Treehole mosquito may spread canine heartworm

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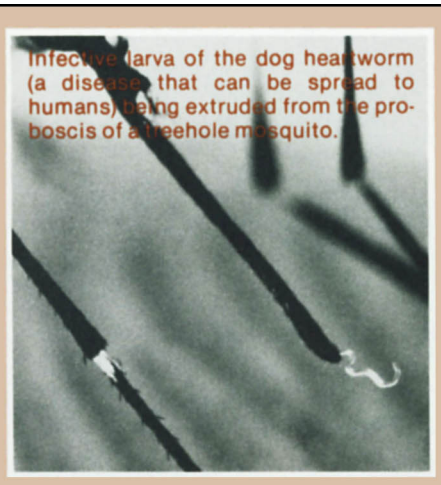

Infective larva of the dog heartworm (a disease that can be spread to humans) being extruded from the proboscis of a treehole mosquito.

Canine heartworm disease is becoming a major concern to dog owners in many areas of California. Although heartworm was originally believed to be a minor problem, recent information received from veterinarians and other sources indicates that concentrations of infection exist in several counties, mostly those in the hill and mountainous regions of northern California. They include El Dorado, Humboldt, Marin, Placer, San Mateo, Santa Cruz, Santa Clara, Shasta, Tehama, and Riverside counties. One veterinarian has reported an infection rate of more than 10 percent among local dogs, on routine examination.

Some 60 mosquito species have been implicated elsewhere around the world in the transmission of this exclusively mosquito-borne disease. California has at least a dozen of these species, two of which were recently discovered. One of the species studied, the western treehole mosquito (*Aedes sierrensis*), seems to be a particularly suitable host for development of this worm. This mosquito is common in most of the areas where heartworm has become a problem, survives as an adult for long periods, and readily feeds on canines.

Canines other than dogs may serve as reservoir hosts of the disease. An examination of coyote hearts from El Dorado County revealed a relatively high infection rate among the animals in that area. The adult treehole mosquito is abundant there and is a potential link in the chain of transmission between coyotes and dogs. Much further work is necessary before we can conclude with any certainty the precise vector or vectors involved in this disease, although the western treehole mosquito must be considered a prime suspect in the transmission cycle.

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Encephalitis viruses persist in southern California

Telford H. Work

Although epidemic threats of *Culex tarsalis* mosquito-transmitted viral encephalitis have diminished during the last two decades in the Central Valley of California, some human cases have occurred in southern California. This may be the result of the changing way of life of a fast-growing human population and the extension of irrigation agriculture in the former Colorado Desert.

The elusive explanation of how virus transmission is maintained between encephalitis epidemics and during the winter led to research by the University of California, Los Angeles, Department of Public Health. Studies began in 1967 in the Imperial Valley to define the existence and year-round behavior of *Culex tarsalis* mosquitoes, carriers of the disease, and to determine the dynamics of any arboviruses being transmitted.

By 1973, it had been established that St. Louis encephalitis (SLE) virus appeared every year, and western equine encephalitis (WEE) virus occurred in most years in a water habitat bordering the Salton Sea. This same area supports winter transmission of California encephalitis viruses by *Culiseta inornata* mosquitoes. Turlock virus in *Cx. tarsalis* appeared intermittently, unrelated to season.

Intermittent appearance of viruses suggested that they were disseminated from a more central point. Intensive quantitative studies initiated in 1970 at Finney Ramer Refuge in the middle of the Imperial Valley revealed a location, which by 1976 was shown to produce SLE virus transmission by *Cx. tarsalis* every year by early June. Simultaneous studies of native cottontails and young steers at an adjacent feedlot eliminated these animals as a source of virus to mosquitoes. Appearance of WEE virus intermittently with substantial periods of absence indicated a different source and mechanism of dissemination, which is as yet undetermined. This difference was strengthened by serological epidemiology of a high-risk population of agricultural workers, through the Campesino Clinic in Brawley. Up to 12 percent of certain age and occupational groups had evidence of prior infection with SLE virus, while there was negligible evidence of WEE virus infection in any group tested. Actual occurrence of SLE cases since 1974 in persons exposed in the Imperial Valley supports the possibility of periodic transmission of the virus to man. (More detailed analysis is made in a doctoral dissertation by Martine Jozan, UCLA, 1977, demonstrating that life-long residents of the Imperial Valley have been infected with SLE.)

Quantitative studies initiated at Finney Lake in 1973 established that the dynamics of *Cx. tarsalis* vector mosquitoes was consistent and predictable during three subsequent years. *Culex tarsalis* was active every night of the year, with low maintenance populations during the cold months of December, January, February, and March. By April, trap-night yields rapidly increased until late June, when a mean maximum temperature of 110° F and decreased relative humidity below 20 percent resulted in a population crash. By this time, SLE virus infection rates were significant. A substantial mosquito population was maintained in July and August with persistence of SLE infection, followed by a secondary population increase with continued SLE