

Native fauna outfoxed by **wanton killer**

Predators must kill prey to survive, but they sometimes engage in 'surplus killing', at a rate far beyond the need for food or food storage. The most familiar example is the wily fox that destroys every fowl in the chicken run when just one carcass would easily feed the family.

Dr Jeff Short of CSIRO Sustainable Ecosystems, and two colleagues, have collated many examples of surplus killing by mammalian predators in Australia, especially the red fox, which has been here for about 140 years, and the dingo, which arrived 3500–4000 years ago.

Their research has found that surplus killing differs between predator-prey systems that have co-evolved over many millennia on the large continental land masses, say in Europe or Africa, and the relatively young predator-prey interactions involving fox and dingo predators and native fauna in Australia.

Surplus killing in the former cases is rare and localised and due to some unusual event, such as the slaughter of 82 Thomson's gazelle by spotted hyenas in Africa on an extremely dark night with heavy rain.

In Australia, however, it seems that the fox has routinely engaged in such behaviour as it colonised new habitat.

Whereas predators and prey that have evolved together are well matched and will persist together indefinitely, the gentle mammals of Australia are no match for efficient predators such as the fox.

The result is ongoing surplus killing, not due to some freakish weather or other unusual circumstances rendering the prey



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The European red fox, introduced to Australia in the 1870s, managed to occupy two-thirds of the continent by the 1930s and wreaked havoc among relatively defenceless native species as it spread.

vulnerable, but as a routine mismatch that has had devastating consequences for the Australian mammal fauna.

Short and his colleagues believe this extreme mismatch between fox and mammal prey, and the phenomenon of surplus killing, has caused the rapid decline of many native species in the small-to-medium size range.

They have documented many cases of indiscriminate surplus predation by the fox on species including the burrowing bettong, the black-flanked rock-wallaby and the tamar wallaby. All survive only in refugia: islands, rock piles, dense vegetation or areas where predator numbers are controlled.

In one case, a single fox gained access to the Heirisson Prong conservation site at Useless Loop in Shark Bay and killed more than 100 of 350 burrowing bettongs in three months, before it was destroyed. This occurred despite the presence of many rabbits, the fox's normal prey.

Another fox reached Garden Island, near Perth, via a 3.7 kilometre vehicular causeway, and killed at least 25 tamar wallabies in just 11 days. Little wonder the formerly widespread tamar wallaby has drastically declined on the mainland.

So why hasn't the dingo had the same impact? After all it has been here much longer

than the fox, yet apparently has only caused the extinction of two species on the mainland; the Thylacine and the Tasmanian devil. It seems that the dingo's different hunting style, preferred prey size, and sparse numbers in pre-European Australia, probably account for the different outcomes.

Active persecution of non-domesticated dingoes by Aborigines, the lack of water before bores became prevalent, and the absence of rabbits as an alternative food supply, would have limited their numbers.

Furthermore, foxes tend to ambush or pounce on their prey, whereas dingoes typically have to pursue their prey for some distance in an exhausting chase. Foxes can climb into rocky refugia, dingoes can't. Foxes occur at higher densities in smaller home ranges than dingoes, and so on.

Dingoes will surplus kill domestic stock or kangaroos concentrated at a water hole, but there are no known cases for medium-sized native mammals.

It is only the fox that seems to have made surplus slaughter the rule rather than the exception as it has colonised Australia.

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Some of the many burrowing bettongs killed by a fox at Heirisson Prong, Shark Bay, WA, in a surplus killing spree.