

## Bill deformity in Red-breasted Toucan, *Ramphastos dicolorus* (Piciformes: Ramphastidae)

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Bill deformities are commonly found in domestic birds, such as chickens, but different forms of beak malformations have been recorded in wild birds as well<sup>1,2,3</sup>. The Psittacidae family, such as parrots and macaws, seems to be the most affected taxa among known cases, but other birds can present this condition as well<sup>2</sup>. Bill deformities may normally be caused by traumas, which usually result in fractured or injured beaks, or by congenital factors, when the bird is born with the malformation<sup>1</sup>. The main reasons for this atypical development could be 1) genetics, as some genes may over-express themselves due to inheritance or spontaneous mutation, 2) a deficient distribution of essential nutrients to the fetus, impairing bill formation, 3) a viral/bacterial/fungal infection to the egg, resulting in mutations on important genes, or 4) external contaminants like pollution and toxic heavy metals, which can cause anomalies to DNA structure, inducing malformation to internal organs as well<sup>1,3,4</sup>. In addition, viral/bacterial/fungal infection may affect beak tissues and cause tumors and deformities in young and adult birds<sup>5</sup>. Known bill malformations are mainly mandible compression, prognathism, or lateral deviations of one or both rinothecas<sup>2,4</sup>. A scissor/crooked beak is an abnormal development of keratin that causes lateral deviations of the rhinotheca<sup>4</sup>. Severe deviations can impair food acquisition, preventing the healthy development of the individual, possibly leading to its death<sup>6</sup>. Toucans' bills are lightweight, as they are made of spongy tissue with air spaces<sup>7</sup>. Besides foraging, the Red-breasted Toucan also uses its bill to show aggressiveness during disputes and courtship and to enlarge nest cavities<sup>8</sup>. Likewise, toucans' bills are important in body temperature regulation, as its many veins dilate or constrict to either disperse heat or prevent temperature respectively<sup>7</sup>.

An observation of a Red-breasted Toucan with a scissor beak was made on April 14<sup>th</sup>, 2014 in a green area inside the city of Getúlio Vargas (27°53'25"S, 52°13'39"W), north of the state of Rio Grande do Sul, Brazil. The municipality is located within the Atlantic Rainforest biome, in an area in which the native vegetation is comprised of Araucaria Moist Forest<sup>9</sup>. The city is surrounded by agricultural and silvicultural areas, but few forest fragments still remain in the landscape. Dur-

ing day time, Red-breasted Toucans are commonly found alone, in pairs or in small groups in wooded areas of the city. The lower jaw of the toucan with the bill malformation was in its correct shape, facing forward, while its upper jaw was laterally deviated to the right, resulting in a scissor-like aspect (Figure 1). The toucan was uneasy and kept vocalizing incessantly, although this act did not seem related to its condition. As it was a healthy adult, it most likely could properly feed during its development. However, this anomaly could prevent this individual from adequately cleaning its feathers, facilitating parasite infestations and possibly other diseases. It could also interfere with mating, as it may not be attractive to the opposite sex, and it could also impair it from defending its territory, although those hypotheses could not be verified as it demands further observations on the specimen's behavior and interactions.

As beak traumas normally cause the fractured part of the bill to fall off, this reported individual's condition could possibly be a congenital characteristic; the individual could have been born with a scissor beak or developed the condition while growing up, or it could be due to a post-hatching bacterial/viral/fungal infection that led to a malformation. However, it was not possible to confirm its real cause since it was only a visual observation, and tissue samples were not collected. The most commonly recorded toucan species presenting bill anomalies is the Toco Toucan (*Ramphastos toco*), a species with over 10 different beak

deformities recorded in the literature, including a scissor beak<sup>2</sup>. This short note is the first reported deformity of this kind in the Red-breasted Toucan. The lack of knowledge of bill deformities in wild bird populations highlights the need to perform specific studies to uncover the cause(s) of these anomalies by sampling both affected and apparently not affected individuals, in order to detect early stages of the condition, in case of infection. Furthermore, in the case of diseases, the correct diagnosis is important to reduce risks of epizootic spreading, and, in the case of external contamination, to identify and diminish agents (pollutants) that might be affecting early stages of birds' development<sup>10</sup>.

### References

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Figure 1. Lateral deviation in Red-breasted Toucan's (*Ramphastos dicolorus*) bill, found in Getúlio Vargas, south of Brazil. Photos: Amanda Perin Marcon.