Dispersal studies in Heliothis, especially using radar.

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A knowledge of dispersal is essential to an understanding of population control and to the management of insecticide resistance. The Division of Entomology, CSIRO, is undertaking ecological studies and radar observations to quantify dispersal of Heliothis moths at a range of altitudes over crops. We are interested both in assessing the value of radar in following low-level movement, and in determining the type of population data that need to be collected to interpret observations made by the radar. A preliminary study in the Darling Downs during February 1984 included direct observations of the frequency, magnitude and direction of movement, and indirect assessments of such movements using various types of trapping.

The radar demonstrated its usefulness for detecting low-level movements when used in conjunction with direct observations and sampling of the insects. It allowed simultaneous assessment of insect movement over an area extending for about three kilometres around the radar up to an altitude of one kilometre. Thus, it can alert observers to areas of greatest insect activity and it can extend the validity of direct observations to a much wider area. Secondly, the radar can be used to observe insect movements that would not otherwise be detectable, such as concentrations of insects ahead of a storm front or in temperature inversions. Thirdly, it can give estimates of the speed and direction of insect movement, of the absolute density of insects above 50 m elevation, and a relative estimate of density below that height.

Heliothis moths were observed to behave like other noctuid moths: at night, individuals fly downwind passing over different crops and fallow fields at a height of 5-10 m; no significant upwind movements occurred. Migration at higher levels, 200-1000 m, was also suspected. Movements at this height would have carried the insects out of the area.