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Diet of Nestling Spectacled Tyrants (*Hymenops perspicillatus*) in the Southeast Pampas Region, Argentina

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ABSTRACT.—We studied the diet of nestling Spectacled Tyrants (*Hymenops perspicillatus*) in the southeast Pampas region, Argentina. From November 2012 to January 2013, we used video footage to determine prey items that the parents fed to their chicks. We obtained 54 hrs of recording time to survey 18 nests. We identified a total of 125 prey items, representing 33 different taxa, grouped into four classes: Insecta, Arachnida, Chilopoda, and Amphibia. Insects accounted for 94% of total prey. The most frequent prey items were orthopterans (Caelifera), unidentified lepidopteran larvae, and odonats (Zygoptera). Lepidopterans were numerically the most important prey item in November, odonats in December, and orthopterans in January. Diet of the nestling birds was generalist in terms of the consumption of insects, and the changes in prey consumption during the course of the breeding season support an opportunistic feeding behavior by Spectacled Tyrants. Received 3 January 2014. Accepted 19 April 2014.

Key words: digital camera, flycatcher, insectivore, Tyrannidae.

The Spectacled Tyrant (*Hymenops perspicillatus*) is a member of the family Tyrannidae that inhabits open lands, grassy areas near water bodies, marshes, and fields and pastures (Fitzpatrick 2004). The Spectacled Tyrant has two subspecies, *H. p. perspicillatus* and *H. p. andinus*; the subspecies *perspicillatus* is distributed from southern Argentina to Paraguay, central Bolivia, Uruguay and southern Brazil (Fitzpatrick 2004). It is considered a partial migrant because part of the population in the south of Argentina moves northward during the post-reproductive period (Canevari et al. 1991).

Diet analysis is one of the first steps in studying a species' basic ecology (Sih and Christensen

2001). An understanding of food habits, not only provides an ability to predict diet shifts in response to changes in prey availability, but also generates practical information for easy management and conservation of a particular species (Sih and Christensen 2001, Sutherland 2004). Although this species is common along its wide distribution, and specifically in the Pampas region (Narosky and Di Giacomo 1993), limited information is available about its diet. This rare information comes mainly from stomach contents, where coleopterans were the main prey, followed by orthopterans (see Marelli 1919, Aravena 1928, Zotta 1936), which are captured by means of short flights from the ground or during sallies from posts, bushes, or reeds (Fitzpatrick 2004). Furthermore, information on food habits is available only for adult individuals of *H. perspicillatus*; there has been no information about the food items that nestlings consume. The breeding period is a critical part of the life cycle of birds. The ability to get enough quality food allows parents to maximize their fertility (Martin 1987) and raise their young under better conditions (Ricklefs et al. 1998).

In the southern area of the Pampas region, Spectacled Tyrant is a representative bird species of tall grasslands, specifically during the breeding period (i.e., austral spring–summer; Pretelli and Isacch 2013). As part of a broader study aimed to understand the attendance behavior of parents at the nest, this study describes the food items provided by Spectacled Tyrant parents to their nestlings and the temporal variability of this behavior throughout the breeding season in native tall grasslands in the southeast Pampas region, Argentina.

METHODS

The study was conducted in south eastern Buenos Aires Province, Argentina, in the vicinity of and within Mar Chiquita Biosphere Reserve (37° 40' S, 57° 23' W). Despite large replacement of native grasslands by croplands and pasturelands

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FIG. 1. Nestling Spectacled Tyrant being fed a beetle (Coleoptera: Scarabaeidae).

in the region (Soriano et al. 1991, Viglizzo et al. 2001), remnants of native tall grasslands still remain where soil conditions (i.e., saline, sandy, or flood) constrain agricultural development (León et al. 1984, Viglizzo et al. 2001). It is there where large grassland expanses of *Cortaderia selloana* were developed.

Spectacled Tyrants nest consistently in grasslands of *C. selloana* of the Pampas region from mid-October to late January (austral spring–summer). They build open-cup nests inside the tussocks, and lay 2–3 eggs per clutch. Nestlings hatch after 16 days of incubation and fledge 14 days after hatching. The probability of nest success from egg-laying to fledging is 24% (Pretelli and Isacch 2013).

We searched for nests in three grassland patches of *C. selloana* from September to late January during the 2012–2013 breeding season. One patch was located within the reserve, and the other two were growing in field margins along secondary unpaved roads <5 km from the reserve. All patches were away from wooded areas and water bodies. We searched systematically for nests in potential nest sites and observed the behavior of parents to aid in location (Martin and Geupel 1993). We recorded nest locations with GPS and marked the nest area with plastic tape to facilitate subsequent monitoring. When the chicks were 8–11 days old, we placed a small digital camera (Mini-DV200) ~30 cm from the nest. We chose to record chicks in this age range, because it is then easiest for us to detect delivery of prey items in the recordings. We installed cameras between 0800–0900 hrs Argentina Time (ART), and recorded all the activity in the nest for ~3 hrs

during good weather conditions. Each nest was filmed only once. We analyzed the video samples later in the laboratory. For each observation, we identified the number and type of prey items brought to the nestlings (Fig. 1). We identified prey to the finest taxonomic level possible using reference collections from the Natural Sciences Museum “Lorenzo Scaglia,” Mar del Plata. Results were expressed in two standard units: 1) by number, which was the total number of items of each taxon in all nests, and 2) frequency of occurrence, which was the percentage of nests where the taxon was recorded. For Lepidoptera and Coleoptera orders, we plotted larvae and adult individuals together. To evaluate the temporal variation of food items offered to nestlings, the results were grouped into periods of 15 days and expressed as relative percentage of consumed prey. Because insects were the most abundant prey (see results), we only considered the Insecta class to describe the temporal variation in the diet of nestlings.

RESULTS

During the sampling period, 18 nests were filmed: seven in November, eight in December, and three in January. We obtained 54 hrs of observation, from which 125 items of prey were identified, representing 33 different taxa grouped into four classes (Table 1). Diet of nestling Spectacled Tyrants was composed basically of insects, which accounted for 94% (118/125) of the total number of consumed prey. The orders Odonata (33/125), Lepidoptera (29/125), Orthoptera (25/125), and Coleoptera (18/125) were the most consumed prey. Of the total of lepidopterans

TABLE 1. List of prey consumed by nestlings of Spectacled Tyrants (*Hymenops perspicillatus*) during the 2012–2013 breeding season in the southeast Pampas region, Argentina.

Prey item	Number of individuals	Frequency of occurrence (%) ^a
INSECTA		
Diptera		
Brachycera		
Asilidae	2	11.1
Calliphoridae	1	5.5
Unidentified diptera	2	5.5
Coleoptera		
Chrysomelidae	7	16.6
Coccinellidae	1	5.5
Curculionidae		
<i>Naupactus</i> sp.	1	5.5
Tenebrionidae		
Larvae	2	11.1
Scarabaeidae		
<i>Cyclocephala</i> sp.	1	5.5
Unidentified coleoptera larvae	6	22.2
Hemiptera		
Heteroptera		
Belostomatidae	1	5.5
Unidentified hemiptera	1	5.5
Hymenoptera		
Apocrita		
Formicidae		
<i>Acromyrmex</i> spp.	2	5.5
Unidentified himenoptera	4	22.2
Lepidoptera		
Arctiidae		
<i>Palustra</i> sp.	1	5.5
Hesperiidae	2	11.1
Ninfalidae	1	5.5
<i>Vanessa braziliensis</i>	1	5.5
Noctuidae	3	16.6
<i>Rachiplusia</i> sp.	1	5.5
Larva	1	5.5
Papilionidae		
<i>Heraclides thoas</i>	1	5.5
Unidentified lepidoptera larvae	18	33.3
Odonata		
Anisoptera		
Aeshnidae	8	16.6
Zygoptera	19	27.8
Orthoptera		
Caelifera		
Proscopiidae	2	5.5
Ensifera	4	22.2
Unidentified orthoptera	2	11.1
ARACHNIDA		
Araneae		

TABLE 1. Continued.

Prey item	Number of individuals	Frequency of occurrence (%) ^a
Araneidae	4	16.6
Lycosidae	1	5.5
CHILOPODA	1	5.5
AMPHIBIA		
Anura		
Hylidae		
<i>Hypsiboas pulchellus</i>	1	5.5
Total number of prey items	125	
Richness of prey items	33	

^a Frequency of occurrence corresponds to the percentage of nests where the taxon was recorded.

and coleopterans, 65% and 45% were larvae, respectively. Fewer represented items offered to nestlings were Hymenoptera (6/125), Arachnida (5/125), Diptera (5/125), and Hemiptera (2/125). Chilopoda was consumed only one time. In addition, we recorded a striking event where a chick was fed a small frog (Table 1). Orthopterans (Caelifera), lepidopterans (larvae), and odonats (Zygoptera) were the prey with the highest frequency of occurrence among nests (Table 1).

Frequency of prey types offered to nestlings by adult Spectacled Tyrants changed along the breeding time frame. In November, lepidopterans (mainly larvae: 60%) were the most abundant prey, especially during the second half of the month. In December, odonats dominated; whereas, at the end of the breeding season orthopterans were the most abundant prey. Despite being relatively less abundant, coleopterans occurred in a similar frequency in the diet of nestlings throughout the breeding period (Fig. 2).

DISCUSSION

Our results support that the diet of nestling Spectacled Tyrants in the southeast Pampas region is based mainly on insects. These results are in agreement with previous diet descriptions for adults (Marelli 1919, Aravena 1928, Zotta 1936). We recorded variation in the proportion of major prey items during the breeding season. This variation could be related to environmental conditions, the relative availability of different prey types, and the ability of Spectacled Tyrants to take advantage of these resources.

The presence of lepidopterans, mostly larvae, coincides with the life cycle of this order. The larvae in these latitudes appear in October and

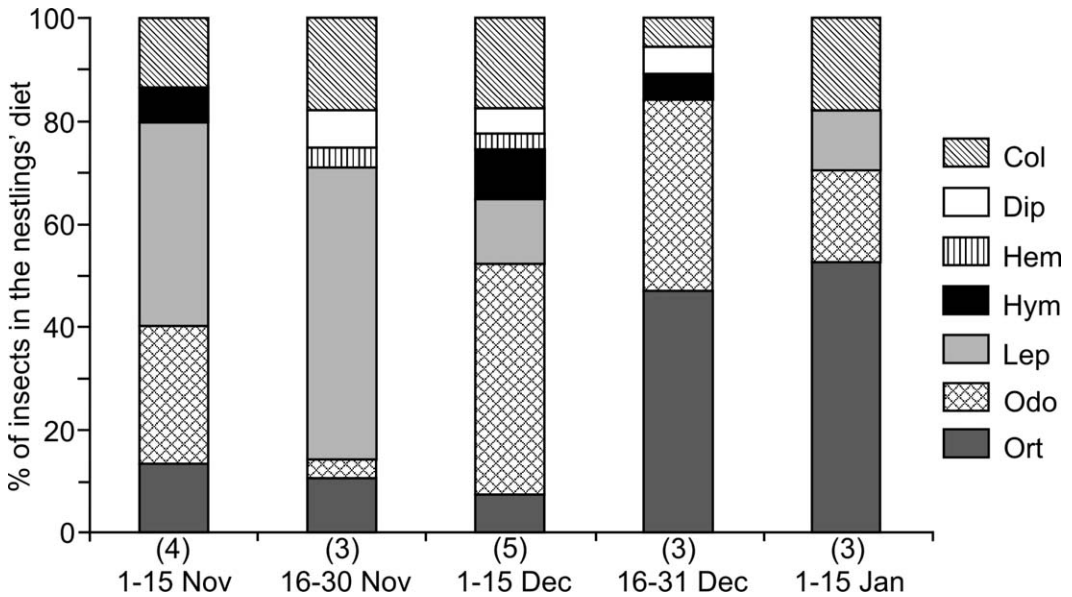


FIG. 2. Seasonal variation of insects in the diet of nestling Spectacled Tyrants (*Hymenops perspicillatus*) through the 2012–2013 breeding season in the southeast Pampas region, Argentina. To the right of the graph are given consumed insect orders; Col: Coleoptera, Dip: Diptera, Hem: Hemiptera, Hym: Hymenoptera, Lep: Lepidoptera, Odo: Odonata, and Ort: Orthoptera. Values in parentheses below the columns refer to the number of sampled nests.

November (austral spring) and their presence is exploited as prey items by birds (Darrieu et al. 2001, Biondi et al. 2005). Grasslands of *Cortaderia selloana* are an important habitat for numerous insects, for example coleopterans, and particularly tussocks are an important source of larvae and adults of lepidopterans (Farina and Cicchino 2011). Therefore, *C. selloana* not only offers a suitable place to nest, but its insect availability makes it also a suitable habitat for reproduction of insectivorous birds.

Environmental conditions of the study region, such as the high representation of wetlands, create suitable conditions for the development of odonats (Muzón and Ellenrieder 1998), which emerge in spring and group into large migratory swarms (Jaramillo 1993). During the sampling period, the relative abundance of odonats was noted during surveys (MGP, pers. obs.), coinciding with their high representation in the diet of chicks. Abundance peaks during November and December, and the use of odonats as a trophic resource in the region has also been recorded for the Swainson's Hawk (*Buteo swainsoni*) (Jaramillo 1993) and the Chimango Caracara (*Milvago chimango*) (Biondi et al. 2005). Odonats are an important source of lipids (Capinera 2010), which makes them a prey

item of vital importance for the development of young. On the other hand, the strong occurrence of orthopterans in the diet towards the end of the reproductive stage could be related to their higher availability then in the study area, especially in January (Cavalli et al. 2013). This pattern of seasonal occurrence of orthopterans in birds' diet well represented at the end of the reproductive cycle has been observed for other species in Buenos Aires Province, such as Yellow-winged Blackbirds (*Agelasticus thilius*) (Darrieu et al. 2001) in the northeast and Caracara Chimangos (Biondi et al. 2005) and Burrowing Owls (*Athene cunicularia*) (Cavalli et al. 2013) in the southeast of this province. Despite the constant availability of coleopterans in the region from September to January (Cavalli et al. 2013), it was a minor source of prey. Spectacled Tyrants seem to take advantage of high availability of certain prey such as lepidopterans, odonats, and orthopterans, which would make it a generalist species in the consumption of insects and, on the other hand, shows an opportunistic feeding behavior, since nestlings were fed in relation to prey availability and not the state of the chicks' development.

Spectacled Tyrants use a combination of two hunting tactics that basically involve the pursuit

and capture of prey in aerial displays, a characteristic behavior of “flycatchers” (Fitzpatrick 2004), and on the ground capture occurs during short runs (Canevari et al. 1991). These tactics were reflected in the broad spectrum of identified prey, as the aerial displays facilitate capture in flight, such as catching adult odonats and lepidopterans, whereas coleopterans and orthopterans can be captured on the ground. However, it is noteworthy that the high representation of larvae, which usually occur within vegetation, indicates possibly an extra hunting tactic of this tyrant. Despite being an insectivorous species, the surprise capture of a little frog shows the foraging plasticity that Spectacled Tyrants can deploy. Other tyrant flycatchers such as Great Kiskadees (*Pitangus sulphuratus*) also prey on amphibians; however, these birds are larger (~62 g) than Spectacled Tyrants (~20 g) (Navas and Bó 2001) and have a broader trophic spectrum (Beltzer 1983, Munin et al. 2012).

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