



NEW ZEALAND BIOSECURE
Entomology Laboratory



Culex (Culex) sitiens Wiedemann

saltmarsh *Culex*

NZ Status: Not present – Unwanted Organism



© 1999 Richard C. Russell

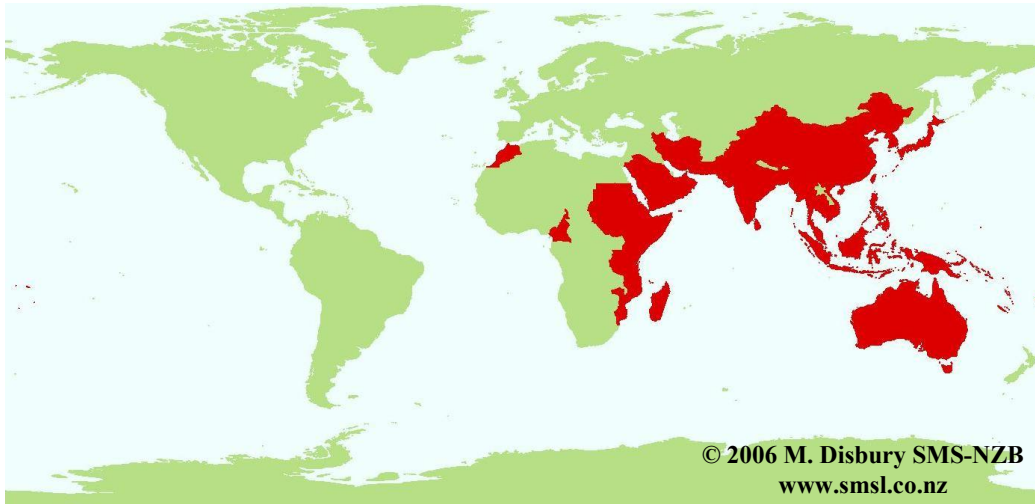
Vector and Pest Status

Culex sitiens is a serious pest in some coastal areas of Australia (NSW, Qld, NT) (Russell, 1993). It is a competent vector of Ross River virus (Mottram *et al.*, 1987), Kunjin and Japanese encephalitis in the laboratory (Kay *et al.*, 1972; Sirivanakarn, 1976). Kunjin has been isolated from members of the *Culex sitiens* subgroup on the western Cape York Peninsula (Johansen *et al.*, 2003). Ross River virus has been isolated from wild caught specimens (Ritchie *et al.*, 1997), but as yet, there is no evidence of any role in the natural cycle of JE (Sirivanakarn, 1976). This species is also involved in the transmission of filariasis (*Brugia malayi*), although only in a secondary role (Ragaeu, 1962; Lee *et al.*, 1989).

Geographic Distribution

Culex sitiens is widespread throughout coastal areas of Southeast Asia and other adjacent tropical areas in the Oriental region, with extensions north and northeast as far as southern China and the Ryukyus Islands (Sirivanakarn, 1976). It is also present within the Ethiopian region, the Middle East (Arabia and Iran), Micronesia, South Pacific, New Guinea and northern Australia (Sirivanakarn, 1976). In the South

Pacific, it is found on the Solomon Islands, Nauru, Vanuatu (New Hebrides), New Caledonia, Tuvalu (Ellice Islands), Fiji, Wallis and Futuna Islands, Samoa, Tonga and Niue (Sirivanakarn, 1976).



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

The potential distribution of *Cx. sitiens* in New Zealand is throughout the North Island and as far south as Christchurch.

Incursions and Interceptions

Culex sitiens has been intercepted on four occasions in New Zealand. Two of these occurred in Auckland on aircraft, the first from New Caledonia in 1943-1944, and second from Fiji/Norfolk Islands in 1950 (Derraik, 2004). This species was also intercepted on an aircraft from Australia during 1979-1982 (Derraik, 2004). Most recently, 4th instar larvae were intercepted at the Ports of Auckland on the 9th March 2003. The larvae were found inside two loose tyres on the back of a truck (rock crushing equipment) which was unloaded from a ship in Auckland. The equipment was loaded on to a ship in American Samoa.

Taxonomy

Culex sitiens belongs to the subgenus *Culex*. Adults are similar and may sometimes be confused with *Cx. annulirostris* (Russell, 1993).

Habits and Habitat

Culex sitiens is a coastal species which breeds in brackish water (Sirivanakarn, 1976). This species is common in areas in the vicinity of beaches, harbours or piers in populated areas (Sirivanakarn, 1976). It commonly breeds in pools, puddles, ponds, wells, ditches, crab holes and rock pools in salt marsh, mangrove and nipa palm swamps, as well as canoes, boats, cement tanks, jars and cans (Sirivanakarn, 1976). It has also been found breeding occasionally in fresh water (Liehne, 1991; Russell, 1993).

The development cycle of *Culex sitiens* was recorded to take a total of 16 days at 24°C, with eggs hatching two days after being laid on the water surface (Lever, 1943).

Adult females are nocturnal biters and will readily feed on humans as well as other mammals and birds (Liehne, 1991). It has been recorded biting humans, chickens, horses, sheep, fowl, pigs, cattle (Sirivanakarn, 1976) and dogs (Travis, 1947; Bemrick and Moorhouse, 1968). They feed indoors and outdoors and rest outside during the

day (Bonne-Wepster, 1954a; 1954b; Russell, 1993). This species has been found to travel up to 35 km from breeding areas (Liehne, 1991) and have been found 55km inland, south of Darwin (Hill, 1917).

References

- Bemrick, W.J. and Moorhouse, D.E. 1968. Potential vectors of *Dirofilaria immitis* in the Brisbane area of Queensland, Australia. *Journal of Medical Entomology* 5: 269-272.
- Bonne-Wepster, J. 1954a. Synopsis of a hundred common non-anopheline mosquitoes of the Greater and Lesser Sundas, the Moluccas and New Guinea. *Documenta de medicina geographica et tropica* 6: 1-29; Part II, 162-190; Part III, 208-246; Part IV, 347-394.
- Bonne-Wepster, J. 1954b. Synopsis of a hundred common non-anopheline mosquitoes of the Greater and Lesser Sundas, the Moluccas and New Guinea. *Special Publications R. Tropical Inst. Amsterdam*, III (apparently issued as CVI but emended in some copies at least to CXI); 1-147.
- Derraik, J.G.B. 2004. Exotic mosquitoes in New Zealand: a review of species intercepted, their pathways and ports of entry. *Australian and New Zealand Journal of Public Health* 28(5): 433-444.
- Hill, G.F. 1917. Report on some Culicidae of the Northern Territory. *Bulletin of the Northern Territory of Australia* 17: 1-8.
- Johansen, C.A., Nisbet, D.J., Zborowski, P., van den Hurk, A.F., Ritchie, S. and Mackenzie, J.S. 2003. Flavivirus isolations from mosquitoes collected from western Cape York Peninsula, Australia, 1999-2000. *Journal of the American Mosquito Control Association* 19(4) 392-396.
- Kay, B.H., Carley, J.G., Barrow, G.J., Walker, P.J. and Fanning, I.D. Entomology. Experimental inoculation of arthropods. *Annual Report of the Queensland Institute of Medical Research* 27:8-9.
- Lee, D.J., Hicks, M.M., Debenham, M.L., Griffiths, M Bryan, J.H. and Russell, R.C. 1989. *The Culicidae of the Australasian Region*. Volume 3. Entomology Monograph No 2. Canberra, Australian Government Publishing Service. 281pp.
- Lever, R.J.A.W. 1943. Entomological notes. 1. Some common mosquitoes of the Suva area. *Agric. Journal Department Agric. Fiji*. 14(4): 101-102.
- Liehne, P.F.S. 1991. *An atlas of the mosquitoes of Western Australia*. Western Australia Department of Health.
- Mottram, P., Fanning, I.D., Kay, B.H. Dale, P.E.R., Hulsman, K. and Morton, R. 1987. Saltmarsh mosquito control. *Annual Report of Queensland Institute of Medical Research* 42; 62-63.
- Ragaeu, J. 1968. Internet medical des moustiques en Oceanie Francaise. *Verh XI Int. Kongr. Ent.* (Wein, 1960), 2: 378-383.
- Ritchie, S. A., I. D. Fanning, D. A. Phillips, H. A. Standfast, D. McGinn and Kay, B.H. 1997. Ross River virus in mosquitoes during the 1994 epidemic around Brisbane, Australia. *Journal of Medical Entomology* 34: 156-159.
- Russell, R.C. 1993. *Mosquitoes and mosquito-borne disease in Southeastern Australia*. University of Sydney, Sydney. 309pp.
- Sirivanakarn, S. 1976. A revision of the subgenus *Culex* in the Oriental region (Diptera: Culicidae). *Contributions of the American Entomological Institute* 12(2): 1-272.
- Travis, B.V. 1947. Relative efficiency of six species of mosquitoes from Guam, M.I., as developmental hosts of *Dirofilaria immitis*. *Journal of Parasitology* 33: 142-145.