

The results and insights from recent research on the chemical ecology of polymorphic acridids are reviewed. Many of the new findings come from studies on the desert locust, *Schistocerca gregaria*, which has continued to be the primary research insect in most laboratories. Earlier confusion between stimuli associated with phase change and social cohesion has been resolved. The roles of chemotactile and olfactory cues together with tactile and visual stimuli in key locust processes, comprising gregarization, social cohesion, synchronous maturation, mating, oviposition, and maternal transfer of gregarious character, are better understood. Some of the key pheromones of the gregarious phase have been characterized. Chemical communication is also shown to be important in the life style of the solitarious phase. The behavioral pattern and responses of this phase reflect a strong propensity of the species to exploit opportunities under appropriate conditions to form or join the crowd and to gregarize. Outstanding questions are highlighted.