University of Florida Book of Insect Records
Chapter 27 *Largest Swarm*

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The Desert Locust, Schistocerca gregaria*, forms the largest swarms. In early 1954, a swarm that invaded Kenya covered an area of 200 km^2. The estimated density was 50 million individuals per km^2 giving a total number of 10 billion locusts in that swarm.*

I define a swarm as a large, coherent group of flying insects.

Methods

Secondary literature, solicitation over the ENTOMO-L and BEE-L bulletin board, and interviews with staff at the University of Florida Entomology/Nematology Department provided the initial candidates. Searching CD-ROM versions of Biological Abstracts and Agricola yielded additional information.

Results

The largest swarms reported in the literature are of migrating insects. Locusts in the desert, mosquitoes in the Arctic and tropics, and butterflies, moths, beetles, bugs and dragonflies, almost everywhere have been seen in mass flights, often involving millions of insects all traveling in the same general direction at the same time (Eisner & Wilson 1977).

The most commonly reported measure of a swarm is the area it covers. When *Melanoplus spretus,* the rocky mountain grasshopper, periodically migrated to the valleys of the northern Rocky Mountain region, the swarms extended to a height of 1.5 km and covered up to 330,000 km^2 , an area larger than Colorado. However numbers of insects were only referred to as myriads or immense (Riley et al. 1878, 1880). The book of Exodus mentions swarms of gnats attacking people and their animals followed by a swarm of locusts that ate what was left and blanketed the country in darkness for three days. The period is uncertain, but is deduced to have been about 1470 BC (Bimson 1981). Hoyte (1993) suggested that the area affected be interpreted as the Nile delta including the district of Goshen. Again, there was no specific information about the number of insects in the swarm.

The first steps towards the quantitative assessment of the swarms were taken by Gunn and colleagues (1948). Air and ground reconnaissance were used to establish and maintain contact with *S. gregaria* swarms and to assess their area, and objective photographic methods were introduced to estimate densities and numbers of locust in these swarms.

Direct determination of density in settled locust swarms provided figures that were roughly similar for several different swarms and averaged 50 million individuals per km^2. These area-density figures were broadly consistent with photographic data on density of locusts in flying swarms. In early 1954, air reconnaissance observations registered 50 swarms that invaded Kenya. They covered a total area of approximately 1,000 km^2 and rose to 1,000 to 1,500 m above the ground, with the largest swarm covering 200 km^2, approximately 10 billion locusts. The total number of individuals in the 50 swarms was estimated at 5×10^{10} locusts, weighing about 100,000 tons (Rainey 1954, 1989; COPR 1982).

Discussion

Swarms of Desert Locust have been recorded somewhere or other in every year since 1860 (Rainey 1963); however, the longest plague period lasted from 1950-1962, and during this period the largest swarm was recorded. Rainey (1954) calculated that of a well-packed swarm observed in East Africa contained 50 million locusts per km^2. At such rates, a swarm of 100 km^2 could contain over 5×10^9 locusts, but not all would be flying at once. Often some will settle while others take off, so that the swarm, however uniform it looks at any moment, is really progressing in a rolling motion with one part constantly replacing the other in the air as the whole body of the swarm moves forward (Baron 1972).

Plentiful information about *S. gregaria* swarms exists because this insect has great economic importance in Africa and many countries are interested in estimates of their number and densities for timing the control measures. *M. spretus* was also a very important pest in the last century, but it cannot be made the champion, because the largest swarm reported is only referred to as formed by myriads or immense insect numbers covering the sky (Riley et al 1880).

For other insect species the swarms have been reported as millions or tens of millions individuals with no specific information as to densities or areas covered (Eisner & Wilson 1977).

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