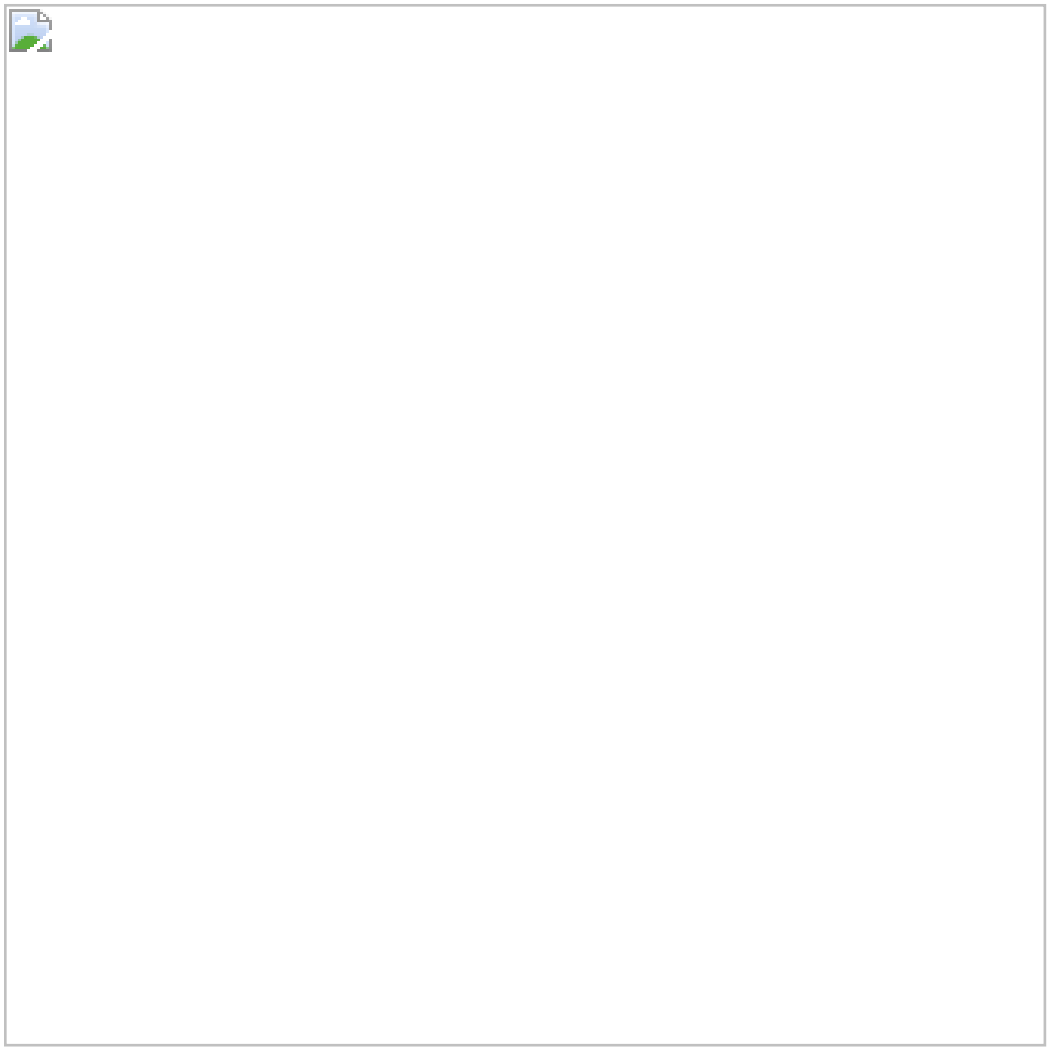

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SHORT NOTES

Winter diet of Great Pampa-finches *Embernagra platensis* in Guaminí Lagoon, Argentina

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Abstract. The diet of the Great Pampa-finch includes seeds rather than insects. Our objective was to study its diet during the winter season and, whenever possible, to record differences between the sexes in diet patterns. This species was studied at Guaminí Lagoon, Buenos Aires Province, Argentina. The stomach content of 38 adult birds was investigated. The analysis shows that the food eaten by *E. platensis* consisted of seeds (60%) (Chenopodiaceae, Asteraceae, Ciperaceae and Poaceae) and insects (39%) (Bellostomatidae, Dytiscidae, Curculionidae, Coccinelidae, Formicidae and Apidae). Males ate more insects and, overall, more items than females. These, in turn, consumed a greater amount of plants. Niche breadth values were 2.9 for males and 3.1 for females. The seeds encountered were those of plant species typically associated with the pampas.

Key words: Great Pampa-finch, *Embernagra platensis*, diet, differences between sexes, Argentina

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The Great Pampa-finch breeds in southeastern Brazil, eastern Paraguay, Uruguay, and eastern Argentina (Short 1975). It can be usually seen in tall grassy areas, often with scattered shrubs, including roadsides, damp grasslands, where pairs or small groups are territorial and often sing while perched on top of bushes and fence posts (Ridgely & Tudor 1989, Hayes 2003).

The Emberizidae is a distinct family of granivorous birds (Canevari et al. 1991), but studies about the food of the Great Pampa-finch registered insects in its diet (Marelli 1919, Aravena 1928, Zotta 1932, 1936, 1940, Beltzer 1990). However, published information about the diet is not abundant, based on low number of samples and isolated data. It seems that sexes are located differently in space; males perch on top of tall shrubs, fly fully, and balance their tails having an advantageous position to catch flying insects. Females, though, inhabit low places keeping terrestrial habits. Therefore, it is possible that both sexes may use separated nourishing niche.

The aim of this study was to provide general information of the Great Pampa-finch diet during winter as well as differences in diet composition between sexes.

This study was carried out in Guaminí Lagoon (36°59′S, 62°28′W), neighboring Guaminí city, Buenos Aires Province, Argentina. Periodic floods determine salty fluctuations (17–40 g/l) in Guaminí Lagoon (Montalti et al. 2003). The study area belongs to the Pampa biogeography province. It has template climate, with annual average temperatures oscillating between 13 and 17°C, and annual precipitation varying in a range of 600 and 1000 mm. Vegetation corresponds to an herbaceous steppe or substeppe, with few rivers and numerous saltiest and fresh water lagoons (Morrone 2001).

The diet of the Great Pampa-finch was studied by the analysis of 38 stomach contents (16 males, 11 females, and 11 undetermined) collected in July 2000.

As part of the whole study program, individual birds have been shot (permission of Provincial Direction of Natural Resources), weighted and frozen. Once in the laboratory, they were unfrozen, measured and the stomach processed to diminish digestion decomposition.

Stomach contents were identified and sorted into prey classes. The number of individuals belonging to each prey taxa represented in the samples was counted. Insect determination was carried out using Merrit & Cummins (1978) and Kusnezov (1978). Systematic determination of plant species consumed by *E. platensis* was done following Cronquist (1993). Minimum sample was determined by using the number of the stomachs and the number of taxa.

Food niche breadth (FNB) was estimated using Levins' (1968) index:

$$FNB = 1/(\Sigma p_i 2),$$

where p_i is the proportion of prey taxon in the diet. A standardized-niche breadth value (FNBst) was calculated, which ranged from 0 to 1:

$$FNBst = (FNB - 1)/(n - 1),$$

where n is the total number of prey categories (Colwell & Futuyma 1971).

The Shannon-Wiener H' index was applied to analyze the value of the diversity as an ecological tool of diagnosis in the population. We considered each organism as a different community, and males and females as two separated types of community whose characteristics were obtained by comparing the sexes.

Comparisons of the data on stomach contents between sexes were made using Mann-Whitney U-test.

All the stomachs contained dietary items. Minimum sample was estimated in 20 of the stomachs. The analysis showed that, during the sampling period, food eaten by Great Pampa-finch consisted primarily on seeds (60.2%) and insects (38.8%). The identification of 1034 food items shows that in general the diet was composed of 21 plant and animal taxa. No significant differences between males and females with respect to prey types were found (Mann-Whitney U-test = 51.5, p = 0.172).

Table 1. Seeds ingested by Great Pampa-finch by number (N) and frequency (F) of occurrence in Guaminí Lagoon.

	N	% N	F	% F
Dicotyledoneae				
Chenopodiaceae				
Chenopodium sp.	91	23.1	5	13.9
Asteraceae				
Helianthus annuus	1	0.3	1	2.8
Monocotyledoneae				
Cyperaceae				
Scirpus sp.	3	0.8	1	2.8
Poaceae				
Triticum aestivum	191	48.5	25	69.4
Panicum spp	87	22.1	6	16.7
Setaria spp	6	1.5	1	2.8
Zea mais	8	2.0	2	5.6
Eleusine tristachya	4	1.0	1	2.8
Undetermined seeds	3	0.8	1	2.8

Among seeds ingested by Great Pampa-finch, the most important in terms of the number and frequency were: *Triticum aestivum*, *Panicum* spp. and Chenopodium spp which represented more than 90% of the food (Table 1). Seed size ranged between 1 mm (*Chenopodium* sp.) and 7 mm (*T. aestivum*).

Insects were the main prey (over 99%) of the animal fraction and Arachnids were found in only three samples (Table 2). Insects were absent in four samples. Ants represented the most important prey item (95.8%), followed by Coleopterans (2.5%) (Table 2). Insect body length ranged from 5.5 mm (Curculionidae), 6.6 mm (Formicidae), 10 mm (undetermined Coleoptera) to 12.5 mm (Apidae).

Table 2. Arthropods consumed by Great Pampa-finch by number (N) and frequency (F) of occurrence in Guaminí Lagoon.

	N	% N	F	% F
Hymenoptera				
Formicidae			29	85.3
Solenopsis saevissima	47	7.3	7	
Acromyrmex lundi	55	8.6	4	
Acromyrmex striatum	36	5.6	4	
Atta sp.	68	10.6	1	
Undetermined Formicidae	409	63.7	29	
Apidae				
Apis mellifera	1	0.2	1	2.9
Coleoptera			12	35.3
Dytiscidae	1	0.2	1	
Curculionidae	6	0.9	3	
Coccinelidae	2	0.3	2	
Undetermined Coleoptera	7	1.1	6	
Hemiptera				
Belostomatidae				
Belostoma sp.	6	0.9	4	11.8
Aranea				
Lycosidae	4	0.6	3	8.8

Gastrolites were found in 30 samples and their size was between 1 and 5 mm. There were no differences between sexes in their number and weight. The mean mass of a stomach sample was 1.13 g ± 0.28 (range: 0.62–1.80), representing ca. 3% of the mean body mass. We have found significant differences between males and females in the number of plant items, plant weight and insects number but not in the number of seeds (Table 3).

The standardized niche breadth was similar in males and females (2.9 and 3.1 respectively). The mean value of specific diversity was 1.18 ± 0.65 (0.24–2.58) for males and 0.96 ± 0.43 (0–1.47) for females, showing no significant differences (Mann-Whitney U-test = 60.0, p = 0.17).

The diet analysis showed 69% of wheat that must be directly obtained from top of the soil at the beginning of July when crops season begins. Because of inadequate agricultural techniques, excessive fertilization and saltiness characterizing the pampas plants, we would expect a major share of the Chenopodiaceae family in the *Embernagra* diet composition. Arthropods, like the Formicidae, Lycosidae, and Curculionidae (seedeaters), could be captured also on the ground. *Atta* and *Acromyrmex* are leave-cutting ants that can be commonly found in the ground and it is worth pointing out that these ants were present in Great Pampa-finch stomach contents. The Coccinelidae were probably collected on shrubs in grassland areas where Great Pampa-Finches could often be seen (Ridgely & Tudor 1989). The aquatic Dytiscidae (larvae) and *Belostoma* sp. were also found in two different samples. The fact that insects represented almost 40% of the diet suggests that invertebrates play an important nutritive role. Beltzer (1990) also reported as marked percentage of seeds and ants as we did it during wintertime. On the other hand, any information on the summer diet was really scarce for comparisons. Seeds have high protein and lipid levels; ants could be eaten for of the same reason. Great Pampa-finches could be foraging mainly on seeds and ants because these are nourishing items or, as Beltzer mentioned (1990), as many other passerines and non-passerines, they could be opportunistic foragers.

We found slight differences in diet composition between sexes. Females more frequently forage on the lower vegetation, so that the plant

Table 3. Mean weight SD (g) and number items consumed by Great Pampa-finch discriminated by sex. Minimum and maximum in brackets. Differences between sexes tested by Mann-Whitney U-test.

	Total	Males	Females	Mann Whitney U-test (p)
Total sample weight	1.13 ± 0.28 (0.62–1.80) (N = 38)	1.12 ± 0.31 (0.62–1.8) (N = 16)	1.25 ± 0.22 (0.751–1.57) (N = 11)	63.00 (0.22)
Plant weight	0.59 ± 0.39 (0.008–1.40) (N = 36)	0.39 ± 0.4 (0.008–1.08) (N = 15)	0.84 ± 0.31 (0.21–1.4) (N = 10)	28.00 (0.009)
Insects weight	0.41 ± 0.34 (0.04–1.23) (N = 34)	0.49 ± 0.37 (0.04–1.23) (N = 16)	0.30 ± 0.32 (0.05–1.10) (N = 9)	49.00 (0.19)
Gastrolites weight	0.25 ± 0.32 (0.001–1.11) (N = 30)	0.33 ± 0.44 (0.001–1.11) (N = 13)	0.22 ± 0.19 (0.06–0.64) (N = 10)	54.50 (0.51)
Insects number	19.5 ± 23.6 (1–77) (N = 33)	24.4 ± 24.4 (1–77) (N = 16)	15.1 ± 22.6 (1–68) (N = 8)	45.50 (0.017)
Seeds number	11.17 ± 9.74 (1–43) (N = 35)	11.4 ± 10.9 (1–43) (N = 16)	8.9 ± 5.04 (2–17) (N = 9)	71.50 (0.42)
Gastrolites number	16.53 ± 12.8 (2–50) (N = 28)	17.0 ± 14.2 (2–44) (N = 12)	10.5 ± 5.98 (4–20) (N = 8)	36.50 (0.37)
Items number	27.2 ± 24.1 (2–104) (N = 38)	35.4 ± 27.7 (6–104) (N = 16)	18.5 ± 19.0 (2–68) (N = 11)	49.00 (0.026)

fraction was more abundant in their stomachs. Males, on the other hand, represent an upper section of the food niche, eating flying insects more frequently than females, resulting in the insect item numbers being different. Even though there were no intersexual differences in niche breadth, the sexes seem to represent different feeding requirements, resulting in searching for food in a different way.

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STRESZCZENIE

[Zimowy pokarm pampasówki szarolicej w Guamini Lagoon, Argentyna]

Pampasówka szarolica żywi się głównie pokarmem roślinnym, przede wszystkim nasionami. Celem badań było oszacowanie składu pokarmu tego gatunku w okresie zimowym, a także znalezienie ewentualnych różnic między płciami. Zbadano zawartość 38 żołądków dorosłych ptaków. 60% ich zawartości stanowiły nasiona (Chenopodiaceae, Asteraceae, Ciperaceae i Poaceae, Tab. 1) a 39% — owady (Bellostomatidae, Dytiscidae, Curculionidae, Coccinelidae, Formicidae i Apidae, Tab. 2). W pokarmie samców stwierdzono więcej owadów, samice w większym stopniu żywiły się pokarmem roślinnym, jednak różnice nie były istotne statystycznie (Tab. 3).