

# Tracking the pasture mosquito

G. A. H. McClelland

Individual adult mosquitoes disperse from their point of origin by flight, on wind currents, and on moving host animals. Several mosquito species that breed in coastal salt marshes, where there is a dearth of hosts for blood meals, clearly migrate large distances to feed and must eventually return to the marshes to oviposit. The pasture mosquito, *Aedes nigromaculis*, a serious pest of cattle, also is a severe nuisance-biter in communities several miles from where it breeds, so its ability to move a considerable distance cannot be questioned.



Small electric vacuums suck in mosquitoes as they land on researchers' legs. Mosquitoes are then marked, released, and recaptured to track their movement.

Movement of individuals within a population, relative to their center of origin (where the adults emerged from their breeding place), usually follows one of three models: (1) completely random, as in a diffusion process; (2) centrifugal, directed migration toward other locations away from the center; or (3) centripetal, with a component of movement toward their center of origin. In addition, there may be an overall element of drift due to prevailing wind direction or local topography. Even the centripetal pattern would not prevent a sizable number (but small proportion) of individuals from huge pasture mosquito populations from reaching distant points, because much variability in behavior could be expected.

Studies using a technique known as mark-release-recapture were conducted in cooperation with the Sutter-Yuba Mosqui-

to Abatement District on two cattle ranches in south Yuba County near the community of Four Corners. Mosquitoes were caught by small electric suction devices as they landed on the legs of catchers who moved within a specified area during a one-hour period. The mosquitoes were counted, marked with a fluorescent powder code (and, in some cases, with additional materials), and released at the center of the same area in which they were caught. On the following and subsequent consecutive days, each catch was examined under ultraviolet light for the presence of previously marked individuals. These were removed and analyzed for their marking code to provide population size and mortality rate estimates.

After two preliminary experiments using single release points, two more were performed using a five-die pattern of releases involving catching circles of 91-meter diameter with various between-circle distances. Thus, mosquitoes released at the center of each of five circles could be recaptured anywhere within any of the five circles, giving 25 possible outcomes for each subsequent day.

The data were cumulated over the duration of daily releases, 12 days for experiment 3 and 21 days for experiment 4, and separated into recapture intervals of 1 to 7 days after release. Estimates derived from these data are consistent with the centripetal model, where the population tends to remain near the point of origin.

The findings reinforce the concept of *Ae. nigromaculis* as a mosquito, with high populations locally in flooded pastures, that depends both on cattle as a source of blood and on breeding in irrigation water rich in nutrients from cattle feces. Therefore, the individual mosquitoes reaching communities some distance away probably represent the drift of a small segment of the pasture population rather than a general random dispersion or directed migration.

---

G. A. H. McClelland is Professor of Entomology, University of California, Davis, CA 95616.



Shown emerging from a water-filled hoofprint, an adult pasture mosquito can travel several miles and become a severe nuisance in populated areas.