PREDATOR CONTROL AND PARA-AMINOPROPIOPHENONE (PAPP)

Your initial questions answered

PAPP (which is short for para-aminopropiophenone) is a new toxin that has been developed as a humane and effective control tool for predators. It is currently registered for targeting stoats and feral cats. PAPP's toxic effects are related to its ability to reduce the red blood cell's ability to release oxygen. After the bait is eaten the onset of symptoms is rapid and stoats and cats are usually unconscious within 45 minutes.

What are the features of PAPP?

A single-feed poison, PAPP rapidly breaks down within the body; it has low toxicity to birds, and is unlikely to cause secondary poisoning for non-targets. An effective antidote is available in case of accidental poisoning.

All pest control toxins have advantages and disadvantages. These are summarised for PAPP below:

Advantages	**Disadvantages**
Simple antidote	At present only available in a paste that has to be added to fresh meat
Humane (very rapid action)	
Low secondary-poisoning risk	
Effective	

How is it used?

The only currently registered product containing PAPP is *Preda***STOP**™. *Preda***STOP**™ is a soft green paste that contains 410 mg/kg PAPP as the active ingredient. It comes in pre-loaded syringes packed in a secure carry box with instructions. Baits are prepared by enclosing a small amount of paste in green-dyed raw minced meat to form a small meatball. These meatballs are placed in the field in bait stations.

Pre-feeding with non-toxic green-dyed minced meat for one to two weeks before laying bait maximizes bait uptake. It is strongly recommended for stoats and must be undertaken for feral cats. In areas occupied by weka and kiwi or other birds that may consume meat baits, the bait stations need to be of a design that will exclude these non-target species. Meat baits containing PAPP must be treated as potentially poisonous to non-target species and must be handled as carefully as other types of toxic bait.

More information and more questions addressed

What sort of toxin is PAPP?

Poisons used for the control of pests are classified as:

i) Anticoagulants- which include diphacinone and brodifacoum
ii) Non-anticoagulants- such cyanide, cholecalciferol and 1080

PAPP is a new non-anticoagulant. It has been described as a red blood cell toxin.

How does PAPP work?

PAPP is absorbed into the blood stream after a bait is eaten. It causes a condition called methaemoglobinaemia which prevents red blood cells releasing oxygen. This creates a deficit of oxygen in cardiac muscle and the brain' leading to death. A lethal dose of *Preda***STOP**™ is approximately 35mg of paste for stoats and 200mg of paste for feral cats, usually causing death within 2 hours. The animals become lethargic and sleepy before they die.

Who uses it and why use PAPP for stoat and feral cat control?

Land managers, pest control professionals and community groups can use PAPP to protect vulnerable native species from predation by stoats or feral cats. The use of PAPP baits can complement traditional trapping and may enable better protection of native birds, such as kiwi, over larger areas.

PAPP provides an additional control tool targeted specifically at stoats and feral cats, species that are notoriously difficult to control. Trapping is labour intensive and prior to the registration of PAPP there were no poisons registered in New Zealand for stoat control.

Are there other target species for PAPP?

The registration of PAPP may be extended in the future to include ferrets. Research is underway testing the effectiveness of PAPP at controlling ferrets.

What are the welfare implications of using PAPP?

One of the drivers for developing PAPP has been animal welfare. A humane death has been identified as a very important aspect of wild animal control. When delivered at a lethal dose, induction of high levels of methaemoglobin induces death with minimal symptoms of distress.

Research has shown the symptoms of poisoning are similar in both feral cats and stoats. The onset of symptoms of poisoning and time to death are swift in comparison to the anticoagulant toxins.

Are there restrictions on the use of PAPP?

The use of PAPP is subject to various controls imposed under the HSNO legislation and conditions of registration. These include:

- Only persons who are Approved Handlers and hold a Controlled Substance License (CSL) may purchase and use PAPP.
- PAPP must be used in bait stations. On completion of the control operation, remaining toxic baits must be recovered and buried.
- The product label instructions must be followed.

Do other countries use PAPP for animal pest control?

In the USA it has been investigated as a tool for coyote control. In Australia it will be used for control of foxes, wild dogs and feral cats. Registration for field use in Australia is expected in 2013/14.

Does PAPP persist in the environment?

PAPP is water–soluble. This means that if any bait falls out of a bait station the PAPP will be easily leached into the soil by rain where it is broken down into non-toxic naturally occurring substances. OECD test results show it degrades within a month. Consequently, PAPP does not accumulate in the environment, and as it is used in bait stations it is unlikely to enter waterways. PAPP appears to have similar biodegradability and solubility as cyanide and 1080.

Will PAPP pollute water supplies?

PAPP is initially being developed for use in bait stations. Baits will be placed in the stations away from waterways so contamination is most unlikely. For example, in the recent Waitutu trial 90 baits were placed out (one per station) at one time over an area of approx 800 hectares and each bait contained approximately 0.04g of PAPP in a meatball type bait. In total there was no more than 4g of PAPP in the field at one time, so soil or water contamination would have been limited and most unlikely.

How toxic is PAPP to humans?

PAPP is toxic to humans. Suspected poisoning requires immediate medical attention. Treatment involves the administration of the antidote (methylene blue) and oxygen.

PAPP must be stored securely to prevent access by children or uninformed persons. When used in the field appropriate signage must be in place to warn of the dangers.

PAPP, like any other poison, has the potential to cause sub-lethal effects if exposure occurs above certain levels. If PAPP users follow simple controls and safe handling practices, they should not suffer any symptoms of PAPP poisoning.

What is the treatment for PAPP poisoning?

Methaemoglobinemia can be treated with oxygen and methylene blue. A 1-2% solution (1-2gm/ 100 ml) can be administered at 1 to 2 mg/kg intravenously slowly over five minutes followed by an intravenous flush with normal saline. This may need to be repeated in severe cases. Methylene blue restores the iron in haemoglobin to its normal oxygen-carrying state.

Cases of nitrite poisoning, which has the same mode of action as PAPP in dogs and cats have been treated successfully with methylene blue. For cats a single dose of 1.5 mg/kg has been found to be safe and effective in reversing methaemoglobinaemia.

What is the risk to livestock or game?

There is potential for PAPP to be toxic to game and livestock, so farm stock should be kept out of areas where PAPP is being used until the risk of poisoning has passed. The risk is also reduced by using PAPP in bait stations which restricts access for non-target species. However, given the large body weight of most game and stock species compared with the target pest species a fatal dose is unlikely.

Sub-lethal doses of PAPP are eliminated from the tissue of animals that survive accidental exposure within one to two days. This menas there is a negligible risk of procurement of contaminated game meat which might be harvested at a later date.

What is the risk to pets?

Dogs are vulnerable to PAPP and a small dog (3 to 4 kg) could conceivably receive a fatal dose of PAPP from a bait targeting feral cats. Domestic cats are equally susceptible to being fatally poisoned as their feral counterparts. Keep pets out of areas where PAPP baits are being used. If this is not possible, dogs should be kept under control and muzzled until this risk of poisoning has passed.

The risk of secondary poisoning from scavenging carcasses of feral cats or stoats killed by PAPP is low. However 'low risk' does not imply 'no risk' so pets and farm dogs should be discouraged from eating potentially poisoned carcasses.

If a pet is suspected to have eaten a PAPP bait, immediate veterinary assistance should be sought. An effective antidote exists if administered promptly.

What is the risk to birds and other species?

Birds are less susceptible to PAPP than stoats and feral cats. However, some species of bird can be adversely affected if they directly eat bait. Weka that ingested PAPP during a trial became subdued and lost their appetite for a period. So it is still important to limit birds' exposure to PAPP by using bait stations that exclude them.

Risk to birds such as hawks that scavenge carcasses should be low given the rapid elimination of PAPP by excretion in the target species and further breakdown in carcasses following death, and also because a large bolus dose is needed to induce toxicity.

Further research on all non-target species including reptiles is being planned.

Who to contact for more information?

Connovation Ltd (manufacturers of *Preda***STOP**™)
Phone: (09) 273 4880