

Brushtail possums (*Trichosurus vulpecula*) may pose a threat to public health in New Zealand

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Australian brushtail possums (*Trichosurus vulpecula*) were first introduced to New Zealand in the 1800s for the establishment of a fur trade. Possums in New Zealand are practically free of their natural competitors, predators and parasites, and as many as 70 million animals now occupy more than 97% of New Zealand's land area. Possums are a serious pest in New Zealand due to their substantial impact on native ecosystems. There is also a considerable economic impact as a result of the large sums invested each year towards their control. However, it should be acknowledged that these animals may also pose a threat to public health.

Bovine tuberculosis is a considerable problem to the dairy industry in New Zealand, and possums are recognised as the most important reservoirs of the disease here. It is estimated that tuberculosis-infected possum populations occupy 10 million hectares (38% of the country) and approximately \$NZ30 million was spent in 2003 to control bovine tuberculosis vectors.¹ In New Zealand, there were 399 new cases of human tuberculosis, including six deaths, reported in 2003,² and it is estimated that 1-5% of cases in humans are caused by bovine tuberculosis.¹ As a result, the fact that possums are carriers of the pathogen that causes tuberculosis has real public health implications,³ and based on the above statistics the number of possum-originated cases of human tuberculosis could range from 4-20 each year.

Another potential public health threat comes from murine typhus, which is caused by *Rickettsia typhi* and which is transmitted to humans by fleas.⁴ Possums initially were thought to be involved in reported cases of murine typhus in the Kaukapakapa area (northern North Island) as potential hosts of the pathogen,^{4,5} but rats (*Rattus* sp.) have since been suggested as the most likely hosts.⁶ None the less, it is still unknown whether possums are hosts of *R. typhi* in New Zealand.

Perhaps the greatest threat to public health posed by the presence of brushtail possums in New Zealand is the animals' potential role as hosts of arboviruses. To date there has been no indigenously acquired arboviral disease in New Zealand, but due to the presence

of exotic mosquitoes and a regular influx of infected humans into this country, it seems that it is just a matter of time before an outbreak occurs.⁷ Ross River virus is the most likely arbovirus to cause an outbreak,⁷ as it is the most common etiologic agent of recognised arboviral disease in Australia⁸ and there are two introduced species of mosquitoes in New Zealand that are competent vectors of this virus, *Ochlerotatus camptorhynchus* and *Ochlerotatus notoscriptus*.⁷ The latter species in particular is abundant and widespread in anthropic habitats in northern New Zealand where brushtail possums are also abundant, and on which *Oc. notoscriptus* has been shown to feed in the Auckland region. Apart from being competent hosts of Ross River virus,⁹ brushtail possums in Australia have yielded antibodies to other arboviruses such as Barmah Forest virus,⁹ Sindbis virus and Murray Valley encephalitis virus.³

Brushtail possums are classified as a matter of conservation and animal health significance, but in reality they may also be a threat to public health. Consequently, further research is needed to assess, in particular, the role of possums as reservoir hosts of arboviruses. Since these animals are protected in Australia, information on possum serology is rare and difficult to obtain.³ Therefore, not enough is known about the range of arboviruses for which brushtail possums may serve as reservoirs, and little is known about the viraemia levels in experimental infections. It may be that government-level involvement and funding will be required to adequately address this issue.

References

1. Green W. *The Use of 1080 to Control Possums and Other Pests: A Resource Document*. Wellington (NZ): Animal Health Board; 2003.
2. Institute of Environmental Science and Research Limited. *Notifiable and Other Diseases in New Zealand - Annual Report 2003*. Wellington (NZ): ESR; 2004.
3. Azuolas JK. Arboviral diseases of horses and possums. *Arbovirus Res Aust* 1997;7:5-7.
4. Roberts S, Ellis-Pegler R. Murine typhus in the Kaukapakapa area again. *Aus N Z J Med* 1997;27:446-7.
5. Crump JA, Murdoch DR, Baker MG. Emerging infectious diseases in an island ecosystem: the New Zealand perspective. *Emerg Infect Dis* 2001;7:767-72.
6. Roberts S, Ellis-Pegler R. Murine typhus in New Zealand. *N Z Public Health Rep* 2001;8:73-75.
7. Derraik JGB, Calisher CH. Is New Zealand prepared to deal with arboviral diseases? *Aust N Z J Public Health* 2004;28:27-30.
8. Russell RC. Ross River Virus: ecology and distribution. *Annu Rev Entomol* 2002;47:1-31.
9. Boyd AM, Hall RA, Gemmell RT, et al. Experimental infection of Australian brushtail possums, *Trichosurus vulpecula* (Phalangeridae: Marsupialia), with Ross River and Barmah Forest viruses by use of a natural mosquito vector system. *Am J Trop Med Hyg* 2001;65:777-82.

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