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SHORT NOTE

BREEDING BEHAVIOR OF THE GRAY-BREASTED FLYCATCHER (*LATHROTRICCUS GRISEIPECTUS*) IN SOUTHWESTERN ECUADOR

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Abstract · Little is known about the nesting behavior of the Gray-breasted Flycatcher (*Lathrotriccus griseipectus*), a species listed as Vulnerable by the International Union for Conservation of Nature. In order to add fundamental information on the life history of this species, we recorded parental behavior at a nest in February–March 2010 in the Jorupe Reserve in southwestern Ecuador. Recordings were made on a tripod-mounted video camera and took place during part of the incubation and nestling stages. Both adults provisioned nestlings. We recorded 7.1 feeds per nestling-hour, with the highest average provisioning rates occurring from 12:00–13:00 h. Nestlings produced an average of 0.8 fecal sacs per nestling-hour. Nestlings fledged in quick succession shortly before 12:00 h on nestling-day 14.

Resumen · El cuidado parental del Mosquero Pechigrís (*Lathrotriccus griseipectus*) en el suroeste del Ecuador
La biología reproductiva del Mosquero Pechigrís (*Lathrotriccus griseipectus*), una especie catalogada como "Vulnerable" por la Unión Internacional para la Conservación de la Naturaleza, es poco conocida. Con el fin de añadir datos básicos sobre la historia de vida del Mosquero Pechigrís, utilizamos una cámara de video para realizar observaciones de un nido ubicado en la Reserva Jorupe en el suroeste de Ecuador, entre febrero y marzo de 2010. Las grabaciones tuvieron lugar durante parte de las etapas de incubación y polluelo. Ambos adultos aprovisionaron polluelos. Registramos 7.1 alimentaciones de polluelo por hora, siendo las tasas de aprovisionamiento más altas de 12:00–13:00 h. Los polluelos produjeron un promedio de 0.8 sacos fecales por hora y polluelo. Los polluelos emplumaron en rápida sucesión poco antes del mediodía 14 días luego de la eclosión.

Key words: Dry forest · Natural history · Nestlings · Tropics · Tumbesian region · Tyrannidae

INTRODUCTION

The Tumbesian region of southwestern Ecuador and northwestern Peru contains both humid forest and some of the most imperiled tropical dry forest in South America (Best & Kessler 1995, Knowlton & Graham 2011). The region is home to a large number of endemic bird species – 30% are found nowhere else (Parker et al. 1995, Flanagan et al. 2005). Because tropical dry forests are understudied compared to tropical rainforests (Miles et al. 2006), the biology of many birds endemic to the Tumbesian region remains poorly known. Among these is the Gray-breasted Flycatcher (*Lathrotriccus griseipectus*), a small tyrannid that lives below 2200 m a.s.l. in both humid and dry forests of the Tumbesian region on the western slope of the Andes in Ecuador and northern Peru (Ridgely & Greenfield 2001, Farnsworth et al. 2018, Freile & Restall 2018). Due to its small range and ongoing habitat degradation in the region, *L. griseipectus* is listed as Vulnerable by the International Union for Conservation of Nature (Collar et al. 1992, Knowlton & Graham 2011, BirdLife International 2016, IUCN 2017), and bird surveys in the region have reported only rare, localized observations of the species (Ridgely & Tudor 1994, Clements & Shany 2001, Barrio et al. 2015, Athanas & Greenfield 2016). Until recently, basic information on its breeding biology was unknown, and behavior at the nest has not been described (Heming et al. 2013, Greeney 2014). Here we present behavioral observations from a nest of *L. griseipectus* discovered at Jorupe Reserve in southwestern Ecuador (04°23'S, 79°57'W; 600 m a.s.l.).

METHODS

The nest was active from 10 February 2010 to 15 March 2010 and was described by Greeney (2014) as being located "1 m above ground in a shallow, upward-opening cavity in the buttress root of a canopy-emergent *Ceiba* tree." We used a tripod-mounted video camera (Sony video Hi8) to record behaviors at the nest. We made video recordings twice during the incubation stage, from 06:20 to 12:00 h on 12 February and from 06:00 to 19:30 h on 18 February. During the nestling stage, we

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recorded the nest on six days (9–12 March and 14–15 March) from c. 06:00 to 18:20 h each day with the exception of 12 March, when we only filmed from 06:30 to 11:30 h. The nestlings fledged by 12:00 h on 15 March, ending the observation period.

RESULTS

Incubation. During the 5.5 h of recording on 12 February, only one egg was in the nest. We observed incubation for 2.3 h that day, but no adult spent the night on the nest. Previously, Greeney (2014) suggested incubation began on 13 February with the laying of the second egg and ended when the nestlings hatched on 1 March, for a total of 16 days of incubation. However, the videotaped observations on 12 February suggest that an adult incubated when only one egg was present, increasing the incubation period to 17 days.

On 18 February, five days after the second egg had been laid, an adult was on the nest when recording began at 05:55 h, and the adult incubated for a further 0.6 h before leaving. An adult was on the nest when observations concluded at 19:20 h, and the eggs were incubated for 9.5 h of the 13.5 h-observation window on 18 February.

Nestling period. The nestlings hatched by early afternoon on 1 March and fledged by 12:00 h on 15 March for a total of 14 nestling-days (Greeney 2014). Our behavioral observations began on nestling-day 8 (where hatch day is nestling-day 0) and ended on nestling-day 14 when the young fledged. Adults visited the nest 826 times over the 54.3 h of recorded nestling time.

Brooding occurred during only 0.8 h of the 54.3 h of recorded nestling time. Due to logistical reasons, recording during the nestling period did not begin until nestling-day 8, and the last observed brooding occurred on nestling-day 10. Thus, it is possible we missed a majority of the brooding time, which likely occurred when the nestlings were younger (e.g., Sheldon et al. 2014). We observed brooding on three occasions: the evening of nestling-day 8 (for 0.2 h until it was too dark to see), the beginning of nestling-day 10 (for 0.5 h), and for 2.3 min starting at 08:01 h on nestling-day 10. In some cases, we suspect the adult was likely on the nest for longer than the observed times, perhaps spending the night on the nest.

Nestling provisioning. *Lathrotriccus griseipectus* is a sexually monomorphic species; however, Greeney (2014) surmised that, at the nest we videotaped, only the female incubated, but both parents were observed feeding the nestlings. In our study, adults fed nestlings on 93% of observed visits and rarely stood at the nest for more than a few seconds after provisioning nestlings. We saw two adults at the nest on only a few occasions and only for a few seconds; adults almost always arrived and fed nestlings one after the other. Most of the food items were too small to identify, but occasionally we observed adults provisioning nestlings with large insects.

We observed adults feeding nestlings a total of 770 times over the course of 54.3 h for an overall rate of 7.1 feeds per nestling-hour. Average feeding rates were highest in the early afternoon from 12:00–13:00 h (8.6 feeds per nestling-hour) and 13:00–14:00 h (8.5 feeds per nestling-hour) (Figure 1). Adults also exhibited high feeding rates in the early morning (8 feeds per nestling-hour from 07:00–08:00 h) and in the late evening (8.1 feeds per nestling-hour from 17:00–18:00 h). Feeding rates were lowest from 16:00–17:00 h and 08:00–09:00 h, with 5.6 and 6.3 feeds per nestling-hour, respectively. On a daily basis, feeding rate was lowest on nestling-day 8 (5.6 feeds per nestling-hour) and highest on nestling-day 10 (8.6 feeds per nestling-hour) and the day of fledging (7.7 feeds per nestling-hour).

Sanitation. The two nestlings produced a total of 86 fecal sacs for a rate of 0.8 fecal sacs per nestling-hour. Fecal sac production was lowest on the first day of observation (0.5 fecal sacs per nestling-hour) and highest on the last day of observation (1.3 fecal sacs per nestling-hour). Nestlings tended to defecate more in the afternoon, with four of the five highest hourly rates coming after 12:00 h. On average, the highest hourly rates of 1.3 and 1.2 fecal sacs per nestling-hour came just before sunset (17:00–18:00 h) and just after sunrise (06:00–07:00 h), respectively, and the lowest hourly rate of 0.3 fecal sacs per nestling-hour was in the mid-afternoon (14:00–15:00 h).

On all but one occasion, nestlings defecated in the presence of adults and the adults carried the fecal sacs from the nest. Just prior to fledging, a nestling deposited a fecal sac over the rim of the nest in the absence of an adult. We never observed adults eating fecal sacs, though it is possible they did earlier in the nestling period.

Fledging. Fledging occurred shortly before noon on nestling-day 14. After being provisioned at 11:54 h, one nestling defecated over the rim of the nest, perched on the rim for 20 s, then flew from the rim at 11:55 h. The second nestling remained in the nest for the next 47 s before abruptly flying out. Neither fledgling returned to the nest in the 1 h we recorded post-fledging. An adult came to the nest a few minutes after the nestlings fledged and removed a fecal sac. Approximately 0.5 h after fledging, an adult made four trips to the nest within 17 min, carrying food on three of these trips.

DISCUSSION

We filmed the nest of *L. griseipectus* during 2 days of the 17-day incubation stage and 6 of the last 7 days of the 14-day nestling stage. We did not find trends in feeds or fecal sacs per nestling-hour across the nestling period, but a study that covers the entire nestling period would be necessary to ascertain trends in parental behavior.

Lathrotriccus griseipectus shares many similarities in breeding biology with its only congener, Euler's Flycatcher (*L. euleri*), including nest construction and placement and egg coloration (Sick et al. 1997, Aguilar et al. 1999, Aguilar & Marini 2007, Marini et al. 2007, Greeney 2014). Observations of *L. euleri* show the same 17-day incubation period we found in *L. griseipectus* and a 15-day nestling period (Aguilar et al. 1999, Auer et al. 2007), which is one day longer than the nestling period we observed in *L. griseipectus* (Greeney 2014).

In *L. euleri* and *L. griseipectus*, both adults provision nestlings (Auer et al. 2007). However, unlike *L. griseipectus, L. euleri* tends to have three eggs per nest (Belcher & Smooker 1937, Greeney 2014, Farnsworth et al. 2018). Auer et al.

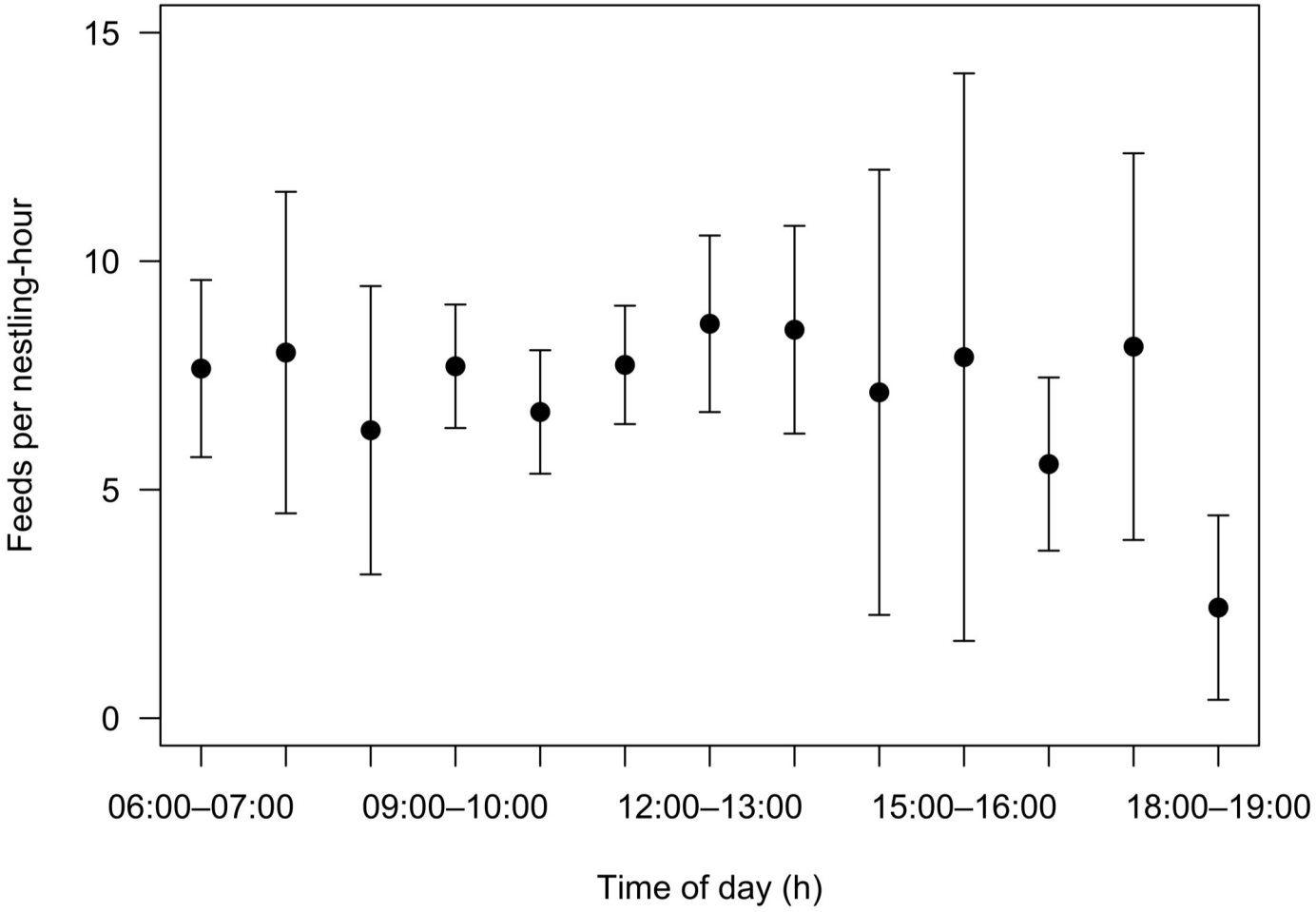

Figure 1. Average feeds per nestling-hour of Gray-breasted Flycatcher (*Lathrotriccus griseipectus*) nestlings (n = 2) based on time of day (h). Data are from a nest discovered at Jorupe Reserve in southwestern Ecuador (04°23'S, 79°57'W; 600 m a.s.l.) that was active from 10 February 2010 to 15 March 2010. The data cover 54.3 h of recording during six of the last seven days of the nestling stage .

(2007) found a mean feeding rate of 21.5 ± 2.8 feeds per hour for *L. euleri*, which exceeds both the average feeding rate of *L. griseipectus* (14.0 feeds per hour) and the highest feeding rate on any day during our observation period (17.2 feeds per hour on nestling-day 10). The higher feeding rate of *L. euleri* is likely due to the higher average brood size (2.6 ± 0.1 young per nest; Auer et al. 2007) relative to *L. griseipectus*; total feeding rates have been shown to increase in other Tyrannidae with increasing brood size (Morehouse & Brewer 1968, Conrad & Robertson 1992).

Two other studies have examined nestling feeding rates of passerines in Jorupe Reserve. Two nestlings of Watkins's Antpitta (*Grallaria watkinsi*) were provisioned on two different days at 1.2 and 1.3 feeds per nestling-hour (Greeney et al. 2009). These rates are much lower than what we observed in *L. griseipectus.* Observations of a Slaty Becard (*Pachyramphus spodiurus*) nest yielded feeding rates of 18.2 feeds per hour (combined parental rate) for two nestlings, which is slightly higher than the 14.1 feeds per hour we observed in *L. griseipectus* (Gelis et al. 2009). However, when only one nestling was present at the nest of *P. spodiurus*, the feeding rate was reduced to 10.1 feeds per hour (Gelis et al. 2009). Two additional studies from southwestern Ecuador (Buenaventura Biological Reserve; 03°39'S, 79°46'W) both showed much lower rates of nestling provisioning than we observed in *L. griseipectus*. At a nest of the Ochraceous Attila (*Attila torridus*) that contained three nestlings, two days of filming uncovered provisioning rates of 0.2 and 0.5 feeds per nestling-hour (Greeney 2006). Based on 336 h of recording at the nest of a Long-wattled Umbrellabird (*Cephalopterus penduliger*), mean rate of nestling provisioning for a single nestling was 1.0 feeds per nestling-hour, and no daily feeding rate was greater than 1.9 feeds per nestling-hour (Greeney et al. 2012). Overall, we observed higher average feeding rates in *L. griseipectus* than in all but one of the comparable studies from the same region.

Lathrotriccus griseipectus is thought to be in decline due to deforestation and habitat degradation caused by rural activities like livestock grazing, and less than 5% of the region's native forest remains (Best & Kessler 1995, Parker et al. 1995, Knowlton & Graham 2011). Climate change will likely exacerbate these issues, as predicted drier conditions in the region may result in the spread of arid scrubland into areas currently occupied by tropical dry forests (Miles et al. 2006, Knowlton & Graham 2011). We hope that this study will provide critical natural history knowledge for a species which remains at risk, and we encourage further research of the little-studied and imperiled avifauna of the Tumbesian region.

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