

Preliminary assessment of the diet of Grey-bellied Comet *Taphrolesia griseiventris* in Cajamarca, Peru

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El Cometa de Vientre Gris *Taphrolesia griseiventris* es un colibrí endémico de los Andes del norte de Perú, considerado como En Peligro en escala global y En Peligro Crítico en Perú. El presente estudio preliminar tiene como objetivo evaluar las especies de flores usadas por *T. griseiventris* como parte de su dieta en la región de Cajamarca, donde ocurre la mayor frecuencia de avistamientos. Se realizaron censos a lo largo del valle de Chonta entre 2017 y 2018, y las flores utilizadas por *T. griseiventris* fueron registradas. Los resultados sugieren que *T. griseiventris* muestra una preferencia por *Delostoma integrifolium* en esta región, y muestra alta fidelidad de sitio, indicando un comportamiento territorial. Se requiere realizar más evaluaciones en otras regiones donde la especie se encuentre para documentar su dieta completa y mejorar la comprensión de su ecología.

Grey-bellied Comet *Taphrolesia griseiventris* is a monotypic hummingbird endemic to the north-central Andes of Peru¹¹. It is one of the most threatened hummingbirds in South America³, being listed as Endangered by BirdLife International³ and Critically Endangered in Peru¹³ due to its small population, estimated at 250–999 individuals, and currently declining due to habitat loss and fragmentation. Despite its conservation status, few attempts have been made to improve our understanding of the species' ecology, including its dietary preferences.

Given that hummingbirds are highly dependent on flowers to obtain energy^{1,4,15}, lack of floral resources can negatively impact their populations. This dependence facilitates study of their diets and habitat requirements without invasive techniques, providing an interesting approach to the study of endangered species such as *T. griseiventris*. While this species has been observed feeding on different ornithophilous flowers, a complete assessment of its diet is relevant to improve future conservation plans.

This preliminary study aims to provide a first assessment of the flowers used by *T. griseiventris* in known territories at different points in the Chonta Valley, where the highest density of records exists, to contribute to our knowledge of the species.

Methods

Study site.—The study area is located in dpto. Cajamarca, northern Andes of Peru (04°30'–07°45'S 78°31'W; 400–3,590 m). Annual temperatures in Cajamarca range from 0–23°C, with a marked rainy season in December–March¹². The site is located in the Chonta Valley, which encompasses montane forests of the north-west Andes⁶, including seasonal woodland. The Chonta Valley includes steep hills dominated by Andean scrub and bromeliads,

at altitudes of 2,700–3,200 m. The landscape is influenced by agriculture and cattle grazing.

Data collection.—The study was undertaken between July 2017 and September 2018. Five visits to the area were made during the wet and dry seasons: in July 2017, February 2018, May 2018, July 2018 and September 2018. In total, 15 days of field work were conducted (120 hours). Searches along the valley focused on sites reported on eBird. Six territories were identified and surveyed. Observations at these sites lasted between 30–60 minutes, recording and photographing all flowers used by the species. Relative frequency of use of each flower species was recorded, and is expressed as the number of territories where a species was used of the total number of territories where the species was present. Within each territory, an additional inventory of ornithophilous flowers was made inside a 2,500 m² plot. Plant identification was based on the online database of the herbarium of Universidad Nacional de Cajamarca.

Results

A total of six flowering plants was recorded in the six territories surveyed. These plants belonged to four families: *Delostoma integrifolium* (Bignoniaceae), *Bomarea* sp. (Alstroemeriaceae), *Tillandsia* sp. (Bromeliaceae), *Eucalyptus globulus* (Myrtaceae), *Clematis haenkeana* (Ranunculaceae) and *Tecoma stans* (Bignoniaceae). Flower species used most frequently were *D. integrifolium* ($f = 1.00$) and *Tillandsia* sp. ($f = 0.33$). The remaining four species were used in a single territory each ($f = 0.17$).

Discussion

In the study area, *T. griseiventris* shows a high preference for *Delostoma integrifolium*, the most frequently used species irrespective of season. This is consistent with other reports of *Delostoma*

Table 1. Ornithophilous species in the habitat of Grey-bellied Comet *Taphrolesia griseiventris* in the Chonta Valley, Cajamarca, Peru. Species used by *T. griseiventris* are marked with an asterisk.

Family	Scientific name
Myrtaceae	<i>Eucalyptus globulus</i> *
Bignoniaceae	<i>Delostoma integrifolium</i> *
Bignoniaceae	<i>Tecoma stans</i> *
Bromeliaceae	<i>Tillandsia</i> sp.*
Alstroemeriaceae	<i>Bomarea</i> sp.*
Ranunculaceae	<i>Clematis haenkeana</i> *
Lamiaceae	<i>Salvia</i> sp.
Adoxaceae	<i>Sambucus</i> sp.
Passifloraceae	<i>Passiflora tripartita</i>
Orchidaceae	<i>Epidendrum</i> sp.

integrifolium in its diet^{2,5}. Although other plant species were used by *T. griseiventris*, they were not defended from other nectarivorous birds, unlike *D. integrifolium*. Overall, 60% of ornithophilous plants was used in each territory (Table 1). Flowering *Tillandsia* sp. were abundant in all territories at both seasons, but *T. griseiventris* was seen visiting them only twice (May 2018 and September 2018). These plants require further investigation because the location of flowers on steep hillsides prevented field observations. Although *Eucalyptus globulus* was numerous in the valley, not all flowering *Eucalyptus* were visited by *T. griseiventris*, suggesting opportunistic use.

In all surveyed territories, flowering *Delostoma integrifolium* was also used by Black-throated Flowerpiercer *Diglossa brunneiventris*, Giant Hummingbird *Patagona gigas* and Tyrian Metaltail *Metallura tyrianthina*. *T. griseiventris* displayed site fidelity across seasons; at each territory, 3–4 trees of *Delostoma integrifolium* were periodically used and the floral patch was actively defended against other hummingbirds, but not from *Diglossa brunneiventris*. Use of *Delostoma integrifolium* by *T. griseiventris* appears to be facilitated by previous piercing by *Diglossa brunneiventris*, given that the corolla is probably too long for *T. griseiventris*; all *T. griseiventris* that visited *Delostoma integrifolium* used pierced holes. This suggests that there is an opportunistic relationship between these two nectar feeders, *T. griseiventris* acting as a secondary nectar robber^{7–9}. This behaviour has been observed in other nectarivorous birds like Cinereous Conebill *Coinirostrum cinereum*¹⁴.

Additionally, all observed individuals of *T. griseiventris* in the field were males. This suggests a potential niche partitioning between males and females, with the latter probably using 'less ornithophilous' flowers, as reported in other

hummingbirds^{10,16}. Further research is needed to address this question.

While this study provides initial information as to the diet of *T. griseiventris*, research should encompass a wider region. For example, *Delostoma integrifolium*, the most used flower in the Chonta Valley, does not occur in Huascarán National Park, where *T. griseiventris* is present⁵. Further investigation should account for variation in the species' diet across the wet, dry and transitional seasons, and in several study sites across its range. Also, the relationship between *T. griseiventris* and co-occurring flowerpiercers needs additional study to better understand the ecological requirements of this endangered hummingbird.

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