NEW TECHNIQUES FOR AN OLD PROBLEM - RECENT ADVANCES IN FERAL PIG CONTROL IN AUSTRALIA

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Abstract: Feral pigs *(Sus scrofa)* are a major agricultural and environmental pest in Australia and pose a serious threat to the livestock industries through their potential role in spreading exotic diseases, such as foot and mouth disease. General methods of control used, such as 1080- poisoning, trapping and hunting, often do not provide the required reductions in population densities necessary to reduce impacts to acceptable levels or provide a high probability of potential success in eradicating outbreaks of exotic diseases in pigs. New techniques and strategies are discussed, such as shooting or poison-baiting from helicopters, and the use of anti-coagulant poisons, "Judas pigs" and oestrus sows, which can overcome these problems, and in some cases, result in the eradication of pigs or their temporary reduction to zero densities in some areas.

Keywords: Feral pig, *Sus scrofa,* Suidae, Health, Pest control, Populations.

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1. Introduction

Feral pigs (*Sus scrofa*) are a major pest in Australia because of their impact on agriculture and the environment. They also have an actual and potential role as hosts or vectors of a number of endemic and exotic diseases and parasites, particularly foot and mouth disease (FMD), which, if it occurred in Australia, could have disastrous effects on the rural economy.

The extent to which feral pig populations in different parts of Australia need to be reduced to prevent or eliminate such impacts (*i.e.* to achieve threshold densities) is not known precisely. However, as a rough guide, control programs probably need to reduce pig populations by at least 70% annually to keep their numbers below pre-control levels (Giles, 1980). This is because of the pigs' potential high reproduction rate. Giles (*op cit*), for example, recorded a natural rate of increase of 0.71 per year for a feral pig population not subject to control measures in western New South Wales following a period of seasonal abundance, while Hone and Pedersen (1980) and Saunders (in press) recorded average rates of increase in pig populations in the same region of 0.57-1.34 per year after control campaigns had removed 58-80% of the populations.

Threshold densities for eradication of potential outbreaks of FMD amongst feral pigs in the western floodplains of New South Wales and the hill country of southeastern New South Wales are approximately 2.3-14/km^2 and 0.03-0.04/km^2, respectively (Pech & Hone, 1988; Pech & McIlroy, 1990). In such cases, very high culling rates (>95%) would be required for rapid eradication of the outbreaks (e.g. < 21 days). Lower culling rates could be effective if a longer outbreak was acceptable.

Traditional methods of control, such as trapping, poisoning with phosphorous or 1080 (sodium monofluoroacetate), and hunting, with or without dogs, do not always provide the reductions in population numbers required to prevent or eliminate the adverse impacts of feral pigs (Hone & Pedersen, *op.cit*; Hone, 1983; McIlroy & Saillard, 1989; Saunders *et al.,* in press). There are also concerns about user safety, bait shyness and the humaneness of both poisons and their impact on non-target animals (McIlroy, 1983; Choquenot *et al.*, 1990). This paper reviews recent improvements to these methods and new techniques and strategies that are being developed to enhance feral pig control in Australia.

2. Use of helicopters for shooting and poisoning campaigns

Shooting feral pigs from helicopters has become a popular control technique in Australia since the early to mid 1980's. Its main advantages are that it is a species specific method and more humane than most other control methods, it produces results equal to poisoning programs, it is labour efficient and more than

competitive on a cost per pig basis compared with other control methods, it can provide a quick reduction of pig numbers over a wide area, including areas such as wetlands and other terrain where access on the ground can be difficult, and it is not affected by seasonal conditions (Korn, 1986). Saunders (*op.cit*) evaluated the technique in the southern Macquarie Marshes in New South Wales over two consecutive years. An 80% population reduction was achieved in the first year, followed by a 65% reduction in the second year, after the population had recovered to 77% of its first year level during the intervening 12 months. While annual use of the technique may not achieve the required reduction of feral pig populations to below the threshold densities for establishment of exotic diseases, or provide long-term protection of agricultural or conservation values, it is useful for short-term protection of other susceptible enterprises such as crops or sheep flocks during lambing (Saunders, *op. cit.*). Ultimately, its use for effective long-term control may require consideration of marginal benefit curves and its integration with either commercial harvesting or other control methods.

Helicopters can also be very useful for aerial distribution of poison baits to areas that are not readily accessible on foot or by vehicles. For example, McIlroy and Saillard (*op.cit.*) found that conventional control programs against pigs in Namadgi National Park, southeastern Australia, during spring were not always effective (e.g. only 0 - 30% population reductions) because many of the pigs moved away from the valley floors, where they had largely overwintered, to more remote areas where there were no access tracks for trail-baiting and other control methods such as trapping. However, when a helicopter was used to distribute bait to remote grassy clearings in the forest, ridge tops and other similar sites, an 86% reduction in pig numbers was achieved in less than 3 weeks (McIlroy, unpubl. data).

3. Use of dogs for hunting

Shooting, or hunting, with or without dogs, is a long-established method of control for feral pigs in Australia. It can take three forms:

- Shooting by landholders, generally on an opportunistic basis, but occasionally as part of coordinated shooting drives.
- Commercial harvesting for export of Wild boar meat. This industry, which began in 1980, is now worth from $10-18 million per annum, depending upon fluctuating market prices.
- Recreational hunting. The feral pig is regarded as the most important game animal in Australia and shooting, bow hunting and dogging are popular pastimes for many amateur hunters.

The effectiveness of shooting or hunting on the ground as a control technique for feral pigs in Australia has not been objectively evaluated, but is generally considered to play an insignificant role in reducing damage except where it is intensively conducted on small accessible properties (Hone, 1984). McIlroy and Saillard (*op.cit.*) monitored the effectiveness of hunting feral pigs with dogs and concluded that the technique was not as effective for the large scale reduction of pig populations as poisoning. However, it could be useful for obtaining samples of pigs for monitoring prevalence of disease during the first few days of an exotic disease outbreak, and for killing pigs that survived other control methods. Its overall effectiveness could be further enhanced by the adoption of recent improvements in the use of dogs for pig control developed in New Zealand. These include the use of "elite" types of dogs with specialist skills, such as long-range finding and bailing abilities, holding abilities, and independent targeting (in which each dog targets a different pig), and the use of radio collars on the dogs to enable hunters to locate bailed pigs more quickly or locate lost dogs (C. Clarke, *pers. comm.*). Clarke found that using radio collars on long-range finders increased kill rates by 31% and using independent target dogs increased kill rates by 66%.

4. Use of anticoagulant poisons

Recent research has indicated that anticoagulants, particularly warfarin, are potential alternatives to 1080 and phosphorous for poisoning feral pigs (McIlroy, *op.cit.*; Hone & Kleba, 1984). Warfarin is acceptable and highly toxic to feral pigs and its slow mode of action precludes many of the problems, particularly bait shyness, associated with the other poisons. Warfarin also has an antidote (Vitamin K1) for cases of accidental poisoning.

McIlroy *et al.* (1989) and Saunders *et al.* (1990) evaluated warfarin as an agent for pig control and reported population reductions of 94% and 99%, respectively, in two hill country areas of southeastern New South Wales. Choquenot *et al.* (1990) obtained only a 61% reduction in the semi-arid rangelands of New South Wales, but suggested that abundant

alternative food after heavy rain may have depressed bait consumption.

5. Use of oestrus-induced sows to enhance trapping

There is some evidence that poisoning and trapping programs preferentially remove sows, leaving a preponderance of boars in residual populations (Choquenot *et al.*, 1993). These boars are more likely to prey on lambs than sows and more readily spread diseases because they range over greater distances (Pavlov & Hone, 1982; McIlroy *et al., op. cit.*). Limited field trials have shown that sows, artificially induced into oestrus by abortion, followed by treatment with a serum gonadotrophin preparation, preferentially attract more pigs (particularly boars) to traps in which they are placed than traps containing anoestrous sows or bait alone (McIlroy, unpubl. data). Choquenot *et al.* (1993), however, found that using oestrous sows in traps, after a conventional trapping session had removed 83% of the pre-existing population, did not result in the capture of any further pigs.

6. Judas pigs

This technique takes advantage of the gregarious nature of pigs and involves fitting radio transmitters to captured pigs and radio-locating them after release to disclose the whereabouts of other pigs in an area. McIlroy (unpubl. data) first tested the technique in 1989, using sows and immature pigs captured near an area where 84% of the pigs previously present had been killed by a warfarin-poisoning campaign. These trials were generally unsuccessful; the released pigs mostly either established new home ranges on their own or began moving back towards their capture site. Trials with sows captured earlier within the poisoned area, however, were very successful, with individuals joining other survivors in the area within 1-7 days of release and from distances of up to 8 km away. The method has since been successfully used in the Northern Territory and in New Zealand. In the Northern Territory the Conservation Commission used two sows that they caught on Undoolya Station near Alice Springs as "Judas pigs" and on 13 subsequent occasions shot all pigs associated with them from a helicopter, eradicating a colony of 47 feral pigs (Bryan, *pers. comm.*). Landcare authorities in New Zealand have had similar success with the technique, using dogs and ground-based shooting (Clarke, *pers. comm.*).

7. Conclusion

The improvements on current methods and the new techniques and strategies described in this paper are not likely to replace traditional methods for feral pig control in Australia. However, in many cases they could enhance the effectiveness of control programs, particularly where intensive management of pigs is required with minimal impact on non-target animals.

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