The Impact of Sheep Predators in Australia and New Control Methods Under Development

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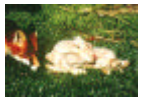
Impact of dingos/ wild dogs on sheep

- Dingo/wild dog distribution has historically dictated the geographical distribution of sheep production in Australia.
- Sheep predation rates vary widely between properties and wild dog density does not correlate with their impact.
- Rates of predation range from 0.1% to 33% and average around 1% sheep losses on properties studied.
- Wild dog impact on Queensland estimated at $33 M p.a., including $18.3 M in direct stock losses.
- There is evidence that wild dogs are increasing in density and ferocity in some areas.

Impact of foxes on sheep



- European red foxes co-inhabit half of mainland Australia and Tasmania with sheep.
- Predation rates of lambs by foxes range from 0.25% where foxes were controlled to 30% in areas without fox control.
- Consistent findings of predation of viable lambs have been reported of 2%, 2.7%, 1-2%, 2.9% and 1.5%.
- Potentially 600,000 lambs (2% of annual yield) fall victim to foxes annually, at a cost to the industry of $15 M ($25 head).
- Figure does not including future lost earnings from wool, genetic improvement, control costs, disease spread or social impacts.

Impact of feral pigs on sheep

- Feral pigs co-occupy 40% of the Australian mainland with stock.
- Feral pig lamb predation reportedly ranges from 0%-38% and averages between 7% (western NSW) and 19% (central NSW).
- 6 million lambs are born annually in co-occupied areas, potentially equating to lamb losses of 0.4 to 1.2 million lambs or greater than $10 million p.a. ($25 head).
- Feral pigs indirectly affect sheep production through pasture consumption and damage, infrastructure damage, and disease transmission.

another innovation

AWI Canid Bait project

- 1080 meat baiting is a widely used and effective method of fox and dog control in Australia, however:
  1. it can also be toxic to some native animals,
  2. it is slow to act, with poisoning taking 4–6 hours,
  3. it can be visually distressing and perceived as inhumane, and
  4. the toxin is still under APVMA review and has been banned in the USA.
- AWI signed a 3 yr contract with PAC CRC in 2003 to assess possible improvements to 1080 baits through using synergists and to develop a new species-targeted toxin for wild dog and fox control.
- The new toxin is selectively toxic for eutherian carnivores, rapid acting and humane in its mode of action. The compound acts by interfering with oxygen transport in the blood, resulting in aneffect similar to carbon monoxide poisoning.

another innovation

Initial wild dog trials with prospective new canid toxin

Pen trials commenced on wild-dogs at Robert Wicks Pest Animal Research Centre, Queensland, in November '03.

T1 Effect on wild dogs of orally administered new toxin

T2 Effect on wild dogs of new toxin administered by gavage

- Gross pathology & histopathology conducted by Queensland Primary Industries Vet. Laboratory

- Full haematology and blood biochemistry by Idexx

- DNA fingerprint analysis by UNSW

Initial European red fox trials with prospective new canid toxin

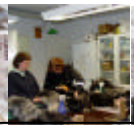
Pen trials commenced on farmed foxes at the University of Kuopio, Finland, in January 2004.

T6 Effect on foxes of new toxin administered by gavage

T7 Assessment of two compounds with putative synergist effects on the toxicity of the new toxin in foxes.

- *same pathology, histopathology, haematology, blood biochemistry and genetic analyses being undertaken.*






Preliminary results from initial wild dog and fox laboratory trials

- Both canids are highly susceptible to the toxin, dogs possibly more so.
- Responses to varying doses were highly predictable for both species, indicating no substantial age, sex, mass, genetic or health biases.
- One of the synergists increased the effectiveness of the toxin in foxes.
- The toxin showed little potential for debilitation from sub-lethal doses.
- Poisoned animals lay down and appear to fall asleep.

Impending research for AWI Canid Bait project

- Wild dog and fox pen trials with toxin + synergist using various modes of delivery.
- Continue non-target species testing under pen and field conditions.
- Examine potential animal antidotes.
- Undertake dog/fox 1080 synergist trials (synergists differ between toxins as related to their mode of action).
- Continue compiling APVMA registration package and facilitate route to market.

MLA / NFACP / PAC CRC / ACT Manufactured Feral Pig Bait

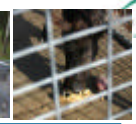
A manufactured feral pig bait does not exist, but could:

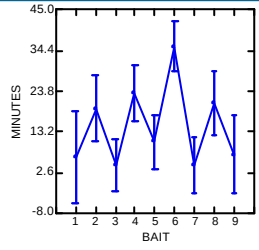
1. eliminate the labour intensive preparation of current baits,
2. provide a bait that is available during all seasons of the year,
3. increase quality control of toxin concentrations in baits,
4. possibly be available as a "take-home" bait, rather than (as at present) graziers and other landholders requiring government land protection officers to supply 1080, and supervise its mixing with the bait,
5. be used for aerial application, and
6. reduce the risk of poisoning non-target animals.

Desirable characteristics of a feral pig bait:

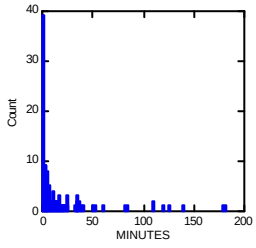
- ✓ Target-specific
- ✓ Humane
- ✓ Easy to use
- ✓ Shelf stable
- ✓ Cheap
- ✓ Field stable in short-term
- ✓ Odourless & tasteless
- ✓ Registered toxin
- ✓ Safe for users
- ✓ Readily accepted
- ✓ Effective antidote
- ✓ Take home poison
- ✓ Low carcase residue
- ✓ Low environmental residue
- ✓ Rapid death
- ✓ Suitable for aerial broadcast

Feral pig bait pen trials

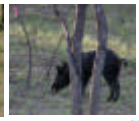


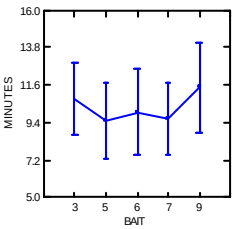
Commercial bait prototypes out-performed grain (6) and meat (8&9).



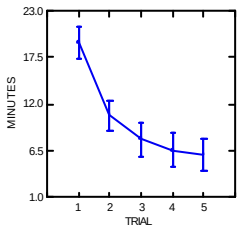
Time taken to make bait preference choices.

Feral pig bait paddock trials





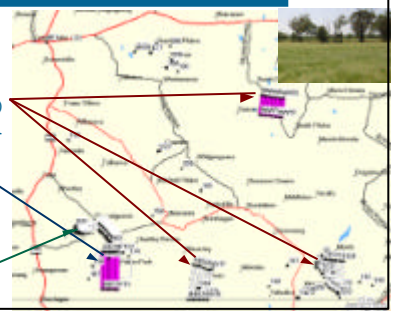
Similar results to pen trials. Package baits (5 & 7) slightly outperformed grain (6) & meat (9).



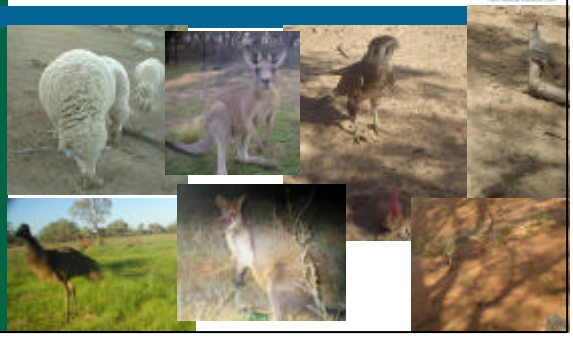
Feral pigs rapidly become familiar with baits indicating benefits of pre-feeding before toxic baiting.

Feral pig bait field trials

- 2 prototype baits tested against fresh meat.
- each bait contained a different biomarker.
- 3 sites (100 km² each) baited under different regimes- waters, grid or combination.
- 4th site baited with triple biomarked baits.
- Feral pigs at all sites aerially shot and collected to assess bait uptake.
- Non-target uptake assessed at 5th site.



Feral pig bait non-target monitoring

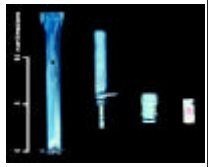


Feral pig bait

- Preliminary results: 80% uptake of manufactured baits in field trials and 52% of fresh meat baits (similar to prior studies) as determined through Iophenoxic acid analysis.
- Extensive toxic bait trials and non-target species testing is currently occurring in three states.
- The manufactured bait will initially contain 1080 (currently used in 75% of pig baiting exercises) in a species-targeted delivery system based on bite-force differentials.
- The bait can be readily adapted to contain cyanide, a toxin endorsed by animal welfare groups.
- The bait could carry vaccines (pseudo-rabies), viruses (immunocontraceptive) or 'Achilles Heel' approaches.

M-44 Mechanical Ejectors

- Have been used in USA for 60+ years for coyote control.
- Are over 95% target-specific.
- Generally contain sodium cyanide, a rapid and humane toxin that produces a corpse.



- Last longer than baits, and can therefore act as permanent sentinel stations for wild dogs and foxes.
- Have been used in Queensland and Victoria under experimental research permits for some years.

Use of M-44's in Australia?

➢ Victoria and Queensland are currently assessing obstacles to registration:

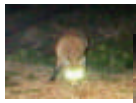
-classed as a restricted weapon in Qld,

-cyanide is a tightly regulated toxin.

➢ Victoria is looking at registering M-44's with a 1080/analgesic combination toxin instead of cyanide.

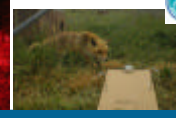
➢ Current toxin development and canid attractant research can directly assist adoption of M-44's in Australia.

Canid lure research



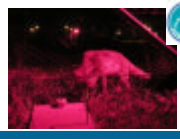
- Synthetic canid lures are widely used by USDA to attractant, survey and control coyotes/wild dogs, but their affect on foxes was less well known.
- Synthetic lures have un-tapped commercial applications in:
  1. attracting and detecting foxes/wild dogs at low density,
  2. increasing the likelihood of trapping foxes/wild dogs,
  3. potentially reducing the area and number of baits required for effective fox/dog baiting programs, and
  4. in turn reducing sheep predator control costs and non-target exposure during such exercises.

Canid lure research

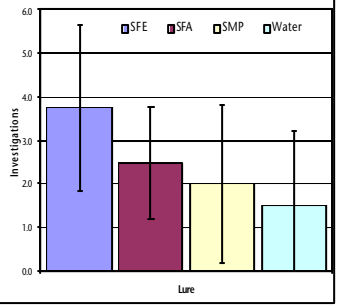


- To pen and field trial three synthetic canid lures to ascertain the behavioural response each elicit in foxes and wild dogs.
- To develop and commercialise an appropriate holding vessel and dispenser (aerosol can) for the most effective lure.
- To incorporate lure/s that promote digging into trial baits for AWI project to increase early uptake.

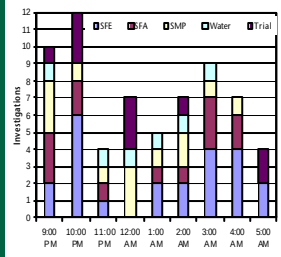
Nightly average lure investigations



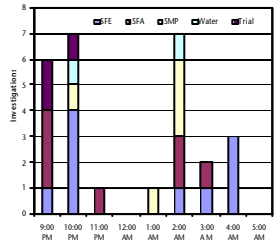
- All stations investigated evenly without lures present.
- SFE most attractive for both sexes.
- Females less interested than males.



Timing of lure investigations



Males: throughout the night



Females: more crepuscular

Acknowledgements

another innovation

ANIMAL CONTROL TECHNOLOGIES

MEAT & LIVESTOCK AUSTRALIA

BRS

Natural Heritage Trust

pestat