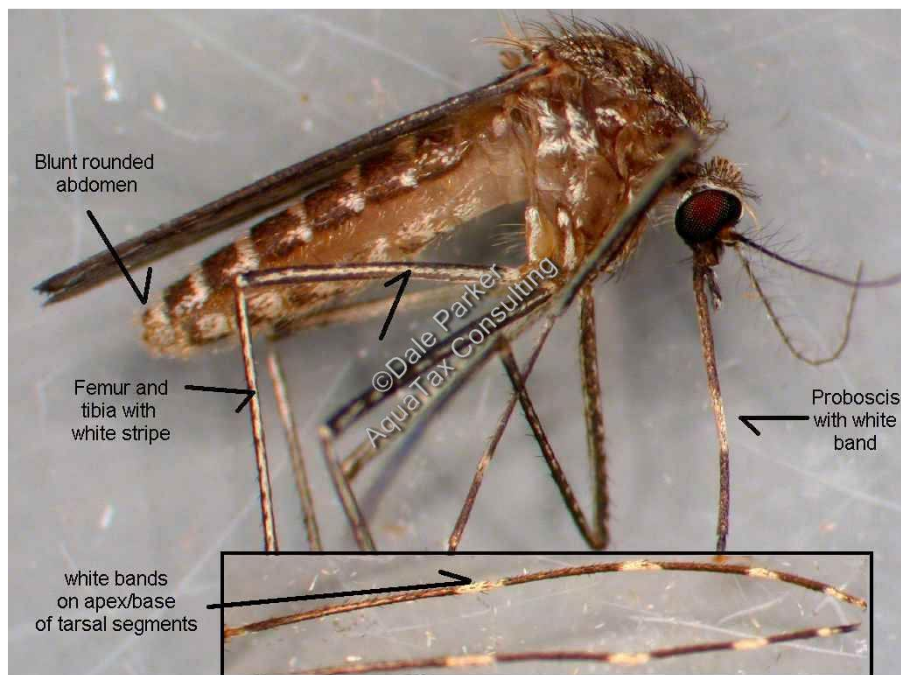




Culex (Culex) tarsalis Coquillett

western encephalitis mosquito

NZ Status: Not present



Vector and Pest Status

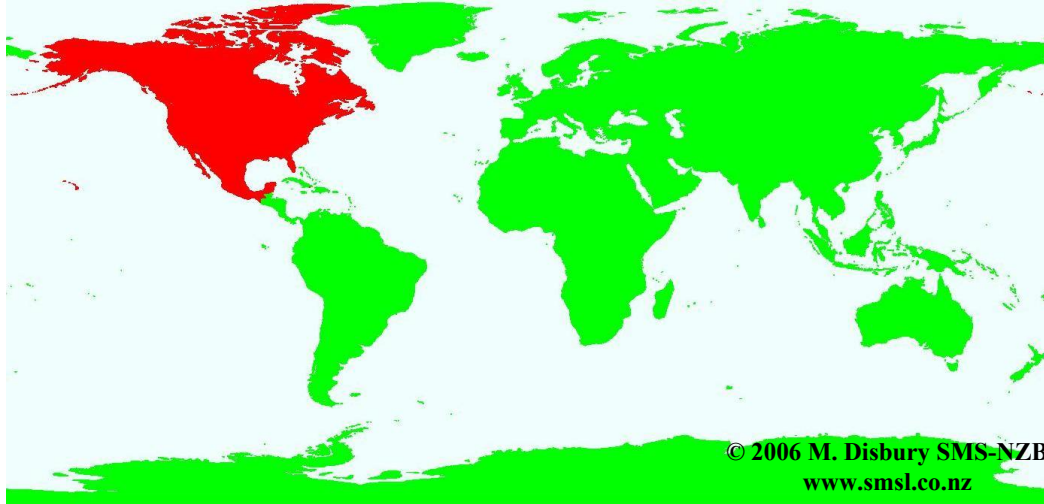
Culex tarsalis is a major vector of St. Louis encephalitis (SLE) and Western equine encephalitis (WEE) (Bohart and Washino, 1978). It is a vector of Californian encephalitis (CE) and the Llano Seco (LLSV), Turlock, Lokern (LOKV), Gray Lodge and Hart Park viruses in birds. It is also an efficient laboratory vector of West Nile virus (Turell *et al.*, 2002; Goddard *et al.*, 2003) and should be considered a potentially important vector of West Nile virus in the western United States (Turell *et al.*, 2002).

It is an experimental vector of Japanese encephalitis and Venezuelan equine encephalitis (Reisen, 1993).

Culex tarsalis is able to transmit Northway virus (*Bunyavirus*) in the laboratory (Kramer *et al.*, 1993) and was highly susceptible to *Brugia malayi* infection (causes Malayan filariasis) in the laboratory (Bangs *et al.*, 1995). This species also has the potential to transmit dog heartworm (*Dirofilaria immitis*) (Loftin *et al.*, 1995) and is a suitable host for *Plasmodium relictum* (avian malaria) (Work *et al.*, 1990).

Geographic Distribution

Culex tarsalis is found in western, central and southern United States and south western Canada and down to Mexico (Carpenter and LaCasse, 1995).



This map denotes only the country or general areas where this species has been recorded, not actual distribution.

Incursions and Interceptions

This species has not been intercepted in New Zealand. It has been identified in recent times as a species with association with imported goods or emerging disease.

Taxonomy

This species belongs to the subgenus *Culex*.

Habits and Habitat

Culex tarsalis ovipositing females choose newly created, nutrient rich waters to lay rafts of approximately 190 eggs on the surface of the water (Reisen, 1993). Larvae can be found in clear or foul water in a variety of habitats including freshwater marshes (Walton *et al.*, 1990), saline wetlands, ditches, irrigation systems, ground pools, pool in stream beds, rain barrels, hoof prints and ornamental ponds (www.mosquito-va.org). Larvae will tolerate a wide range of water conditions, however excessive organic pollution is not tolerated (Reisen, 1993).

This mosquito develops rapidly and produces multiple generations (Reisen, 1993). Egg to adult development ranges from 7 days to less than 4 weeks (Reisen, 1993). Some females exhibit autogeny, i.e. they mature their initial egg batch without a blood meal and oviposit 4-5 days after emergence, however the frequency of this trait is dependent upon temperature, photoperiod and nutrition (Reisen, 1993).

During the day, adults rest in sheltered places including tree cavities, animal burrows and artificial habitats like barns and chicken houses (www.ms mosquito.com). Adult females in colder climates overwinter as inseminated nulliparous, that require a blood meal to produce their initial eggs in the spring (Reisen, 1993).

Culex tarsalis are persistent biters attacking at dusk and after dark, both indoors and outdoors. Dispersal is primarily during host-seeking flights (~10km) which average about 90 metres a day from breeding sites habitats (Reisen, 1993). In America, during spring, when population abundance is low, most females feed on birds shortly after

sunset (Reisen, 1993). During later summer when abundance is high, bird mosquito-avoidance behaviour diverts many females to feed on mammals including rabbits, horses, cattle and humans (Reisen, 1993). This host shift may be important in virus transmission to horses and humans (Reisen, 1993).

A host-seeking study in California indicated that the most frequent bloodmeal hosts of *Cx. tarsalis* were passeriform birds (64%) and rabbits (25%) (Lothrop and Reisen, 2001). In New Mexico, a host preference study found that *Cx. tarsalis* showed a slight preference for chickens and dogs over cattle and horses (Loftin *et al.*, 1997).

In a host-feeding study in California, it was demonstrated that *Cx. tarsalis* had a relatively balanced mammalian-avian feeding ration. The degree to which mammals or birds were fed on by this mosquito for the most part, depended upon host availability. This species has been recorded to feed from rabbits, cattle, horses, dogs, chickens, pheasants, quails and a number of other birds species (Tempelis and Washino, 1967).

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