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Feratox[®] as a Humane Control Agent for Wallabies in Tasmania

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ABSTRACT: Compound 1080 has been used to control native wallabies and possums in Tasmania for over 50 years. Public concern in relation to humaneness and its effects on domestic dogs and nontarget species has led to opposition to its use. Feratox[®], a form of encapsulated cyanide pellet registered for brushtail possum control in New Zealand, was considered as a replacement toxin. Trials in New Zealand showed that the material is fast-acting and humane in wallabies. In Tasmania, protocols were developed using bait stations that would minimise access by nontarget macropods and wombats. In field trials using Feratox[®], however, there was excessive spillage of toxic pellets and variation in bait take between seasons by Tasmanian pademelons. Further work is under way to resolve these issues to see if protocols can be developed for the safe and effective use of cyanide pellets in areas where nontarget mammals are prevalent.

KEY WORDS: Australia, bait development, Bennett's wallaby, brushtail possum, Feratox[®], humane toxicants, *Macropus rufogriseus*, New Zealand, nontarget species, poisons, potassium cyanide, Tasmania, Tasmanian pademelon, *Thylogale billardierii*, *Trichosurus vulpecula*, wallaby

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INTRODUCTION

Tasmania's topography, with cleared valleys and rocky bush-covered hills, has resulted in extensive pasture/bush interface providing ideal habitat for native herbivores such that Bennett's wallaby (*Macropus rufogriseus*), Tasmanian pademelon (*Thylogale billardierii*), and brushtail possum (*Trichosurus vulpecula*) have increased in abundance to become serious pests in agricultural and forest production areas. Compound 1080 has been used in Tasmania since the 1950s (Statham 2005), and currently blue-dyed carrot mixed with 1080 (0.014%) is laid on the ground primarily for these species (Statham 1989). While this is an effective method of control, the effects on nontarget herbivore species (Statham 1983) and secondary poisoning of dogs associated with this use of poison have led to public complaints and increasing opposition to 1080 use. Public pressure resulted in state government plans to phase out use of 1080 by 2015, and a grant of \$A4 million from the Commonwealth Government was provided in 2004 to assist with the development of alternatives to 1080.

Among the range of alternatives considered, another toxin was seen to be a useful option. A review of toxins already registered in New Zealand or Australia indicated that Feratox[®], an encapsulated form of potassium cyanide (KCN) used in New Zealand for control of the Australian brushtail possum, would be a suitable alternative to 1080 (Coleman et al. 2006) based on its humaneness (Gregory et al. 1998), lack of secondary poisoning, and lack of persistence in the environment (Eason and Wickstrom 2001).

Feratox[®] possum baits consist of potassium cyanide contain 115 mg of potassium cyanide encapsulated within a hard coating that protects the cyanide from both air and moisture and consequent breakdown. The pellets have an outer coating consisting primarily of sugar as an attractant and a green dye. During chewing, the bait is crushed in the possum's teeth, releasing cyanide gas and resulting in rapid death (Eason and Wickstrom 2001). A small, unpublished pilot study in 5 Bennett's wallaby (Morris et al. 2000) indicated that Feratox[®] showed promise as a wallaby control agent. Although no LD₅₀ data exists for cyanide use on wallabies, the LD₅₀ for cyanide on possums is 8.7 mg/kg (Bell 1972) and is similar for many other species (Eisler 1991). On the basis of this data, a 115-mg possum Feratox[®] bait may be marginal for a 26-kg Bennett's wallaby but adequate for the smaller wallabies. In a pen trial, Shapiro et al. (2008) showed that 115-mg Feratox[®] pellets were a humane control option for Dama wallaby (*Macropus eugenii*), and in a later field trial an estimated 93% of a resident wallaby population was killed (Shapiro et al. 2011). This provided base information for Tasmanian work, because Dama wallabies are similar in size to Tasmanian pademelons.

Under the Alternatives to 1080 Program, trials were approved in 3 areas:

- 1) Development and testing of a Feratox[®] pellet suitable for Bennett's wallaby in New Zealand, where they are a pest species,
- 2) trials with bait feeders, in an attempt to minimise nontarget species access to toxic bait in Tasmania,

- 3) trials with toxic baits in field conditions in Tasmania.

These field trials and the early pen trials in New Zealand were consistent with the recommendation of the Coleman et al. (2006) report to determine the effectiveness of Feratox[®] and identify effective delivery systems to minimise nontarget risk.

METHODS AND RESULTS

Feratox[®] Bait Development for Wallabies in New Zealand

Twenty-four Bennett's wallabies (12 males and 12 females) were housed in individual pens and fed wallaby pellets, vegetables, and fruit, plus access to grass. The first 20 were presented with Feratox[®] pellets developed specifically for Bennett's wallaby containing 200 mg of KCN, coated in a peanut butter/grain-based bait (213 Bait, Connovation Ltd., Auckland, New Zealand) used widely in New Zealand as an attractant in control of possums. At least 3 pellets were placed in each feeder bowl to mimic field delivery systems and to ensure that each wallaby had the maximum opportunity to encounter a toxic pellet. The final 4 were presented with Feratox[®] pellets (200 mg KCN) using 'Strikers' (Connovation Ltd., Auckland, New Zealand), which are small rectangular potato starch dishes (7.5 × 2 × 2 cm) filled with paste bait and 3 Feratox[®] pellets.

Nineteen wallabies were killed after eating from feeders and 4 were killed after eating from the Strikers. Of the 24 Bennett's wallabies included in this trial, 23 cracked at least 1 Feratox[®] pellet in their mouth and died. None of the 23 wallabies that cracked the Feratox[®] recovered, and there were similarities in the key interval times observed compared with those previously observed in pen trials using Feratox[®] on Dama wallabies (Shapiro et al. 2008) and possums (Gregory et al. 1998) (Table 1). The first symptoms observed (onset) were similar among individuals, and these included first aiming their neck/snout upwards, then loss of balance, and the animal becoming prone. Once prone, there were a few minor leg and arm spasms, but these were not common, and for the most part the animals lay quietly on their sides until they became unconscious.

The short interval from the onset of symptoms until individuals were unconscious reduced the potential window for suffering that exists with slower-acting toxins. The high kill rate achieved using the most palatable bait gave an effective platform to progress to field trials to

maximize efficacy and minimize exposure of nontarget species.

Initial Bait Delivery Testing in Tasmania

The aim of these trials was to evaluate bait stations for their accessibility to the target species while excluding nontarget species, principally Tasmanian bettong (*Bettongia gaimardi*), long-nosed potoroo (*Potorous tridactylus*), common wombat (*Vombatus ursinus*), and Forester kangaroo (*Macropus giganteus*).

Six different bait stations from New Zealand were trialled in a 0.8-ha compound containing breeding populations of Bennett's wallaby and pademelons. Three were commercial products used to dispense dry bait. The first was a plastic bait station with a lift-up lid, an opening of 60 mm diameter, and a capacity of 120 g (Ferafeeder, Connovation Ltd., Auckland, New Zealand). The second and third were plastic boxes (Sentry and Kilmore bait stations, Pest Control Research, Christchurch, New Zealand). Sentry had a capacity of 200 g and an opening of 85 × 70 mm. Kilmore had a capacity of 1.5 kg, an opening 85 × 90 mm, and a baffle to direct feed behind the opening. The fourth bait station was the Striker (Connovation Ltd., Auckland). The final two bait stations were experimental ones developed by Landcare Research (Lincoln, New Zealand) to hold a single Feratox[®] pellet.

Captive Animal Trials

Wallaby access to the 3 box-style bait stations was tested by varying the height from the ground to the base of the feeding hole, and spillage was measured by installing a 350 × 270-mm tray covered with mesh into the ground below the bait station opening. Trials were run at each bait station height for 3 - 5 nights using commercial wallaby pellets (Barastock wallaby pellets, Ridley Agriproducts, Melbourne, Australia) as bait. A blended bait of 25% peanut butter, 10% canola spread, and 65% crushed and whole barley was used for the Striker and peanut butter in the Landcare experimental stations. Infrared-activated video and still cameras were used to examine the behaviour of animals at the bait stations.

Bait consumption, spillage, and camera data were checked on a daily basis. Records of the number of visits by each species to each station were made, but not the number of individual animals. This illustrates a major limitation of photographic recording, whereby it is not possible to identify individuals unless they are well

Table 1. Times (to the nearest minute) of key intervals following onset of symptoms of Feratox[®] poisoning in Bennett's wallabies, Dama wallabies and possums in monitored cage trials.

Species	Bennett's Wallaby* (Hix et al. 2008)		Dama Wallaby (Shapiro et al. 2011)		Possum (Gregory et al. 1998)	
Key Intervals	Mean	Range	Mean	Range	Mean	Range
Onset to lying prone	8	2 - 14	2	1 - 3	3	1 - 7
Onset to unconsciousness	14	8 - 20	6	2 - 17	3	1 - 9
Onset to last breath	18	10 - 31	11	4 - 19	14	6 - 22
Onset to heart stopping	22	15 - 36	16	8 - 22	18	11 - 26

*Mean and range key interval times for wallabies are only for 21 of the 23 wallabies that had times recorded; the other two died at night and were not recorded.

Figure 1. Kilmore bait station.

Figure 2. Striker bait station.

Table 2. The percentage of animals seen to be feeding compared with those seen near a feeder from 8 field trials and captive studies.

Bait Station Height (mm)	Potoroo	Bettong	Pademelon	Bennett's Wallaby
Still camera				
350	14.4	Not tested	Not tested	Not tested
450	0	19.1	Not tested	Not tested
500	Not tested	6.5	Not tested	Not tested
550	Not tested	6.0	Not tested	Not tested
600	Not tested	0	Not tested	Not tested
Video camera				
350	72.6	Not tested	Not tested	Not tested
450	0	68.6	Not tested	Not tested
500	Not tested	58.1	61.7	66.7
550	Not tested	51.7	63.1	81.3
600	Not tested	0	50.2	67.7

marked on both sides. On the basis of ease of access, minimal spillage of pellets, and capacity, the Kilmore (Figure 1) and Striker (Figure 2) stations were selected for field trials.

Field Trials

Trials were carried out using Kilmore bait stations at varying heights on properties selected for known populations of potoroos, bettongs, and Forester kangaroos. The large capacity of Kilmore bait stations ensured bait was continuously available. The same procedures as in the compound were followed, except that bait consumption and cameras in the field were monitored every 2 - 4 days.

Table 2 is a summary of the results from the captive animal studies and from 8 trials with free-living animals. The data show the percentage of feeding incidents as a proportion of the total number of photos or videos of each of the species seen within 2 m of a bait station at the various trials. The percentage of animals recorded as feeding was generally higher with the video than the still cameras, due to the fact that an animal could get a mouthful of feed and have its head out of a feeder before a still camera took a photo.

Potoroos were able to feed from bait stations set at

350 mm but not at 450 mm above ground level. Bettongs fed readily at a height of 450 mm by standing on tip-toes and balancing with their tail. They managed to feed at 550 mm by jumping and holding the bottom edge of the bait station opening, and pulling themselves up to access the feed. They were unable to feed at a height of 600 mm. Trials with Bennett's wallaby and pademelon were not carried out at the lower heights.

Forester kangaroos were not recorded feeding from a station at any time, despite being filmed close to some bait stations at 2 trial sites. Wombats were present at several sites, but only one was recorded attempting to feed, and this was at a height of 350 mm.

As possums climbed the posts to reach bait stations, height was not a consideration for this species. In the field, possums were often the first species to the bait stations in the evening, and individuals were sometimes seen in video clips aggressively repelling other possums and other species.

On the basis of these data, it appeared that a bait station height of 500 mm was suitable for minimising nontarget access to the bait, except in the presence of bettongs where the base of feeder hole needed to be at 600 mm.

Feratox Trials in Tasmania

Following successful completion of the bait station trials, several trials were conducted to assess the suitability of Feratox® as a control agent for wallabies and possums in Tasmania.

Field Trial 1

The trial site was on pasture bounded on the north and east sides by eucalypt plantation and was bisected by a shelter belt of mature radiata pines extending out east-west from the plantation, with another belt of pines on part of the southern side. Kilmore bait stations were established, with the base of the feed opening at least 500 mm above the ground, with a total of 21 stations in 3 rows parallel to the eastern edge of the plantation at 10, 80, and 180 m out into the pasture. Free-feed baiting (pre-baiting) with wallaby pellets (Barastock wallaby pellets) was carried out for 3 weeks. One kilogram of bait was placed in each bait station. DVR Eye video cameras (PixController Inc., Export, PA, USA) were allocated at random to 7 bait stations. The trial site was visited at least twice weekly to download video data, replace bait, and collect the remainder for weighing.

Poisoning was conducted for 5 nights. Two hundred grams of feed pellets and 8 Feratox® pellets were placed in each bait station with the Feratox® on top of the other pellets. The bait station contents were replaced daily and any removed Feratox® pellets were replaced.

A spotlight transect, including both the area to be poisoned and a control area, was marked out prior to free-feeding. The transect, which was a total of 1,025 m in length, was walked by 2 observers, 3 times before free-feeding and 3 times after poisoning. The only animals seen to be feeding from the bait stations were possums, and only possums were found dead after poisoning. Twenty-five were killed in an area of approximately 10 ha. The number of dead possums was surprising, considering that none were seen during spotlighting in the poisoned area either before or after the poisoning, and only 1 was seen in the control area. In contrast, 15.7 (± 9) pademelons were seen in the poisoned area pre poisoning and 25.5 (± 9.2) post poisoning. In the control area, the number seen were 7.3 (± 4.8) pre poisoning and 14.5 (± 9.9) post poisoning.

Video footage recorded few pademelons at the bait stations, hopping past, or even grazing nearby, despite abundant faecal pellets in the area. The general reluctance of pademelons to use the Kilmore bait stations was puzzling, as individuals had eaten the same bait from Kilmore bait stations in two other trials.

Wombats were seen at similar low densities throughout the area before and after poisoning. They were recorded on camera several times, as were forest ravens (*Corvus tasmanicus*), two devils (*Sarcophilus harrisi*), and a rabbit (*Oryctolagus cuniculus*).

Spillage of Feratox® pellets from the stations during this trial was a concern, with 25 of the 96 pellets taken from bait stations being spilt plus 28 unaccounted for.

Field Trial 2

The second trial was on pasture adjacent to native bush and a eucalypt plantation where the property owner

could not establish improved pasture because of browsing by pademelons. On the basis of results from Trial 1 and acceptance of Strikers by Bennett's wallaby in both New Zealand trials and in captive studies, Striker bait stations were used. Forty-one Strikers were placed within 5 m of the bush edge and another 10 were placed 30 - 40 m out into the paddock. They were stapled singly to posts with the base at least 500 mm above the ground. Each Striker held approximately 18 g of bait, which was a mix of peanut butter (25%), margarine (5%), crushed maize (35%) and crushed barley (35%). Cameras were placed on 4 of the sites, and at those sites 2 Strikers were used to increase the chance of recording animal behaviour.

Free-feeding was carried out for 14 nights with daily replacement of eaten Strikers. During the poisoning phase, 2 Feratox® pellets were embedded into the bait in each Striker. Poisoning extended over 5 nights, with replacement of eaten or partially eaten Strikers each morning.

A driven spotlight transect through the area to be poisoned and a through control site was used. All animals in view, i.e., up to 140 m from the vehicle in the open, were counted. Three counts were carried out on consecutive nights before and after the poisoning.

Bait take increased from 40% to 98% during the pre-feeding period. Bait take during the poison period did not reflect the expected drop over time as animals were killed, despite 29 animals (17 pademelons and 12 possums) being killed the first night and an overall kill of 51 pademelons and 13 possums. On the final night, a potoroo was also killed. As the bait feeder was out of potoroo reach (520 mm to the base), it was presumed that it picked up some spilt bait containing a Feratox® pellet from the ground. Overall, 40.1% of pellets taken from the bait stations were found on the ground; of these, 30.3% were the normal green colour, and 9.8% had the outer sugar and dye coating removed.

In the prefeeding period, an average of 2.2 possums were filmed feeding per night, compared with 9.4 pademelons. In addition to these two species, a Tasmanian devil, 2 wombats (*Vombatus ursinus*), 2 feral cats (*Felis catus*), a quoll (*Dasyurus maculatus*), and a number of native hens (*Gallinula mortierii*) were recorded in the vicinity of the bait stations. During the poisoning period, a number of ravens, attracted by the carcasses, were recorded as well as pademelons and 1 possum.

The spotlight data showed 12.0 (± 7.0) pademelons in the control area prior to poisoning and 12.7 (± 2.9) post poisoning. In the poisoned area, the counts were 39.7 (± 13.1) pre poisoning and 6.7 (± 3.2) post poisoning. The largest number of pademelons post poisoning were seen within 25 m of the edges of the poisoned areas, probably reflecting the movement of animals from the unpoisoned edges. Like the first trial, the spotlight counting underestimated the number of possums in the area, as none were seen either pre or post poisoning in the area poisoned. Both the number of carcasses found and the spotlight results indicated that the use of Strikers was effective, with an 83% reduction in number of pademelons in the poisoned area.

The rate of spillage of toxic pellets from the bait stations in both trials, and the death of a nontarget animal

in the second trial, were significant problems. On 3 occasions, video clips showed a Feratox[®] pellet falling from a pademelon's mouth after a period of chewing. A subsequent investigation by Connovation Ltd., the makers of Feratox[®], found that the pellets which had been supplied for these trials, which were modified from the standard pellets and deemed more suitable for Tasmanian species, were much harder than those normally produced. As such, they were presumably more difficult to break open with chewing than normal pellets.

Bait Development

Following these two field trials, further work was required on bait development and presentation to address the issues of bait spillage and death of nontarget species. This started with a closer study of Bennett's wallaby and pademelon feeding behaviour in captivity. Strikers were used, as these had been readily accepted by pademelons in the second field trial. Video footage of both species feeding from Strikers showed that they used their lower incisors as scoops when feeding, and this sometimes caused bait to fall out of a Striker during feeding. Spillage was accentuated by the aggressive behaviour of some pademelons around the bait station, which led some individuals to grab a mouthful of bait and move away.

To overcome the problem, experienced in the first two field trials, of hard pellets falling out of a pademelon's mouth during chewing, pellets containing starch instead of cyanide were prepared with a range of hardness. Trialling these with captive wallabies showed that those with the softest shell had a spillage rate of less than 1%, compared with up to 20% for the hardest.

The feeding technique used by wallabies at Strikers led to development of a bait that could be taken with a single bite. Developmental work using placebo Feratox[®] was carried out initially on the captive populations at Mt. Pleasant Laboratories and then in 3 field trials, prior to further testing with actual Feratox[®].

A placebo Feratox[®] pellet was glued to paper. Pellet plus paper were dipped in palm wax, to help waterproofing, and covered with approximately 1.5 g of an attractant bait consisting primarily of peanut butter, rice flour, and treacle. One or more pellets were then stapled to a feeder board. It was found that with this system, both pademelons and Bennett's wallabies could pluck a bait from the feeder board without spillage, and that the softer pellets were broken in the mouth more readily.

Field Trial 3

A further Feratox[®] trial, using the new feeder arrangement, was conducted on a grazing property being heavily browsed by both Bennett's wallaby and pademelons. Prefeeding with non-toxic bait was carried out for 7 days, prior to 7 days of poisoning, with a further 4 days of non-toxic bait after the poisoning. Five pellets per board were used during pre-feeding and for the first 2 days of poisoning; from then on, the number was reduced to 3 per feeder due to the lower bait take.

In addition to pre and post poison walked spotlight transects (1,600 m total), 30 faecal pellet collection lines were used in the poisoned and control areas, in an effort to improve the estimation of population reduction

(Southwell 1989). These were 20 m long and 1 m wide, with 3 lines, which were 20, 50, and 80 m from the bush edge. Faecal pellets accumulated in each of the 7 days prior to and post poisoning were collected, identified as far as possible to species, recorded, and dried. Cameras were also used on all bait stations.

Overall, 41 pademelons, 9 Bennett's wallaby, and 6 possums were killed along a 450-m bush edge. However, both spotlight and faecal pellet counting suggest that the poisoning had a low percentage success. Spotlight counting showed only a 10% reduction in pademelon and 18% reduction in Bennett's wallaby numbers after poisoning, and the faecal pellet numbers indicated a 53.7% and 22.2% reduction, respectively. There were no changes in either index in the control area. The two estimates measured different aspects of the population. Spotlight counting was an instantaneous count, involving disruption of the population, whereas faecal pellet counting indicated the relative population grazing over a 7-day period.

A feature of this trial was the significant proportion of dropped pellets. Ten percent were found on the ground during the prefeeding period, with the majority in the first 3 days as animals adapted to eating them. However, during the poison period, 50.6% of those taken from bait stations were found on the ground. Throughout the whole period of the trial, there was intermittent heavy rain, and that, in addition to the thinner Feratox[®] coating, led to a greater than normal liberation of cyanide from the pellets. Later testing by Connovation Ltd. showed that the emission of HCN from these pellets was greater than 30-50 µg/hr, in contrast to standard Feratox[®] which is less than 1 µg/h. It is probable that some animals were able to detect the cyanide and eat the bait from around the Feratox[®] pellet, while dropping the pellet in the process.

Field Trial 4

This trial was on the same property as Trial 2, but was carried out in summer rather than winter. The site was open pasture with native bush on the east and plantation on the west. Bait stations were in 2 rows, the first 15 m from the bush edge and the second 65 m from the bush both had a spacing of 40 m between stations. Both spotlight counting with a walked transect of 900 m and faecal pellet lines 10 and 50 m from the bush were used to assess population changes. Cameras were used on half of the 22 bait stations.

Prefeeding was carried out for 7 days, initially using single pellet baits, but was changed to Strikers placed horizontally, with two per station, due to forest ravens (*Corvus tasmanicus*) feeding on the baits. With the Striker feeders, ravens appeared to be taking only part of the available free feed.

On video recordings from the prefeeding phase, no pademelons were seen feeding, while Bennett's wallaby were obviously taking baits. This difference was reflected in the poisoning results, as 6 Bennett's wallaby and 10 pademelons were killed, all of the Bennett's wallaby on the first night, although a mean of 26.7 pademelons were seen in the poisoned area pre poisoning and only 4.7 Bennett's wallabies. The reduction post poisoning was only 6% in pademelons and 79% in the Bennett's wallaby. Poison baits were removed after 5 nights, due to

concerns about the loss of Feratox[®]. Altogether, 26.3% of the pellets taken from the feeders were found on the ground, and 67.7% were missing. Video evidence of ravens eating bait and pellets indicated they had taken some of the missing pellets and had flicked others away.

DISCUSSION

New Zealand trials have shown that Feratox[®] is a humane control agent for Dama and Bennett's wallabies, as well as for brushtail possums, and it is worth considering as a toxin to replace 1080 in Tasmania. The lack of secondary poisoning would also protect domestic dogs and native carnivores. It was also found to be possible to significantly restrict the access of nontarget species in Tasmania by use of bait stations at a height that precluded access to all but the target species.

Several issues arose during field poisoning trials in Tasmania. The difficulty of assessing possum numbers by spotlight counting in and adjacent to wooded areas was such that no assessment of the effectiveness of control could be made. This was resolved by use of faecal pellet counting, but as spotlight counting is widely used, it may mean that the contribution by possums to pasture loss is underestimated.

Spillage of Feratox[®] from bait stations during feeding potentially exposed nontarget species to the toxin, as was demonstrated by the death of a potoroos in one trial. Spillage was partly a consequence of the adaptation of Feratox[®] to suit different animal species. Initially, the pellets were too hard and extended chewing time, which, combined with the big gap between the incisor and premolar teeth in wallabies, allowed some pellets to fall from the mouth. The aggressive behaviour of pademelons and their scraping bait from Striker bait stations also appeared to account for some pellet spillage.

A difference in bait take by pademelons, and consequent difference in effectiveness of poisoning between seasons, was demonstrated in Trials 2 and 4. On the one property, there was an 83% reduction in numbers in winter but only 6% at best in summer, using similar baiting techniques. It is possible that the lack of interest in summer is a result of the pademelons' need for a diet high in water content at that time, rather than a high energy requirement in winter when lactating.

Ravens had been present in variable numbers at all other trial sites, particularly during poisoning when they scavenged carcasses, but they had not previously been attracted to baits. The concerns with ravens taking the pellets were that the bait was unavailable for the target species and that they were dropping Feratox[®] pellets, rather than that the ravens might have been killed. The design of the Feratox[®] is such that birds can't break the coating, and no raven carcasses were found, despite extensive searching and the birds being on open paddock for most of the day. The interest from ravens probably resulted from lack of alternate food, as there were few fruits, berries, or pasture grubs available.

In New Zealand, Feratox[®] has been registered since 1997, and many groups of licensed pest control operators use this tool routinely. In Tasmania, there is a more complex ecosystem with a greater array of nontarget species. Unless the issues of bait acceptability and pellet

spillage can be resolved to safely allow control of both Bennett's wallaby and Tasmanian pademelons in both winter and summer (the periods of pasture shortage), it will be difficult to routinely use Feratox[®] in Tasmania.

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