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SHORT COMMUNICATION

JAGUAR *PANTHERA ONCA* (LINNAEUS, 1758) (MAMMALIA: CARNIVORA: FELIDAE) PRESUMABLY FEEDING ON FLATHEAD CATFISH *PYLODICTIS OLIVARIS* (RAFINESQUE, 1818) (ACTINOPTERYGII: SILURIFORMES: ICTALURIDAE) AT AROS AND YAQUI RIVERS, SONORA, MEXICO

Juan Pablo Gallo-Reynoso

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Jaguar *Panthera onca* (Linnaeus, 1758) (Mammalia: Carnivora: Felidae) presumably feeding on Flathead Catfish *Pylodictis olivaris* (Rafinesque, 1818) (Actinopterygii: Siluriformes: Ictaluridae) at Aros and Yaqui rivers, Sonora, Mexico

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Abstract: Despite the abundant literature on the feeding preferences of the Jaguar *Panthera onca* throughout its range in America, few studies report fish consumed as prey by Jaguars. This paper reports two accounts of Jaguars presumably feeding on the introduced Flathead Catfish *Pylodictis olivaris* at the Aros and Yaqui rivers in Sonora, northwestern Mexico.

Keywords: Diet, feeding preferences, fish remains, northwestern Mexico.

The Jaguar *Panthera onca* is known to forage on over 85 prey species (Weckel et al. 2006), mainly on a large variety of mammals, birds, reptiles, and fish (Gudger 1946; Emmons 1987; Aranda & Sánchez-Cordero 1996; Polisar 2000; Garla et al. 2001; Polisar et al. 2003; Weckel et al. 2006; Azevedo & Murray 2007; Castañeda et al. 2013; Hayward et al. 2016). It preys on aquatic and semi-aquatic fauna, such as *Caiman* species in Brazil (Da Silveira et al. 2010), Morelet's Crocodile *Crocodilus moreletti* in Calakmul, Mexico (Aranda & Sánchez-Cordero 1996;

Pérez-Flores 2018), large marine turtles such as *Chelonia mydas*, *Dermochelys coriacea*, *Eretmochelys imbricata*, and *Caretta caretta* throughout America (Arroyo-Arce & Salom-Pérez 2014; Fonseca et al. 2020), *Lepidochelys olivacea* and *C. mydas* on the Pacific coast of Costa Rica (Carrillo et al. 1994; Alfaro et al. 2016; Fonseca et al. 2020). One individual was observed scavenging on a dolphin carcass in Honduras (Castañeda et al. 2013). Other semi-aquatic prey consumed by Jaguars in the Amazon river basin are the Capybara *Hydrochoerus hydrochaeris* (Schaller & Vasconcelos 1978; Weckel et al. 2006; Da Silveira et al. 2010) and fauna associated with water bodies like the Baird's Tapir *Tapirus bairdii* in the Calakmul region (Pérez-Flores et al. 2020). Jaguars also hunt Giant Otters *Pteronura brasiliensis* in Guyana and Brazil (Shackley 1998; Ramalheira et al. 2015). Regarding fish, Jaguars feed on piranha *Serra salmus* in Alto Pantanal, Brazil (Da Silveira et al. 2010). Fish make 5% of Jaguar prey at Río Manu, Parque Nacional Manu

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in Peru (Emmons 1987). The Jaguar diet comprises 21 fish species at Llanos Altos, Venezuela (Polisar 2000). Although the Jaguar is adapted to exploit rivers, lagoons, and coastal areas where large prey species are available, it is also important to record fish as a key component of the Jaguar's diet. No published accounts of Jaguars preying on fish in Mexico are currently available.

The Jaguar is listed as an endangered species in Mexico (NOM-059-ECOL-2010) and as Near Threatened in the IUCN Red List of Threatened Species (Quigley et al. 2017). This felid species needs close and regular monitoring in key regions of the country to ascertain its status. The presence of Jaguars in the state of Sonora is highly important for representing the northernmost population of this large felid in Mexico and Latin America (López-González & Brown 2002; Rosas-Rosas & Bender 2012). Currently, Jaguar populations in northern Mexico have remained stable since large land areas are dedicated to preservation in several ranches. An example is the Northern Jaguar Project, which includes two ranches, Los Pavos and Zetasora, totalling 35,000ha. Other 17 nearby ranches participate in voluntary projects such as

the 'Living with cats' initiative, comprising about 35,600 ha to support Jaguar conservation in this area of Sonora. In southern Sonora, the Monte Mojino Reserve dedicates 7,370 ha to Jaguar conservation (Blust 2019). Multiple camera traps record large amounts of information on individual Jaguars in these large areas of Sonora, which has led to the establishment of a Jaguar corridor in interior areas of Sonora, far from the arid landscapes of the Sonoran Desert (Rosas-Rosas & Bender 2012).

Here I describe two incidents of fish presumably caught by Jaguars at the Aros and Yaqui rivers in central Sonora, observed while monitoring Bald Eagles *Haliaeetus leucocephalus* and Neotropical Otters *Lontra longicaudis*.

OBSERVATIONS

On 7 May 1995, my companion and I were surveying the confluence area of the Bavispe and Aros rivers that make the Yaqui river in northwestern Mexico (Figure 1). We travelled upstream in a canoe on the Aros river while searching the riverbanks for Neotropical Otter tracks and latrines, of which we found several. We noticed

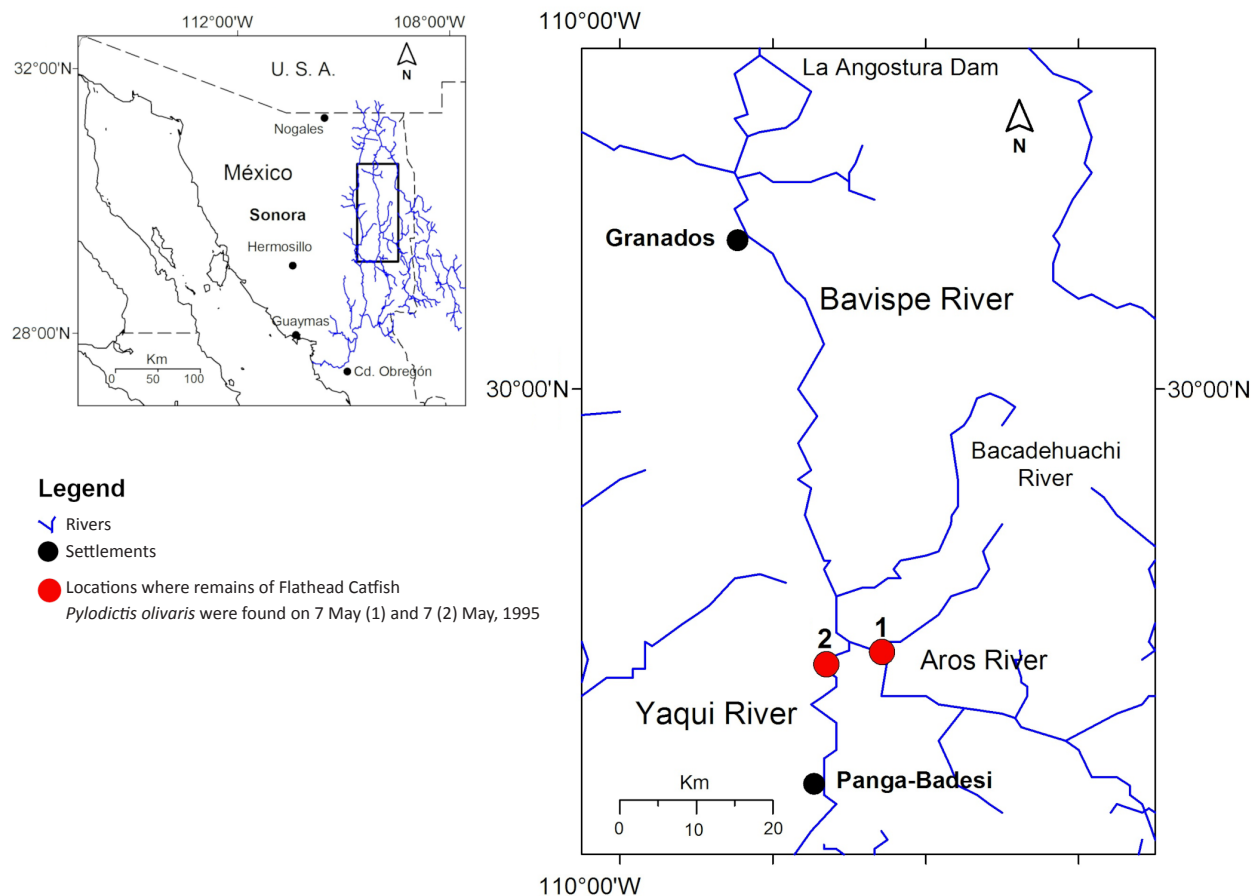


Figure 1. Map of the study area in Sonora, Mexico.



Image 1. Flathead Catfish *Pylodictis olivaris* presumably preyed on by Jaguar *Panthera onca* and scavenged by Coyote *Canis latrans* and Black Vultures *Coragyps atratus* at Aros river, Sonora, Mexico. © J.P. Gallo-Reynoso.

large tracks on the northern riverbank 3 km upstream that made us approach the shore, assuming they were of a Mountain Lion *Puma concolor*. Instead, the tracks observed resembled tracks of a Jaguar according to the field guide of animal tracks by Aranda-Sánchez (1981). These tracks, which seemed to be about a week old, showed that the individual had moved upstream along the riverbank. We followed the Jaguar tracks and lost them in a rocky area facing a large and deep pool, where the cat seemingly climbed. We found a Neotropical Otter latrine above those rocks and collected spraints. The otter tracks continued from the rocks to the riverbank, and we followed them to behind a rock. There, we again found the week-old Jaguar tracks coming from the water. We followed the tracks further up and found the almost entirely devoured carcass of a Flathead Catfish *Pylodictis olivaris* measuring about 1 m in length, which probably weighed 10 kg (Sergio Avila pers. comm. 11 October 2019) (Image 1). Avila had previously weighed one of these catfish individuals at the Aros river and recorded 10 kg. The inspection of both these large fish remains and the Jaguar tracks made us think that the catfish was taken out of the water and dragged to the sandy riverbank between tall vegetation composed of Jarilla *Baccharis salicifolia*, where it was eaten the previous week. The large size and estimated weight of the fish ruled out the possibility that a Neotropical Otter had captured and dragged it out of the water this far. The size of the catfish head and remains suggest it

was a significantly heavy fish for an otter to take out of the water, although large fish have been recorded to be preyed upon by Neotropical Otters. There were no otter tracks around the carcass, but only those of the Jaguar and some tracks of a Coyote *Canis latrans*. From the inspection of the carcass, we determined that the fish was probably scavenged by the Coyote, as several bones were crushed and scattered. Tracks of Black Vulture *Coragyps atratus* and White-tailed Deer *Odocoileus virginianus* were also observed in the area.

Several hours later, after leaving our camp at the confluence of the Bavispe and Aros rivers to continue our monitoring of Bald Eagles and Neotropical Otters, we noticed a freshly killed partially eaten catfish some 7 km downstream, about 10 km away from the first location (Figure 1). It was submerged in a shallow area less than 50 cm deep in the middle of the Yaqui river. The fish was probably killed in this shallow and wide area of the river, but was not taken out of the water by the predator. We lifted it into the canoe for identification. It was a large Flathead Catfish, olive dorsally, yellowish ventrally, about the same size as the one previously found scavenged at the Aros river. We noticed several gashes on the body that appeared to have been made by raptor claws. Initially, we thought that it had been caught by a Bald Eagle *H. leucocephalus* that nested nearby, but it was not taken out of the water. We also determined that the probability of this catfish individual being killed by a Neotropical Otter was low because the marks on

its body were longer, and the slashes made by claws were more extended than would be expected from an otter. Upon a detailed inspection, we determined that the large and heavy fish probably weighed over 10 kg and was slashed by large paws on both flanks, the gills, and other parts of the body. The catfish suffered deep wounds on its head from large and widely separate incisors and was crushed by a powerful bite, most likely inflicted by a Jaguar. The bite certainly killed the catfish. We left the fish remains in the same spot, then moved to the western riverbank, where we found a set of fresh Jaguar tracks with old White-tailed Deer tracks nearby.

DISCUSSION

These two observations of large Flathead Catfish individuals presumably killed and eaten by Jaguars in two different rivers suggest that either a single or two different Jaguars roaming in the area preyed on these large introduced catfish, which are an available food resource (Campoy-Favela et al. 1989; Leibfried 1991; Varela-Romero et al. 2011). Schaller & Vasconcelos (1978) reported that Jaguars leave large portions of the prey uneaten when perturbed or satiated. The Flathead Catfish is an unexpected food source for Jaguars in this part of Sonora, an area where Jaguars have been documented to prey on White-tailed Deer, hares *Lepus*, rabbits *Sylvilagus audubonii*, Collared Peccary *Pecari tajacu*, White-nosed Coati *Nasua narica*, cattle and other smaller prey (Rosas-Rosas et al. 2008) locally available, as shown by the White-tailed Deer tracks. On the other hand, Neotropical Otters eat their prey near the edge of the water, mostly on rocky substrates (Gallo 1996). The analyses of spraints collected at the same area showed that they feed on a variety of fish species in these two rivers, which are also available as prey for Jaguars. Ninety percent of the otter's diet is composed of introduced fish, of which five are dominant: Channel Catfish *Ictalurus punctatus*, Yellow Catfish *Ameiurus melas*, Largemouth Bass *Micropterus salmoides*, Flathead Catfish, and Tilapia *Oreochromis* (Gallo 1996). These large fish are likely preyed on by Jaguars as well. For comparison, the Neotropical Otter also feeds on Flathead Catfish, but the bone remains found in otter spraints were smaller than the sizes of the individual fish presumably preyed upon by Jaguars. These felids are good swimmers capable of crossing large expanses of water; they swim across rivers and lagoons to gain access to places at the other margin of these water bodies searching for food (Da Silveira et al. 2010). This behaviour was observed in a coastal lagoon in Campeche, where Jaguars swam to an island more than 200 m away from the bank (Gallo-Reynoso

2012). At Chichankanab lagoon in Quintana Roo, we have observed large tracks of a Jaguar emerging from the water to a muddy riverbank following the tracks of a tapir after having swum across the lagoon, which harbours a high density of Morelet's Crocodiles (Gallo-Reynoso and Ortega-Padilla, pers. obs. 17 October 2018). Knowing that Jaguars can capture large prey from aquatic habitats, there is no doubt that they can catch large fish such as the Flathead Catfish and presumably consume them as prey.

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