New dietary observations on *Melanerpes flavifrons* (Aves, Picidae): nectar consumption and possible pollination of two inflorescences

Estevão Freitas Santos 1*

Jayrson Araújo de Oliveira 2

1 Projeto Avifauna de Goiás, CEP 74.270-170, Goiânia – GO, Brasil
2 Universidade Federal de Goiás, Goiânia – GO, Brasil
* Corresponding author
estevaobirding19@gmail.com

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Abstract

Despite the predominant insectivorous habits of woodpeckers, the Yellow-fronted Woodpecker (*Melanerpes flavifrons*) stands out for its primarily frugivorous diet. In this study, we report two observations made in the Atlantic Forest of Goiás regarding nectar consumption by *M. flavifrons*. These are the first documented records of this habit in Brazil for the flowers of *Inga ingoides* and *Combretum fruticosum*. This behavior suggests that pollination might be involved in the process and there is possibly a greater demand for nectar by birds in the interior of the country during the driest period of the year.

**Key words:** *Combretum fruticosum; Inga ingoides*
Woodpeckers (Picidae) are widely distributed birds in the Neotropical region (SICK, 1997), where they are represented by 95 species (SHORT, 1985) and exhibit a diverse array of behavioral, ecological, and morphological traits. They are mostly recognized by their insectivorous habits, although some are fond of fruits (WINKLER et al., 1995; WINKLER; CHRISTIE, 2002; ROCCA et al., 2006). In fact, many neotropical species enjoy vegetable matter, such as those in the genera *Campephilus*, *Celeus*, *Colaptes*, *Melanerpes*, *Veniliornis* and *Piculus* (MOOJEN et al., 1941; SCHUBART et al., 1965; SICK, 1997; FRANCISCO; GALETTI, 2001; MIKITCH, 2002; PIZO, 2004; TUBELIS, 2007; VASCONCELOS et al., 2008), and seem to consume more of these resources during the winter (SICK, 1997).

The Yellow-fronted Woodpecker (*Melanerpes flavifrons*) is one of the most attractive, colorful, and strepitous representatives of the family and exhibits noteworthy social habits (SICK, 1997; SIGRIST, 2014; WINKLER et al., 2020). It is endemic to the Atlantic Forest (VALE et al., 2018) and occurs from southern Bahia to Rio Grande do Sul, as well as in Paraguay, Argentina, and locally in central Brazil (SICK, 1997; WINKLER et al., 2020). It includes a variety of items in its diet, such as arthropods, fruits, seeds, and even sugary water (WINKLER et al., 2020). Examples of fruits it consumes are those of *Cecropia pachystachya* (MARCONDES-MACHADO; ARGEL-DE-OLIVEIRA, 1988; MIKITCH, 2002) and *Cabralea canjerana* (PIZO, 1997), and it is one of the most frugivorous woodpeckers in southeastern Brazil (PARRINI, 2015).

Despite copious previous records of vegetable matter in the diet of this species, apparently *M. flavifrons* has still not been documented feeding on nectar of native flowers; although, there are a few comments of nectar ingestion in the literature (e.g., SICK, 1997; PARRINI, 2015). Contrastingly, other species of the genus (e.g., Gila Woodpecker, *M. uropygialis*) are known to seek nectar (WINKLER; CHRISTIE, 2002). Here, we present the first documented records of *M. flavifrons* feeding on the flower nectar of two species native to Brazil, as well as the possibility that pollination is involved in this activity.

Two excursions were conducted. On June 27, 2019, E.F.S. visited the Córrego Taquari riparian forest within the private area of Rancho Sabiá (17°04’S 49°35’W) (Area 1) in Varjão, southwestern Goiás, Brazil. E.F.S. and J.A.O. went on a second excursion on May 27, 2021, to private farmland next to Parque Estadual Altamiro de Moura Pacheco (16°33’S 49°08’W) (Area 2) in Goianápolis. The vegetation matrix of both areas is mainly comprised of pastures and orchards on farms, and patches of semideciduous and deciduous forests, within Atlantic Forest *sensu latissimo*, i.e., in the former Mato Grosso de Goiás that is now almost completely gone (WILLIS, 1992; IBGE, 1993; OLIVEIRA-FILHO; RATTER, 1995; OLIVEIRA-FILHO et al., 2006; NEVES et al., 2017).

We recorded Yellow-fronted Woodpeckers visiting the flowers of two species of canopy plants native to central Brazil, *Inga ingoides* (Rich.) Willd., a relatively tall arboreous legume, and *Combretum fruticosum* (Loefl.) Stuntz., a large liana that is widespread in the Neotropical region. The flowers of *Inga* are hermaphroditic with white stamens and a green corolla (KOPTUR, 1983; NETO et al., 2007). In Goiás, *I. ingoides* blooms for two to four months at the end of the dry season (between July and October). *Combretum fruticosum* has erect flowers in elongated inflorescences, which vary in color from green to yellow and orange (SCHEMSKE, 1980; GRYJ et al., 1990). It blooms from April to July in the study region.

In Area 1, a pair of *M. flavifrons* was observed foraging on an *I. ingoides* tree for about 4–5 minutes while it climbed up the trunk and insistently vocalized. Once, the female jumped to a horizontal branch in the periphery of the tree and landed immediately next to some flowers. The individual penetrated its acuminate bill amidst the stamens and appeared to reach the corolla and obtain nectar with its long tongue. This movement was repeated several times within a couple minutes, and two other flowers were visited before the pair flew away.

In Area 2, a group of five individuals of *M. flavifrons* (three males and two females) was fortuitously
observed and spent almost 2 h around the flowers of *C. fruticosum* in the canopy of seasonal semideciduous forest (ca. 15 m high). All five individuals sought nectar, perching beside or on the inflorescences and using both the bill and the tongue to reach the nectaries (Figures 1 and 2). One female chased a Variable Oriole (*Icterus pyrrhopterus*) to visit a flower and one male scared away a Sayaca Tanager (*Thraupis sayaca*) from the treetop. All the individuals seem to have contacted the reproductive organs of the flowers. At the end of the process, they had their forehead, throat, and bill covered in reddish pollen.

It is not clear if the female Yellow-fronted Woodpecker observed feeding on nectar of *I. ingoides* in Area 1 was also pollinating flowers, since the individual was not observed carrying pollen. However, it touched the nectaries and visited more than a single flower in a row, so it might have acted as a pollen vector. *Inga* is more regularly pollinated by bats and moths (KOPTUR, 1983), but this does not exclude other activities, including pollination by diurnal visitors, such as hummingbirds (KOPTUR, 1984; AMORIM et al., 2012), tanagers and icterids (pers. obs.).

Gryj et al. (1990) attested that perching birds are the main pollinators of *C. fruticosum* flowers, since they carry abundant pollen during usually long visits. As mentioned above, we observed all the individuals of *M.*
flavifrons dusted in pollen of *C. fruticosum* during their 2-hour visit to this plant, and the pollen was on their faces when they left one inflorescence and headed to another. The transportation of pollen grains and multiple visits suggest that *M. flavifrons* contributes to pollinating this species.

Indeed, other species of woodpeckers, including other *Melanerpes*, have also been observed feeding on the nectar of *Combretum* species. Gryj et al. (1990) listed *M. chrysogenis* as a visitor of *C. fruticosum* in Costa Rica, and Silva and Rubio (2007) observed *M. candidus* visiting *C. lanceolatum* in the Brazilian Pantanal. Thus, these observations suggest that the nectivorous habits of *Melanerpes* are likely much more common, including in other plant species with a perching-bird pollination syndrome.

Rocca et al. (2006) suggested that moving from sipping fruit juice to feeding on nectar is a relatively simple step for woodpeckers, due to their morphological attributes. Furthermore, we postulate that the certain demand for nectar among woodpeckers and other birds, at least in the region, perhaps involves seasonality. Both of our observations were made during dry periods of the year (May and July), when fleshy fruits are generally scarce. Considering the frugivorous habits of *M. flavifrons*, we assume that this resource scarcity in the winter favors a more regular search for nectar, which could also increase the obtainment of nutrients during periods of food deficiency. Such patterned behavior has also been postulated for events of flower consumption by insectivorous bird species, which may increase their search for this resource during the dry season when food is scarce (see GONSIOROSKI et al., 2021).

We suggest making more observations in Brazil of avian floral visitors, especially perching birds, for both species of plants. Systematic observations will provide a better understanding of the benefits of these visits to the birds and the reproductive and phenological systems of the plants. Ultimately, this data would contribute to increasing our knowledge of the natural history of these species and could contribute to habitat conservation and restoration. Since many woodpeckers are fond of “plant juice” additional observations could corroborate the importance of this resource for the group, especially during periods of food scarcity.

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