Latin American Journal of Aquatic Research, 51(2): 331-337, 2023
DOI: 10.3856/vol51-issue2-fulltext-2979

Short Communication

New records of Bramidae in Chilean waters: the sickle pomfret (*Taractichthys steindachneri*) and the rough pomfret (*Taractes asper*)

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ABSTRACT. Artisanal fisheries in center-southern Chile targeted a large amount of southern ray bream (*Brama australis*), whereas other species of Bramidae are negligible in the catches. During a small-scale fishing trip targeting *B. australis* off the coast of Lebu Harbour (38ºS) in August 2021, two specimens of other Bramidae species were also caught, but the fishermen did not identify them. The first corresponded to a sickle pomfret, *Taractichthys steindachneri*, the first record of the species in Chilean waters. The second specimen corresponded to the rough pomfret, *Taractes asper*, already reported from the Chilean coast, but with only one previous record from the eighties. We discussed how the occurrence of *T. steindachneri* and *T. asper* provide insights regarding the *B. australis* demography in the south Pacific.

Keywords: *Brama australis*; artisanal fishery; range extension; southeastern Pacific

Bramidae's worldwide marine and oceanic fishes contain 7 genera and 20 species (Mead 1972, Carvalho-Filho et al. 2009, Nelson et al. 2016). Most of these fishes are migratory and pelagic, inhabiting mostly the warm and temperate waters of the world up to 600 m depth, with only a few species reaching up to 1000 m depth. Several species present remarkable changes in body and fin shape throughout their development (Mead 1972, Haedrich 1986, Thompson & Russell 1996, Carvalho-Filho et al. 2009), which might challenge the correct identification of some species. Five bramids were previously reported from Chilean waters: *Brama australis* Valenciennes, 1838, *B. brama* (Bonaterre, 1788), *B. dussumieri* Cuvier, 1831, *Taractes asper* Lowe, 1843, and *Xenobrama microlepis* Yatsu & Nakamura, 1989 (Nakamura 1986, Meléndez et al. 1993, Pequeño 1997, San Martín et al. 2017). Considering the wide-ranging habits of most of the Pacific Bramidae, it would not be a surprise that additional species were recorded along the long Chilean coastline, as here reported for *Taractichthys steindachneri* (Döderlein, 1883) and the second record of *T. asper* from southeastern Pacific.

The artisanal fisheries operating in central-southern Chile targeted a large amount (~39,000 t during 2021) of *B. australis* (Gálvez et al. 2022). Approximately 90% of these catches are reported by artisanal boats (~8 m length) and small-scale vessels (~14 m length) alternating gears between longlines and gillnets with the position of the shoal with depth (Gálvez et al. 2018). Nowadays, 70% of the *B. australis* catches come from the Biobío region and land most on Lebu Harbour (38ºS). Bycatch from artisanal operations targeting *B. australis* off the Biobío region is relatively low and

Corresponding editor: Alejandra Volpedo

changing seasonally from jack mackerel (*Trachurus murphyi*), hoki (*Macruronus magellanicus*), jumbo squid (*Dosidicus gigas*), blue shark (*Prionace glauca*) and other less frequent fish species (Wiff et al. 2022, 2023). Canales-Aguirre et al. (2018) reported another species of Bramidae, *X. microlepis*, in hauls targeting *B. australis* in the southernmost part of its distribution in the Chilean Patagonia.

Of the 20-known species of Bramidae, only a few supported large-scale fisheries, and those are referred to as the *Brama* genus. In contrast, other species of Bramidae are considered rare and usually caught as bycatch of other targeted species (Canales-Aguirre et al. 2018). Indeed, fishers' local ecological knowledge indicates that other Bramidae species are uncommon in the artisanal fisheries targeting *B. australis* in Chile. These species are usually catego-rized as "weird or rare pomfrets." Describing the distribution of rare species can help understand changes in oceanographic characteristics and give insights regarding the targeted species' demography (e.g. Galván et al. 2022). Therefore, the main aim of this short communication is to report, for the first time, the occurrence of *T. steindachneri* in Chilean waters and the second record of *T. asper* since first reported in Chile during the eighties.

Two specimens of both *T. steindachneri* and *T. asper* were caught as bycatch of *B. australis* in a small-scale longline vessel of 14 m length fishing approximately 100 miles southwest off the Lebu Harbour (38ºS) at 130 m of depth in August 2021. Each weighed about 6 kg, as reported by the fishermen. Both were photographed and then eaten. The specimens were identified following Mead (1972), and their main characters are displayed below.

***Taractichthys steindachneri* (Döderlein, 1883)** (Fig. 1)

Characters: body oval, compressed. The dorsal profile of the head arched, rounded, and covered with scales, the snout is short, shorter than the eye diameter, interorbital space rounded, the mouth is oblique, the lower jaw projecting, the upper jaw is moderately thin, scaly, and reaches vertically to the middle of the pupil, preopercle and opercle covered by scales, dorsal and anal fin falcate anteriorly, their lobes much elongate, reaching to or beyond one-third of fin-length when depressed, pectoral fin long reaching about the middle of anal fin, caudal fin lunate. Silvery blue, darker on dorsum, paler on belly, caudal fin with an abruptly white posterior border. Selected morphometrics in the percentage of standard length (SL): head length 28.6-32.2, snout length 8.2-9.6, eye diameter 5.7-7.5, upper jaw length 12.8-16.8, pre-dorsal length 41.0-44.0, pre-anal length 54.0-54.9, pre-pectoral length 29.5-31.8, depth 46.7-57.2. The species can reach 92 cm fork length and weigh up to 17 kg (Kindong et al. 2020). It was previously reported in Peru (Chirichigno & Cornejo 2001).

Figure 1. Specimen of *Taractichthys steindachneri*.

***Taractes asper* Lowe, 1843** (Fig. 2)

Characters: body oval, compressed. Dorsal profile of the head slightly rounded and covered with scales, the snout moderate, slightly longer than eye diameter, interorbital space rounded, mouth oblique, lower jaw projecting, upper jaw broad and scaly, reach vertically to the anterior border of the pupil, the preopercle and opercle covered by scales, caudal peduncle without a keel. Dorsal and anal fin falcate anteriorly, pectoral fin long but not reaching beyond the falcate portion of the anal fin, caudal fin lunate. Brown overall, dorsal, and ventral thirds darker, fins dark, the caudal fin posterior border whitish. Selected morphometrics in the percentage of SL: head length 29.8-40.4, snout length 8.2-10, eye diameter 7.2-16.4, upper jaw length 15.8-22.2, pre-dorsal length 38.1-45.8, pre-anal length 56.5-64.4, pre-pectoral length 30.8-38.2, depth 38.7-46.4. The species can reach 50 cm SL and at least 750 g (Quigley et al. 2014, Kindong et al. 2020).

Figure 2. Specimen of *Taractes asper*.

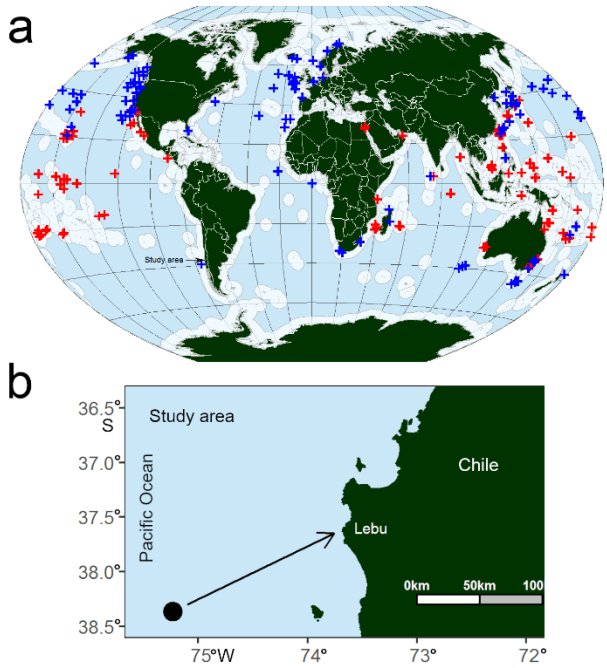

Figure 3. a) Worldwide distribution of the occurrence of *Taractes asper* (blue crosses) and *Taractichthys steindachneri* (red crosses). White shaded jurisdictional zones, black arrow indicating Lebu harbor, b) detailed catch area (in black circle) of the two specimens used in this study. Sources: Esmark (1862), Collin (1874), Willgohs (1952), Holgersen (1959), Blacker (1962), Aron & Goodyear (1969), Peden & Ostermann (1980), Paulin (1981), Albikovskaja et al. (1987), Peden & Jamieson (1988), Minchin & Isaev (1989), Quero et al. (1992), Meléndez et al. (1993), Moteki & Nagasawa (1998), Jonsson & Palsson (2006), Khalaf & Zajonz (2007), FishNet 2 (2013), González-Lorenzo et al. (2013), Quigley et al. (2014), Sánchez-Cárdenas et al. (2016), Al Jufaili & Esmaeili (2022), Fishbase (Froese & Pauly 2022), Fortis-Benavides & González-Leiva (2022).

Remarks

Despite the extensive distribution of *T. steindachneri* and *T. asper*, inhabiting tropical and temperate oceanic waters and coastal areas (Fig. 3), they are categorized as rare and uncommon species (Amaoka & Nakaya 1989, González-Lorenzo et al. 2013, Quigley et al. 2014). Both species have been reported as bycatch of the longline fishery targeting *Thunnus obesus* (Zhu et al. 2012, Kindong et al. 2020), *Beryx* sp. (González-Lorenzo et al. 2013), or bycatch of trawlers targeting *Micromesistius poutassou* and *Thunnus alalunga* (Quigley et al. 2014). These low occurrence levels are revealed from the literature revision in which only 78 specimens of *T. asper* were reported between 1860 and 2021. Likewise, only 464 specimens of *T. steindachneri* have been reported between 1903 and 2021 (Fig. 4). Generally, bycatch species are less important for fishermen and thus are not usually reported nor registered in logbooks (Quigley et al. 2014). In addition, 64 and 94% of *T. asper* and *T. steindachneri* records were reported in the last 42 and 16 years, respectively (Fig. 4). Increments in these species reporting in recent years can be associated with the expansion to fishing oceanic waters beyond the jurisdictional zones. As is the case of *Brama japonica* (Seki & Mundy 1991), more scientific observers trained to identify rare or uncommon species (Kindong et al. 2020) and more frequent climate events altering species distribution (Fortis-Benavides & González-Leiva 2022).

Eastern Pacific records of *T. steindachneri* have been restricted to the northern hemisphere along the areas between the coast of California and El Salvador (Sánchez-Cárdenas et al. 2016, Fortis-Benavides & González-Leiva 2022). Our work extended this previous range southwards, the first record of this species in the southeast Pacific. During 2021, coastal waters off Chile were characterized by cold La Niña (Bonicelli et al. 2021). Indeed, Fortis-Benavides & González-Leiva (2022) indicated that *T. steindachneri*

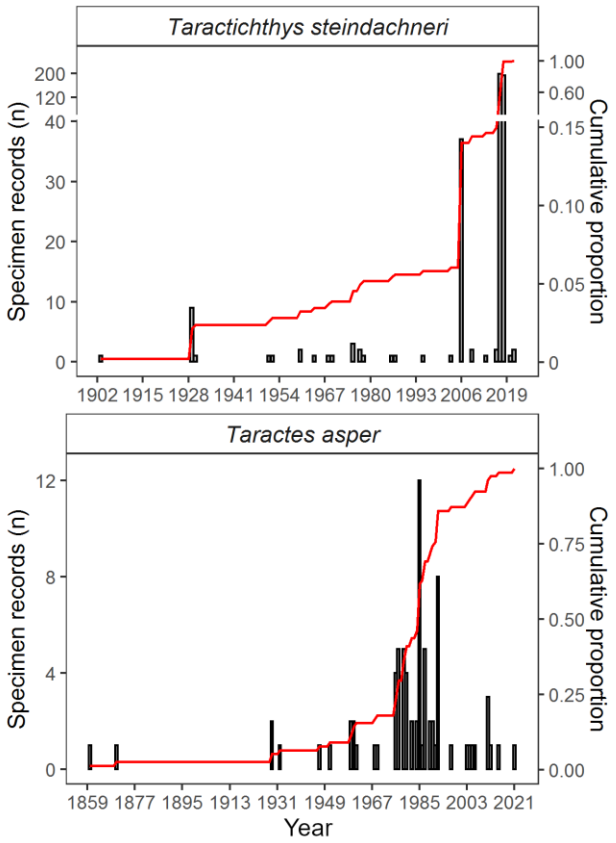

Figure 4. Annual (gray bar) and cumulative (red line) specimen records of *Taractychthys steindachneri* and *Taractes asper* worldwide reported by different sources and including this study. Sources: Esmark (1862), Collin (1874), Willgohs (1952), Holgersen (1959, 1960), Blacker (1962), Mathiasson (1962), Hognestad (1968), Paulin (1981), Villavicencio-Garayzar & Chávez (1986), Albikovskaja et al. (1987), Peden & Jamieson (1988), Minchin & Isaev (1989), Seki & Mundy (1991), Quero et al. (1992), Meléndez et al. (1993), Santos et al. (1997), Moteki & Nagasawa (1998), Jonsson & Palsson (2006), Khalaf & Zajonz (2007), Byung-Jik et al. (2012), Zhu et al. (2012), FishNet 2 (2013), González-Lorenzo et al. (2013), Quigley et al. (2014), Sánchez-Cárdenas et al. (2016), Kindong et al. (2020), Al Jufaili & Esmaeili (2022), Fortis-Benavides & González-Leiva (2022), this study.

off El Salvador during November 2020 could be related to cold water masses associated with La Niña. These preliminary observations highlight the importance of environmental events altering the distribution patterns in Bramidae species.

Much evidence indicates that several Bramidae species are spawning in oceanic waters. Larval and juvenile stages of *B. japonica* (Seki & Mundy 1991), *T. asper* (Quigley et al. 2014), and *B. australis* (Castro & Landaeta 2002, Acuña et al. 2009) have been found in subtropical areas of the north Pacific, in tropical areas in the west Atlantic, and oceanic seamounts in the south Pacific, respectively. Indeed, *T. steindachneri* may also show a large migratory pattern with spawning sites in oceanic waters. Given that both species described here, *T. steindachneri* and *T. asper*, were caught as bycatch in the same haul targeting *B. australis*, making us hypothesize why these species share the same shoal with *B. australis*. The conceptual model for *B. australis* includes oceanic spawning (Leal & Oyarzún 2003), therefore considering large-scale migrations associated with seamounts in oceanic areas in the south Pacific (Wiff et al. 2022, 2023). During these migrations, other Bramidae species with oceanic distribution as *T. steindachneri* and *T. asper*, may act as "stowaways", following the metaphor of Canales-Aguirre et al. (2018) to describe the presence of other Bramidae species when targeting *B. australis*.

Understanding bycatch is crucial for adequately managing species (Wiff et al. 2020). Behavioral studies in fishes have shown that fish are associated with individuals with whom they are familiar (Ward & Hart 2005), supporting the hypothesis that *T. steindachneri*, *T. asper*, and *B. australis* are mixed up with each other at some point during their ontogeny. Following the fishers' ecological knowledge, it is not the first time they found these species of Bramidae when targeting *B. australis*. However, there are still rare and uncommon events, as the fishing monitoring still needs to register them. Therefore, the lack of reporting these rare pomfret species in logbooks is caused by the lack of bycatch monitoring in the artisanal fisheries targeting *B. australis*. Indeed, the presence of onboard scientific observers on the artisanal vessels targeting *B. australis* is almost null (J. Sateler, *comm. pers.*), precluding the bycatch quantification. Therefore, efforts must be addressed to assess other species in the *B. australis* fishery in Chile, contributing to understanding the demography and population dynamics of the main targeted species and developing guides and distribution maps for bycatch such as *T. steindachneri* and *T. asper*.

ACKNOWLEDGMENTS

This study was funded by Fondo de Investigación Pesquera y Acuicultura (FIPA-Chile) project number FIPA 2019-14 conducted by Centro UC - Center of Applied Ecology and Sustainability (CAPES-UC), Chile. R. Wiff was also funded by the CAPES-UC, Chile project FONDECYT N°FB0002 (2014) and by ANID-Programa Iniciativa Científica Milenio Código

ICN2019-015. The authors are very grateful to Enrique Aguilar, the fishermen from Lebu Harbour, and Luis Abraham Barrientos for providing the photos and related information on *T. steindachneri* and *T. asper* used in this research. We are grateful to Jorge Sateler (IFOP) for helpful comments regarding the monitoring of *B. australis* and the identification of other Bramidae species in the Chilean artisanal fishery and to Agustín M. De Wysiecki for his help on editing the specimen's photos. Finally, we thank four anonymous reviewers for their valuable comments and suggestions that greatly improved an early version of this short communication.

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Received: August 28, 2022, Accepted: December 9, 2022

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