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SHORT-COMMUNICATION

Crested Quetzal (*Pharomachrus antisianus*) preying on a Glassfrog (Anura, Centrolenidae) in Sierra de Perijá, northwestern Venezuela

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ABSTRACT: We report the predation of a glassfrog (*Hyalinobatrachium pallidum*) by a Crested Quetzal (*Pharomachrus antisianus*). The record was made in a locality in the Sierra de Perijá, near to the northern part of the border between Colombia and Venezuela, and consisted in observinga male *P. antisianus* vocalizing with a glassfrog in its bill. The vocalizations were answered by a female, which approached the male, took the frog with its bill and carried it into a cavity built on a landslide. Subsequent to this, the male remained near to the cavity until the female left it and together they abandoned this place. Based on the behavior observed in the couple of quetzals, and what has previously been described that this group of birds gives their young a diet rich in animal protein comprised of arthropods and small vertebrates, we believe that the couple was raising a brood at the time when the observation was carried out.

KEY-WORDS: Anurophagy, diet, *Hyalinobatrachium*, Trogonidae, Trogoniformes.

The consumption of animal protein is a behavior exhibited by most of the species of the family Trogonidae. Within this family there is a wide range of alimentary habits, ranging from species that are almost exclusively frugivorous to others whose diet consists equally of fruits and insects, and species that are exclusively insectivorous or carnivorous (Smith 2004). Members of the genus *Pharomachrus*, commonly recognized as Quetzals, are the most frugivorous species in the family, described as birds that only eat fruits and sometimes include animal protein as part of their feeding, which is represented by arthropods and/or small vertebrates (Johnsgard 2000, Collar 2001).

Studies focused on describing the diet of Quetzals are scarce. One of the most comprehensive is based on the review of the stomach contents of the following four species: Crested Quetzal (*Pharomachrus antisianus*), Golden-headed Quetzal (*P. auriceps*), Resplendent Quetzal (*P. mocinno*), and Pavonine Quetzal (*P.pavoninus*). This study concludes that these birds are primarily frugivorous and only *P. auriceps* and *P. pavoninus* included arthropods in their diets (Remsem *et al.* 1993). Others that focused on *P. mocinno* indicated that the adults of this species are almost exclusively frugivorous and the animal portion of their diet is given to nestlings (Wheelwright 1983), a behavior also reported for *P. pavoninus* (Lebbin 2007) and *P. auriceps* (Lohnes & Greeney 2008).

The Quetzals (*Pharomachrus* spp.) are characterized by having a glistening plumage with the upperparts, head, neck and chest green or golden green and lower breast, belly and undertail coverts red (Johnsgard 2000). This genus is composed by five species (*P. antisianus*, *P. auriceps*, *P. fulgidus*, *P. mocinno* and *P. pavoninus*), distributed from southern Mexico to Bolivia, where they primarily inhabit cloud and rain forests (Stotz *et al.* 1996, Collar 2001).

Despite the wide distribution in the Neotropical region and the fact that these are very attractive birds, the natural history of Quetzals is poorly known, with *Pharomachrus mocinno* being the better-know species of the group. The remaining species have had less attention and most of their biological aspects are unknown throughout their ranges. This situation also holds in Venezuela, where *Pharomachrus* species are distributed in the Cordillera de Mérida and Sierra de Perijá (*P. antisianus* and *P. auriceps*), the Cordillera de la Costa (*P. fulgidus*) and south of the Orinoco River (*P. pavoninus*) (Hilty 2003).

Knowing the natural history of a species is important for their conservation, with diet being one of the main factors, especially when one wants to establish conservation

plans (Young 1997). *Pharomachrus antisianus* is one of the lesser-known species of Quetzal and it is only known that they feed on fruits, berries, insects, lizard and frogs (de Schauensee & Phelps 1978), without specific details on the composition of these items. Therefore, our objective is to contribute with knowledge of their alimentary habits describing the predation of a Glassfrog by this species.

The predation event was registered on 18 February 2014 at 15:30 h, in a mature cloud forest located in the upper basin of the Lajas River (Serranía de Lajas), in the Venezuelan side of the Sierra de Perijá (10°20'N / 72°34'W, 1700 m elevation). This event consisted of the observation of an adult male of *Pharomachrus antisianus* perched in a tree at level of the understory with a Glassfrog in its bill (Figure 1). The bird was easily located in the vegetation by its noisy and persistent vocalization, which was maintained until a female came to perch in the tree. During the encounter of the couple, the male gave a Glassfrog to the female and it flew with the prey to a cavity built on top of a landslide, followed by the male who landed near the edge of the cavity until the female came out of it. Due to brevity of the event and the rapid movement of birds within the forest, only a photograph of the male when he was perched could be taken. Later observations were conducted over three consecutive days, where the male was observed vocalizing with the female and giving others foods, but unfortunately, it was not possible to identify if these were fruits or animal items.

FIGURE 1. Crested Quetzal (*Pharomachrus antisianus*) perched in a tree at level of the understory whit a Glassfrog (*Hyalinobatrachium pallidum*) in its bill, before to delivering prey to the female (photograph by M. Quiroga-Carmona, taken at February 18 of 2014).

The inclusion of animal items in the diet of frugivorous birds has been described previously in several groups such as barbets, motmots, quetzals, toucans and trogons (Remsem *et al.* 1993). This behavior is attributed to the higher demand for proteins that is required during the reproductive season, since these are necessary for the formation of egg shells and development of the embryos, and a diet composed only on fruits is not nutritionally sufficient during this period (Martin 1987, Winkler 2001). In addition, in altricial nestling birds, protein diets allow rapid growth and for that reason nestlings also are fed with a diet that includes animal items (Morton 1973). This information, together with the fact that the couple of *Pharomachrus antisianus* exhibited a similar behavior to that described several species of Quetzals (*Pharomachrus auriceps*, *P. mocinno* and *P. pavoninus*) during its breeding period, that these species include animal items in the diet of their nestlings (Wheelwright 1983, Lebbin 2007,

Lohnes & Greeney 2008), and that the observation was performed during the reproductive season of *P. antisianus* (Hilty 2003), make us think that this couple had been raising a brood.

The predation of frogs by quetzals has been previously described for *Pharomachrus antisianus* (de Schauensee & Phelps 1978), *P. mocinno* (Stiles & Skutch 1989) and *P. pavoninus* (Lebbin 2007). For the latter species, it has been described that the predated frogs are of the genera *Hyla* and *Phyllomedusa*. We identified the predated frog initially for its morphological characteristics and also based on species of the family Centrolenidae (*Hyalinobatrachium pallidum* and *Centrolene daidaleum*) whose distribution include the sector of the Sierra de Perijá where we performed the observation (Locality 4 described in Fig. 1 of Rojas-Runjaic *et al.* [2012]). In addition, the coloration and the pattern of distribution of the melanophores in the legs suggest that this frog is an individual of *Hyalinobatrachium pallidum* (Castroviejo & Rojas-Runjaic *pers. comm.*).

The scarce information available about the natural history of the Quetzals is a regrettable fact, because it makes difficult to understand their biological relationships, and at the same time, its importance within the ecosystems they inhabit. Additional studies aimed at determining the significance of animal items in their diets and how the quality of habitat may influence in nestling breeding are needed.

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