

Vertebrate pests in macadamia: pigs

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Jeremy Bright, Development Officer – Macadamia

Les Gains and Brice Kaddatz, Suncoast Gold Macadamias

Habitat and damage

Feral pigs are usually found within two kilometres of a water source, although they can cover much greater distances. Pig population densities depend on environmental conditions such as food and water sources. Pigs are most active in late afternoons and early mornings, but if they have been hunted will become nocturnal. They cause environmental damage such as wallowing and rooting up the ground causing erosion (Figure 1) and are a major biosecurity risk, potentially spreading weeds and pathogens. They can also destroy infrastructure on the farm, including watercourses.

Pigs seem content in macadamia orchards (Figure 2) and can consume macadamia nuts in large quantities. Examining gut contents reveals multiple kilograms of kernel (Figure 3). A moderate size pig can consume up to six kilograms of nuts in shell per hour. A mature pig (90–100 kg) will consume 3% of its body weight per day; smaller pigs up to 5% of body weight. Ten pigs feeding in an orchard for ten days can destroy nearly 300 kilograms of nuts in shell.



Figure 1. Pigs damage the orchard floor causing erosion and making it difficult to harvest.

Breeding

Male pigs are sexually mature at around 18 months and they usually roam alone, seeking out new territories. Females travel in groups called sounders. They can breed from 7–12 months of age and will produce a litter of 2–10 piglets (Figure 4). In favourable conditions, up to three litters can be produced per year, leading to rapid population expansion.



Figure 2. Pigs making their way to macadamia trees.



Figure 3. Gut contents of a 70 kg sow containing approximately \$60 of macadamia kernel.

Monitoring

Monitoring should involve pig numbers before and after control measures, as well as identifying and quantifying the effects from their activity. Feral pigs consistently use trails (pads) from one area to another, such as from shelter to food supply or water, and marking of these trails is common.

Feral pigs will often root up the ground leaving depressions that make it difficult for finger wheels to harvest nuts. Conversely, the only sign might be small shell segments scattered about the foraged area. If pig damage to the crop is suspected, then a bright torch at night over the area will highlight the white inside the cracked shells. Also look for other signs such as pig prints on damp ground and muddy rub marks on tree trunks. Game cameras can be placed on pads to identify the numbers and sizes of pigs, providing useful information for determining the best control options.

Control

Exclusion

Fencing is the best option. An effective pig fence needs to be robust, regularly maintained and should incorporate a high power energiser. Where properties are within close proximity to each other, consider area-wide fencing around the boundaries of the properties. This will increase effectiveness and also assist with costs.

While the initial cost of an effective pig exclusion fence (Figure 5) might seem high, it is likely that it will be recouped in just one season based on the following example calculations:

- one pig consumes 2.5 kg of kernel in one night, that is 33% of nut in shell (NIS), which equates to 7.5 kg of NIS lost



Figure 4. Pigs can produce up to three litters per year and can have up to 10 piglets.

- the NIS value is \$6/kg, so in one night the pig consumes \$45 of nuts
- if there are 15 pigs in the orchard, then $15 \times \$45 = \675 lost per night
- the season goes from March to September (approximately 230 days) and for approximately 60 days, there will be enough nuts on the ground for the pigs to take their fill of 2.5 kg, thus a loss of \$40,500 from pigs.
- the cost of effective fencing (mesh fencing with an electric stand out wire) is about \$9,000 per kilometre
- a 40-hectare orchard might only need 2.6 km of fencing (if a square block), costing \$23,400.

Therefore, you are saving almost \$17,000 in the first year and \$40,500 every year following (@ \$6/kg NIS 10% mc).

Trapping

There are several trap types for pigs including silo mesh traps, trigger traps (Figure 6) and remotely controlled traps. Traps are generally set along a well-worn pad or in an area known to be frequented by pigs. Free feeding for a time to get the pigs entering and leaving the trap is essential. It might take weeks before a trap can be set to keep pigs in. The benefit of remotely controlled trigger traps is that the pig population can be monitored from a remote camera and the door triggered with the press of a button when the full complement of pigs is inside the trap.

Traps do not work well in orchards while there are nuts on the ground. The trap is best placed in a quiet area as far from the orchard as possible. It might be necessary to work with neighbours to find a suitable location.



Figure 5. An effective pig exclusion fence.

Macadamia nuts in shell are an excellent food to use in traps, as there are few other animals attracted by them.



Figure 6. Pigs caught in a trap.

Shooting

Shooting can contribute to pig control, however long sleepless nights during harvest are less than helpful. Ground shooting is usually opportunistic; either involving dogs to locate the pigs or patiently waiting in a hide for the pigs to appear. If trapping strategies are being used, avoid shooting near the trap as it will disrupt the regular pattern of pig intrusion and disperse them to other areas.

Combining methods

Shooting and pig-dogging in conjunction with remote trapping is a good strategy for limiting immediate damage and reducing the pig population over time, as it encourages the pigs to feed in 'safety' at the trap location. Shooting and pig-dogging might be the only way to eliminate trap-shy pigs, which are often the large sows.

The [Hunt safe, hunt legal – be a responsible pig-dogger program](#) raises awareness of the responsibilities of pig-doggers. For further information on responsible pig hunting, refer to the DPI website: www.dpi.nsw.gov.au/hunting/game-and-pests/be-a-responsible-pig-dogger.

Further reading

Mitchell B and Balogh S (2010) Monitoring techniques for vertebrate pests – feral pigs: www.pestsmart.org.au/wp-content/uploads/2010/03/Monitoring-techniques-for-vertebrate-pests---pigs2.pdf

NSW Game Hunting Guide (2017) <https://www.dpi.nsw.gov.au/hunting/rules-and-regulations/nsw-game-hunting-guide>

Case study

Les Gains

Our farm is at Amamoor in the Mary Valley, about 20 km south of Gympie. We are surrounded by cattle properties and the general district contains many macadamia, avocado, stone fruit and small crop farms. The Amamoor State Forest is nearby.

From about 2000 to 2010, we experienced sporadic feral pig intrusions, with little damage or crop loss. On several occasions we had doggers come on to the property, and although they never caught a pig, they did seem to deter them.

In 2011 we had our first serious pig problem. We borrowed some game cameras to see where the pigs were entering and exiting. There were two separate sounders plus some individual boars, a total of about 25 pigs. We started by hunting (shooting) them in late evenings and early mornings, but the pigs soon reverted to night time visits. Then it became spotlight shooting and locating the pigs by listening for them cracking nuts. At night, and with no wind, this proved very difficult because the pigs often detected us before we could get close enough. We were not reducing pig numbers, with sows producing litters faster than we could cull them. The doggers were still coming but catching nothing.

In 2012 the pigs returned in greater numbers. We installed a pig trap in a corner of one block and loaded it with food. Unsurprisingly, the pigs ignored the trap to free range in the orchard. However, at the end of the season after harvesting, we caught seven pigs by providing a trail of nuts from their entry point to the trap. Using night-vision monocular made hunting easier but we were not making large inroads into their numbers.

A change in strategy was in order. We realised we needed patience to attract and get the pigs into a routine, but that that was not a good idea in the orchard while we were losing the crop. So in 2013, we sought agreement from two neighbours with cattle to place traps on their properties. We followed the pig pads (tracks) from our farm and found places on the pads that were quiet and had little human activity. Food (NIS) was placed there and soon vanished,

so we then placed traps at these locations. Now we could hassle the pigs as much as possible in our orchard and force them to eat at the trap sites. This was successful and we were able to cull large numbers of pigs from the traps. The pigs were still coming to our orchard but we also now had a phone camera that would alert us when they arrived so we could quickly disturb them. The doggers were still coming and going away empty-handed, but making life hard for the pigs.

We used this strategy successfully for the next couple of years. The main problem was the time taken to check the trap sites and replenish the food supply. The phone camera was a great help here since it only needed to take one photo each morning to see if we needed to visit a site. Meanwhile, other macadamia and avocado growers were asking for assistance and we were quite successful at trapping large numbers of pigs.

About this time I teamed with a keen shooter from Brisbane, he had thermal gear, monocular and a rifle scope, which made night shooting much easier than my digital night vision. This allowed me to concentrate on the trapping while he cleaned up the trap-shy pigs or where it was not worth the time and effort to set up a trap.

Over many years we have gained access to over a dozen properties covering about 350 hectares. Landholders are very supportive and are continually on the lookout for pig activity. Three of them have their own traps and now pig numbers are very low.

Despite the very low incidence of pig activity on our property, we still want to keep them out completely for biosecurity reasons (crop contamination). We have started building pig-proof fencing around all the tree blocks. We are about half way through after about 18 months of building it ourselves. We started on the blocks that were most affected and since completing those areas, there has been no pig activity detected. We have used two fencing systems; a seven-wire electric only at \$6,000-8,000 per kilometre (internal) or a pest animal mesh with electric outrigger at \$8,000-10,000 per kilometre (boundaries).

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