

## **Questions and Answers about the southern saltmarsh mosquito**

### **Why eradicate?**

Thankfully there has never been an outbreak of the mosquito-borne disease Ross River Virus in New Zealand. To reduce the risk of such an outbreak, southern saltmarsh mosquito eradication activity was started when the mosquito was first discovered in Napier 1998.

### **What do I do if I think I have found it?**

While eradication from New Zealand has been confirmed, if you think you've seen southern salt marsh mosquito (as the name suggests, salt marshes are its preferred habitat), please take note of its location and immediately phone: 0800 80 99 66 to report the possible finding.

### **What was the cost of eradicating the southern saltmarsh mosquito?**

Approximately \$70 million over the past eleven years. The Government provided this funding based on a health impact assessment undertaken by University of Otago scientists (Dr Mark Hearnden) in February 1999, and subsequently revised by Ministry of Health officials; and on cost benefit analyses carried out by the New Zealand Institute of Economic Research, that indicated eradication would result in net benefits.

### **What was the predicted health impact from this mosquito?**

There is significant saltmarsh habitat close to many major New Zealand population centres - for example Auckland, Wellington, Christchurch, Napier, Tauranga, and Invercargill. The Southern Saltmarsh Mosquito Technical Advisory Group advised that if it was not eradicated, its eventual spread to all available New Zealand habitat, and the eventual introduction of Ross River virus into the New Zealand environment, was inevitable.

The resident population of New Zealand is over 4 million people and so, at an estimated cost of \$2,800 per case (based on Australian figures for treating cases and on an estimate of 1,000 cases per 100,000 people), this translated to an estimated direct health cost of around \$120 million for the first epidemic.

These costs do not include costs required to control mosquito populations, the economic injury to the tourism image, lost productivity, and the impacts on lifestyle. The impacts on indigenous species such as ground-nesting birds, from an aggressive, biting mosquito are not known.

### **What is Ross River Virus Disease?**

In humans, Ross River virus infection causes a variety of syndromes. The most common syndrome ("epidemic polyarthritis") involves aching and inflamed muscles and joints, headaches and rashes, with acute onset and symptoms persisting for weeks or months, or in rare cases, years. The southern saltmarsh mosquito may also be a vector of some animal diseases and may disrupt egg incubation and chick rearing of wading birds. It has also been implicated in transmitting Barmah Forest disease to humans.

## **Where and when was the mosquito discovered in New Zealand?**

Following the initial incursion at Napier in December 1998, incursions were detected over the next few years at:

- Mahia (2000)
- Tairāwhiti (2000)
- Porangahau (2000)
- Mangawhai (2002)
- Whitford (2002)
- Kaipara (north) (2002)
- Kaipara (south) (2002)
- Whangaparaoa (2004)
- Wairau/Grassmere (2005)
- Coromandel (2006)

## **What was involved in the eradication programme?**

The eradication programme involved a number of components at each site:

- intensive surveillance to find out where the mosquito was and where it might spread to;
- treatment: regular aerial and ground-based application of mosquito control chemicals (S-methoprene and *Bacillus thuringiensis israelensis*) to infested habitat;
- habitat management: removing weeds and thick vegetation to allow the treatment agents to reach the water where the mosquitoes were breeding, clearing ditches to improve drainage, repeatedly flooding habitat to encourage eggs to hatch
- surveillance: looking for mosquito larvae and adults to check whether treatment was working and to make sure all potential habitat had been identified and that the mosquito was not spreading;
- communications: making sure local authority staff, landowners, residents, recreational visitors, and other interested people knew what was going on.

The treatment phase of an eradication programme was completed when there had been:

- treatment with S-methoprene over two summers; and
- no adults for at least nine months; and
- three inundations of potential habitat with water (thus allowing for hatching of any remaining eggs); and
- no southern saltmarsh mosquito larvae detected.

## **How can you be confident an area is totally free of the southern saltmarsh mosquito?**

Eradication is determined when:

- adult and larval numbers decrease to zero as a result of repeated treatments with control agents; and
- a minimum of three water events (rain and/or very high tides to raise the level of water in the salt marshes) has occurred to hatch eggs; and
- no larvae or adults are found for at least two years.

## **What's a saltmarsh?**

It's the inter-tidal waterway where salty sea water mixes with fresh water, and is commonly found in estuaries, sounds, drains and coastal areas where rivers meet the sea. The water in these waterways is sometimes referred to as 'brackish'. It is the preferred habitat for the saltmarsh mosquito if it does not have normal daily tidal flows.

### **What is the life-cycle of the southern saltmarsh mosquito?**

The mosquito lives in areas where salty water is available such as coastal saltmarsh, saltwater lagoons, and reclaimed land near estuaries. The mosquito lays its eggs on soil or vegetation in these habitats. Eggs hatch when occasional floods or king tides cover them in water. Areas that have normal tidal flows are not habitat for these mosquitoes.

### **What is involved with the ongoing surveillance programme? Where is monitoring taking place?**

Routine surveillance of high-risk mosquito habitats provides our best opportunity for intercepting incoming mosquitoes and for detecting new populations of mosquitoes early enough to prevent their permanent establishment in New Zealand. The Ministry of Health developed a national saltmarsh mosquito surveillance programme that covers all saltmarsh mosquito species not just the southern saltmarsh mosquito. It surveys all potential saltmarsh habitat and so maximises opportunities for early intervention to prevent establishment of saltmarsh mosquito species.

The national saltmarsh mosquito surveillance programme, now managed by MAF Biosecurity New Zealand provides a national overview. Monitoring occurs at optimum times to detect saltmarsh mosquito larvae or adults present in saltmarsh habitat. A risk assessment of potential habitat for saltmarsh mosquito establishment reviews risk factors such as habitat quality, any sites previously positive for southern saltmarsh mosquitoes, proximity to ports, and human population density.