


Trapping options for Corn Snakes

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Contents

Introduction

Detections of corn snakes (*Pantherophis guttatus*) at large in Australia have increased over recent years and the requirement for jurisdictions to find and capture these snakes is challenging, particularly when resources are limited. Currently, visual searches are the primary detection method for snake incursions in Australia. Although effective, visual searches are labour and time intensive, particularly for snakes, which are notoriously difficult to detect. As a result, alternative or complimentary methods to visual searches, such as trapping, are being investigated.

Currently, a variety of traps that capture snakes are available. However, few have been rigorous tested, and none evaluated for corn snakes. The "minnow/shrimp pot" trap has been tested extensively in the USA on brown treesnakes (*Boiga irregularis*) and has potential for corn snake capture. Minnow traps are also known to effectively capture other species in addition to brown treesnakes including copperheads (*Agkistrodon contortrix*), black and rat snakes (*Elaphe obsolete, Antherophis alleghaniensis*). For brown treesnakes, these traps are particularly effective for individuals greater than 900 mm snout-vent length (SVL) (Tyrrell et al. 2009); capture probabilities for snakes smaller than 800 mm SVL are significantly lower (Boyarski 2005). Capture of particularly large individuals may also be problematic if they have difficulty squeezing through the trap opening (Rodda et al. 2007).

Nevertheless, based on similar attributes between snakes known to be captured using the minnow trap and the corn snake (i.e., habitat use, size and foraging strategies), this trap type currently appears the best option.

Pros

- Non-lethal trap design
- Can be easily modified
- Inexpensive depending on level of modifications (ranging from ~$15 - $150 per trap)
- Design has been proven to capture snakes with similar biology to corn snakes
- Able to capture multiple individuals without decreasing capture probabilities
- Mesh allows airflow through the trap
- Faecal and other material does not accumulate in the trap

Cons

- Efficacy may decrease with snakes below 800 mm SVL and large individuals that cannot fit through trap opening
- Traps provide little shelter from the elements unless a plastic roof or sleeve is used
- Sleeves may trap heat, and potentially increase thermal stress on captive and attractant animals.
- Traps may capture non-targets

Trap Design

Size and Shape

The minnow trap design is two mesh cylinders about 500 mm long and 200-300 mm diameter with inward-pointing funnel ends (Figure 1). The best and cheapest option is to purchase commercial minnow traps (e.g., https://www.hookedonline.com.au/black-wire-minnow-shrimp-pot-2-piece).

Figure 1. Standard minnow trap/shrimp pot. Traps can be purchased for around $15 each.

Material

Preferably made of 6 mm galvanized steel mesh. Can be powder coated.

Shelter

A light coloured semi-flexible plastic roof or sleeve is required to protect the bait/attractant and caught snake (Figure 2). Studies have shown that some snakes preferentially enter chambers to investigate chemical cues if the contents of the chambers are not visible (Lankford 1989). Plastic roof provides protection and slightly darkens the trap interior, which increases appeal as refugia and decreases escape rate (Rodda et al. 1999).

Refugium Tube

Refugia for captured snakes is necessary to provide protection and decrease risk of escape (particularly if entrance flaps are not fitted). A 200-300 mm length of 50 mm (inside) diameter plastic pipe is an ideal refugium for snakes to 1.8 m snout-vent length (Figure 3).

Figure 2. Minnow trap showing semi-flexible plastic roof used protect the bait/attractant and caught prey. Photo: USGS/Colorado State

Figure 3 Inside modified minnow trap showing a snake entering through the trap flap and snake PVC pipe refugia (foreground). Photo: USGS/Colorado State

Flap

To decrease risk of escape, fitting a flap over the open ends of the trap may be desirable, particularly if traps are not checked regularly (at least once per day). Be aware that snakes may be more reluctant to enter a trap with flaps than one without.

The flap housing is a plumbing fitting of ABS plastic (51 mm × 38 mm flush bushing or pipe reducer: see Figure 4a) drilled to accommodate the hinge pin and the bolt above the hinge pin (Figure 4b). Note that the bolt functions only to fill the space above the hinge through which a very small snake could escape.

The flap hangs inside the inner lip of the housing (making it a one-way flap: snakes can easily get in but not escape). The flap is made from either 6-mm black plastic mesh or galvanized steel mesh (Figure 4c), and is attached to the hinge pin with small metal rings (bent wire or jewellery rings).

The hinge pin may be either a straightened chrome-plated paper clip or stainless steel wire. The hinge pin is longer than the width of the housing, with the excess length bent sharply around the outside of the housing (Figure 4b).

The housing is pushed into the 55 mm opening of the minnow trap from the inside. The flange on the housing makes it impossible for a snake to push the housing out as the trap ends squeeze the housing between the screw head-hinge pin ends and the flange.

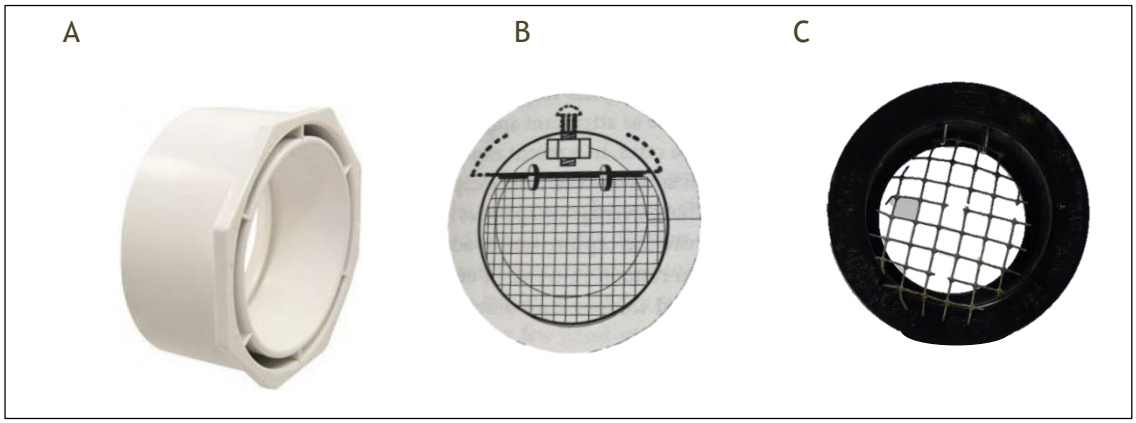


Figure 4. A) 51 mm x 38 mm flush bushing, B) diagram of the trap from the inside (Rodda et al. 1999), and C) fully assembled flap.

Attractant

Traps can be baited with live mice or eggs.

Mice

To date, the best bait attractant for snake traps is live mice (Clark et al. 2012). Live mice baits can increase trapability by more than 4-fold and decrease escape rate 2-fold (Rodda et al. 1999).

If a live mouse is used as bait (attractant), the following setup is required:

- In the trap, the live mouse is housed in a separate chamber. Snakes entering the trap are unable to access the mouse. The chamber is a rectangular 3 mm metal mesh rectangle, either folded into a box, or closed with a rigid but porous metal lid. Both options are held closed with a thick rubber band (Figure 5 and 6).
- Alternatively, a one-piece trap designed by USDA Wildlife Services (Vice et al. 2005) can be used. This trap has a mouse chamber that is accessible from the exterior (i.e. mouse care can be performed without removing the trap from its site of attachment. (Fig. 7 and 8). The internal volume of the mouse chamber is almost 50% larger than the first option.
- Within the chamber, food and water needs to be provided. A food block of mixed grain in paraffin wax and a potato as a source of water works best. These are replenished when necessary; intervals should be no longer than every five days.

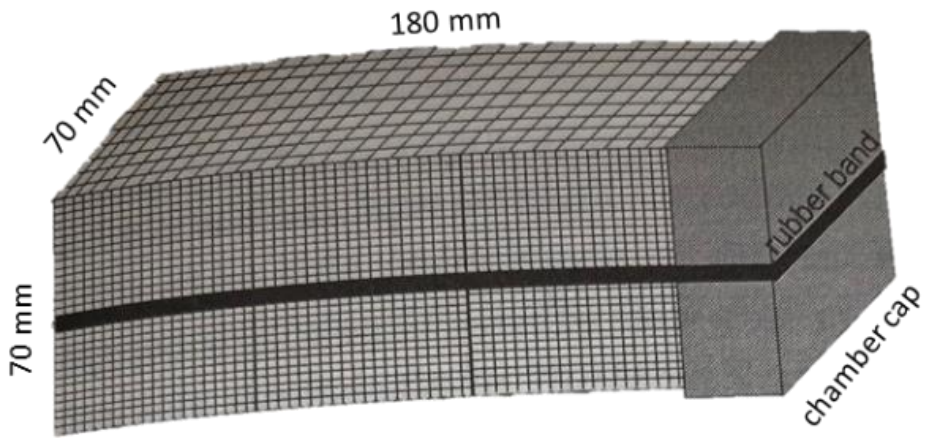


Figure 5 The mouse chamber is constructed of 3 mm galvanised steel mesh made into a tube with a double-roll seam. It is squared off and closed with a chamber cap, held together with an elastic band. Image from (Rodda et al. 1999)

Figure 6 Live mice bait, potato and food block (grains imbedded in non-toxic wax) are housed in a separate bait chamber. Photo: USGS/Colorado State

Figure 7 Trap modification with the in-built bait chamber Photo: (Vice et al. 2005). USDA

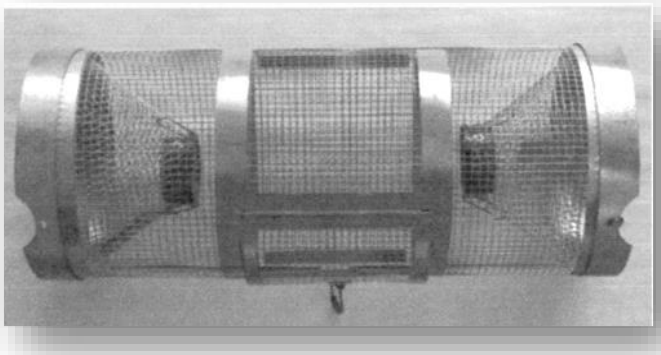


Figure 8. The USDA Wildlife Services designed trap, fully assembled. The centre of the trap houses the mouse chamber, with the entrance door visible bottom centre. These traps are commercially constructed in the USA for approximately $120-$150 per trap.

Eggs

Although not as effective as live mice, chicken eggs (or smaller) are a cheap and simple bait type for the traps (See Figure 9). The use of eggs eliminates the cost of developing secondary bait chambers, decreases bait cost and increases transportation efficiency. Ethical and animal welfare considerations are also minimised.

One to two eggs (preferably two) are placed directly into the chamber. Eggs should be as fresh as possible (not refrigerated) prior to being placed in the trap.

Figure 9. Baiting minnow traps with eggs (chicken or smaller) is the simplest bait method

Trap Deployment

Since corn snakes are ground dwellers and tree climbers, traps should be placed on the ground or hung up to 1.5 m above the ground (1 m works best with brown treesnakes).

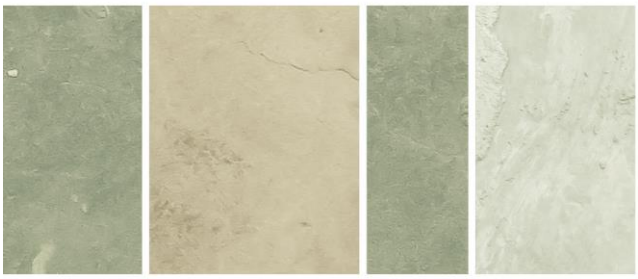
- Small drift fences may be used, although this could possibly increase capture of non-targets

Traps can be hung directly on fences or trees. If no fixture points are available or traps are deployed to open or scrubby areas, traps can be suspended horizontally from rebar, star pickets or natural vegetation on 9-gauge wire.

It is highly desirable to use multiple traps to form a trap array where possible.

- Recommended trap spacing is 15 -20 m apart.
- A square array works best to cover an area; however hanging in lines, along climbing substrates such as fences may also be effective.

Traps should checked each morning (and evening if possible, particularly if flaps are not being used).



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