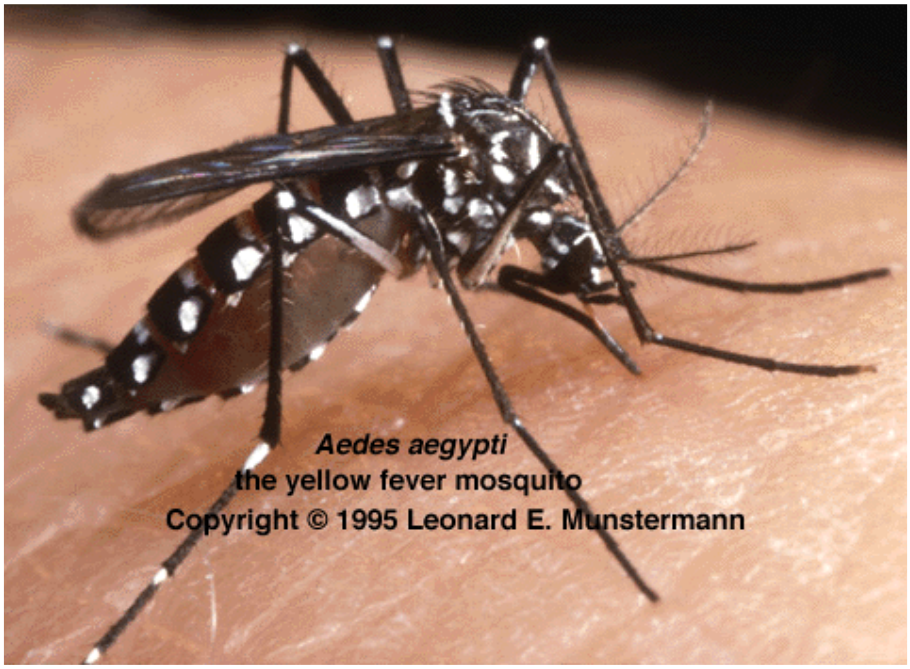
Aedes (*Stegomyia*) *aegypti* (*Linnaeus*)

yellow-fever mosquito

NZ Status: Not present – Unwanted Organism



Vector and Pest Status

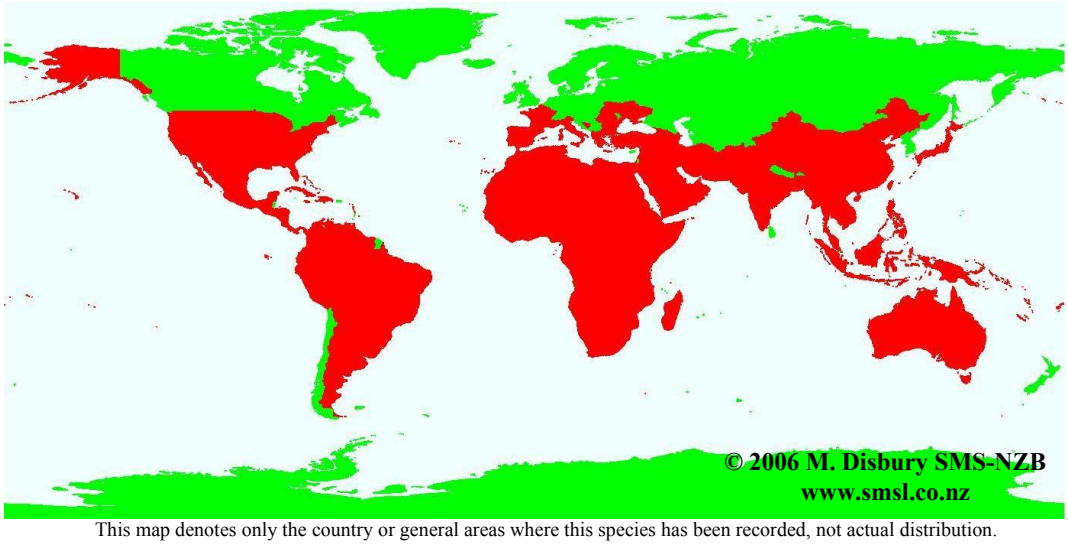
Aedes aegypti is the primary vector of dengue fever and yellow fever (Black *et al*., 2002). In Asia, Chikungunya virus is thought to be transmitted by *Ae. aegypti* (Sam and Abu Bakar, 2006).

Laboratory studies have shown this species can transmit both Murray Valley encephalitis and Ross River virus efficiently and is considered a potential vector of these arboviruses (Lee *et al*., 1987). Studies have shown this species is a poor laboratory vector of dog heartworm (*Dirofilaria immitis*) (Serrao *et al*., 2001) and it can also transmit Chandipura virus (Rhabdoviridae) (Mavale *et al*., 2005).

Aedes aegypti has been recorded with filarial infections of *Wuchereria bancrofti* and *Dirofilaria immitis* (Russell *et al*., 2005). It is also susceptible to infection and can transmit the avian parasite *Plasmodium gallinaceum* (Alavi *et al*., 2003). This species is also capable of mechanical transmission of lumpy skin disease virus (LSDV) from infected to susceptible cattle (Chihota *et al*., 2001).

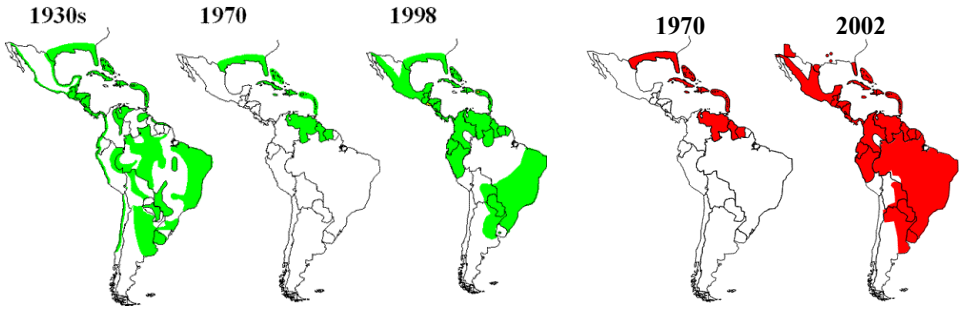
Geographic Distribution

Aedes aegypti is predominantly a coastal species on large continents, sometimes confined to ports, however, in Australia, United States and Brazil this species has spread inland (Lee *et al*., 1987). *Aedes aegypti* is widespread throughout the world, including Africa, Argentina, Australia, Brazil, Caribbean Islands, China, Cook Islands, Fiji, India, Hawaii, Japan, Malaysia, Morocco, New Caledonia, Papua New Guinea, Peru, Philippines, Portugal, Samoa, Seychelles, Surinam, Taiwan, Thailand, Vanuatu and the U.S.A (www.wrbu.org).



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

The distribution of *Ae. aegypti* changed over the years as a result of an eradication programme. In the Americas, because of the threat of outbreaks of urban yellow fever, a hemisphere widespread eradication campaign was started in 1947. Almost all of the countries of the hemisphere were able to eradicate *Ae. aegypti* except Venezuela and the USA, and these countries remained a source of reinfestation. Because of funding, technical and administrative problems, most countries were unable to sustain a high level of surveillance once the species had been eradicated from their territory. Reinfestations often escaped attention for some time and when discovered were frequently already widespread; as time went on, funding and national will were less and less available to attempt it again. By 1993 virtually every country in Latin America had become reinfested (Gratz, 1993).



Distribution of *Aedes aegypti* in the Americas. NB. 1970 was at the end of the mosquito eradication program (www.cdc.gov).

Incursions and Interceptions

Aedes aegypti larvae and adults has been intercepted in New Zealand on a number of occasions. More recent interceptions have included larvae collected at the Ports of

Auckland in 2004 from a concrete mixer truck ex Wallis and Futuna Islands, and again at the Ports of Auckland in 2005, in a canoe on a trailer imported from Rarotonga.

On the 30th July 2005, an adult *Ae. aegypti* was collected after it flew into a vehicle at the Ports of Auckland, and subsequently, *Ae. aegypti* and *Ae. albopictus* was discovered breeding in a hatch cover on the wharf.

The most recent interception involved larvae intercepted at the Ports of Auckland on the 14/1/2007 in hatch covers on a ship from Rarotonga.

Taxonomy

Aedes aegypti belongs to the *Scutellaris* group of subgenus *Stegomyia*. At least three morphologically distinguishable biotypes of this species are known (Christophers, 1960; Lee *et al*., 1987). *Aedes aegypti* is a small, dark mosquito with conspicuous white markings and banded legs, a black proboscis and white scaling on the tips of the palps. Adults and larvae may be confused with *Ae. notoscriptus* and *Ae. mallochi* (Russell, 1993).

Habits and Habitats

Aedes aegypti is a domestic container breeding species. It commonly breeds in artificial containers including water drums (Chadee and Rahaman, 2000), roof guttering (Montgomery and Ritchie, 2002), rain water tanks, pot plant saucers, tanks, tins, vases, tyres, subterranean waters and refuse filled by rain (Lee *et al*., 1987). This species will also breed in natural containers such tree holes and leaf axils of bromeliads (Lee *et al*., 1987; Forattini and Marques, 2000).

Aedes aegypti prefers to breed in rainwater with some organic matter, but this species can tolerate brackish and even chlorinated water (Lee *et al*., 1987). Eggs are laid on the inside of containers just above the water line (Lee *et al*., 1987) and are desiccation resistant (Cooling, 1924) for up to 1 year (Womack, 1993). Development time for each of the juvenile stages has been recorded for *Ae. aegypti* in Fiji during the months of September and October (mean temperatures of 23.6°C and 24.4°C respectively); eggs - 2 days, larvae - 11 days, pupae – 2 days, a total development period of 15 days (Lever, 1943 in Lee *et al.,* 1987).

In America, *Ae. aegypti* is active during the summer in northern states and active all year in the southern states (Womack, 1993). It does not overwinter in the egg stage in colder climates, but more southern populations remain reproductively active during winter and are periodically inactive during cold periods (Womack, 1993). Larvae have been recorded to die below 10°C, while adults do not survive well at temperatures below 5°C and are killed by temperatures below freezing (Womack, 1993).

Adults prefer urban and domestic breeding sites and are commonly found indoors (Lee *et al*., 1987). They tend to bite indoors (Lee *et al*., 1987), or in sheltered areas near housing. This species commonly bites during the day (Lee *et al*., 1987) and is especially active in the morning between 6-7am and late afternoon 5-6pm (Gillett *et al*., 1969). *Aedes aegypti* primarily bites humans, however it will feed on a wide range of species including birds and mammals (Lee *et al*., 1987).

There are varying reports on the natural dispersal of *Aedes aegypti*. In field trials, Harrington *et al*. (2001) found the greatest distance *Ae. aegypti* flew was 79m, however Muir and Kay (1998) showed the mean distance travelled by recaptured females and males was 56m and 35m respectively. Results of a study of dispersal within and

between rural communities demonstrated that *Ae. aegypti* generally disperses relatively short distances, although there were a few mosquitoes moving a maximum of 512m from one village to the next (Harrington *et al*., 2005). In a study in Brazil, rubidium (rb) blood fed females of *Ae. aegypti* were released to track their dispersal (Honorio *et al.*, 2003). Rb-marked eggs were detected up to 800m from the release point, suggesting that females can fly at least 800m within 6 days (Honorio *et al.*, 2003).

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