Locust Plague Management

Plagues of desert locust and other species—actually a grasshopper that changes form, color and behavior and then migrates en masse—have been recognized as a very localized threat to agricultural production in for some unlucky farmers in Africa and western Asia for thousands of years. Accounts of locust invasions in North Africa date back to about AD 811. Since then, it is known that desert locust plagues have occurred sporadically up until the present, and that they follow weather—especially rain and vegetative growth—patterns.

Generally, the desert locust is a solitary insect that occurs in desert regions of Asia to western India, northern Africa, the Sahel, and the Arabian Peninsula. During the solitary phase, locust populations are low and do not damage crops.

After periods of drought followed by heavy rains, when vegetation flushes occur in major desert locust breeding areas (for example, the India/Pakistan border and Red Sea Coastal areas), rapid population buildups and competition for food sometimes result in a transformation from solitary behavior to gregarious behavior on a regional scale.

This transformation from solitary grasshoppers to locust swarms that migrate can occur over two or three generations. Locusts often form thick groups of marching nymphs and swarms of winged adults that can devastate localized agricultural fields where they land.

During plagues, locust swarms and bands are found to move across entire regions and from region to region, from India and Pakistan in Asia to Mauritania and Senegal on the Western edge of Africa. This swarming behavior can last for several years, and is usually ended as it started—with changing weather conditions. In fact, high winds and storms from the Sahara Desert actually blew locust swarms from West Africa into the Atlantic Ocean at the end of the 1980s plague, ending that plague.

A single swarm of locusts can be very large with up to 80 million per square kilometer over a large area. In one day, locusts in a swarm can fly over 100 km in the general direction of prevailing winds. Bands of larvae can march about 1.5 km per day. Plagues often involve hundreds of swarms.

Crop Losses

Desert locusts can consume green vegetation of most plants, including leaves, flowers, bark, stems, fruit, and seeds. Almost all crops, as well as non crop plants, are at risk, including millet, rice, maize, sorghum, cowpea, sugarcane, barley, cotton, passion fruit, orange trees, date palm, vegetables, rangeland grasses, acacia, pines, and banana. Crop loss as a result of desert locust infestation is difficult to characterize, but it will be important for developing intervention strategies on a demonstrably cost-effective basis.

There have been many unsuccessful attempts to calculate crop losses due to locusts on national or regional levels. Most studies, in fact, arrive at the conclusion that losses are not important

enough to warrant control operations. Losses are patchy; one farm may lose a large proportion of their crop production, while a neighbor may lose nothing.
Locust crop damage, in addition to occurring very sporadically, is geographically patchy, due to the nature of swarms. The Food and Agriculture Organization (FAO) and the international donor community have been developing studies to better understand the economic impact of locust swarm feeding and crop losses.

Survey and Control

The best IPM method for locust control is monitoring and timely information flow from the field to governments, and then amount neighboring countries. Solitary locust populations present during recession periods must be monitored regularly to predict the beginning of gregarious behavior and to locate locust bands and swarms for rapid response control operations.

FAO forecasts locust population events and general patterns of swarm movement during outbreaks and plagues. They use meso-scale and synoptic-scale weather patterns, weather and vegetation index information gathered from satellite images, preferred egg-laying soil mapping, and probabilities based upon historical maps of locust outbreaks and population levels throughout the recession and plague periods. Timeliness is of essence in using these tools.

In spite of this technology, most discoveries of locust bands and swarms are accomplished through visual surveillance by field scouting teams. Survey and control operations are usually run by national crop protection services, and occasionally with military assistance. Remember that swarms of locusts have a strong psychological impact on those people who see them, though they are of no harm to individuals.

Control of Locusts

Control of large bands and swarms of desert locusts has been attempted using different methods and technologies with varying degrees of success. Farmers often dig trenches along the perimeters of susceptible crops to catch bands of larvae marching toward crops. Once the larvae are in the trench, they can be buried or burned. Many cultures use smoke to attempt to drive locusts from their fields. And, in some agrarian societies, a magic or holy man is summoned to dispel the bands and swarms with incantations and potions.

Natural enemies exist, but they are easily overwhelmed by the sheer magnitude of most swarms and bands—their population levels lag behind those of the locust—they simply cannot increase as fast as the locusts. Locusts are eaten in most countries, even considered ‘manna from heaven’ or ‘protein on the wing’. They are dried, fried with chili, garlic, and salt, boiled, or grilled. In some countries they are caught en masse, dried and fed to domestic animals like chickens and pigs. In protein-poor parts of the Sahel, this delivery of protein on the wing to the farmer’s doorstep is seen as a good omen. And in some countries eaten locusts are said to have aphrodisiac qualities, but the final story is up in the air.

From the 1940s to the 1980s chlorinated hydrocarbon insecticides like dieldrin and lindane were sprayed on vegetation and the ground to create barriers against marching and feeding locust

larvae. These pesticides are known for their persistence in nature and killing ability. These are also reasons they are no banned—they continue to kill indiscriminately long after being applied. The 1986-1989 emergency crop protection campaign used more selective, but less persistent, insecticides like carbaryl, chlorpyrifos, malathion, fenitrothion, deltamethrin, and lamda cyhalothrin, mostly as ULV—ultra low volume formulations. Other formulations such as the popular emulsifiable concentrates, dusts, and wettable powders were also used.

Locust Plague Control Chaos

During a plague and the ensuing irrational psychological impact on people that see them and fear them, many donor reactions can go astray. The sightings of plagues—and now television coverage—are often used effectively to pressure donors to fund cash-strapped ministry field teams for survey trips, per diems, and vehicles. Consultants from many interests rapidly arrive to sell pesticides, consulting time, helicopters and airplanes to monitor for and spray locusts, spray equipment companies, and companies with new radar and weather forecasting technologies and services. Fear is used to justify large spray campaigns when weather is the ultimate locust population control. Spraying merely does localized crop protection for lucky farmers who receive it or those with large hectarage and close contacts with government officials that can dictate who receives free crop protection spraying and who does not.

And, this is done without strong economic data showing that in fact the locust plague will eat enough crops to cause wide-spread food insecurity. In many cases, they simply do not. The added risks of pesticide exposure to the health of spray applicators and wide-spread environmental damage provide another reason not to spray widely. Food security stores from local markets that have sufficient grain from the fortunate farmers (most of them) who did not experience locusts in their fields can more than make up for those that lost cops. And, food security stores can make up the remainder. Remember that locusts follow years of good rains—so do good crop yields. In fact, in some years with locust plagues, record crop yields are realized due to the good rains.

Much restraint must be practiced by decision-makers so as not to overreact to the clouds of locust swarms in the sky—that may cause folks who have an aversion to insects—which is most of us—to react. Cool heads will make the best decisions about control. In fact, some limited amount of locust control may be needed to respond to requests, and do some local crop protection for high-value crops. But, the amount spent should track carefully the real regional- and national-level crop losses—measured against market-place food surges resulting from good rains. Losses will usually be a few percentage points, not 30% or 50% or more often quoted by those with an interest in supplying goods and services, and in maintaining their sustainability.