

Abstract

We have studied the effect of shifting the desert locust, *Schistocerca gregaria* (Forskål) from crowded to solitary conditions, or vice versa on the emission of the adult aggregation pheromone (as measured by released phenylacetonitrile) and compared this with changes in morphometrics. Adult males of the F_0 generation resulting from shifting crowd-reared (gregarious) hoppers, fledglings or mature adults (aged 20–22 days after the final moult) to solitary conditions did not produce phenylacetonitrile, similar to solitary-reared adults. Conversely, adults of the F_0 generation resulting from shifting solitary-reared (solitarious) hoppers, fledglings or mature adults to crowded conditions produced pheromone at levels which were not significantly different from those of control adults from the crowd-reared colony. The levels of pheromone increased in the F_1 generation but decreased and leveled off in the F_2 and F_3 generations. Extreme sensitivity to crowding was demonstrated by the fact that even pairings of one solitarious hopper with another produced F_0 adult males that produced phenylacetonitrile, although in significantly lesser amounts than by males reared at a density of four per cage or by crowd-reared control males. In contrast, morphometrics changes were slow and required several generations.

The H/W ratio (hind-femur length to head capsule width) was more sensitive to treatment effects than the E/F ratio (fore-wing to hind-femur length), in agreement with previous findings. We conclude that pheromone titres are a more sensitive measure than morphometrics to determine the onset of phase change in the desert locust.