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Recent Research on Tephritids in Hawaii: Mating and Trapping Studies

ABSTRACT

My entomological life has had two distinct phases: pre-Tephritidae and Tephritidae. During the former stage, I worked on a variety of topics with a variety of insects, including habitat selection by stream insects, foraging behavior and community structure of tropical robber flies, territorial behavior of desert grasshoppers and solitary bees, nesting behavior of sand wasps, and lek behavior of Hawaiian *Drosophila*. These projects were conducted in various locales, including the US states of Pennsylvania, California, Arizona and Hawaii as well as Panama, Costa Rica, and Australia. The Tephritidae phase began in the mid-1990s in Hawaii and is ongoing. Initially, research focused largely on mating behavior of the medfly, the oriental fruit fly, and the melon fly and identifying means to improve the sexual competitiveness of males used in SIT programs. Over recent years, more effort has been devoted to assessing the effectiveness of male lures and food baits for detection trapping.

Past affiliations included pre- and post-doctoral student at the University of California, Los Angeles, Assistant Researcher at the University of Hawaii, Australian Research Council Fellow, and Founding Director of the Duke University Study Abroad Program in Tropical Biology. I am currently a Supervisory Entomologist with the USDA-APHIS.

The talk will focus primarily on two studies concerning the mating behavior of mass-reared males from a pupal color genetic sexing strain (termed DTWP) of the oriental fruit fly, *Bactrocera dorsalis*, and will also note ongoing work on the trapping effectiveness of synthetic food baits and “modified” male lures. The first mating study evaluated the suitability of DTWP for concurrent implementation of Male Annihilation and Sterile Insect Techniques. Work focused on identifying the male age at which pre-release exposure to methyl eugenol both reduced post-release attraction to methyl eugenol-baited traps and enhanced mating competitiveness. The second study described the effect of overflooding ratio and male-only releases on the mating competitiveness of DTWP males. Mating success was scored for DTWP versus wild males at ratios of 1:2, 1:1, 2:1, and 10:1 both when DTWP females were or were not concurrently released with the DTWP males. In all treatments, mating appeared to be random, with close correspondence between observed numbers of particular male-female pairings and expected numbers based on the relative numbers of flies released of each sex and strain. Trapping work compared captures using (i) torula yeast borax and food cones and (ii) male lures with increased loadings of attractant.

