



Record of a massive *Myliobatis goodei* and *M. ridens* discard in Cassino beach, Rio Grande do Sul state, southern Brazil, SW Atlantic

GONZALO VELASCO^{1*} & MARIA CRISTINA ODDONE²

¹ Instituto de Oceanografia, Universidade Federal do Rio Grande (FURG), Cx Postal 474, Rio Grande, RS, 96201-900, Brazil. * Corresponding author: gonzalo.velasco@furg.br

² Instituto de Ciências Biológicas, Universidade Federal do Rio Grande (FURG), Cx Postal 474, Rio Grande, RS, 96201-900, Brazil.

Abstract. A beach seine operation was witnessed in Cassino Beach, Rio Grande do Sul coast, Brazil, with a discard of 178 individuals of *Myliobatis goodei* and *M. ridens* in one haul. Individuals had 44.0-84.0 cm of disc width. This species and fisheries need long-term monitoring and managing.

Key words: artisanal fisheries, elasmobranchs by-catch, conservation, Myliobatoidei

Resumo. Registro de um descarte massivo de *Myliobatis goodei* e *M. ridens* na praia do Cassino, RS, Brasil, Atlântico Sudoeste. Uma operação de arrastão-de-praia foi observada na praia do Cassino, RS, Brasil, com um descarte de 178 indivíduos identificados como *Myliobatis goodei* e *M. ridens* em um lance. Os indivíduos mediram entre 44.0 e 84.0 cm de largura de disco. Estas espécies e esta pescaria precisam ser monitoradas no longo prazo e manejadas.

Palavras-chave: pesca artesanal, captura incidental de elasmobrânquios, conservação, Myliobatoidei

Fisheries activities' discards, comprising many species, are commonly found on the sandy shore along the Rio Grande do Sul State, southern Brazil. Along the extensive sandy Cassino beach (638 km, with only one significant interruption in the Patos Lagoon mouth) both coastal industrial and artisanal fisheries (bottom trawling and gill-netting), and beach artisanal fisheries (beach seine and a new gear with drifting gill-nets, locally called "lance de praia"), take place (Reis *et al.* 1994, Boffo & Reis 2003, Vooren & Klippel 2005; Velasco *et al.* 2011). The target species of the beach artisanal fisheries are mainly scienids like the whitemouth croaker *Micropogonias furnieri* (Desmarest, 1823), the weakfish *Cynoscion guatucupa* (Cuvier, 1830), king weakfish *Macrodon atricauda* (Günther, 1880), the Southern kingcroaker *Mentichirrus americanus* (Linnaeus, 1758) and the Gulf kingcroaker *M. littoralis* (Holbrook, 1847), and the mullet *Mugil liza* Valenciennes, 1836. Elasmobranchs are a bycatch of these fisheries, with the exception of the Brazilian guitarfish *Rhinobatos horkelii*, which was targeted in the decade of 1980 to depletion. However, the

magnitude of the catches of some skates and rays have been increasing by virtue of the regional industrial fisheries, in view of the lower landings that bony fishes have been presenting (Oddone & Vooren 2005, Vooren & Klippel 2005, Isaac *et al.* 2006).

Beach seine is a traditional fishing gear used by artisanal fishermen in Cassino beach (Vooren 1997, Vooren & Klippel 2005). Not so long ago, this gear was used for targeting the whitemouth croaker and the Brazilian guitarfish, but since the collapse of the guitarfish fishery and its prohibition by means of the Ministry of the Environment's regulation number 5 from May 21st, 2004 ("Instrução Normativa MMA n° 05, de 21 de Maio de 2004"), fishermen have been targeting other species. However, the coastal area and the surf zone are also seasonally visited by other elasmobranchs species like the eagle rays *Myliobatis* spp. (Vooren 1997, Vooren and Klippel 2005, Velasco *et al.* 2011).

Since the *Myliobatis* species complex confusion was recently solved and *Myliobatis ridens* (Ruocco *et al.*, 2012) was described (this species had been previously recorded as *Myliobatis*

“broad-teeth” morphotype (BT), by Vooren, 1997), both species can be clearly identified and accounted for in fisheries' landings. Until now, the few data collected made reference to *Myliobatis goodei* Garman, 1885, *Myliobatis* sp. BT, and *M. freminvillei* Lesueur, 1824, as the species caught by beach seine, and discarded.

A new record of massive fishing and discarding involving genus *Myliobatis* was witnessed during the late afternoon (*c.a.* 18:00 h) on October 15th, 2011. On this occasion, we were able to see the fishermen in action, count the totality of the specimens laying on the sand, and even return back to the water several alive specimens. Due to the lack of cooperation by the fishermen, who were afraid of the environment agency, the Brazilian Environment and Natural Renewable Resources Institute's (“Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis” - IBAMA) inspections and fines, little biological data were recorded at that time. Yet, the species were identified by the direct observation of the dentition (according to Ruoco *et al.* 2012) as *Myliobatis goodei* and *M. ridens* (Fig. 1). A total of 178 individuals were discarded from a single beach seine haul (Fig. 2).



Figure 1. Dentition of *Myliobatis ridens* (above) and *M. goodei* (below) discarded on Cassino Beach by beach seine artisanal fisheries, on October 15th, 2011

The bony-fish catch of that haul was composed mainly by the Argentinean menhaden *Brevoortia pectinata* (Jenyns, 1842), the bluefish *Pomatomus saltarix* (Linnaeus, 1766), the whitemouth croaker, the American harvestfish *Peprilus paru* (Linnaeus, 1758) and one female angelshark *Squatina argentina* (Marini, 1930) (Fig. 3) that was quickly measured (TL 42.5 cm) and released alive.

The random sample of eight individuals measured that evening had disc width (DW) ranging from 44.0 to 84.0 cm for *Myliobatis goodei*, and 45.0 to 50.0 cm DW for *M. ridens*. The following morning, when returning to the site, only some heads along to the vertebral columns and viscera were found. Such material was still useful for the macroscopic analysis of the teeth and gonads, confirming the previous day observations. Female *M. ridens* were macroscopically classified as mature according to the ovarian follicular activity. Follicles were vitellogenic and maximum follicular diameter was 1.5 cm. Male *M. ridens* were also mature, according to the macroscopical aspect of the testicular surface which presented lobes of 0.7 and 0.8 cm in diameter (Fig. 4). The maturity stages were identified as “capable to reproduce” in both sexes (stages 3 and 3a respectively) according to ICES (2013).

We conclude that these beach fisheries may capture, incidentally, more than one *Myliobatis* species, in the same haul, sometimes in large numbers, including reproductive females and males. Such fisheries also capture other elasmobranch species such as the *Squatina argentina* here recorded, that is globally considered an Endangered species (EN) (see IUCN Red List status at <http://www.iucnredlist.org/details/39329/0>), and Critically Endangered (CR) in the Brazilian national assessment done by the Chico Mendes Institute for the Conservation of Biodiversity (Instituto Chico Mendes de Conservação da Biodiversidade-ICMBio)

(<http://www.icmbio.gov.br/portal/biodiversidade/fauna-brasileira/lista-de-especies/6570-especie-6570.html>). Presently, the *Myliobatis* species are still in the Data Deficient (DD) category in the global assessment by the IUCN, but are considered Endangered (*M. freminvillei*) and Critically Endangered (*M. goodei* and *M. ridens*) in the ICMBio's list (accessible through: <http://www.icmbio.gov.br/portal/biodiversidade/fauna-brasileira/lista-de-especies.html>). Thus, a long

term governmental monitoring of artisanal coastal and beach fisheries is needed to assess the status and abundance trends of the Southwest Atlantic

populations, in the pursue of protecting the elasmobranchs biodiversity.



Figure 2. Eagle rays *Myliobatis goodei* and *M. ridens* and bony fishes discarded after a beach seine haul on Cassino Beach, on October 15th, 2011.



Figure 3. A juvenile angelshark *Squatina argentina* discarded after a beach seine haul on Cassino Beach, on October 15th, 2011, measured and released alive.



Figure 4. Ovary (above) and testis (below) of discarded *Myliobatis goodie*. Maturity stages were classified as “capable to reproduce” (stages 3 and 3a respectively) according to ICES (2013).

Acknowledgments

We thank the anonymous reviewers and the Editors, for the corrections.

References

- Boffo, M. S & Reis, E. G. 2003. Atividade pesqueira da frota de média escala no extremo sul do Brasil. *Atlântica*, 25(2): 171-178.
- ICES. 2013. **Report of the workshop on Sexual Maturity Staging of Elasmobranchs (WKMSSEL), 11-14 December 2012, Lisbon,**

Portugal. ICES CM 2012/ACOM:59. 68 pp.

- Isaac, V. Martins, A. S., Haimovici, M. & Andriquetto, J. M. (Eds.). 2006. **A Pesca Marinha e Estuarina do Brasil no Início do Século XXI: recursos, tecnologias, aspectos socioeconômicos e institucionais.** Publicação do Especial do Projeto: Uso e Apropriação de Recursos Costeiros—Modelo Gerencial da Pesca. Instituto do Milênio/CNPq Editora Universitaria UFPA, Belem, Brasil, 157–180.
- Reis, E. G., Vieira, P. C. & Duarte, V. D. 1994. Pesca artesanal de teleósteos no estuário da Lagoa dos Patos e costa do Rio Grande do Sul. *Atlântica*, 16: 69-86.
- Oddone, M. C. & Vooren, C. M. 2005. Reproductive biology of *Atlantoraja cyclophora* (Regan 1903) (Elasmobranchii: Rajidae) off southern Brazil. *ICES Journal of Marine Science*, v. 62, p. 1095-1103.
- Ruocco, N. L., Lucifora, L. O., Astarloa, J. M. D., Mabrugaña, E. & Delpiani, S. M. 2012. Morphology and DNA Barcoding Reveal a New Species of Eagle Ray from the Southwestern Atlantic: *Myliobatis ridens* sp. nov. (Chondrichthyes: Myliobatiformes: Myliobatidae). *Zoological Studies*, 51(6): 862-873.
- Velasco, G., Oddone, M. C. & Lopes, R. P. 2011. Records of selective fishing mortality of *Myliobatis goodei* on the southern Brazil coast by beach seine. *Brazilian Journal of Oceanography*, 59 (4): 397-400.
- Vooren, C. M. 1997. Demersal elasmobranchs. In: Seeliger, U., Odebrecht, C. & Castello, J. P. (Eds.). **Subtropical convergence environment: the coast and the sea in the Southwestern Atlantic.** Springer, Berlim, Chap. 6.16: 141-146.
- Vooren, C. M. & Klippel, S. (Eds.). 2005. **Ações para a conservação de tubarões e raias no sul do Brasil.** Igaré, Porto Alegre. 262p.

Received: October 2015

Accepted: December 2015

Published: January 2016