

## Beak deformity in three bird species from the southwest of the Brazilian Amazon

### Deformidad del pico en tres especies de aves del sudoeste de la Amazonia brasileña

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#### Abstract

Beak deformity have a frequency of 0.5% in wild bird populations. In addition to being rare, beak deformities are also poorly reported in the Brazilian scientific literature. Here we report beak deformities in the species: *Dendrocincla merula*, *Amazona ochrocephala* and *Pheugopedius genibarbis*, all of which occurred in southwestern Brazilian Amazon. Dendrocolaptids make intensive use of their beaks in the search for insects and small vertebrates, where they explore in cracks in wood with lateral blows. In the case presented here, this behaviour may have been the cause of the breakage of the tip of this individual's maxilla. In Brazilian territory, few species of parrots were recorded with deformity in the beak and in the individual in this work, everything indicates that *Amazona ochrocephala* was a captive animal, as it was excessively thin and its diet probably had a low content of vitamins and calcium, where their deficiency even when the animal was a puppy may have contributed to the deformity of the maxilla. Cases of beak deformities in species of the Troglodytidae family are rare, but the individual in this work presented an unusual curvature in the maxilla not observed in other individuals in museum collections. Only with more reports will we be able to better understand the occurrence and causes of these beak deformities in wild birds.

#### Resumen

La deformidad del pico es una característica rara y tiene una frecuencia baja, con 0.5% de casos en poblaciones de aves silvestres. Además de ser raras, las deformidades del pico también son escasamente reportadas en la literatura científica brasileña. Reportamos aquí deformidades en los picos de aves de las especies: *Dendrocincla merula*, *Amazona ochrocephala* y *Pheugopedius genibarbis*, en los cuales todos los registros ocurrieron en el sudoeste de la Amazonia brasileña. Los dendrocoláptidos hacen uso intensivo del pico en la búsqueda de insectos y pequeños vertebrados, explorando en grietas de la madera con golpes laterales. En el caso aquí presentado, este comportamiento de exploración pudo haber sido la causa de la rotura de la punta del maxilar de este individuo. En el territorio brasileño, pocas especies de loros fueron registradas con deformidad en el pico y en el individuo de este trabajo, todo indica que *Amazona ochrocephala* era un animal de cautiverio, ya que estaba excesivamente delgado y su dieta probablemente tenía un bajo contenido de vitaminas y calcio, donde su deficiencia incluso cuando el animal era un joven puede haber contribuido a la deformidad del maxilar. Los casos de deformidades del pico en especies de la familia Troglodytidae son raros, pero el individuo de este trabajo presentaba una curvatura inusual en el maxilar no observada en otros individuos de esta especie depositados en la colección científica. Sólo con más informes podremos entender mejor la ocurrencia y las causas de estas deformidades del pico en aves silvestres.

#### Keywords:

Beak anomaly; malformation; wild birds; bird biology; Amazon.

#### Palabras clave:

Anomalía del pico; malformación; aves silvestres; biología de aves; Amazonia.

## Introduction

Beak deformity is a rare feature and has a low frequency, with 0.5% of cases in wild bird populations (Pomeroy 1962). Possible causes for the beak abnormality can be genetic, developmental, injury or disease (Craves 1994). The most common cause of beak anomaly may be overgrowth of the dermotheca and rhamphotheca; however, the bone structure remains normal (Taylor & Anderson 1972, Thompson & Terkanian 1991).

Deformed beaks vary from small to extreme proportions (Gorosito et al. 2016) and can assume different shapes, such as: crossed mandibles, decurved upper mandible, upcurved lower mandible, elongation of both mandibles, bent to the side and gapped (BTO 2024). Deformed beaks can affect the health of birds (Van Hemert et al. 2012), but some individuals adapt to obtain food (Souza et al. 2016, Purificação 2019). The alignment of the feathers with the use of the beak -i.e., preening, keeps the plumage in good condition and removes dirt particles and ectoparasites, such as feather lice and ticks (Scott 2010). Birds with beak deformity can also have normal feathers and health status (Souza et al. 2016, Santos et al. 2018).

Beak deformities in wild birds are relatively rare in nature, and cases are also rarely reported in the Brazilian scientific literature (Vasconcelos & Rodrigues

2006, Souza et al. 2016, Purificação 2019, Smith et al. 2019, Moura et al. 2019, Moura et al. 2020, Moura et al. 2022, Moura et al. 2023). These published records of beak deformities are timely and provide us with information that can tell us something about the health conditions of bird populations.

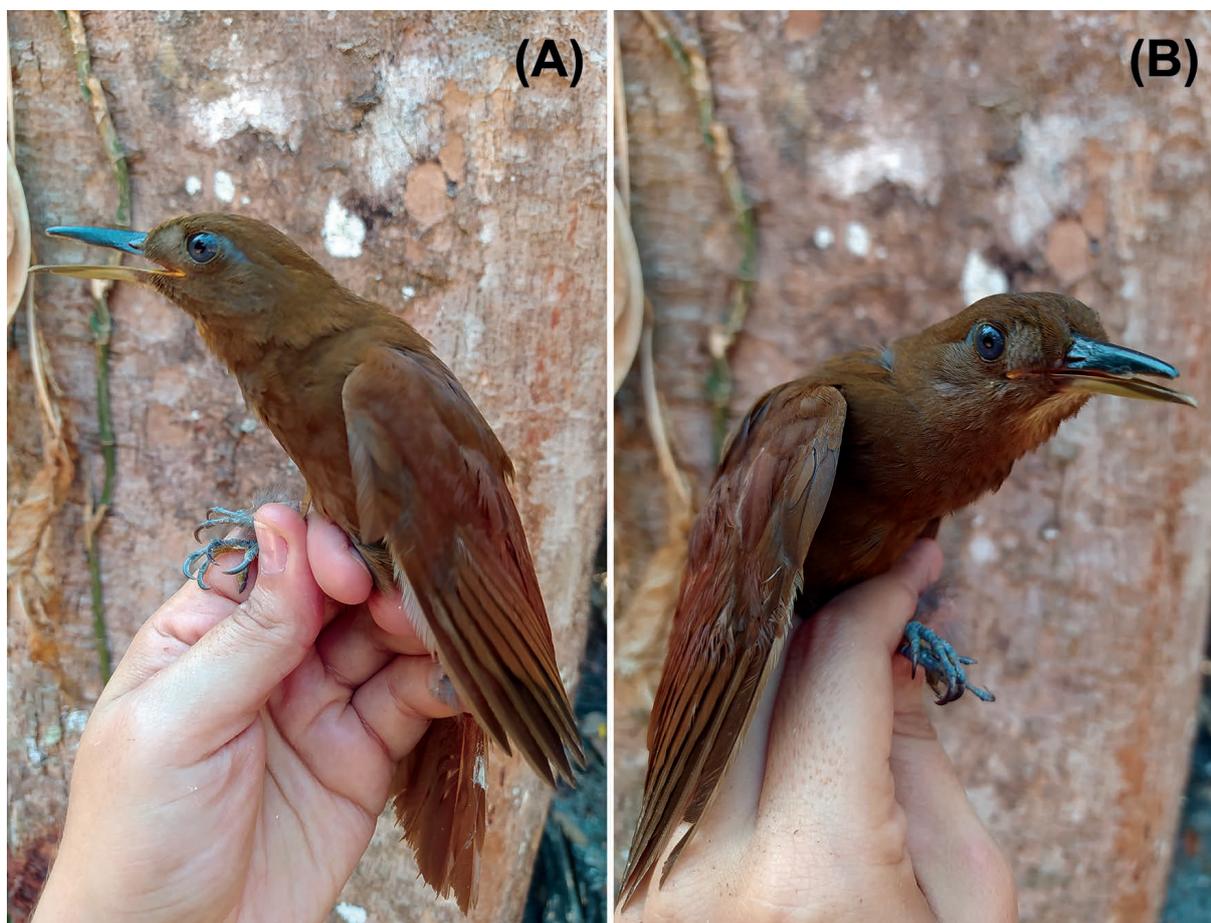
## Description of records

We report here three cases of deformities in beaks of wild birds in the southwestern Brazilian Amazon:

### *Dendrocincla merula* (Lichtenstein, 1820)

White-chinned Woodcreeper - (Passeriformes: Dendrocolaptidae)

A specimen of White-chinned Woodcreeper with a deformity in the beak was captured with a mist net on October 6, 2020 in an area covered by dense *terra-firme* forest, in the municipality of Pauini, Amazonas (08°30'37.6" S, 69 °7'22.9" W). The bird had a shorter maxilla in relation to the mandible (Fig. 1A). The mandible lacked a tip and a side part on both sides. On the right side, it was also possible to observe a small fissure (Fig. 1B). After obtaining the biometric data, the bird was released close to the capture site and flew normally. We were unable to record the specimen feeding, but it appeared to be healthy at the time of capture.



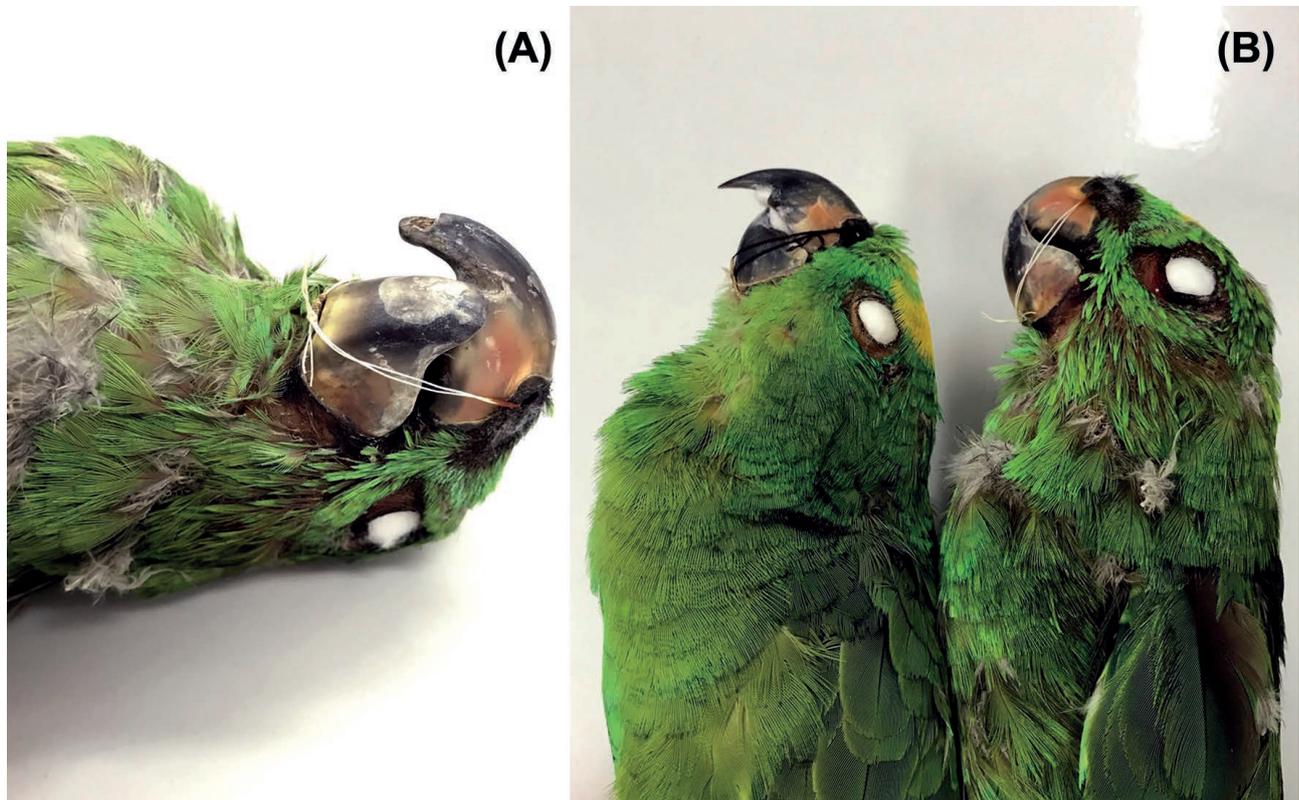
**Figure 1.** White-chinned Woodcreeper, *Dendrocincla merula*, with beak deformity. A: Short maxilla lacking the distal region and part of the lateral margin on both sides; B: cleft on the right side of the maxilla. Photos: Luana Alencar.

***Amazona ochrocephala* Gmelin, 1788**

Yellow-crowned Parrot - (Psittaciformes: Psittacidae)

On December 24, 2018, a Yellow-crowned Parrot, which died at the Wild Animal Screening Center of the Brazilian Institute for the Environment and Renewable Natural Resources (CETAS/IBAMA-AC), was donated to

the Ornithology Laboratory of the Federal University of Acre (UFAC), in Rio Branco, and prepared for the taxidermy technique. The adult individual ( $\sigma$  testicles:  $2 \times 3$  mm; Collection number: AC-1168), presented a profound deformity in the maxilla (Fig. 2A). The maxilla was crossed, facing to the right, not over the mandible as in a normal specimen (Fig. 2B).



**Figure 2.** A Yellow-crowned Parrot, *Amazona ochrocephala*, with crossed jaw. A: beak detail; B: Comparison of the cross-beaked specimen with a normal-beaked specimen. Specimens belonging to the ornithological collection of the Federal University of Acre (Example without beak deformity: AC-1205; specimen with beak deformity: AC-1168). Photos: Ednaira Santos.

***Pheugopedius genibarbis* (Swainson, 1838)**

Moustached Wren - (Passeriformes: Troglodytidae)

On August 7, 2012, we captured an individual of Moustached Wren in the Zoobotanical Park of the Federal University of Acre ( $09^{\circ}50'07.2''$  S,  $67^{\circ}52'12.3''$  W), in the municipality of Rio Branco, Acre. This one died, possibly due to stress during capture. During individual's removal from the net, we noticed accentuated curvature in the maxilla and mandible (Fig. 3). In addition, the mandible in this individual was slightly larger than the maxilla (Fig. 3). After scientific taxidermy, it was verified that it was an adult female ( $\text{ovary: } 3 \times 2$  mm) that was incorporated into the scientific collection under the Collection number: AC-443.

We present in Table 1 the beak measurements of the specimens reported here in comparison with the average beak measurements of specimens without deformation (for each species) deposited in the ornithological collection of the Federal University of Acre, Brazil.

Finding answers to the causes of beak deformities is not simple (Craves 1994), since these anomalies are related to several factors such as wear or trauma (Pomeroy 1962), nutritional deficiencies (Stevens et al. 1984), viral, bacterial, fungal and/or parasitic infections (Gartrell et al. 2003, Gorosito et al. 2016, Zylberberg et al. 2016). Generally, birds with these beak deformities die prematurely (Sogge & Paxton 2000) and this may contribute to the scarcity of information on this topic (Barreiro et al. 2002).

Birds of the Dendrocolaptidae family are abundant in neotropical forests, mainly in primary forests (Sick 1997). In a bibliographic survey, a record of beak deformity was found in *Dendrocincla fuliginosa* (Verea et al. 2012), but during searches on the collaborative website Wikiaves ([www.wikiaves.com.br](http://www.wikiaves.com.br)), we did not find records of beak deformity in *Dendrocincla merula*. Dendrocolaptids use their beak intensively in the search for insects and small vertebrates, where they explore in crevices in wood, rip splinters from tree bark and remove moss with lateral blows (Sick 1997). In the case pre-



**Figure 3.** Moustached Wren, *Pheugopedius genibarbis*, with beak deformity compared to a normal beak specimen (right). Note the curvature of the maxilla and the longer mandible of the specimen on the left. Specimens belonging to the ornithological collection of the Federal University of Acre (Example with beak deformity: AC-443; specimen without beak deformity: AC-223). Photo: Edson Guilherme.

**Table 1.** Beak measurements of three species of wild birds with deformity (present study) and without deformity (specimens housed in the scientific collection) from the southwest of the Brazilian Amazon. SD = standard deviation; (n) = number of specimens measured; max.-min. = maximum and minimum values found.

Species	Maxilla (mm)		Mandible (mm)		Base width of beak (mm)	
	Present study	Mean±SD (n) max.-min.	Present study	Mean±SD (n) max.-min.	Present study	Mean±SD (n) max.-min.
<i>Dendrocincla merula</i>	27.8	26.8±1.1 (6) 28.4–25.1	*	17.1±1.4 (6) 19.9–16	8.2	8.2±0.4 (6) 8.9–7.7
<i>Amazona ochrocephala</i>	29.8	31.8±1.8 (11) 34.5–28	21.8	20.6±2.1 (11) 25.6–18.6	18.3	18.8±1.1 (11) 21–17,4
<i>Pheugopedius genibarbis</i>	15.8	16.1±1.2 (8) 17.6–13.8	11.9	12.5±2.9 (8) 14.8–10.2	6	5.4±0.3 (8) 6.1–5

\* The bird was released before this measure was taken.

sented here, this behaviour may have been the cause of this individual's maxillary tip breaking. By continuing to forage with a broken maxillary tip, probably the lateral margin also broke, resulting in the cleft observed on the right side. Although specimens of this family have fragile beaks, the record of beak deformity in the Dendrocolapidae family has been quite uncommon.

In Brazilian territory, few parrot species were recorded with beak deformity (Souza et al. 2016). In the case presented here, everything indicates that the pampas parrot donated from CETAS/IBAMA was a captive animal. He was excessively thin (weight: 493.7 g) and probably his diet was low in vitamins and calcium (see Tangredi 2007). The deficiency of these minerals, even when the

animal was a chick, may have contributed to the deformity of the maxilla. The disproportionate growth at the tip of the maxilla must have been due to the fact that the animal could not use the tip of the beak to break more rigid food.

According to Wilkinson (1953) temporary beak deformities are common in cage birds and attribute this anomaly to incorrect feeding, however, with the bird's maturity, the deformed beak region falls off and growth occurs normally. In this case, the specimen of *Amazona ochrocephala* presents the structure of the resistant beak and the crossed maxilla over the mandible is characteristic observed in permanent anomalies (Pomeroy 1962).

The Moustached Wren (*P. genibarbis*) captured and collected in the Zoobotanical Park (PZ) of the Federal University of Acre, presented an unusual curvature in the maxilla, a detail not observed in other individuals of this species deposited in the scientific collection of the Laboratory of Ornithology at UFAC. The PZ is a fragment isolated by urban matrix and presents an overpopulation of some bird species, including *P. genibarbis* (Pedroza & Guilherme 2021). Some individuals in this population who are isolated by urban matrix have presented a neoplastic disease called eyelid papilloma (Souza et al. 2017). Populations isolated from each other are more likely to have diseases and anomalies, which may be the case for the individual in this study. Cases of beak deformities in species of the Troglodytidae family are rare. Sick (1997) reports that when capturing a Musician Wren (*Cyphorhinus arada*) he observed the beak turned slightly to the side. In our review of the literature, we did not find other cases of beak deformities in specimens of this family.

There are still occasional reports of beak anomalies in wild birds (Pomeroy 1962, Craves 1994, Handel et al. 2010, Gorosito et al. 2016, Smith et al. 2019, Souza et al. 2016, Purificação 2019, Smith et al. 2019, Moura et al. 2020, Moura et al. 2022, Moura et al. 2023). Knowledge about these cases will grow as researchers around the world begin to realize the importance of publicizing them. It may happen that a researcher is faced with a bird with a deformity in the beak but neglects the case. Only with more reports can we better understand the occurrence and causes of these beak deformities in wild birds.

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The authors declare no conflict of interest.

**Rol de los autores / Authors Roles:**

LA: Conceptualization, Research, Writing - Preparation of the original draft, Drafting: proofreading and editing.

ES: Writing: proofreading and editing.

RV: Writing: proofreading and editing.

EO: Writing: proofreading and editing.

EG: Conceptualization, Writing: proofreading and editing.

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