

An Outlook Of The Trend And Timeline Of Locust Swarms In 2020 With Institutional Measures: A Comparative Study At Global And National Level

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Introduction

The year 2020 brought lot of unpleasant experiences to the whole world. The agriculture sector was not left indifferent to it rather was most hardly hit by these traumas. The pandemic led oversupply of labour and low access to market. The situation was worsened by the humongous tide of those floating creatures which had fallen on the field and took away everything leaving only turmoil and pain to be harvested. Locust attack of 2020 was an unwanted experience which taught us many lessons to be learned.

Locusts belong to a family of grasshoppers called Acrididae. The Desert Locust (*Schistocerca gregaria*), found in various parts of Africa, Asia, and the Middle East, is considered the most destructive migratory pest in the world because they are highly mobile and can form swarms containing millions of locusts, leading to devastating impacts on crops, pasture and fodder. A small swarm (1 km²) can be made up of 80 million locusts and can consume the same amount of food in one day as 35,000 people, while a large swarm can eat up to 1.8 million metric tons of green vegetation, equivalent to food enough to feed 81 million people. Locusts breed very fast and a single female locust can lay egg pods containing anywhere from 80-150 eggs (Jain, 2020). Polyphagous nature of locusts and the overlapping of their life cycle with crop season lead to enormous crop damage.

In the given article we have tried to understand the trend and timeline of the breeding and distribution of locust swarms from January 2020 to December 2020. We have also

discussed about some commendable institutional actions taken at world and national level to control the damage by these swarms. Timely action and community control is the only and most efficient way of minimizing the damage. At the end, we have mentioned some methods which could be followed by the farmers at the field to control the locust damage at individual and area based level.

Timeline of Locust Swarm Movement In 2020

Timeline	Global Situation	Local Situation
Jan 2020	In the Horn of Africa, there has been a significant and extremely dangerous increase in swarm activity. Locust infestations are increasing on the Red Sea coast. Swarm breeding is thought to be underway along parts of the southern coast of Iran.	Immature / maturing adults / swarms were observed and control operations were undertaken in the Jaisalmer, Barmer, Bikaner, Jalore, Jodhpur, Pali, Sirohi, Sriganganagar of Rajasthan and Banaskantha and Bhuj-Kutch of Gujarat.
Feb 2020	Situation is alarming in the Horn of Africa. Above-normal breeding continues along both sides of the Red Sea coast. Swarm breeding is on progress and dense immature swarms arrived along parts of the southern coast of Iran. A few residual summer-bred swarms appeared in northwest Pakistan.	Control operations were undertaken against Immature/maturing/mature, pink/ yellow swarm / adult groups in Jaisalmer, Barmer, Jodhpur, Sriganganagar districts of Rajasthan and Fazilka of Punjab.
March 2020	Situation is alarming in the Horn of Africa. Swarms laying eggs in the southwest of Iran, Mature adult groups laying eggs at Pakistan and more hopper groups form from Baluchistan (Pakistan) breeding and immature	No desert locust population were seen during the survey

	adults start to form groups	
April 2020	Spring breeding is underway which will cause a further increase in locust infestations in East Africa, eastern Yemen and southern Iran.	Low density I-IV instar gregarious /transient hoppers were observed at Jaisalmer, Suratgarh, Fazilka areas near Indo-Pak border and immature adults were seen at Jaisalmer.
May 2020	The current situation remains extremely alarming in East Africa. Adult groups are migrating to the India border from breeding areas in Baluchistan and the Indus Valley.	Immature adult groups/swarms were observed at various districts of Rajasthan, Madhya Pradesh and few districts of Maharashtra and Uttar Pradesh.
June 2020	Desert Locust threat to food security and livelihoods continues in the Horn of Africa, is increasing in southwest Asia, and could spread to West Africa. Locust infestation decline at Iran, some swarm laying eggs near Indo-Pak border.	Immature, maturing, mature adult groups/swarms were observed at various districts of Rajasthan, Gujarat, Madhya Pradesh, Uttar Pradesh and Haryana. III instar hoppers were observed at Bikaner, Barmer and Jodhpur areas.
July 2020	Summer breeding is underway along both sides of the Indo-Pakistan border. In Pakistan, hopper groups and bands are present in the Nagarparkar area in Tharparkar of southeast Sindh. In Iran, locust numbers have declined.	Immature, maturing, mature, breeding adult groups/swarms were observed at various districts of Rajasthan, Gujarat and Haryana. I- V instar hoppers were observed at various districts of Rajasthan and Gujarat.

Aug 2020	Summer breeding continues along both sides of the Indo-Pakistan border. In India, widespread breeding is underway throughout Rajasthan where hoppers are forming groups and bands.	Immature, maturing, mature, breeding adult groups/swarms were seen at Churu, Bikaner, Suratgarh, Hanumangarh, Jhunjhunu, Barmer. I-V instar hoppers were observed in various districts of Rajasthan and Gujarat
Sept 2020	In Southwest Asia, the situation has improved dramatically as the seasonal monsoon withdraws from the summer breeding areas along both sides of the Indo-Pakistan border	India is free from gregarious as well as solitary desert locust activities
Oct 2020	The situation is expected to deteriorate as more swarms are forming and another generation of breeding commences from the Red Sea to Somalia. Numerous swarms formed in northeast Ethiopia during October because of unusually good summer rains	India is free from gregarious as well as solitary desert locust activities
Nov 2020	Widespread breeding continues in eastern Ethiopia and central Somalia	India is free from gregarious as well as solitary desert locust activities
Dec 2020	Substantial and widespread breeding continues in eastern Ethiopia and central Somalia. Swarms invades Kenya, more swarms are expected from north. That will spread to northern and central countries.	India is free from gregarious as well as solitary desert locust activities

(Source – Prepared by Locust Warning Organization, Jodhpur & Issued by Plant Protection Adviser, Directorate of Plant Protection, Quarantine and Storage, N.H.IV, Faridabad)

Control Strategies By Institutions

At Global Level

- The World Bank Group has approved a US\$ 500 million program to provide flexible support to countries in Africa and the Middle East affected by the locust outbreak (The World Bank, 2020).
- Established in 1967, the Commission for Controlling the Desert Locust in the Central Region (CRC) with 16 member states plays a key role in enhancing Member Countries' early preparedness and response capabilities with regard to Desert Locust and to address any gaps between calm situations and emergency situations, so that emergencies can be resolved efficiently and effectively..
- The Desert Locust Information System (DLIS) of the FAO issues advisories and warnings to countries plagued by locusts.

At National Level

- In India, the locust control and research is governed through Locust Warning Organization (LWO with Headquarters at Jodhpur, Rajasthan), established in 1939 and amalgamated in 1946 with Directorate of Plant Protection Quarantine and Storage (DPPQS) of Ministry of Agriculture and Farmer's Welfare. It undertakes regular surveys in the scheduled desert areas of Rajasthan and Gujarat to monitor the presence of desert locust and ecological conditions. During the survey, an assessment is made to determine, if the locust numbers have crossed the economic threshold level (ETL) which is 10,000 adults/ha and 5-6 hoppers/bush that may require control.
- Teams equipped with vehicle-mounted sprayers or aerial sprayers are effective against swarms. Direct application of chemical pesticides on swarms roosting on vegetation, during morning and evening, is the most effective method. The Directorate of Plant Protection, Quarantine and Storage have approved five synthetic pesticides such as chlorpyrifos, deltamethrin, fipronil, lambda cyhalothrin and malathion for the control of swarms (Prathapan, 2020).
- The Rajasthan state government announced compensation worth Rs 31 crore for four affected districts – Jaisalmer, Barmer, Jalore and Jodhpur – after conducting a



special assessment of losses. Farmers whose crop was damaged would be entitled to compensation worth Rs 13,500 per hectare of land.

- The centre has ordered 60 sprayers from United Kingdom and allowed deployment of drones for controlling locust swarm which has affected around 50,000 ha across states of Rajasthan, Punjab, Gujarat and Madhya Pradesh. The union government had coordinated with states governments to restrict locust attacks. More than 200 locust circle offices and temporary camps were engaged in conduct in surveys and control operations. 89 fire brigades for pesticide spray, 120 survey vehicles, 47 control vehicles with spray equipments and 810 tractor mounted sprayers have been deployed for effective locust control, as per requirement during different days. The government had ordered for procurement of additional 55 vehicles and ensures adequate stock of pesticide (53,000 liters Malathion) with Locust Control Organizations and also gave Rs 14 crore to Rajasthan, which is the worst affected state with more than 21 districts under attack.

Basic Measures For Locust Control

- The locust is controlled at all its stages of life cycle viz., Egg, nymph and adult. Ploughing, digging and harrowing of place where eggs have been laid on a large scale and destroying eggs may be done. Adults can be beaten to death by thorny sticks, brooms or can be swept together and buried under ground in heaps. These things are easy to do when the females are laying eggs. Burning is particularly effective at night or early morning when adults are sluggish because of the cold or resting on the trees during the night. They can be easily shaken off, swept together and burnt. During night time even flame throwers can be used. During the day, the swarms can be prevented from sitting on crops by waving white pieces of cloth or by beating the drums.
- Farmers should go to their cropped field and make loud sound by beating empty tins/ metal plates, drum or radio or through other electronics sound system to prevent locust swarm landing in the crop.
- Spray neem based formulation (0.15 % EC) @ 3 ml/ liter of water on standing crop as feeding deterrent (locust not known to feed on neem plant).

- Dig a trench 2 feet deep and 2 feet wide in front of marching hopper band and then apply Cypermethrin 50 EC @ 2 ml per liter of water or Carbosulfan 25 EC 2 ml per liter of water. Dusting with Cypermethrin 10 WP or Fenvelerate 0.4 D (25 kg/ ha) in the trenches also effective especially against nymphs.
- Poison bait consisting of wheat or rice bran, an insecticide and attractant like molasses may be useful [Rice bran + Jaggery + Chlorpyrifos (can be changed depending on availability, as it is banned in recent government order): 10kg + 1 kg + 1 liter] prepare in small balls, and spray/spread in the field. Poison baits are effective when used early in the morning or in the evening. During the day, the baits dry quickly so hoppers do not eat it.
- Biological control agents like *Metarhiziumanisopliae* @ 5 g/ liter or dusting of powder formulation inside the trenches is effective only weather is humid and temperatures are below 35°C.
- Taking hens to the field in large numbers or attracting other birds like common Myna, Tilyar (Starling) , Black drongo etc by providing bird perches helps in minimizing the locust number.
- Alternate methods like using locust as human diet or converting it into poultry feed, animal feed or converting in to a manure etc may help during the crisis.
- Spraying following insecticides provide effective control Chlorpyrifos 20 EC @ 2ml/ liter or Malathion 50 EC @ 2ml/ liter or Malathion 25 WP @ 2 g/ liter or Deltamethrin 2.8 EC @ 1 ml/ liter or Fipronil 5 EC @ 2 ml/liter.
- An effective control of locust possible by close cooperation and information sharing between affected countries (India, Iran and Pakistan) about the movement of locust.
- If the locust swarm is spotted settled in non cropped area or non-scheduled cropped area, the state agriculture department should arrange aerial spraying of ULV formulation of insecticide like Malathion 96% ULV @ 1 liter / ha or Fenitrothion 96 % ULV @ 0.5 liter / ha with the help of ULV nozzles fitted on a Helicopter.
- Anti-locust organizations: Central anti-locust organization: this organization was handled by PPQS, New Delhi in the past and now also can take leadership now. They can coordinate the weekly density of locusts per unit area in the breeding areas in India and to carry out the control operations on community basis. Keeping watch on



coming swarms, their direction and size and guiding periodically helps to check the menace. Government.

- Pesticide control of Locust: Malathion 96% ULV is used in Desert Locust control in India. A buffer of minimum 5000 liters of Malathion 96% ULV will be maintain at specific LCOs from where pesticide can be mobilised for immediate requirement. In 2014, an agreement had been signed with Hindustan Insecticides Limited (HIL) with the provision that the company will supply the required quantity of pesticide. M/s HIL will keep ready stock of 8000 litres Malathion 96% technical reserve and on receiving demand from the Directorate of PPQ&S, will supply the desired quantity of Malathion 96% ULV formulation to the Locust Circle Offices within 7-10 days of the supply order. However, in case of requirement of larger quantity of Malathion 96% ULV, HIL needs 25-30 days to supply the pesticide.
- Teams equipped with vehicle-mounted sprayers or aerial sprayers are effective against swarms. Direct application of chemical pesticides on swarms roosting on vegetation, during morning and evening, is the most effective method. The Directorate of Plant Protection, Quarantine and Storage has approved five synthetic pesticides such as chlorpyrifos, deltamethrin, fipronil, lambda cyhalothrin and malathion for the control of swarms (Prathapan, 2020).