

# Peregrine falcons capture fish in Brazil

Bianca Pinto Vieira<sup>1,3</sup> and Julio Amaro Betto Monsalvo<sup>2</sup>

<sup>1</sup> Departamento de Ecologia e Zoologia, Centro de Ciências Biológicas, Universidade Federal de Santa Catarina. Florianópolis, SC, Brazil.

<sup>2</sup> Centro de Ciências Biológicas e da Saúde, Universidade Presbiteriana Mackenzie. São Paulo, SP, Brazil.

<sup>3</sup> Corresponding author: biancabiofsc@gmail.com

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**ABSTRACT:** This note first describes two instances of Peregrine falcons (*Falco peregrinus tundrius*) capturing fish in different places in Brazil. The first record was in the Ibirapuera Park, municipality of São Paulo, where an adult male swept and captured a fish on the lake's surface, as a typical fishing raptor's strategy. The second one was an adult female catching fish in a salty lagoon in the municipality of Florianópolis. She used vertical diving, surprisingly dipping into water. In both circumstances, falcons had the opportunity to capture birds but they still opted to fish. Although Peregrine falcons mostly prey on birds, there are already some records of feeding on mammals, reptiles, and insects. There are some possible reasons why Peregrine falcons would go fishing, but advanced studies are necessary to test them.

**KEY-WORDS:** behavior; diet; *Falco peregrinus tundrius*; foraging habits; hunting strategy.

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## INTRODUCTION

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According to Cramp & Simons (1980), the diet of falcons is related to prey availability and habitat quality. Thereby it is expected that the Peregrine Falcon (*Falco peregrinus* Tunstall, 1771) would have a greatly varied diet since it occurs from urbanized to uninhabited areas, sometimes being found even in the middle of the ocean (Voous 1961, Cramp & Simons 1980, Del Hoyo *et al.* 1994). At first, this statement causes strangeness once it is a bird-eating specialist. On the other hand, there are already some prey variation recorded for this species, which also eats small mammals (see Cade & Digby 1982, Thiollay 1982, Byre 1990, Silva 1997, Wells 1999, Serra *et al.* 2001, Kulic 2005, Castellanos *et al.* 2006, Pereira *et al.* 2006, Brown 2007, Probst *et al.* 2007, Bagyura *et al.* 2008, Drewitt & Dixon 2008, Moshkin 2009), insects (see Layard & Layard 1882, Herbert & Herbert 1965, Cade & Digby 1982, White & Brimm 1990, Amies 1997, Collar 2002, Pereira *et al.* 2006), and reptiles (see Layard & Layard 1882, Cade & Digby 1982, Pereira *et al.* 2006).

Peregrine falcons main hunting behaviors include pursuit, vertical dive, swoop, and attack from perch (Beebe 1960, Craddock & Carlson 1970, Rogers & Leatherwood 1981, Cade & Digby 1982, Vasina & Straneck 1984, Fox 2003, Zoratto *et al.* 2010). This species prefers surprise attacks (Herbert & Herbert 1965,

Cade & Digby 1982, Dekker 2009), adapting place, time, and strategy to achieve its preys, in an opportunistic behavior (Beebe 1960, Sick 1961, Sick 1997, Silva 1997, Serra *et al.* 2001, Pereira *et al.* 2006, Verdari 2011). Between Peregrine falcons migratory subspecies, *Falco peregrinus tundrius* comes from northern hemisphere to winter in southern hemisphere (Ratcliffe 1980, Cade & Digby 1982, Del Hoyo *et al.* 1994). In Brazil, the high expression of this species' opportunistic hunting behavior, suiting itself according to the chosen habitat, has already been reported by some studies (see Sick 1961, Sick 1997, Silva 1997, Serra *et al.* 2001, Pereira *et al.* 2006).

Fishes as prey of Peregrine falcons are very rare (Cramp & Simons 1980, Ratcliffe 1980, Cade & Digby 1982, Del Hoyo *et al.* 1994). The hunting behavior to capture fishes is mostly speculated. Therefore, this paper describes two observed strategies of fishing used by *Falco peregrinus tundrius* in Brazil, with the first record of intentional full diving into water.

## MATERIALS AND METHODS

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Both records were opportunistic. First record occurred in the Ibirapuera Park's urban lake (23°35'08.6"S; 46°39'34.4"W; elev. ±760 m), municipality of São Paulo, state of São Paulo. The Ibirapuera Park has 110 ha and is

located at a highly urbanized area. This park has two lakes connected with a depth between 0.5 to 2.5 m.

The second record was in the Ponta das Canas' salty lagoon (27°24'29.8"S; 48°25'37.9"W; elev. ±2 m), municipality of Florianópolis, and coastline of the state of Santa Catarina. The Ponta das Canas' salty lagoon has 28 ha bordered with mangrove forests and *restinga*. Because of tidal influence in the Ponta das Canas' salty lagoon, depth varies between -10 and 3 m.

## RESULTS

On 21 November 2007, J. A. B. M. observed an adult male Peregrine Falcon swooping and capturing a silvery-grey fish with his talons in the urban lake of

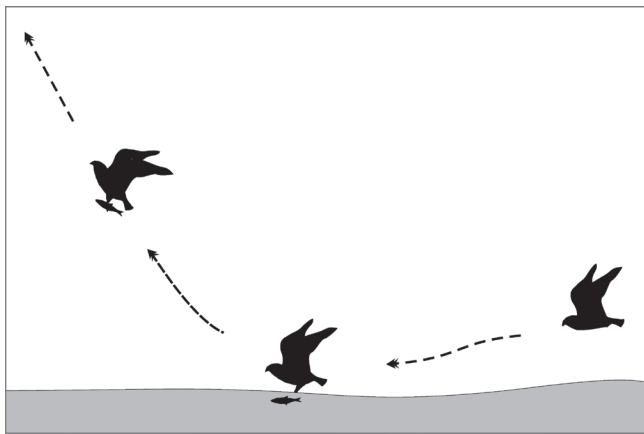


FIGURE 1. Male of *Falco peregrinus tundrius* fishing by swooping on 21 November 2007 at Ibirapuera Park, São Paulo, Brazil. Author: B. P. V.

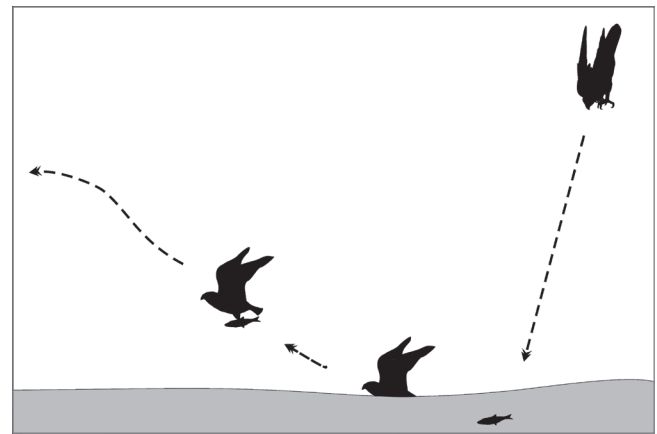


FIGURE 2. Female of *Falco peregrinus tundrius* fishing by vertical dive on 27 January 2012 at the Ponta das Canas' salty lagoon, Florianópolis, Brazil. Author: B. P. V.

## DISCUSSION

Both areas were used by many Passeriformes and aquatic birds. At the Ibirapuera Park, the same male was seen hunting birds, such as Great Kiskadee (*Pitangus sulphuratus* (Linnaeus, 1766)) and Snowy Egret (*Egretta thula* (Molina, 1782)) (J. A. B. M. *pers. obs.*). Also, there were flocks with hundreds of individuals of Black Skimmer (*Rynchops niger* Linnaeus, 1758), Cabot's Tern (*Thalasseus acuflavidus* (Cabot, 1847)), Lesser Yellowlegs (*Tringa flavipes* (Gmelin, 1789)), Greater Yellowlegs (*Tringa melanoleuca* (Gmelin, 1789)), and Semipalmated Plover (*Charadrius semipalmatus* Bonaparte, 1825) at the Ponta das Canas' salty lagoon (B. P. V. *pers. obs.*). Therefore, there was no lack of avian prey. Also, we discarded the possibility of the falcon being confused and striking the water rather than the sky because during both attacks reported herein the water was visibly darker than the sky.

Some studies had previously found fish as an exceptional prey for Peregrine falcons (Cade 1960, Weir

Ibirapuera Park (Figure 1). The male is known to winter around the park at least since 2005 (J. A. B. M. *pers. obs.*). As soon as the male got height, the fish slipped and fell into the lake. The falcon swooped and captured it again but the fish slipped for the second time. The male gave up on the prey which was probably a Cichlidae, with 15–20 cm in length. Soon after the hunt, he killed a blue-and-white swallow *Pygochelidon cyanoleuca* (Vieillot, 1817), which was flying around.

On 27 January 2012, B. P. V. saw an adult female doing a vertical dive at high speed and getting into the water of the Ponta das Canas' salty lagoon (Figure 2). The impact caused a loud noise and, almost one second later, she emerged with one fish in her talons, probably a Cichlidae or Mugilidae. Then, the female flew toward some buildings where she probably had a roost.

1979, Tatum 1981, Hardy 1992, Barnes & Garwood 1995, Wheeler 2003, Moshkin 2009). Even though it is rare, this exception has been reported worldwide. For different reasons, fish consumption was not seen either in São Paulo nor Florianópolis. However, Weir (1979) and Moshkin (2009) had already confirmed fish consumption by this species, including remains in nests, which also suggests the feeding of the young.

Both records were of adults yet of different sexes. Dekker (2009) indicates that Peregrine falcons' hunting behavior seems to be innate without difference between males and females, though individuals can become more proficient with age, as also evidenced by Dekker (1980). There are some tactics that can increase hunting success, leading the falcon to ignore its common type of prey in order to get alternatives (Silva 1997). It is possible that falcons could have learned how to fish by observing sympatric fish-eating raptors such as Ospreys (*Pandion haliaetus* (Linnaeus, 1758)) and Bald Eagles (*Haliaeetus leucocephalus* (Linnaeus, 1766)) in their breeding sites

in the northern hemisphere. But more detailed studies are necessary to prove that. In particular cases, hunting behaviors employed to get exceptional prey are different from the ones used to capture birds, such as the capture with beak described by Sick (1997).

Until now, the most speculated behavior to justify fish as prey was kleptoparasitism over Ospreys (Barnes & Garwood 1995, Wheeler 2003, Moshkin 2009), since Peregrine falcons would have “*an innate fear of water*” (Beebe 1960). Nevertheless, Heredia & Clark (1984) and Dekker (2009) support that kleptoparasitism is rare in Peregrine falcons. Also, Dekker (2009) highlights a size ratio whereby Peregrine falcons tend to parasitize smaller birds, being parasitized by bigger ones, both intra- and inter-specifically.

Cade (1960) observed direct hunting with a male swooping and grabbing a fish that leaped from the water. Tatum (1981) also reported an individual performing repeated swoops at sea, until it finally snatched a fish. In addition, Hardy (1992) described another male capturing two fishes with parachuted flight, as Kestrel's maneuver. On the other hand, the tactics described here are somewhat similar to those used by raptors adapted to fish. For example, the diving tactic used in Florianopolis was similar to the Osprey's feet-first plunging (Wheeler 2003, Gwyne *et al.* 2010). Nevertheless, these behaviors could also be viewed as simple adaptations of hunting flights already performed by Peregrine falcons in other situations (see strategies in Beebe 1960, Craddock & Carlson 1970, Fox 2003).

Despite its reported “*fear*”, it is well known that Peregrine falcons use habitats strictly associated with water (Beebe 1960, Cade 1960). Foraging in Brazilian wintering areas, for example, is commonly performed in aquatic habitats, including shorebirds migratory routes (Sick 1997, Silva 1997, Pereira *et al.* 2006). In fact, our second record happened in a migratory coastal route. The hunting with intentional and complete dive into the lagoon provides more evidence that Peregrine falcons indeed have a strict fearless relation with water or at least does not avoid it.

The interaction with water, the adaptation of strategies, and the greater diet flexibility in wintering areas probably could culminate in fishing strategies as an alternative foraging behavior. In terms of wildlife management, knowing the physiological effects of dietary breadth on health and longevity of Peregrine falcons could also influence how rehabilitation and falconry are done today.

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