



## Injuries caused by the venomous catfish *pintado* and *cachara* (*Pseudoplatystoma* genus) in fishermen of the Pantanal region in Brazil

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### ABSTRACT

**INTRODUCTION:** the fishing activity throughout the Upper Paraguay River Basin has huge financial and biological importance. This retrospective study investigated the occurrence of injuries caused by fish of the *Pseudoplatystoma* genus (spotted catfish or *pintado* and striped catfish or *cachara*) in professional fishermen of the Pantanal of Mato Grosso do Sul State. **METHODS:** we collected information through a questionnaire, showing that fishing is carried out by workers with low level of education, mainly adults or seniors with low financial gains. **RESULTS:** in Miranda town, 126 of 315 fishermen were interviewed and 38 individuals reported injuries (30.16%). In Corumbá town, 355 of 627 fishermen were interviewed, and 111 (56,61%) reported injuries. The lacerated lesions were the most common, associate with edema, erythema, radiating pain to the root of the limb, paresthesias and local necrosis. More rarely, they reported the occurrence of fever, cardiac arrhythmias and cold sweating. These manifestations may be associated with late secondary infections or envenomations caused by the toxins in the stingers of the fish. Many questionable and inappropriate treatments are used, sometimes aggravating the injuries. **CONCLUSIONS:** the freshwater professional fishermen need guidance on first aid measures and prevention of accidents caused by these venomous fish.

**Key words:** Pantanal, Spotted catfish, Striped catfish, *Pseudoplatystoma*, professional fishermen, Public Health.

### INTRODUCTION

Since the dawn of Humanity, fisheries resources are considered a source of great food importance, providing employment and income to those engaged in the activity, although these workers are susceptible

to a number of dangers and diseases. In the region of the Pantanal (a vast area of flooded plains in Midwest Brazil), the fishing activity is essential for human survival (Benante et al. 2012). According to anterior studies injuries in professionals fishermen in freshwater environments in Brazil are common (Haddad Jr 2003, Haddad Jr and Lastoria 2005,

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Haddad Jr and Martins 2006, Silva 2009, Silva et al. 2010).

Some Brazilian freshwater fish can cause serious injuries in humans. As an example, the Siluriformes (a group of freshwater catfish) have hard and serrated stingers in the pectoral and dorsal fins that cause perforating or lacerated wounds and sometimes possess venom (Haddad Jr 2003, 2008, Haddad Jr and Lastoria 2005, Haddad Jr and Martins 2006, Silva 2009, Silva et al. 2010). The venoms of various species of Siluriforms have action analogous to massive liberations of prostaglandins and acetylcholine and can cause severe pain, skin necrosis and ischemia in the compromised area (Williamson 1995, Junqueira 2006). These venoms are labile and have the effects attenuated by immersion in hot water (approximately 50° C) water for 30 to 90 minutes, which provokes decreasing of the pain (Haddad Jr 2003, 2008, Haddad Jr and Lastoria 2005, Haddad Jr and Martins 2006).

The mandijubas or yellow catfish (*Pimelodus maculatus*) and mandis-chorões (*Pimelodella* sp.) are the most common cause of injuries in all rivers and lakes of Brazil (Haddad Jr 2008). Other

larger catfish as the *Pseudoplatystoma* genus (surubins) have large and sharp stingers which can carry toxins causing pain and necrosis (Haddad Jr 2008). In a previous study, a percentage of 24% of professional fishermen of the Pantanal region cited anterior injuries by stingers of *Pseudoplatystoma* (Silva 2009, Silva et al. 2010).

The genus *Pseudoplatystoma* is part of the Pimelodidae family and they inhabit major watercourses in deep channels in the major system rivers of Brazil (Amazon, Prata, Tocantins/Araguaia and São Francisco Basins). They have robust bodies, and are important as human food. *Pseudoplatystoma corruscans* and *P. reticulatum* species (the spotted catfish or *pintado* and the striped catfish or *cachara*) are fitted with large, serrated barbs on the fins, causing perforating and/or lacerated wounds, as well as edema, erythema and occasional skin necrosis (Figure 1) (Buitrago-Suárez and Burr 2007). There is also possibility of serious infections caused by staphylococci and streptococci, such as less common highly pathogenic bacteria, such as the *Vibrio*, *Aeromonas*, *Pseudomonas* and *Edwardsiella* genera (Haddad Jr 2008).



**Figure 1** - *Pseudoplatystoma corruscans*, the pintado or spotted catfish (above) and *Pseudoplatystoma reticulatum*, the cachara or striped catfish (below). Detail: stinger in the pectoral fin. Photos: Vidal Haddad Junior.

The treatment is done by soaking the affected local in hot water for 30-90 minutes, cleaning the area, removing fragments of the stinger and promoting the tetanus vaccination. There is no specific antivenom for cases of injuries caused by fish in Brazil (Haddad Jr 2003, 2008, Haddad Jr and Lastoria 2005, Haddad Jr and Martins 2006).

Although injuries by fish are considered as a public health problem in the continental Brazil, there are few reliable reports about these kind of problems in amateur and professional fishermen (Garrone Neto et al. 2005, Haddad Jr et al. 2013).

This occur due to the scarcity of data and underreporting, with the aggravation of the victims do not seek medical care. The use of popular medications is frequent, as there are no standard guidelines for the treatment and prevention of these injuries.

This study investigates the occurrence of injuries caused by *Pseudoplatystoma* fish in the professional fishermen in the Corumbá and Miranda towns in the Pantanal region (Figure 2), identifying their causes, predisposing factors, aspects of the injuries and physical and socioeconomic consequences.



**Figura 2** - The Pantanal region, in the Upper Paraguay River Basin (Mato Grosso do Sul and Mato Grosso States), with indication of the study area - Corumbá and Miranda towns. ANA, GEF, PNUMA, OEA (2004).

## MATERIALS AND METHODS

This project was approved by the Ethics Committee of the Universidade Anhanguera-Uniderp, obtaining the register n° 16824513.8.0000.5161 of 6/27/2013 and had the collection of data carried out in two phases: in Miranda, Mato Grosso do Sul State (MS), in June 2013 and Corumbá, MS, in the months of September and October 2013.

Considering the nominal or ordinal research and finite population (margin of sampling error = 4% variable), was given a total of 368 individuals to be interviewed. Nevertheless, from the total of 942 fishermen registered, 481 professionals were interviewed.

Visits were made to the fishermen colonies to obtain preliminary information relevant to the study and previous contact with local leaders. There were also visits to local concentrations of fishing (landing fish, boat repair shops, fishmongers and public houses) to obtain consent for the interviews. The interviews took place with the use of a questionnaire to obtain data with questions pertaining to age, educational level, family income, time working in fishing, date and time of the injury, number of injuries suffered, the conditions of the latest accident, part of body injured, types of skin lesions, time and intensity of pain, secondary symptoms and treatments employed. The other items checked were the time of absence from work due the wounds, seeking or not medical assistance; the time elapsed until the medical care, used specific treatment and sequelae.

The most recent accident was recorded, without observing the time elapsed from the moment of trauma until the time of the interview. The fishermen were interviewed to measure the incidence of injuries with *Pseudoplatystoma* through assessments and identification of the species in question through photographs. Formatting and statistical analysis were performed with the use of *Sphinx Lexical* software, applying the univariate, bivari-

ate and multivariate analyzes, with treated and examined aiming at the objectives of predetermined research data.

## RESULTS AND DISCUSSION

The absence of fishermen under 18 years and a reduced number of 19 to 30 years were observed. Approximately 63.7% of all professional fishermen interviewed are over 40 years old, adults or seniors already. Illiteracy reaches 19.5%. Most had only finished elementary school (63.1%). About 40% of them income up to the minimum wage and 55% receive 1-2 minimum wages.

The total fishermen injured by *Pseudoplatystoma* catfish were 149. Most were caused by spotted surubins or *pintados* (*P. corruscans*, n = 76) and 73 were caused by striped surubins or *cacharas* (*P. reticulatum*). In Corumbá town, 68.47% of professional fishermen were victimized more than once, while in Miranda town, 52.63% were wounded more than once. The time of the day of occurrence of the injuries was predominantly nocturnal (49.55% and 57.89% in Corumbá and Miranda). Injuries with fishermen occurred mainly during landing and processing of the fish. Most of the fishermen do not wear boots, which predisposes accidents in the feet. Agonizing fish repeatedly caused accidents, which were primarily associated with the carelessness or negligence of the fishermen to handling them. The hands were the location of the most injured segment of the body (38, 9% of cases), followed by foot injuries with 35.6%. These data reflect the recklessness to embark the fish.

The fishermen of Corumbá presented 25.2% of puncture wounds and 74.8% of lacerated injuries, while in Miranda were recorded 26.3% of puncture wounds and 73.7% of lacerated wounds. The signs and symptoms of local fishermen are shown in the Table I.

The most of the injuries caused intense, constant, persistent pain, which is compatible with the action of toxins. Long-lasting inflammation was

TABLE I

Profile of the lesions caused by the *Pseudoplatystoma* genus in professional fishermen of Corumbá e Miranda towns (MS).

	Perforating wounds	Lacerated wounds	Edema	Erythema	Necrosis	Pruritus	TOTAL
Corumbá	25,20%	74,80%	86,50%	98,20%	26,10%	0,90%	100,00%
Miranda	26,30%	73,70%	81,60%	84,20%	26,30%	50,00%	100,00%

also observed in over 85% of the victims, although the presence of necrosis remained at about 25% of casualties (Figure 3). Other symptoms were identified, such as nausea and vomiting, fatigue and dizziness, dyspnea, sneezing and secondary infection. However, fever, tachycardia, cold sweating, radiating pain to the root of the limb and paresthesias were the most prominent (Table II). The manifestations are compatible with envenomations, which enhances the discovery of toxins in the stingers in experimental studies reported recently (Lopes-Ferreira et al 2014).

The treatments observed were varied, most of dubious effectiveness. Use of gasoline, urine, vitreous humor of freshly caught fish and as more employee treatment, the application of alcohol were recorded. Other common treatments: appli-

cation of ice, alcoholic solutions with herbs and brine. We also recorded to application of hot water compresses. The use of hot compresses is considered an effective treatment for the pain caused by vasoconstriction induced by the venom of Siluriformes such as the yellow catfish, since the hot water causes vasodilatation and consequent transient relief (Haddad Jr 2003, 2008, Haddad Jr and Lastoria 2005, Haddad Jr and Martins 2006, Silva 2009, Silva et al. 2010).

The time away from work by fishermen due to accidents showed substantial differences from one town to another. The dependence is very significant.  $\text{Qui}2 = 17.89$ ,  $\text{df} = 4$ ,  $p = 0$ . In Corumbá 41.4% of fishermen continued working after suffering injury, and 40.5% were absent 1-7 day from its activities after the accident. Miranda 76.3% contin-



**Figure 3** - Wound caused by the *Pseudoplatystoma corruscans* catfish one day after the sting. The edema and erythema in the foot are associated with the action of the toxins. Photo: Vidal Haddad Junior.

**TABLE II**  
Systemic manifestations caused by *Pseudoplatystoma* stings in professional fishermen of Corumbá and Miranda towns (MS).

	Corumbá (n=111)	Miranda (n=38)
Nausea/Vomits	2 (1,80%)	2 (5,30%)
Fever	39 (35,10%)	30 (78,00%)
Malaise	20 (18,00%)	2 (5,20%)
Dispnea	8 (7,20%)	2 (5,20%)
Sneezing	0 (0,00%)	2 (5,20%)
Tachycardia	54 (48,60%)	13 (33,80%)
Cold sweat	72 (64,80%)	22 (57,20%)
Secondary infection	6 (5,40%)	6 (15,60%)
Psychomotor agitation	0 (0,00%)	0 (0,00%)
Radiating pain to the root of the limb	83 (74,80%)	23 (59,80%)
Paresthesias	84 (75,60%)	16 (41,60%)

ued working without interruption after the injury, and only 10.5% of professional fishing broke for 1-7 days due to injuries.

#### CONCLUSIONS

Based on data and assessments we concluded that:

- Injuries caused by spotted surubins (*pintados*) and striped surubins (*cacharas*) are frequent and important in Brazilian freshwater environments;
- The clinical manifestations caused by *Pseudoplatystoma* genus are traumatic and toxic. The symptoms observed are compatible with envenomation (persistent pain and inflammation, necrosis) and trauma;
- The *Pseudoplatystoma* genus presents venomous fish and the pain resulting from the sting come from the trauma and toxins. The first aid treatment must be directed to the two mechanisms of aggression.
- The stings of surubins cause significant morbidity and may alienate fishermen of the work for long periods. The prevention of the stings is fundamental;
- Based on the information obtained, we devise mechanisms for prevention and public health educational activities (in form of

pamphlets and leaflets) to reduce the problem as well as improve the quality of life of the professional fishermen of the Pantanal region.

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