

## Observations of birds feeding on bridal creeper (*Asparagus asparagoides*) fruits within Yanchep National Park, Western Australia

Christopher Stansbury, Department of Geography, Edith Cowan University, Mount Lawley Campus, Perth, WA 6009, Australia.<sup>A</sup>

<sup>A</sup> Present address: Department of Geography, University of Western Australia.

### Summary

This study identified birds feeding on bridal creeper fruits in Boomerang Gorge, Yanchep National Park. During the study, 24 of the known 92 land species that occur in the Park were sighted in the vicinity of Bridal Creeper infestations. Five species, the red wattlebird, purple swamphen, little crow, ringneck parrot and the silvereye, were observed feeding on bridal creeper fruits. Observations of fruit removal and theory on seed dispersal by birds were used to identify possible dispersal systems that contribute to the current distribution of bridal creeper infestation in the park.

### Introduction

The importance of frugivory as a means of seed dispersal for many plant species is well documented (Murray 1986). Bridal creeper (*Asparagus asparagoides* = *Myrsiphyllum asparagoides*) has fleshy fruits which are known to be dispersed by birds. Previous studies outside Western Australia by Raymond (1994) identified the silvereye and blackbird as feeding on bridal creeper fruits in Victoria. The emu, silver gull, singing honeyeater, spiny-cheeked honeyeater and the introduced starling were identified as feeding on bridal creeper fruits in South Australia (Cooke and Robertson 1990). To date, no research has been carried out on frugivorous birds as a mechanism for the dispersal of bridal creeper in Western Australia.

There have been 134 species of birds previously recorded in Yanchep National Park (CALM, 1989), 92 of which were land birds and 49 wetland birds. There were also four feral species found in the Park. This study reports on observations of the removal of bridal creeper fruits by some of these birds in Yanchep National Park. The types of birds found feeding on bridal creeper are documented and an analysis is made of the relationship between these frugivorous birds and the spatial distribution of new seedlings within the Park.

### Methods

A small pilot study was set up in November 1994 to investigate which birds were feeding on Bridal Creeper fruits in Boomerang Gorge, Yanchep National Park (31°32'S-115°41'E). Observations were made between the hours of 6.00 am and 10.00 am over a week (16-23 November

1994). These hours were chosen because the early morning period provided the best weather and viewing conditions and it was also observed to be the prime feeding period for frugivorous birds in the Gorge.

Weather conditions in the afternoon proved to be unsuitable due to strong south-westerly winds. Observations were concentrated within the Gorge as the area is the most severely infested region of the Park, and is considered the place of initial introduction of the weed.

Binoculars were used to assist with bird identification, observations of feeding habits and fruit mandibulation. Identity of birds was confirmed using Simpson and Day (1994).

### Results

During the study, 24 of the known 92 land species were sighted in the vicinity of the bridal creeper infestations, five of which were observed to be feeding on bridal creeper fruits. They were the red wattlebird, purple swamphen, little crow, ringneck parrot and the silvereye (Table 1).

On observing fruit handling techniques, most fruits were gulped by the silvereye and western swamphen, although the exocarp was discarded by the silvereye.

The silvereye, a small bird weighing less than 12 g, does not have a specialized gastro-intestinal system and have long (between 6 and 29 minutes) gut passage times (French, O'Dowd and Lill 1992). Silvereyes tended to spend very little time at any single fruiting plant and usually left well before the consumed seeds had time to pass through its gut.

When given a choice between different types of fruit, two of the identified frugivores displayed a preference towards fruits other than the bridal creeper berries. This was evident in the Gorge late in the bridal creeper fruiting season (December), when the silvereye showed preference towards an isolated wild fig tree (*Ficus caprina* L.). The fig tree had newly ripened fruits, whereas, bridal creeper fruits were already very mature. However, it was noted that in areas away from the fig tree, the silvereye continued to feed upon the bridal creeper fruits. This observation highlights the importance of location and effort in relation to the cost (search time)-benefit (nutritional gain) equation.

Fruit preference was also evident around a wild gooseberry plant (*Physalis peruviana* L.) late in the bridal creeper season. The purple swamphen showed more preference towards the gooseberries than the bridal creeper fruits. This may have been due to the ease of accessibility as the majority of bridal creeper fruits were out of reach of the western swamphen, while the gooseberry bush was located low enough on the ground.

In Boomerang Gorge, definite zones (i.e. height of bridal creeper above the ground) from which different bird species preferred to feed, were observed. The swamphen foraged among fruits at the lower ground level and the silvereye fed on fruits above ground which were well protected by the thick understorey supporting bushes. The red wattlebird and ring-neck parrot consumed bridal creeper fruits at the apex of the plants, often perched in the branches of supporting trees.

### Bridal creeper distribution within Yanchep National Park

A possible explanation for the observed dominance of bridal creeper under the canopy of native tuarts (*Eucalyptus gomphocephala*) is that they, and associated understorey species, are utilized as perches by the silvereye. This is particularly noticeable around isolated standing tuart trees in the transitional zone between Tuart woodland and Banksia open heath. It is assumed that these isolated tuart trees act as resting perches or stepping stones for bridal creeper frugivores as they forage within their habitat.

The gut passage times of silvereye indicate that consumed seeds are likely to be deposited in locations away from the crown of the original fruiting plant. These seeds usually have a greater chance of successful germination, provided that they are deposited in a suitable microhabitat (i.e. under the canopy of the tuart woodland rather than the limited shelter that would be found in a Banksia woodland). Tuart woodland not only provides adequate shade, but also contributes to edaphic processes. This theory is supported in studies of other plants by Sorensen (1981), in studies on the interaction of birds and fruit in a temperate woodland.

In general, seeds of terrestrial plants usually fall in continuous leptokurtic distributions with the mode under or near the parent and a steadily declining number farther away (Howe 1986, 1989). As far as the distribution of bridal creeper within Yanchep National Park is concerned, the most severe infestations are centred around the old settlement and the severity of infestations declines the further you travel from the site of original introduction.

**Table 1. Birds observed feeding on bridal creeper fruits in Boomerang Gorge, Yanchep National Park.**

Birds sighted during this study	Observed eating bridal creeper fruits	Evidence of fruit removal from other sources
1. White-cheeked Honeyeater ( <i>Phylidonyris nigra</i> )		
2. Silver Gull ( <i>Larus novaehollandiae</i> )		Cooke et al. 1990
3. Sacred Kingfisher ( <i>Todirhampus (Halcyon) sancta</i> )		
4. Welcome Swallow ( <i>Hirundo neoxena</i> )		
5. New Holland Honeyeater ( <i>Phylidonyris novaehollandiae</i> )		
6. Western Spinebill ( <i>Acanthorhynchus superciliosus</i> )		
7. Red Wattlebird ( <i>Anthochaera carunculata</i> )	*	
8. White-browed Scrubwren ( <i>Sericornis frontalis</i> )		
9. Splendid Fairy-wren ( <i>Malurus splendens</i> )		
10. Silvereye ( <i>Zosterops lateralis</i> )	*	Raymond 1994
11. Purple Swamphen ( <i>Porphyrio porphyrio</i> )	*	
12. Little Crow ( <i>Corous lennetti</i> )	*	Raymond 1994
13. Australian Magpie ( <i>Gymnorhina tibicen</i> )		
14. Laughing Kookaburra ( <i>Dacelo novaeguineae</i> )		
15. Australian Magpie-lark ( <i>Grallina cyanoleuca</i> )		
16. Singing Honeyeater ( <i>Lichenostomus virens</i> )		Cooke et al. 1990
17. Long-billed Black Cockatoo ( <i>Calyptorhynchus baudinii</i> )		
18. Willie Wagtail ( <i>Rhipidura rufiventris</i> )		
19. Grey Fantail ( <i>Rhipidura fuliginosa</i> )		
20. Ringneck (Port Lincoln) ( <i>Barnadius zonarius</i> )	*	
21. Galah (Pink and Grey) ( <i>Cacatua roseicapilla</i> )		
22. Feral Pigeon ( <i>Columba livia</i> )		
23. White-tailed Black-Cockatoo ( <i>Calyptorhynchus latirostris</i> )		
24. Varied Sittella ( <i>Daphoenositta chrysoptera</i> )		
Total sighted 24	5	4

### Conclusion

The relationship between bridal creeper and the native birds of Yanchep National Park is congruent with a 'generalized dispersal system' (Schupp 1993). Bridal creeper fruits have small seeds that are persistent, fruits are produced in large quantities, there is a low and variable level of fruit removal, a sharply peaked fruiting season and seed dispersal is not critical. Bridal creeper fruits are small and attract a selection of frugivores. They are also utilized by birds whose diets are varied.

In order to provide more conclusive evidence on particular birds that contribute to the spread of bridal creeper, further detailed studies need to be carried out on fruit handling and seed dispersal. Although this study has identified five bird species that feed on bridal creeper fruits, it is not known if each one of them contributes equally to the plants dispersal. There is a need for an attempt at a more holistic approach that includes a study of the gastro-intestinal biology of the identified species, a chemical analysis of the fruits to determine their nutritional quality, statistical analysis of variance in the quantity of fruits removed, handling and mandibulation techniques, observations on the effect of gut passage times on seed viability, their subsequent dispersal and germination. Aspects of vicariance biogeography and seed dispersal by birds in bridal creeper's native habitat (South Africa) may also be explored.

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