

Diet of one wild Western Ground Parrot *Pezoporus flaviventris*

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Abstract. The aim of this study was to examine the diet of a wild Western Ground Parrot *Pezoporus flaviventris*, a cryptic and critically endangered species. There has been no previous systematic study of the diet for this species. A wild male Western Ground Parrot was filmed over several days in spring 2006, in the Fitzgerald River National Park, Western Australia. The bird was recorded feeding, sunbathing, preening and dozing in his natural habitat. Fifty 30-second samples of the video were used to obtain 555 feeding records. The bird's diet at that time was most dependent on flowers (38%), followed by sedge seeds (35%), and a further 20% was comprised of green fruit of dicotyledonous plants. At least 27 plant species were consumed by the individual in this study. The plant species eaten varied considerably within and among 30-second video samples, as well as varying between days. The daily diet is likely to vary to a similar degree to the overall pattern. Other observations, combined with the findings of this study, emphasise the diversity of plant species in the diet of the Western Ground Parrot.

Introduction

The Western Ground Parrot *Pezoporus flaviventris* is cryptic and is listed as critically endangered under the Australian *Environment Protection and Biodiversity Conservation Act 1999*. It is endemic to the south-west of Western Australia and was, until recently, classified as a subspecies of the Eastern Ground Parrot *Pezoporus wallicus*. Genetic analysis has indicated that it should be classified as a distinct species (Murphy *et al.* 2010; BirdLife Australia 2014). The biology and ecology of the Western Ground Parrot are not well known, and there has been no systematic study of its diet (Department of Parks and Wildlife 2013).

There have been two direct studies of the diet of the Eastern Ground Parrot. One in Croajingolong National Park, Victoria (Meredith & Isles 1980), included experimentation with extracting crop contents so as to find out more about diet. A study of the contents of 60 crops was carried out over 9 months at Cooloola National Park in Queensland (McFarland 1991a). Both of these studies indicated that the Eastern Ground Parrot is almost entirely granivorous. A further study (Bryant 1991, 1994) inferred a list of species and plant parts eaten by the Eastern Ground Parrot in Tasmania, based on plants flowering and fruiting in locations from which birds were flushed.

The few previous feeding records of the Western Ground Parrot have indicated that this species has a mixed diet, including leaves, green fruits and flowers as well as seeds (Higgins 1999; Newbey 2004; Barth 2007). These scattered records suggest that this species may have a much more varied diet than the Eastern Ground Parrot, and therefore one aim of the present study was to investigate this. Although the range of the Western Ground Parrot has now shrunk dramatically, historical locations have all been sandplain country or swampy heathland (Ford 1969), each of which supports a wide diversity of plants (Beard 1990).

A common problem encountered by recovery teams and wildlife managers responsible for the recovery of cryptic and threatened species is the lack of field data relating to

ecological requirements of the species of concern. The aim of the present study was, by examination of video footage of a foraging wild bird, to identify food items selected by the bird, and to gain some understanding of the proportions of different kinds of food in the diet, information which may also assist in management of the small captive population.

Study area and methods

Study area

The site of filming was 26 km from the sea within the Fitzgerald River National Park, which is situated on the southern coast of Western Australia (Figure 1). The site, a gently undulating sandy plain with scattered stunted mallee over low heath, covered ~18 hectares (B. Barrett unpubl. data 2006), and comprised three fire ages (>20, 17 and 8 years since being burnt). There was feeding across the site, with most in the younger vegetation (M. Barth pers. comm. 2016). There are >120 plant species

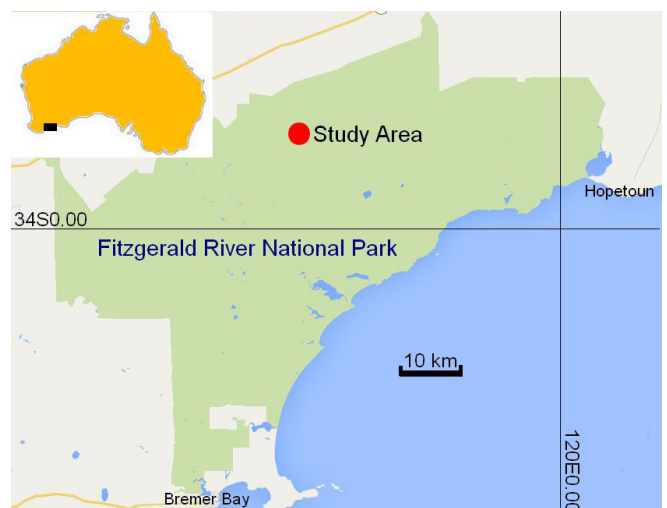


Figure 1. Location of the study site within the Fitzgerald River National Park, Western Australia. Map base from Google Maps.

Table 1. The date, number of videos used, and total number of 30-second samples from the videos of a foraging Western Ground Parrot for each day of filming, Fitzgerald River National Park, September–October 2006.

Date	No. of videos	No. of samples
22 September	1	1
24 September	2	4
2 October	7	24
5 October	1	7
7 October	3	9
Spring (undated)	1	5
Total	15	50

in this vegetation type in this location, ~13% (by species) being sedges (Chapman & Newbey 1987, 1995). There is no fresh water nearby as the creeks are saline. The annual rainfall is ~415 mm.

Fifty 30-second samples were selected from the videos of a wild Western Ground Parrot filmed by Brent Barrett and his team for the Western Australian Department of Environment and Conservation (now Department of Parks and Wildlife). Filming was on at least five different days between 22 September and 7 October 2006. The videos ranged in length from 3 to 10.5 minutes, and samples were selected on the basis of active, visible feeding. There was a gap of at least 10 seconds between any two samples selected. Table 1 shows the date of filming, and the number of video segments obtained and number of samples from that date. Five of the samples are undated for a reason unknown to me, but all filming took place between 20 September and 28 October 2006.

It was determined that the bird filmed was a mature male from the shape of the upper mandible and the coloration of the throat and upper breast when compared with sexed skins in the Western Australian Museum, the Australian Museum and Museum Victoria, and also from the bird's behaviour (McFarland 1991b). The bird was caring for a juvenile, which was very rarely seen or heard during filming but as a consequence the adult was less inclined to move far away.

A feeding unit as recorded was each time that the bird reached for another 'bite' of food. The plant species and the part of the plant that was eaten were recorded. For each of the 50 30-second video samples, the date, category of food taken, number of times it was taken, total number of times that the bird reached for more food, dominant food and the number of times that food was taken were recorded. Inevitably, some food items were obscured from view.

The categories of food items were as follows:

Sedge seeds. The condition of these seeds (dry or green) could not be determined from the video images. All were taken from growing seed-heads.

Green fruit. This comprised pods and/or green seeds from pea plants (Fabaceae) or the small fruit of *Synaphea favosa*.

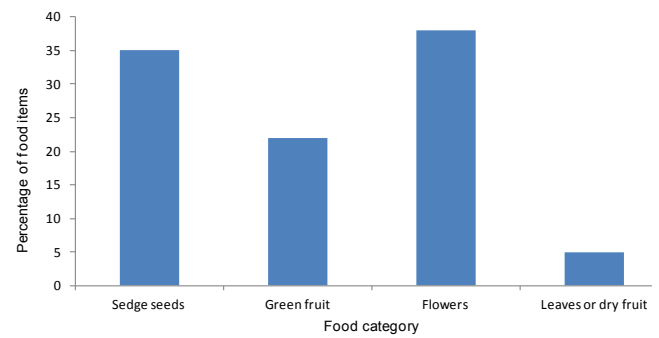


Figure 2. Percentage of 514 identifiable food items in each category that were taken by the foraging Western Ground Parrot over the 50 video samples of the study, Fitzgerald River National Park, spring 2006.

Flowers. These included entire flowers or parts of flowers, and flower buds.

Other. Leaves, dry fruit of flowering plants, and stems.

Obscured. Cases where feeding motion was visible but food type was not.

Plants were identified by use of a field herbarium compiled for a previous study from sites near the current study site, and with reference to FloraBase, an online resource provided by the Western Australian Herbarium (Department of Parks and Wildlife 1998).

Results

Summary data for food types and the 16 dominant (i.e. the most frequently recorded) species consumed in individual 30-second video samples are shown in Appendix 1.

Feeding rate

In the 1500 (50 x 30) seconds of video analysed, 555 food items were swallowed, averaging 2.7 seconds per feeding unit. The rate varied from three to 40 items in 30 seconds. The feeding rate was determined by the size of the items, whether 'chewing' was necessary, and whether time was taken searching for the next food item. Green pods were found to require more 'chewing' than seeds, flowers or small green fruit, and so more time was taken between 'bites' of these. Consuming a whole grevillea flower was also slow.

Components of food intake

The total number of identifiable feeding units in the calculation is 514 (Figure 2, based on the results from Appendix 1, excluding the obscured food items). Flowers made up 38%, sedge seeds 35%, green fruit 22% and other (leaves or dry fruit) 5% of the identifiable feeding units.

Varying food choice

In total, 27 species from nine plant families were eaten in 25 minutes (spread over at least 5 days). Of these, 16 species



Figure 3. The sedge *Mesomelaena stygia* subsp. *stygia* was the most commonly recorded food plant of the Western Ground Parrot (Appendix 1). Photo: Brent Barrett/Department of Parks & Wildlife



Figure 4. The Western Ground Parrot feeding on green pods and seeds of a prickly bitter-pea *Daviesia incrassata* subsp. *reversifolia*. Photo: Brent Barrett/Department of Parks & Wildlife



Figure 5. Western Ground Parrot consuming the base of a *Grevillea tripartita* flower. During 1 minute, the bird travelled -0.7 m, and fed, in sequence, on Curry Flowers, a Nodding Coneflower, Curry Flowers, grevillea flowers (photograph), a sedge, grevillea flowers from the same flowerhead, and another sedge. When the parrot moved on, three grevillea flowers of the original flowerhead were found to be untouched. Photo: Brent Barrett/Department of Parks & Wildlife

from seven families were the dominant items consumed in one or more individual video samples (Appendix 1). The seven families, listed in order of the number of video samples in which they were the dominant food item, were: Cyperaceae [sedges] (19), Ericaceae [heaths] (11), Fabaceae [peas] (10), Proteaceae (8), Myrtaceae (1), Haemodoraceae (1) and Malvaceae (1) (total 51 as there was one dominance tie).

The remaining 11 species of plants that were eaten, but did not dominate any of the 50 samples, were mostly from the same families: Cyperaceae, Ericaceae, Fabaceae, and Proteaceae; plus Restionaceae and Goodeniaceae. Appendix 2 lists all 27 food species recorded from the video samples.

It was clear from the video samples studied that there was nearly always more of a food type readily available than was taken at the time. For example, Curry Flowers *Lysinema ciliatum* were very common, and many more could usually be seen than were taken.

Figures 3, 4, and 5, taken from some of the video samples, show the bird feeding on some differing plant species and plant parts.

Varying food choice within 30-second intervals

The diversity of food items consumed by the Western Ground Parrot was notable, even within individual 30-second video samples. In only 38% of samples was a single food type consumed, with two food types consumed in 48%, three in 12%, and four food types in 2% of samples (Figure 6). There were also changes from one species of sedge seed to another, for example, but this is not shown here.

Varying food choice on 1 day

On 2 October, the date on which almost half the samples were recorded, there was a range of plant parts eaten. The dominant category for each of the 24 samples on this day was: flowers (10), sedge seed (9) and green fruit (5). The dominant plant species were Curry Flower (8),

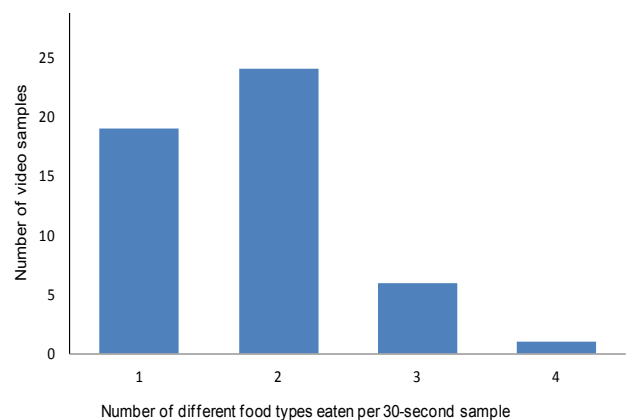


Figure 6. Number of video samples (of total $n = 50$) showing one, two, three or four different food types eaten by the Western Ground Parrot within 30 seconds at the Fitzgerald River National Park, spring 2006. Food types were: flowers and flower buds; green fruit including pods and seeds; sedge seeds; and other (which includes leaves and dry fruit).

Mesomelaena stygia subsp. *stygia* (5), a prickly bitter-pea *Daviesia incrassata* subsp. *reversifolia* (3), Round-leaf Bitter-pea *D. teretifolia* (2), *Lepidosperma* sp. 2 (2), *Grevillea tripartita* (2), a bloodroot *Haemodorum discolor* (1), Black Rapier-sedge *Lepidosperma carphoides* (1), and *Schoenus* sp. (1) (total 25 because of one dominance tie).

Discussion

Studying the diet of wild ground parrots is extremely challenging. The birds are very difficult to locate as they quietly feed and rest amongst low dense vegetation, emerging only on the dark side of dawn or dusk to fly low, and often, but not always, to call. Little detailed work has been accomplished in this area except for the two studies on crop contents and the flush site study of the Eastern Ground Parrot. There are a few records of the diet of the Western Ground Parrot, but there has been no previous systematic documentation that would enable comparison between species.

The Victorian study of the Eastern Ground Parrot (Meredith & Isles 1980) found that of four birds, two fed only on sedge seeds (of one or two species), one on seeds of three sedges and one dicotyledon species, and the fourth had been feeding mostly on *Cassythia* seeds of one species and a few buds from another *Cassythia* species, as well as a few seeds from three sedges. There were also anthers, indicating some feeding on flowers, but this was not quantified. Later, these results were combined with analysis of the crop contents of two predated Eastern Ground Parrot nestlings from New South Wales, plus a small number of feeding observations and deductions (from food sources available at flush sites) from Tasmania, South Australia, New South Wales and Victoria. It was concluded that seeds or fruit of monocotyledons in the Cyperaceae and Restionaceae, and dicotyledons in the Lauraceae, Epacridaceae (now Ericaceae) and Fabaceae were frequent food sources for the Eastern Ground Parrot (Meredith *et al.* 1984).

The more extensive Queensland study (McFarland 1991a), of crop contents of 60 Eastern Ground Parrots over 9 months, showed that seeds of both monocotyledons (especially sedges) and dicotyledons (especially grevilleas, peas and heath plants) formed most of the diet, with species and proportion varying throughout the year. Forty plant species were identified, with between one and 17 species being identified in each month's crop contents. *Sprengelia sprengelioides* (a heath plant, the seeds of which were found in many crops) was the only species appearing in most crop contents over all months. Seed pods, stalks and flowers were ingested in some months but in such small quantities that no measure of abundance was given.

An indirect study of the diet of the Eastern Ground Parrot in Tasmania resulted in a list of plant species likely to be consumed. The list was compiled by examining the vegetation at 50 plots from which birds had been flushed (Bryant 1991, 1994). Typically only 25 plant species occurred in each plot. Species with neither seeds of a suitable size, flowers, nor small fruit were omitted from the list, so that what remained had to include the mainly

sedentary bird's food sources: flowers and buds of 10 dicotyledons and seeds of 12 sedge species. Bryant (1991) also cited previous feeding observations, a subset of both monocotyledons and dicotyledons in Tasmania.

The current study covered just over 2 weeks, from late September to early October 2006. The dominant food plant groups of sedges, heath plants, peas, and grevilleas concur with those of the Queensland study of the Eastern Ground Parrot. Like the Cooloola birds, the Western Ground Parrot of the present study had a diet diverse in plant species, with 27 plant species seen to be consumed within only 25 minutes of video footage.

Both mainland studies of the Eastern Ground Parrot showed that species to be granivorous. The Western Ground Parrot of the present study, however, was clearly not an exclusive granivore, given that flowers, flower parts and flower buds formed over one-third of the diet determined from the video samples. The green pods of pea plants were also commonly eaten as well as the green seeds within. However, it is worth noting that granivory in ground parrots has been emphasised by study of crop and gizzard contents (Meredith & Isles 1980; McFarland 1991a), whereas direct (this study) and indirect (Bryant 1991, 1994) observational studies have indicated a broader diet. All studies from Victoria, Queensland, Tasmania and Western Australia point to sedge seeds being an essential dietary component of ground parrot species.

Apart from the present study, feeding records of the Western Ground Parrot have been sparse, but they indicate that this species has a mixed diet (Appendix 2). The first record was of a bird feeding on the semi-succulent leaf of a pea plant, Ouch Bush *Daviesia pachyphylla* (Newbey *et al.* 1983). In the summer of 1988–1989, during a radio-tracking study in the Fitzgerald River National Park, feeding signs were noted on 14 occasions, and included seven plant species: Ouch Bush leaves, dry seed of Nodding Coneflower *Isopogon teretifolius*, and the remaining five were green fruit on flowering plants (Burbidge *et al.* 1989), none of which was observed being consumed during the current video-based study. Another observation of a Western Ground Parrot feeding on flowers within the Fitzgerald River National Park was on 20 November 1994: the bird was flushed from a *Banksia cirsioides*, where it had been, 0.75 m above ground level, and there were clear signs that it had been feeding on the banksia flowers (Newbey 2004).

Further records were obtained by observation of the same individual as in the present study, in the same year (Barth 2007). The observations were made on nine occasions between 20 September and 28 October 2006, which includes the present study period. Twenty-one food species were determined, most of them different from those in the present study, and included four sedges, one twine-rush, one grass, four pea plants and 10 other flowering plants, an indication of diversity of food choices, although it is not stated what part of each plant was eaten.

In contrast with the direct studies of the Eastern Ground Parrot, the video samples offered an excellent opportunity for examining the diet of a wild bird without the need to capture the bird. It also offered the opportunity to observe

feeding behaviour of the bird. It was clear in many of the video frames that the bird changed food species before all of the readily available food items had been taken. The results of this study, although relating to one individual bird in one location and in one season, correlate with other observations, and suggest that a diet diverse in both plant species and plant parts is selected by wild Western Ground Parrots.

Bryant (1991) described the Eastern Ground Parrot as an opportunistic feeder. It is likely that the Western Ground Parrot is also an opportunistic feeder. The Fitzgerald River National Park is exceptionally rich in flora (Chapman & Newbey 1995), and the study site there offered more choice of food plants than was available in any of the Tasmanian sites described by Bryant (1991, 1994). Although there are always plants in flower in the Fitzgerald River National Park, spring is when flowering is at its peak, which is also the breeding season for the Western Ground Parrot. The individual observed in this study was caring for a juvenile, and this could further affect food choices.

Data from the 1988–1989 radio-tracking study in the Fitzgerald River National Park (Burbidge *et al.* 1989) showed that Western Ground Parrots very actively foraged from 0730 h until 1030 h, were then less active until 1600 h, when activity heightened again until 1730 h ($n = 16$). Using the feeding rate of one food item per 2.7 seconds, a bird would consume 6000 food items in the very active period plus some in the less active period. It was calculated by Meredith & Isles (1980) that an Eastern Ground Parrot would need to consume 10 000 seeds per day to fulfill the daily energy budget. A diet with proportionally more flower bases and green fruit and fewer seeds should offer more nutrition for less effort.

Another factor could lie in the climate. For example, both Cooloolo (Queensland) and Croajingolong (Victoria) have ~1200 mm rain per year, with rain each month. The rainfall (415 mm annually) of the present study area is sparsest in the hot months. Western Ground Parrots do not fly out to drink and there is no permanent fresh water in the Fitzgerald River National Park study area. Although the condition of the sedge seeds eaten was not known, the other main selections—flowers and flower buds, and green pods and seeds—are all moist. Whether a bird in captivity with a constant supply of water needs a diet that includes these components for its overall health is not known.

This paper provides new ecological information for this critically endangered species. Despite many extensive surveys, no Western Ground Parrots have been located in the Fitzgerald River National Park since April 2012 (S. Comer pers. comm. 2015). Recent fires in the last stronghold for the species (Cape Arid National Park) are estimated to have burnt 90% of the remaining habitat that was known to be occupied (Comer & Burbidge 2016).

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Appendix 1. Feeding samples from video images of dominant (i.e. most frequently recorded) food sources of a Western Ground Parrot foraging in the Fitzgerald River National Park, September–October 2006. The 50 feeding samples are listed showing the filming date, number of feeding units per food category, total number of feeding units per sample, dominant food category, and dominant food item. Totals at the base of the table show the number of times each food category was taken overall. Food categories: F = flowers, parts of flowers and flower buds; G = green fruit, pods and seeds; O = other less commonly eaten plant material (leaves and dry fruit); and S = sedge seeds.

Date	No. of feeding units/food category					Total no. of feeding units per sample	Dominant food category	Family and species of dominant food item	Comments
	Sedge seeds	Green fruit	Flowers	Other	Obscured				
22 Sept.	14					14	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
24 Sept.			5			5	F	PROTEACEAE <i>Grevillea tripartita</i>	Flower base
24 Sept.			7			7	F	MALVACEAE <i>Lasiopetalum rosmarinifolium</i>	
24 Sept.	3		2		3	8	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	Grevillea—eating flower base only
24 Sept.	6		3		1	10	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
2 Oct.			3			3	F	PROTEACEAE <i>Grevillea tripartita</i>	One complete flower, much 'chewing'—only three swallows
2 Oct.	1		1	1		3	F	PROTEACEAE <i>Grevillea tripartita</i>	<i>G. tripartita</i> is the largest item. Other = dry fruit
2 Oct.	4	1	12		1	18	F	HAEMODORACEAE <i>Haemodorum discolor</i>	
2 Oct.			7			7	F	ERICACEAE <i>Lysinema ciliatum</i>	
2 Oct.	1		8			9	F	ERICACEAE <i>Lysinema ciliatum</i>	
2 Oct.			10			10	F	ERICACEAE <i>Lysinema ciliatum</i>	
2 Oct.			11			11	F	ERICACEAE <i>Lysinema ciliatum</i>	Flower base eaten, corolla discarded
2 Oct.			11			11	F	ERICACEAE <i>Lysinema ciliatum</i>	
2 Oct.			10			10	F	ERICACEAE <i>Lysinema ciliatum</i>	
2 Oct.		2	7		3	12	F	ERICACEAE <i>Lysinema ciliatum</i>	
2 Oct.		4				4	G	FABACEAE <i>Daviesia incrassata</i> subsp. <i>reversifolia</i>	Some seeds removed from pod
2 Oct.	2	2				4	G	FABACEAE <i>Daviesia incrassata</i> subsp. <i>reversifolia</i>	Much 'chewing' of <i>Daviesia</i> pods
2 Oct.		5				5	G	FABACEAE <i>Daviesia incrassata</i> subsp. <i>reversifolia</i>	
2 Oct.	2	6	1			9	G	FABACEAE <i>Daviesia teretifolia</i>	
2 Oct.		7				7	G	FABACEAE <i>Daviesia teretifolia</i>	

Appendix 1 continued

Date	No. of feeding units/food category					Total no. of feeding units per sample	Dominant food category	Family and species of dominant food item	Comments
	Sedge seeds	Green fruit	Flowers	Other	Obscured				
2 Oct.	7	2				9	S	CYPERACEAE <i>Lepidosperma</i> sp. 2	
2 Oct.	9		1			10	S	CYPERACEAE <i>Lepidosperma</i> sp. 2	
2 Oct.	7		4		1	12	S	ERICACEAE <i>Lysinema ciliatum</i> , CYPERACEAE <i>Lepidosperma carphoides</i>	Four of each. The three other sedge records were of other species.
2 Oct.	5		1		1	7	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
2 Oct.	3	1		1	1	6	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	Other = leaf of <i>Daviesia</i>
2 Oct.	10				3	13	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
2 Oct.	8	1	1	2	1	13	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
2 Oct.	6	2			3	11	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
2 Oct.	11		5			16	S	CYPERACEAE <i>Schoenus</i> sp.	
5 Oct.		4		2		6	G	FABACEAE <i>Daviesia decurrens</i>	Other = dry fruit
5 Oct.		6	3			9	G	FABACEAE <i>Daviesia decurrens</i>	
5 Oct.		5				5	G	FABACEAE <i>Daviesia decurrens</i>	
5 Oct.	4	8				12	G	PROTEACEAE <i>Synaphea favosa</i>	
5 Oct.				8		8	O	FABACEAE <i>Gompholobium confertum</i>	Other = dry fruit
5 Oct.			2	7		9	O	FABACEAE <i>Gompholobium confertum</i>	
5 Oct.	6					6	S	CYPERACEAE <i>Lepidosperma</i> sp. 1	
7 Oct.	3		14		2	19	F	ERICACEAE <i>Astroloma pallidum</i>	
7 Oct.	3		5			8	F	PROTEACEAE <i>Grevillea tripartita</i>	
7 Oct.			4	2	1	7	F	PROTEACEAE <i>Grevillea tripartita</i>	Other = leaf
7 Oct.		13	4		6	23	G	PROTEACEAE <i>Synaphea favosa</i>	
7 Oct.		24				24	G	PROTEACEAE <i>Synaphea favosa</i>	
7 Oct.	9	4				13	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	

Appendix 1 continued

Date	No. of feeding units/food category					Total no. of feeding units per sample	Dominant food category	Family and species of dominant food item	Comments
	Sedge seeds	Green fruit	Flowers	Other	Obscured				
7 Oct.	8	5	2		3	18	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
7 Oct.	13					13	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
7 Oct.	5		1	4	2	12	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	Other = leaf?
Spring			33		7	40	F	MYRTACEAE <i>Calytrix leschenaultii</i>	
Spring		5	9			14	F	ERICACEAE <i>Lysinema ciliatum</i>	
Spring	2		6			8	F	ERICACEAE <i>Lysinema ciliatum</i>	
Spring	17	3				20	S	CYPERACEAE <i>Lepidosperma</i> sp. 2	
Spring	11	4			2	17	S	CYPERACEAE <i>Mesomelaena stygia</i> subsp. <i>stygia</i>	
Totals	180	114	193	27	41	555			

Appendix 2. Food plants of the Western Ground Parrot in the Fitzgerald River National Park, between 1983 and 2006. Plant part: D = dry fruit, F = flower or bud, G = green pod or fruit, L = leaf, S = sedge seed. Source: 1 = this study, 2 = Newbey *et al.* (1983), 3 = Burbidge *et al.* (1989), 4 = Newbey (2004), 5 = Barth (2007). Feeding was observed (Sources 1, 2, 5) or food signs were seen after flushing (Sources 3, 4).

Plant type	Family	Species	Plant part	Source		
Dicotyledons	Dilleniaceae	<i>Hibbertia gracilipes</i>	F	3		
		<i>Hibbertia lineata</i>		5		
		<i>Hibbertia recurvifolia</i>		5		
	Ericaceae	<i>Andersonia parvifolia</i>			5	
		<i>Andersonia sprengelioides</i>	F		1	
		<i>Astroloma pallidum</i>	F		1	
	Rhamnaceae	<i>Cryptandra</i> sp.			5	
	Ericaceae	<i>Lysinema ciliatum</i>	F		1, 5	
	Euphorbiaceae	<i>Stachystemon virgatus</i>	F		3	
		<i>Stachystemon polyandrus</i>	F		3	
	Fabaceae	<i>Daviesia abnormis</i>	G		1	
		<i>Daviesia decurrens</i>	G		1, 5	
		<i>Daviesia incrassata</i> subsp. <i>reversifolia</i>	G		1	
		<i>Daviesia pachyphylla</i>	L		2, 3	
		<i>Daviesia teretifolia</i>	G		1, 5	
		<i>Daviesia</i> sp. 1	G		1	
		<i>Daviesia</i> sp. 2	G		1	
		<i>Gompholobium confertum</i>	D		1	
		<i>Jacksonia intricata</i>			5	
		<i>Pultenaea</i> sp.			5	
	Goodeniaceae	<i>Goodenia coerulea</i>	F		1, 5	
	Haemodoraceae	<i>Conostylis deplexa</i>	F		3	
		<i>Haemodorum discolor</i>	F		1	
	Malvaceae	<i>Lasiopetalum rosmarinifolium</i>	F		1	
	Myrtaceae	<i>Calytrix leschenaultii</i>	F		1	
		<i>Leptospermum maxwellii</i>	F		3	
	Proteaceae	<i>Banksia cirsioides</i>	F		1, 4	
		<i>Banksia tenuis</i> var. <i>tenuis</i>			5	
		<i>Grevillea obliqua</i>	F		1	
		<i>Grevillea oligantha</i>	F, G, L		1, 5	
		<i>Grevillea tripartita</i>	F		1, 5	
<i>Hakea trifurcata</i>				5		
<i>Isopogon teretifolius</i>		D		3		
<i>Synaphea favosa</i>		F, G, L		1, 5		
Monocotyledons		Cyperaceae	<i>Caustis dioica</i>	S		5
			<i>Lepidosperma angustatum</i>	S		5
	<i>Lepidosperma brunonianum</i>		S		5	
	<i>Lepidosperma carphoides</i>		S		1	
	<i>Lepidosperma</i> sp. 1		S		1	
	<i>Lepidosperma</i> sp. 2		S		1	
	<i>Lepidosperma</i> sp. 3		S		1	
	<i>Lepidosperma</i> sp. 4		S		1	
	<i>Mesomelaena stygia</i> subsp. <i>stygia</i>		S		1, 5	
	<i>Schoenus</i> sp.		S		1	
	Poaceae		<i>Neurachne alopecuroidea</i>	S		5
	Restionaceae		<i>Chordifex sphacelatus</i>	S		1, 5