Corella, 2010, 35(2): 49-51

Euthanasia of pest sturnids in nestboxes

Christopher R. Tidemann[1], Kate Grarock and Daryl H. King

Fenner School of Environment and Society. The Australian National University, Canberra, ACT 0200.
[1]Corresponding author: chris.tidemann@anu.edu.au

Received: 14 April 2010; Revised 5 April 2011

Nestboxes are commonly used as a research tool or for enhancing habitat quality for native hollow-dependent wildlife, but these objectives can be compromised if boxes are occupied by feral species, such as Common Myna *Sturnus tristis* and Common Starling *S. vulgaris*. Mynas and starlings exclude other potential nestbox users by actively harassing them, and by accumulating large volumes of nesting material that preclude occupation by other users. Here, we report a system using air-cooled carbon monoxide (CO) from a small 4-stroke petrol engine that enables *in situ* euthanasia of pest sturnids, eggs and chicks in nestboxes. The activity was carried out after dark, when sitting females were reluctant to fly, and was monitored via closed circuit television, to ensure that non-target species were not affected. Once the adults were euthanased, the entire contents of the box, including adults, chicks, eggs and nesting material, were dumped, via a hinged base (drop floor), thereby freeing up the box for other potential occupants. We report results from the 2009–2010 and 2010-2011 breeding seasons, during which a total of 48 adult female mynas was euthanased, along with 115 eggs (33 clutches) and 119 chicks (35 clutches). Time to immobility of adults (n = 48) was 96.4 ± 29.4 seconds (mean ± s.d.). Young chicks were far more tolerant of carbon monoxide poisoning than adults and were euthanased, once the box contents had been removed, by placing them in a cloth bag and striking them against a hard object. No starlings were encountered in this trial, but earlier trials with carbon monoxide euthanasia indicate that the method would also work for this (and perhaps other) pest species.

INTRODUCTION

Nestboxes are commonly used for investigating the ecology of hollow-dependent wildlife, and are sometimes used for enhancing habitat quality in areas where mature trees are scarce (Gibbons and Lindenmayer 2002; Durant *et al*. 2009; Goldingay and Stevens 2009). These objectives may be compromised by occupation of the boxes by feral birds, such as Common Mynas *Sturnus tristis* and Common Starlings *S. vulgaris*. Pest species, such as these, not only aggressively exclude other potential nestbox users, but the large quantities of nesting material they accumulate may also preclude subsequent occupation by other species. Pell and Tidemann (1997) reported that 45 per cent of 77 nestboxes in Canberra urban nature reserves were occupied by mynas and Harper *et al.* (2005) reported 38 per cent occupancy of 120 nestboxes by mynas in peri-urban vegetation remnants around Melbourne. Large quantities of nesting material in occupied boxes were reported in both studies. Starlings can pose similar problems in some parts of Australia (e.g. Pell and Tidemann 1997; Goldingay and Stevens 2009) and America (Weitzel 1988; Wiebke 2003).

Baffles shielding nestbox entrances have been recommended as a possible solution to the problem of pest birds usurping nestboxes (e.g. Birds Australia 2010), but our literature search and anecdotal reports from users suggested that their effectiveness is questionable. Homan (2000) trialled three baffled nestboxes that appeared to exclude mynas, but Parsons (n.d.) commented “While there is some suggestion that the creation of a baffle at the entrance may stop introduced birds from using nest boxes, there is little scientific evidence to support it”. In some circumstances it may be possible to exclude unwanted species by using entrance holes too small to admit them, but in many cases suitable entrance hole dimensions overlap between target and pest species (Goldingay and Stevens 2009). Millett *et al.* (2004) describe the use of nylon nooses around entrances to remove nesting mynas from nestboxes set up for Seychelles Magpie Robins *Copsychus sechellarum*, but such a method would be unacceptably time-consuming for multiple boxes and of dubious welfare acceptability. Without a simple, effective and humane method of excluding mynas and starlings from nestboxes, or removing them or their nests once they have begun incubating, it is likely that the provision of extra nesting resources will simply facilitate the expansion of the population of these pest species. In ecological studies of native species, mynas and starlings constitute unwanted noise in the experimental system, so in this case also an acceptable method to resolve the problem would be useful.

Following development of methods for using carbon monoxide (CO) as a euthanasia agent for trapped pest sturnids (Tidemann and King 2009), we describe here a system using carbon monoxide for euthanasing mynas or starlings incubating eggs or chicks in nestboxes. The equipment is not cheap, but the procedures are simple and the labour costs relatively low. Overall, the system may provide a more satisfactory resolution of the problem of pest birds occupying nestboxes than those that are currently available, especially in situations where multiple boxes are installed.

The objective of this study was to determine if nestbox euthanasia could form a useful addition to the toolkit currently available for reducing myna numbers, principally trapping with selective valve traps (Tidemann 2005), which is being undertaken in Canberra, and elsewhere, by community members (CIMAG 2010; Indian Myna Bird Project 2010; King 2010). Here we report a preliminary evaluation of the nestbox euthanasia technique after two breeding seasons.

MATERIALS AND METHODS

One hundred and eighty-nine nestboxes were installed at around four metres height above ground on trees on private residences in five Canberra suburbs between 21 September and 13 November 2009. An additional seventeen boxes were installed between 16 July and 4 September 2010, bringing the total number of boxes to two hundred and six prior to the second nesting season. The boxes were made of 15 millimetres construction plywood, with an internal volume of 19 litres, and fitted with a 65 millimetres diameter entrance hole and a hinged base (drop floor). The nestbox floors were usually held closed by a screw or clip, but could be released, if necessary, to dump the box contents. Once the boxes were installed, occupation was monitored visually by the residents and reported monthly via a web portal set up for the purpose – and by email immediately if mynas occupied the boxes. When residents reported repeated visits by mynas the sites were visited after dark and the contents of the boxes inspected via a closed circuit television system (Figure 1). The camera for the CCTV was a 32 millimetres diameter unit containing a camera and five LEDs that allowed viewing in total darkness (Jaycar Electronics), mounted on the end of a three-metre wand and connected to the monitor via a five-metre coaxial cable. The camera, and exhaust pipe (see below) were centred in a 100 millimetres diameter plastic foam flange that served to prevent the escape of adult birds – and subsequently to provide a loose seal to contain exhaust gas for euthanasia. The temperature of the exhaust gas was measured at the end of the wand with a digital thermometer (TP3001 Digital Thermometer, Jingchuang Electronics Manufacturing Co Ltd, Jiangsu province, China.), and was found to be little different from ambient, i.e. the cooling system was effective. To minimise noise, because the euthanasing was done at night in residential areas, the engine was enclosed in a loose circular baffle of acoustic foam and loosely covered with a lid of the same material. The baffle minimised noise but its loose fit still allowed for air-cooling of the engine – and exhaust. The cost of the engine was around $400 and the CCTV system around $300.

When it was determined by CCTV inspection that a particular box contained a pest bird, air-cooled exhaust gas was delivered via a 12.5 millimetres plastic pipe running along the wand from the gas generator – a 25 cubic centimetre petrol engine (Honda 4-stroke GZ25 2008, with the whipper snipper device removed), previously determined to deliver three per cent carbon monoxide (Tidemann and King 2009). This small engine was highly portable, weighing just 5.6 kilograms. The motor was run until it was clear from the CCTV surveillance that the adult bird was immobile (which had previously been determined to equate to death), and then the complete contents of the box, including the adult, and any eggs, chicks and nesting material, was emptied via the hinged base of the box into a garbage receptacle. Young chicks were far less affected by carbon monoxide than adults, as is common with neonate birds and mammals (Raj and Whittington 1995; Mohan Raj pers. comm.). In instances where young chicks were present in the boxes they were removed after the adults had been euthanased and killed separately by placing them in a cloth bag and striking it against a hard surface.

RESULTS

At the completion of the first season a total of 56 boxes had been occupied by birds (31 Common Myna; 21 Crimson

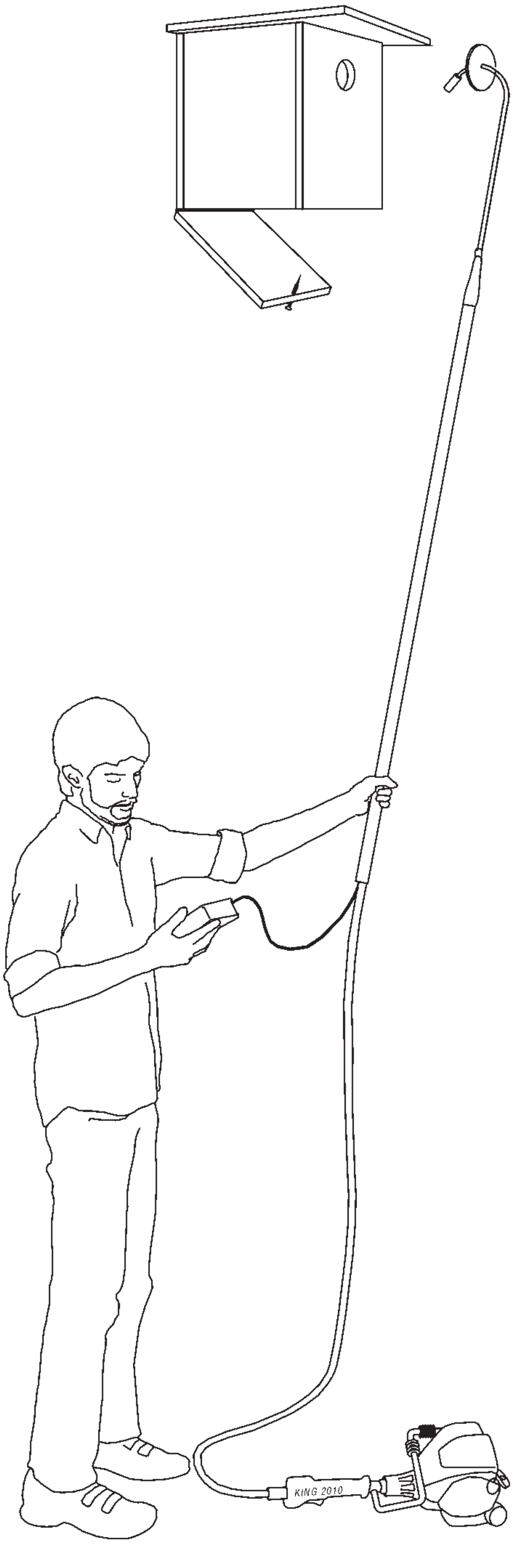

Figure 1. *Drop-floor nestbox and micro-euthanaser. The 25 cc 4-stroke engine delivers air-cooled exhaust (3% CO) via a wand that also includes a closed circuit television camera and screen. This enables the operator to view the contents of the nestbox before euthanasing undesirable occupants. The nestbox floor is usually held closed by a screw or clip that can be released to dump the contents into a garbage receptacle.*

Drawing by Daryl King.

Rosella *Platycercus elegans*; 4 Eastern Rosella *P. eximius*); six by mammals (5 Brushtail Possum *Trichosurus vulpecula*; 1 Sugar Glider *Petaurus breviceps)* and 18 by feral honeybees *Apis mellifera*. No starlings were found in the nestboxes. A total of 26 adult female mynas was euthanased by the procedures described above, along with 64 eggs (18 clutches) and 53 chicks (17 clutches). In six instances, nestboxes from which mynas had already been removed once, were re-occupied by a new female that was also euthanased and removed, along with her clutch of eggs and/or chicks. These procedures took 38.5 hours of labour. The time to immobility from the start of the motor of 20 females was 87.1 ± 23.9 seconds (mean ± s.d.). Birds sometimes attempted to escape past the foam plug at the end of the wand, but we observed no signs of distress (*sensu* Tidemann and King 2009) from the euthanasing procedure itself.

At the completion of the second season a total of 53 boxes had been occupied by birds (24 Common Myna; 20 Crimson Rosella *Platycercus elegans*; 7 Eastern Rosella *P. eximius*, 2 Galah *Eolophus roseicapilla*); six by mammals (5 Brushtail Possum *Trichosurus vulpecula*; 1 Sugar Glider *Petaurus breviceps)* and 40 by feral honeybees *Apis mellifera*. As with the first nesting season, no starlings were found in the nestboxes. A total of 22 adult female mynas was euthanased by the procedures described above, along with 51 eggs (15 clutches) and 66 chicks (18 clutches). In eight instances, nestboxes from which mynas had already been removed once, were re-occupied by a new female that was also euthanased and removed, along with her clutch of eggs and/or chicks. These procedures took 33 hours of labour. The time to immobility from the start of the motor of 21 females was 92.38 ± 11.47 seconds (mean ± s.d.).

DISCUSSION

Further testing of this system, coupled with monitoring, over successive breeding seasons will enable us to determine if it is useful for managing myna numbers; it may be that removal of mature breeding birds from the population has a greater effect than valve trapping, which trends toward capture of younger, less experienced birds (King, 2010). So far, it seems clear that the system can provide an efficient and humane way of euthanasing pest sturnids in nestboxes. No starlings occupied boxes during this trial, but starlings can sometimes be a problem in the Canberra area (Pell and Tidemann 1997). The findings of Tidemann and King (2009) indicate that carbon monoxide would also provide a humane euthanasia agent for starlings and, although the times to immobility recorded in the present study are slower than can be generated with a larger engine, the speed of induction of unconsciousness is unimportant in ensuring a humane death. Relying on volunteers to determine and report the nesting of the myna was at times problematic, with potential nesting going unreported and false reports proving time consuming to investigate.

Our primary objective in this study was to test if this method for removal of mynas could have a significant impact on reducing myna numbers. It was not our intention to evaluate all options for dealing with the problem; in many cases occupation of nestboxes by mynas or starlings may not matter. At this stage we simply describe the technique as a possible useful addition to the pest sturnid control toolkit. Clearly, it is important for researchers to determine if *in situ* euthanasing might be appropriate for their studies – or if other methods, including the do-nothing option, would be more appropriate. It would be useful if future researchers investigated other methods of excluding pest species, such as the use of entrance baffles – internal and external – and the possibility of tailoring entrance dimensions to exclude unwanted species.

ACKNOWLEDGEMENTS

This research was approved by the ANU Animal Experimentation Ethics Committee (Protocol S.RE.08.08). Sam King carried out the euthanasing. We thank the Canberra residents who hosted the nestboxes and reported on their occupants and two referees for helpful comments on the manuscript.

REFERENCES

Birds Australia (2010). Nestboxes Technical Information. Information Sheet #9. http://www.birdsaustralia.com.au/resources/info-sheets.html. Accessed 29 May 2010.

CIMAG (2010). Canberra Indian Myna Action Group. http://www.indianmynaaction.org.au/ Accessed 29 May 2010.

Durant, R., Luck, G. W. and Matthews A. (2009). Nest-box use by arboreal mammals in a peri-urban landscape. *Wildlife Research* **36**: 565–573.

Gibbons, P. and Lindenmayer, D. B. (2002). 'Tree hollows and wildlife conservation in Australia'. (CSIRO Publishing: Collingwood.)

Goldingay, R. L. and Stevens, J. R. (2009). Use of artificial tree hollows by Australian birds and bats. *Wildlife Research* **36**: 81–97.

Harper, M. J., McCarthy, M. A. and van der Ree, R. (2005). The use of nest boxes in urban natural vegetation remnants by vertebrate fauna. *Wildlife Research* **32**: 509–516.

Homan, P. (2000). Excluding the common myna*Acridotheres tristis* from artificial next boxes using a baffle. *Victorian Naturalist* **117**: 75.

Indian Myna Bird Project (2010). http://www.indianmyna.org/ Accessed 29 May 2010.

King, D. H. (2010). The effect of trapping pressure on trap avoidance, and the role of foraging strategies in anti-predator behaviour of Common Mynas (*Sturnus tristis*). *Canberra Bird Notes* **35**: 85-108.

Millett, J., Climo, G. and Shah, N. J. (2004). Eradication of common mynah *Acridotheres tristis* populations in the granitic Seychelles: successes, failures and lessons learned. In 'Advances in Vertebrate Pest Management, Volume III'. (Eds. C. J. Feare and D. P. Cowan.). Pp. 169–183. (Filander Verlag: Furth.)

Parsons, H. (n.d.). Best Practice Guidelines for Enhancing Urban Bird Habitat: Scientific Report. Birds in Backyards Program, Sydney. http://birdsinbackyards.net/search.cfm?searchstring=guidelines+for+enhancing. Accessed 29 May 2010.

Pell, A. S. and Tidemann, C. R. (1997). The impact of two exotic hollow-nesting birds on two native parrots in savannah and woodland in eastern Australia. *Biological Conservation* **79**: 145–153.

Raj, A. B. and Whittington, P.E (1995). Euthanasia of day-old chicks with carbon dioxide and argon. *The Veterinary Record* **136**: 292–294.

Tidemann, C. (2005). Indian Mynas - Can the problems be controlled? In 'Proceedings of the 15th National Urban Animal Management Conference, Canberra 19-21 October 2005'. (Ed. M. Hayward). Pp 55–57. (Australian Veterinary Association: Artarmon.)

Tidemann, C. R. and King, D. H. (2009). Practicality and humaneness of euthanasia of pest birds with compressed carbon dioxide (CO_2) and carbon monoxide (CO) from petrol engine exhaust. *Wildlife Research* **36**: 522–527.

Weitzel, N. H. (1988). Nest-site competition between the European Starling and native breeding birds in Northwestern Nevada. *Condor* **90**: 515–517

Wiebe, K. L. (2003). Delayed timing as a strategy to avoid nest-site competition: testing a model using data from starlings and flickers. *Oikos* **100**: 291–298.