



## LOCUSTS: PROBLEM AND MANAGEMENT IN INDIAN CONDITION SPECIALLY IN CENTRAL REGION IN THE MIDDLE OF THE COVID-19 PANDEMIC

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### ABSTRACT

The word "locust" is derived from the Latin *locusta*, meaning grasshopper. Locusts are a collection of certain species of short-horned grasshoppers in the family Acrididae that have a swarming phase. These insects are usually solitary, but under certain circumstances they become gregarious. In India, LC&R scheme is responsible for control of Desert Locust. LWO is responsible to monitor and control the locust situation in SDA. They are voracious feeders. This study is based on attack and management of locusts in two districts during COVID-19 pandemics. In one district they cause negligible damage on the other hand in second district they cause 100 % damage to moong bean, urd bean and mentha crops. Both chemical and biological measures were proved effective against the locusts attack. There are probabilities of some more attack of locusts in different areas so vigilance will remain continued towards expected invasion of locust in coming days.

**KEY WORDS:** LC&R- Locust Control and Research, LWO- Locust Warning organization, SDA- Scheduled Desert Area, SWAC- South-West Asia commission, FAO- Food and Agriculture Organization, COVID-19-Corona Virus 19.

### INTRODUCTION

Locusts are usually solitary, but under certain circumstances they become more abundant and change their behaviour and habits, becoming gregarious. No taxonomic distinction is made between locust and grasshopper species; the basis for the definition is whether a species forms swarms under intermittently suitable conditions. More recently, changes in agricultural practices and better surveillance of locations where swarms tend to originate, have meant that control measures can be used at an early stage. These grasshoppers are normally innocuous, their numbers are low, and they do not pose a major economic threat to agriculture. However, under suitable conditions of drought followed by rapid vegetation growth, serotonin in their brains triggers a dramatic set of changes: they start to breed abundantly, becoming gregarious and nomadic, when their populations become dense enough. They form bands of wingless nymphs which later become swarms of winged adults. Both the bands and the swarms move around and rapidly strip fields and cause damage to crops. The adults are powerful fliers; they can travel great distances, consuming most of the green vegetation wherever the swarm settles, (Antesy *et al.*, 2009). Swarming behaviour decreased in the 20th century, but despite modern surveillance and control methods, the potential for swarms to form is still present, and when suitable climatic conditions occur and vigilance lapses, plagues can still occur, (Stone and Ahmed *et al.* 2020). Locusts are large insects and convenient for use in research and the study of zoology in the classroom. They are also edible insects; they have been eaten throughout history and are

considered a delicacy in many countries, (Harper Douglas). Desert Locust are well adapted to their changing environment and are highly mobile, flying many hundreds or even thousands of kilometres between their summer, winter and spring breeding areas.

### DISTRIBUTION

It is international pest affecting about 60 countries, mainly India, Pakistan, Afghanistan, Arabia, Persia, Iraq and Africa. There are nine well-recognized species. The following species occur in India.

1. The Bombay locust: - *Patanga succincta*
2. The migratory locust: - *Locusta migratoria*
3. The desert locust: - *Schistocerca gregaria*; Very common and most destructive.

### Locust control organisations in the world and in India

In India, the scheme Locust Control and Research (LC&R) is responsible for control of Desert Locust and is being implemented through Organisation known as "Locust Warning Organisation (LWO)" established in 1939 and later amalgamated with the Directorate of Plant Protection Quarantine and Storage in 1946. Locust Warning organization (LWO) is responsible to monitor and control the locust situation in Scheduled Desert Area (SDA) mainly in the States of Rajasthan and Gujarat while partly in the States of Punjab and Haryana by way of intensive survey, surveillance, monitoring and control operations where required. However, the main objective of Locust Warning Organisation (LWO) is protection of standing crops and other green

vegetation from the ravages of Desert locust which is one of the most dangerous pests occurring in desert areas throughout the world.

#### **In the world**

United Nations Special Fund Desert Locust Project, which was sponsored by the F.A.O. in 1960. This is being subscribed by several countries including India. Its purpose is to develop more effective and less expensive control of the desert locust.

#### **Breeding Season**

In all, there are three breeding seasons for locusts (i) Winter breeding (November to December), (ii) Spring breeding (January to June) and (iii) Summer breeding (July to October). India has only one locust breeding season and that is Summer breeding. The neighboring country Pakistan has both spring and summer breeding.

#### **Nature of damage**

Locusts are voracious feeders, each adult, consuming its own weight of vegetation daily. It is estimated that 1 sq. mile settled swarm contains about 300 tons of locusts. Biggest 300 Sq.miles swarm is on record. Similarly hoppers eat 6-8 times more than they're own weight. It has been assessed that in India during 1926-31 plague, the damage caused to crops, fodder etc., was about 10 crores of rupees and consequential loss due to premature death of cattle and other livestock was incalculable. These insects are usually solitary, but under certain circumstances become more abundant and change their behaviour and habits, becoming gregarious, (Simpson et.al 2008).

According to the Food and Agricultural Organization (FAO) of the United Nations, a swarm of locusts spread across an area of one square kilometre can eat as much food as 35,000 people in one day. Their appetite is voracious and one locust can consume food equal to its own weight, about two grams, on a daily basis. And since a square kilometre swarm would contain about 40 million locusts, it can cause a significant amount of damage in a short period of time. Large swarms of desert locusts have entered areas in India where they had not been seen since 1993 and have already caused damage to crops in Rajasthan, Gujarat, Madhya Pradesh, parts of Uttar Pradesh and Maharashtra. The migratory pest has made several incursions into Rajasthan in the last two decades – including a significant one last year. But this time, the swarms have spread to parts of Madhya Pradesh, Uttar Pradesh and even Maharashtra.

Locusts last swarmed Madhya Pradesh and Uttar Pradesh in 1993 and have not been seen since 1974 in Maharashtra. The real damage, however, is being caused and will be caused in rural India where farmers already bearing the brunt of the COVID-19 induced lockdown and the low prices they have fetched in the last few years, stare at massive crop damage that the locust swarms are capable of inflicting.

During the 1st fortnight of May 2020, immature adult groups/swarms were observed at Jaisalmer, Barmer, Jodhpur, Phalodi, Bikaner, Nagaur and Ganganagar. Out of 342 nos. of spots control operation were undertaken at 213 spots covering 21675 hectare area. Whereas scheduled desert area of India is 2, 05,785.45 sq km.

Small scale localized locust breeding have also been reported and controlled during the period 1998, 2002, 2005, 2007 and 2010. Since 2010 till 2012-13, situation remained calm and no large scale breeding and swarms have been reported. However, solitary phase of Desert locust has been reported from time to time at some locations in the State of Rajasthan and Gujarat (GOI, Directorate of Plant Protection Quarantine and Storage).

**FAO Update** (13 May): The current situation remains extremely alarming in East Africa. At this time, there is a risk that swarms will migrate to the summer breeding areas along both sides of the Indo-Pakistan border as well as to Sudan and perhaps West Africa.

**SWAC:** Hopper bands are maturing along the southwestern coastal plains of Iran. In Pakistan, adult groups are migrating to the India border from breeding areas in Baluchistan and the Indus Valley. In India, more adult group can cause the damages.

#### **MATERIAL AND METHODS**

In our study we have covered two districts of Madhya Pradesh in the year 2020 namely Chhindwara and Chhatarpur in the summer. Locust cause only 2-3 % damage in the area of Chhindwara district but the mode of damage was just opposite in district Chhatarpur. In district Chhatarpur locusts came from district Jhansi (Uttarpradesh) and covered village- Achhatt of block-Chhatarpur while moving during district Panna (Madhyapradesh), and cause 100% damage just in one day on 23.05.2020 in 06.30 AM. In Chhindwara locust attack has occurred in two blocks namely Sauser and Pandhurna. Locusts came from district Amaravati (Maharashtra) in the 07.30 AM on 27.05.2020 in village Umarikala, Block Pandhurna. They were dangerously high in numbers and covered total 14 villages of both the block. In Souser they attacked in Borgaon, Doda borgaon, Semara, and Lodhikheda. In Pandhurna block the attacked Kondher, Hiwarasnadwar, Badhchicholi, Langha, Rajana, Rajorakala, Temanisahani, Umarikala, Hiwaraprathwiram and Khaperkheda. Due to frequent awareness campaigning locusts least damage the plants and field crops in both the blocks. Farmers of both the blocks were very aware and they make noise of bell, DJ, dhol etc as biological measures to control the locusts. The traditional means of control are based on the use of insecticides from the ground or the air, but other methods using biological control are proving effective in the region of Chhindwara district but situation was just opposite in chhatarpur district. Farmers of chhatarpur district were used chemical control measures with tractor operated power sprayers in the evening time of same day. But even they failed to control at the time just after attack in the morning, they were very late. Upto night locusts caused 100% damage in the field of moong bean and urd bean and caused 10% damage in mentha due to astringent taste in leaves. farmer Shree Kripal Sahu, Shree Bachchi bunkar, Shree Ramesh Sahu are reported 100 % damage in the field of moong bean and urd bean. only stems are remaining, locusts feed on all vegetation around the crop fields.

**TABLE 1:** Locust swarms attack information, Chhatarpur, MP

Parameter	Details
Entry point of Locust swarms attack in district (entry from which district and name of Location/ entry point in your district along with date and time)	<b>From Jhansi, Dist. Jhansi, Uttarpradesh</b> Vill-Achhat, Block- Chhatarpur Date- 23-05-2020, 06:30 AM
Route followed by Locust swarms in district (name of Location date and time wise)	1. Vill-Achhat, Block- Chhatarpur Date- 23-05-2020, 06:30 AM to 04:00 AM in 24-05-2020
Exit of Locust swarms attack in district (name of Location/ exit point date and time & name of district when it entered now )	Vill-Bagota, Block- Rajnagar <b>Dist. Panna Madhyapradesh</b>
Damage done (Block/location wise area affected and % damage)	3.6 ha, 100% damage
Total area affected in District and % damage	8.92 ha, 100 % damage
Preventive measures	Dhol, Drum, Teen box, Thali beating
Control measures	Application of Chlorpyrphos 20% @ 1.25 L/ha, Melathion 50 EC 1850 ml/h and Lamdacylothrin 5 EC @ 400 ml/ha
Advisory measures taken	advisory provided to farmers via KMA and Whatsapp

**TABLE 2:** Locust swarms attack information, Chhindwara, MP

Parameter	Details
Entry point of Locust swarms attack in district (entry from which district and name of Location/ entry point in your district along with date and time)	<b>From Morshi, Dist. Amravati, Maharashtra</b> Vill-Umrikala, Block- Pandhurna Date- 27-05-2020, 07:30 AM
Route followed by Locust swarms in district (name of Location date and time wise)	1. Vill-Umrikala, Hivra Prithviram, Hivra Senadwar, Laangha, Rajna, Temni Sahni & Khaparkheda, Block- Pandhurna Date- 27-05-2020, 11:00 AM to 12:00 PM 1. Vill-, Borgaon, Semra, Doda Borgaon, Lodhikheda, Block- Sausar Date- 27-05-2020, 12:00 PM to 02:00 PM
Exit of Locust swarms attack in district (name of Location/ exit point date and time & name of district when it entered now )	Vill-, Doda Borgaon, Lodhikheda, Block- Sausar to Date- 27-05-2020, 06:00 PM Vill- Badchicholi and Kondhargaon , Block- Pandhurna to Date- 27-05-2020, 06:00 PM Dist. Savner Maharashtra Dist., Katol, Maharashtra
Damage done (Block/location wise area affected and % damage)	Negligible
Total area affected in District and % damage	Negligible
Preventive measures	Dhol, Drum, Teen box, Thali beating
Control measures	Application of Chlorpyrphos 20% @ 1.25 L
Advisory measures taken	advisory provided to farmers via KMA and Whatsapp

## RESULTS AND DISCUSSION

Destroying vegetation by burning it or overgrazing and also the continuous use of pesticides can encourage locusts, because they kill the pest's natural enemies. The regions of Punjab, Uttar Pradesh, Haryana and Delhi bordering the Thar are suitable for locusts, but also allow reptile's natural enemies of the locusts to thrive all year, thereby preventing locust breeding. Scientists stress an integrated locust management system therefore must combine both chemical and biological methods to produce optimum results. If they are resting on bushes or hedges, they can be easily burnt with help of flame throwers. When flying locusts are about to descend in large swarms in cultivated areas, the best way to tackle them is to prevent then alighting by all possible methods, such as waving a white cloth, or creating a cloud of smoke, by burning refuse, etc., spraying with neem kernel suspension

as a deterrent to the crop, has also been tried with success. Recently with the introduction of aerial application of insecticide like Chlorpyrphos, Melathion, Lamdacylothrin, the control of locust swarms has become easier. Therefore, vigilance will remain continued towards expected invasion of locust in coming days. Because there are some more probability of further attack of locusts in many areas of India, actually at present locusts are moving in small groups, due to use of chemical as well as biological control measures the swarms are not in large numbers, they have made many small groups and moving from one place to another. So there are some more chances of attack of small swarms in this summer 2020.

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