



<http://dx.doi.org/10.11646/zootaxa.3936.2.4>

<http://zoobank.org/urn:lsid:zoobank.org:pub:4FBD786F-5CC9-4D6F-943F-09CE31DDA7AE>

Tetronarce cowleyi, sp. nov., a new species of electric ray from southern Africa (Chondrichthyes: Torpediniformes: Torpedinidae)

DAVID A. EBERT^{1,2,3,6}, DIANE L. HAAS^{1,4} & MARCELO R. DE CARVALHO⁵

¹Pacific Shark Research Center, Moss Landing Marine Laboratories, 8272 Moss Landing Road, Moss Landing, CA 95039, USA. E-mail: debert@mlml.calstate.edu

²Research Associate, Department of Ichthyology, California Academy of Sciences, 55 Music Concourse Drive, San Francisco, CA 94118, USA

³Research Associate, South African Institute for Aquatic Biodiversity, Private Bag 1015, Grahamstown, 6140, South Africa

⁴California Department of Fish and Wildlife, 830 S St., Sacramento, CA 95811, USA

⁵Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, Trav. 14, no. 101, São Paulo, SP, CEP 05508-090, Brazil. E-mail: mrcarvalho@ib.usp.br

⁶Corresponding author

Abstract

A new species of torpedo ray, *Tetronarce cowleyi*, sp. nov., is described from specimens collected from the southeastern Atlantic Ocean. The new species is placed in the genus *Tetronarce* based on a uniform dorsal coloration and absence of papillae around the spiracles. The new species is distinguished from its closest congeners, the North Atlantic *Tetronarce nobiliana* Bonnaparte, 1835, and southwestern Atlantic *Tetronarce puelcha* Lahille, 1926, by a combination of morphological characteristics including a shorter spiracular length, a proportionally greater head length as measured between snout margin and fifth gill openings, a proportionally greater preoral snout length, a uniform shiny black or dark gray dorsal surface, lacking any prominent markings, and a creamy white ventral color with dark edges in juveniles but fading with growth. *Tetronarce cowleyi*, sp. nov., is further distinguished from *T. nobiliana* by its more circular anterior disc shape (vs. relatively straight in *T. nobiliana*), fewer tooth rows (32/28 vs. 38–53/38–52 in *T. nobiliana*), greater mouth width (1.5–1.7 times as great as interorbital width vs. 0.5–0.6 times interorbital width in *T. nobiliana*), smaller distance between second dorsal and caudal fins (3.5–4.9% vs. 6.6–6.8% in *T. nobiliana*), and a clasper length extending nearly to lower caudal fin origin (claspers in *T. nobiliana* that extend only two-thirds distance between second dorsal and caudal fins). *Tetronarce cowleyi*, sp. nov., is known from Walvis Bay, Namibia to Algoa Bay, Eastern Cape, South Africa, at depths of 110 to 457 m.

Key words: *Tetronarce*, electric ray, new species, Namibia, South Africa, Southeastern Atlantic Ocean

Introduction

The family Torpedinidae Bonaparte, 1838, has long been considered to consist of a single genus, *Torpedo* Houttuyn, 1764, and two subgenera, *Tetronarce* Gill, 1862, and *Torpedo* Houttuyn, 1764 (Compagno, 2005). However, these two subgenera have been recently elevated to full generic rank based on their distinct morphology (treated as distinct genera in Carvalho *et al.*, 2002; Ebert *et al.*, 2013; Ebert, 2014; Carvalho, *in press*). The two genera can be distinguished by their dorsal coloration and the presence or absence of spiracular papillae. Furthermore, *Tetronarce* species tend to attain a much larger size (up to 180 cm total length; TL) than *Torpedo* species, which are usually small to moderate sized (range from 25 to 80 cm TL) electric rays (Carvalho, *in press*). The genus *Tetronarce* has up to 10 valid species, while the genus *Torpedo* has at least 15 valid species; both genera have several known undescribed species (Carvalho *et al.*, 2002; Compagno, 2005; Haas & Ebert, 2006; Carvalho, *in press*).

Representatives of both genera occur in southern African waters. The genus *Torpedo* is represented by *T. fuscomaculata* Peters, 1855, and *T. sinuspersici* Olfers, 1831 (Compagno, 1986; Compagno *et al.*, 1989; Carvalho,

Consortium and the David and Lucile Packard Foundation to the Pacific Shark Research Center. Additional support provided by a National Science Foundation grant (DEB 1132229) to Gavin Naylor, College of Charleston. MRC is supported by the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) through grants 2012/09877-0, 2012/02349-5 and 2012/05391-5, and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) (304615/2011-0).

References

- Allué, C., Borrueal, C., Lloris, D. & Rucabado, J.A. (1984) Datos pesqueros de la campaña “Benguella II”. In: Rucabado, J.A. & Bas, C. (Eds.), *Resultados de las Expediciones Oceanográfico-Pesqueras “Benguella I” (1979) y “Benguella II” (1980) Realizadas en el Atlántico Sudoriental (Namibia)*. Vol. 9. Datos Informativos, Instituto de Investigaciones Pesqueras de Barcellona, pp. 85–190.
- Barnard, K.H. (1925) A monograph of the marine fishes of South Africa. Part 1. *Annals of the South African Museum*, 21, 1–418.
- Barnard, K.H. (1947) *A Pictorial Guide to South African fishes*. Maskew Miller, Cape Town, xvii, 226 pp.
- Bigelow, H.B. & Schroeder, W.C. (1953) The fishes of the western North Atlantic, Part II: sawfishes, skates, rays, and chimaeroids. *Memoirs of the Sear Foundation for Marine Research*, 2, 1–xv + 1–514.
- Bini, G. (1967) *Atlante dei pesci delle coste italiane. I. Leptocardi, Ciclostomi, Selaci*. Mondo Sommerso, Milano, 206 pp.
- Capapé, C. & Desoutter, M. (1980) Nouvelles descriptions de *Torpedo (Tetronacre) nobiliana* Bonaparte, 1835, et de *Torpedo (Tetronarce) mackayana* Metzelaar, 1919 (Pisces, Torpedinidae). *Bulletin du Museum National d'Histoire Naturelle de Paris*, 4è Serie, n°2, Section A, 1, 325–342.
- Carvalho, M.R. de (1999) *A systematic revision of the electric ray genus Narcine Henle, 1834 (Chondrichthyes: Torpediniformes: Narcinidae), and the higher-level phylogenetic relationships of the elasmobranch fishes (Chondrichthyes)*. PhD dissertation, The City University of New York, 735 pp.
- Carvalho, M.R. de, Stehmann, M.F.W. & Manilo, L.G. (2002) *Torpedo adenesis*, a new species of electric ray from the Gulf of Aden, with comments on nominal species of *Torpedo* from the Western Indian Ocean, Arabian Sea and adjacent areas (Chondrichthyes: Torpediniformes: Torpedinidae). *American Museum Novitates*, 3369, 1–34.
[http://dx.doi.org/10.1206/0003-0082\(2002\)369<0001:TAANSO>2.0.CO;2](http://dx.doi.org/10.1206/0003-0082(2002)369<0001:TAANSO>2.0.CO;2)
- Carvalho, M.R. de. (2015) Torpedinidae. In: Heemstra, P.C., Heemstra, E. & Ebert, D.A. (Eds.), *Coastal Fishes of the Western Indian Ocean. Vol. 1*. South African Institute for Aquatic Biodiversity, Grahamstown, South Africa. [in press]
- Compagno, L.J.V. (1986) Family Torpedinidae. In: Smith, M.M. & Heemstra, P.C. (Eds.), *Smith's Sea Fishes. 1st Edition*. Southern Book Publishers, Johannesburg, pp. 112–113.
- Compagno, L.J.V. (1999) An overview of chondrichthyan systematics and biodiversity in southern Africa. *Transactions of the Royal Society of South Africa*, 54, 75–120.
<http://dx.doi.org/10.1080/00359199909520406>
- Compagno, L.J.V. (2005) Checklist of living Chondrichthyes. In: Hamlett, W.C. (Ed.), *Reproductive Biology and Phylogeny of Chondrichthyes*. Science Publishers, Inc., New Hampshire, pp. 503–548.
- Compagno, L.J.V., Ebert, D.A. & Cowley, P.D. (1991) Distribution of offshore demersal cartilaginous fish (class Chondrichthyes) off the west coast of southern Africa, with notes on their systematics. *South African Journal of Marine Science*, 11, 43–139.
<http://dx.doi.org/10.2989/025776191784287664>
- Compagno, L.J.V., Ebert, D.A. & Smale, M.J. (1989) *Guide to the Sharks and Rays of Southern Africa*. Struik, Cape Town, 160 pp.
- Ebert, D.A. (2014) *Deep-sea cartilaginous fishes of the Indian Ocean*. Volume 2. Batoids and Chimaeras. FAO Species Catalogue for Fishery Purposes. No. 8, Vol. 2. Rome, FAO. 129 pp.
- Ebert, D.A., White, W.T., Ho, H.-C., Last, P.R., Nakaya, K., Séret, B., Straube, N., Naylor, G.J.P. & Carvalho, M.R. de (2013) An annotated checklist of Taiwan Chondrichthyans. In: Carvalho, M.R. de, Ebert, D.A., Ho, H.-C., & White, W.T. (Eds.), *Systematics and biodiversity of sharks, rays, and chimaeras (Chondrichthyes) of Taiwan*. *Zootaxa*, 3752 (1), 279–386.
<http://dx.doi.org/10.11646/zootaxa.3752.1.17>
- Fowler, H.W. (1936) The marine fishes of west Africa based on the collection of the American Museum Congo Expedition, 1909–15. *Bulletin of the American Museum of Natural History*, 70, 1–1493.
- Fowler, H.W. (1941) The fishes of the groups Elasmobranchii, Holocephali, Isospondyli, and Ostariophysi obtained by United States Bureau of Fisheries Steamer Albatross in 1907 to 1910, chiefly in the Philippines and adjacent seas. *Bulletin of the U.S. National Museum*, 100, 1–879.
- Haas, D.L. & Ebert, D.A. (2006) *Torpedo formosa* sp. nov., a new species of electric ray (Chondrichthyes: Torpediniformes: Torpedinidae) from Taiwan. *Zootaxa*, 1320, 1–14.
- Lahille, F. (1928) Nota sobre unos peces elasmobranchios. *Anales del Museo Nacional de Historia natural Bernardino Rivadavia*, 34, 299–339, pls. 1–5.
- Lloris, D. (1986) Ictiofauna demersal y aspectos biogeográficos de la costa sudoccidental de Africa (SWA/Namibia).

Monografías de Zoología Marina, 1, 9–432.

- Naylor, G.J.P., Caira, J.N., Jensen, K., Rosana, K.A.M., White, W.T. & Last, P.R. (2012) A DNA sequence-based approach to the identification of shark and ray species and its implications for global elasmobranch diversity and parasitology. *Bulletin of the American Museum of Natural History*, 367, 1–263.
<http://dx.doi.org/10.1206/754.1>
- Norman, J.R. (1935) Coast fishes. 1. The South Atlantic (including the Cape Verde islands, West Africa, Ascension Islands, Tristan da Cunha and Gough Island). “*Discovery*” *Report*, 12, 1–58.
- Smith, J.L.B. (1949) *The sea fishes of southern Africa*. Central News Agency, Cape Town, xviii + 550 pp.
- Smith, J.L.B. (1965) *The sea fishes of southern Africa*. 5th Edition. Central News Agency, Cape Town, 580 pp.
- Thompson, W.W. (1914) Catalogue of the fishes of the Cape Province (Part 1). *Marine Biological Reports*, 2, 132–167. [Cape Town]
- Tortonese, E. (1957) *Leptocardia, Ciclostomata, Selachii. Fauna d'Italia. Vol. 2*. Bologna, Edizioni Calderini, 334 pp.
- Turon, J.M., Rucabado, J., Lloris, D. & Macpherson, E. (1986) Datos pesqueros de las expediciones realizadas en aguas de Namibia durante los Anos 1981 a 1984 (“Benguela III” a “Benguela VII” y “Valdivia I”). In: Macpherson, E. (Ed.), *Resultados de las Expediciones Oceanográfico-Pesqueras “Benguela III” (1981) a “Benguela VII” (1984) y “Valdivia I” realizadas en el Atlántico Sudoriental (Namibia)*. Vol. 17. Datos Informativos, Instituto de Ciencias del Mar, Barcelona, pp. 1–345.
- Von Bonde, C. & Swart, D.B. (1923) The Platosomia (skates and rays) collected by the S.S. “Pickle”. *Union of South Africa, Fisheries and Marine Biological Survey*, Report (3), 1922, Special Report (5), 22 pp.