

Incidental description of crop contents of the Mexican Parrotlet (*Forpus cyanopygius*)

Descripción incidental del contenido del buche en el periquito catarino (*Forpus cyanopygius*)

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Abstract

Little is known on the ecology of the Mexican Parrotlet (*Forpus cyanopygius*), an endemic species of western Mexico. Here, we present the first diet report for this species based on crop contents of three individuals that died following impact with a metallic structure. The individuals presented a crop full of 3,015 to 5,400 seeds from *Ficus insipida*. Figs are an important resource for many vertebrate species and is a food resource reported in the diet of many psittacines. Our report highlights the importance of gathering incidental information to fill knowledge-gaps for poorly known species and enable better conservation planning.

Keywords: Bird collision, diet, *Ficus insipida*, Psittacidae, urban ecology.

Resumen

Poco se sabe sobre la ecología del periquito catarino (*Forpus cyanopygius*), una especie endémica del occidente de México. Aquí, presentamos el primer informe de dieta para esta especie basado en el contenido de buche de tres individuos que murieron tras el impacto con una estructura metálica. Los individuos presentaron un buche lleno de 3,015 a 5,400 semillas de *Ficus insipida*. Los higos son un recurso importante para muchas especies de vertebrados y es un recurso alimenticio reportado en la dieta de varias especies de psitácidos. Nuestro informe destaca la importancia de recopilar información incidental para llenar los vacíos de conocimiento de especies poco conocidas para una mejor planificación de su conservación.

Palabras clave: Colisión de aves, dieta, ecología urbana, *Ficus insipida*, Psittacidae.

Introduction

The Mexican Parrotlet (*Forpus cyanopygius*) is an endemic species of western Mexico, distributed on the Pacific slope from southern Sonora to Colima (Navarro and Peterson 2007). This species inhabits tropical deciduous and semi-deciduous forest, forest edge,

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plantations, tropical semi-deciduous forest, and riparian vegetation, following seasonally available resources (Howell and Webb 1995, Collar et al. 2019).

Overall, little is known on the feeding ecology of the Mexican Parrotlet. However, other species of the genus *Forpus* have a diet based mainly on soft fruits and small seeds (Pacheco et al. 2004, Roncal-Rabanal et al. 2020). For the Mexican Parrotlet, anecdotal reports suggest that the species has a general diet of fruits of the genus *Ficus* (Forshaw 1989, Juniper and Parr 1998). However, almost no concrete reports exist of dietary observations for the species.

Given the threats to the species from capture for trade and habitat loss (Cantú et al. 2007, Marín-Togo et al. 2012), the Mexican Parrotlet is considered Threatened under Mexican law (SEMARNAT 2010), and is cataloged as Near Threatened by the International Union for Conservation of Nature (Birdlife International 2016). As for most parrot species, there is a dearth of knowledge on basic natural history of the Mexican Parrotlet. Here we present the first diet report for the Mexican Parrotlet in the wild determined from crop samples collected from three adult individuals.

Description of observations

Our observations were made at the campus of the Centro Universitario de la Costa (20°42'15.66"N, -105°13'22.90"W), of the Universidad de Guadalajara in the city of Puerto Vallarta, Mexico. The university campus contains university buildings, green areas of soccer fields, and some remnants of tropical dry forest. This vegetation has a characteristic seasonality in which most tree species shed their leaves during a prolonged dry season, and is considered to have higher plant species richness than other dry forests in America, dominated by Leguminosae, Euphorbiaceae, Rubiaceae, and Bignoniaceae (Lott et al. 1987).

On 18 December 2018, we observed a flock of approximately 60 Mexican Parrotlets flying across forest remnants that surround the university campus. At ~17:00 h CT, various individuals of the flock crashed against a chain-wire fence that surrounds the soccer fields, causing injuries to 20 individuals, of which three died. These individuals were taken to the Zoology Laboratory at Centro Universitario de la Costa for inspection.

We aged and sexed individuals based on external characteristics, such as the presence of turquoise blue patches on the wings and under tail coverts, morphometric measurements (*sensu* Forshaw 1989), and inspection of gonads (Turcu et al. 2020). The three individuals were similar in size and body weight (Table 1), with an average body length of 12.7 ± 0.33 cm, close to the largest size recorded for the species (13 cm; Forshaw 1989), and average body weight of 32.1 ± 2.80 g. However, based on inspection of the gonads we concluded that two individuals were males given the larger, oval-shaped gonad, and one female that showed a distinctive gonad shape, as reported in other Psittacines (Turcu et al. 2020).

All individuals presented a full crop at the time of the impact (~17:00 h CT). To determine crop contents, we dissected the three individuals that died, and the collected crop contents were placed in Petri dishes to remove as much moisture as possible and for inspection. Crop contents consisted of plant material, seeds, and, in the case of one individual, partially digested pulp (Fig. 1). Seeds were inspected under the microscope, and were compared with fruits of tree species fruiting in the area. We thereby determined that crop contents were comprised solely of seeds and pulp of *Ficus insipida* (Moraceae). We weighed the samples to assess total crop content to the nearest 0.01 g (Adam Equipment HCB 302 Scale, United Kingdom). Lastly, we added water to the petri dishes to separate and count the seeds under the microscope. Crop content ranged from

Table 1. Measurements and crop contents of three Mexican Parrotlets in Puerto Vallarta, Mexico, on 18 December 2018.

Individual	Body length (cm)	Wing chord (cm)	Body mass (g)	Crop content biomass (g)	Seed count
Male 1	12.3	9	32.8	2.12	5,030
Male 2	13	9	35.2	2.01	5,400*
Female	13	9	32.2	1.25	3,015

*a rough estimate given the condition of some partially digested seeds from this individual

3,015 to 5,400 seeds, with a weight ranging from 1.25 g (female) to 2.12 g (Table 1). Upon inspection, the seeds from two individuals seemed complete, however, in the third individual almost half of the crop content had damaged seeds.

Discussion

We determined that crop contents for three individuals of the Mexican Parrotlet were comprised of a single species of *Ficus insipida*, indicating that the birds had been foraging in that tree species. *Ficus* tree species are an important resource for many vertebrates, including birds, as they produce fruits throughout the year (Lambert and Marshall 1991, Ragusa-Netto 2002, Kattan and Valenzuela 2013). Fruit production by *Ficus* trees is of particular importance during the dry season, a period of resource scarcity (Shanahan et al. 2001, Bianchini et al. 2015), which coincides with the breeding season of most parrot species in western Mexico (Renton 2001).

In particular, *Ficus insipida* is a tree species that is widely distributed from Mexico through the Andean region to the lowland rainforest of western

Amazonia (Honorio-Coronado et al. 2014). Figs and in particular fruit pulp and seeds of *F. insipida* have been reported in the diet of many species of parrots. Other example are the seeds of the fig *Ficus calyptroceras* were parrots are the most important consumers. (Ragusa-Netto 2002). *F. insipida* has been reported in the diet of many psittacine species, from the largest to the smallest species. Specifically, on the Mexican Pacific coast most parrot species consume *Ficus* fruits and seeds, such as the Military Macaw (*Ara militaris*; de la Parra-Martínez 2016), the Lilac-crowned Parrot (*Amazona finschi*; Renton 2001), and the Orange-fronted Parakeet (*Eupsittula canicularis*; Palomera-García 2010).

Resource requirements of parrots and their role in seed dispersal or predation is poorly known (Renton et al. 2015). Some studies have shown that parrots are seed predators (Janzen 1981, Villaseñor-Sánchez et al. 2010), particularly larger species (Matuzak et al. 2008), but some species may also act as an endozoochorous dispersers (Young et al. 2012, Blanco et al. 2016). In both cases, parrots have an important role in forest dynamics, maintaining tree species diversity by preventing dominance of particular tree species, and influencing recruitment patterns of trees (Villaseñor-Sánchez et al. 2010, Renton et al. 2015).

Small parrot species tend to be more frugivorous (Matuzak et al. 2008, Renton et al. 2015), and may play an important role in seed dispersal. However, further studies are required to determine the viability of seeds consumed by the Mexican Parrotlet to assess their role as a seed disperser or seed predator. Additionally, specific efforts to assess dietary shifts and the caloric value of different resources are critical for a better understanding of food webs, and proper conservation efforts of this endemic species and other Psittacines in this region.

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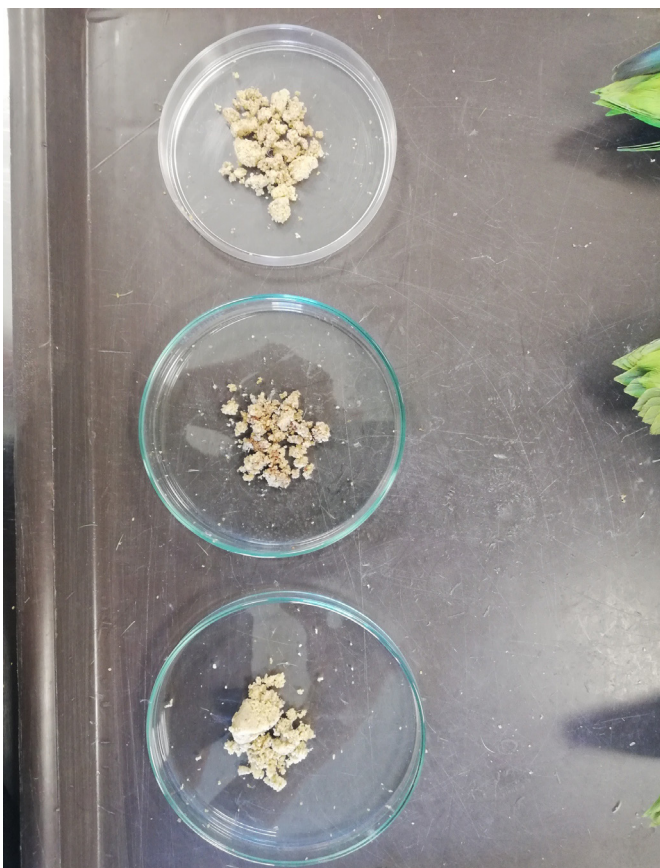


Figure 1. *Ficus insipida* seeds found in the crop of three individuals of the Mexican Parrotlet in Puerto Vallarta, Mexico, on 18 December 2018. Photograph: S.M. de la Parra-Martínez.

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