Chicks, Food and Fragmentation

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Introduction

There has been extensive fragmentation of habitat and many local population extinctions of Malleefowl have occurred. There are however, many small isolated remnants, particularly in the Western Australian wheatbelt, which support small populations of Malleefowl and most of which are privately owned. Food availability is an important factor in the survival of both adults and chicks. In studies of chick mortality, it has been shown that metabolic stress, due to an inability to find food, is a major cause of mortality (Benshemesh 1992; Priddel & Wheeler 1990; Frith 1962).

Malleefowl Diet

In 2002, I was able to undertake a student project on diet analysis of Malleefowl at Curtin University, Western Australia. For this, I examined the crop and gizzard content of 19 birds, 8 from SA and 11 from WA. The results of this study confirm the birds are opportunistic feeders taking a wide range of plant material and invertebrates.

There was a diversity of invertebrates identified, particularly ants, with a low number of individuals from each species. Invertebrates are taken opportunistically and not sought out. The birds also took advantage of insect outbreaks. One SA bird had taken a large number lerps, others had taken large numbers of grasshoppers and winged ants. There was no strong seasonal preference for any particular food type, however seeds were the major food type taken, making up 66% of food objects in the stomach.

Apart from native seed, agricultural crop including lupins and wheat were also taken. Ten of the birds had taken either or both of these seeds. Crop seed is readily available, both in the field and from roadside grain spills after harvest. Vegetative material from weed species commonly found on roadsides was also taken. This, together with observations of birds feeding regularly in cropland (pers. obs.), indicates adults will readily seek food outside of the remnant habitat.

Chicks and Food

The stomach content of one chick was also able to be examined and was found to contain predominately termites and Fabaceae seeds, probably a species of *Daviesia* (Table 1).

Table 1: *MPG 09 Stomach Analysis, Narembeen Malleefowl chick*

CROP				GIZZARD			
Species	**Type**	**Size mm**	**No.**	**Species**	**Type**	**Size mm**	**No.**
Plant				***Plant***			
Fabaceae, *Daviesia* sp	S	2x3	18	Fabaceae, *Daviesia* sp	S	2x3	97
Hibbertia sp	S	1.5x1.5	2	*Hibbertia* sp	S	1.5x1.5	8
Lilieaceae/ Epacridaceae	P	4x3	3	*Eremophila* sp	S	3.5x2.5	2
				Hibbertia/ Epacrid: *Astroloma sp*	S	4x2	2
				Hibbertia sp	S	2x2	2
Invertebrates				***Invertebrates***			
Camponotus terebrans	H	-	4	*Camponotus terebrans*	H		1
Crematogaster frivola	H	-	5	Prob. remains of termites			
Terebrionidae; *Adelium* sp	C	-	1				
Termites	I	-	308				

KEY: S – Seed, P – Pod, H – Hymenoptera, I - Isoptera

Malleefowl chicks are independent and like other precocial chicks, have innate cues targeted at particular stimuli that will eventually lead, through trial and error, to the selection of food objects (Davies 1961; Göth 2002). But whereas most precocial chicks are able to learn from parents and siblings, Malleefowl cannot. Innate cues and the ability to learn edible from inedible objects quickly is important for successful foraging and survival.

The findings of the diet analysis are consistent with observations of chick behaviour after emergence from the mound. Pecking is orientated toward objects with reflective surfaces (such as insect carapaces) and objects of contrasting colour to the background (Waag 2003). A study of Brush-turkey chick pecking orientation had similar results (Göth & Proctor 2002). One interesting observation however, was the difference in time before pecking began. The Brush-turkeys were found to have a 40hr period after emergence before pecking began. The Malleefowl however, began pecking within half an hour of emergence.

Implications for small remnants

In small reserves, where isolated populations of Malleefowl occur, there may be insufficient food available for the chicks to learn to forage successfully in the critical period. There are a number of factors relating to food which should be explored for managing a remnant or rehabilitating an area in order to maintain the Malleefowl population through the survival and recruitment of the young.

Malleefowl chicks are in direct competition with adults for seeds & invertebrates, however, adults are also able to utilise vegetative material (shrubs which chicks cannot reach during foraging), agricultural crop and supplied grain. In order to maximise the amount of food available for chicks, food objects available at the ground level in small remnants must be targeted.

The presence of Fabaceae and *Acacia* species in a remnant is important to provide seed (Frith 1962). Seeding can be reduced by grazing, so fencing remnants and

control of herbivores such as kangaroos and rabbits which compete with the Malleefowl is important. In rehabilitation work, it is important not only to select indigenous plant species, but also plants with a range of seeding times, particularly those seeding during the summer hatching months.

The importance of termites in Malleefowl chick diet is not known. These invertebrates are found in a range of habitats and the behaviour of some makes them ideal prey for Malleefowl chicks. A large proportion of termite species in Australia are grass and debris feeders. Many of these species forage on the surface during the day when the chicks are active and can be locally abundant (Ratcliffe *et al* 1952). In order to support these species, a healthy herb layer and litter is needed.

Another invertebrate which occurs widely in the Australian landscape and could be of importance to Malleefowl chicks (though there is no evidence as yet) are the collembolans. These small (3-10mm) invertebrates inhabit the surface layer of soil and debris (Harvey & Yen 1997) and could be picked up by the chicks when foraging. The litter layer is important for these creatures.

During observation of the chicks after emergence, one chick displayed drinking type behaviour in reaction to a piece of reflective shade cloth on the ground (Waag 2003). This would seem to indicate the chicks have cues for drinking as well as feeding. Though moisture can also be gained from food such as invertebrates, it may be that rainfall or dew may also be quite important initially.

There needs to be more work examining the behaviour and diet of chicks in small isolated remnants in order to determine the factors critical to achieving successful foraging and ultimately, recruitment into the population.

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Acknowledgements

Thanks to Professor Stephen Davies for his ongoing support, encouragement and advice.

I would also like to acknowledge the financial support to attend this conference from Dr Terry Walshe through the Centre of Excellence in Natural Resource Management, University of Western Australia, Albany and also from the Western Australian Group of Birds Australia.

During both projects there were many people who assisted me, particularly with the identification of the samples from the diet analysis, thankyou.