OSPRI

Ferrets as TB hosts

Where ferrets fit in the TB cycle

OSPRI's primary objective is the eventual eradication of bovine tuberculosis (TB) in New Zealand. A large part of this involves controlling TB-infected wildlife. While any mammalian species can become infected with the TB causing organism, it is important to distinguish between those that become infected incidentally and those that harbour disease independently ('maintenance hosts') and/or can transmit it ('vectors') to livestock. Possums are proven maintenance hosts and vectors of TB and hence attract intensive control effort. But what about ferrets?

Where other wildlife species nearby are harbouring TB, ferrets are very likely to become infected due to their scavenging nature. It is also potentially possible, under certain circumstances, for ferrets to transmit infection on to livestock. However, by themselves ferrets are not normally capable of maintaining the TB infection cycle. The exception is when very high-density ferret populations exist year-round: when there are more than three ferrets per square kilometre, they could theoretically be independent TB maintenance hosts [1].

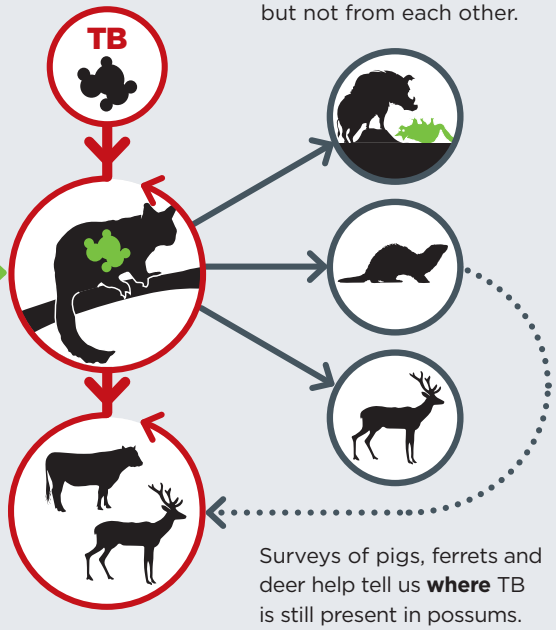
Because ferrets are not ordinarily maintenance hosts for TB, they are not targeted for control but are used as an effective mechanism for the detection of infection in possums where there are sufficient ferrets present. Killing and examining ferrets is a cost-effective means of surveying large areas to detect the presence of TB in wildlife because they acquire infection readily from scavenging TB-carcasses and

How we find and control the TB infection cycle

The **red line** tracks the path of TB infection within the possum population, circulating and infecting maintenance hosts, with a weak link between ferrets and livestock.

Possum control breaks the disease cycle in possums and stops them from infecting farmed cattle/deer.

Possums can maintain TB within their own population and cause about 50% of herd infection cases.



Pigs, ferrets and sometimes deer get TB from possums but not from each other.

Surveys of pigs, ferrets and deer help tell us **where** TB is still present in possums.

because they cover relatively large areas (typical home ranges are about 140 hectares for males, 100 hectares for females). Over a five-year period spanning the 2007/08–2011/12, for example, in excess of 35,000 ferrets were killed and assessed for such TB surveillance purposes [2].

Key facts about ferrets

1. **Ferret habitat: where you find rabbits, you will find ferrets**

   Ferrets are widespread but patchily distributed throughout New Zealand. They favour the dry grasslands and low shrublands typical of the east coast of the South Island and lower North Island. Forested regions or regions with high rainfall are poor habitat for ferrets.

   Rabbits are one of ferrets' main prey items and, in general, areas with high rabbit numbers will support the highest ferret populations. Extremely high population densities (exceeding six ferrets per square kilometre) were reported in the 1990s [2] before the introduction of rabbit haemorrhagic disease; such high densities are less likely nowadays.

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2. Reproduction and the dispersal of young ferrets

Ferrets breed in late winter/spring and typically rear four to eight kits per female. Young ferrets become independent in late summer/autumn, and these juveniles can disperse over several kilometres. Some have been known to cover more than 20 km, and dispersal over such distances could lead to the apparent spread of TB outside vector-risk boundaries.

However, research by Landcare Research indicates this likely to be rare if it does happen at all, especially where TB-possums have already been controlled [2].

3. How are ferrets killed? Do we use 1080?

Ferrets are usually trapped using kill-traps, tunnel traps or leg-hold traps baited with, for example, fresh rabbit meat. Ferrets are not targeted by large-scale poisoning (such as aerial 1080 operations of the type used against possums or rabbits) although they may be killed by 1080 secondary poisoning if they scavenge carcasses of poisoned animals. Since ferrets are known predators on ground-nesting birds, any control of them as a result of TB surveillance work is usually welcomed by conservationists.

4. How to tell if a ferret has TB

Ferret carcasses are collected by field workers for examination and sampling. Further testing is carried out through a specialised laboratory. Infection in ferrets is located predominantly in the lymph nodes ('glands') associated with the head (under the jaw) and the intestinal tract or gut. In early stages of TB, ferrets will carry infection without showing signs of gross disease or even visible TB abscesses; however, TB can still be detected by culturing tissue taken from the lymph nodes. In late stages of TB, ferrets may develop large abscesses internally and if they live long enough, could develop draining sinuses around the neck region. It is very rare to detect any gross lesions at all during our surveillance activities (most TB is detected through the culture of lymph nodes). Very sick ferrets become noticeably thin but generally remain active.

5. Routes of infection

Ferrets are carnivorous and cannibalistic and will readily scavenge carcasses, including animals that have died from TB. If ferrets ingest a large number of TB bacteria from a tuberculous carcass, they can become infected. Infected ferrets do die of causes other than their infection as there are many things that kill ferrets including predators, starvation and climatic conditions. If TB infection progresses, affected animals may become disorientated an/or lethargic. The rare transmission risk to livestock would require inquisitive cattle or farmed deer to investigate terminally sick or dead ferrets that are present in their environment. Although ferrets with advanced disease may be shedding TB bacteria, pasture contamination is not considered a significant mechanism of transmission.

6. Could ferrets be a TB threat in the future?

Ferrets' avid scavenging behaviour makes them useful to TB managers as wildlife sentinels; they are especially valuable for detecting where TB persists at a very low level in local possum populations that would otherwise be expensive and time-consuming to monitor directly. However, there is a theoretical risk that ferrets may present to complete eradication from New Zealand. Computer modelling by scientists at Landcare Research has highlighted a potential risk (albeit a very small one) that TB could persist in environments where moderate/high densities of ferrets co-exist with moderate/high densities of TB-infected feral pigs [3]. In this situation, TB could theoretically persist in the absence of an infected possum population nearby. This risk has yet to be proven in the field.

References

1. Caley, P. 2002: Assessing the host status of feral ferrets for Mycobacterium bovis in New Zealand.
2. Byrom et al. 2015: Feral ferrets (Mustela furo) as hosts and sentinels of tuberculosis in New Zealand. http://dx.doi.org/10.1080/00480169.2014.981314
3. Barron et al. 2015: The role of multiple wildlife hosts in the persistence and spread of bovine tuberculosis in New Zealand. http://dx.doi.org/10.1080/00480169.2014.968229

Acknowledgement

Factsheet information provided by Landcare Research | Manaaki Whenua, from research commissioned by OSPRI.