# RAT CONTROL - BAIT STATIONS USING 1080 CEREAL BAITS
# (with optional deer repellent)
# (CONTROLLED SUBSTANCES LICENCE REQUIRED)

## Timing of operations

- Timing is critical and depends on what is being protected. For ecosystem management, timing should be related to rat tracking indices.
- Bait acceptance is significantly higher in winter and spring[1], however, high kills have been achieved in all seasons.
- August-September operations, just prior to the breeding season, will maximise the benefit to native birds, but the benefit will last for the duration of one bird-breeding season only because rat populations recover within 3-5 months after the operation [2,3].
- To protect invertebrates and skinks, rats should be controlled year round [4].

## Bait station placement

- No greater than 100 x 150m apart in forest habitats, and closer where mice are also being targeted.
- There should be at least one bait station within each rat's home range. Home ranges are generally reported by length. Ship rats have an average range length of 100-200m during the breeding season. Non-breeding ship rats have larger home ranges. Norway rat home ranges are between 218-916m in length [4].
- If the terrain is suitable, establish bait stations on grids using GPS to locate each bait station and record its location as a waypoint. In rough terrain, locate bait stations on ridges and spurs with additional lines across the contour to ensure that all rats should be within 150 m of a bait station. Spacing and locations should be established as precisely as possible using GPS: inaccurate location of lines will cause gaps and pockets of survivors.
- Bait stations should be attached to the dry side of trees with the opening 15-20 cm above the ground. This optimises bait station use by rats and avoids rain and water splashing off the ground affecting bait quality.
- Where weka are present bait stations must be at least 1 m above the ground.

## Bait stations

- Key requirements: allows rats easy access, limits access by non-targets, protects bait from the elements, limits bait spillage, no blockages, holds up to 1.5 kg of bait, easy to fill (and transport when establishing the network), durable, and designed for easy attachment.
- An example of one that fits these criteria is the large Philproof bait station.

## Bait

- While both "0.08% 1080 Rodent Pellets" and "0.15% 1080 Pellets" (Animal Control Products) are both are effective at controlling rats, 0.15% 1080 pellets are recommended to prevent sub-lethal poisoning and bait shyness in non-target pests (possums)[2] .

- Two bait formulations are available: RS5, and No. 7. Generally, RS5 is favoured where a shorter exposure period required and where there is limited chance of rain or ground moisture ruining the bait on the first night. In wet forest and where a longer exposure period is sought, the No.7 bait is generally chosen.
- Baits should be ordered with EPRO deer repellent where it is necessary to minimise the by-kill of deer. Prefeed baits should also be treated with the repellent.
- Lure (i.e. cinnamon, orange) concentrations on baits should be 0.3% wt/wt (also referred to as double lure). The primary purpose is to mask the odour of 1080 to possums [5]. Although not experimentally investigated, it is likely that 'lures' may function in a similar manner for rats too as they are known to be highly attuned to the presence of toxins in baits [6]. Lures dissipate in storage [7] and may result in reduced kills and bait shyness. High lure concentrations (> 0.5%) may also reduce the palatability of baits to rats, as they do with possums [8].
- Green dye is included in bait as a bird-deterrent. Together with improved bait quality (i.e. greatly reduced fragmentation), this has reduced the risk to most bird species studied [9,10]. Risk assessment procedures [11] have been developed, and deterrent bait additives are being developed for some species that may be put at risk during 1080 operations, such as kea [12].
- Bait must be stored in a suitable building (i.e. secure, dry, well ventilated, with a concrete floor) with no direct sunlight on stored bait. Shrink wrap around pallets should be removed to prevent the bait sweating. Correctly stored baits will remain adequately toxic and palatable (to possums: rats not tested) for 12 months [7].

## Bait application

- Pre-feeding should be conducted for best results [13]. Pre-feeding should be undertaken for two weeks. This may need to be extended during wet weather or if bait stations have been raised to minimise the risk to non-target ground dwelling birds.
- Non-toxic pre-feed bait should be the same type of bait as the toxic bait. It should not contain green dye but should contain the lure. Pre-feeding is essential for high kills [13]. It reduces wariness of rats to toxic bait [14] and the likelihood of 1080 shyness occurring [2]
- The pre-feeding should consist of 1 - 1.5 kg non-toxic bait per fill. Bait stations must be checked regularly during pre-feeding to ensure they do not become empty, or the bait has degraded and become unpalatable. There should be a constant supply of pre-feed in each bait station so rats learn that they are a source of food.
- Pre-feed must not be mixed with toxic bait as it may result in rats being sub-lethally poisoned and becoming bait shy. Remove any residual pre-feed before putting in the toxic bait.
- The quantity of toxic bait needed will depend on numbers of rats and other non-target pests i.e. possums. 400-500 g of 1080 bait per bait station is sufficient to control low-density rat populations (<20% tracking tunnel index), but if possum numbers are high more bait will be required.
- It is not necessary to leave toxic bait out for more than 7 nights. Most 1080 bait will be eaten in the first three nights.
- At the end of the operation uneaten 1080 bait must be collected and removed from operational area. This reduces the chance of rats being exposed to poor quality bait and becoming bait shy through sub-lethal doses.

## Sustaining rat control over the long term

- Monitoring conservation outcomes is essential to judge effectiveness of the control programme. Control operations are useless unless outcomes are achieved.
- Build into costing provision for replacement of lost/damaged bait stations and track maintenance.
- Alternating bait types, toxins, lures and techniques are important in ongoing control programmes. Continuous use of a single pesticide use is not recommended.
- Careful recording of the amount of bait used and retrieved can allow better estimates of future needs.
- Using 1080 as an initial knockdown toxin is recommended but repeat dosing is not advisable as it will lead to an increasing proportion of bait-shy survivors [2].
- Incorrect use of 1080 bait can cause bait shyness. Pre-feeding and good quality bait will dictate the success of the current (and potentially subsequent) control operations.

## Limitations

- In areas of high possum numbers, possum competition for toxic bait can reduce availability of bait to rats [15].
- The method is labour intensive and relatively expensive in the first year because of initial set-up of lines and bait stations. Labour costs increase in difficult terrain.
- Rat populations bounce back within months once control is stopped [4].
- Mouse numbers may increase after rat control [2] .
- Native birds are at risk if they feed from the bait stations or if baits are spilt[16].
- Dogs are susceptible to poisoning if they eat bait or carcasses containing 1080 [7].
- All species of rat are initially neophobic (new object reaction), i.e. they avoid unfamiliar objects in a familiar environment. This is why pre-feeding is so important [14].
- Rodents develop acquired aversion to acute toxins, baits and lures if they receive a sublethal dose of the toxin and illness has followed. This can be present for up to 12 months [14].
- Limited knowledge on preferred baits and lures for rats.
- Community views on poisoning can vary, so effective consultation is required.

## References


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