



# Exotic mosquito species established in New Zealand

This factsheet presents the exotic mosquito species established in New Zealand and their geographic distribution.

## Key facts



The *Culex sitiens*, first discovered in Kaipara Harbour in 2018, was eradicated in 2020



As of 2020, there are three long-established exotic mosquito species in New Zealand



The Southern Saltmarsh mosquito (*Aedes camptorhynchus*), first discovered in New Zealand in 1998, was eradicated in 2010

## Exotic mosquitoes can be bad for our health

Exotic mosquitoes can spread mosquito-borne diseases between humans (e.g. dengue fever, malaria) by biting infected people and then biting other susceptible individuals. These diseases are a major cause of illness and death overseas. International travel and climate change enable exotic mosquitoes to inhabit new territories. Mosquito-borne diseases are spreading globally, including to the Pacific, where the warm, wet and humid climate is favourable for exotic mosquitoes. The introduction of high-risk exotic mosquitoes to New Zealand's environment would increase the risk of mosquito-borne disease outbreaks occurring here. New Zealand's native mosquitoes tend to bite birds and are considered less likely to spread serious diseases to humans. Different types of exotic mosquitoes have varied abilities to spread different diseases. Monitoring the types and distribution of exotic mosquitoes which have been introduced to New Zealand is, therefore, important.

## No new exotic mosquito species were introduced to New Zealand in 2020

No new exotic mosquito species were introduced in 2020. There are currently three long-established exotic species present in New Zealand. The eradication of the Southern saltmarsh mosquito (*Aedes camptorhynchus*) in 2010 has been the most important change to New Zealand's mosquito profile in recent years (Table 1). New Zealand has an ongoing saltmarsh mosquito surveillance programme as a result of the Southern Saltmarsh Mosquito (*Aedes camptorhynchus*) mosquito's previous establishment.

While remaining exotic introduced species in New Zealand have the potential to carry mosquito-borne diseases (e.g. *Culex quinquefasciatus* can spread diseases such as Japanese encephalitis), the absence of locally-acquired mosquito-borne disease outbreaks in New Zealand suggests that they are not high-risk vectors of these diseases at present (Kramer et al 2011).

**Table 1: New Zealand's history of exotic mosquito introductions**

Exotic mosquito species known to have established in New Zealand	Time period		New Zealand distribution
<i>Aedes australis</i>	1961 - present		Southern South Island
<i>Aedes notoscriptus</i>	1916 - present		North Island and South Island from Lyttelton north
<i>Culex quinquefasciatus</i>	1830 - present		North Island and northern South Island
Southern saltmarsh mosquito ( <i>Aedes camptorhynchus</i> )	1998 - 2010	Eradicated	

Source: NZ BioSecure 2020

## Recent developments

In 2018, the Ministry for Primary Industries (MPI) first reported finding Saltmarsh Culex (*Culex sitiens*) larvae in the Kawau Parua Inlet, Kaipara Harbour (Auckland Region) through the National Saltmarsh Mosquito Surveillance Programme. In 2020, MPI announced the eradication of the *Culex sitiens* from New Zealand, two years after larvae were initially detected. The eradication was the result of a successful ground surveillance and aerial spraying programme. *Culex sitiens* is a vector of Ross River virus and possibly Japanese encephalitis (MPI 2020).

## Climate change will make New Zealand more vulnerable to mosquito-borne diseases

Climate change is likely to make New Zealand's environment increasingly favourable for the survival and spread of mosquito species and mosquito-borne diseases (Tompkins et al 2012). Environmental factors which determine how well mosquito-borne diseases spread include (Weinstein et al 1997; Kramer et al 2011):



### **Disease characteristics**

Some disease agents (viruses, bacteria, parasites) are faster at incubating within mosquitoes, and are therefore more readily spread. A warmer New Zealand climate could also increase the ability of mosquitoes already established in New Zealand to spread diseases, by shortening incubation times.



### **Human population density**

How closely people live together, and the extent of mosquito prevention measures nearby (e.g. insecticide sprays, mosquito nets).



### **Climate and geography**

Climate factors such as temperature, rainfall, humidity, vegetation and water can determine whether mosquitoes survive long enough to reproduce, bite an infected human and/or incubate the disease before biting someone else.



### **The presence of particular mosquito species**

Specific high-risk species are efficient at spreading different diseases.

Mapping the distribution of New Zealand's changing environment (e.g. climate and population distribution) for suitability for mosquito establishment and mosquito-borne disease transmission, is complex.

Different combinations of environmental factors have variable effects on different mosquito species and different disease agents. Data modelling is also necessary to address data uncertainties. A few New Zealand projects have modelled the potential distribution of specific mosquito-borne diseases under different environmental conditions (De Wet et al 2005; Tompkins et al 2012). In general, the Auckland and Northland regions in the North Island have the greatest outbreak potential.

## Data for this indicator

For additional information, see the metadata link below.

## References

De Wet N, Slaney D, Ye W, Warrick R, Hales S. 2005. *Hotspots: Modelling capacity for vector-borne disease risk analysis in New Zealand*. Waikato: International Global Change Institute, and Wellington: Ecology and Health Research Centre.

Kramer LD, Chin P, Cane RP, Kauffman EB, Mackereth G. 2011. Vector Competence of New Zealand Mosquitoes for Selected Arboviruses. *Am J Trop Med Hyg* 85(1): 182 – 9.

MPI (Ministry for Primary Industries). 2020. Alerts: Culex sitiens. URL: <https://www.mpi.govt.nz/news/media-releases/eradication-of-the-mosquito-culex-sitiens-from-new-zealand/> (accessed February 2021).

New Zealand BioSecure Entomology Laboratory (NZ BioSecure). 2020. *New Zealand Mosquitoes*. Southern Monitoring Services Limited. URL: [www.smsl.co.nz](http://www.smsl.co.nz) (accessed February 2021).

Tompkins D, Brock A, Jones G, et al. 2012. *Modelling the Impacts of Climate Change on Infectious Diseases in New Zealand*. Porirua: Institute of Environmental Science and Research Limited.

Weinstein P, Laird M, Browne G. 1997. *Exotic and endemic mosquitoes in New Zealand as potential arbovirus vectors*. Wellington: Ministry of Health

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