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### NOTES ON FORAGING ECOLOGY OF THE LITTLE-KNOWN GREEN-CAPPED TANAGER (*TANGARA MEYERDESCHAUENSEEI*)

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**Notas sobre ecología de forajeo de la poca conocida *Tangara Gorriverde* (*Tangara meyerdeschauenseei*).**

**Key words:** Green-capped Tanager, *Tangara meyerdeschauenseei*, foraging ecology, Peru.

The Green-capped Tanager (*Tangara meyerdeschauenseei*) is one of the two species of *Tangara* tanagers described during the last 20 years (Schulenberg & Binford 1985, Graves & Weske 1987). The species is restricted to three sites at the headwaters of the Río Inambari, dept. Puno, Peru (Schulenberg & Binford 1985) and Tokoaque, dept. La Paz, Bolivia (Hennessey & Gomez in press). The Green-capped Tanager was classified as vulnerable in IUCN red data book (BirdLife International 2000) and as high conservation priority (Stotz *et al.* 1996); however, no investigation of this species has been conducted since its discovery, and basic biology, such as breeding biology, habitat requirement, diet, and vocalizations, is virtually unknown (Isler & Isler 1999).

I studied the foraging ecology of this species between 4 and 12 June 2002 northeast of Sandia (S14°19'14", W69°27'55", 2200 m), dept. Puno, Peru. Observations were made along the road from Sandia toward San Juan de Oro, which parallels the Río Inambari. The

first 7 km of the road between Sandia and the community of Huancaruque (S14°16'27", W69°25'32", 1870 m) was semiarid, and the vegetation consisted mostly of grass and shrubs shorter than 3 m. Some cacti and small plantations of custard apple (*Annona cherimolia*) were also found near Huancaruque. Beyond Huancaruque, the vegetation became taller, and patches of trees 10–15 m tall were found.

Birds were opportunistically found while I walked slowly along 10 km of road from Sandia to 3 km beyond Huancaruque. Every time I found a pair or group of Green-capped Tanagers, I followed one individual until it ate something. I took only the first observation for each individual, and then moved to observe another individual. For each foraging observation, I recorded the following foraging parameters on microcassette: food item, attack maneuver, substrate type or fruit species, perch diameter, perch angle, foliage density, foraging height, distance to top, horizontal position, and habitat type. For

TABLE 1. Percentage of fruit species eaten by Green-capped Tanagers (*Tangara meyerdeschauensei*) (n = 30).

Family	Species	Percentage
Ulmaceae	<i>Celtis iguanaea</i>	57%
Clethraceae	<i>Clethra sp.</i>	17%
Myrsinaceae	<i>Myrsine sp.</i>	10%
Annonaceae	<i>Annona cherimolia</i> <sup>a</sup>	7%
Papaveraceae	<i>Bocconia integrifolia</i>	3%
Lythraceae	<i>Adenaria floribunda</i>	3%
Myrtaceae	<i>Psidium guajavaa</i>	3%

<sup>a</sup> Cultivated plant species.

attack maneuver, perch angle, and foliage density, I followed the classifications described by Remsen & Robinson (1990). For horizontal position, I used four categories: three parts of a tree (inner, middle, and foliage) and air (outer). I estimated substrate size and perch diameter relative to birds' size (e.g., a half of a head diameter or three times a leg diameter), and then I converted these to estimates of absolute substrate size and perch diameter using measurements taken from museum bird specimens.

Green-capped Tanagers were mostly found in pairs or small groups of 3–4 individuals. In at least one group, I saw one juvenile together with two adult birds, suggesting that it was a family group. The juvenile had duller buff underparts, less yellow tint on crown, a smaller blackish face mask, and paler bluish green wings and tail than did the adults. Although the paintings of this species in Clements & Shany (2001) and Isler & Isler (1999) show the upperparts of the adults as metallic green, in the field their backs looked metallic buff contrasting with a bluish-green wing and tail. The green on the head was limited to a narrow band on forecrown, and the rest of the crown looked yellowish buff or brownish buff.

The first pair was observed 2 km from Sandia. Along the rest of the observation

TABLE 2. Percentage of attack maneuver used for foraging fruits and arthropods by Green-capped Tanagers.

Attack methods	Fruit foraging (n = 32)	Arthropo dforaging (n = 35)
Glean	45%	36%
Reach-up	31%	14%
Reach-out	6%	23%
Reach-down	9%	6%
Hang-down	—	6%
Hang-upsidedown	—	3%
Bite	9%	—
Leap	—	3%
Sally	—	9%

road, I found and mapped thirteen pairs/family groups. I usually observed between five and 10 pairs/family groups per day. In scrub habitat Green-capped Tanagers were mostly observed in pairs, but in the woody area beyond Huancaruque they were also seen in mixed-species flocks. They vocalized fairly often, especially when flying from one shrub to another. Their contact call “chui” was similar to the call of the sympatric Blue-gray Tanager (*Thraupis episcopus*), but drier and shorter. I observed a male singing on a shrub twice during this study.

Green-capped Tanagers were recorded eating a variety of items: arthropods (49%), fruits (45%), nectar (4%), and flower petals (1%) (n = 71). Seven species of fruit were taken, including two cultivated species (Table 1). The five species of wild fruits had small berries with a diameter of less than 1 cm. The tanagers plucked entire berries, but consumed the larger cultivated fruits [custard apple and guava (*Psidium guajava*)] piece by piece. When they plucked small fruits, they often extended their body to pick fruits far from perches (47%, Table 2). This foraging maneuver is commonly used among tanagers (Moermond & Denslow 1983).

When capturing arthropods, Green-

TABLE 3. Substrate types where arthropods were captured by Green-capped Tanagers (n = 35).

Substrate type	Percentage
Live leaf	63%
Dead leaf	6%
Epiphyte	9%
Branch	9%
Partially moss-covered branch	6%
Air	6%
Flower bud	3%

capped Tanagers used more diverse attack maneuvers than when foraging on fruits (Table 2). This presumably reflects the wide variety of substrates searched for arthropods, such as leaves, epiphytes, branches, and air (Table 3), and more diverse portions of trees used for searching for arthropods than for fruits (Table 4). Although Green-capped Tanagers searched various substrate types for arthropods, over 60 % of their searching was directed at live leaves (Table 3). This preference for live leaves when searching for arthropods is also found in other closely related *Tangara* tanagers, e.g., the Lesser Antillean Tanager (*T. cucullata*, Lack & Lack 1973), the Scrub Tanager (*T. vitriolina*, Hilty *et al.* 1986), and the Chestnut-backed Tanager (*T. preciosa*, Isler & Isler 1999).

Average foraging height was  $2.0 \pm 0.1$  m (mean  $\pm$  SE, n = 69, range 0.5–7.0) and did not differ significantly between fruit foraging and arthropod foraging (t = 0.25, df = 63, P = 0.80). Their foraging height seemed determined by the vegetation height, and I observed them foraging higher in areas with taller vegetation. Average perch diameter was  $7.8 \pm 0.9$  mm (mean  $\pm$  SE, n = 55, range 2–45) and did not differ significantly between fruit foraging and arthropod foraging (t = -1.34, df = 50, P = 0.18), even though Green-capped Tanagers perched at interior parts of trees more often when searching for arthropods (Table 4).

TABLE 4. Horizontal position use in woody vegetation by Green-capped Tanagers.

	Fruits (n = 30)	Arthropods (n = 35)
Middle	—	14%
Foliage	100%	80%
Outer	—	6%

Perhaps, Green-capped Tanagers finish their breeding in April or May in this area, considering that I did not observe any nesting behavior but various family groups with juveniles, and most juveniles seemed to have already finished their first molt. More extensive observations are necessary to understand various ecological aspects of this species, such as population size, seasonal movement, nest site requirement, seasonal change in foraging ecology, social system, which are indispensable for their conservation.

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