20. DOES THE INTEGRITY OR STRUCTURE OF MALLEE HABITAT INFLUENCE THE DEGREE OF FOX PREDATION ON MALLEEFOWL?

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Abstract

Mallleefowl are in decline across their range. Previous studies have found that the survival rate of young Malleefowl is low, the single greatest cause of mortality being predation by the introduced Red Fox (*Vulpes vulpes*). Many of these studies, particularly those in New South Wales, were conducted in habitats that were heavily modified by fire, exotic herbivores or plant harvesting. In this paper, we examine the survival of Malleefowl in relatively undisturbed mallee habitats within two conservation reserves in South Australia. Both reserves were long unburnt and free of large exotic herbivores, but differed greatly in understorey structure. Fifteen young captive-reared Malleefowl were released in each reserve. In all, 70% of these individuals were dead within 40 days. Fox predation was the prime cause of mortality, accounting for at least 35%, and perhaps as much as 96%, of all deaths. The rate and causes of mortality were similar in the two reserves. The overall rate of Malleefowl survival was (1) better than that recorded in more-disturbed habitat in New South Wales in the absence of fox control, but (2) substantially less than that in New South Wales after widespread fox control was implemented. This study indicates that Malleefowl in South Australia are subject to significant levels of fox predation, even in relatively undisturbed habitats. Available data indicate that during the past two decades Malleefowl populations in South Australia have declined at about the same rate as those in New South Wales. Current declines in South Australia are typically about one quarter of what they were 15 years ago. For the two mallee habitats examined, evidence suggests that understorey structure had no influence on the degree of predation. We conclude that habitat integrity and structure have very little effect on Malleefowl demography, and suggest that Malleefowl populations across Australia are threatened by foxes, placing the species at substantial risk of extinction.

Introduction

In 1990 we were able to test the possibility that captive–bred Malleefowl, released into the wild, would survive better in areas of undisturbed and long unburnt mallee compared with birds released into disturbed areas, where fox predation is known to cause high mortality in the released birds (Priddel *et al*. 2007). The study also examined differences in survival of captive-bred Malleefowl between dense and less dense stands of mallee. The project was a joint one between the New South Wales Department of Environment and Climate Change and the South Australian Department of Environment and Heritage. Historical data on number of active mounds, mortality rates and fox baiting protocols from both Departments were used in the analysis. The Monarto Zoological Park was able to provide captive-bred Malleefowl that they reared from eggs taken in the parks in which the birds were to be released.

The comparison was made between two mallee reserves in New South Wales, Yathong (107,241 ha, only half mallee) and Yalgogrin (558 ha) and two mallee reserves in South Australia, Bakara (1031 ha) and Ferries McDonald (843 ha). Yathong was badly disturbed. Until 1978 it was heavily grazed by sheep, rabbits and some cattle; when the sheep and cattle were removed, goats multiplied and were still numerous when the study was undertaken. Wildfires had burnt much of the reserve in 1957, 1975, 1984 and 1994. At Yalgogrin sheep graze the area and there is broombush harvesting and cutting eucalypts for oil as well. Bakara lies adjacent to 1300 ha of privately owned remnant mallee and has not been burnt for at least 80 years. The mallee is relatively thin with an understorey of spinifex. Ferries McDonald is dense mallee, reserved in 1956 and not burnt since.

Methods

Before the releases at Bakara and Ferries-McDonald a number of releases of captive-bred Malleefowl, raised at Western Plains Zoo, had been made at Yathong and Yalgogrin over the years. These previous releases were of chicks ranging in age from a week to 6 months of age, and all were

fitted with radio transmitters. Fifteen Malleefowl chicks between 97 and 190 days of age were released at each of Bakara and Ferries McDonald on 1-2 June 1990. Each carried a 25g radio transmitter (AVM type, SB2). They were tracked and located daily for the first 11 days after release and intermittently thereafter for the life of the transmitter, about 4 months. The signal from the transmitter doubled in rate if the bird did not move for 10 hours and this enabled searches to be made for chicks that died and the remains inspected to ascertain the cause of death.

The density of the mallee on the two South Australian reserves was measured quantitatively using quadrats. Canopy and understorey cover was recorded and a horizontal structural measure also taken. The results were used to calculate an index of vegetation density. Standard statistical techniques were used to examine trends in the numbers of active mounds from historical and recent data.

Results

The results of the various releases at Yathong, Yalgogrin, Bakara and Feries McDonald are given in Table 1. References to the details of the New South Wales releases are given in Priddel *et al*. (2007).

Table 1. The results of releasing captive-bred Malleefowl of various ages into four mallee remnants. Note that all the fox baiting was from vehicles, except the widespread baiting at Yathong that was done both from the air and from vehicles. The figure in the last column is a minimum, confirmed count. Many more may have been taken by foxes.

Location of remnant	Fox control	Area with baits sq km	Baits/ sq. km	No. birds let go	Age of birds: months	% alive after 30 days	% alive after 90 days	Known % lost to fox
S.A.								
Bakara	None			15	3-6	33	27	27
Ferries McDonald	None			15	3-6	33	33	50
N.S.W.								
Yalgogrin	None			17	0-4	24	0	18
Yalgogrin	None			15	3-6	7	0	73
Yathong	None			23	3-5	4	0	52
Yathong	Localised	0.4	7.5	12	6-8	50	42	86
Yathong	Localised	6.4	7.5	12	8-11	33	17	70
Yathong	Localised	19.2	1.5	24	4-5	42	25	45
Yathong	Widespread	107.2	3.5	24	6-7	88	75	33

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are needed to see this picture.

Figure 1. The numbers of active mounds of Malleefowl per square kilometre at Yalgoggrin in New South Wales (open circles) compared with the number of active mounds per square kilometre in six reserves in South Australia (closed circles).

Figure 1 shows, as mounds per square kilometre, the numbers of active mounds at Yalgogrin in New South Wales between 1986 and 1999 compared with the numbers in South Australia. The South Australian figures are combined data from six sites that were monitored between 1989 and 2005. The regression lines have been drawn separately for the New South Wales and South Australian data.

Discussion

The survival rate of captive-bred Malleefowl released into New South Wales reserves has been shown to be dependent on the level of fox control implemented (Priddel & Wheeler 1999). Table 1 shows that at Yalgogrin and Yathong no birds survived to 3 months without fox control. When localised baiting was undertaken 33-50% of the released birds survived for at least one month and 17-42% survived at least 3 months. After widespread fox baiting, 75% of the birds survived for at least 3 months. The survival of captive-bred Malleefowl released at Bakara and Ferries McDonald in the absence of fox control was 30% after 3 months. Thus compared with a series of releases at Yathong and Yalgogrin where the vegetation was more disturbed than at the South Australian sites, Malleefowl released at Bakara and Ferries McDonald survived better than those released in the absence of fox control, about as well as those released when localised fox control was undertaken and less well than those released when widespread fox control was implemented. There was no discernable difference between the survival of birds released into Bakara and Ferries McDonald, although the vegetation was twice as dense at Ferries McDonald as at Bakara. Apparently the dense vegetation did not offer additional protection to the Malleefowl from predation by foxes. The numbers of active Malleefowl mounds is declining at the same rate in New South Wales and South Australia and the trend indicates that the bird may soon be extinct in the areas from which the data were derived.

It is difficult to avoid the conclusion from the experiments undertaken so far, that fox control is only effective if it is implemented intensely and simultaneously over a wide area.

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References

Priddel, D. & Wheeler, R. (1999) Malleefowl conservation in New South Wales: a review. . *In* Dekker, R.W.R.J., Jones, D.N. and Bensehmesh, J. (eds.) Proceeding of 3rd International Megapode Symposium, Nhill, Australia*. Zoologische Verhandelingen* 327:125-141.

Priddel, D., Wheeler, R. & Copley, P. (2007). Does the integrity or structure of mallee habitat influence the degree of fox predation on Malleefowl (*Leipoa ocellata*)? *Emu* **107**:100-107.