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the secretive Silvereyes



By Dr I. Rooke, Research Officer

During the past five years the Agriculture Protection Board, in co-operation with scientists from CSIRO's Division of Wildlife Research and the University of Western Australia, has studied the biology and control of the silvereye in the South-West of Western Australia. The project was partially funded by a voluntary levy on vignerons in the Margaret River and Mt Barker areas.

The first part of the study investigated the bird's biology—its food requirements, reproductive rate, how it interacted with other birds and its seasonal movements. It was hoped that this knowledge would help develop effective techniques for either controlling the bird or lessening the damage it causes.

Silvereyes are small native Australian birds. They have caused sporadic damage to fruit, especially grapes, since the first European settlers arrived, but the birds are not very well known because of their secretive habits. They are very common along the south-west coastal areas of the State. Other populations exist in eastern Australia and New Zealand.



■ Banded silvereye (top) alongside marri flowers.

■ Silvereyes eat and damage grapes when their natural foods are not available.

Territories

Silvereyes were caught at Prevelly Park, near Margaret River, and fitted with coloured leg bands, each bird having a unique combination of colours. They were then released and when seen again their positions were plotted on a map of the area. A line drawn to encompass 90 per cent of the different sightings of each bird was used to define their home range. A smaller area, which included half of all sightings, was defined as their territory.

Territories of adjacent males sometimes overlapped. Where this happened the overlap area usually contained important food sources. Nesting sites were frequently well away from preferred food sources. This is probably a strategy designed to minimise the chance of predators finding their nests; it might also help minimise interference from other silvereyes.

Breeding

Silvereyes nest from September to January. One pair nested four times and raised 10 fledglings in a season. Others were less successful, but the population is capable of very rapid expansion as 39 breeding adults produced 80 fledglings in one season of the study. Even if half the fledglings died before they became completely independent, the population would still have doubled in a season.

Predators of silvereyes included square-tailed kites, goannas, mice, rats and cats. They accounted for 17 per cent of the eggs and 10 per cent of nestlings. About 3 per cent of nestlings and 4 per cent of fledglings died from exposure to cold.

Fledglings were difficult to observe because they ranged widely throughout the area and eventually left the coast. The number of young birds increased throughout the season, reaching a maximum in January.

Movements

More than 11,000 birds were banded and released in the Witchcliffe, Margaret River and Cowaramup districts. One bird was caught 100 kilometres away near Manjimup a year later, however, no other movement of more than 30 km was detected, indicating that the population was largely resident within that area. Some birds moved about 20 km in a few days. Many were recaptured several times at the same site.

During January the food supply along the coast dwindles so the birds move inland. If marri trees do not produce nectar, the birds attack grape crops.

In some years, after the marri nectar crop finishes, silvereyes return to the coast to feed on *Rhagodia* (seaberry saltbush) berries. They may stay there throughout winter or range widely

through the farmlands and forests, eating insects and sometimes nectar from the winter-flowering karri.

In spring they return to the coast as the nectar from *Diplolaena dampieri* becomes available.

Food

Silvereyes are opportunist feeders, eating whatever is available at the time. They consume many insects throughout the year and feed on berries, fruit, nectar and food scraps. They have even been found drowned in a bucket of milk after presumably attempting to drink the contents.

To determine their food preferences, caged silvereyes were given a choice of foods: white and red grapes, figs, nightshade berries, nectarines and sugar-water, the latter made up to the same strength as nectar. They preferred the sugar-water, then nightshade berries and figs. They liked nectarines and grapes least of all.

The birds seem to prefer *Rhagodia* berries to grapes because in 1982 they returned to the coast after the marri had finished flowering, although there were plenty of grapes still unpicked nearby.

Because nectar is rapidly absorbed from the bird's stomach, it is not possible to show directly that it is eaten by silvereyes. However, observations of the birds probing marri flowers, and of heavy loads of marri pollen on their faces during autumn, strongly support this belief. When there is a heavy crop of marri nectar, silvereyes eat this exclusively and do not damage vineyards. Silvereyes appear to eat grapes only when no other food is available.

A significant negative correlation was found between silvereyes damage in vineyards and the average yield per hive of honey collected by a local beekeeper. Statistical data also suggest that good nectar years coincide with warm springs and autumns and relatively cool periods during February and March.

In the study, caged birds could not survive on grapes alone, and comatose birds were found in vineyards. Physiological studies show that in late summer the birds' fat reserves are low and their stress hormone levels are high. It may be that grapes do not supply enough water for them and the effort of commuting from vineyard to water supply and back is too much for the already stressed birds.

The comatose birds apparently suffered from dehydration, but the caged birds had enough water and probably died of protein deficiency.

Preventing vineyard damage by Silvereyes

In the previous article, **Dr I. Rooke** *outlined the studies which helped to devise practical ways of controlling attacks by silvereyes on vineyards in the South-West of Western Australia. The preventative methods vignerons can use are discussed here.*

Limiting the population

Shooting has been used traditionally with little or no effect. Silvereyes are very numerous and mobile and any temporary advantage gained by reducing numbers in an area is quickly lost as a result of an influx from adjacent areas.

Because silvereyes eat a wide range of foods and take advantage of every food opportunity presented to them, their population is extremely resilient. They are capable of at least doubling their numbers annually, therefore to permanently reduce the population more than half their number would have to be killed each year. This is difficult and undesirable.

Small-scale destruction of breeding and feeding habitats would be ineffective for the same reason, while large-scale destruction would eliminate most other birds before it had any serious effects on the silvereye population.

Since silvereyes have some beneficial effects in insect control, their destruction might lead to an increase in insect pest problems.



■ *Rhagodia* (seaberry saltbush) berries are a favourite food of silvereyes.

Natural food supply

Food preference studies show that silvereyes eat grapes only when other foods are not available. When the marri flowers profusely there is plenty of nectar and silvereyes hardly damage the grape crop. Similarly, in years when *Rhagodia* (seaberry saltbush) berries are plentiful, silvereyes prefer them to grapes. Preservation of both the marri forest and coastal heath habitats are essential if damage by silvereyes is to be minimised.

Insufficient data are available to accurately predict years when either food source is likely to be scarce, but it appears that good nectar crops follow warm autumns and springs and that hot summers tend to reduce nectar yield.

Alternative food supply

Alternative food supplies such as figs or nightshade berries should help to keep silvereyes out of vineyards during poor nectar years. Careful selection of varieties and appropriate watering of figs will ensure they ripen at the same time as grapes. *Banksia occidentalis* (red swamp banksia) is being tried as an alternative source of nectar by one vigneron. Saltbush grown as a fence line plant is also suggested as an alternative food source.

Providing additional food sources does not increase the number of silvereyes. Observations

showed that the size of the coastal population of silvereyes in spring was not determined by food supplies during the previous autumn.

Repellents

Mesurol, a bird emetic, has been used to protect vines successfully in South Australia. Cage trials in Western Australia showed that birds which had not previously been in contact with grapes developed an aversion to all grapes when exposed to those sprayed with mesurol. Birds which had previously eaten untreated grapes continued to search until they found them.

It is possible that a treated strip of vines along the outside of the vineyard may deter silvereyes when only first-year, younger birds are present, but the whole vineyard would have to be treated to deter older birds.

Field trials with mesurol however were inconclusive. During the years of the trials, marri flowered profusely and few silvereyes entered vineyards.

Vignerons should be cautious in reaching conclusions based on observation alone because silvereyes may leave a treated vineyard for reasons unconnected with the treatment.

Acoustic jamming devices

A device which emitted sound at the same frequency as the one birds use to communicate with each other was ineffective in a field trial.

Frightening devices

Frightening devices do not work for long nor are they very effective. Birds quickly learn to ignore devices which do not harm them and to avoid others.

Netting

Enclosing the vines completely in mesh nylon netting no larger than 15 mm x 15 mm is effective. The initial cost of the netting is high and it may be difficult to remove without tearing, but if used carefully and stored out of sunlight it should last for at least four years. Given that silvereyes are only likely to attack grapes in some years, the cost of netting may be justified, especially when used to protect the more highly prized or early ripening grape varieties which are most at risk.

Vineyard planning and management

In years when the birds' natural food supply fails completely it is unlikely that vineyard management will have any appreciable effect on keeping silvereyes out of grapes. In good nectar years, the birds will not enter anyway. Management however, might be of some value in intermediate years when silvereyes need grapes to supplement a small supply of natural food.

Water supplies

Grapes do not contain sufficient water to meet silvereyes' needs. Many birds are found dead or comatose in vineyards and these are frequently suffering from dehydration. If vines are planted as far as possible from a water source, silvereyes have to use up more energy to obtain both food and water and are discouraged from eating grapes.

Clearing vegetation

Silvereyes enter vineyards from surrounding vegetation in which they hide from predators. However where vegetation has been cleared from around vineyards, there has been little reduction in the amount of grape damage. Clearing vegetation for considerable distances around vineyards might be effective, but silvereyes might react by taking up residence in the vineyard.

Row configuration

Silvereyes prefer to move along the rows when feeding in vineyards. It has been suggested that planting rows parallel to the outside discourages the birds from penetrating far into the vineyard. The probable result of this is that damage would be increased in the outer rows and somewhat decreased further in from the edge. The net effect, however, would be an equivalent level of total grape damage.

Hedging

The practice of trimming lateral branches from vines is known as hedging. This reduces leaf cover and makes the vines less attractive to silvereyes as less shelter is available to them. Hedging is unlikely to reduce total silvereyes damage and might shift damage from a hedged vine to an unhedged one. It could be used to reduce damage to a highly prized variety at the expense of others.

The "bird break"

One vigneron has adopted the practice of picking several rows of grapes from close to the periphery of the vineyard, while leaving the outside row unpicked. This has an effect similar to providing alternative food. The outside row is sacrificed and the quality of wine from the next few rows may be lowered, but the remainder of the vineyard is protected.

Conclusions

Netting is the only certain method of preventing damage in the short term. Providing alternative food sources around the periphery of the vineyard may also be effective. Spraying the outer rows with mesurol may be beneficial, but this requires further testing.

In the long term, encouraging the growth of marri and seaberry saltbush will ensure that silvereye damage to grapes is limited.



■ Netting can be used to protect prized wine-grape varieties.