



acta

**F
U
O
G
I
E**

Feral Pig Bait

*Protecting Australia's
Livestock & Wildlife*

Introduction - The PIGOUT® bait project

A collaborative development

Existing field preparation of baits made from poisoned grain and fresh meat or offal can pose problems including dosing accuracy, OH&S, handling, stability of the bait, cost of preparation and risks to non-target species.

MLA and the Federal Government through the National Feral Animal Control Program and wildlife and Exotic Disease Preparedness Program (WEDPP) supported a detailed research program to develop a shelf-stable feral pig bait. This R&D project involved a collaboration between the Invasive Animal Cooperative Research Centre (IA-CRC) and scientists at Applied Biotechnologies Pty Ltd (the R&D arm of Animal Control Technologies Pty Ltd).

This core team received active cooperation from several government and semi-government agencies throughout Australia and was also assisted by many environmental agencies, private landholders and National Park managers.

The testing focused on making and delivering a new bait that was shelf-stable, easy to handle, reliably dosed, and highly effective for feral pigs. Above all it was found to reduce the risks to livestock, working dogs and native non-target species, without the need for construction of bait stations or other protective measures.

The bait also has the capacity to deliver vaccines and bio-markers to pigs and is being tested to carry improved toxins and contraceptives.

PIGOUT® will also be a crucial control technique in the event of an exotic disease outbreak, which would have the potential to threaten human health and decimate the grazing industries of Australia.

The cooperation of so many groups is testimony to the importance of developing the PIGOUT® bait, and the team acknowledges the support of the many participants in one of the most successful collaborative projects seen in the vertebrate pest field.



Table of Contents

Impact of feral pigs and control methods	I
Purpose	3
Regulatory information	3
Health and Safety Warnings	4
Summary of Use	4
Feral pig poisoning	5
References	12

Acknowledgements:

This booklet has been prepared by Dr Steve Lapidge and Dr Brendan Cowled of the IA-CRC with Prof Linton Staples, Ms Michelle Smith and Paul Crock of Animal Control Technologies Pty Ltd with reference to all relevant published and government advisory and legislative information together with the results of the extensive testing program on the PIGOUT® bait project.

In addition the booklet has been formally pre-reviewed by a reference panel of ten pig management experts from all states and territories. We would like to acknowledge the constructive comments and advice from all contributors.

Advice received by Animal Control Technologies (ACTA) from listed organisations does not constitute an endorsement of the product or the company and they do not bear any responsibility for, or the liability, from the end use of this booklet or the product. The information contained in this booklet is based on scientific literature and material produced to date, and is believed to be reliable. ACTA and collaborating agencies assume no responsibility for the accuracy or completeness of the data contained herein. © 2007 ACTA Pty Ltd

acta



How big is the feral pig problem?

The number of feral pigs (*Sus scrofa*) in Australia has been estimated to be between 3.5 and 23.5 million, inhabiting approximately 40% of Australia. Their distribution and abundance fluctuates markedly between years based on environmental conditions and availability of food and water.

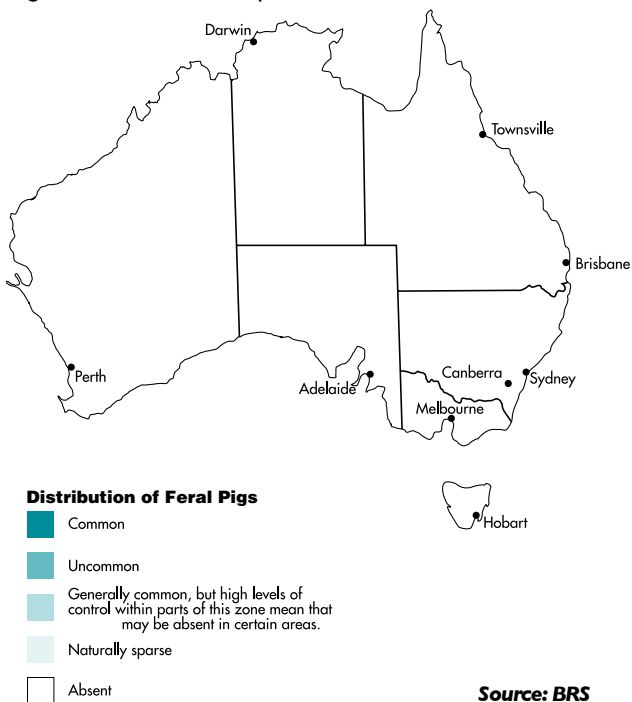
What damage do feral pig cause?

Due to the wide habitat range of feral pigs (much of which includes grazing land), the cost to Australian Industry and the environment can be measured in hundreds of millions of dollars in lost productivity and environmental destruction.

Damage to agriculture:

The agricultural impact of feral pigs alone has been estimated to be in excess of \$100 million annually. Impacts include lamb predation, infrastructure damage, crop and pasture damage, water fouling, disease spread, erosion, competition with stock and the huge costs of control.

Lamb and goat predation is so serious that vast areas infested with pigs have become unusable for sheep farming. Lamb losses of around 15% to pigs is common but losses as high as 38% have been reported.



Environmental impact:

Rooting and digging behaviour of feral pigs effectively ploughs up riparian vegetation and destroys native ecosystems, leaving these areas susceptible to soil loss, weed establishment and to the spread of disease such as dieback (*Phytophthora cinnamomi*) through native vegetation.



Feral pigs are opportunistic scavengers and prey on invertebrates, bird eggs, small mammals, reptiles, amphibians and soil invertebrates. Their selective feeding habits also effect the biodiversity of vegetation and creates competition for the food resources of native species.

Feral pigs have negative impacts on native ecological systems including changing species composition, disrupting species succession and by altering nutrient and water cycles. Impacts can be direct or indirect, acute or chronic, periodic or constant, and may be influenced by changing seasonal conditions.

Damage to infrastructure:

Feral pigs can damage fences by tearing holes and by weakening wires and posts. They also destroy or pollute water sources and damage water supply channels in irrigated areas by their wallowing behaviour and defecation.

Disease amplification and transfer:

Feral pigs are also known to be vectors for a number of serious endemic and exotic diseases that have the potential to devastate commercial pig operations as well as transmitting to other animals and humans. Examples include Foot and Mouth Disease Virus (FMD), leptospirosis, brucellosis, meloidosis and Japanese encephalitis.

The disease risk posed by feral pigs is regarded by some as a "ticking time bomb" for Australia if a serious exotic disease gains access to the wide-ranging pig population.



Photo: Brendan Cowled



Some information about feral pigs

Feral pigs can range in liveweight from 10kg weaners to 300kg or more old boars. The average range in wild pig populations is from 20 to 70kg, but weights vary greatly with season and food availability. Animals larger than 100kg are relatively uncommon.

Pigs are omnivores and readily eat vegetable matter and meat in any form. They utilise seasonally available food and generally sustain themselves on anything they find ranging from fruit and sugarcane in tropical regions to lambs in pastoral regions.

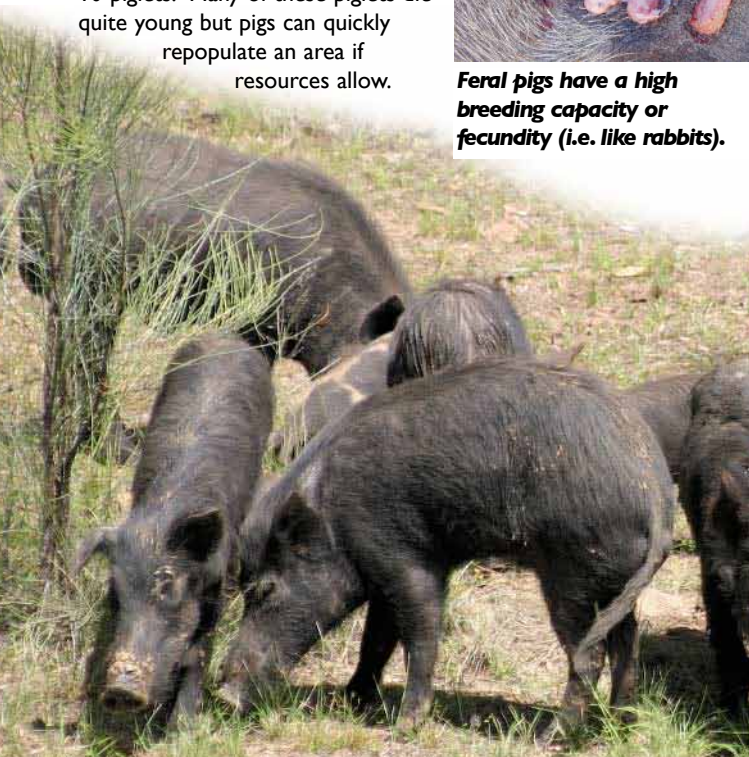
Female pigs can breed in their first year and commonly raise litters of 10 piglets. Many of these piglets die quite young but pigs can quickly repopulate an area if resources allow.



Fully grown feral pigs can exceed 300kg but most are less than 100kg



Feral pigs have a high breeding capacity or fecundity (i.e. like rabbits).



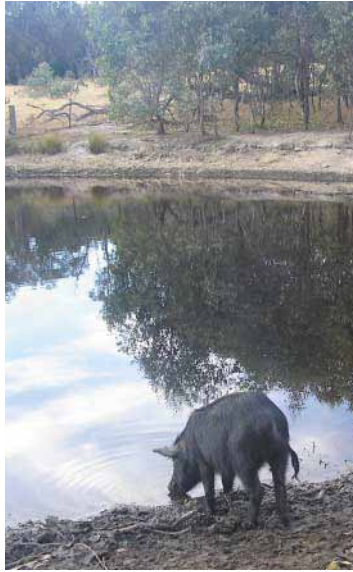


Feral pigs are aggressive if threatened and can cause serious injuries by biting or gouging with tusks (boars).

Feral pigs are mostly active foraging for food at night but can also move around during daylight hours, particularly when undisturbed.

One of their greatest weaknesses is that they require drinking water each day. When conditions are dry they are most often found close to waterways, waterholes or dams.

The concentration of pigs around waterholes in dry seasons provides an ideal opportunity to control the pest.



The need for pigs to access water each day provides an excellent control opportunity.



Feral pigs commonly raise litters of 10 piglets



Controlling feral pigs

The impact of feral pigs on ecosystems in Australia has resulted in their listing at federal level, and in some states as a 'threatening process' for endangered species and ecological communities.

Under the Commonwealth EPBC Act 'predation, habitat degradation, competition and disease transmission by feral pigs' are listed as a key threatening process.

Methods for control

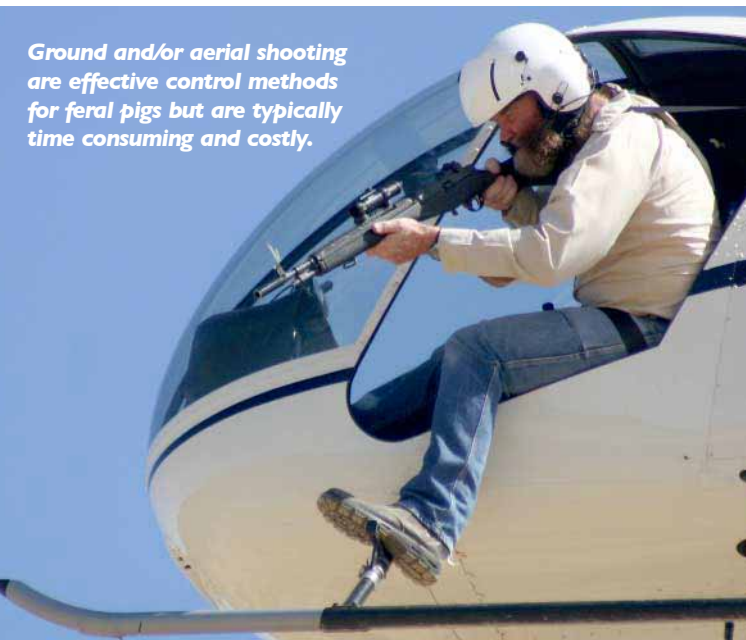
Techniques to reduce the impact of feral pigs vary between states and territories, but the most common methods include harvesting, shooting, trapping and baiting.

A single method in isolation may provide limited local control of the pig problem. As with all vertebrate pests, integrated management campaigns involving neighbours and utilising different control methods concurrently will result in more successful widespread or regional result.



The Federal EPBC Act listing means the impacts of feral pigs must be managed under the law.

Ground and/or aerial shooting are effective control methods for feral pigs but are typically time consuming and costly.



Trapping

Cage trapping can provide useful control for feral pigs, especially in areas where baiting and shooting are too risky.

Simple traps can be constructed at minimal financial cost, however the need to constantly monitor the traps make these control methods time consuming and expensive.



Harvesting feral pigs for the game meat trade is effective however involves extremely stringent requirements and is a fickle market.

Animal welfare issues are also critical in relation to the time the animals are in the traps and the construction of the trap to ensure minimal risk of injury to the trapped animals.

Regulations regarding the types of baiting materials must also be strictly adhered to.

Good operators can trap significant numbers of pigs in well constructed cage traps.



Baiting

Baiting provides one of the most effective methods for a quick and efficient knockdown of feral pig numbers over wide areas and has been practiced successfully for many years in most jurisdictions.

Traditionally, baits for the control of pigs were manufactured in the field with meat offal or grain used as the substrate, and the poison either injected or spread through the bait.

Poison types

Feral pigs have been baited with a range of poison substances including sodium fluoroacetate ('1080'), yellow phosphorus and warfarin (an anticoagulant poison to which pigs are highly susceptible).

The use of yellow phosphorus in carcass material as a bait for pigs poses significant risks for non-target poisoning of other animals. The use of phosphorus and anticoagulant poisons are not supported on humaneness grounds.

Controlling feral pigs with baits containing sodium fluoroacetate or '1080' is legal, and very effective. However strict protocols apply for accessing or making the baits in all states and territories.



The PIGOUT® Project has delivered a shelf-stable factory-dosed manufactured bait



What is '1080'?

Sodium fluoroacetate or '1080' is a chemical found in several Australian native plant species. It is a small molecule closely resembling acetate, a key element in the metabolism of sugar to produce energy in cells.

Once ingested by the feral pig, the fluoroacetate molecules substitute for acetate in the metabolic process and block the activity of enzymes critical to energy production. The feral pigs succumb to a loss of energy to all organs, with the heart, diaphragm and brain most affected.

Death occurs approximately 6 to 12 hours after bait ingestion.

Below: Pigs take to PIGOUT® baits in a baiting trial. Right: Pigs were radio-tracked and their bodies recovered.



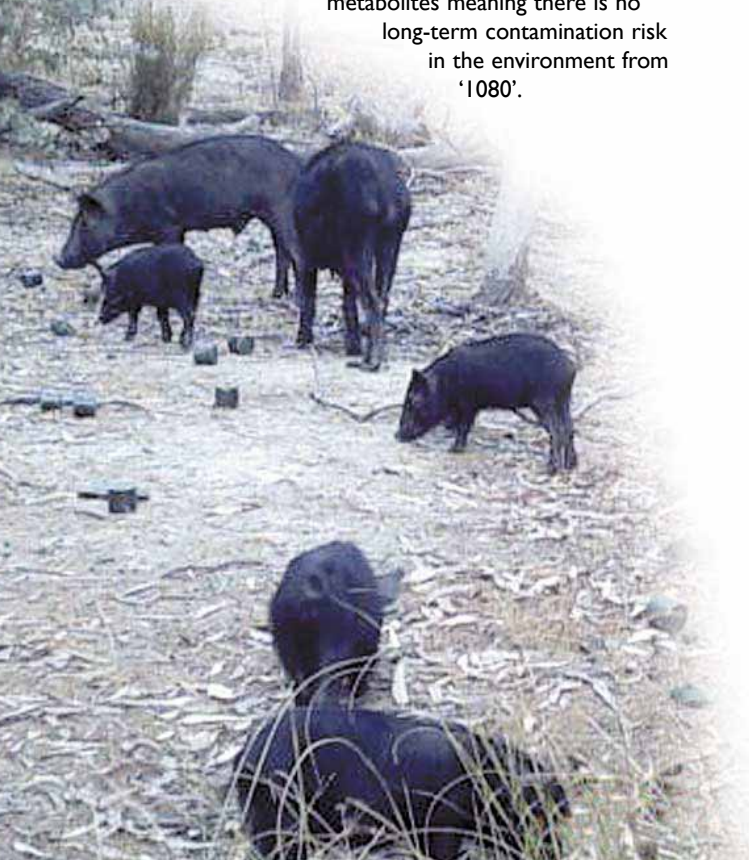
Secondary poisoning risks & '1080'

Extensive research has shown that the level of '1080' remaining in the edible tissues of a dead pig are too low to be a major poisoning risk to scavenging animals and birds.

There is however, sufficient poison residue in the stomach to pose a risk to scavenging wild dogs and foxes that are highly susceptible to '1080' poison. While this may be beneficial in secondary control of these pest animals, it is why working dogs should never be allowed to scavenge on pig carcasses.

A large bird of prey would need to eat more than 10kg of dead pig flesh at one time to receive a dose to put the bird at risk.

Any poison residue in the pig carcass is eventually degraded by bacteria and moulds to harmless metabolites meaning there is no long-term contamination risk in the environment from '1080'.



Baiting methods

Baiting can be conducted by ground or aerial application in areas where access is difficult or the scale of the program makes ground baiting too costly.

Ground baiting of local populations of pigs is highly successful. Best results however, are obtained when baiting is conducted over broad areas in co-ordinated campaigns. In such campaigns, all feral pig habitats across a landscape should be effectively treated. Efficacy is affected by a number of factors including pre-feeding, numbers of baits laid, placement and timing.



PIGOUT® Feral Pig Baits will greatly simplify aerial campaigns

Timing of baiting programs

Successful campaigns coincide with a shortage of feed as pastures dry off in the autumn (southern Australia) and the dry season (northern Australia).

Periods of extended dry or drought provide an exceptional opportunity to control feral pigs as populations tend to congregate around limited watering points. Baiting these areas at this time provides excellent control. Baiting prior to the breeding season (generally between May to October), removes the breeding capacity of a population.

Pre-feeding

Pre-feeding prior to application of poisoned baits has also been shown to increase the efficacy of ground baiting because the free-feeding draws more pigs to bait stations and lets them get a taste for the food prior to the introduction of the poison baits.



Pre-feeding can be undertaken with un-poisoned grain or non-toxic 'Pre-Feed PIGOUT® Baits'



Involving neighbours

As with any vertebrate pest control program, results are greatly improved when conducted over broad areas in co-ordinated campaigns involving neighbours.

This approach minimises refuge areas where pigs can avoid baits and removes the pest from a wider area to help reduce re-infestation of baited areas by pigs from neighbouring unbaited land.

Co-ordinated aerial campaigns can cover very large areas, however it should be noted that historically aerial baiting has not been demonstrated to achieve as great a knock down as ground baiting. The reasons vary, but insufficient bait densities and high non-target takes of meat baits have possibly contributed to the lower level of efficacy. Aerial baiting with 'clusters', as already practiced by some farmer groups, may prove more effective.

As with all pest control programs successful long-term population suppression will be markedly reduced without follow up monitoring and integrated control efforts.

PIGOUT®, like any other bait or single control method is unlikely to achieve eradication by itself. It is a tool for use as part of an integrated approach.



PIGOUT® Feral Pig Bait

PIGOUT® Feral Pig Bait is a factory-prepared, shelf-stable bait for the control of feral pigs.

The bait is made with a sturdy, cereal-based matrix, specially flavoured and dyed to maximise uptake by pigs and minimise uptake by birds and non-target species.

The bait is strengthened by an edible bio-degradable cellulose skin designed to reduce non-target uptake, ensure ease of handling and increase the resilience of the bait when deployed from the air.

PIGOUT® baits have proven to be more target specific for feral pigs than other commonly used bait types such as meat and grain due to their size and omnivore appeal.

Each bait contains 72 mg of '1080' contained in a special toxin delivery system that is incorporated into the centre of each bait. The bait core is designed to minimise migration of poison into the surrounding bait matrix.

Non-target risks

Field research with both toxic and non-toxic PIGOUT® baits has indicated that most non-target animals (including livestock) that visit bait sites are unlikely to eat significant portions of the baits.

As the poison is localised in the patented core, the bait matrix itself contains virtually no poison, non-target animals can consume part of the bait with reduced risk of consuming a lethal dose of the toxin.



PIGOUT® shelf-stable baits will greatly simplify baiting campaigns across Australia



The PIGOUT® patented poison core - the bait matrix itself contains virtually no poison



Conducting a PIGOUT® program

Ground placement of baits with pre-feeding

Identify areas of high feral pig activity through historical knowledge and observation of signs such as wallows, faeces, rooting, tracks, watering point activity, sightings and surveys.

Establish lines of bait stations in these areas by placing small piles (0.5kg) of grain or several un-poisoned PIGOUT® Pre-Feed baits every 50 to 100m.

Earth or sand pads around bait stations should be swept to allow the prints of animals approaching and consuming bait material to be determined.

Check the bait stations regularly over 7 days for evidence confirming pig activity and replace 'Pre-feed' baits or grain with new material at sites where free-feed was taken.

Gradually reduce the number of feeding points to encourage pigs to feed from a central free-feeding area.

At the end of the free-feed period, place poisoned PIGOUT® baits in clusters at each active bait station. Monitor uptake daily and replace taken baits until bait take stops (generally day 2 or 3).

The number of baits should reflect the estimated number of feral pigs present, with enough baits offered to ensure that each pig has access to at least one or two baits.

Each pig should have access to at least one or two PIGOUT® baits.

Where possible, recover any uneaten poisoned baits three days after placement.



Most pigs should succumb in the first three nights after placement of the poisoned baits.

Demonstrating the efficacy of PIGOUT® Feral Pig Baits

Extensive trials have been conducted across numerous land types and conditions that have clearly demonstrated the effectiveness of the new PIGOUT® Feral Pig Bait.

In this sequence of photographs taken with high-tech remote sensing cameras, a group of pigs encounters a cluster of toxic PIGOUT® baits.

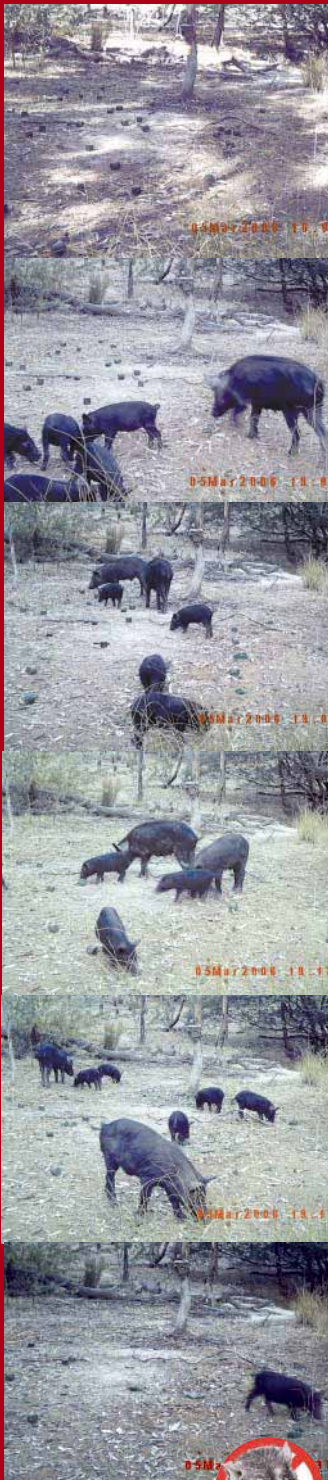
The pigs find and consume all but a few of the baits over a period of a couple of hours.

Feral pigs have been shown to self-regulate their uptake of baits and '1080' depending on their body size and speed of bait consumption.

This means if a baiting program is to be successful, it is better to place more baits than the estimated number of pigs rather than fewer baits.

This applies to any type of bait including grain and meat, and may explain lower than expected rates of success in conventional baiting programs.

In this trial, carcasses of 80% of the pigs were recovered the next morning within the area around the bait station.



Aerial placement of baits with or without pre-feeding

Inspect area to determine the location and indicative mob size of feral pigs present.

The number of baits distributed should reflect the overall density of feral pigs, and the area over which baiting is to occur.

Deploy PIGOUT® baits at a rate of 10 to 40 baits per km² in clusters of 5 to 10 baits depending on anticipated feral pig mob size (greater mob size = greater cluster size).



Aerial baiting can be very successful, but dropping baits in clusters is highly recommended.

Baiting clusters should either be dispensed along defined grid lines throughout areas where feral pigs are known to be active, or selectively to areas of known high local pig density such as around waterholes.

The latter practice is preferred as it will enable multiple baits to be found by a mob of feral pigs.

Aerial free-feeding

Free-feeding is not normally conducted in aerial baiting campaigns but there is no restriction on this being done using un-poisoned PIGOUT® Free-Feed baits.

Free-feed the area using un-poisoned PIGOUT® Free-Feed baits once or twice during the week prior to poison bait deployment to encourage maximum uptake of the poisoned baits by feral pigs.

The key to successful free-feeding is using accurate GPS equipment to ensure the free-feed drops are in exactly the same area as the poison bait drops.

Dose and number of baits

The dose of '1080' in PIGOUT® baits is 72mg/bait. This is much higher than the dose required in predator baits used for the control of foxes (3mg/bait) and wild dogs (6mg/bait).

The pig bait dose provides sufficient poison to kill most pigs in the shortest time from a single bait, and the presentation of the toxin in an inner core seeks to minimise the risk to non-target animals.

Some pigs may require more than one bait due to their large size, or because of the wide variation in tolerance between pigs to 1080 poison.

Pigs will readily eat several baits if offered so it is best to provide more baits than the estimated number of pigs present in order to maximise the opportunity for all pigs in a group to obtain one or more baits.



Protection of native fauna, stock, working dogs and pets

PIGOUT® baits have been shown to be highly target specific and have several features to help minimise the risks of feral pig control programs to non-targets.

The poison in PIGOUT® is localised to the centre of each bait in a special core, and the matrix is coloured, flavoured and structured to minimise uptake by most non-target herbivores, birds and stock.



Nevertheless, no control operation is risk free and in addition to following the instructions on the label, the following measures should be adopted to further minimise risks to all non-target animals:

Use free-feeding with un-poisoned PIGOUT® Pre-Feed baits in conjunction with swept soil or sand plots in areas of high conservation value to identify any risks to non-target animals.

DO NOT deploy baits where tracks or other signs indicate that non-target animals are eating pre-feed baits.

Restrictions to access and use of PIGOUT® baits

1080 is a Schedule 7 Restricted poison under the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) and the Agricultural and Veterinary Chemicals Code Regulations, and requires special precautions in manufacture, handling, labeling, storage and use.

The details on the PIGOUT® label are extensively reviewed and approved by the APVMA and its associated review agencies. Baiting feral pigs must only occur under the conditions set out in the product label or under special permits issued by the APVMA.

Distance restrictions

1080 baiting is not permitted in urban or residential areas where potential harm to domestic animals or people may occur.

There are various state and territory regulations as to where poison baiting can occur in relation to various features such as houses, roads, water courses and property boundaries.

Distance restrictions for all states and territories are summarised on the PIGOUT[®] label, however the minimum distances are as follows:

Minimum distance baiting is allowed

Property boundary	20 m
Habitation	2 km
Dam/watercourse	20 m
Domestic water supply	100 m
Roads, stock routes, recreational paths, public places	1 km
Town area	5 km

Notification and signage requirements

In all jurisdictions, neighbours must be notified at least 72 hours prior to any feral pig poison baiting campaign. Working with neighbours to maximise the area of pig control benefits everyone so neighbourly co-operation and teamwork is strongly encouraged.



Warning signs must also be erected at property entrances, and in some states, at other strategic locations. These must be maintained for a month. Repeat notifications must occur in NSW if baiting continues for longer than two weeks after initial notification.

***Baiting must not occur
where wildlife will be harmed.***



Frequently Asked Questions

How long does it take for PIGOUT® baits to break down?

PIGOUT® baits are designed to break down over time with the action of moulds and bacteria in the soil. Breakdown varies with temperature and soil moisture from quite quickly in wet tropical conditions, to a considerable time in dry arid areas.

In moist soil conditions in most temperate parts of Australia, 75% of the 1080 in a buried bait is lost over a two week period.

While PIGOUT® baits are designed not to be attractive to dogs, to be sure, baits should either be retrieved from bait sites before working dogs are re-introduced to an area that has been baited, or any dogs muzzled to prevent them picking up an old bait.

Is 72mg of 1080 enough for an average feral pig?

Most feral pigs weigh less than 100kg and hence will be controlled with one PIGOUT® bait. Larger pigs however may require more than one bait hence the recommendation to cluster bait.

Should a lure trail be used?

No. Lure trails are not necessary, however free-feeding with PIGOUT® Free Feed Baits prior to laying of poison baits is encouraged to maximise the number of pigs at a bait site.

How far apart should I place the baits?

Baits should be laid in clusters where feral pigs are known to be active rather than laid individually as pigs feed in groups.

Can baits be regurgitated?

PIGOUT® baits are designed to digest quickly in the stomach of the feral pig, and are hence probably less prone to regurgitation than whole meat baits.

Are farm livestock at risk from PIGOUT® baits?

Livestock are not commonly attracted to PIGOUT® baits. Nevertheless it is prudent to ensure stock cannot access the baits once laid.

Can PIGOUT® be used in aerial campaigns?

Yes. Where aerial application of baits is permitted, PIGOUT® baits can be successfully used.

How do I order PIGOUT® baits?

Contact your usual 1080 baiting source: Qld - Local Gov. LPO or DNR&M LPO, NSW - RLPBs, ACT - EACT, SA - APCB, NT - Parks & Wildlife, WA & Vic - Leading rural merchants.

PIGOUT® is subject to the same permit & indemnity requirements from these agencies as fresh meat or grain baits containing 1080.



PIGOUT®

Feral Pig Bait



PIGOUT® Feral Pig Bait contains '1080'
- a Restricted Schedule 7 chemical.

PIGOUT® Feral Pig Bait provides a reliable and cost-effective method to reduce feral pig numbers in rural areas & crown land.

- Proven highly effective for wild pig control
- Simple to use
- Degrades in the environment
- Available in 32 & 64 bait tubs.

It is available through the following government agencies and authorities for use with necessary permits:

**Queensland - Dept Natural Resources & Mines or
Local Government Authorised 1080 Land Protection Officers**
New South Wales - Rural Lands Protection Boards
South Australia - Natural Resource Management Boards
ACT - Environment ACT
Victoria - '1080' Authorised rural merchant stores
WA - S7 licenced rural merchant stores
NT - Contact ACTA for more information.

Restrictions apply in some situations contact your relevant government agency for local advice.

PIGOUT® Feral Pig Bait is stocked locally by:

***PIGOUT® Feral Pig Bait is another quality product from
Animal Control Technologies Aust. manufacturers of:***

DOGGONE® Wild Dog Bait,
FOXOFF® Econobait,
RABBAIT® Pindone Oat Bait,
RATTOFF® Zinc Phosphide Bait Sachets,
MOUSEOFF® Zinc Phosphide Rodent Bait,
MOUSEOFF® Bromadiolone Rodent Bait.

www.animalcontrol.com.au
enquiries@animalcontrol.com.au
PO Box 379 Somerton
Victoria Australia 3062