



Fishing on boards: a new fishing technique in the south coast of Brazil

LEONARDO MARTINS PINHEIRO^{1,3}, CAROLINE PORTAL^{2,3}, FEDERICO SUCUNZA³ & PAULO HENRIQUE OTT^{3,4}

¹ Universidade Federal do Rio Grande do Sul – UFRGS, Programa de pós-graduação em Ecologia – Laboratório de Ecologia Humana e de Peixes – LEHPE, Avenida Bento Gonçalves, 9500, Setor 4 Prédio 43411, CEP - 91501-970, Porto Alegre, RS, Brasil, lpinheiro.biomar@gmail.com - Corresponding author;

² Universidade Federal de Juiz de Fora – UFJF, Programa de pós-graduação em Biodiversidade e Conservação da Natureza, Laboratório de Ecologia Comportamental e Bioacústica – LABEC, Rua José Lourenço Kelmer, s/n, CEP - 36036-900, Juiz de Fora, MG, Brasil, carolsportal@gmail.com;

³ Grupo de Estudos de Mamíferos Aquáticos do Rio Grande do Sul – GEMARS, Rua Saldanha da Gama, 937, CEP - 95560-000, Torres, RS, Brasil, fsucunza@gmail.com;

⁴ Universidade Estadual do Rio Grande do Sul – UERGS, Unidade do Litoral Norte, Rua Machado de Assis, 1456, CEP - 95520-000, Osório, RS, Brasil, Paulo-ott@uergs.com.

Submetido em: 07/02/2024; Aceito em: 12/06/2024; Publicado em: 05/07/2024

DOI 10.37002/revistacepsul.vol13.2544e20240004

Abstract. In southern Brazil, various fishing gear is used to capture numerous species of fish. The present study aims to describe a new technique used by artisanal fishers on the north coast of Rio Grande do Sul, southern Brazil. For three days, in June 2019, direct observations of fishing operations and interviews were carried out with three pairs of fishers who used cast nets and “stand-up paddle” boards, aiming to capture mullet. 107 specimens were sampled, of which 99% had a total length above the length at first maturation. It was not possible to make an accurate estimate of total catch. In addition, to providing the first record of a new fishing technique, with potential for expansion in the region, this study reinforces that constant fishing monitoring is essential for understanding fishing dynamics, as well as for the management of the activity.

Keywords: *Mugil liza*, small-scale fisheries, cast net.

Resumo. Pesca em pranchas: uma nova técnica de pesca na costa sul do Brasil.

No sul do Brasil, diversos petrechos de pesca são utilizados para a captura de inúmeras espécies de peixes. O presente estudo visa descrever uma nova técnica utilizada por pescadores artesanais no litoral norte do Rio Grande do Sul, sul do Brasil. Durante três dias, em junho de 2019, foram realizadas observações diretas de operações de pesca e entrevistas com três duplas de pescadores que utilizavam tarrafa e pranchas de “*stand-up paddle*”, visando a captura de tainha. Foram amostrados 107 espécimes, dos quais 99% apresentaram comprimento total acima do comprimento de primeira maturação. Não foi possível realizar uma estimativa precisa de captura total. Além de fornecer o primeiro registro de uma nova técnica de pesca, com potencial de expansão na região, este estudo reforça que o monitoramento pesqueiro constante é fundamental para a compreensão da dinâmica pesqueira, assim como para o ordenamento da atividade.

Palavras-chave: *Mugil liza*, pesca artesanal, tarrafa.

Artisanal fishing encompasses work in the family economy (Brasil, 2009) and is vital for around one million professionals in Brazil (Zamboni *et al.*, 2020). The abundance of fishing resources in southern Brazil favors the development of fishing using numerous techniques (Haimovici *et al.*, 2006, Castello *et al.*, 2009). On the north coast of Rio Grande do Sul (RS), the main fishing gear used by artisanal fishers is the gillnets and castnets (Klippel *et al.*, 2005). In the city of Torres, on the northern limit of RS, artisanal fishing takes place near the mouth of the Mampituba River (Gonçalves & Ott, 2022) and in the adjacent coastal region by small and medium-sized vessels (Moreno *et al.*, 2009, Larre *et al.*, 2021, Gama, 2023).

Among the species with behavior and distribution largely determined by oceanographic factors, the mullet (*Mugil liza* Valenciennes, 1836) represents great importance for both artisanal and industrial fisheries in southern Brazil (Miranda & Carneiro, 2007, Mafra *et al.*, 2020). Of the different artisanal fisheries for mullets in southern Brazil, cast net is described by Pedrosa (1949) as capable of being used with and without vessels, mainly associated with estuarine areas. This fishing technique consists of launching a circular net over fishes and catch them by sacking.

Traditionally accessed by artisanal fishers, mullets have been increasingly targeted by industrial fisheries (de Souza *et al.*, 2017).

Based on industrial fishing landings, Sant’Ana & Kinas (2015) showed a declining trend of mullets in southern Brazil, and proposed that the stock was fully exploited between 2000 and 2015. As a result, in 2015, the Brazilian government published the interministerial ordinance nº 03, which approves the management plan called “Mullet Management Plan”, aiming at bioecological and socioeconomic sustainability in mullet fishing (MPA/MMA, 2015). Since 2018, this management plan has included quotas and limitations on the number of vessels for some fisheries (Steenbock, 2019). Such criteria are based on production information and stock assessment, establishing annual limits (Canton & Dias, 2023), as provided for in the aforementioned ordinance.

In this context, fisheries monitoring presents itself as the main tool for planning management strategies of target and non-target species, understanding labor relations, and assessing the socio-economic importance of the activity. Given the already-known artisanal fishing modalities in the region (Moreno *et al.*, 2009, Cardoso & Haimovici, 2011, Larre *et al.*, 2021, Gama, 2023), this study describes a new technique emerging in southern Brazil that aims to capture mullets.

This fishing technique was observed on the shores of Prainha (-29.344547°; -49.726836°) and Praia da Cal (-29.347600°; -49.728947°), in the municipality of Torres

(Figure 1). This technique was recorded exclusively on these two beaches, located north and south of Morro do Farol, respectively, and more than 2000 meters from the mouth of the Mampituba River. The incursions were carried out between June 11 and 13 2019. Observations were made during the fishing activity to describe the equipment used and the way this new fishing technique is employed. In addition, interviews with fishers were conducted to record specific information regarding the equipment (*e.g.*, mesh size) and the biomass and total length of fish captured were measured. An estimate of production and economic yield was made based on the approximate average production of fishing pairs, as well as the observed sales value. The analyzes were conducted using the Paleontological Statistics (PAST) software (Hammer *et al.*, 2001).

The new fishing technique consists of using a cast net onboard of a stand-up paddle board (SUP). Two fishers work together with

one lying on the board, paddling and directing it in the best position for the launch. The second fisher kneels at the prow of the board, from where he guides the first in the direction of the near-surface fish shoals and, when well positioned, throws the cast net (Figure 2). After launching, this fisher falls into the water. If no fish is caught, the fishers return to land to prepare the cast net for another attempt. During this study, a maximum of three pairs were observed performing this practice simultaneously.

The cast nets used had mesh sizes of 70 and 80 mm between opposite nodes and a total length of 19 fathoms. The SUPs used had dimensions of 300x80 cm. A total of 107 specimens of *M. liza* was sampled during the study period, and sexual identification was obtained from 52 (48%) of them. Average total length (TL) was 41.4 cm (± 5.1 , min.=32 cm, max.=53 cm). In addition, 99.5% (n=106) of the specimens sampled were above 35 cm (Figure 3). This size corresponds to the L50 of the species



Figure 1. Regional contextualization of the study area, highlighting the monitoring zones of the 2019 harvest.



Figure 2. **A.** Sighting the shoal; **B.** Directing the best position for launching the cast net; **C.** Throwing the fishing gear over part of the shoal; **D.** Unhooking the fishing yield.

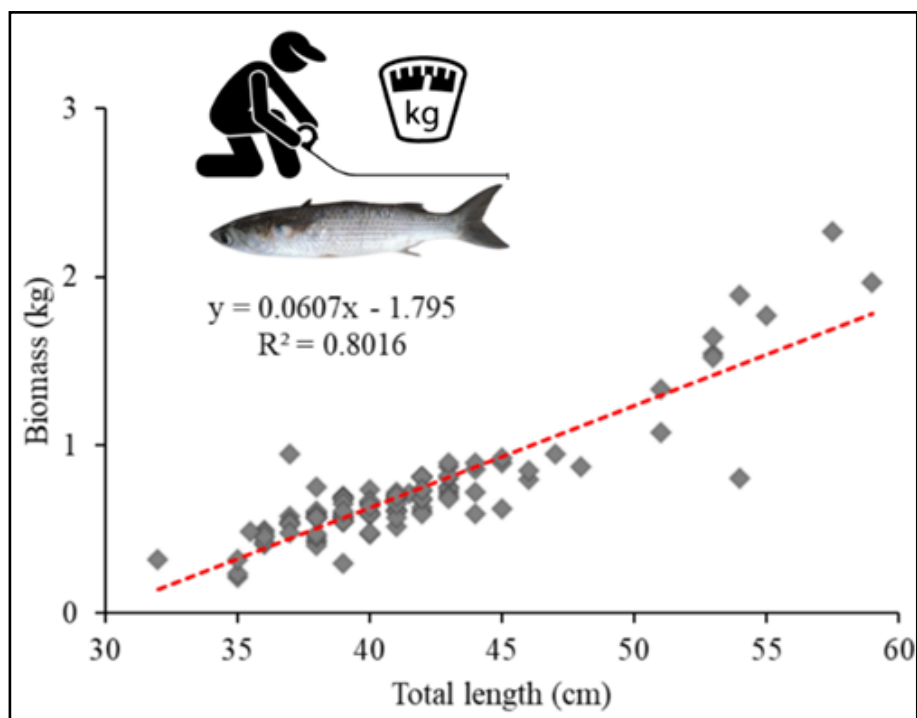


Figure 3. Weight-length relationship of mullets from the sampled capture technique.

(Albieri & Araújo, 2010), which is also the minimum size allowed for capture according to Brazilian law (MMA, 2005). The length-weight relationship of sampled specimens resulted in a strong linear correlation ($R^2=0.8$), indicating that larger individuals have greater weight (Figure 3).

It is noteworthy that less than 1% of the individuals sampled were below the minimum body size allowed by legislation ($CT > 35$ cm) (MMA, 2005) (Figure 4). Furthermore, the specimens were captured by registered professional fishers and within the period allowed by Brazilian Ordinance nº 24 of 2018, since the annual window for capturing *M. liza* in open waters using non-motorized fishing systems in the southeast and southern Brazil extends from May 1st to December 31st. (SEAP, 2018). Caught fishes were sold directly to consumers at the beach. The fishers classified the fish by size and set the average price at R\$30 (approximately U\$ 8) per six specimens. Although no accurate estimate of the total catch was made, one fisher mentioned that more than a hundred specimens were caught in a single day.

Although this new fishing technique is used on a new craft, the activity essentially extends the artisanal fishing already practiced on land in the region, primarily along the shores

and jetties of the Mampituba River estuary. In this context, it is noteworthy that cast net fishing is widely employed by artisanal fisheries in the Mampituba River channel throughout the year, mainly for subsistence and local trade (Gama, 2023). Occasionally, the mullet fishery within the estuary is also conducted in collaboration with Lahille's bottlenose dolphins (*Tursiops truncatus gephyreus*) (Gonçalves & Ott, 2022). Importantly, there is an absence of a designated prohibition period for the capture of mullet with cast nets in estuarine waters in southeastern and southern Brazil (SEAP, 2018).

The SUP fishing technique described here offers fishers enhanced mobility, allowing them to access resources more dynamically than the conventional practice of fishers on land. This appears to amplify fishing effectiveness, allowing the capture of individuals that possibly do not enter the estuary. These factors may trigger conflicts with fishers who conventionally use cast nets and do not have the ability to approach the resource using boards. Bearing in mind that this technique is performed by duly registered professional fishers, using equally provided gear and mesh, it is in line with the National Policy for the Sustainable Development of Aquaculture and Fisheries

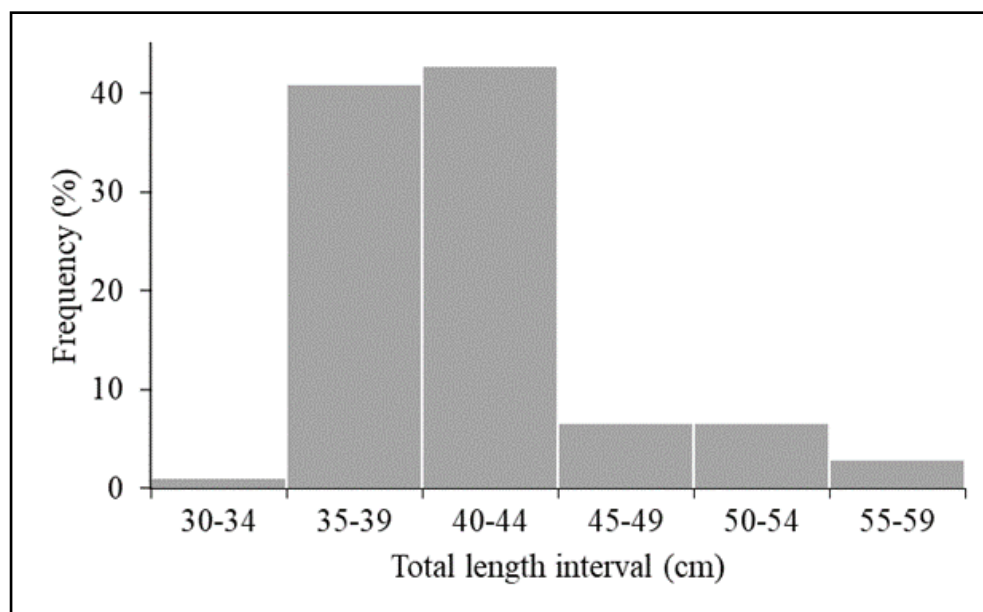


Figure 4. Histogram of the frequency of individuals of *Mugil liza* per total length measured during three days of fishing monitoring off Torres, Rio Grande do Sul, Brazil.

(Law nº 11,959/2009 - Brasil, 2009). Furthermore, it does not violate any other existing fishing restrictions in the region. However, it is worth noting that SUDEPE/RS ordinance nº 06/1984 proposes the prohibition of fishing from boats with cast nets in the Mampituba River, as well as in areas close to 2,000 meters from its mouth (SUDEPE/RS, 1984).

The modality of fishing with the use of SUP is often practiced in continental environments in an amateur and sportive way, mainly abroad (Rott, 2011). In Brazil, as far as we know, there is solely anecdotal accounts documenting the application of this fishing technique. Reports include the utilization of a SUP for sardine fishing at Fernando de Noronha, northeastern Brazil (Marinho, 2013), mullet fishing in Tramandaí (RS) (Braun, 2021), and fishing for several fishes in Santa Catarina (Ribeiro, 2024), in southern Brazil. In all cases mentioned, no modifications were observed on the board used for fishing practices, except for the utilization of a standard SUP cargo net for equipment transportation in Santa Catarina and bodyboarding flippers instead of paddling in Tramandaí. Moreover, the modality reported in the present study distinguishes itself by involving the collaborative efforts of two fishers.

Nevertheless, despite the artisanal characteristics of the SUP technique described here targeting *M. liza*, official and continuous monitoring is crucial to comprehend the full extent of its contribution to the capture of the species' stocks in the region. This is particularly important considering the various methods employed in capturing the species and its status as fully exploited. It is also crucial to disseminate local fishing regulations, especially that concerning spatial restrictions on boat fishing, particularly in the vicinity of estuaries.

Considering the rising popularity of SUP as a recreational activity in the region and the increasing affordability of the boards, whether new or used, this fishing technique may have the potential to become more widespread. Monitoring the dynamics of fishing in artisanal communities becomes a vital tool for strategies that aim to guarantee artisanal fish-

ermen's access to marine resources and provide subsidies for more efficient management measures.

References

- ALBIERI, R. J. & ARAÚJO, F. G. 2010. Reproductive biology of the mullet *Mugil liza* (Teleostei: Mugilidae) in a tropical Brazilian bay. *Zoologia* 27(3): 331–340. DOI: <[10.1590/S1984-46702010000300003](https://doi.org/10.1590/S1984-46702010000300003)>.
- BRAUN, V. 2021. Vinicius Braun Fishing Life – Pesca de tarrafa. Available at: <<https://www.youtube.com/watch?v=cJjtvxSxDUM>>. Accessed on 06 jun. 2024.
- BRASIL. 2009. Lei nº 11.959, de 29 de junho de 2009. Dispõe sobre a Política Nacional de Desenvolvimento Sustentável da Aquicultura e da Pesca, regula as atividades pesqueiras. Diário Oficial [da] União, Brasília, 30 de jun. de 2009.
- CANTON, L. & DIAS, M. 2023. Gestão da pesca da tainha entre 2018 e 2022: uma avaliação crítica dos cinco anos de gestão com cotas de captura. Brasília, Oceana Brasil. 26p. DOI: <[10.5281/zenodo.7886821](https://doi.org/10.5281/zenodo.7886821)>.
- CARDOSO, L. G. & HAIMOVICI, M. 2011. Caracterização tecnológica, social, econômica e ecológica da atividade pesqueira sediada em Passo de Torres, Santa Catarina, Brasil. *Bol. Inst. Pesca*, 37(3): 275-288.
- CASTELLO, J. P., SUNYÉ, P. S., HAIMOVICI, M. & HELLEBRANDT, D. 2009. Fisheries in southern Brazil: a comparison of their management and sustainability. *J. Appl. Ichthyol.*, 25: 287–293. DOI: <[10.1111/j.1439-0426.2009.01229.x](https://doi.org/10.1111/j.1439-0426.2009.01229.x)>
- DE SOUZA, D. S., SILVA, R. C. & STEENBOCK, W. 2017. De quem é o peixe? Aspectos socioeconômicos da pesca industrial e artesanal de tainha (*Mugil liza*) em Santa Catarina. *Revista CEPSUL - Biodiversidade e Conservação Marinha*, 6: e2017002.
- GAMA, R. M. 2023. Caracterização da pesca e situação dos estoques pesqueiros a partir da percepção dos pescadores de Passo de Torres/SC e Torres/RS, sul do Brasil. São Francisco de Paula. 128p. (Dissertação de Mestrado. Universidade Estadual do Rio Grande do

- Sul).
- GONÇALVES, Y. C. & OTT, P. H. 2022. A Visão dos Pescadores sobre a Importância da Participação dos Botos na Pesca Artesanal de Tarrafa em Dois Estuários do Sul do Brasil. *Biodivers. Bras.* [Internet], 12(5): 128-150. DOI: <[10.37002/bioBrazil.v12i5.1898](https://doi.org/10.37002/bioBrazil.v12i5.1898)>.
- HAIMOVICI, M., VASCONCELLOS, M., KALIKOSKI, D. C., ABDALAH, P., CASTELLO, J. P. & HELLEMBRANDT, D. 2006. Diagnóstico da pesca no litoral do Rio Grande do Sul. In ISAAC, V. J., MARTINS, A. S., HAIMOVICI, M. & ANDRIGUETTO, J. M. (eds.). *A pesca marinha e estuarina do Brasil no início do século XXI: Recursos, tecnologias, aspectos socioeconômicos e institucionais. Projeto RECOS: Uso e Apropriação dos Recursos Costeiros. Grupo Temático: Modelo Gerencial da Pesca. UFPA, Belém, chap. 7: 157–180.*
- HAMMER, Ø., HARPER, D. A. T. & RYAN, P. D. 2001. PAST: Paleontological statistics software package for education and data analysis. *Paleontological Association.*
- KLIPPEL, S., PERES, M. B., VOOREN, C. M. & LAMÓNACA, A. F. 2005. A pesca artesanal na costa da Plataforma Sul. In KLIPPEL, S. & VOOREN, M. C. (eds.). *Ações para a conservação de tubarões e raias no sul do Brasil. Igaré, Porto Alegre, chap. 11: 179-197.*
- LARRE, G. G., PNHEIRO, L. M., SANTOS, M. L. D., DANILEWICZ, D., OTT, P. H. & SUCUNZA, F. 2021. New data on bycatch of the Brazilian Guitarfish, *Pseudobatos horkelii*, in Southern Brazil. *J. Appl. Ichthyol.*, 37: 971-974. DOI <<https://doi.org/10.1111/jai.14252>>
- MMA. 2005. Instrução Normativa nº 05 de 22 de novembro de 2005. Estabelece o tamanho mínimo de captura de espécies marinhas e estuarinas do Sudeste e Sul. *Diário Oficial [da] União, Brasília, 24 de nov. de 2009.*
- MAFRA, E. O., OLIVEIRA, R. de, & QUADRO, M. F. L. 2020. The influence of the zonal variation of the Brazil-Malvinas confluence in the harvest of the mullet in the state of Santa Catarina between 2006 and 2016. *Ciênc. Nat.*, 42: e13. DOI: <<https://doi.org/10.5902/2179460X55314>>.
- MARINHO, A. C. 2013. Pescaria na ilha conta com apoio de prancha. Available at: <<http://g1.globo.com/platb/pe-viver-noronha/2013/09/08/pescaria-na-ilha-conta-com-apoio-de-prancha/>> Accessed on: 20 jun. 2021.
- MIRANDA, L. V. & CARNEIRO, M. H. 2007. A pesca da tainha *Mugil platanus* (Perciformes: Mugilidae) desembarcada no estado de São Paulo: subsídio ao ordenamento. *Série Relatórios Técnicos, Inst. Pesca, São Paulo, 30: 1-13.*
- MORENO, I. B., TAVARES, M., DANILEWICZ, D., OTT, P. H. & MACHADO, R. 2009. Description of the coastal medium scale fishery on the Northern Rio Grande Do Sul State: fishing communities from Imbé/Tramandaí and Passo de Torres/Torres. *B. Inst. Pesca, 35 (1): 129-140.*
- MPA/MMA. 2015. Portaria Interministerial nº 03, de 14 de maio de 2015. Aprova o Plano de Gestão para o Uso Sustentável da Tainha, *Mugil liza*, nas regiões Sudeste e Sul do Brasil. *Diário Oficial [da] União, Brasília, 15 de mai. de 2015.*
- PEDROSA, C. 1949. O pescador de tarrafa. Tipos e aspectos do Brasil, p. 154-156. Available at: <<https://www.rbg.ibge.gov.br/index.php/rbg/article/view/4209/3489>> Accessed on: 15 Dec. 2023.
- RIBEIRO, J. E. 2024. Pesca com tarrafa em stand up paddle. Available at: <<https://www.youtube.com/@joseeduardoribeiro747/videos>> Accessed on 22 Jan. 2024.
- ROTT, D. 2011. Paddle-integrated wireless controller. In *World Intellectual Property Organization.*
- SANT'ANA, R. & KINAS, P. G. 2015. Avaliação do estoque de tainha (*Mugil liza*): ampliação dos modelos bayesianos de dinâmica de biomassa para múltiplas séries de CPUE, com adição de temperatura superficial do mar e capturabilidade autocorrelacionada. *Relatório II - Avaliação de estoque – Tainha – OCEANA, Brasília-DF, 31 p.*
- SEAP. 2018. Portaria nº 24, de 15 de maio de 2018. Estabelece normas, critérios e padrões para o exercício da pesca em áreas determinadas para a captura de tainha (*Mugil liza*), no litoral das regiões Sudeste e Sul do Brasil e estabelece cota de captura da espécie para o

ano de 2018. Diário Oficial [da] União, Brasília, 15 de mai. de 2018.

STEENBOCK, W. 2019. Subsídios para o ordenamento da pesca da tainha (*Mugil liza*, Mugilidae): uma análise histórica recente de aspectos relacionados à política de cotas. Revista CEPSUL - Biodiversidade e Conservação Marinha, 8: e2019003. DOI: <<https://doi.org/10.37002/revistacepsul.vol8.874e2019003>>

SUDEPE/RS. 1984. Portaria nº 006, de 30 de junho de 1984. Regulamenta a atividade de pesca por meio da definição de áreas de exclusão (Molhe da Barra de Torres, Torre do Centro, Rio Mampituba e sua Barra, Morro do Forno e no Jacaré), petrechos (carrettilha, espinhel, rede de espera, redes fixas e tarrafa) e limita a extração de marisco, no Município de Torres/RS. Diário Oficial [da] União, Brasília, jul. de 1984.

ZAMBONI, A., DIAS, M. & IWANICKI, L. 2020. Auditoria da pesca: Brasil 2020: uma avaliação integrada da governança, da situação dos estoques e das pescarias. Brasília, Oceana Brasil, 64p. DOI: <10.5281/zenodo.4310303>.