PESTSMART

Fumigation for rabbit control

Introduction: Fumigation is a valuable tool in successful rabbit management programs. It is an effective follow-up technique to poison baiting and warren ripping, and is a particularly useful control method in areas where other techniques cannot be used (eg poison baiting).

Fumigation works by replacing the air in warrens with lethal gasses, which are in-turn inhaled by rabbits, causing them to suffocate and die. There are two types of fumigation:

- pressure fumigation - where the fumigant is generated outside the warren and forced into the warren under pressure, usually from a pump
- diffusion (or static) fumigation – where tablets are placed in active burrows (Figure 1) and the fumigant generated is allowed to passively diffuse through the warren (this is the preferred method)[1].

There are strict regulations around the use of fumigants for rabbit control that reduce the risk of harm to operators. For this reason, users may also require training or accreditation before using approved fumigants. Operators should always check with their local authorities before undertaking a fumigation program and refer to the manufacturer's recommendations for use.

The fumigants currently registered for use in Australia are chloropicrin (CLPN) and phosphine (PH_3). Phosphine gas is produced on wetting metal phosphide tablets (eg Phostoxin®)[2]. However there are concerns about the use of these chemcials because they do not kill rabbits as humanely as other chemicals. A more suitable alternative, carbon monoxide, is currently being developed for warren fumigation[2,3].

Figure 1: Phostoxin tablets and dry paper are pushed deep into the warren entrance. Image: Invasive Animals CRC

Fumigants

Chloropicrin: Chloropicrin is a colourless, toxic liquid that is currently used in Australia as an insecticide, soil and warren fumigant, and rodenticide. Chloropicrin is classified as a dangerous poison (Schedule 7) as it has a high potential to cause harm, even at low exposures. Chloropicrin has recently been placed under review by the Australian Pesticides and Veterinary Medicines Authority (APVMA) because of environmental, human health and human safety concerns. It is not recommended for use, even though it is still registered in some states. Pressure fumigation using chloropicrin (eg Larvicide®) has been phased out as an approved fumigant in New South Wales.

Phosphine: Phosphine is a colourless, flammable, toxic gas that is lethal to almost all animals. For warren fumigation, phosphine gas is produced when metal (eg aluminium or magnesium) phosphide tablets or pellets are exposed to moisture. In the field, phostoxin tablets are inserted deep into the warren entrance using a length of poly-pipe as an applicator, followed by dry paper (Figure 1). Water that is poured down the poly-pipe to wet the tablets/paper results in phosphine gas. To increase the concentration of this fumigant in treated warrens, all entrances are rapidly closed off with soil, and firmly compacted to seal in the fumigant. Each entrance of the warren is treated systematically using this procedure.

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Aluminium phosphide is classified as a Schedule 7 poison and a dangerous good and is registered for use as a pesticide in Australia. Phosphine is currently the preferred toxin for diffusion fumigation.

Carbon monoxide: Carbon monoxide (CO) is a colourless, odourless gas that causes oxygen depletion which leads to unconsciousness and a rapid humane death. Car exhaust fumes contain very low concentrations of CO, but also contain other gases (eg hydrocarbons, ozone, nitrogen dioxide and nitric oxides that are highly irritating to airways), making it an unsuitable fumigant for rabbit control. Field trials are underway that will test the safety (to operators) and efficacy (lethal effect on rabbits) of a portable fumigator that produces rapidly lethal levels of carbon monoxide and low levels of irritants; incorporates a smoke trace when operating in high-CO mode; and heat exchanger to lower exhaust emissions to safe temperatures.

Carbon monoxide fumigator: The Invasive Animals Cooperative Research Centre, in conjunction with NSW Department of Primary Industries (NSW DPI) and WG&B Manufacturing are currently developing a carbon monoxide pressure fumigator for lethal management of rabbits in situations where ripping and baiting are not feasible. This project builds on existing fumigation technology by improving effectiveness and efficiency, ease of use and handling, operator health and safety, and humaneness of the lethal outcome.

Please see the *IA CRC Product Status update* for an understanding of how the team is progressing toward getting this product to market (*www.pestsmart.org.au/iacrc-product-status-update/*).

When to use: Fumigation works most effectively as a follow-up technique to poison baiting and warren ripping. It is a labour-intensive and costly technique, so strategic use as part of a broader rabbit control program is recommended. Fumigation is useful for removing any remaining rabbits after baiting and ripping, particularly in areas where access is limited (eg along fence lines and river banks, under trees) or where baiting and/or ripping is not possible (eg sensitive cultural site, high-value conservation area, risk to non-target species or proximity to dwellings).

Fumigation can be carried out any time of the year but is most effective if done just before the start of the rabbit breeding season. It is not recommended in summer because it is difficult to seal off the burrow entrances with dry soil.

Figure 2: Carbon monoxide (CO) fumigator prototype. Image: Invasive Animals CRC

Welfare, health and safety: Appropriate safety equipment including gloves and protective clothing is recommended when fumigating rabbit warrens.

Face masks are essential when working closely with chloropicrin (eg filling or draining the fumigator tank). Following practical, safe operating procedures can minimise the need for heavy physical protective barriers such as full-face respirators or breathing apparatus, which can make work clumsy and uncomfortable[5]. Simple, routine precautions to avoid chemical exposure include working up-wind from the warrens when fumigating and wetting aluminium phosphide tablets only as they are placed into rabbit burrows.

Further information:

1. Sharp T and Saunders G (2005). *Diffusion fumigation of rabbit warrens*. NSW Department of Primary Industries, Orange, New South Wales.
2. Marks C (2009). Fumigation of rabbit warrens with chloropicrin produces poor welfare outcomes – a review. *Wildlife Research 36:342-352*.
3. Gigliotti F, Marks CA and Busana F (2009). Performance and humaneness of chloropicrin, phosphine and carbon monoxide as rabbit-warren fumigants. *Wildlife Research 36:333-341*.
4. Invasive Animals CRC (2010). Research Portfolio Summary 2010. Invasive Animals Cooperative Research Centre, Canberra.
5. Cooke B (2011). *Rabbit Resurgence: Minimizing Future Economic and Biodiversity Losses*. Final report on Invasive Animals Cooperative Research (IA CRC) Project 7.T.8e. Unpublished report, Invasive Animals CRC, Canberra.

Watch: *Fumigation with phostoxin for rabbit control* *and* *Fumigation with carbon monoxide for rabbit control* *on PestSmart YouTube channel (http://www.youtube.com/PestSmart)*