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First record of peacock bass (*Cichla* sp.) capture dynamics in a sport-fishing tournaments in the Brazilian Amazon

Primeiro registro da dinâmica de captura de tucunarés (*Cichla* sp.) em um torneio de pesca esportiva na Amazônia Brasileira

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Abstract: Aim: The objective of this study was to characterize the sport-fishing tournament "Amigos do Tarumã" over the nine tournaments held between 2014 and 2023 in the state of Amazonas. This research generated the first report on the dynamics of peacock bass (*Cichla* sp.) catches at the Amigos do Tarumã tournament in the state of Amazonas, Brazil, over nine events between 2014 and 2023. **Methods:** The data were provided by the organizer and creator of the event, with additional documents being obtained from the Institute of Environmental Protection of Amazonas and the State Secretariat for the Environment of Amazonas. Catches were recorded for each team and year, and statistical analyses were performed using descriptive analysis and the Kruskal-Wallis test to verify possible differences in total length (cm) over the years. About 1,700 fishers participated in the nine tournaments, with 1,240 peacock bass being caught, of which 726 were measured. **Results:** The total lengths recorded ranged between 30 and 75 cm. There were significant differences in the average total length of the peacock bass only in the tournaments between 2014 and 2019 ($P < 0.05$). **Conclusions:** In addition, the results suggest that, as a precautionary measure, tournaments that target peacock bass (*Cichla* sp.) should adopt the minimum catch size of 32 cm, in order to guarantee sustainability and the conservation of the peacock bass stock in the region.

Keywords: fishing management; sport fishing; catch and release; Negro river; fishing tourism.

Resumo: Objetivo: O objetivo deste estudo foi caracterizar o torneio de pesca esportiva "Amigos do Tarumã" ao longo dos nove torneios realizados entre 2014 e 2023 no estado do Amazonas. Esta pesquisa gerou o primeiro registro da dinâmica de capturas de tucunarés (*Cichla* sp.) realizadas no Torneio Amigos do Tarumã no Estado do Amazonas, Brasil, ao longo de nove edições entre 2014 e 2023. **Métodos:** Os dados foram fornecidos pelo organizador e idealizador do evento, com documentos adicionais obtidos do Instituto de Proteção Ambiental do Amazonas e Secretaria de Estado do Meio Ambiente do Amazonas. As capturas foram registradas para cada equipe e ano, e análises estatísticas foram realizadas usando análise descritiva e teste de Kruskal-Wallis para verificar possíveis diferenças entre o comprimento total (cm) ao longo dos anos. Cerca de 1,700 pescadores participaram das nove edições, nas quais capturaram 1,240 tucunarés, com 726 sendo medidos. **Resultados:** Os comprimentos totais registrados variaram entre 30 e 75 cm. Houve diferenças significativas no comprimento total médio dos tucunarés apenas entre as edições de 2014 e 2019 ($p<0.05$). **Conclusões:** Além disso, os resultados sugerem que, como medida de precaução, torneios que tenham como alvo os tucunarés (*Cichla* sp.) devem adotar o tamanho mínimo de captura de 32 cm, visando à sustentabilidade e a conservação do estoque de tucunarés na região.

Palavras-chave: manejo pesqueiro; pesca esportiva; pesque e solte; rio Negro; turismo de pesca.

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1. Introduction

Sport fishing is one of the most popular leisure activities worldwide and is widely practiced in many countries (Cowx, 2002; Cooke & Cowx, 2006; FAO, 2012). In addition, sport fishing has the potential for further growth, due to the diversity of target species (Brasil, 2010b), the increase in the number of fishers (Freire et al., 2016) and due to its characteristic of promoting connections and interactions between fishers and the natural environment (Silva & Lima, 2014). The activity also has a socio-economic influence since it affects several commercial sectors and contributes to the generation of employment and income (Albano & Vasconcelos, 2013) via the hiring of people for the positions of cooks, waiters, drivers and marine technicians (Lubich et al., 2023a).

In 2018, the Brazilian Ministry of Sport officially recognized sport fishing as a new modality of sport and certified the Brazilian Confederation of Sport Fishing (CBPE) (Brasil, 2018). This recognition increased the visibility of sport fishing and boosted the realization of several events, with an emphasis on tournaments. Fishing tournaments are regulated competitions, with or without prizes, that are supervised by the organizing entity (Brasil, 2010b). According to Brasil (2010b), these championships can only take place with the prior approval of the Ministry of Fisheries and Aquaculture, following the standards of the Brazilian Institute of the Environment and regional and state bodies.

In Brazil, recreational fishing competitions began in the 70s, with the first tournaments recorded in Rio de Janeiro and Espírito Santo (Arfelli et al., 1994). Over the years, sport fishing has gained prominence throughout the country, leading to the formation of several associations and entities that represent sport fishers (Brasil, 2010a). However, despite just over 50 years of holding tournaments, few studies have been conducted to evaluate this activity. The information that is available is concentrated on the tournaments held in the southern (Mourato et al., 2009), south-eastern (Mourato et al., 2018; Mourato et al., 2023) and north-eastern (Freire et al., 2012; Mourato et al., 2018; Mourato et al., 2023) regions of the country.

In the northern region, the state of Amazonas is host to the "Amigos do Tarumã" sport fishing tournament, the largest event of its kind in the area. Now in its ninth year (2023), this tournament brings together amateur and professional sport fishers in search of the largest specimens of peacock bass (*Cichla* sp.). Due to its popularity among fishers, the peacock bass is recognized as a symbol of sport fishing in the Amazon region (Amazonas, 2018). The genus *Cichla* includes 16 described species (Kullander & Ferreira, 2006; Sabaj et al., 2020), seven of which are found in the rivers of the state of Amazonas (Kullander & Ferreira, 2006). Among these species, *Cichla temensis* (Humboldt, 1821) is the most sought after due to its size and strength (Lubich et al., 2023a), as it can reach up to 94 cm in total length and weigh just over 13 kg (IGFA, 2024).

Despite the growth of the tournament, no scientific studies have yet been conducted in the Amazon region on this topic. However, a recent assessment of recreational fishing sustainability in the Middle Negro River, Amazonas identified ecological and management weaknesses (Lubich et al., 2025), which reinforces the importance of understanding how sport fishing tournaments interact with local fishery dynamics. The objective of this study was to characterize the sport-fishing tournament "Amigos do Tarumã" over the nine tournaments held between 2014 and 2023 in the state of Amazonas. To this end, the following aspects will be addressed: i) the dynamics of the tournament throughout the years; ii) the geographical origin of the participating fishers at the international, national and municipal levels; and iii) the analysis of annual variations in the average total length (cm) of the peacock bass during tournaments, in order to identify patterns or trends over time.

2. Materials and Methods

2.1. Area of operation of the Amigos do Tarumã tournament

The Amigos do Tarumã tournament concentrates its activities mainly in the region of the Lower Negro River, which includes conservation units (CUs) such as environmental protection areas and sustainable development reserves (SDRs) (Figure 1). These areas encompass the Tarumã-açú and Tarumã-mirim basins. Since its inauguration, these two rivers have been the main places explored by the fishers, along with the Cuieiras River basin, which was used only in one year (2018) (Amazonas, 2023). The restriction of the use of the Cuieiras River in later tournaments occurred due to the regulation of the Cuieiras River fishing agreement in 2019, which prohibited its exploitation to favor the renewal of stocks (Amazonas, 2020). In addition, there were reports by community members that holding the tournament interfered with local fishing production (Rogério Bessa, personal communication).

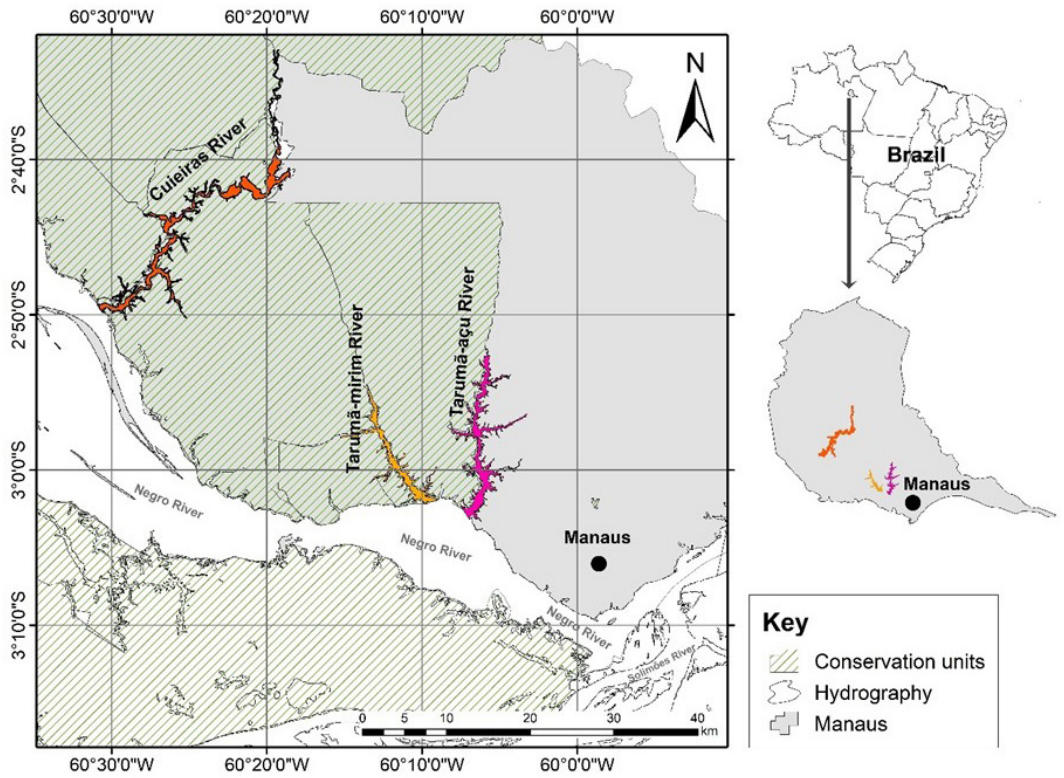

Figure 1. Area of operation of the Amigos do Tarumã tournament, held in the state of Amazonas, Brazil.

Although the general fishing areas are well defined by the tournament regulations (Figure 1), there is no georeferenced record of each catch, which limits the possibility of performing spatial analyses on the distribution of peacock bass captures or habitat associations.

The Tarumã-açú and Tarumã-mirim basins are characterized by having lentic systems due to the low flow velocity during the periods of rising water, high water and falling water of the Negro River, which occur between December and September (Marinho et al., 2022). These basins are supplied by rivers typically with black or clear waters, with pHs ranging between 4.5 and 6.0, electrical conductivity between 8.5 and 22.5 and dissolved oxygen between 4.0 and 7.5 mg/L^{-1}; however these parameters are influenced by the water levels (Marinho et al., 2022; Santos et al., 2006).

2.2. Description of the dynamics of the Amigos do Tarumã tournament

The Amigos do Tarumã tournament usually takes place in the second half of the year, between the months of September and October, coinciding with the low-water season in the region. The catches are carried out over a day, starting in the morning (07:00 am) and arriving in the afternoon (3:00 pm), totaling eight hours of fishing. The competition is divided into two categories: boat fishing (in a team of up to three fishers) (Figure 2A) and individual kayak fishing (Figure 2B), the latter being introduced in 2021, during the seventh edition. From 2017, the tournament began to include the women's category, attracting nationally renowned professional anglers.

The equipment that is allowed for catching fish includes fishing rods for baitcasting reels or spinning reels, flies, hand nets and pliers. The use of live bait, passive equipment, chemicals or explosives is prohibited. Throughout the nine editions (2014-2023), several aquatic environments were explored to catch peacock bass (Figure 3A), such as areas where there are standing dead trees (Figure 3B), embankments (Figure 3C), flooded forests (Figure 3D), rocks (Figure 3E) and beaches (Figure 3F). The scoring system of the teams is based on the sum of the total lengths (TLs) of the peacock bass captured. In the boat fishing mode, the three fishers must present a maximum of five specimens for measurement and summation. While in the individual kayak fishing modality, a maximum of up to three specimens is allowed. However, the tournament regulations establish a minimum capture length of 30 cm total length (TL), with those less than 30 cm not counted or measured.

Figure 2. Fishing categories A – boat fishing with up to three fishers and B - individual kayak fishing for competing in the Amigos do Tarumã tournament, held in the state of Amazonas, Brazil.

Figure 3. A – Peacock bass in a river and environments of B – standing dead trees, C – embankment, D – flooded forest, E – rocks and F– a beach exploited by fishers in the Amigos do Tarumã tournament (2014 – 2023), held in the state of Amazonas, Brazil.

Between 2014 and 2018, the measurements of the TLs of the captured specimens were made by transporting the live fish to the measuring station, where they were evaluated by the tournament referees at the measuring stations and then released (Figures 4A to 4C). However, since the 2019 edition, this process has been prohibited due to the identification of an increase in the apparent mortality rate, caused by the transport of fish for measurement at the stations. Currently, it is mandatory for fishers to record the measurement of the TL by way of video, as well as the release of the peacock caught (Figures 4D to 4F), with the aim of proving the adoption of catch and release and reducing the mortality rate.

2.3. Data acquisition

The data used in the research are secondary and were obtained through a collaboration with the CEO and creator of the event, Mr. Rogério Sampaio Bessa. Because the tournament follows a strict catch-and-release protocol, all measurements are non-invasive, with no collection of biological samples or georeferenced records. Therefore, information on sex, gonadal development, and individual GPS capture points was not available for analysis. Therefore, in this collaboration, we obtained data on the amount of peacock bass caught, the nationality of the participants and the total length (TL) in cm of the peacock bass in the nine years of the tournament, held between 2014 and 2023. It is worth noting that due to the COVID-19 pandemic, there was no tournament in 2020. In addition, notes and technical opinions issued by the Amazonas Environmental Protection Institute and the Amazonas State Department of the Environment were consulted via official public websites, and additional information was requested via e-mail to the appropriate departments of these institutions.

Based on the information collected, the organization and tabulation of the data were performed using the Microsoft Excel® program.

Figure 4. Peacock bass (*Cichla* sp.) measurement methodology in the tournaments from 2014 to 2018: A – transport of peacock bass, B – measurement by referees and C – release into the environment. In the tournaments from 2019 to 2023, the measurement and validation were carried out through filming of the stages of D – capture of the peacock bass, E – measurement of the total length (cm) at the capture site and F – release of the specimens during the Amigos do Tarumã tournament, in the state of Amazonas, Brazil. Photos: Daniel Olentino (A–C) and authors (D–F).

Records of catches in the tournament were categorized by year and team, with a distinction between the tournament's two competition modalities: boat fishing and kayak fishing. In the boat fishing, the team, which consists of three fishers has the freedom to catch as many peacock bass as it wishes, but, for evaluation purposes in the competition, it must select only the five largest peacock bass caught, whose total lengths (cm) will be recorded. In the individual kayak fishing modality, the catch limit is up to three peacock bass.

2.4. Analysis of the data

Mapping - The elaboration and construction of the mapping of the origin of the participants was carried out using Q-GIS software (QGIS Development, 2023). Hydrographic data and national and international territorial limits available in the databases of the Brazilian Institute of Geography and Statistics (IBGE, 2024), the National Water Agency (ANA, 2024) and the Global Administrative Areas Database (www.gadm.org) were used.

Descriptive analysis - descriptive statistics (minimum, maximum, mean and standard deviation) and absolute frequency (N) (Zar, 2010) were performed using the Microsoft Excel® program.

Statistical analysis - To test the hypothesis of the study "Is there is a difference in the mean total length (cm) of peacock bass caught by the teams between the annual editions of the tournament", analysis of variance was performed, with the response variable being the mean total length (cm) (TL), and the predictor variable being the year. The assumptions of normality were verified using the Shapiro-Wilk test (Shapiro & Wilk, 1965) via the function shapiro.test of the stats package (R Core Team, 2023), and homogeneity was checked using the Levene test (Levene, 1960) via the leveneTest function of the car package (Fox & Weisberg, 2019). Normality (TL (cm): W=0.96923, P = 0.0001056) and homogeneity (TL (cm): df = 8/210, F = 2.1195, P = 0.03531) of the residuals were not obtained. Therefore, due to the non-fulfillment of the test premises, the Kruskal-Wallis test (Kruskal & Wallis, 1952)was performed, using the function kruskal.test in the *stats* package (R Core Team, 2023). All the analyses were carried out using the software R (R Core Team, 2023).

3. Results

3.1. Origin of participants of the Amigos do Tarumã tournament

Between the years 2014 and 2023, there were nine editions of the event, with the exception of the year 2020. During these editions, 1,700 sport fishers participated, coming from Brazil and other parts of the world. Fishers from the following ten countries were registered: Argentina, Bolivia, Brazil, Colombia, United States of America, Japan, Paraguay, Peru and Venezuela. At the national level, the presence of fishers from 12 Brazilian states (Figure 5) and nine municipalities in Amazonas (Figure 5) was identified.

3.2. Catch profile

In total, 1,240 peacock bass were caught, of which 726 were measured and 514 were not since

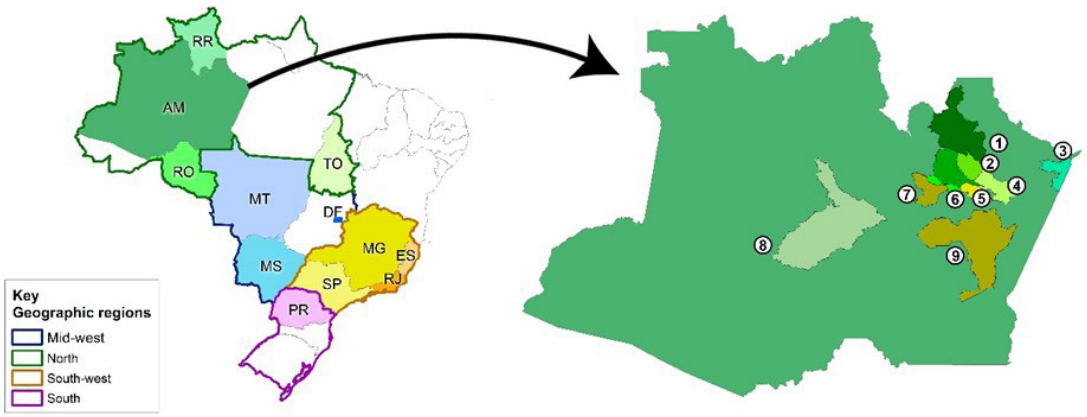

Figure 5. Brazilian states and municipalities of the fishers participating in the Amigos do Tarumã tournament, between 2014 and 2023, based in the state of Amazonas, Brazil. AM – Amazonas, DF – Distrito Federal, ES – Espírito Santo, MG – Minas Gerais, MS – Mato Grosso do Sul, MT – Mato Grosso, PR – Paraná, RJ – Rio de Janeiro, RO – Rondônia, RR – Roraima, SP – São Paulo and TO – Tocantins. Municipalities of Amazonas: 1 – Presidente Figueiredo, 2 – Rio Preto da Eva, 3 – Parintins, 4 – Itacoatiara, 5 – Careiro da Várzea, 6 – Iranduba, 7 – Manacapuru, 8 – Coari and 9 – Borba.

they presented a TL < 30 cm (Table 1). In five (2014, 2018, 2019, 2021 and 2023) of the nine editions, peacock bass with the minimum capture length (30.0 cm) were recorded (Table 2). The largest TL of peacock bass varied between years, but, in general, the three largest peacock bass captured measured 75.0 cm, 74.0 cm, and 73.5 cm in 2018, 2021, and 2016, respectively (Table 2).

Between 2021 and 2023, the competition in the individual kayak fishing modality was attended by 17 fishers who recorded catches (Table 1). In the first two editions, the smallest peacock bass reached the minimum TL capture size, 30 cm (Table 3). In the following three years, the largest peacock bass recorded measured 62 cm, which was caught in 2021 (Table 3). A reduction in the maximum TL of peacock bass was observed in later editions, as well as a decrease in the number of participants in this category (Table 3).

In the boat fishing modality (N = 202), most of the registered teams failed to capture and present the five peacock bass allowed (N = 129) for measurement, but they had some catches. The highest means of TL (cm) were obtained in 2021, with 43.6 cm (Figure 6A). In the kayak fishing modality, in the years 2022 and 2023, the mean TL (cm) of the three peacock bass did not differ (Table 3 and Figure 6B).

Table 1. Quantitative of the peacock bass (*Cichla* sp.) captured, measured and unmeasured throughout the nine editions (2014-2023) of the Amigos do Tarumã tournament, held in the state of Amazonas, Brazil.

Years	Total (N)	Measured (N)		Not measured (N)
		Boat fishing (N)	Kayak fishing(N)	
2014	141	70	-	71
2015	100	66	-	34
2016	111	75		36
2017	160	98	-	62
2018	134	84	-	50
2019	147	76	-	71
2021	135	66	17	52
2022	130	60	15	55
2023	182	96	3	83

Table 2. Descriptive analysis of catches and total lengths (cm) of peacock bass (*Cichla* sp.) captured in the boat fishing modality of the Amigos do Tarumã tournament, Amazonas (2014 – 2023).

Year	N	Peacock bass measured in the first position Min. – Max. (mean ± SD)	N	Peacock bass measured in the second position Min. – Max. (mean ± SD)	N	Peacock bass measured in the third position Min. – Max. (mean ± SD)	N	Peacock bass measured in the fourth position Min. – Max. (mean ± SD)	N	Peacock bass measured in the fifth position Min. – Max. (mean ± SD)
2014	22	33.0 – 61.5 (43.0 ± 7.9)	19	30.0** - 68.0* (40.1 ± 10.0)	13	35.0 - 62.5 (44.4 ± 9.5)	10	31.0 - 55.5 (42.7 ± 9.6)	6	23.0 - 65.0 (45.7 ± 15.9)
2015	22	30.5** - 56.0 (41.5 ± 7.1)	16	35.0 - 51.0 (42.1 ± 5.7)	13	35.0 - 61.0 (41.8 ± 8.6)	9	30.5 - 70.5* (46.8 ± 13.7)	6	34.0 - 67.0 (46.4 ± 11.5)
2016	22	30.5**- 49.5 (39.9 ± 5.8)	22	30.5 - 73.5* (38.2 ± 8.7)	15	30.5 - 57.0 (41.8 ± 8.6)	10	33.0 - 63.0 (44.7 ± 11.4)	6	32.0 - 41.0 (35.3 ± 3.2)
2017	22	33.5 - 65.0* (44.0 ± 9.0)	22	30.5 - 55.0 (41.0 ± 8.3)	22	30.0** - 56.5 (40.2 ± 8.3)	16	30.0 - 62.5 (42.7 ± 10.0)	16	32.0 - 59.5 (42.5 ± 7.6)
2018	20	30.0** - 64.0 (41.5 ± 10.5)	20	30.0- 75.0* (41.7 ± 11.1)	20	31.0 - 71.0 (42.5 ± 11.6)	16	30.5 - 65.0 (43.2 ± 11.5)	8	30.5 - 60.5 (38.2 ± 9.7)
2019	22	30.0** - 51.0 (38.8 ± 6.07)	22	30.0 - 48.0 (36.9 ± 5.1)	17	30.0 - 55.0* (37.7 ± 7.0)	8	31.0 - 51.0 (43.3 ± 8.9)	7	32.0 - 40.0 (36.1 ± 3.1)
2021	22	30.0** - 58.0 (44.8 ± 8.4)	16	32.0 - 63.0 (46.2 ± 10.3)	12	30.0 - 74.0* (43.4 ± 11.8)	9	32.0 - 70.0 (40.6 ± 11.2)	7	31.0 - 45.0 (37.7 ± 4.8)
2022	23	30.5** - 67.2 (40.5 ± 9.3)	16	31.0 - 55.2 (39.8 ± 6.5)	9	37.0 - 62.8 (43.3 ± 7.8)	7	32.5 - 54.0 (38.8 ± 7.2)	5	42.0 - 68.1* (51.08 ± 10.9)
2023	27	30.0** - 70.0* (41.1 ± 9.8)	22	31.5 - 56.0 (43.1 ± 7.8)	21	30.0 - 65.0 (45.0 ± 15.9)	14	30.0 - 58.0 (40.2 ± 8.7)	12	31.0 - 63.5 (41.9 ± 10.7)

N = amount captured. Min = Minimum, Max = Maximum, SD = standard deviation. * = largest fish measured in the edition. ** = smallest fish measured in the edition.

In general, the lowest mean TL values (cm) were obtained in 2022 (36.25 cm), while the highest were recorded in 2014 (42.43 cm). The mean TL of the peacock bass varied over the years (Figure 7).

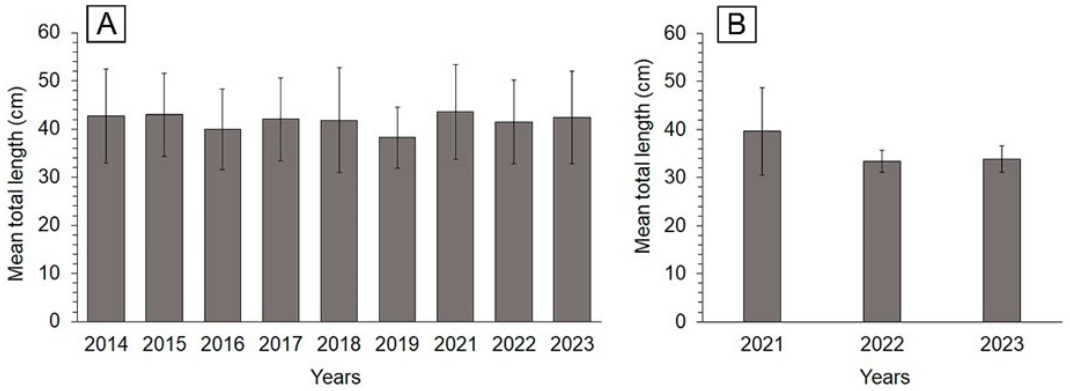

Figure 6. Mean total lengths (cm) of peacock bass (*Cichla* sp.) captured and measured in the A – boat fishing and B – individual kayak fishing modalities in the Amigos do Tarumã tournament (2014-2023 edition), Amazonas, Brazil.

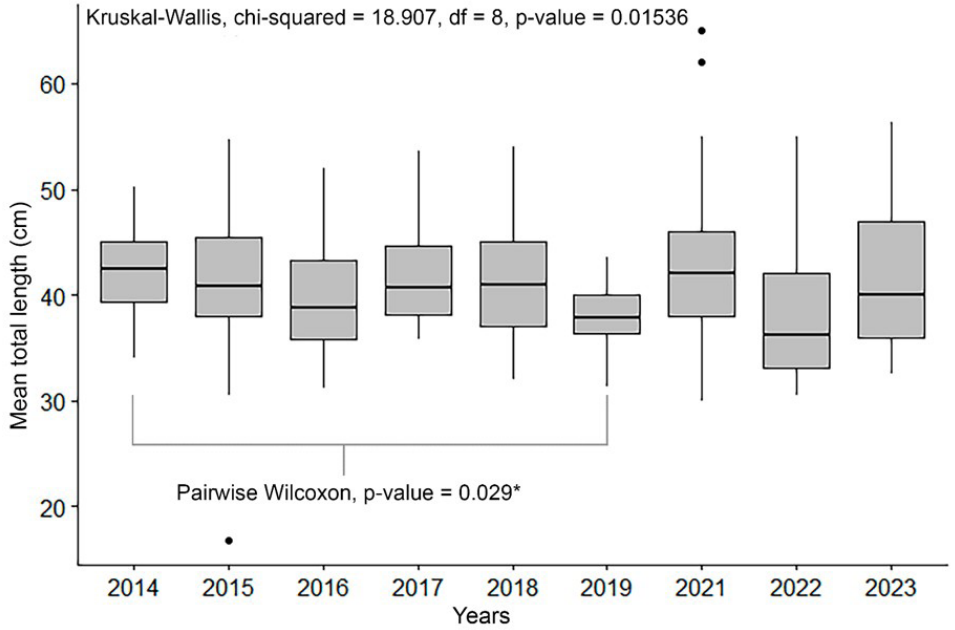

Figure 7. Box plot of the mean total length (cm) of the peacock bass (*Cichla* sp.) captured and recorded in the Amigos do Tarumã tournament, carried out in the state of Amazonas, Brazil.

Table 3. Descriptive analysis of the total lengths (cm) of peacock bass (*Cichla* sp.) captured in the individual kayak fishing modality. In this modality, only three fish per fisher are counted in the Amigos do Tarumã tournament, Amazonas (2014-2023).

Year	N	Peacock bass measured in the first position Min. – Max. (mean ± SD)	N	Peacock bass measured in the second position Min. – Max. (mean ± SD)	N	Peacock bass measured in the third position Min. – Max. (mean ± SD)
2021	7	30.0** - 62.0* (42.0 ± 11.2)	6	30.0 – 37.0 (33.5 ± 2.5)	4	38.0 – 56.0 (44.5 ± 7.8)
2022	8	30.0** - 35.0* (32.6 ± 1.7)	4	32.0 – 34.0 (33.0 ± 0.8)	3	34.0 – 40.0 (36.0 ± 3.4)
2023	2	32.0** - 32.5 (32.3 ± 0.4)	1	37.0*[1]	0	NMR

NMR = no measurement recorded, Min = Minimum, Max = Maximum, SD = standard deviation. [1]Obtained only one catch in 2023, therefore it is not possible to perform the other descriptive analyses. * = largest fish measured in the edition. ** = smallest fish measured in the edition.

There was a statistical difference in the mean TL of the peacock bass between the years 2014 and 2019 ($P < 0.05$; Figure 7).

4. Discussion

In the Amigos do Tarumã tournament, catches occur during just one fishing day, which lasts for eight hours. The tournament has national and international reach. In the first editions there were only men's competitions. However, five years ago, they included the women's category and, more recently, individual kayak fishing. In the nine editions, 1,240 peacock bass were caught, though only 726 were measured, with mean total lengths (cm) ranging between 30.0 and 75.0 cm. The lowest average values occurred in 2022 (36.25 cm), while the highest were recorded in 2014 (42.43 cm).

The duration of the Amigos do Tarumã fishing tournament is slightly longer than that of the tournaments held in the states of Bahia and Sergipe, in the north-eastern region of Brazil. In these states, fisheries occur at sea and last between three and seven hours (Freire et al., 2014). In contrast, its duration is inferior to the tournament held in Ilhabela, São Paulo, which lasts 10 h, with departure at 7:00 am and return at 5:00 pm (Amorim & Silva, 2005). Tournaments in the north-eastern region, specifically in the state of Bahia, take place throughout the year, with an average of two official events per month throughout the calendar year, taking place in marine environments and estuaries (Freire et al., 2012; Freire et al., 2014). These differences in the duration of the fishing tournament may be related to weather conditions and possibly the environment.

The majority participation of male fishers was expected, and follows a pattern already known among sport fishers in different parts of Brazil, such as Amazonas (Lubich et al., 2023a), São Paulo (Amorim & Silva, 2005), Sergipe (Freire et al., 2014) and Bahia (Bahia & Ávila, 2015), as well as in other countries around the world, such as Mexico (López-Rocha et al., 2020) and the United States (Sylvia & Weber, 2022). However, the socio-economic profile cannot be determined, as state licensing and supervisory bodies do not request this information for the tournament to occur. Therefore, the organization does not collect or store this data. Despite this, demographic and social data are important for profiling participants and identifying factors related to their participation in the tournament, such as fishers' income.

The Amigos do Tarumã tournament attracted participants from ten countries and twelve different states, demonstrating national and international relevance. In the tournaments held in Bahia, most of the participants were fishers from other regions, such as Rio de Janeiro, Espírito Santo, Sergipe and Alagoas (Bahia & Ávila, 2015), with no indication of foreign participants. Although information about the origin of domestic and foreign participants in fishing tournaments is scarce (Arfelli et al., 1994; Mourato et al., 2009; Freire et al., 2012; Freire et al., 2014; Mourato et al., 2018; Mourato et al., 2023), the wide reach of the Amigos do Tarumã tournament is evident when compared to other similar events.

In the category of boat fishing, up to three fishers per vessel are allowed to participate. This pattern was observed in other tournaments that are held in the north-eastern region, specifically in the state of Sergipe, where the number of fishers varies from one to three (Freire et al., 2014). However, in state championships, up to 15 members per team are allowed to participate, with only five allowed to fish simultaneously three (Freire et al., 2014). This variation can be explained by the specific characteristics of the vessels used in the practice of fishing, which can vary between different regions and environments. (Lubich et al., 2023a) state that, in the region of the middle Negro River, in the Amazon, all the fishers reported the need to use vessels to carry out fishing, regardless of size (small, medium or large), different from land-based fishing, which does not use a vessel and is carried out mainly in coastal areas of large cities.

In the Amazon region, the most common equipment used in tournaments and sport fishing are baitcasting reels or spinning reels, with or without weights on the lines. In maritime tournaments, there is a predominance of the use of spinning reels, in addition to the use of live bait for catching fish (Freire et al., 2012; Freire et al., 2014). In the Amigos do Tarumã tournament, the regulations prohibit the use of live bait. The use of natural baits in sport fishing is considered an environmental problem, as it can indirectly introduce new species into the environment and affect the local environmental balance (Lubich et al., 2023b).

In the Amigos do Tarumã tournament, the peacock bass captured are filmed during measurement of the TL and the release of the specimen into the environment. In national tournaments, as in Sergipe (Freire et al., 2014), and internationally, such as in Mississippi, in the United States (Meals & Miranda, 1994), after capture, it is common to transport fish in tanks or plastic bags with water from the environment

to the measuring stations. However, this practice can be harmful and can increase the apparent and sublethal mortality rate. Higher water temperatures also affect fish metabolism, resulting in adverse effects (Meals & Miranda, 1994; Sylvia & Weber, 2022). Holbrook (1975) and Schramm Junior et al. (1987) recommend avoiding holding tournaments in the warmer months. Furthermore, according to Arlinghaus et al. (2007) and Brownscombe et al. (2017, 2019), catch and release is a practice that can help increase survival rates and is associated with good management practices. In Brazil, this approach has become popular among sport fishers since the 1990s as a voluntary conservation tool (Freire, 2005). Although studies on the mortality of peacock bass in sport fishing estimate rates ranging from 0.55% to 5.20% (Thomé-Souza et al., 2014; Barroco et al., 2017), there is still a specific knowledge gap about fish mortality in fishing tournaments.

The Amigos do Tarumã tournament focuses exclusively on peacock bass species. In other regions of Brazil, such as in the south-east, tournaments focus on the marlins (*Istiophorus* sp., *Makaira* sp. and *Tetrapturus* sp.) (Arfelli et al., 1994; Amorim & Silva, 2005), while in the north-east, the Brazilian silverside (*Atherinella brasiliensis*) is the main target (Freire et al., 2012). In international tournaments, in Mexico, groupers (*Epinephelus morio*, *Mycteroperca banaci*) are predominant, while in the USA, the exclusive catch of largemouth bass (*Micropterus salmoides*) is popular (Sylvia & Weber, 2022). This evidences the tendency to exploit species of only one group in fishing tournaments.

The Amigos do Tarumã tournament uses a scoring system based on the sum of the TLs of the peacock bass captured. In contrast, maritime tournaments in Sergipe, north-eastern Brazil, adopt a system that considers the weight (kg) of each fish, and each 10 g is equivalent to 10 points, plus an additional point per fish caught (Freire et al., 2014). Thus, although the scoring systems can vary, the length and weight of the fish caught are always used as a measure of the score in the tournament.

Considering the lack of literature on fishing tournaments that target peacock bass, the discussion will focus on the minimum capture length. In the Amigos do Tarumã tournament, the minimum TL for a peacock bass is set at 30 cm, with individuals of ≥ 30 cm being the target for capture. In fishing tournaments in Brazilian maritime regions, minimum catch sizes are defined for the species caught. In the case of marlins (*Istiophorus* sp., *Makaira* sp., *Tetrapturus* sp. and *Kajikia* sp.), the minimum weight ranges from 50 to 200 kg, depending on the species (Amorim & Arfelli, 2001; Gochfeld et al., 2012). In international competitions, the minimum length is determined by the specific legislation for each species. For example, sea bass (*Centropomus* sp.) have catch limits between 61 and 71 cm in the state of New Jersey, USA, and 35 cm in the Hudson River in New York, USA (Gochfeld et al., 2012). Largemouth bass (*Micropterus salmoides*) range from 10.16 cm to 60.96 cm (Jesus et al., 2009). In tournaments, individuals that are below the minimum size (weight or length) are released and not counted, since they do not reach the target size. In addition, for any kind of fishing, according to the environmental legislation of the state of Amazonas, the minimum length for capture of peacock bass was established at 25 cm (IBAMA, 2001). However, studies show that *C. temensis* reaches the length of first sexual maturation (L_{50}) with a standard length of 31.11 cm (Campos et al., 2015), and *C. vazzoleri* with 26.70 cm (Horie et al., 2024). Although the minimum size of the Amigos do Tarumã tournament is cautious, compared to the legislation, it is slightly below the L_{50} of *C. temensis*. Therefore, we recommend that tournaments targeting peacock bass adopt a minimum capture length of greater than 31.11 cm.

Although the tournament enforces a minimum total length of 30 cm for peacock bass (*Cichla* spp.), it is important to emphasize that this standard is based solely on the internal regulations of the event. This situation reflects the broader absence of a unified management framework for recreational fishing in the state of Amazonas, as demonstrated by Lubich et al. (2025), who recommend the creation of participatory and integrated management plans for the Middle Negro River region. Currently, there is no specific legislation in the state of Amazonas that regulates size limits or other biological parameters specifically for sport fishing tournaments. The only normative guidance derives from general fisheries management legislation, such as IBAMA Ordinance No. 01/2001, which establishes a legal minimum catch size of 25 cm for peacock bass, regardless of fishing modality. This regulatory gap reinforces the importance of voluntary management strategies adopted by tournament organizers and highlights the need for more comprehensive policies that consider the particularities of recreational and competitive fishing activities in the Amazon region.

5. Conclusions

This is the first report on fishing tournaments in the Brazilian Amazon. In the Amigos do Tarumã

tournament, filming of the measuring is used to prove the total length of the peacock bass, and the release is also filmed. Thus, we recommend that this method also be adopted in other Brazilian tournaments. This method forces the fisher to release the fish into their natural habitats, possibly reducing the mortality rate. In addition, it is important to conduct future studies to assess the mortality of peacock bass in sport fishing competitions and tournaments. Considering that the standard length of *Cichla temensis* at first sexual maturation is 31.11 cm, we suggest adjusting the minimum catch length to 32 cm in tournaments that target this species. This will promote more sustainable actions and minimize possible impacts on the stock in the long-term. Furthermore, recording the geographical coordinates of the capture site and identification of the species of peacock bass caught will help to better understand the distribution and abundance of these fish in the region. This study also encourages researchers to investigate this theme further, filling in existing gaps and enriching our knowledge about the dynamics of fishing tournaments and fishing activities carried out in the Amazon.

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Data availability

The entire data set supporting the results of this study has been published in the article itself.

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