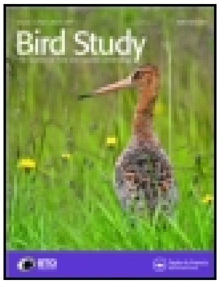

Bird Study
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/tbis20

Diet of young Great Bustards Otis tarda in Spain: sexual and seasonal differences

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Available online: 28 Feb 2012

Bird Study (2012) **iFirst**, 1–9

Diet of young Great Bustards *Otis tarda* in Spain: sexual and seasonal differences

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Capsule Arthropods are the most important diet component of Great Bustards *Otis tarda* in the first months of life.
Aims To determine the diet composition of young Great Bustards in Spain.
Methods The diet was estimated by stomach content analysis ($n = 49$).
Results Stomach contents' dry weight consisted of 33% arthropods, 30% green plant material and 23% seeds. Gastroliths were only found in summer and autumn. The diet composition changed significantly between seasons. In summer, diet consisted mainly of arthropods (50%), with green plant material being the main component in winter (56%). Volume of stomach contents and mean size of ingested arthropods were higher in males than in females. Diet composition did not differ between sexes. In summer, ground-dwelling and plant-visiting arthropods such as Mantidae, Tenebrionidae and caterpillars were the most abundant. In winter, weeds, legumes and cultivated seeds were more frequent than arthropods. Cereal plants were the least consumed in all seasons, although Barley and Wheat seeds played an important role during winter and autumn.
Conclusion The results highlight the importance of arthropods and weeds as a fundamental component of the diet of young Great Bustards. Because previous studies show that arthropods and weeds are usually more abundant in extensive farming, we recommend the implementation of agri-environmental measures in Great Bustard breeding areas.

A successful conservation programme of a threatened species should consider all of the species' habitat requirements in order to guarantee population viability. For instance, a suitable habitat needs to provide appropriate foraging grounds to ensure that the nutritional requirements of offspring as well as adults can be met. This is especially important in steppe birds inhabiting farmland areas, and particularly relevant in the Great Bustard *Otis tarda*, a primarily ground-dwelling species whose chicks have a long fledging period during which they are particularly sensitive to food scarcity (Martín *et al.* 2007).

Great Bustards are large, lekking birds that survive in highly fragmented populations in cereal pseudo-steppes from the Iberian Peninsula and Morocco to eastern China (Palacín & Alonso 2008). They are considered Globally Threatened and qualify as Vulnerable in the Red List of Threatened Species (IUCN 2011). The population has suffered dramatic declines in Spain in the second half of the 20th century up to 1980 owing to excessive hunting pressure (Alonso *et al.* 2003) and also because of agriculture intensification combined with habitat fragmentation (Alonso & Palacín 2010).

Females nest on the ground and rear alone their precocial chicks (usually one, sometimes two, rarely three) during a period of between 6 and 12 months (Alonso *et al.* 1998). Breeding success is highly variable in Great Bustards, with productivity values ranging between 0.04 and 0.53 chicks per female per breeding attempt when measured in September (Morales *et al.* 2002, Martín *et al.* 2007). Around 70% of the chicks die during their first summer because of starvation, predation and other causes (Martín *et al.* 2007). Starvation plays an important role because of the high energetic demands of young during their first weeks of fastest growth (Litzbarski & Litzbarski 1996, Quaisser *et al.* 1998). Chicks obtain most of their food by pecking at food items themselves, but in their first summer receive complementary feedings from their mother, at a rate that decreases throughout the dependence period (Alonso *et al.* 1998).

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Great Bustards are the most sexually size-dimorphic living birds (Alonso *et al.* 2009). This dimorphism begins at a very early age. Young males grow much faster and are already notably heavier than female chicks at an age of three weeks, reaching double the weight of females when they are three months old (Alonso *et al.* 2009). Consequently, the diet composition (diversity of food types, prey sizes or both) could influence the pattern of growth in these sexually size-dimorphic species. Previous studies of the diets of Great Bustards have ignored age or sex differences (Palacios *et al.* 1975, Lucio 1985, Caballero 2002, Lane *et al.* 1999, Rocha *et al.* 2005) or focused on material and energy turnover of raw components provided in artificial food mixtures (Faragó 1991a,b, Kostryukova & Sukhanova 1992). Some studies highlighted the higher energetic demands in the first weeks of life in captive-reared conditions (Ildikó & Pál 1992, Quaisser *et al.* 1998). Diet studies from wild young Great Bustards are remarkably scarce (Ryabov & Ivanova 1971). However, understanding diet preferences of wild young Great Bustards should provide significant insight into the species' ecological requirements, which will be relevant for the management of their populations and habitats. The present study is the first that investigates sexual and seasonal differences of diet composition and arthropod prey size in young Great Bustards in the Iberian Peninsula.

METHODS

Study area

We studied the stomach contents of 49 young Great Bustards distributed throughout Spain (Fig. 1). Stomachs were collected mainly in central Spain (Madrid, Guadalajara and Toledo; $n = 40$), with a few additional samples from other areas: Villafáfila ($n = 4$) and Navarra ($n = 2$) in the north, Andalusia ($n = 2$) in the south, and Cáceres in the west ($n = 1$). Specimens were found in agro-steppe farmland, mostly dedicated to dry cereal cultivation: >80% of the surface was Wheat *Triticum aestivum* and Barley *Hordeum vulgare*, with other minor crops such as legumes *Vicia* spp., Olive *Olea europaea* groves, Sunflowers *Helianthus annuus* and Common Grape Vines *Vitis vinifera*. Most cereals are grown in a traditional two-year rotation system, and harvested during late June and early July. Occasionally fields may lay fallow for two or more years. Consequently, a dynamic mosaic of ploughed, cereal and stubble habitats is created.

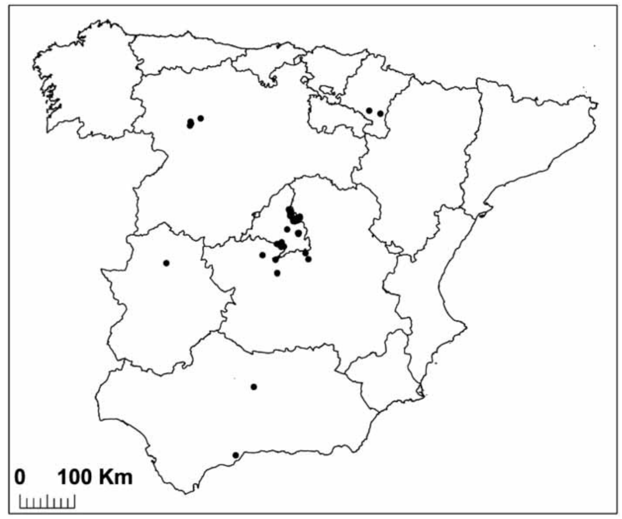

Figure 1. Map of Spain showing the sampling sites of young Great Bustard stomachs.

Stomach analysis

The diet was determined by analysis of the stomach contents from 49 Great Bustard carcasses collected between 1998 and 2010. Most of these stomachs ($n = 39$) were found as part of a longer-term monitoring study, in which chicks had been previously provided with radio-transmitters. Other stomachs ($n = 10$) were obtained from birds upon arrival at bird recovery centres. Fresh dead chicks are very hard to find owing to high summer temperatures in our study areas, and also because of the abundance of scavengers.

We sexed all birds through discriminant analysis of their body measurements (Martín *et al.* 2000). The ages of young birds were estimated from the average hatching date of 122 nests in our study area (Magaña 2007, Magaña *et al.* 2011). The causes of death were known in 80% of cases; these included collisions with power lines, predation and being killed by combine harvesters. Tarsus length (distance between the notch on the back of the inter-tarsal joint and the lower edge of the last complete scale before the toes diverge) was measured by digital calliper (0.01 mm precision) in 35 carcasses. Tarsus length was used as a morphometric measurement to correct analysis by body size.

The volume of each stomach's content was measured in a graduated cylinder (0.1 cm^3 precision). Stomach contents were washed in a 0.5-mm sieve and all identifiable materials were sorted into food types: green plant material (i.e. leaves, stems, and flowers), animal remains, seeds and gastroliths. These food types were dried in a drying chamber at 60°C until constant weight was reached (≥48 hours). The percentage dry mass of each component was then calculated for each stomach. Green plant material was identified down to the species level using microhistological techniques (Catán *et al.* 2003) and our reference collection of tissues (C. Bravo; unpubl. data). Invertebrates and seeds were identified down to order, family or species whenever possible, using our own reference collection and published identification guides (Calver & Wooller 1982, Moreby 1988). The minimum number of individuals ingested of each arthropod order or family was recorded using key body parts (Moreby 1988). Arthropod mass and prey size consumed was estimated by allometric regression equations (Hódar 1997). Recognizable remains of prey were measured (head width, pronotum, elytra length, mandible length, etc.) with digital callipers (0.01 mm precision). Weight (mg) and length (mm) were estimated by means of linear regression for each taxon (Hódar 1997). The percentage arthropod mass and the average prey size were calculated for each stomach.

Data analyses

Sexual differences in volume content of stomach were examined by ANCOVA, with log-transformed volume content as dependant variable, sex as a fixed effect factor, and tarsus length and age as covariates. Tarsus length was included to control for size effects within and between sexes to ensure that a possible significant sex effect was independent of sexual dimorphism.

The relative consumptions of the different food types (leaves, stems, flowers, arthropods, seeds and gastroliths) were calculated with the dry weight obtained directly in the stomach contents. Relative consumption of these dietary components was classified by season: summer (July–September), autumn (October–November) and winter (December–January). Sexual and seasonal differences in relative consumption of food types were calculated using two-way ANOVA, followed by Tukey's test for post hoc comparisons between seasons. Relative consumption of food types was subjected to arcsine of square-root transformations to meet better the assumptions of normality and homogeneity of variance.

Differences in prey size of arthropods consumed by male and female Great Bustards were also analyzed using ANCOVA, with log-transformed prey size as a dependant variable, sex and taxonomic group of prey as fixed-effect factors, and tarsus length as a covariate.

We verified the normal distribution of all model residuals visually by checking normal probability plots and with the Shapiro–Wilks test and we verified the homogeneity of variances and goodness-of-fit by plotting residuals versus fitted values. All *P*-values reported are two-tailed with rejection levels set at 5%. All analyses were carried out in SPSS version 19.0.

RESULTS

The contents of 49 stomachs of Great Bustard chicks, totalling 1102.13 g dry weight were identified. The average volume of stomach contents was larger in males (9.3 ± 2.6 cm^3) than in females (4.5 ± 0.9 cm^3). The relationship between volume of stomach contents and sex depended on age and tarsus length, as demonstrated by a significant interaction between sex, length of tarsus and age (ANCOVA: sex: $F_{1,40} = 0.223$, $P = 0.639$; length tarsus: $F_{1,40} = 2.064$, $P = 0.159$; age: $F_{1,40} = 0.014$, $P = 0.907$; sex × tarsus length: $F_{1,40} = 3.877$, $P = 0.056$; sex × age: $F_{1,40} = 6.773$, $P = 0.013$; tarsus length × age: $F_{1,40} = 4.764$, $P = 0.035$; sex × tarsus length × age: $F_{1,40} = 8.841$, $P = 0.005$).

A total of 2832 animal prey items from eight arthropod orders were identified (Appendix 1), amounting 33.67% of the stomach contents' dry weight. Green plant material consisted of 39 taxa and represented 30.82% of the dry weight. The plant parts ingested were mainly leaves (78.09%), followed by stems (14.01%) and flowers (7.88%) (Appendix 1). Seeds numbered 1353 and represented 23.40% of the dry weight. Nearly all of them belonged to cultivated species (Wheat, Barley, Olives) (Appendix 1). Gastroliths were found in summer and autumn, constituting 12.11% of the dry weight of the samples.

Overall, arthropods were the major component of the diet of young Great Bustards. There were significant seasonal differences in diet composition with higher consumption of leaves during winter, and stems, arthropods and gastroliths in summer and autumn (Table 1). Arthropods were the main food element in the summer diet (49.9%). Summer diet did not differ from autumn diet (post hoc Tukey's test: leaves, $P = 0.457$; stems, $P = 0.057$; flowers, $P = 0.873$; arthropods, $P = 0.974$; seeds, $P = 0.509$). In winter, the green plant material component was greater than in other seasons, and consequently the arthropod component decreased from 49.9% to 8.7% dry weight in winter. Leaves were the main component of the winter diet (56.01%).

The proportions of arthropods and seeds were higher in the diet of males in all seasons, but sex differences were not significant (sex: arthropods $F_{1,43} = 0.079$, $P = 0.780$; seeds $F_{1,43} = 2.072$, $P = 0.175$; sex × season:

Table 1. Seasonal changes in dry weight in grams (% ± sd) of the different diet components in young Great Bustard stomachs ($n = 49$) collected in Spain from summer to winter.

	Summer (n = 19)	Autumn (n = 20)	Winter (n = 10)	F	P
Leaf	0.147 ± 0.204	0.210 ± 0.163	0.561 ± 0.319	15.162	< 0.001*
Stem	0.080 ± 0.112	0.030 ± 0.056	0	5.110	0.010*
Flower	0.020 ± 0.049	0.030 ± 0.052	0	2.511	0.093
Arthropod	0.397 ± 0.241	0.367 ± 0.280	0.087 ± 0.169	12.020	< 0.001*
Seed	0.167 ± 0.232	0.256 ± 0.266	0.352 ± 0.299	1.589	0.216
Gastroliths	0.187 ± 0.176	0.129 ± 0.109	0	16.714	< 0.001*

*Significant difference according to Tukey's post-hoc tests (Leaf, winter–summer $P < 0.001$; winter–autumn $P < 0.001$; Stem, winter–summer $P = 0.007$; Arthropod, winter–summer $P < 0.001$; winter–autumn $P < 0.001$; Gastroliths, winter–summer $P < 0.001$; winter–autumn $P < 0.001$.

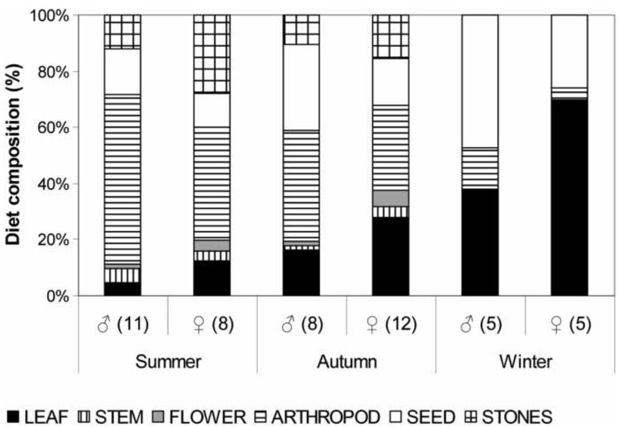

Figure 2. Sexual and seasonal variation in percentage dry weight of the main food-types found in stomach contents of young Great Bustards ($n = 49$).

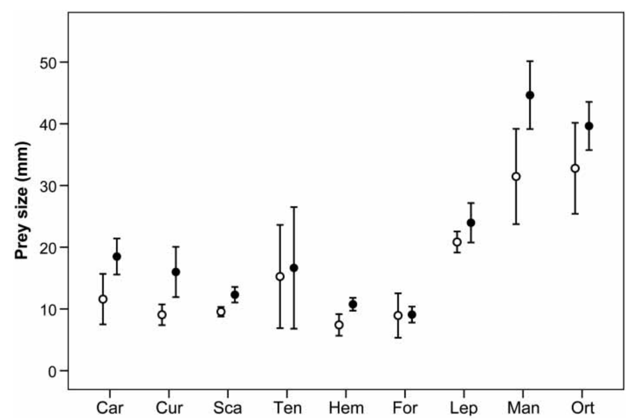

Figure 3. Mean size of arthropods consumed during summer by young male (•) and female (○) Great Bustards.
Error bars represent sd; Car, Carabidae; Cur, Curculionidae; Sca, Scarabeidae; Ten, Tenebrionidae; Hem, Hemiptera; For, Formicidae; Lep, Lepidoptera; Man, Mantidae; Ort, Orthoptera.

arthropods $F_{2,43} = 0.636$, $P = 0.534$; seeds $F_{2,43} = 0.560$, $P = 0.575$; Fig. 2). In contrast, the proportion of leaves was higher in females than in males (sex: $F_{1,43} = 4.988$, $P = 0.031$; sex × season: $F_{2,43} = 2.952$, $P = 0.063$).

Prey size was not affected by body size of young birds (tarsus length: $F_{1,35} = 0.191$, $P = 0.665$; sex × length tarsus: $F_{1,35} = 0.075$, $P = 0.786$; taxonomic group's size × tarsus length: $F_{8,35} = 0.313$, $P = 0.956$). There was a significant effect of taxonomic group of prey and sex on prey size, with males consuming bigger sizes of arthropods than females (ANCOVA: sex: $F_{1,35} = 41.218$, $P < 0.001$; taxonomic group's prey: $F_{8,35} = 101.225$, $P < 0.001$; sex × tarsus length × taxonomic group's prey: $F_{7,35} = 2.229$, $P = 0.055$; Fig. 3).

DISCUSSION

The proportions of arthropods, green plants and seeds in the diet of young Great Bustards varied seasonally, probably reflecting the seasonal food availability of each component. This agrees with previous studies of the diet of Great Bustards, as well as Little Bustards *Tetrax tetrax*, in which seasonal changes in diet have been observed (Lucio 1985, Lane *et al.* 1999, Jiguet 2002, Rocha *et al.* 2005). Young Great Bustards have a mostly non-specialist diet, though they show clear preferences for insects in summer–autumn, and legumes and weeds in winter.

The animal component of a young Great Bustard diet in the present study was 35.12% – much greater than the 6% animal fraction in the adult diet (Lane *et al.* 1999, Rocha *et al.* 2005). Studies carried out in Eastern Europe estimated the animal component in the diet of young Great Bustards in their first summer was approximately 30% (Gewalt 1959). This composition with a high input of invertebrates has been used in captive-rearing programmes (Litzbarski *et al.* 1987, Ildikó & Pál 1992, Kostryukova & Sukhanova 1992, Quaisser *et al.* 1998) to cover the higher nutritional requirements of young birds during their rapid growth phase. Moreover, Litzbarski *et al.* (1987), Litzbarski and Wayze (2007) and Illdikó and Pál (1992) emphasized the significance of Orthoptera as the main animal food for captive-bred birds. Our results showed that grasshoppers were in fact very common in the diet. During summer, grasshoppers and other Orthoptera were the most abundant arthropods available in the field (Litzbarski *et al.* 1987, Lane *et al.* 1999, Clere & Bretagnolle 2001, Bravo & Ponce unpubl. data). However, they were not consumed in higher proportions than other arthropods such as Tenebrionids, ants, caterpillars and mantis which were also very frequent in the diet. In fact, in northern Spain Orthoptera were consumed in proportion to abundance or less often than expected (Lane *et al.* 1999). Possibly ground-dwelling and plant-visiting arthropods with limited or slow mobility, such as ants and Tenebrionids, were easier to capture than Orthoptera.

Our data showed a lower consumption of green plants than animals during the first months of a chick's life. The species ingested were mainly weeds (in spite of a high abundance of cultivated plants such as cereals) and the preferred parts of the plant were the leaves. Similar findings were reported for adults in a cereal farmland area in northern Spain (Lane *et al.* 1999) and in Houbara Bustards *Chlamydotis undulata* in Abu Dhabi (Tigar & Osborne 2000). Compared with animal prey, most plant tissues are nutritionally less profitable. Weed stems are rich in fibrous components such as lignin and cellulose, and have lower concentrations of nutrients, such as proteins and digestible carbohydrates, necessary for a rapid chick growth (Newman 2007). According to several studies, herbivorous animals tend to select foliage with a relatively high nitrogen and low fibre content, such as legumes and some weeds (Dunning 1990, Karasov 1990). Most of the seeds eaten were Wheat or Barley seeds (64.8%), which were abundant in cereal stubble after harvesting during summer (Bravo & Ponce unpubl. data) and may also sometimes be found on the surface of recently sown fields in autumn and winter. Birds probably also select them because the energy content of Wheat or Barley is greater than that of other cultivated species and weeds (Karasov 1990).

Gastroliths were only found in summer and autumn. They facilitate digestibility by grinding food in the gizzard (Wings 2007). This might be particularly helpful for chicks because they might be less efficient in general than adults and would benefit from this additional aid for mechanical breakdown of the food. Moreover, previous studies reported that gastroliths may also constitute an important source of calcium and magnesium (Kopischke 1966). During their first months of life Great Bustard chicks have higher demands for these elements because of their rapid growth, thus gastroliths might be an important source of calcium.

Sexual differences

Some species with marked sexual size-dimorphism exploit different food resources because of divergent nutritional and energetic requirements, or to reduce resource competition between sexes (Ruckstuhl & Neuhaus 2006). Sexual size-dimorphism develops at a very young age in Great Bustards (Alonso *et al.* 2009). Consequently, owing to the higher energy requirements of males (about 16% higher than in females according to Quaisser *et al.* [1998]), diet composition and absolute amount of food intake might differ between the sexes. Our results confirmed that the animal proportion in the diet, mean prey size and stomach contents were greater in males. These preliminary results suggest that these differences could be increasing as sexual size-dimorphism increases towards adulthood. Studies of sex differences in the diet of adult Great Bustards are necessary to investigate this hypothesis.

Conservation implications

Agricultural intensification has generally caused a decline in the abundance of weeds and arthropods (Krebs *et al.* 1999, Stoate *et al.* 2001). This has exerted a negative influence on many bird populations (Benton *et al.* 2002, Boatman *et al.* 2004). In the case of Great Bustards, the use of pesticides has been suggested to affect the survival of Great Bustard chicks through a decrease in the abundance of invertebrates (Hellmich 1992). The rapid growth of male chicks in this species (Alonso *et al.* 2009) and their dependence on a diet rich in invertebrates make them particularly susceptible to starvation during periods of low food availability. The male-biased mortality detected at an early age in this species is probably the result of a marked sex difference in nutritional demands (Martín *et al.* 2007). This factor might critically affect population viability in certain cases (Lane *et al.* 2001, Streich *et al.* 1996). Other vertebrates inhabiting agro-ecosystems have been also shown to suffer the effect of intensification through their decreased breeding success. Among these are the Little Bustard (Jiguet 2002, Traba *et al.* 2008), Lesser Kestrel *Falco naumanni* (Bonal & Aparicio

2008, Rodríguez & Bustamante 2008); European Hare *Lepus europaeus* (Reichlin *et al.* 2006) and Grey Partridge *Perdix perdix* (Panek 1997).

A message from the present study for conservation management is that a reasonable abundance of weeds and arthropods needs to be guaranteed. This can be achieved by the conservation of traditional farmland habitats and perhaps through implementing agri-environmental schemes (Perkins *et al.* 2011, Chamberlain *et al.* 2011) or organic farming (Bengtsson *et al.* 2005, Ponce *et al.* 2011). Further studies are needed to evaluate adequately the costs and benefits of these and alternative conservation measures proposed for endangered farmland birds living in Mediterranean dry land farmland areas.

ACKNOWLEDGEMENTS

We thank M. Magaña, C.A. Martín, B. Martín and R. Barrientos for their help during field sampling. We are grateful to L.M. Bautista for reading and commenting on a previous draft of the manuscript. V. Bretagnolle and one anonymous reviewer for helpful comments and suggestions to improve the paper. E. Crespo and P. Cervera (CERI Castilla-La Mancha), A. López (Dirección General de Áreas Protegidas y Biodiversidad, Castilla-La Mancha), J.A. Arranz (Dirección General Medio Natural, Castilla y León), M.J. Martos and I. Zorrilla (Centro de Análisis y Diagnóstico de la Fauna Silvestre, Andalucía), M.M. Elósegui, M. Lamuela (Sección de Hábitats, Gobierno de Navarra) and A. Onrubia for sending some of the bustard carcasses. Financial support was provided by projects CGL2005-04893 and CGL2008-02567 of the Dirección General de Investigación, Spanish Ministry for Science and Innovation.

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(MS received 21 September 2011; revised MS accepted 30 January 2012)

APPENDIX 1. COMPOSITION OF THE STOMACH CONTENTS OF 49 YOUNG GREAT BUSTARD *OTIS TARDA* IN SUMMER, AUTUMN AND WINTER

	Summer		Autumn		Winter	
	FA%	DM%	FA%	DM%	FA%	DM%
Arthropods	**100.000**	**49.930**	**95.000**	**39.200**	**30.000**	**8.740**
Coleoptera						
Carabidae	31.600	1.100	30.000	0.900		
Chrysomelidae	0.000	0.000	5.000	0.000	10.000	0.010
Curculionidae	15.800	3.300	15.000	2.600	10.000	2.580
Scarabaeidae	21.100	0.300	40.000	0.300		
Tenebrionidae	73.700	3.200	50.000	2.500	20.000	0.470
Orthoptera	73.700	5.600	30.000	4.400		
Dyctioptera						
Mantidae	68.400	5.200	30.000	4.100		
Hymenoptera						
Formicidae	68.400	2.900	75.000	2.200		
Hemiptera	36.800	1.700	15.000	1.300		
Araneae	26.300	0.500	0.000	0.400		
Lepidoptera larvae	15.800	24.700	10.000	19.400	10.000	5.670
Diptera	5.300	0.030	0.000	0.000		
Unidentified insects	31.600	1.300	5.000	1.100		
Green plant material	**78.900**	**27.880**	**80.000**	**30.360**	**100.000**	**56.010**
Amaranthaceae						
Amaranthus sp.	10.500	0.950				
Boraginaceae						
Heliotropium europaeum	15.800	0.740	5.000	1.760		
Chenopodiaceae						
Chenopodium sp.	10.500	0.600				
Compositae						
Achillea ageratum	15.800	2.790	5.000	0.970		
Anacyclus clavatus					50.000	8.330
Andryala integrifolia	15.800	1.180				
Carduus tenuiflorus	5.300	0.050				
Chondrilla juncea	36.800	4.690	15.000	1.570		
Cichorium intybus	10.500	0.810	5.000	0.520		
Conyza canadensis	21.100	1.880	30.000	2.560		
Lactuca serriola	21.100	3.720	25.000	5.460	10.000	1.370
Leontodon taraxacoides					10.000	0.300
Mantisalca salmanctica	10.500	0.530				
Taraxacum officinale			10.000	1.830		
Convolulaceae						
Convolvulus arvensis	21.100	1.580	5.000	0.020	10.000	0.230
Cruciferae						
Alyssum minus			5.000	0.070	10.000	7.290
Biscutella auriculata					10.000	4.330
Camelina sp.	5.300	0.050	5.000	0.190		
Capsella bursa-pastoris					10.000	0.230
Descurainia sophia					10.000	0.460
Raphanus raphanistrum			5.000	0.330	50.000	7.060
Sisymbrium sp.			5.000	0.210		
Geraniaceae						
Geranium sp.					10.000	0.320
Gramineae			5.000	1.780	20.000	0.340
Labiatae						
Lamium amplexicaule			5.000	0.260	10.000	5.460
Leguminosae						
Astragalus sp.	5.300	0.160				
Medicago sativa	10.500	1.070	15.000	0.550	40.000	5.810

(*Continued*)

Appendix 1. Continued

	Summer		Autumn		Winter	
	FA%	DM%	FA%	DM%	FA%	DM%
Medicago sp.	5.300	0.140	10.000	0.210	20.000	4.640
Ononis spinosa	36.800	2.810	20.000	1.660		
Trifolium sp.	5.300	0.050	10.000	0.380		
Vicia sp.	10.500	0.230	10.000	0.210	50.000	4.960
Malvaceae						
Malva silvestrys	15.800	0.930				
Onograceae						
Epilobium sp.			10.000	3.080		
Papaveraceae						
Papaver rhoeas					40.000	4.100
Plantaginaceae						
Plantago sp.			5.000	0.190		
Polygonaceae						
Polygonum aviculare	5.300	0.770				
Rumex pulcher	5.300	0.020			10.000	0.270
Rubiaceae						
Galium tricornutum					10.000	0.220
Scrophulariaceae						
Kickxia spuria	5.300	0.160				
Solanaceae						
Solanum nigrum	15.800	0.880	5.000	0.090		
Undeterminated	5.300	1.070	20.000	6.450	40.000	4.950
Seeds	**68.400**	**12.740**	**90.000**	**21.620**	**100.000**	**32.350**
Gramineae						
Hordeum vulgare/Triticum aestivum	57.890	10.350	1.440	2.520	90.000	3.600
Leguminosae						
Vicia sp.						
Cicer aritinum			1.020	1.780		
Oleacea						
Olea europaea	10.530	1.680	8.480	14.790	20.000	28.8
Solanacea						
Solanum nigrum	5.263	0.004	1.220	2.130		
Vitacea						
Vitis vinifera			0.210	0.370		
Other seeds	10.526	0.705	0.030	0.040		

FA%, percentage of stomachs in which each taxon was found; DM%, percentage of each taxon's contribution to the total dry weight of the stomach contents.