

POSSUMS AS HOSTS OF BOVINE TB

FACTSHEET RD05

HOW DO WE KNOW POSSUMS ARE THE MAIN HOST OF TB?

Within the last decade, more than 120,000 possums have been necropsied (i.e. dead animals dissected by specialists) to check for bovine TB but only about 0.04% were infected. That has led to some scepticism about the central importance of possums as the primary wildlife host for bovine TB. However, the underlying explanation for the low prevalence recorded is that these possums were largely collected in surveys where the aim was to prove TB had been eradicated from an area. Such surveys have been central in helping Tbfree New Zealand declare over one million hectares free of infected wildlife, enabling them to stop possum control in these areas. Nonetheless, the scepticism about the importance of possums as hosts needs addressing.

A comprehensive scientific review summarising what is known about the epidemiology of TB in possums is now available online (see link below). Only the key historical observations showing the crucial role of possums in maintaining TB and spreading it to cattle are summarised here.

KEY OBSERVATIONS IMPLICATING POSSUMS AS TB HOSTS

Possums in some places undoubtedly do get TB (*Fig. 1*) – in the most extreme case, in 1990, 62% of possums living in rough grazing land adjacent to the Ahaura River in Westland were infected.

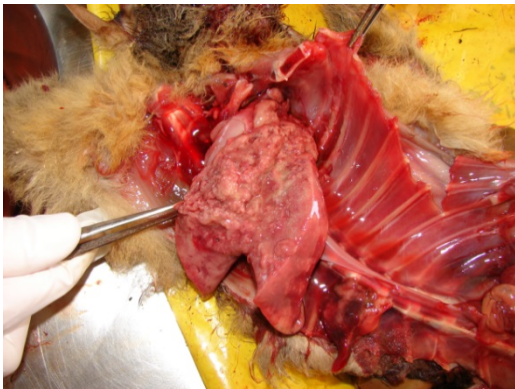


Fig. 1 No room to breathe – the pus-filled lungs of a possum that died of TB.

Possums usually have small home ranges so those living more than a few hundred metres from where cattle graze seldom interact with them. Most possums that get TB die within 4-6 months, so the sustained presence of TB in possums in deep forest (where they are well away from livestock) indicates that the disease must be cycling within their populations; and there are good examples of this. In the Hohonu Range in Westland, a TB prevalence of 13% was recorded in 1973/74; falling to 3% in 1989/90; then rising to 9% in 1997 – with prevalence unrelated to nearness to farmland. Similarly in 1997-2000, 6% prevalence was recorded in an uncontrolled possum population in the Hauhungaroa Range forest (central North Island) more than 3km from farmland; only 2% had been recorded in the wider area more than 15 years previously.

While it is almost impossible to observe TB being transmitted between wild animals, there is now incontrovertible proof that possums do pass TB to one another. In the Orongorongo Valley (near Wellington) in an area away from farmland, researchers tracked possums known to have a unique strain of TB, and found that strain had passed to other possums that shared the same patch of forest.

It is also obvious that cattle only very occasionally pass the disease to possums. During the early part of last century, possums shared rough farmland habitat with cattle herds that were often heavily infected. But TB was not recorded in possums until the 1960s. In contrast, there is very strong historical evidence that TB passes from possums to cattle far more readily because cattle often investigate and lick possum carcasses (*Fig. 2*).



Fig. 2 Lethal curiosity. The image on the left shows a TB-infected possum with open abscesses in its armpit (a common site of infection), from which highly infective pus is draining. The image on the right shows how transmission could occur through a cow sniffing and licking a possum carcass (if it were like the one on the left).

Within a decade of TB being found to be common in some local populations of possums, possum control was undertaken near and on farms where the high levels of TB persisted in cattle despite quarterly stock testing and culling of infected animals. Within two years of the possum control, TB in cattle dropped to very low levels (*Fig. 3*). This strongly implies that possum control had largely stopped TB transmission from possums to cattle. This pattern in the response to control was also observed in other places in the 1980s, leaving no need for further scientific confirmation.

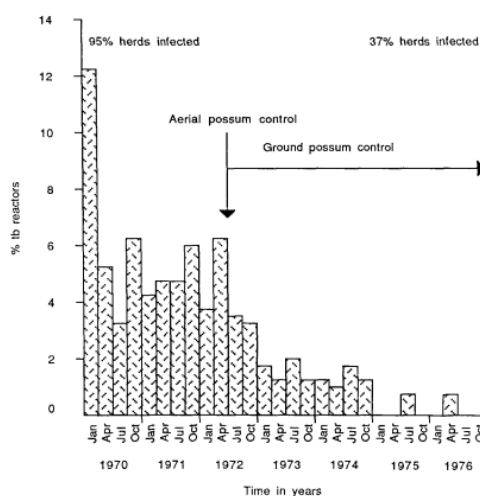


Fig. 2 Past evidence – decline to near zero in the percentage of TB positive tests (reactors) in cattle from 40 herds in the Cape Foulwind area after initiation of possum control (from *Surveillance 13(3)* p. 5).

CAN THE TB CYCLE IN POSSUMS BE BROKEN?

- In the 1990s, at Hohotaka (central North Island), a major experimental field trial showed that reducing possum densities by 78% resulted in TB disappearing from possums and cattle within 10 years
- No TB has ever been found in possums within large areas that have been under intensive possum control for many years.
- In the few farmed areas with TB possums and little or no possum control, herds generally remain continuously infected.
- Since most farmed areas with TB infected wildlife have been brought under possum control, the number of infected herds in New Zealand has declined from over 1700 in 1994 to under 35 by late 2015.

IMPLICATIONS

Given the relative rarity of infected possums nowadays, the recent scepticism about the role of possums as vectors of TB is perhaps understandable. But that scepticism is misplaced. The rarity of TB infection in possums, and therefore the low rate at which they now pass TB back to cattle, is a measure of local eradication success – by demonstrating that TB is being progressively eliminated from possums in more and more areas. These data have been the key to convincing government and agricultural stakeholders that national eradication of bovine TB is feasible and affordable, and that this should be adopted as New Zealand's TB management goal. (See links to a 2015 review of TB eradication science and to the eradication proposal summary).

The very slightly daunting aspect of the national eradication goal is that it aims to achieve a prevalence in possums that is a lot lower than 0.04% mentioned above. The goal is less than 0.000003% – less than one infected possum in the national population of roughly 30 million possums (i.e. none at all).

LINKS TO RELATED TOPICS

Possum TB scientific review: <http://www.tandfonline.com/doi/full/10.1080/00480169.2014.963791>

Review of TB eradication science: http://media.wix.com/ugd/a90ea3_f723007759c94a2c95e8d387060fc865.pdf

Eradication proposal summary: http://media.wix.com/ugd/a90ea3_9978ecb1f6bc4e668f19549ce8ceac2a.pdf

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