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Letter to the Editor

Procedure for Collecting Gastric Contents in Giant Amazon Turtles *Podocnemis expansa* (Schweigger, 1812) (Testudines, Podocnemididae)

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The genus *Podocnemis*, of the family Podocnemididae, is represented in South America by six species: *P. expansa, P. erytrocephala, P. vogli, P. lewyana, P. unifilis* and *P. sextuberculata* (4, 7). The species *P. expansa* (Fig. 1), known as the giant Amazon turtle, is largely distributed throughout the Amazon river and in most of its tributaries (3). The giant Amazon turtle is found in the states of Amapá, Pará, Amazonas, Rondônia, Acre, Roraima, Tocantins, Goiás and Mato Grosso, encompassing equatorial forests and savanna (*cerrado*) ecosystems in the north and west-central regions of Brazil (3). This reptile can measure from 75 to 107cm in length, 50 to 75cm in width and weigh up to 60kg (9), being the largest fresh water testudine in South America (2, 5, 8). They are long-lived animals with late sexual maturation and a low individual replacement rate (1, 6).



Figure 1: *Podocnemis expansa* adult female on a river sand bank in the environmental protection area of the Araguaia river. (Personal archive).

For management and conservation efforts of these species, health studies are important. Studies on the gastric content are useful for the identification of diseases agents like parasites and infectious microorganisms, sometimes representing potential zoonosis. The collection of the material from the stomach begins by manual restraint of the animal, which should be lying on the carapace. We use a "mouth opener" made with a hard plastic tube (2cm in diameter and 7 cm in length) with a soft, flexible hose partially covering the tube (Fig. 2A).

The keratinous beak of *P. expansa* is stimulated to open with the mouth opener and the animal bite it. Once the bite occurs, the jaw is held firm to the central portion "c" (Fig. 2B) of the opener leaving the hard portion "a" outside of the beak and the flexible portion "b" inside the oral cavity (Fig. 2B). This mouth opener, at the correct position, keeps the beak open, allows the passage of the probe into its interior while protects it from bites (Fig. 3). The flexible silicon probe is then introduced into the stomach following application of approximately 40mL of sterile saline solution followed by 20mL of air. Finally, the caudal portion of the turtle is slightly raised and the stomach content is aspirated. After the collection of the content, the probe and the mouth opener are carefully removed and the reptile is released. Depending on the testudine size (carapace length), adjustment in the diameter and length of the mouth opener may be required to avoid injury to the beak and jaw. Additionally, probe length is a key consideration since undersized probes will not reach the stomach, while oversized probes may injure the gastric mucosa. The diameter of the probe must be appropriate for the animal size to avoid lesions of the esophagus and to achieve the gastric content. The liquid and the air volume introduced in the stomach must also be appropriate to the volumetric capacity of the organ.

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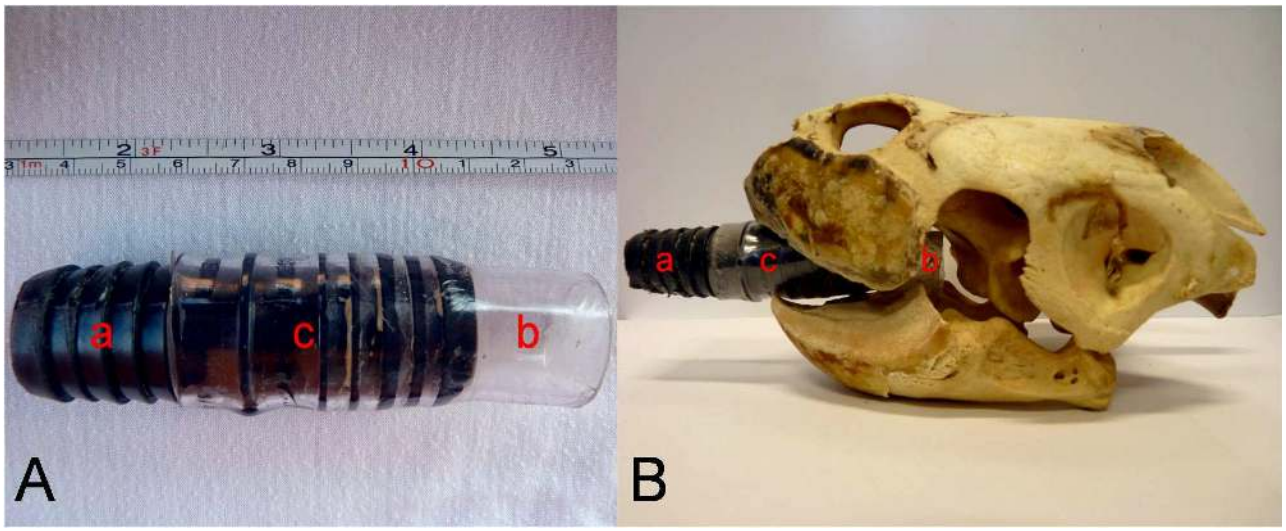


Figure 2: (A) "Mouth opener" utilized in testudines; (B) Demonstration of the correct position of the mouth opener in the adult *P. expansa* skull; (a) Hard plastic tube kept out of the oral cavity of the animal; (b) Flexible hose portion used to avoid injury to the oral cavity; (c) Portion of the mouth opener where the animal will bite. (Personal archive).

This method of collecting gastric contents was developed by our staff and has been successfully used in our research (Video 1).



Figure 3: Probe introduction demonstration through the "mouth opener"; (P) Silicon flexible probe used in the stomach washing procedure in adult *P. expansa*. (Personal archive).

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