with chlorpyrifos in the direction of front marching of hoppers trapping and bring them in ditches.

Recommended amount of insecticide should be used.

Cover your mouth eyes nose and had before spraying.

Spray should be done away from livestock and children.

Don't

Don't collect locust after spraying

Adults should not be e controlled during day.

Avoid overuse of recommended chemicals.

Do not eat or drink anything at the time of spraying.

Do not confuse grasshopper with locust.

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