Hydrops caesurus (Reptilia, Serpentes, Dipsadidae): new records and evidences of habitat use and diet in the Brazilian Pantanal

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Hydrops caesurus Scrocchi, Ferreira, Giraudo, Ávila & Motte 2005 was described from localities in subtropical to temperate areas of Paraguay-Paraná and Plata River basins. Specimens in the type series were obtained from diverse aquatic habitats in western Brazil, Argentina and Paraguay, between 19°00' and 28°30'S (Scrocchi et al., 2005). An additional record for Argentina, mentioned in Etchepare et al. (2012), falls within this range.

In Brazil, representatives of this aquatic snake were previously recorded only in the southern portion of the Pantanal wetlands, in the state of Mato Grosso do Sul. Known range in that state (Scrocchi *et al.*, 2005) extends from the vicinities of urban areas in Miranda, Ladário, and Corumbá, to Acurizal Ranch, a private reserve situated in the Precambrian massif Serra do Amolar, in the northernmost limits of the huge municipality of Corumbá.

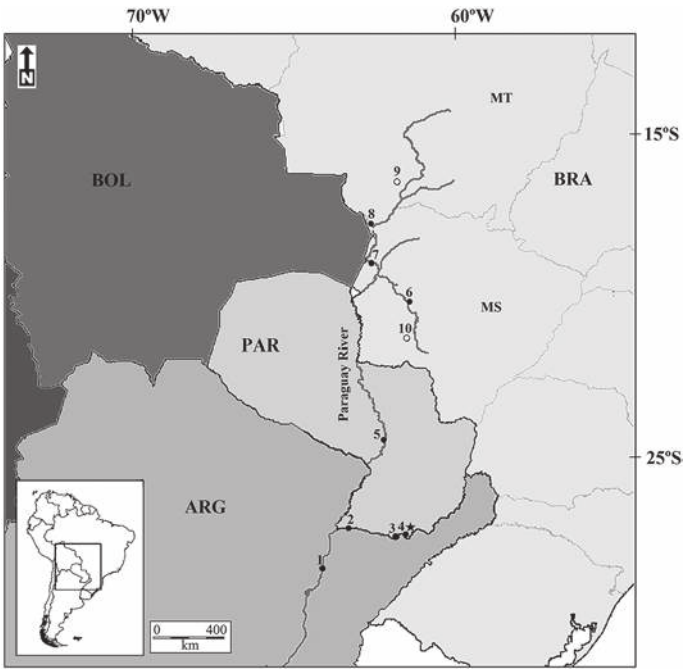

Figure 1: Locality records of *Hydrops caesurus* in Argentina (ARG), Paraguay (PAR), and Brazil (BRA), in the states of Mato Grosso (MT) and Mato Grosso do Sul (MS). Star: type-locality (Departamento Itapúa, Isla Paloma, Canal de los Jesuitas). Solid circles: literature records (1 – Corrientes: Bella Vista; 2 – Corrientes: Arroyo Carambola, Esteros de Iberá, Departamento San Miguel; 3 – Corrientes: Puerto Tala, Isla Apipé Grande; 4 – Departamento Itapúa, Complejo Isla Yacyreta; 5 – Departamento Pte. Hayes, Paraguay River, 14 km S from Puerto Rosario; 6 – Miranda; 7 – Ladário; 8 – Serra do Amolar, municipality of Corumbá. Sources: Scrocchi *et al.*, 2005; Etchepare *et al.*, 2012). Open circles: new Brazilian records reported herein (9 – Poconé; 10 – Jardim).

In the southern Pantanal, individuals of *Hydrops caesurus* have been recorded also by tourists and local staff (S. Duleba, *pers. obs.*) during underwater observation sessions in the lodge "Recanto Ecológico Rio da Prata" (21°26'18"S; 56°26'43"W; municipality of Jardim, Mato Grosso do Sul, ca. 130 km south of Miranda). Thus, Jardim is the first new locality we here record for the species.

On 30 April 2009, an adult specimen of *H. caesurus* (not sexed; snout-vent length 388 mm; tail length 69 mm; 28 g; unvouchered) was found at Pouso Alegre Lodge (16°32'24"S; 56°43'27"W), municipality of Poconé, in the Brazilian state of Mato Grosso. A second specimen (adult male, snout-vent length 380 mm; tail length 105 mm; 22 g) was found approximately one year later, on 26 April 2010, almost exactly in the same location (see below). This latter specimen was collected under permit IBAMA/SISBIO 13429-1, and deposited at the "Coleção Zoológica de Vertebrados da Universidade Federal de Mato Grosso" (Cuiabá, Mato Grosso, Brazil), under accession number UFMT 8684.

The main entrance to Pouso Alegre Lodge is located near km 33 of the "Transpantaneira", an unpaved road (MT 060) crossing the northern portion of the Pantanal wetlands. Pouso Alegre is situated nearly 170 km northeast of Acurizal Ranch and can be considered as the northernmost record of the species (Figure 1).

At Pouso Alegre Lodge, both individuals of *H. caesurus* were found amidst a dense stand of *Bromelia* sp. (Bromeliaceae), in a patch of permanent dry deciduous forest situated between a seasonally flooded open savanna – almost completely dried on both occasions – and a semi-deciduous forest, still flooded (Figure 2). Seasonally flooded habitats in the area become inundated annually, from December to May-June, mainly due to overflows of the Cuiabá River – the main tributary of Paraguay River in the northern Pantanal – after the onset of the rainy

season. Figure 2B shows a partial view of the unexpected permanently dry habitat in which *H. caesurus* was recorded for the first time in the northern Pantanal.

In the original description of *H. caesurus,* Scrocchi *et al.* (2005) stated that feeding habits of the new species were unknown. Nevertheless, Marques *et al.* (2005) assumed them to be based on fishes, and pictorially represented this in a field guide on the snakes of the Pantanal, in which the species was treated as *Hydrops* sp. This assumption was probably based in published data for the congeners *Hydrops martii* (Wagler, 1824) and *Hydrops triangularis* (Wagler, 1824), as in Cunha and Nascimento (1993) and Albuquerque and Camargo (2004).

On 21 January 2007, a specimen of *H. caesurus* was photographed underwater while constricting the anterior portion



Figure 2: Habitats at Pouso Alegre Lodge (Poconé municipality, state of Mato Grosso), a new locality record for *Hydrops caesurus* in the Brazilian Pantanal; A) seasonally flooded savannah contacting northwestwards the site shown in "B"; B) permanently dry deciduous forest, with dense stands of *Bromelia* sp., where two specimens of *H. caesurus* were found in subsequent years; C) seasonally flooded semideciduous forest contacting southeastwards the site shown in "B". This area remained inundated a little longer than "A".

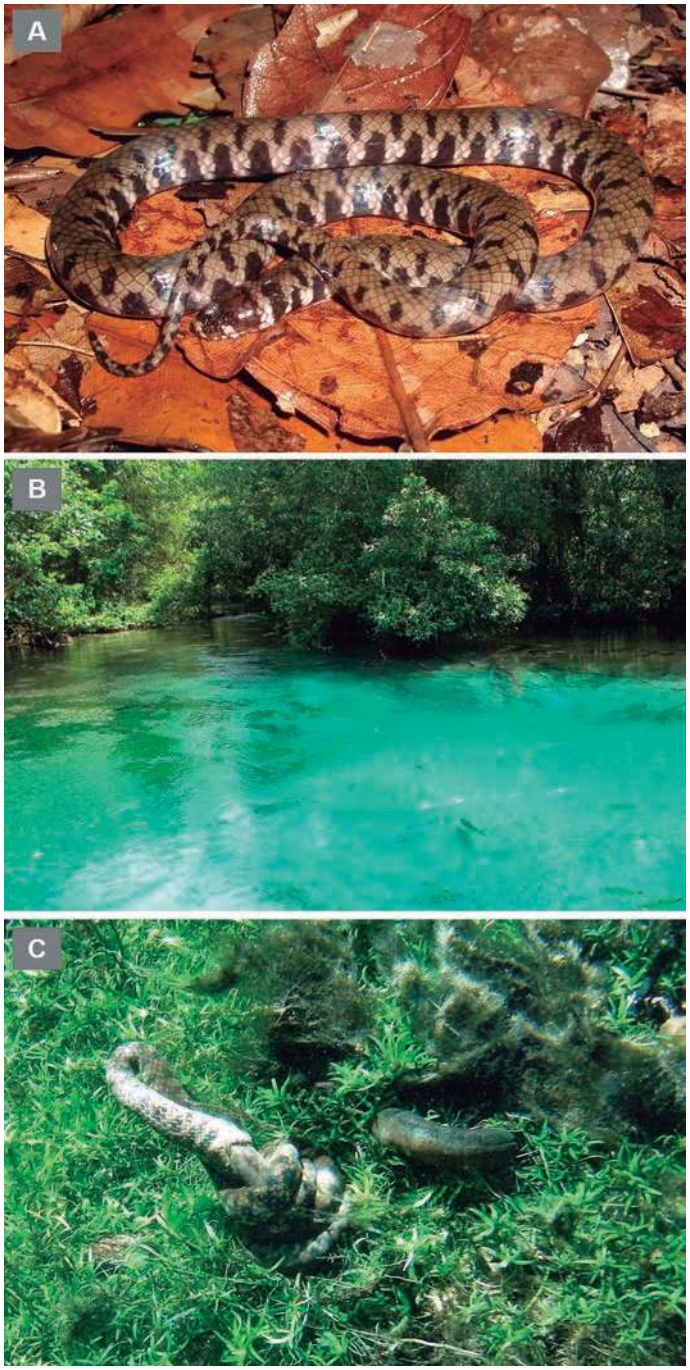

Figure 3: A) Adult specimen of *Hydrops caesurus* (Pouso Alegre Lodge, Poconé, Mato Grosso); B) "Olho d'Água" spring, at "Recanto Ecológico Rio da Prata" (Jardim municipality, state of Mato Grosso do Sul), southern Brazilian Pantanal; C) an individual of *H. caesurus* constricting and beginning to swallow an eel *Synbranchus* sp. amidst a dense stand of macrophytes and algae at the bottom of "Olho d'Água" spring.

of the body of a synbranchid eel (*Synbranchus* sp.). The photo was taken at "Recanto Ecológico Rio da Prata" (Jardim, Mato Grosso do Sul), in a small lake originating from a spring locally known as "Olho d'Água" (21°26'18"S; 56°26'43"W; Figure 3), in the headwaters of Rio da Prata. This is a left-bank tributary of the Miranda River and belongs to the Paraguay River Basin, to which the species is restricted until now.

Water temperature is nearly constant throughout the year (around 24°C) at "Olho d'Água", and maximum depth is 250 cm. The bottom of the lake – particularly along the banks – is covered by dense stands of macrophytes, filamentous algae and mosses, providing shelter and food for a number of aquatic organisms, which includes freshwater eels of the families Synbranchidae and Gymnotidae. Species composition and structure of the vegetation in the typically clean, calcium bicarbonate springs from the Bodoquena limestone plateau – including the "Olho d'Água" lake – were described and illustrated in detail by Scremin-Dias *et al.* (1999).

The snake and its prey (Figure 3C) were interacting at the bottom of the lake, near the base of the bank, at a depth of about 70 cm, in highly transparent water and amidst a submersed stand of macrophytes, predominantly *Heteranthera zosterifolia* Mart. (Pontederiaceae). Although we have no information if the snake actually completed the ingestion of its prey, one of us subsequently witnessed other similar predation attempts, involving the same predator-prey pair of species. On 12 distinct occasions, individuals of *H. caesurus* were observed at "Olho d'Água" while foraging amidst submersed macrophytes, from where individuals of *Synbranchus* sp. were occasionally observed to flee (S. Duleba, *pers. obs.*).

Although evidence is still scarce for *H. caesurus,* diet for this species seems to be similar to that of *H. triangularis,* regarded by Scartozzoni (2009) as a specialist in elongate, eel-like freshwater fishes (Synbranchiformes). According to the same author, diet is probably composed predominantly of synbranchiforms in the ancestor of the tribe Hydropsini, a well-supported clade to which *Hydrops* belongs, together with *Helicops* and *Pseudoeryx* (Grazziotin *et al.,* 2012).

In spite of the fact that *Hydrops* occupies a basal position in the tribe, its diet is not conservative among the three species presently comprising the genus. While *Hydrops triangularis* and *H. caesurus* are synbranchiform specialists, individuals of *H. martii* are reported to feed on a more variable set of fish types, including siluriforms (Callichthyidae, Pimelodidae), characiforms (Erythrinidae), and gymnotiforms (Cunha and Nascimento, 1993; Albuquerque and Camargo, 2004; Scartozzoni, 2009).

The finding of an aquatic snake crawling on land in a permanently dry habitat deserves some additional comments. Both encounters of *H. caesurus* in a dry deciduous forest at Pouso Alegre Lodge occurred during a period of lowering water – known as "vazante" in the Pantanal wetlands. Exactly in the same location, an individual of the Large-Headed Pantanal Swamp Turtle [*Acanthochelys macrocephala* (Rhodin, Mittermeier & McMorris 1984), Chelidae], was found in the beginning of a rainy season (December 2009; L.V. Campos Filho, *pers. obs.*), under heavy rain. Evidence of migratory movements across permanently dry habitats, both at the beginning and at the end of the rainy season, has also been found among aquatic amphibians in the Pantanal, such as those in the genera *Pseudis* and *Lysapsus* (Hylidae, Pseudinae) (Rodrigues *et al.,* 2011; C. Strüssmann, *pers. obs.*). The two individuals of *H. caesurus* were possibly also encountered while on their way from a drying aquatic habitat to a still-flooded one, in an attempt to find a suitable aquatic habitat to survive the drought. Migratory movements across very distinct habitats or among habitats with distinct hydroperiods should be further investigated among aquatic vertebrates in the Pantanal, in order to assess the levels of interdependence of these habitats and to subsidize conservation planning.

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