

STOMACH CONTENTS OF PARENTAL AND YOUNG PIED CURRAWONGS *Strepera graculina*

GRAHAM R. FULTON and HUGH A. FORD¹

Zoology, University of New England, Armidale, New South Wales 2351

¹(To whom correspondence should be addressed)

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INTRODUCTION

The Pied Currawong *Strepera graculina* is a generalized predator (Lepschi 1993; Wood 1998) and omnivore (Vellenga 1966; Rose 1973; Lepschi 1993), with its diet showing distinct seasonal trends (Prawiradilaga 1996; Wood 1998; Rose 1999). Pied Currawongs may follow flushes of seasonal foods; for example, stick insects in summer (Readshaw 1965, 1968) and exotic fruits in winter (Buchanan 1989; Bass 1989, 1990, 1995). Bass (1989) identified them as a vector for exotic seed dispersal, and Prawiradilaga (1996) and Major *et al.* (1996) highlighted their role as urban nest predators. Most information on their diet has been collected close to or in urban environments by either observation or pellet analysis. However, pellet composition can be biased by the over-representation of indigestible hard parts of some food types and lack of hard parts of others, which are not swallowed (e.g. vertebrate bones), and the absence of easily digestible items (e.g. caterpillars and vertebrate flesh). Furthermore, observations used together with pellet analysis are frequently biased by logistical limitations and prey items from a particular time of day may not be detected (Brown and Ewins 1996).

In this paper we present details of the stomach contents of Pied Currawongs culled in an experiment on their impact as nest predators.

METHODS

Overall, 13 birds (seven adults, two juveniles, and four nestlings) were culled from four nest-sites. However, only 12 were recovered. The cull took place in Imbota Nature Reserve (formerly Eastwood State Forest) near Armidale, on December 2, 1999. Imbota is a large woodland fragment (240 ha) surrounded by cleared pastoral land.

All culled birds were immediately placed on ice in an esky then transferred to a freezer the same day and stored at about -15°C until dissection. Pied Currawong crops were indistinct or absent; hence, both stomach and oesophageal contents were taken out and stored in 70 per cent alcohol. They were later examined microscopically with a Kyowa dissecting microscope at 7 to 45 \times magnification. Wet mass of some items was obtained to the nearest 0.01 gram using a Mettler PJ3600 DeltaRange[®] electronic microbalance. Sequence and nomenclature of invertebrates follow Brusca and Brusca (1990).

RESULTS AND DISCUSSION

In total 169 individual items, representing a minimum of 83 invertebrates, four vertebrates and three plants were detected in the guts of 12 Pied Currawongs (Table 1 and

TABLE 1

Occurrence of prey species in stomachs of 12 Pied Currawongs. Number (n) = total minimum number of individuals detected in each stomach and oesophagus. Nest number and sex (M — male, F — female) or age (J — juvenile, N — nestling) of each individual bird.

Prey taxon	2M	9M	9F	9J	9J	11M	11F	11N	12M	12F	12N	12N	Total
Araneae (Spiders)						2							2
Diplopoda (Millipedes)			1							1			2
Chilopoda (Centipedes)								1		1			2
Orthoptera (Crickets and Grasshoppers)				1									1
Hemiptera (True Bugs)													
Scutelleridae (Shield-backed Bugs)	1	2					1						4
Homoptera													
Cicadidae (Cicadas)								1					1
Hymenoptera													
unknown wasp spp.	1												1
Formicidae													
<i>Myrmecia tarsata</i>						3	6						9
unknown ant spp.					1								1
Diptera	1												1
Tipulidae (Crane Flies)			2				2			4			8
Coleoptera (Beetles)													
Scarabaeidae (Scarab Beetles)	2	1					2		1				6
unknown spp.	11	2	2	1	3	9			2	1	4	4	39
Trichoptera (Caddisflies)			3										3
Lepidoptera (Butterflies and Moths)			1				1						2
unknown invertebrate	1												1
Vertebrate													
Bird				1									1
unknown vertebrate			1					1				1	3
Plant						2				1			3

Appendix 1). The invertebrates included a wide variety of arthropods, with beetles being the most frequently detected prey. Parcels of flesh were found in nestlings from two nests and avian leg bones were taken from a nestling at another nest. In addition, one adult female had ingested portions of intestine, which contained a moth proboscis, from an unknown vertebrate. Only two birds contained small amounts of plant material, one had three flowers and four seeds and a second had a mass of grass. Our data indicate a predominance of invertebrate and vertebrate prey over fruits during the Pied Currawong breeding season. This agrees with the findings of others that reported a largely animal diet of Pied Currawongs during the breeding season (e.g. Lepschi 1993, 1997; Wood 1998; Rose 1999).

Bulldog Ants *Myrmecia tarsata* are highly aggressive and secrete formic acid (Schmidt 1986; Prawiradilaga 1996) and histamine-releasing factors (Prawiradilaga 1996). These substances may cripple invertebrates and are extremely painful to humans (pers. obs., GRF and HAF). These ants were detected in both parent Pied Currawongs at one nest-site. Prawiradilaga (1996) noted that many common invertebrate prey taken by Pied Currawongs were toxic, including Bulldog Ants. In addition, three caddisfly larvae intact in their silk cases were found in the stomach of an adult female. These larvae inhabit aquatic habitats (Brusca and Brusca 1990). We know of no other records of freshwater aquatic prey taken by Pied Currawongs. However, Pied Currawongs have been reported hunting marine slaters (Rose 1999), catching marine crabs on rocks along the Lane Cove River (Cooper and Cooper 1981) and foraging on tidal flats of Dangar Island (Recher 1976).

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APPENDIX 1

Mass in grams (g) is given following storage in 70 per cent alcohol (wet mass) after drying with paper towels. Dr Mary Notestine made most of the identifications. However, *Myrmecia tarsata* (bulldog ants) were identified to species by comparison with the specimens from the Zoology Museum, at the University of New England. 'PC' followed by a number denotes the Pied Currawong nest-site and thus, the relationship of one bird to another.

Taxon	Quantity and comments
PC2 male	No other birds appeared at this nest-site, thus, it might not have been a breeding bird.
Scarabaeidae sp. 1	2 whole
Diptera	2 wings
Hymenoptera sp. 1(wasp)	2 wings
Coleoptera sp. 1	2 wings (elytra); black with three brown spots
Scutelleridae sp. 1	2 scutellum
Coleoptera sp. 2	1 abdomen
Coleoptera sp. 3	27 legs
Coleoptera sp. 4	1 head
Coleoptera sp. unknown	3 membranous wings
Hymenoptera sp. 1? (wasp)	1 leg and abdomen
Unknown invertebrate	2 black body segments with transparent 'windows'
Coleoptera sp. 5	1 black head

Appendix 1 — *continued*

Taxon	Quantity and comments
PC9 male	
Scarabaeidae sp. 1	2 legs
Scutelleridae sp. 1	3 scutellum
Coleoptera sp. 6	1 metallic blue abdomen
Coleoptera sp. 1	1 wing (elytron); black with three brown spots
PC9 female	
Trichoptera	3 caddisfly larvae in cases
Lepidoptera sp. 1	2 wings and part body
Unknown intestine	0.04 g
Lepidoptera sp. 1?	1 proboscis (found in intestine above)
Diplopoda	1 incomplete body
Coleoptera sp. 7	1 wing (elytron); black, striped brown
Unknown intestine	0.84 g
Tipulidae	3 wings
Coleoptera sp. 8	1 abdomen
PC9 juvenile I	
Orthoptera sp. 1	1 pair of external jaws
Coleoptera sp. 9	1 leg
Avian	2 nestling leg bones (tibiotarsus and femur)
PC9 juvenile II	
Coleoptera sp. 8	2 abdomens
Formicidae sp. 1	2 parts of head each with eye
Coleoptera sp. 10	2 wings (elytra); black ridged and pitted
PC11 male	
Araneae sp. 1	1 intact huntsman
Plant	3 flowers
Plant	4 hard spherical seeds
Araneae sp. 2	1 pedipalp (male)
Coleoptera sp. 8	8 abdomens
<i>Myrmecia tarsata</i>	3 bulldog ants (Formicidae — Myrmeciinae)
Coleoptera sp. 11	1 wing (elytron); black and ridged
PC11 female	
Scarabaeidae sp. 2	2 abdomens
Scutelleridae sp. 1	1 scutellum
Tipulidae	4 wings
<i>Myrmecia tarsata</i>	6 bulldog ants (Formicidae — Myrmeciinae)
Lepidoptera sp. 1	1 wing
PC11 nestling	
Parcel of flesh	0.76 g
Chilopoda sp. 1	1 intact individual
Cicadidae	1 intact individual
PC12 male	
Coleoptera sp. 3	5 legs
Coleoptera sp. 9	1 leg
Scarabaeidae sp. 2	1 abdomen
PC12 female	
Chilopoda sp. 2	section of body
Coleoptera sp. 7	2 wings (elytra); black, striped brown
Diplopoda	1 incomplete body
Tipulidae	24 legs
Unknown grasses (blades)	more grass mass than invertebrate mass
PC12 nestling I	
Parcel of flesh	1.88 g
Coleoptera sp. 10	2 wings (elytra); black ridged and pitted
Coleoptera sp. 7	1 wing (elytron); black striped brown
Coleoptera sp. 12	1 head and prothorax
Coleoptera sp. 13	1 wing (elytron); holes or 'windows' in rows
PC12 nestling II	
Coleoptera sp. 10	1 wing (elytron); black ridged and pitted
Coleoptera sp. 1	1 wing (elytron); black with three brown spots
Coleoptera sp. 14	2 legs
Coleoptera sp. 12	1 head