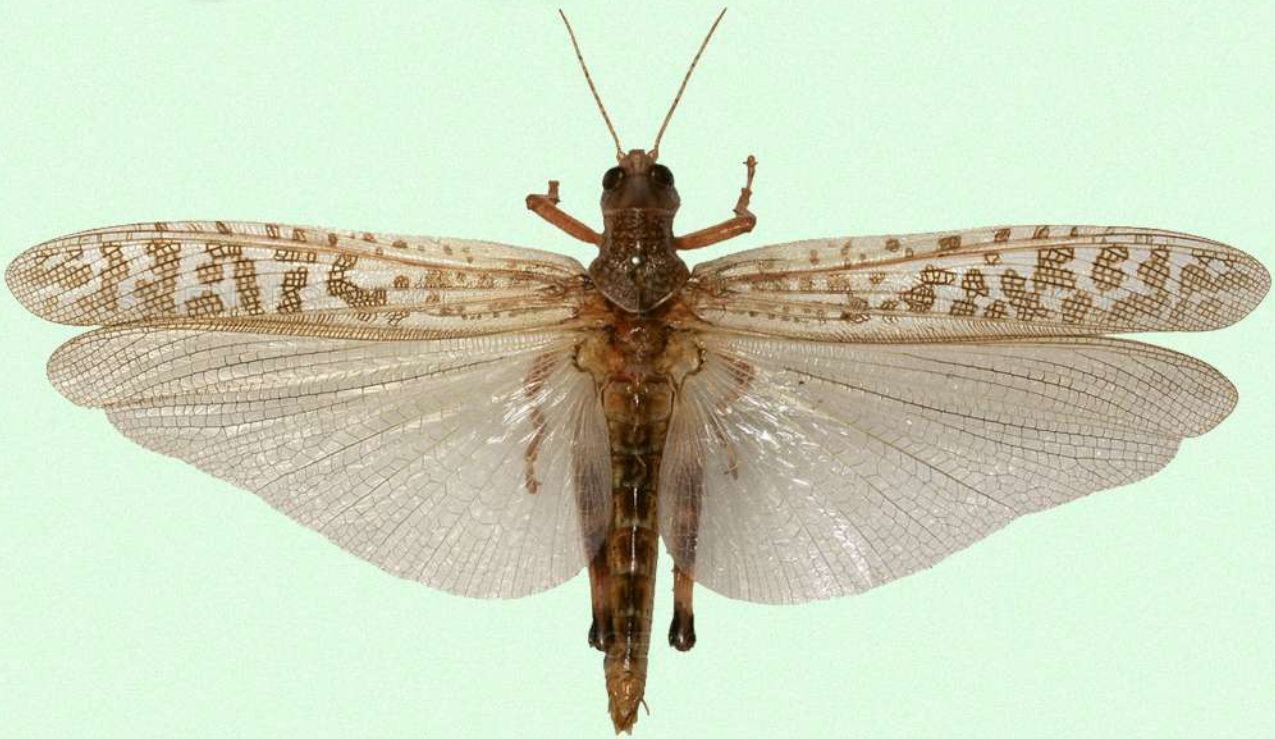




# Is there a difference between grasshopper and locust?



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## Is there a difference between grasshopper and locust?

Both Grasshoppers and locusts belong to Acrididae. A few species of grasshoppers develop to gregarious forms under optimal environmental condition as locusts.

### Grasshoppers

They are ground dwelling and undergo incomplete metamorphosis prior to becoming adults. They live as solitary phase without causing much damage to crops. The grasshoppers develop gregarious behaviour under congenial environmental conditions and become locusts.

### Locusts

Locusts are grasshoppers which develop gregarious character under suitable environmental conditions. Drought like conditions drive locusts to congregate in small areas where there is vegetation. They abandon their solitary phase as grasshoppers and their reproduce at high rates forming bands of nymphs and swarms as adults. The shift from solitary phase to gregarious phase is triggered by a hormone, serotonin. During the swarms their flight path is unidirectional and alight in green patches they come across, thereby causing damage to vegetations and yield loss.



Image Source: FAO



Image Source: Dr Santosh C. Kedar

# Locust species reported in India



**A**



**B**

Desert locust  
*Schistocerca gregaria*  
(Forskål)



**C**



**D**

Migratory locust  
*Locusta migratoria*  
(Linnaeus)



**E**



**F**

Bombay Locust  
*Nomadacris succincta*  
(Johannson)



**G**



**H**

Tree locust  
*Anacridium rubrispinum*  
Bey-Bienko

Image Source:

A- Dr Santosh C. Kedar;

C, E and G- <https://www.nbair.res.in/Databases/insectpests>

F & H- Dr Swaminathan et al., ICAR-NPIB

The desert locust, *Schistocerca gregaria*, is known from Biblical times. Locust in Southwest Asia occurred right from the time when crops were cultivated in this region. Among the species of locust the desert locust (*Schistocerca gregaria*) is of serious concern considering the magnitude of damage it causes. There is a mention of locust in Mahabharatha and Quran. Being polyphagous in nature they cause damage by feeding on leaves, flowers, fruits and seeds. A single swarm of locust made up of several million individuals can eat away every kind of plant on its way in no time.

There are two distinct subspecies namely *Schistocerca gregaria gregaria* (Forskål) and *Schistocerca gregaria flaviventris* (Burmeister).

Differentiation of desert locust (*Schistocerca* spp.) from other grasshoppers

Mesosternum with the length of lateral lobes longer than their width (Fig.1). Prosternal process always present (Fig.1). Male subgenital plate always bilobed (Fig.2). Usually moderate to large size.....*Schistocerca*  
(Desert Locust)

Mesosternum with the length of lateral lobes as wide as or wider than their width. Prosternal process present or absent. Male subgenital plate variable. Usually small to medium size .....Other Acrididae  
(Grasshoppers)

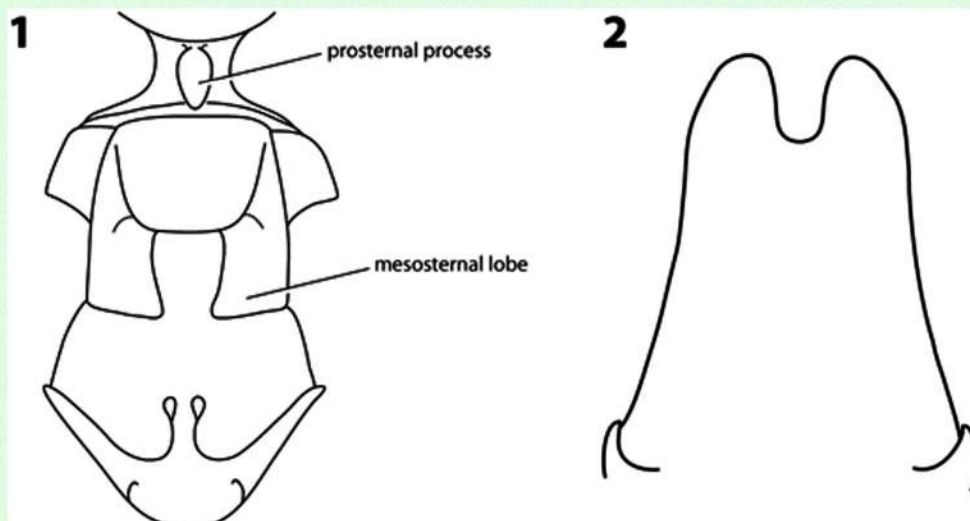


Image Source: <https://www.schistocerca.org/key.htm>

The locust should not be misidentified with other grasshoppers such as AK /Ekka or calotropis grasshopper, *Poekilocerus pictus* (Fab.) and coffee locust, *Aularches miliaris* (L.) for which the image is shown below.



AK / Ekka / Calotropis grasshopper  
*Poekilocerus pictus* (Fab.)



Coffee locust  
*Aularches miliaris* (L.)

## Different stages

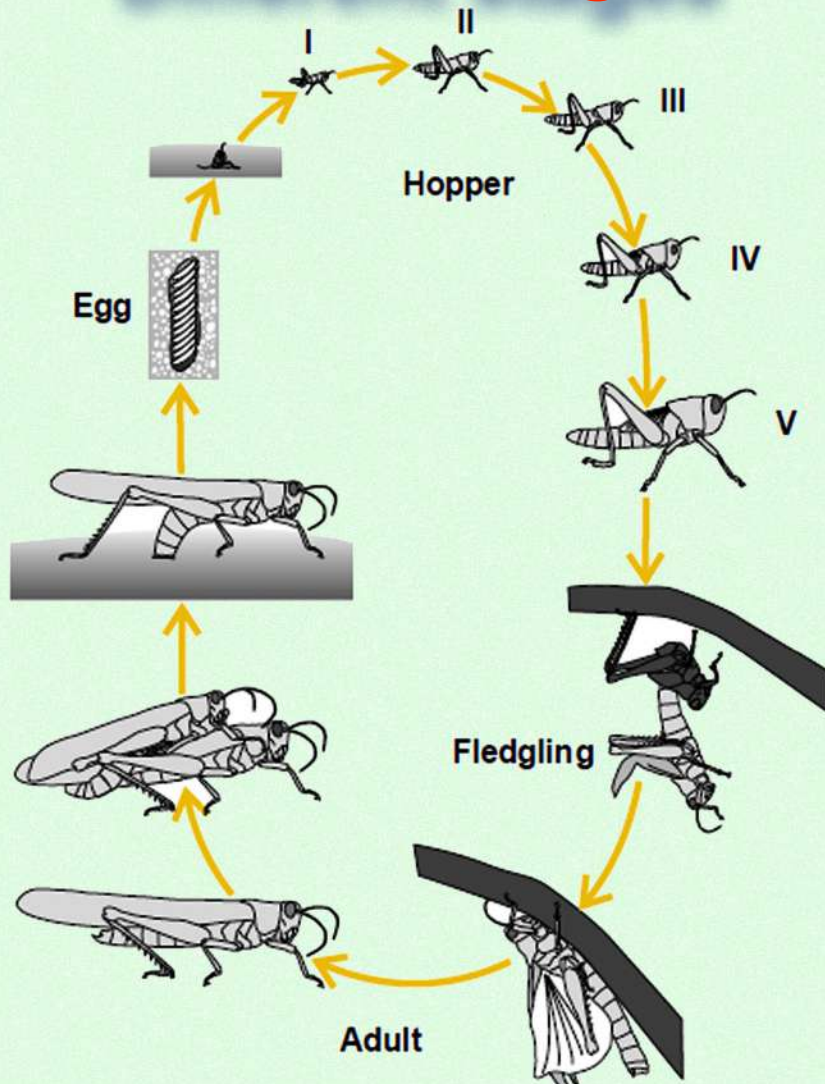


Image Source: <http://ppqs.gov.in>

# Bionomics

## Eggs

Female pierces its ovipositor into moist sandy soil and deposits the egg pods at a depth of about 10-15 cm. Gregarious females lay 2-3 egg pods with 60-80 eggs/pod at an interval of 7-10 days. While solitarious females lay 150-200 eggs. Soil moisture and temperature are crucial for egg development, a temperature below 15°C ceases the development of egg. The incubation period is 10-12 days when the optimum temperature is between 32 and 35°C.

## Hoppers

On hatching the wingless nymphs (hoppers) emerge and there are 5 instars. On each moult there is a distinct coloration change occur. Temperature has a strong influence on the rate of development. It takes 22 days when temperature is 37°C, while in cooler temperatures below 20°C it takes 70 days.

## Adults

The moulting from V instar nymphs to young adults is called 'fledging' a period during which the wings are soft and cannot fly. On hardening of wings the sexual 'immature adult' takes to flight over a long distance. The immature adult stage is most injurious. Under optimal conditions the adult may mature in 3 weeks and under unfavourable conditions it may take up to 8 months. In general, however, it usually takes about 4 weeks before an adult is ready to reproduce. On alightment after the flight they feed on all the green matter in vicinity. On devouring the green cover they migrate and fly with the wind (downwind) in search of green vegetation and favorable breeding conditions. On maturation, gregarious adults become bright yellow. Males mature earlier than females. Oviposition commences in a couple of days after copulation.



[photo Axel Hochkirch ©]


# Management


## Preventive Control Strategy


Desert locust infested countries adopt the preventive control strategy for the management of desert locust so as to reduce the frequency, duration and intensity of plagues. This is achieved by periodical surveys by Locust Warning Organisation (LWO) to provide early warning so as to act and contain the pest at an early stage. This strategy consists of regular surveys to provide early warning and contingency planning to allow early and effective response before the situation becomes out of control. The scheduled desert area of Rajasthan and Gujarat are monitored by LWO for the presence of desert locust and ecological conditions.


Economic threshold level (ETL) is 10,000 adults/ha. and 5-6 hoppers/bush to initiate control measures. Control operations are not recommended when locust numbers are low, isolated and scattered because this would not be effective and it would be harmful to the environment.


## A. Cultural and mechanical methods

 Make loud sound in the cropped field by beating empty tins/metal plates, drum or radio or through any other electronic sound system to prevent locust swarm landing on the crop.


 If hopper band is formed and observed marching, ignite dry grass or any trash in front of the marching hopper band to kill the nymphs.


 Dig a trench 2 feet deep and 2 feet wide in front of marching hopper band for trapping and killing by the application of any one of the insecticides mentioned herewith


 Movement of vehicles from the infested area to the fresh area to be checked for the roosting locust swarms on the vehicle roof top and treated with chemicals accordingly.

 The desert locust adults and mature swarms use downwind air for their flight and in this manner the movement of the swarms could be predicted for issuing alert warning and management.

## **B. Chemical Control Strategy**

 Spray 5% Neem seed kernel extract on standing crop as feeding deterrent.

 If hatching of eggs started and nymphs observed, spray bio-pesticide – *Metarhizium anisopliae* var. *acridum* @ 75 gram/15 lit water (Not available in India) or any insecticide

 If a locust swarm is spotted invading a cropped area, the State Agriculture Department should arrange aerial spraying of ULV formulation of insecticide with the help of ULV nozzles on a Helicopter or drone.

Sr. No	Chemical	Dose (gram active ingredient per ha)	
		Hopper nymphs	Adults
<b>Recommended on standing crops</b>			
1.	Chloropyriphos 20% & 50% EC	240	240
2.	Deltamethrin 2.8 % EC & 1.25 % ULV	12.5	12.5
3.	Diflubenzuron 25 % WP	60	NA
4.	Fipronil 5% SC & 2.92 % EC	6.25	6.25
5.	Lambdacyhalothrin 5% EC & 10% WP	20	20
6.	Malathion 50% EC & 25 % WP & 96% ULV	925	925
<b>Recommended for the control of locust, only in the scheduled desert area and not on the standing crops</b>			
1.	Fenitrothion 96% ULV	1.0 lit/Ha desert area	
2.	Fenvalerate 0.4% DP	25kg/ha	
3.	Malathion 5%DP	25kg/ha	
4.	Quinolphos 1.5%DP	25kg/ha	



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