What is in the pipeline? Eradicat®, Curiosity® and other tools

Dave Algar[A], Michael Johnston[A], Michael O'Donoghue[B] and Julie Quinn[C]

[A]*Department of Parks and Wildlife*
[B]*Scientec Research Pty Ltd*
[C]*Department of the Environment*

Bait types

Poison baiting is recognised by most practitioners as the most effective method for controlling feral cats (Algar and Burrows 2004; Algar *et al*. 2007; DEWHA 2008; Short *et al*. 1997). The implementation of an annual baiting strategy can provide for the effective and sustained control of feral cat populations at the landscape level (Algar *et al*. 2013a).

There are three feral cat bait types that are at various stages of development. The *Eradicat*® bait is similar to a chipolata sausage in appearance, approximately 20 g wet-weight, dried to 15 g, blanched and then frozen (Algar and Burrows 2004). The bait is composed of 70% kangaroo meat mince, 20% chicken fat and 10% digest and flavour enhancers (Patent No. AU 781829). Toxic baits are injected with 4.5 mg of the toxin sodium monofluoroacetate (compound 1080) per bait. *Eradicat*® baits have recently been registered for operational use in Western Australia. *Curiosity*® and *Hisstory* baits are based on the *Eradicat*® bait medium but differ in their method of toxicant delivery. These baits were developed to mitigate impacts on non-target wildlife species for use at sites where baits that have been directly-injected with 1080 present a hazard.

The alternative approach of toxin delivery used in *Curiosity*® and more recently the *Hisstory* bait uses an acid-soluble encapsulated pellet known as the 'hard shell delivery vehicle' (HSDV) (Johnston *et al.* 2011). *Curiosity*® contains 80 mg of the toxin para-aminopropiophenone (PAPP) and *Hisstory* contains 4.5 mg 1080 in the HSDV. The HSDV ensures that the toxin does not disperse throughout the bait but releases in the cat's stomach. This method of delivering the bait also plays a key role in reducing the potential exposure of non-target species. When feeding, feral cats are known for consuming large food items, they do not in general masticate but, using their carnassials as "shears" cutting prey up into pieces which they then swallow whole (Leyhausen and Tonkin 1979). Consequently, baits are simply cut into manageable portions which are then swallowed entire, including the HSDV. Conversely, most wildlife species process food items more thoroughly in the mouth. Field studies have shown that most Australian species tend to reject the HSDV if they consume the bait and therefore avoid exposure to PAPP (Hetherington *et al*. 2007; Forster 2009).

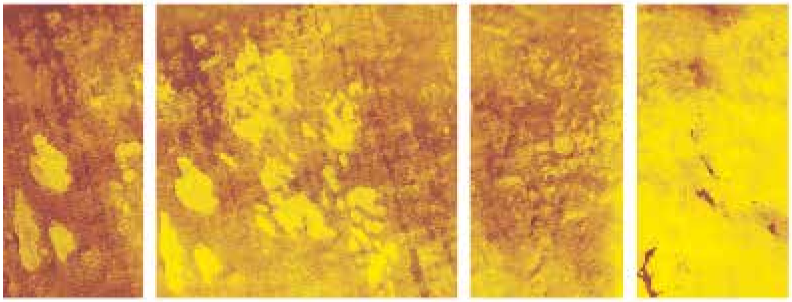
Curiosity® is to be submitted for registration over the next two months. *Hisstory* is currently being tested in field efficacy trials in northern Australia where a HSDV is required to minimise risk to mammalian and avian species but where species that have relatively high susceptibility to PAPP such as varanids (Eason *et al*. 2014; Johnston *et al*. 2014), are active at the time of baiting.

Baiting strategies

There are three factors that are critical to the outcome of baiting programs: 1) bait density and bait encounter; 2) the abundance of prey items; and 3) weather conditions at the time of baiting. Cats, despite being opportunistic predators, will only consume a food item if they are hungry (Bradshaw 1992). If a cat encounters a bait when not hungry it may not be consumed regardless of the acceptability of the bait. For feral cat baiting programs to be efficient and cost-effective, baits must be delivered at a level that maximises their uptake by feral cats but minimises the number of baits required which will also reduce the potential risk posed to non-target species. The relationship between bait consumption and hunger can be extended to prey abundance, which is also a function of long-term weather conditions (season/rainfall). The likelihood of cats encountering baits when hungry is potentially diminished in the presence of an abundant prey population. Therefore bait uptake is invariably low when prey availability is high (Algar *et al*. 2007). The impact of baiting can also be substantially reduced if significant rainfall occurs immediately following the baiting program. Rain renders the baits less palatable to cats by washing away the oils and flavour enhancers that sweat to the surface of the bait. Bait longevity in the field is a critical component in developing successful baiting campaigns to target feral cats.

The current prescription for aerial baiting campaigns requires the deployment of 50 baits/km^2 along flight lines 1 km apart and for ground baiting campaigns, baits are located at 100 m intervals along road/track access. Baiting efforts should be maximised during seasonal declines in prey abundance/activity, termed the "baiting window" (Algar *et al*. 2007). Baiting outcomes can be improved if long-term weather forecasts are used to ensure that baiting programs are only conducted when prolonged periods of fine weather are assured.

With the development of new technologies such as GPS data-logger radio-collars that now can be fitted to cats and the data they provide, we can now be smarter in the way we bait. Instead of the blanket approach currently used we can be more strategic and develop baiting programs based on likely bait encounter rates and distribution patterns and also habitat preferences. These refinements will further improve baiting efficacy and cost-efficiency.



Other tools

Fundamental to the development of an effective control strategy for any pest species is the ability to effectively trap the target species for the collection of biological information, and to enable radio-collaring of individuals to monitor various key parameters. Trapping is also a useful follow-up technique post-baiting, where eradication of cats is required (e.g. small scale areas and islands) or to provide additional control effort (Algar *et al*. 2013; Fisher *et al*. 2014). We have developed a method of trapping that takes advantage of cats' agility and ability to jump for use at sites where conventional trap sets pose a hazard to non-target species. Here, traps are set on a raised platform that minimises the capture risk to non-target fauna yet is still effective for the capture of feral cats. These elevated trap sets are a refinement of the earlier 'bucket trap' used to reduce the risk to non-target species such as robber crabs (*Birgus latro*) on Christmas Island (Johnston *et al*. 2010).

We are also developing a lethal implant, '*Tic-Toc*' that will allow release of radio-collared individuals, retrieval of the radio-collar and data collection, and provide greater certainty about the fate of animals used during studies on 'high stakes' programs such as island eradications.

A revision to the 'Feline Audio Phonic' audio lure is being manufactured that produces the sound of a female cat calling when in oestrus. The phonic consists of a printed circuit board with a microprocessor data driven voice ROM that produces the sound. This phonic will have potential use in both trapping and monitoring programs.

We have also been able to synthetically manufacture the compound from the plant species, *Acalypha indica*, which stimulates cats to chew the plant's roots and then roll in it. This behaviour induces what appears to be a drugged stupor (Algar *et al*. 2013b). The compound is likely to be incorporated into baits and lures to further enhance their attractiveness.

References

Algar D, Angus GJ, Williams MR and Mellican AE (2007). Influence of bait type, weather and prey abundance on bait uptake by feral cats (*Felis catus*) on Peron Peninsula, Western Australia. *Conservation Science Western Australia* **6**, 109–149.

Algar D and Burrows ND (2004) A review of Western Shield: feral cat control research. *Conservation Science Western Australia* **5**, 131–163.

Algar D, Hamilton N, Nickels D and Flematti G (2013b). Science, a weed and cat control. *LANDSCOPE* **29**(2), 59–61.

Algar D, Onus ML and Hamilton NA (2013a). Feral cat control as part of '*Rangeland Restoration*' at Lorna Glen (Matuwa), Western Australia: the first seven years. *Conservation Science Western Australia* **8**(3), 367–381.

Bradshaw JWS (1992). *The Behaviour of the Domestic Cat*. CAB International, Wallingford.

DEWHA (Department of the Environment, Water, Heritage and the Arts) (2008). *Threat Abatement Plan for Predation by Feral Cats*. Department of the Environment, Water, Heritage and the Arts, Canberra.

Eason CT, Miller A, MacMorran DB and Murphy EC (2014). Toxicology and ecotoxicology of para-aminopropiophenone (PAPP) – a new predator control tool for stoats and feral cats in New Zealand. *New Zealand Journal of Ecology* **38**(2), 177–188.

Fisher P, Algar D, Murphy E, Johnston M and Eason C (2014). How does cat behaviour influence the development and implementation of monitoring techniques and lethal control methods for feral cats? *Applied Animal Behaviour Science*: in press. doi:1016/j.applanim.2014.09.010.

Forster G (2009). Non-target species uptake of feral cat baits containing Rhodamine B. B.Sc (Hons) thesis. Department of Agricultural Sciences, Latrobe University, Bundoora, Victoria, Australia.

Hetherington CA, Algar D, Mills H and Bencini R (2007). Increasing the target-specificity of ERADICAT® for feral cat (*Felis catus*) control by encapsulating a toxicant. *Wildlife Research* **34**, 467–471.

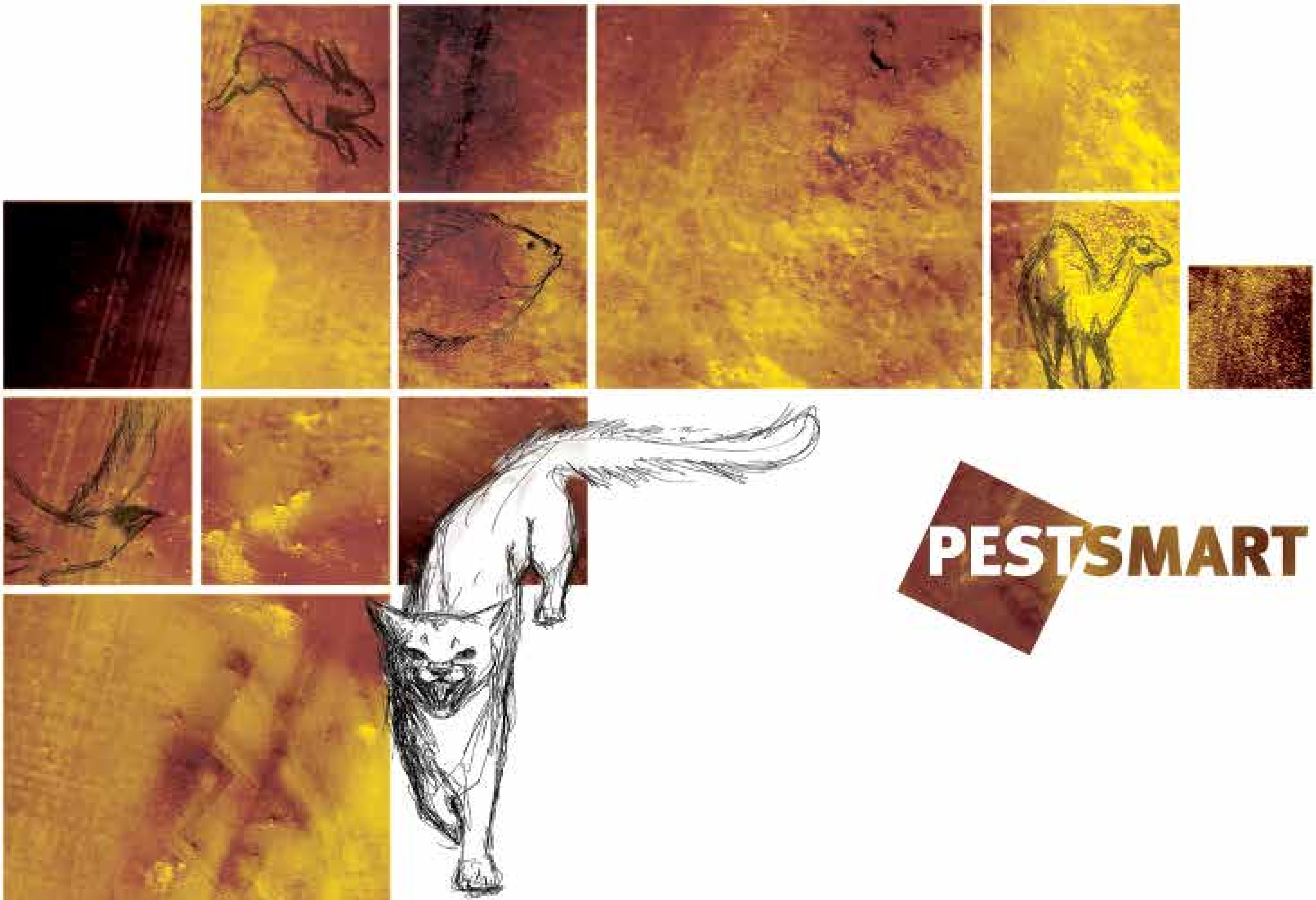
Johnston M, Algar D, Hamilton N, Lindeman M (2010). A bait efficacy trial for the management of feral cats on Christmas Island. Arthur Rylah Institute for Environmental Research Technical Report Series 200. Department of Sustainability and Environment, Heidelberg, Victoria.

Johnston M, Algar D, O'Donohue M, Morris J (2011). Field efficacy of the Curiosity feral cat bait on three Australian islands. In: Island Invasives: Eradication and Management (eds. CR Veitch, MN Clout and DR Towns) pp 182–187. IUCN, Gland, Switzerland.

Johnston M, Bould L, O'Donoghue M, Holdsworth M, Marmion P, Bilney R, Reside A, Caldwell D, Gaborov R and Gentles T (2014). Field efficacy of the *Curiosity*® bait for management of a feral cat population at Roxby Downs, South Australia. Arthur Rylah Insitute for Environmental Research Technical Series No. 253. Department of Environment and Primary Industries, Victoria, Australia.

Leyhausen P, and Tonkin BA (1979). Cat behaviour. *The Predatory and Social Behaviour of Domestic and Wild Cats*. Garland STPM Press.

Short J, Turner B, Risbey DA and Carnamah R (1997). Control of feral cats for nature conservation. II. Population reduction by poisoning. *Wildlife Research* **24**, 703–714.



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