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DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

TreeNote

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Parrot damage in agroforestry

in the greater than 450 mm rainfall zone of Western Australia

Occurrence of damage

Port Lincoln ringneck parrots cause major economic damage to blue gums (*Eucalyptus globulus*) and other tree crops. They also damage general farm trees, some grain crops at seeding and before harvest, some flower crops, fruit crops and garden plants, and native vegetation, especially grass trees, (formerly called 'blackboys'), Damage is common in areas with high parrot populations, but varies from year to year, and varies between areas. Inland areas such as Darkan and Boyup Brook are often badly affected but severe damage has also been reported in coastal areas with high parrot populations, such as Margaret River.

In blue gums, parrot damage has been spreading and increasing in intensity over the past decade, coinciding with increases in both the range and population of Port Lincoln parrots in the South West. Surveys by the Agriculture Protection Board show population increases in many agricultural shires, with the greatest increase between Beverley and Tambellup. Damage is usually greatest from late summer to winter, and seems to be worse in years when marri flowering is poor.

Areas of trees most susceptible to parrot damage include high fertility sites such as sheep camps and edges of plantations near native forest or other remnant native trees.

The most likely causes of increasing parrot damage to blue gums are:

- increased parrot numbers
- changes in the availability of other foods at critical times, and
- changes in parrot behaviour (as more parrots 'learn' to attack blue gums)

A 'twenty-eight' parrot. See box for explanation of Port Lincoln and 'twenty-eight' parrots.

Type of damage

Port Lincoln parrots attack the top 2 m of blue gums. They strip the bark from portions of the stem, then scrape the exposed cambium and phloem sap with the base of their beaks. Some damaged stems callous and heal over (faster in fast-growing trees), but many break off. Lower lateral shoots grow out and up to replace the damaged main stem, causing trunk deformities such as bends or forks. Depending on their severity, these

Port Lincoln or twenty-eight?

Two races of ringneck parrot are found in the South-West, the yellow-bellied Port Lincoln parrot (*Barnardius zonarius zonarius*), and the green-bellied 'twenty-eight' (*B. z. semitorquatus*), as well as intermediate forms between the two. Most investigations into blue gum damage attribute it to the Port Lincoln race and intermediate forms, rather than the pure 'twenty-eight'.

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deformities can make trees unsuitable for sawlogs and lower their value as chiplogs due to higher harvesting costs and reduced yield.

Parrot damage is most costly in young trees, because any deformities that result will be low down on the trunk of the mature tree, and may devalue a large volume of wood. Parrot damage in the tops of older trees is less of a problem because the volume of wood affected is smaller.

Importance of the 'base log'

The 'base log' (or butt log) cut from the bottom of a tree trunk is the most important and valuable part of the tree because it contains a large part of a tree's wood volume. For example, a base log 3 m long contains about 25% of the timber volume of a typical 25 m tall blue gum harvested for pulpwood. A base log of 6 m contains almost half the tree's wood.

Parrots stripped bark from this young tree causing the top section of stem to wither and die (hand points to stem). Two replacement stems made a fork about 1.5 m above the ground. To improve the tree's future commercial value, one new stem was pruned off (right) while still small. This returned the tree to a single stem. PHOTO BY PETER RITSON

Critical height

The 'critical height' for parrot damage is equal to the minimum marketable log length, plus an allowance of 0.1 m at the bottom for stump height and 0.2 m at the top for forks or bends to form below the point of damage.

Damage below this 'critical height' is especially serious because it can make the base log (or 'butt' log) worthless. The loss of saleable timber due to parrot damage above and below the 'critical height' is shown in Figure 1.

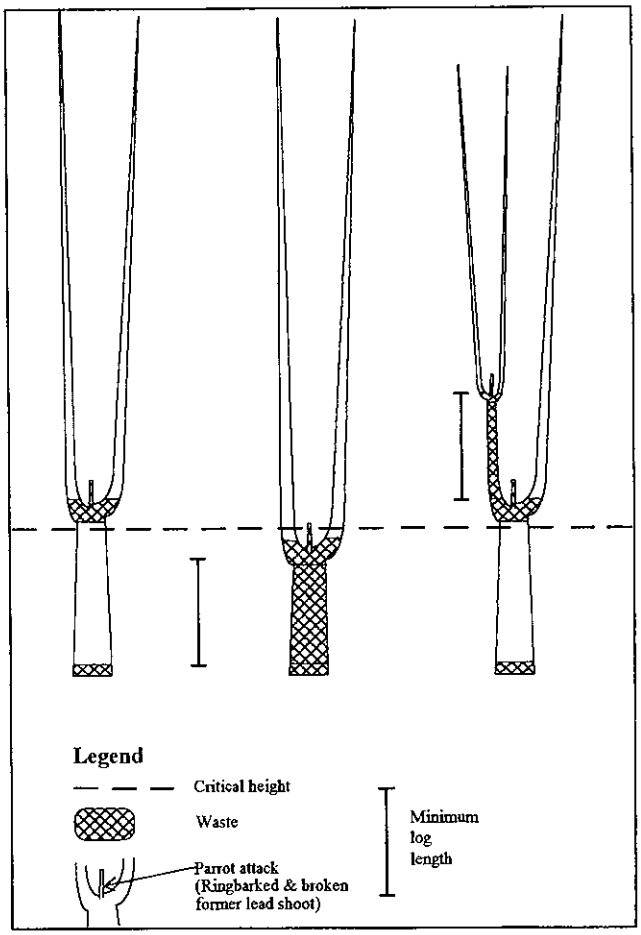

Figure 1. 'Critical height' for parrot damage
DIAGRAM BY PETER RITSON

Left tree: Minor volume loss. *Parrot damage is above the critical height, so it is still possible to harvest a saleable base log.*

Centre tree: Major volume loss. *Parrot damage is just below the critical height. The base of the tree is wasted.*

Right tree: Moderate volume loss. *Although above the critical height, the two forks are less than the minimum log length apart.*

Critical period

The 'critical period' for parrot damage is the period when the base log is vulnerable to damage. Measures to control parrot damage have their greatest economic return during this period. The critical period starts when trees are first likely to be damaged (generally January the year after planting), and ends when the trees are tall enough for any new damage to be above the critical height.

Examples

Most parrot damage is in the top 2 m of trees. Blue gums grown to produce logs at least 3 m long are most vulnerable to parrot damage until they are taller than 5.3 m (that is, 2 m taller than the critical height), which they reach at about age two years (the end of the critical period). Similarly, trees grown to produce 6 m logs are vulnerable until they exceed 8.3 m in height, at about three years of age.

Minimising the risk of damage

The risk of parrot damage should be taken into account during planning for commercial trees. In areas with high parrot populations and a history of parrot damage, possible strategies include:

- planting trees in large blocks, to minimise the amount of edge relative to the area of trees
- minimising the period that parrot control will be needed, by minimising the number of years over which trees are planted, and by maximising their early growth rate
- budgeting adequate money and labour for parrot control.

Control measures

Ways to reduce parrot damage include:

- restricting access to non-native food sources, to prevent a build up in parrot numbers
- reducing the number of parrots by shooting or trapping (under licence or open season)
- keeping parrots away from trees by scaring them, erecting barriers, breeding unpalatable trees, applying repellents, or by attracting them to an alternative food source

Some of these strategies are discussed below.

Restricting food sources

Access to an increased quantity and diversity of food throughout the year is the most important reason why parrots are plentiful. The best way to reduce parrot numbers is to consistently deny them non-native foods, especially grain. Reduce the amount of grain available to parrots by enclosing all stored grain, cleaning up spillage around silos and self-feeders, and avoiding wastage of hand-fed grain. Feed out in the late afternoon or at dusk to minimise the amount eaten by parrots, and maximise the amount eaten by stock.

If possible, reduce non-native food sources before planting tree crops. Sudden removal of food can cause parrots to seek alternatives, such as your trees.

Reducing parrot numbers by shooting or trapping

Shooting with a licensed firearm is legal for all farmers in the South-West Division (outside the Perth Metropolitan Region) under a current Open Season. Ringneck parrots can be shot at any time of the year on private property where there is a reasonable expectation that they may damage primary production.

Shooting is used successfully in blue gum plantations to reduce resident parrot numbers and damage to young trees. However, it is labour intensive and has only a short-term effect. The population builds up again after the shooting stops, as other parrots migrate into the area.

The cost per hectare of protecting trees by shooting is lowest for:

- large areas of trees - to maximise the number of trees protected by a single shooting program
- stands of trees of the same age - to minimise the number of years that parrot control is needed in an area

Trapping is most likely to be successful where it is used consistently over a large area by a number of landowners. Large 'walk-in' traps developed in the past couple of years have made trapping more efficient.

Unlike shooting, trapping is less effective for one landowner alone, because it relies on attracting parrots to the trap, and may continually attract parrots from neighbouring areas.

CALM is working with several groups to test coordinated regional trapping programs. The results to date are promising, but not conclusive. Until these trials are concluded, CALM will not be in a position to endorse trapping as a standard parrot damage control technique.

Note: Parrot trapping is not permitted unless licensed by CALM. Traps must be emptied daily, and non-target species must be released unharmed.

Poisoning is not an option. There is no poison available to kill or incapacitate ringneck parrots without also harming other wildlife species.

Note: Poisoning ringneck parrots is illegal.

Kojonup trapping trial

The Kojonup LCDC organised a coordinated regional parrot control program supported by funding from the Commonwealth's Farm Forestry Program, CALM and Bunnings, to try to reduce ringneck parrot numbers and damage. Landowners in the south-west quadrant of the Shire shot and trapped parrots during the 1996/97 and 1997/98 winters. Participants were licensed to trap parrots by CALM.

Monitoring of parrot numbers, and damage to trees and grass trees both inside the trial area and in surrounding areas has been carried out since 1997. Initial results appear promising, particularly at the centre of the trial area but further analysis of the data is needed before definite conclusions can be drawn. Results should be available before the 1999/2000 damage season.

Repellents, barriers, scaring

No simple ways to make trees unattractive to parrots have been developed. Breeding unpalatable trees would be a complex and long term project, and there are no proven techniques for erecting barriers or applying repellents to fast growing tree crops at a reasonable cost. Techniques to scare birds have only short-term effects.

Diversionary feeding

Supplying alternative sources of food at strategic times to attract birds away from valuable crops is effective for some bird pests in cereal crops. In blue gum trials,

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supplying oats in covered hopper feeders reduced parrot damage to about half that found at control sites.

However, extreme care is needed with diversionary feeding. If the food spoils or runs out, parrots may cause even worse damage to the trees. Since diversionary feeding could cause an increase in parrot numbers, leading to more damage in the long term, it is best used in conjunction with shooting.

Note that trapping also involves diversionary feeding to attract parrots to traps. It is important to maintain a consistent supply of food throughout a trapping program, to attract parrots away from the trees.

Predators

The importance of predation in regulating parrot populations is unknown. Native predators include eagles, hawks, snakes and the chuditch.

Combination of methods

A combination of methods may give effective parrot control during the critical period:

- Minimise access to grain and other agricultural foods throughout the year, to keep the resident parrot population as small as possible.
- Start shooting parrots as soon as tree damage is noticed, continuing for several days to drive off any that are not killed.
- During peak periods of damage, if shooting alone does not reduce damage, try a combination of diversionary feeding and shooting.

Why do ringneck parrots damage trees?

Do parrots damage trees to get food, to clean or groom their beaks, or is it just delinquent behaviour? The following observations suggest ringneck parrots are seeking food:

- Damage usually decreases when other food sources become available (such as marri blossom in February), and increases when other food sources suddenly stop (such as feeding out oats).
- Parrots systematically scrape the exposed cambium after the bark is stripped.
- Blue gum sap is very sweet – healthy trees contain between 20% and 30% total sugars, a similar sugar content to eucalypt nectars.
- Parrot damage is more common on fast growing trees on fertile sites such as sheep camps, and most damage is near the trees' growing tips. This pattern of damage is consistent with amino acid concentrations in blue gums - trees on fertile sites have high amino acid content in their phloem sap, especially near the growing tips. Parrots need lots of amino acids in their diet during egg production, juvenile growth and moulting (February – April).

Rectifying the damage

To minimise economic loss in tree stands damaged by parrots, silvicultural treatments such as culling, form pruning and coppicing may be useful. A separate TreeNote is planned on this topic.

Why are ringneck parrots so plentiful?

Ringneck parrots have a number of characteristics that help them thrive in our agricultural environment. These attributes may explain their apparent population increase.

Generalist feeders. They eat a variety of foods, such as seeds (80-90% of their diet), nectar, fruit, fungi, and the leaf bases of grass trees.

Adapt well to a changing diet. They learn quickly how to exploit new foods, and thrive on oats, capeweed, dock and thistles. There is little competition for some of these seeds. Oats are especially useful to parrots to help them survive winter, because of their high oil and low gluten content. Parrots also eat other oily seeds such as sunflower and canola.

High breeding success. Females start breeding when very young and can breed for many years. They lay about seven eggs per clutch, some females producing two clutches per year. After hatching out in October, the young birds grow rapidly, and are almost adult size when they leave the nest in November and early December. Mortality from hatching to fledging can be as low as 25 per cent.

Favoured by agricultural development. In their natural environment, ringneck parrots encountered large seasonal variations in food supply. Each year, most young birds and a proportion of the older birds died. The replacement of large areas of native vegetation with agriculture has increased the amount and diversity of food available to parrots and, most importantly, provided a year-round supply. Now many more parrots survive their first year to breed.

Further information

'Parrot damage to bluegum tree crops. A review of the problem and possible solutions' by Peter Ritson. Resource Management Technical Report, number 150, Agriculture Western Australia, November 1995.

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