Mammalia 74 (2010): 431–432 © 2010 by Walter de Gruyter • Berlin • New York. DOI 10.1515/MAMM.2010.056

Short Note

Puma (*Puma concolor*) predation on a water buffalo (*Bubalus bubalis*)

Fernando C.C. Azevedo[1,2,4,*], Henrique V.B. Concone[2], André Pires-daSilva[3] and Luciano M. Verdade[4]

[1] Instituto Pró-Carnívoros, Av. Horácio Neto 1030, Pq Edmundo Zanoni, Atibaia SP, 12945-010, Brazil, e-mail: fazevedo@procarnivoros.org.br
[2] Projeto Onça-Pantaneira, Fazenda Real/Filial São Bento, Miranda 79380-000 MS, Brazil
[3] Biology Department, University of Texas at Arlington, Arlington, TX 76019, USA
[4] Laboratório de Ecologia Animal, LZT, USP/ESALQ, Caixa Postal 09, Piracicaba, SP 13418-900, Brazil

*Corresponding author

Keywords: *Bubalus*; buffalo; domestic; Pantanal; predation; *Puma*.

Having the widest distribution of any terrestrial mammal in the Americas (Currier 1983), pumas (*Puma concolor*) (Linnaeus, 1771) are known to prey on an array of wild and domestic prey species. In North America, pumas prey mostly on large wild ungulates (Iriarte et al. 1990, Thompson et al. 2009). In Central and South America, food habits of the puma are concentrated upon medium and small prey species (Iriarte et al. 1990, Branch et al. 1996, Scognamillo et al. 2003, Azevedo 2008). Large prey species are also important in times of scarcity of more vulnerable small and medium prey species (Branch et al. 1996, Bank et al. 2002, Azevedo 2008). As the availability of wild ungulates decreases, domestic stock might be consumed as an alternative prey source (Polisar et al. 2003). The consumption of livestock is also reported when domestic animals are kept near forested areas (Azevedo and Murray 2007, Palmeira et al. 2008). Despite preying on a variety of domestic stock such as cattle, goat, sheep, swine, and horses (Andelt 1999, Turner and Morrison 2001, Mazzoli et al. 2002, Rosas-Rosas et al. 2003, Azevedo 2008, Palmeira et al. 2008), puma predation on water buffalo (*Bubalus bubalis*) has never been reported. Here we document an observation of a puma preying on a water buffalo.

Our research is part of an ongoing project initiated in 2007 to examine livestock predation by jaguars (*Panthera onca*) and pumas in the southern part of the Pantanal region of the Mato Grosso do Sul state in Brazil (Lat 19°28′40″S and 57° 00′49″W). The Pantanal is a floodplain covering approximately 140,000 km^2 of land on the borders of Bolivia and Paraguay. The Pantanal is characterized by an annual regime of flooding and low land relief, with the landscape comprising wetlands, seasonally inundated grasslands and woodlands, and non-flooding forests. Our study site is a working 100 km^2 cattle ranch/wildlife reserve, located in the southern region of the state of Mato Grosso do Sul, in Brazil. Water buffalo in the Pantanal region are raised as domestic stock, mainly for meat.

On 15 April 2008, a 3-month-old female water buffalo calf was killed and consumed by two pumas. Based on the tracks found around the carcass, an adult female puma and one cub visited the carcass. No tracks of jaguars were found near the carcass. The calf was found in a patch of forest inside an allotment where a group of adult female buffalos and their calves were grazing. The carcass was lying on the ground, uncovered, under the shade of a tree and not yet consumed by scavengers (Figure 1). The necropsy indicated multiple marks of wounds inflicted on the throat. The multiple marks match the size and shape of a large carnivore's bite. The death could have been caused by asphyxiation. The abdominal cavity was opened. Distal portions of several ribs were partially consumed and the hide and muscles of the left lateral abdominal area were fed upon. We did not find fractures on the skull or other bones. On 16 April, the female puma returned to the carcass and dragged it approximately 10 m away, taking it through a four-wired fence to another allotment where the carcass was fed upon again. The puma consumed portions of the ribs and part of the left shoulder. Before its death, the calf was in apparent good nutritional condition but had difficulty moving owing to some hind limb problems.

A potential explanation for this puma predation we observed could be related to the calf's limited mobility together with the energetic needs of the female puma at the time of the encounter. We speculate that, having to provide for her dependent cub, the female puma might have risked an attack towards the buffalo herd and killed the calf.

The few reported cases of predation on water buffalo are often related to large predators such as tigers, leopards and crocodiles, specifically during juvenile and calf stages (De Silva et al. 1994, Bagchi et al. 2003, Wegge et al. 2009). The introduction of water buffalo in cattle producing areas in South America has provoked a new ecological interaction with two other large predators, jaguar and puma. However, as reported in our study, cases of predation on water buffalo calves are rare and have been reported only for jaguars mostly upon young animals with physical impediments that prevented their movement with the herd (Hoogesteijn and

Figure 1 Three-month-old female water buffalo of approximately 90 kg found dead and partly consumed by a female puma on April 2008 at São Bento ranch, Pantanal, Brazil.

Hoogesteijn 2008). Within a period of 2 years, we recorded 72 cases of predation by large cats (predation rates=0.007 and 0.008 for 2007 and 2008, respectively). Jaguars were responsible for 71 cases of predation on cattle. Although pumas could pose problems for water buffalo kept as domestic stock adjacent to their habitat, the only case of predation by pumas recorded was the one herein reported upon a water buffalo calf. In contrast to cattle, water buffalo display defensive behavior against predators and this could explain lower rates of predation on water buffalo where they are raised in contact with cattle (Hoogesteijn and Hoogesteijn 2008). To our knowledge, this is the first report of a puma predation on a water buffalo.

Acknowledgements

We thank J. Aycrigg and W. Seybold for constructive comments on an earlier draft of this manuscript. We also thank the National Center for the Conservation of Predators CENAP/ICMBio for the support. This work was financed by Fazenda Real/Filial São Bento, FAPESP (Proc. No. 2007/00976-7), Premier Pet and World Wildlife Fund/Brazil Program Pantanal para Sempre. Institutional support was provided by Instituto Pró-Carnívoros.

References

Andelt, W.F. 1999. Relative effectiveness of guarding-dog breeds to deter predation on domestic sheep in Colorado. Wildl. Soc. Bull. 27: 706–714.

Azevedo, F.C.C. 2008. Food habits and livestock depredation of sympatric jaguars and pumas in the Iguaçu National Park area, south Brazil. Biotropica 40: 494–500.

Azevedo, F.C.C. and D.L. Murray. 2007. Spatial organization and food habits of jaguars (*Panthera onca*) in a floodplain forest. Biol. Conserv. 137: 391–402.

Bagchi, S., S.P. Goyal and K. Sankar. 2003. Prey abundance and prey selection by tigers *Panthera tigris* in a semi-arid, dry deciduous forest in western India. J. Zool. 260: 285–290.

Bank, M.S., R.J. Sarno, N.K. Campbell and W.L. Franklin. 2002. Predation of guanacos (*Lama guanicoe*) by southernmost mountain lions (*Puma concolor*) during a historically severe winter in Torres del Paine National Park, Chile. J. Zool. 258: 215–222.

Branch, L.C., M. Pessino and D. Villarreal. 1996. Response of pumas to a population decline of the plains vizcacha. J. Mammal. 77: 1132–1140.

Currier, M.J.P. 1983. *Felis concolor*. Mammal. Species 200: 1–7.

De Silva M., S. Dissanayake and C. Santiapillai. 1994. Aspects of the population dynamics of the wild Asiatic water buffalo (*Bubalus bubalis*) in Rahuna National Park, Sri Lanka. J. S. Asian Nat. Hist. 1: 65–76.

Hoogesteijn, R. and A. Hoogesteijn. 2008. Conflicts between cattle ranching and large predators in Venezuela: could use of water buffalo facilitate felid conservation? Oryx 42: 132–138.

Iriarte, J.A., W.L. Franklin, W.E. Johnson and K.H. Redford. 1990. Biogeographic variation of food habits and body size of the American puma. Oecologia 85: 185–190.

Mazzoli, M., M.E. Graipelb and N. Dunstonec. 2002. Mountain lion depredation in southern Brazil. Biol. Conserv. 105: 43–51.

Palmeira, F.B.L., P.G. Crawshaw Jr., C.M. Haddadc, K.M.P.M.B. Ferraz and L.M. Verdade. 2008. Cattle depredation by puma (*Puma concolor*) and jaguar (*Panthera onca*) in central-western Brazil. Biol. Conserv. 141: 118–125.

Polisar, J., I. Maxit, D. Scognamillo, L. Farrel, M.E. Sunquist and J.F. Eisenberg. 2003. Jaguars, pumas, their prey base and cattle ranching: ecological interpretations of a management problem. Biol. Conserv. 109: 297–310.

Rosas-Rosas, O.C., R. Valdez, L.C. Bender and D. Daniel. 2003. Food habits of pumas in northwestern Sonora, Mexico. Wildl. Soc. Bull. 31: 528–535.

Scognamillo, D.G., I.E. Maxit, M.S. Sunquist and J. Polisar. 2003. Coexistence of jaguar (*Panthera onca*) and puma (*Puma concolor*) in a mosaic landscape in the Venezuelan llanos. J. Zool. 259: 269–279.

Thompson, D.J., K.M. Fecske, J.A. Jenks and A.R. Jarding. 2009. Food habits of recolonizing cougars in the Dakotas: prey obtained from prairie and agricultural habitats. Am. Midland Nat. 161: 69–75.

Turner, J.W. Jr. and M.L. Morrison. 2001. Influence of predation by mountain lions on numbers and survivorship of a feral horse population. Southwest. Nat. 46: 183–190.

Wegge, P., M. Odden, C.P. Pokharel and T. Storaas. 2009. Predator–prey relationships and responses of ungulates and their predators to the establishment of protected areas: a case study of tigers, leopards and their prey in Bardia National Park, Nepal. Biol. Conserv. 142: 189–202.