FACTS & FABLES

Flying Foxes & Fruit Crops

The Queensland government has banned the killing of flying-foxes as a method of fruit crop protection. This is important for conservation and animal welfare, and beneficial for woodlands and forests. Because shooting is ineffective, most fruit growers have netted their crops. Here we explain why it is important the ban stays in place, and why the fruit industry will not suffer dire consequences because of it.

Queensland Conservation




Queensland's flying-foxes

Flying-foxes are large bats that eat nectar and fruit. The four species that can cause damage in Queensland orchards (shown left to right above) are:

- Spectacled flying-foxes (Pteropus conspicillatus) north of about Ingham
- Grey-headed flying-foxes (P. poliocephalus) from south of about Maryborough
- Black flying-foxes (P. alecto) in most coastal fruit-growing districts
- Little red flying-foxes (P. scapulatus) in most fruit-growing districts (only occasionally)

Declining populations

Early European settlers recorded huge camps of flying-foxes that would blacken the sky when they flew out at dusk. But with large-scale land clearing and killing, flying-fox populations have greatly declined. In the 1930s biologist Francis Ratcliffe estimated there were "many millions" of Grey-headed flying-foxes, and that they had already suffered a 50% decline. Now there are far fewer Greys: an estimated 400,000 or so.

Because flying-foxes typically don't breed successfully until they are three and give birth to just one young a year, maintenance of their populations requires high survival rates. The decline of two species – Spectacled and Grey-headed flying-foxes – has been so large that they were listed as threatened ('vulnerable') under federal environment legislation in 2002. This listing was recommended by an independent scientific committee after extensive consultation and review of the evidence.

Recent studies suggest that flying-fox populations continue to decline.[1] They continue to lose habitat, and suffer from a variety of other threats including shooting, entanglement in barbed wire and loose netting, electrocution on power lines and tick paralysis. Their decline is a problem not only for flying-foxes, but for the ecosystems that benefit from them.

Entangled in backyard netting
Photo: Mike Jupp

Ecological value as flying foresters

In their nightly foraging, as they fly from tree to tree dusted with flower pollen or eject the seeds of fruit eaten, flying-foxes are inadvertently regenerating woodlands and forests. Many eucalypts produce most of their nectar at night to attract these exceptional pollinators.

Flying about 20-50 km a night between food trees and their camp, flying-foxes maintain the genetic diversity of native trees and reforest gaps.

As the climate changes, this ecosystem service will become increasingly important to facilitate the flow of adaptive genes between trees and assist plant movement. Conserving long-distance pollinators should be a high climate change priority.

MYTHS

Myths about flying-foxes
Flying-foxes have an image problem. But much of the negative commentary is based on myths or misunderstandings.

Photo: Nick Edards

MYTH: Flying-foxes are in "plague" numbers

Because flying-foxes are colonial animals – living together in roosts and flying out together at dusk for feeding – they give the impression of existing in very large numbers. But two species are listed as threatened because their numbers have declined so much.

Flying-foxes need high rates of survival to maintain their populations. They cannot breed up quickly, as a female can only have one young a year. This is the exact opposite of what is implied by 'plague'.



Flying-foxes face many threats, including land clearing, and entanglement in barbed wire and loose netting around fruit trees. Photo: Mike Jupp

1 These studies include assessments of the population structure of the two threatened species that show populations are skewed towards young animals, implying high levels of mortality.

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Flying-foxes and orchards

Ever since European colonists planted orchards in the 1800s, there have been complaints about flying-foxes. This is not surprising, as orchards represent a concentrated and accessible source of food for flying-foxes, rendered more attractive as a large proportion of their native food trees have been cleared.

The 'killing' approach to crop protection has a long history. In 1929, biologist Francis Ratcliffe was brought from England to investigate the 'flying-fox problem'. He noted in his report after a 2-year investigation that the object of most orchardists suffering damage from flying-foxes was for the most part "to kill as many flying foxes as possible". But he found that shooting was "expensive and ineffective" and that the problems were exaggerated.

Damage Mitigation Permits – a brief history

Despite being a native animal, flying-foxes were only protected under Queensland law in 1994. Before that (except for a few years)[2] they were classed as vermin and anyone could kill as many as they wanted without a permit. There were shooting parties and bounties, and very large numbers were slaughtered in camps and orchards.

Even after they were 'protected' and fruit growers were required to obtain a damage mitigation permit to kill them, many thousands of flying-foxes continued to be shot or electrocuted in orchards. Many more were killed illegally than legally.

However, the past decade has seen a growing appreciation for the value of flying-foxes, and much better protection.

2000: 112 damage mitigation permits are issued, and >12,000 flying-foxes are killed under permit.

2001: A court case reveals that ~18 000 flying-foxes were illegally electrocuted on a north Queensland property.[3] The Queensland government bans the use of lethal electric grids for crop protection.

2002: Two flying-fox species are listed as threatened by the federal government. A quota is set to limit the numbers of flying-foxes shot to no more than 1.5% of estimated national populations.

2008: The Queensland government bans the shooting of flying-foxes on the advice of the independent Animal Welfare Advisory Committee that it is inhumane.

Electrocution was found to be inhumane.
Photo: Carol Booth

Why shooting is inhumane

The ripening of many orchard crops (eg. lychees and stone fruits) coincides with the birth season for most flying-foxes. If their mothers are killed in orchards, young flying-foxes starve to death in the colony.

Another welfare problem is that because of the difficult shooting conditions at night in orchards, a high rate of wounding is inevitable. Autopsies conducted on 58 killed or euthanased flying-foxes in a NSW orchard in 2007 found that most had died due to haemorrhaging from internal wounds rather than instantaneously as humaneness requires.[4] Many of the euthanased bats would have suffered for days before dying if they had not been found. Only 8% of injured bats had been located and killed by shooters.

Xray showing where one bullet has gone through and broken the wing and another bullet has lodged causing non fatal injuries.
Photo: Australian Wildlife Hospital

The shooting of flying-foxes has now been reviewed by two independent committees (whose composition included farmers and the RSPCA) in Queensland and NSW, each of which concluded that it is inhumane. Even if all flying-foxes shot in orchards could be killed quickly and humanely, there is no way of preventing the starvation of dependent young. No code of practice can overcome this hurdle.

MYTHS

MYTH: Without damage mitigation permits the fruit industry will be decimated

The majority of fruit growers affected by flying-foxes now have their crops protected by nets. This is the only way to protect an orchard from significant flying-fox pressure. Fruit losses in un-netted orchards are only a small proportion of overall fruit production.

Having a damage mitigation permit to shoot 15-30 flying-foxes a month is not the solution to a flying-fox problem. Even when growers were permitted to shoot far larger numbers, they were not able to prevent sometimes large losses.

If crop protection could be achieved by shooting a few flying-foxes, there wouldn't have been so many growers investing in netting.

MYTH: Flying-foxes are "dirty"

Flying-foxes have exemplary hygiene and spend hours grooming, so they are usually very clean. They may smell strong due to chemical signals they use. Males secrete a musk-like chemical to mark their breeding territories. (They probably don't much like many human smells.)

We do not agree with the shooting of native birds and bats. It may seem like an easy way out but it does little to improve profitability. Nets have saved our crops and therefore our profits 100 per cent.

John Gough, stonefruit grower, December 2008

2 They were protected under the *Fauna Conservation Act 1974*, but they were reclassified as vermin in 1984 due to complaints by fruit farmers.

3 The case Booth v Bosworth resulted in an injunction against the fruit grower to prevent his use of electric grids to kill flying-foxes. He had 6.4 km of grids to protect his 60 ha lychee orchard, and was found to be killing 300-500 a night.

4 Anja Divljan et al. (2009) Report on deaths and injuries to Grey-headed flying-foxes, *Pteropus poliocephalus* shot in an orchard near Sydney, NSW .

Flying Foxes & Fruit Crops

Why shooting is ineffective

Even when there were few restrictions on the numbers of flying-foxes that could be shot, orchardists claimed large losses. It is widely agreed that shooting cannot stop flying-fox damage when there are large incursions. Pressure on orchards is typically greatest when native foods are in short supply.

A female about to leave her baby at camp. If she is shot, her young will starve to death.
Photo: Nick Edards

The quota system in place for six years prior to the shooting ban allowed at most one flying-fox (on average of each species) to be killed each night.[5] Although many growers complained that the quota system did not allow them to protect their crops, some now claim that killing a small number of flying-foxes is effective because it allows them to kill 'scout' bats.

Do 'scout' bats exist?

Some growers contend there are certain flying-foxes whose role it is to search out food and then lead other bats to it (like honeybees). They claim that if they shoot these 'scouts' other flying-foxes won't find their orchard.

But there is no scientific evidence for bat scouts. While flying-foxes undoubtedly learn from each other, the scout idea is not consistent with what is known about the capacity of flying-foxes to find food.

As a very concentrated source of food and obvious features in the landscape (from a flying bat view), orchards would be easy to find – easier than single fruiting trees in a forest. Flying-foxes have an excellent memory for places – allowing them to return to the same branch in the same tree in a camp after months of being away – which would allow them to return to orchards they had previously seen or visited. They wouldn't need a 'scout' to find them.

The history of growers shooting large numbers of flying-foxes in orchards is evidence they can't control bats by shooting just a few (or even many). Even if there were scouts, farmers can't patrol their entire orchard all night every night and shoot every bat that enters. A NSW survey found that farmers on average spent just 4.8 hours a week guarding their orchards.

The fact that the majority of growers affected by flying-foxes have now netted suggests that shooting a few bat 'scouts' was not working. It's not that simple.

Crop protection – what works?

A large proportion of fruit growers have adopted what is the only consistently effective method of crop protection – full exclusion netting. This is now considered industry best practice. Some form of netting protection has been adopted by about 90% of lychee, rambutan and longan growers in North Queensland, according to DPI.

If flying-foxes cause significant losses in an orchard, then it makes economic sense to net.

Full exclusion netting over a peach orchard.
Photo: Nancy Pallin

A common experience has been that growers who net recover their costs within a very few years due to fruit saved.

According to the Lychee Information Kit, netting may be cost effective even if only small crop savings are achieved. The kit provides two examples of its cost effectiveness: (a) the netting of a 1.36ha orchard would provide a 30% return on investment if only 15% of the crop was saved per year over 10 years, and (b) the netting of a 4.28ha orchard would also produce a 30% return on investment if only 12.5% of the crop was saved per year over 10 years.

The Queensland government provides low-interest loans for netting through QRAA. Netting can be done in stages, using profit earned from saved fruit to fund subsequent stages.

If losses are generally low and it is not cost-effective to net, there are other non-lethal options such as noise and light deterrents that may reduce losses. Some growers find them effective. But there is need for research to determine what works best under what circumstances. Flying-foxes can become habituated to deterrents, limiting their effectiveness.

MYTHS

Photo: Ivor Davies

MYTH: Flying-foxes are "disease-ridden"

Flying-foxes have no more diseases than other wildlife. The many thousands of people who have been in close contact with flying-foxes as wildlife carers have not suffered health consequences (except lack of sleep).

Flying-foxes are known to host three viruses that very rarely cause illness in humans. Just one person is known to have died due to contact with a flying-fox infected with Australian bat lyssavirus. This can only be transmitted when infected bat saliva comes into contact with human tissue through an open wound. It can be avoided by people not handling bats unless they are vaccinated. Hendra virus is transmitted to humans from horses, not flying-foxes. There are precautions horse owners can take to limit risks. And Menangle virus, which has caused a flu-like illness in two people, is transmitted from pigs.

People are not at risk of disease by living near a colony, or if flying-foxes fly overhead or feed in their gardens. Anyone who is bitten or scratched by a flying-fox should seek medical advice.

5 For example, the quota specified that damage mitigation permits could be issued to kill up to 15 Spectacled flying-foxes, 20 Grey-headed flying-foxes and 30 Black flying-foxes per month per orchard.