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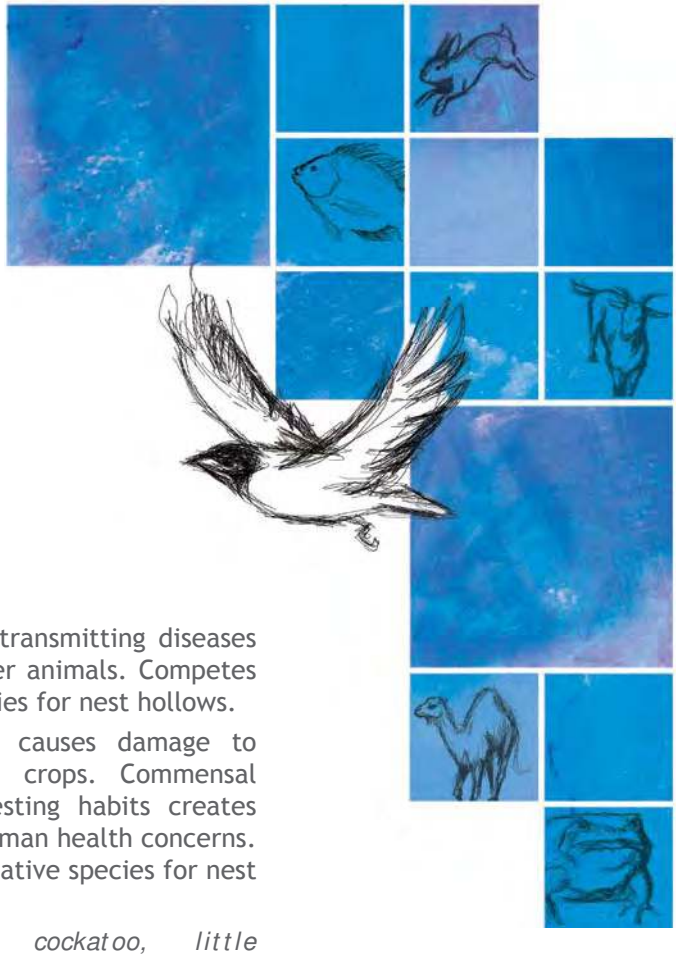

Standard Operating Procedure

BIR002: Trapping of pest birds

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Background

Pest bird problems are increasing in Australia, particularly with recent expansions in the grape and wine industry, and in the olive industry. More than 20 species of birds conflict with primary production by significantly reducing profitability of a wide range of crops in the cereal, horticultural and aquaculture industries. Over-abundant introduced and native species also compete with and displace less abundant native species, impacting on biodiversity.

Methods of pest bird control include non-lethal techniques such as scaring devices, chemical repellents, habitat manipulation, use of decoy food sources and exclusion netting. Lethal methods of control involve shooting, trapping and poisoning. In many situations lethal control methods have little effect on reducing damage.

The aim of trapping is to reduce bird numbers in order to minimize the damage done to crops etc. However the process is often labour intensive, opportunistic and may have limited value in bird control. After trapping, pest birds are humanely killed.

This standard operating procedure (SOP) is a guide only; it does not replace or override the legislation that applies in the relevant state or territory jurisdiction. The SOP should only be used subject to the applicable legal requirements (including OH&S) operating in the relevant jurisdiction.

Application

- Problem bird species and the damage they cause includes:
  - *Common starling*: causes damage to fruit (particularly grapes and cherries), vegetable and cereal crops. Implicated in carrying and transmitting diseases to man and other animals. Competes with native species for nest hollows.
  - *Common myna*: causes damage to fruit and grain crops. Commensal roosting and nesting habits creates aesthetic and human health concerns. Competes with native species for nest hollows.
  - *Sulphur-crested cockatoo, little corella*: damages ripening sunflower crops, fruit and nut crops.
  - *Galah:* causes damage to germinating cereal crops.
  - *Sparrow:* causes damage to fruit vegetable, grain and oilseed crops, compete with native species for nest hollows.
  - *Pigeon:* roosting sites cause fouling damage (from build-up of faeces) in urban areas. Implicated in carrying and transmitting diseases to man and other animals.
  - *Crows and ravens (corvids)*: consume fruits and grains. May prey upon sick, dying or mismothered lambs and can injure sheep.
- With widespread and common species such as starlings, damage control is best achieved by action targeted at problem areas.
- The optimum time for trapping will often vary depending on the species of bird and the type of crop being protected. During the breeding season most birds are territorial and so trapping may be less effective. At other times of the year, particularly during autumn/winter when food is less abundant, birds may form large flocks

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Starlings used as lure birds. Image: Brian Lukins

and many birds can be caught. However, the efficacy of trapping in terms of reduced density or damage also needs consideration. For example, for bird species with high rates of fecundity (e.g. starlings and mynas) removing birds during or just prior to the breeding season may cause greater reductions in density in the long term or for the approaching ripening season.

- Confinement in a trap causes fear and distress; therefore traps need to be carefully managed.
- Operators should be competent in bird handling and restraint techniques. This will help to minimise harm to the birds and protect the handler from injury.
- Any control of pest birds must be implemented in accordance with any relevant State, Territory and Commonwealth legislation. Permits may be required for the control of some species. Contact the relevant State/Territory fauna agency for further details.
- Trapped pest birds should be euthanased after capture. The National Consultative Committee on Animal Welfare considers that trapping for the local pet or export trade is not an acceptable option on welfare grounds. Also, trapping of pest birds for relocation should only be used where there is a high probability that it will lead to amelioration of the problem and can be conducted with minimal risk to the welfare of the birds.

Animal welfare considerations

Impact on target animals

- Trapped birds are likely to suffer from distress when confined and they can sometimes be injured while trying to escape from the trap or during capture or restraint prior to euthanasia.
- Trapped birds must only be killed by humane methods with minimal delay.
- Traps must have sufficient height, length, and breadth to permit the bird to stretch its wings freely.
- When the trap is in use, it must be inspected on a regular basis, preferably daily. At each inspection any birds caught in the trap must be removed from it and killed quickly and humanely. Regular inspections will help to prevent captured birds from being harmed by other captured birds or by predators outside of the trap (eg corvids, currawongs).
- If lure (or decoy) birds are used they must be provided with adequate food, water, shelter and a perch. The lure bird/s must be removed when the trap is not in use. Traps containing lure birds must be inspected regularly (ie for small traps at least once daily, for larger traps at least every two days). Maintaining the same lure birds may be more appropriate with some species (eg starlings) rather than rotating with 'fresh' birds, as they become habituated to captivity within a couple of days. Lure birds that show signs of prolonged distress should be euthanased (see *Impact on non-target animals* section).
- When the cage traps are left in the open but not in use, they must be rendered incapable of holding or catching birds (eg door secured in open position). Food should be removed when the trap is not in use.
- Adequate shade is essential for the humane operation of the trap. Shade material (eg shadecloth, tarpaulin, plywood etc) can be incorporated into the trap during construction or added during trap setup. Waterproof material will also provide protection during extremes of weather.
- Where possible, trapping should be avoided in adverse weather conditions.
- Captured birds must be approached carefully and quietly to reduce panic, further stress and risk of injury.
- Trapped birds are euthanased using one of the following methods:
  - *Cervical dislocation*: This involves separation of the skull and the brain from the spinal cord by pressure applied posterior to the base of the skull. The brain stem, which controls respiration and heart activity, is consequently damaged, stopping breathing and reducing blood flow to the brain, leading to death. Studies in rats have shown that electrical activity in the brain persists for around 13 seconds following cervical dislocation. This may represent a period of remaining consciousness.

- *Inhalation of carbon dioxide*: When animals are placed into a chamber containing up to 70% CO_2 they lose consciousness very quickly due to the narcotic effect of the high intake of CO_2 on the brain without causing hypoxia. Death is caused by direct depression of CNS, respiratory and cardiac functions. One hundred percent CO_2 can cause severe dyspnoea (difficulty in breathing) and distress in conscious animals but this higher concentration is recommended for young chicks as they are more tolerant of CO_2.
- *Injection of Barbiturate*: Causes depression of the central nervous system resulting in cardiac and respiratory arrest. Causes rapid euthanasia with minimal discomfort. The intravenous route causes the quickest death.
- *Inhalation of carbon monoxide*: Although there are significant occupational health and safety hazards associated with its use, carbon monoxide gas is also sometimes used to euthanase trapped birds. Compressed bottled gas as well as cooled and scrubbed exhaust from non-vehicular petrol engines without a catalytic converter are acceptable sources of carbon monoxide. See Appendix for further information. When inhaled, carbon monoxide binds to haemoglobin in the red blood cells with an affinity 250 times that of oxygen. This results in reduced oxygen-carrying capacity and altered delivery of oxygen to cells. Hypoxia - the reduction of oxygen supply to the tissues - eventually leads to unconsciousness and death.

- To minimise the animal welfare implications of leaving dependent nestlings and chicks to die from starvation it is preferable not to undertake trapping during the nesting season. If trapping must occur during nesting, reasonable efforts should be made to find nest hollows containing young birds so they can be killed quickly and humanely.
- Special care and knowledge is necessary for holding or restraining birds, and the most appropriate method should be used for each species.

Impact on non-target animals

- Traps are not target specific; therefore other species, usually birds, may be caught.
- To reduce the impact on non-target species, traps should be placed in areas that are frequented by the target species. Free-feeding can assist in identifying the likelihood of capturing non target species, and appropriate areas for capture.
- Using lure birds or taped-recordings of target bird calls may help to minimise non-target bird capture and improve trap success.
- Non-target birds caught in traps must be visually inspected for injuries and signs of illness or distress before release. Stressed birds will close their eyes and may also hunch-up their necks and maintain a stiff and unusual looking posture. A rapid heart rate, loss of feathers, change in body temperature, trembling or shaking may also be observed. Birds should be dealt with as follows:
  - Birds which are unharmed should be immediately released at the site of capture. If a bird has been handled, do not release it into mid-air. Turn it right side up and allow it to sit in the ground so that it can become oriented.
  - Birds which are suffering from thermal stress should receive appropriate attention. A bird suffering from thermal stress can initially be placed in a suitable quiet holding area which provides warmth or shade to allow recovery before release. Honeyeaters and heat stressed birds will drink sugared water while they are being held in the hand.
  - Birds that are unable to fly may be suffering from a slight strain to the wings. Place them on a perch in good cover and they will usually recover rapidly.
  - Birds with treatable minor injuries that cannot be immediately released or those failing to recover from thermal stress should be presented to a veterinarian or a registered wildlife carer for treatment.
  - Birds that have injuries which are untreatable or which would compromise their survival in the wild should be euthanased using one of the techniques described below in the *Procedures* section.

Currawong caught in a myna trap. Image: Brian Lukins

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Common starlings in a MAC trap. Image: Bruce Mitchell

Health and safety considerations

- Care must be taken when handling birds (especially pest species) as they may carry diseases such as psittacosis (chlamydiosis), aspergillosis, erysipelas, yersiniosis and salmonellosis that can affect humans and other animals. Routinely wash hands after handling all birds. Personal protective equipment, especially face masks, are recommended when handling birds to reduce the risk of contracting disease.
- Operators need to be wary of the potential for injury when handling birds. Some species of birds can deliver painful bites and scratches. For example, parrots (e.g. cockatoos, galahs, corellas) have large, heavy beaks and strong jaws that are capable of inflicting serious injury. Raptors, if encountered as non-target species, are ferocious and can use their feet as weapons. Protective gloves can be used if required for handling large birds, although these may hinder dexterity. A towel is useful to place over the birds head or to give raptors something alternative to grip.
- Operators must be protected by tetanus immunisation in case of infection of scratches and bites.
- During set-up of traps and handling of gas cylinders, operators should be wary of the risks of injury from lifting heavy items.
- Use of carbon dioxide:
  - Carbon dioxide should be used in a well ventilated place.
  - Carbon dioxide is non-flammable, non-explosive and poses minimal risk to personnel when used with properly designed equipment. However, inhalation of significant concentrations of CO_2 can cause narcosis and/or asphyxia.
  - If CO_2 is inhaled, remove patient from the contaminated area to allow them to breathe in fresh air. Early signs of exposure are headache and shortness of breath. If patient is not breathing, make sure airway is clear and apply artificial resuscitation. Keep warm. Oxygen may be given but only under the supervision of a trained person.
  - Although prolonged exposure to low levels of CO_2 (up to 1.5 % in inhaled air) are well tolerated, chronic health effects can result.
  - For further information refer to the Material Safety Data Sheet (MSDS), available from the supplier.

Equipment required

Traps

- The traps used should be specific for the target species. Several trap designs exist, including the following:
  - *Walk-in cage traps* operate by attracting birds into a cage with a lure including food or other birds. A trap door is then activated closing the bird inside the cage. The use of lure-birds is applicable for flocking birds such as starlings. Simple designs can capture a single bird at a time; more elaborate designs can capture multiple birds and include holding catches for lure birds. Traps must be checked regularly to prevent attacks from predators.
  - *Clap and sprung traps* rely on a spring to throw a net over an area or close a door on a cage. Some traps can be triggered by a bird, while others rely on a person to trigger the spring. Captured birds have to be quickly removed from these traps.
  - *The Modified Australian Crow (MAC) Trap* has a V-shaped upper entrance and is commonly used for trapping corvids. The same design with a modified entrance can be used for smaller species, such as starlings, mynas and sparrows. The trap can capture and hold a large number of birds, providing that there is adequate shade, food and water. Requires less maintenance than other traps, therefore they may only need to be checked every 2 days.
  - *Two-stage roost trap* has been developed at the Australian National University for common mynas (*Acridotheres tristis*) (see http://sres.anu.edu.au/associated/myna/trapping.html). The design is a large (0.8 W x 0.8 L x 1.9m H) mesh trap with two compartments. The lower compartment

has two walk-in funnel entrances (First stage); the upper compartment has a one-way entrance leading upwards (Second stage) and is also where the lure birds are housed. This trap has provision for housing so may only need to be checked every 2 days.

- *Mist nets* are fine nylon or polyester nets which are suspended between two upright poles. Birds fly into the net and remain caught until released. They are mostly used by researchers and are commonly used for small to medium-sized birds. Mist nets require continual monitoring, expert handling of caught birds and result in and increased likelihood of non-target capture. Users of mist nests must hold an authority from the Australian Bird and Bat Banding Scheme and a separate permit from the relevant state/territory fauna agency.

- Details of trap specifications and construction can be obtained from relevant state/territory pest control officers.

Bait material

- Bait material suitable to the species being trapped should be used. For example:
  - *Mynas and starlings:* chick starter pellets, bread, sultanas, fruit, pet food
  - *Corvids:* offal, meat, animal carcasses.
  - *Galahs, cockatoos, long-billed corellas*: wheat or other grain

Carbon dioxide equipment

- Compressed CO_2 in cylinders
- Gas regulator/s
- Large canvas or heavy duty plastic bags for enclosing traps
- Chamber/container for birds that are gassed outside the trap

Other equipment

- Hand held nets
- Calico bird-bags
- First aid kit

Procedures

Trapping of birds

- An ideal trap site is where the birds are already feeding, but traps can also be placed near roosts and along the route from the roosting area to the feeding ground.
- Traps may need to be tied down in the event of windy weather.
- A period of free-feeding using bait appropriate for the target species is recommended prior to the commencement of trapping, to both limit non-target captures and to improve trap success.
- Regular checking of traps ensures provision of clean food, water and shade. Some traps will need to be checked more regularly than others i.e. traps that hold only small numbers of birds need to be checked daily. The frequency of trap monitoring will depend on a number factors including trap success, presence of predators, number of lure birds, or if lure birds are observed not to be eating, or appear unwell or stressed eg through feather loss, lethargy etc. Initially, all large traps should be checked daily, then gradually less often if birds and the enclosure remain in good condition. The frequency should increase when many birds are being captured.
- Remain quiet when checking traps so as not to frighten birds that are in or near the trap.
- To reduce panic and injury to birds, always approach the traps slowly, particularly when there are birds inside. When free-feeding, ensure that birds inside the trap are able to leave it without panic.
- When removing non-target birds from the trap, always remove the larger birds first as their movements can injure the smaller ones.
- Animals such as dogs and cats and non-essential personnel must be kept away from the area whilst the trap is in operation.

Common starlings in a walk-in cage trap. Image: Brian Lukins

Euthanasia of trapped birds and disposal of carcasses

Acceptable methods of euthanasia for trapped pest birds are:

Neck (cervical) dislocation

- This technique requires mastering of technical skills to ensure that loss of consciousness is rapidly induced.
- Carefully remove birds from the trap by hand or using a hand held net.
- Dislocate the neck by taking the birds legs in the left hand (if right handed) and the head between the first two fingers of the right hand with the thumb under the beak. A sharp jerk with each hand, pulling the head backward over the neck will break the spinal cord and carotid arteries.
- Cervical dislocation is not suitable for birds larger than 3 kg as it is difficult to pull the neck quickly. Most pest birds will be below 3 kg in weight. For example, average weights for some species are:
  - starlings - 50 to 80 g
  - sulphur crested cockatoos -1 kg
  - corellas - 565 g
  - galahs - 330 g
  - ibis - 2.5 kg
  - ducks - 1 to 2 kg

Inhalation of carbon dioxide (CO_2) gas

- Compressed CO_2 gas in cylinders should be used so the inflow to the chamber can be regulated precisely.
- Birds can either be: (1) removed from the trap and placed into a container pre-filled with CO_2, or (2) remain in holding cages, which will be enclosed within a material or plastic sack.
- A continuous inflow of CO_2 should then be allowed to flow into the sack. A constant level of CO_2 should be maintained for at least 3 minutes and anaesthesia will occur within 60 seconds.
- With birds inside the chamber, an optimal flow rate should displace at least 20% of the chamber volume per minute.
- Carbon dioxide used in a sealed environment is suitable for animals up to 3 kg.
- Carbon dioxide is heavier than air so incomplete filling of a chamber may permit some birds to fly up to avoid exposure to the gas.
- Care must be taken to limit the number of birds in a chamber at any one time so as to maintain a constant CO_2 concentration.

Carbon dioxide cylinder and chamber. Image: NSW DPI

- Each bird must be verified as dead before removing it from the chamber. If the bird is not dead CO_2 narcosis must be followed with cervical dislocation.

Overdose of barbiturate

- Usually given by the intraperitoneal route in smaller birds. For larger birds such as cockatoos, the intravenous route is preferred.
- Barbiturates should only be administered by an appropriately qualified person e.g. a veterinarian.
- Birds killed by this method may contain potentially harmful residues and should be disposed in a manner that will prevent them from being consumed by predatory/scavenger animal species.
- Death of euthanased birds should always be confirmed by observing the following:
  - absence of movement
  - absence of rhythmic, respiratory movements
  - absence of heart beat - feel the chest between thumb and forefinger
  - absence of eye protection reflex (corneal reflex) or 'blink'.
- If death cannot be verified, a second method should immediately be used to kill the bird. Carcasses should only be discarded once death has been established.
- Bird carcasses should be collected and disposed of in an appropriate manner in accordance with acceptable practices as required by local councils and applicable federal, state or territory regulations.

Euthanasia of nestlings and destruction of eggs

- The most suitable methods of euthanasia for chicks and nestlings are:
  - *Inhalation of carbon dioxide*: may need a longer time for death (at least 10 minutes), increase CO_2 concentration to 100%.
  - *Cervical dislocation*: effective and humane
  - *Decapitation*: the instrument used must be sharp and well maintained. In larger chicks the method should be performed after a blow to the head to render the bird unconscious.
  - *Concussion (stunning)*: a blow on the head will usually be sufficient to render the bird insensible. To ensure death stunning must be followed by another method eg decapitation or exsanguination (bleeding-out).
- It is believed that in avian embryos greater than half of the way to hatching, the neural tube has developed sufficiently to allow perception of pain. Therefore, it is preferable that eggs are destroyed by cooling or freezing them to <4oC for at least 4 hours. However, under field conditions quickly breaking the eggs and decapitation or crushing of the embryo may be a humane and more practical alternative.

Information on the use of carbon monoxide for the euthanasia of trapped birds

The humaneness and efficacy of carbon monoxide as a gaseous euthanasia agent is highly dependent on the source of the gas. There are currently four ways of delivering carbon monoxide. These are:

- Carbon monoxide from a *commercially compressed cylinder* is acceptable because it induces loss of consciousness without pain or discernable discomfort and death occurs rapidly if the right concentration is achieved. However, carbon monoxide cylinders are NOT readily available for such use due to OH&S issues.
- Carbon monoxide sourced from the *cooled exhaust of non-vehicular petrol engines without a catalytic converter* (eg lawn mower, whipper snipper engine or purpose-built carbon monoxide generator) appears to be acceptable since the level of carbon monoxide remains high and results in a rapid death. However, the literature suggests that contaminants such as hydrocarbons in the fumes can be irritating to the eyes and airways which makes the efficiency of delivery important.
- Carbon monoxide sourced from the *cooled exhaust of vehicular petrol engines with a catalytic converter* (ie from cars less than approximately 10 years old) is not acceptable on the basis of all current information. For example, research has shown that the levels of carbon monoxide drop off very quickly after the engine has started, leaving only a small window where concentration is adequate for a rapid death (ie for up to approx 60 seconds after a car has been cold started). It is also likely that the level of potential irritants e.g. carbon, are highest during this short time.
- Carbon monoxide sourced from the *cooled exhaust of older vehicles without catalytic converters* may be acceptable but would still have welfare concerns due to a high variability in the age and condition of engines and presence of contaminants.

Further information

Contact the relevant federal, state or territory government agency from the following list of websites:

- Australian Department of Sustainability, Environment, Water, Population and Communities
  http://www.environment.gov.au/
- Australian Department of Agriculture, Fisheries and Forestry
  http://www.daff.gov.au
- ACT Territory and Municipal Services Directorate
  http://www.act.gov.au/browse/topics/environment
- NSW Department of Primary Industries
  http://www.dpi.nsw.gov.au/
- NT Department of Land Resource Management
  http://lrm.nt.gov.au/

Common starlings in a MAC trap. Image: Bruce Mitchell

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- Qld Department of Agriculture, Fisheries and Forestry http://www.daff.qld.gov.au/
- Biosecurity SA, SA Department of Primary Industries and Regions http://www.pir.sa.gov.au/biosecuritysa
- Tas Department of Primary Industries, Parks, Water and Environment http://www.dpiw.tas.gov.au/
- Vic Department of Primary Industries http://www.dpi.vic.gov.au/
- WA Department of Agriculture and Food http://www.agric.wa.gov.au

Also refer to:

- Invasive Animals Cooperative Research Centre http://www.invasiveanimals.com/ or http://www.feral.org.au

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Revised June 2012

Cover image: Brian Lukins