



CONNOVATION
CONSERVATION BY INNOVATION

**Ecological
Horizons**



**General
Dogs Body**



Milestone report

MLA project code:	B.AHE.0065
MLA project title:	Fox and feral cat control using spray tunnel
Project leader:	Simon Humphrys
MLA project manager/coordinator:	Allen Cameron
Milestone number:	3
Date:	31 December 2013

Milestone 3

Complete multiple habitat field trials of the preferred tunnel prototype.

Assess the appropriateness of registering spray tunnels in Australia, and seek patent protection and additional funding if required.

Abstract

This project iteratively developed and tested a sentinel spray device as proof-of-concept that automating fox and feral cat control on-farm could be achieved that would reduce predation and disease spread impacts on sheep and goat enterprises.

The project began by testing whether cats and foxes would groom carrier gels/pastes and toxic formulations applied to their coats. This research demonstrated all cats and some foxes reliably groom and that there was a preference to groom certain areas of their coats. When toxic gel/paste containing para-aminopropiophenone (PPAP) was sprayed onto the upper flank of cats and foxes a majority of cats could be lethally poisoned but only some foxes.

Spray device development initially used pipes/tunnels (see image 1) to achieve some species selectivity but these were not practical formats due to relatively low and highly variable visitation rates by cats and foxes.

Image 1

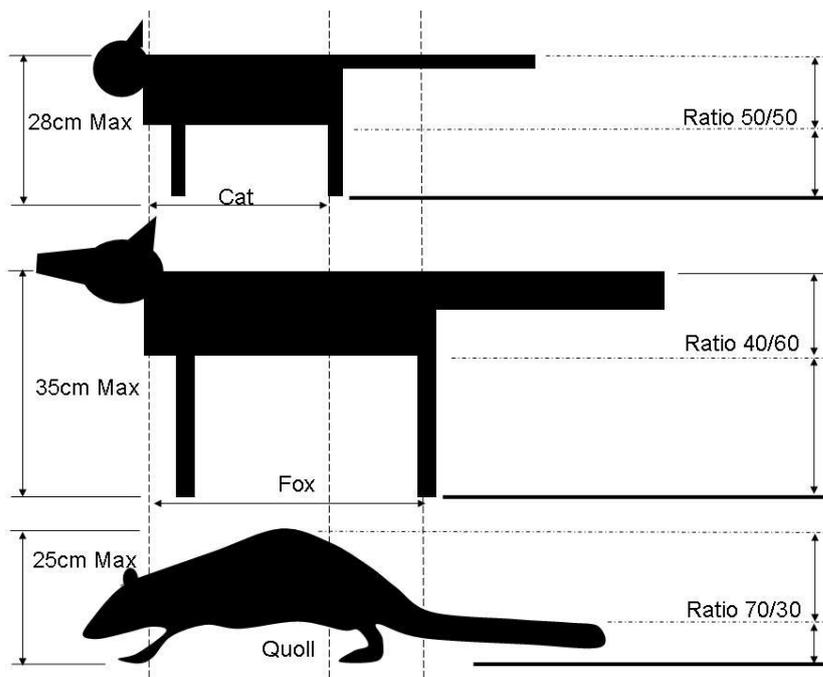


Radio-collared feral cat investigating spray tunnel on Kangaroo Island (SA)



Ultimately the spray device evolved to encompass a morphometric array of sensors designed so that cats and foxes would be the most likely species to actuate the unit and a spray mechanism to administer poison to the coat of cats and foxes. The morphometric array has been designed so that a cat or fox sized/shaped animal would block the 2 sensors at 3 and 9 o'clock and not the top or bottom sensors. This actuates the device and it sprays whatever animals is in front of it. If the two lateral sensors are blocked at the same time as the top or bottom sensor the device is not actuated. This is how the devices have been targeted to cats and foxes (see image 2)

Image 2



Proof-of-concept studies were completed in pens (see attached report) using captured wild cats and foxes and also under field conditions (see attached report). The results of pen and field testing showed that devices could be configured (images 3, 4, 5) to selectively target cats and foxes that passed by them, however in achieving that the devices were rarely activated in the field. Moreover the sensor array was vulnerable to environmental conditions that resulted in devices failing in the field eg moisture, fogging, dust obscuring sensors. The field studies clearly demonstrated that the final spray device prototype was not sufficiently robust or species specific to warrant commercialisation

New technologies such as image recognition and automating analysis of camera images in real-time offer practical solutions to overcoming the shortcomings of the current prototype and maintain the potential of automating species specific lethal management via sentinel devices.

Image 3



Image 4



Image 5



Project objectives

The objectives of this Project were:

1. To develop and pen/field trial non-toxic then toxic prototype spray tunnels in multiple environments.
2. To assess the utilisation of tunnels by foxes and cats and the risk to non-target species.

Success in achieving milestone

All three milestones have been met as per the Project Variation agreed and signed off between MLA and Invasive Animals Ltd in March 2012.

Overall progress of the project

Overall, this project achieved its stated aims. The project confirmed that cats and foxes will groom a toxic viscous liquid formulation that is squirted onto their coats but foxes are certainly less inclined to this behaviour than cats.

Tunnel designs were trialled initially on Kangaroo Island using radio collared cats but this design was abandoned due to low visitation rates. At least 7 different prototypes based around a sensor array were designed and manufactured by Connovation (the owner of the internal mechanism/engineering/electronics that makes the devices fire poison liquid) tested in pens in Victoria and their design improved after each test period. This required both external and internal engineering to arrive at a final field ready prototype.

In pen studies the project demonstrated approximately 50% of cats that trigger the devices were killed as they groomed PAPP gel off their coats. However, foxes that triggered the devices and were sprayed with PAPP gel failed in each case to groom sufficiently quickly to receive a lethal dose of PAPP (see attached report 1).

As the initial field trials in the north west of South Australia are aimed at feral cat control, the pen study efficacy of the preferred prototype was considered satisfactory since few non-targets exist in that environment and if 50% of cats passing the devices in the field were killed this would prove the concept.

This field trialling commenced on the 31st of May 2013 and the trial ran for 30 days (see attached report 2).

Results from this field trial were also used to determine the practical robustness of the preferred prototype and informed the project management of next developmental steps. Extensive testing of a future prototype will require that units are effectively species specific and that the mechanisms used to achieve species specificity are robust enough for deployment in the field eg can withstand broad weather conditions and operate reliably.

Recommendations

The project has proof-of-concept tested spray tunnels and spray devices in two very different in-field environments (Kangaroo Island and Northern South Australia rangelands). The results of these field studies have demonstrated that sensor arrays can be used to make devices selectively targeted to cats and foxes but not species specific. In addition sensor arrays were not sufficiently robust for in-field use. These results have lead the project management team to conclude that spray devices that use sensor arrays will not be commercially viable and that automation of image recognition in real-time should be assessed as a platform for achieving what the sensor arrays were designed for - species specificity.

Outcome

An invoice will be generated by Invasive Animals Ltd and delivered to MLA as per the payment schedule below.

Payment Date	Milestone	Fees	Expenses	Capital	Total
31-Mar-2011	1 *	30,000.00	20,000.00	0.00	50,000.00 [PAID]
30-Apr-2013	2 **	30,000.00	20,000.00	0.00	50,000.00
25-June-2014	3 **	10,000.00	10,000.00	0.00	20,000.00
TOTAL					AUD \$120,000.00
*or on signing of this agreement					
**on acceptance and approval of corresponding milestone, with tax invoice and copy of receipts attached					
NB: any money uncommitted at the end of the Project must be returned to MLA					