



NEW ZEALAND BIOSECURE
Entomology Laboratory



Aedes (Finlaya) notoscriptus (Skuse)

striped, or ankle biting mosquito

NZ status: Introduced



Vector and Pest Status

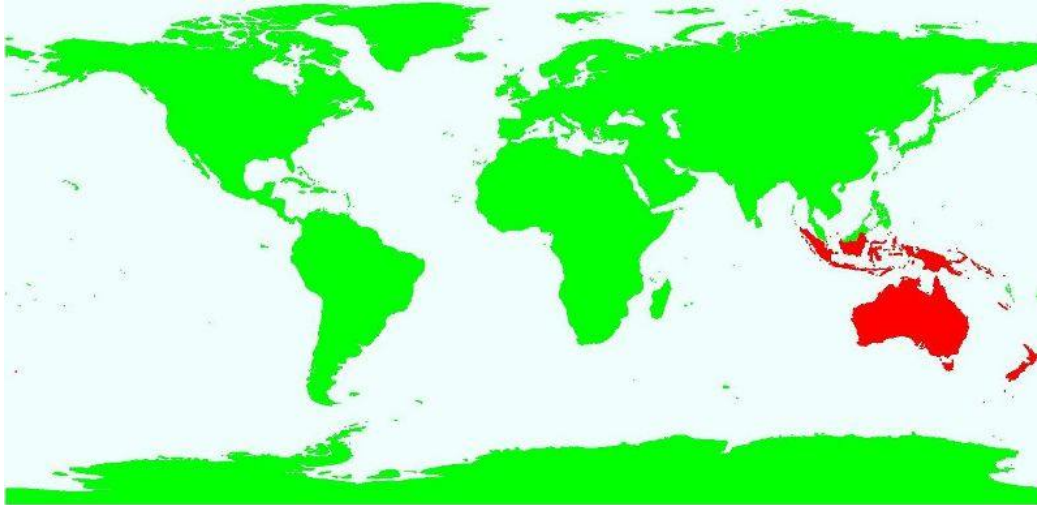
Aedes notoscriptus is the major vector of dog heartworm (*Dirofilaria immitis*) in Australia (Russell, 1997), a filaroid which is not present in New Zealand. *Ae. notoscriptus* is also a known vector of Ross River Virus, Barmah Forest virus (Kay *et al.*, 2007) and Murray Valley encephalitis, although there is no record of the latter occurring in the field (Liehne, 1991). Studies have also shown that vector competence can be highly variable. While some populations of *Ae. notoscriptus* are viable vectors other pools have not been proven competent. (Watson and Kay, 1998 & 1999).

Ae. notoscriptus also vectors dengue but is not considered to be an important vector as infection levels in this species are very low (Watson and Kay, 1999).

Geographic Distribution

Aedes notoscriptus is an introduced species which was first found in New Zealand in the 1920s. This species is believed to have entered New Zealand through shipping and was originally found most around ports (Belkin, 1968). Currently, this species is widespread throughout the North Island, and in the South Island it is found as far south as Lyttleton (Weinstein, 1997, Holder, 1999, Reinert, 2004).

Aedes notoscriptus also occurs throughout the South Pacific (Lee *et al.*, 1982), in New Guinea, New Caledonia, Indonesia and the Solomon Islands (Bullians & Cowley, 2001; Liehne, 1991), and in Australia including the Torres Strait Islands (Russell, 1997).



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

Incursions and Interceptions

Aedes notoscriptus has been intercepted at New Zealand borders at least 11 times since 2001, however not all these interceptions are believed to be specimens of exotic origin, but local specimens occurring in high risk areas e.g. ports. Two are considered to be most likely interceptions from Australia, and several others very likely to be of exotic origin.

Although this species is now well established in New Zealand, it seems likely that repeated exotic introductions will continue to occur, increasing the chance of disease agents such as dog heartworm being introduced with them.

Taxonomy

Aedes notoscriptus belongs in the subgenus *Finlaya*. It was moved to the proposed genus *Ochlerotatus* by Reinert (2001), but general uncertainty around the proposed changes has seen this species replaced back in the genus *Aedes* subgenus *Finlaya*, awaiting further evidence.

Adult females can be distinguished from other species in New Zealand by their characteristic lyre shaped scutal pattern, bright white stripes on very dark legs and banded proboscis.

The banding on the proboscis differentiates *Aedes notoscriptus* from exotic mosquito species with similar scutal patterns such as *Aedes aegypti* (Russell, 1993).

Habits and Habitat

Aedes notoscriptus is a fresh water container breeder that prefers vegetated containers in well shaded sites (Belkin, 1968). It can be found in natural containers e.g. tree holes or rock pools but it has adapted to breeding in man made containers including plant pot saucers, old jars and blocked roof gutters. In New Zealand this species breeds frequently around domestic environments, where it most commonly comes into contact with man (Montgomery *et al.*, 2002; Derraik, 2004). This increase into man-made habitats has also made this species more widespread. It is able to colonise the natural environment in these newly occupied areas, where natural containers are often underutilised by native species (Laird, 1996).

Overwintering occurs in the larval stage, but this is only characteristic of the species in cooler climates, including New Zealand. Development is ongoing throughout the year in more temperate environments with peaks in numbers during warmer months (Liehne, 1991; New Zealand BioSecure, unpub. data).

Eggs are laid at the water level around the edges of containers. They are laid individually and are desiccation resistant (Liehne, 1991).

Aedes notoscriptus females will readily feed at night and in shaded areas during the day, but the preferred biting time is in the evening and early morning - crepuscular activity (Foot, 1970). *Aedes notoscriptus* can be a serious pest as it is an avid biter of both humans and animals, including stock and poultry (Laird, 1996). Adults have been recorded travelling up to 238m from release sites (Watson *et al.*, 2000).

References

- Belkin, J.N. 1968. Mosquito studies (Diptera, Culicidae). VII. The Culicidae of New Zealand. *Contributions of the American Entomological Institute* 3(1): 1-28
- Bullians, M. and Cowley, D.R. 2001. Blood feeding by *Aedes notoscriptus* (Skuse) (Diptera: Culicidae) on the brush-tailed possum, *Trichosurus vulpecula* (Kerr). *New Zealand Entomologist* 24: 87-88
- Derraik, J.G.B. 2004. Mosquitoes (Diptera: Culicidae) breeding in artificial habitats at the Wellington Zoo. *The Weta* 28: 28-31.
- Holder, P, Browne, G. and Bullians, M.1999. The mosquitoes of New Zealand and their animal disease significance. *Surveillance* 26(4): 12-15
- Foot, M.A. 1970. Ecological studies on *Aedes notoscriptus* (Diptera: Culicidae). *New Zealand Entomologist* 4(4): 20-30.
- Kay, B.H, Boyd, A.M, Ryan, P.A. and Hall, R.A. 2007. *Mosquito feeding patterns and natural infection of vertebrates with Ross River and Barmah Forest viruses in Brisbane, Australia. American Journal of Tropical Medicine and Hygiene* 76(3): 417-23.
- Laird, M. 1996. New Zealand's Mosquito Fauna in 1995: History and Status. Auckland, University of Auckland.
- Liehne, P.F.S. 1991. An atlas of the mosquitoes of Western Australia. Perth. Western Australia Department of Health.
- Lee, D. J., Hicks, M.M., Debenham, M.L., Griffiths, M., Marks, E.N., Bryan, J.H. and Russell, R.C.1989. The Culicidae of the Australasian region. Volume 7. Canberra, Australian Government Publishing Service.
- Montgomery, B.L. and Ritchie, S.A. 2002. Roof gutters: a key container for *Aedes aegypti* and *Ochlerotatus notoscriptus* (Diptera:Culicidae) in Australia. *American Journal of Tropical Medicine and Hygiene* 67(3): 244-6.

- Reinert, J.F. 2001. Revised List of abbreviations for Genera and Subgenera of Culicidae (Diptera) and notes on Generic and Subgeneric changes. *Journal of the American Mosquito Control Association*: 17, (1): 51–55.
- Reinert, J.F., Harbach, R.E. and Kitching, I..J. 2004. Phylogeny and classification of Aedini (Diptera: Culicidae), based on morphological characters of all life stages. *Zoological Journal of the Linnean Society* 142: 289-368.
- Russell, R.C. 1993. Mosquitoes and mosquito-borne disease in southeastern Australia: A guide to the biology, relation to disease, surveillance, control and the identification of mosquitoes in southeastern Australia. Sydney. University of Sydney.
- Russell, R.C. and Geary, M.J. 1997. Which mosquitoes are the 'best' vectors of dog heartworm in southeastern Australia? *Arbovirus Research in Australia* 7. 243-246.
- Watson, T.M. and Kay, B.H.. 1998. vector competence of *Aedes notoscriptus* (Diptera: Culicidae) for Ross River Virus in Queensland, Australia. *Journal of Medical Entomology* 35(2): 104-106.
- Watson, T.M. and Kay, B.H. 1999. Vector competence of *Aedes notoscriptus* (Diptera: Culicidae) for Barmah Forest virus and of this species and *Aedes aegypti* (Diptera: Culicidae) for dengue 1-4 viruses in Queensland, Australia. *Journal of Medical Entomology* 36 (4): 508-14.
- Watson, T.M, Saul, A. and Kay, B.H. 2000. *Aedes notoscriptus* (Diptera: Culicidae) survival and dispersal estimated by mark-release-recapture in Brisbane, Queensland, Australia. *Journal of Medical Entomology* 37(3): 380-4.
- Weinstein, P., Laird, M. and Browne, G. 1997. Exotic and endemic mosquitoes in New Zealand as potential arbovirus vectors. Wellington, Ministry of Health.