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PENNY D. OLSEN & JERRY OLSEN, *CSIRO Division of Wildlife and Rangelands Research*  
*P.O. Box 84, Lyneham, A.C.T. 2602 and*  
*RMB 1705 Read Road, Sutton, N.S.W. 2620*

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### CROP AND GIZZARD CONTENTS OF TWO MALLEE FOWL

During a study on several aspects of Mallee fowl *Leipoa ocellata* biology in triodia — mallee shrubland, 10 km west of Renmark South Australia, two adult Mallee fowl were accidentally killed providing an opportunity to examine their crop and gizzard contents.

The first bird, a male, was found dead on 6 January 1983. His crop was virtually empty (contents: one bee, one seed of *Cassythia melantha*, and foliage of *Arthropodium strictum*), but the gizzard contained two species of seed (Table I). The second bird, a female, was killed by a fox after being scared from her roost on 17 November 1984. When her carcass was found (approximately one hour after death) the entire alimentary canal below the crop had been eaten, but the crop was full of food items (Table II). Crop samples from both birds contained litter material (old eucalypt leaf and twig

fragments), and the male's crop also contained egg shell fragments (Tables I and II). Presumably this material was picked up incidentally while feeding. The sand found in the gizzard of the male (Table I) probably aids the mechanical break down of food items. In both birds, plant material, chiefly seeds, was by far the most important food type in terms of both number of items, and bulk, accounting for 99% and 93.5% of food on a dry weight basis (Table I and II). The sample from the male bird may be biased because the gizzard is primarily a site of mechanical break down of food stuffs and the relatively soft bodies of animals would have a short processing time compared to the relatively hard-coated seeds. *Cassythia melantha* seeds are surrounded by a fleshy pulp when ripe; because there was no sign of this pulp in either the crop or gizzard of the male it may be assumed that the seeds had been in the alimentary

TABLE I

*Crop and gizzard contents of a male Mallee Fowl collected on 6 January 1983.*

Item	Species	Number	Dry wt (mg)	% of total <sup>a</sup> contents
Detritus	Litter material		34	
	Mallee fowl egg shell		80	
	Sand		5 320	
Plant material seeds	<i>Cassythia melantha</i>	41	3 656	99.0
	unidentified sp. A	84	2 617	70.9
			904	24.5
Foliage	<i>Zygophyllum</i> sp. (empty seed pods)		18	0.5
	<i>Arthropodium strictum</i> (seed pods and stems)		117	3.2
Animal material			35	1.0
Insects				
Hymenoptera	<i>Apis mellifera</i>	1	35	1.0

<sup>a</sup>Food items only considered in calculations. Calculations expressed on the basis of dry wt.

TABLE II

*Crop contents of a female Mallee Fowl collected on 17 November 1984.*

Item	Species	Number	Dry wt (mg)	% of total <sup>a</sup> crop contents
Detritus (litter material)			136	1.0
Plant material			13 231	93.5
Seeds	<i>Dodonaea bursariifolia</i>	826	12 300	87.0
	unidentified sp. B	166	364	2.6
	<i>Zygophyllum</i> sp. (seeds and pods)	4	54	0.4
	<i>Enchylaena tomentosa</i>	10	46	0.3
	unidentified sp. C	18	12	0.1
Foliage	<i>Arthropodium strictum</i> (flowers and stems)		235	1.7
	<i>Scleroina</i> = <i>Bassia</i> sp. (growing tips)		220	1.6
Animal material			778	5.5
Insects				
Hemiptera	Nymphs, probably Pentatomidae	20	262	1.9
Blattodea	Cockroach	1	113	0.8
Hymenoptera	Ants	43	37	0.3
	<i>Camponotus</i> sp.	3		
	<i>Crematogaster</i> sp.	1		
	Dolichoderinae	39		
	Wasps	2	66	0.5
	<i>Echthromorpha</i> sp.	1		
	Mutillidae	1		
Coleoptera	Larvae	4	59	0.4
	Adults	4	25	0.2
Orthoptera	Grass hopper	2	55	0.4
Odonata	Adult dragon fly	1	26	0.2
Assorted insect legs		many	17	0.1
Arachida				
	Spiders <i>Araneus</i> sp.	12	118	0.8

<sup>a</sup>Expressed on the basis of dry wt.

system for sometime. Despite possible biases, the crop and gizzard contents of these birds suggest that Mallee fowl are primarily grainivorous, a finding consistent with previous observations (Lea & Gray 1935; Frith 1962).

The best description of Mallee fowl diet comes from Frith's (1962) study, which was carried out by observing feeding birds through binoculars from a distance, but the data so derived was described by Frith as, '... not of great accuracy'. The fruits, buds, and seeds of shrubs accounted for 73%, herbs 10%, and invertebrates 17% of Frith's feeding records. Mallee fowl diet varies with time of year as seasonally available food sources change. Legume seeds are the principal dietary item over summer, while herbs are the primary plant food during

autumn and winter (Frith 1962). Invertebrates are eaten when ever encountered at all times of the year, but are not specifically searched for (Frith 1962). The buds and fruits of the shrub *Beyeria opaca* are important food items over spring and summer (Chandler 1913, 1934; Ross 1919; Frith 1962). A list of dietary items known for Mallee fowl is given in Table III.

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TABLE III

List of food items species recorded for Mallee fowl.

ITEM		SOURCE
Plant material		
Fungus		Chandler 1913, 1934; Bellchambers 1916
Trees	<i>Pittosporum</i> sp.	Frith 1962
	<i>Eucarya acuminata</i>	Cleland 1952
	<i>Owenia acidula</i>	Cleland 1952
Shrubs	<i>Cassia eremophila</i>	Frith 1962
	<i>Acacia brachybotrya</i>	Frith 1962
	<i>A. hakeoides</i>	Frith 1962
	<i>A. buxifolia</i>	Frith 1962
	<i>A. rigens</i>	Bellchambers 1916; Frith 1962
	<i>A. stenophylla</i>	Bellchambers 1916
	<i>Eritostemon difformis</i>	Frith 1962
	<i>Beyeria opaca</i>	Chandler 1913, 1934; Ross 1919; Frith 1962
	<i>Dodonaea busariifolia</i>	Table II
Herbs		Frith 1962
	<i>Zygophyllum</i> sp.	Table I and II
	<i>Arthropodium strictum</i>	Table I and II
Parasites	<i>Cassytha melantha</i>	Table I; Lea & Gray 1935
Animal material		
Insects	Blattodea	Table II; Frith 1962
	Coleoptera	Table II; Frith 1962
	Hemiptera	Table II
	Hymenoptera	Tables I and II; Ross 1919; Frith 1962
	Odonata	Table II
	Orthoptera	Table II
Arachida	Araneae	Table II

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DAVID T. BOOTH, Department of Zoology, The University of Adelaide  
GPO Box 498, Adelaide 5001

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### THE EFFECT OF CYCLONE 'SIMON' ON TERNS NESTING ON ONE TREE ISLAND, GREAT BARRIER REEF, AUSTRALIA

Adverse weather can reduce the breeding success of seabirds. Marine terns are particularly susceptible to high winds where spray and rough sea surface can reduce fishing success (Boecker 1967; Langham 1968; Salt & Willard 1971; Dunn 1973, 1975; Taylor 1983). Hurricanes recorded in North America have resulted in the flooding of nest sites and entrapping of chicks in sand and vegetation (Owre 1967; Gochfield & Ford 1974; Nisbet 1972, 1978; Nisbet & Cohen 1975), and

death through wetting of plumage and inability to maintain body temperature (White *et al.* 1976). Cyclones occur mainly from December to April along the Australian east coast with 1.7, 1.9 and 1.3 per year in January, February and March, respectively (Lourensz 1981). There is a report of tern mortality caused by a cyclone in the MacArthur Islands (MacGillivray 1914). This account refers to the effect of Cyclone 'Simon' on the breeding success of terns nesting on One Tree Island