

Jewish Scientists Study Locusts

Entomology

Combating Insect Pest Deemed Major Problem

THE migratory locust of Africa, which shook the hard heart of Pharaoh of old and is now causing widespread damage throughout northern Africa and the Near East, is being attacked as a major scientific problem by entomologists of the Hebrew University in Jerusalem. Recent studies by Drs. F. S. Bodenheimer, G. Fraenkel, K. Reich and N. Segal have contributed new facts which will eventually be of use in conquering this age-old bringer of desolation and famine.

Although the locust is about the oldest of recorded insect pests, strangely enough very little positive knowledge has been gathered as yet regarding its biology, habits and

primary breeding places. One of the first things developed by the Hebrew University scientists has been definite evidence that the locust is not strictly an insect of the desert, as has usually been supposed. There are strong indications that the primary breeding grounds of the insects that make trouble in Egypt, the Sinai region, Transjordan and Palestine are in the moderately moist borderlands of the desert, and that a bad locust year is almost always preceded by a decidedly rainy winter, giving the ground where the eggs are laid plenty of water in its upper layer. This hypothesis is supported by evidence gathered by earlier workers in the Sudan and elsewhere.

Studies both in laboratory and field indicate that the eggs are not formed in the body of the female locust until spring. After they are laid in the ground the young insects inside the shells require from two to four weeks before hatching. While they are passing through their five nymphal stages, growing larger each time they shed their skins, they begin their migratory march. In six or eight weeks they have become full grown winged adults, and their migrations become the vast flights that darken the sun and strip fields and orchards bare. Their adult life seems to last about ten months, completing the year's cycle.

Locusts are decidedly insects of clear sky and hot sun. They avoid the ground and the stones upon it during the chilly hours of night, roosting on the vegetation, especially on shrubs. When the first signs of dawn appear they hop down to earth, and creep about in small clumps until the first direct sunlight reaches them. Then they stop and sun themselves for a time, standing broadside on, to get the full benefit of the early rays.

As the day warms up, the horde begins its march. It keeps relentlessly ahead, climbing over all natural obstacles, and not diverting from its set course even when an easier route presents itself. If the weather is very hot, the insects stop for a siesta at midday, this time turning their bodies so as to expose as little surface as possible to the sun, or taking advantage of all chance patches of shade. On resuming march in the afternoon they feed voraciously, cleaning everything bare where they stop for lunch. Late in the afternoon, when the temperature falls, they call a halt, again sunning themselves, seeking dark stones for warmth whenever possible. Then they climb the shrubbery for the night.

These reactions seem to be governed by temperature rather than by light, for it has been found that when the weather is very warm they will march all night. Locusts are decidedly warm-weather creatures. At all stages in their lives they like high temperatures, thriving best when the mercury stands so high in the tube that human beings are distinctly uncomfortable.

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Grasshoppers Threaten United States

Entomology

GRASSHOPPERS threaten to wreak heavy damage to grain and forage crops in Montana and the Dakotas this year. There were many hoppers in these states, and in parts of Texas, last year, and the eggs they laid are now hatching in large numbers. If climatic and other conditions favor the growth of the young insects the outbreak may reach serious proportions. The U. S. Department of Agriculture is urging farmers in the threatened regions to combat the pests now with poisoned bran baits, before they grow their wings and get beyond control by taking to the air.

The American grasshoppers that appear in great numbers, following some climatic or other cycle not yet understood, are close kin to the old-world locusts, that have already begun to play havoc in the fields and orchards of northern Africa, Egypt, Palestine, Greece and Roumania. They have always hung in threatening clouds on the western frontiers of American agriculture. Old-timers in Kansas can tell incredible tales of their sundarkening flights that stripped rich

wheat-fields to the naked ground in minutes. The decreasing seriousness of their raids during the past few decades is attributed partly to the breaking up of their breeding grounds by agriculture and partly to the success of combat methods used against them.

Some confusion and unnecessary alarm will doubtless be caused during the next few weeks by the outbreak of seventeen-year cicadas that is due to appear in an area stretching from southwestern Iowa down to the Oklahoma-Arkansas boundary. These insects are commonly called locusts, though they are not locusts at all, and really do very little permanent damage. The seventeen-year cicada is the longest-lived insect known, spending years as a root-sucking larva underground and appearing punctually at the end of that time to emerge as a winged insect, lay its eggs and die. The adult activities of the seventeen-year cicada cause leaves to wither on trees to some extent, but that is all the mischief the insect does. These pseudo "locusts" need cause no alarm; it is only when the true locust, the long-winged grasshopper, puts in his appearance that the crops are in danger.

The picture on the cover of this week's Science NEWS-LETTER, showing an ant's-eye view of a grasshopper, is from the camera of Cornelia Clarke.

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