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First records of the rare eelpout *Lycenchelys xanthoptera* Anderson, 1991 (Teleostei, Zoarcidae) in the Ross Sea, Antarctica

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Six eelpout species (Zoarcidae) are currently known from the Ross Sea and adjacent areas: *Dieidolycus leptodermatus* Anderson, 1988; *Lycodichthys dearborni* (DeWitt, 1962); *Ophthalmolycus bothriocephalus* (Pappenheim, 1912); *Pachycara brachycephalum* (Pappenheim, 1912); *Seleniolycus pectoralis* Møller & Stewart, 2006 and *Seleniolycus robertsi* Møller & Stewart, 2006 (Anderson, 1990, 2006; Møller & Stewart, 2006). Zoarcidae is thereby one of the most diverse non-Notothenoid fish families in the Ross Sea.

Recent collecting by New Zealand Ministry of Fisheries Observers and the Museum of New Zealand Te Papa Tongarewa (Te Papa) Natural Environment's Fish Team in the Ross Sea has resulted in many specimens registered into the National Fish Collection (NFC) at Te Papa. Examination of the zoarcids in this valuable new material (44 lots, 56 specimens) revealed 6 specimens assignable to the genus *Lycenchelys* Gill, taken from stomach samples of toothfish (*Dissostichus* spp.) and Antarctic starry skate (*Amblyraja georgiana*) caught on baited longlines. The zoarcids match the description of *Lycenchelys xanthoptera* Anderson, 1991, which is only known from the five type specimens taken from a single location in the Weddel Sea. In the present paper we provide new morphological and meristic data for this rare species and discuss the possible disjunct distribution pattern.

Methods and abbreviations

During the austral summers of 2001-02 and 2004-05, fish specimens were acquired as either by-catch or toothfish stomach contents, on exploratory commercial longlines using baited 9/0 hooks. Specimens were frozen on capture and returned to New Zealand where they were thawed and registered into the NFC at Te Papa. Fish specimens were fixed in 10% formalin and stored in 70% ethanol. All specimens were radiographed. Measurements were made with dial calipers to the nearest 0.1 mm. Definitions of character states and measurements follow those of Anderson (1982, 1994). Measurement abbreviations: SL = standard length; HL = head length. Institutional abbreviations: NMNZ = Museum of New Zealand Te Papa Tongarewa; ZMH = Zoological Museum, Hamburg.

Materials

Ross Sea: NMNZ P.038575, 269 mm SL, male, Antarctica, Ross Sea, Iselin Bank, 71º 19.00'S, 177º 10.00'E, depth 1249–1254 m, retrieved from gill slits of *Amblyraja georgiana* captured on a longline, FV *San Aotea II*, C. Morrish, OBS 1595A/083, 28 Feb. 2002; NMNZ P.038578, 270 mm SL, female, Antarctica, Ross Sea, Iselin Bank, 72º 33.00'S, 176º 50.00'E, depth 1131–1185 m, retrieved from stomach contents of *Dissostichus* sp. captured on a longline, FV *San Aotea II*, C. Morrish, OBS 1595A/050, 14 Feb. 2002; NMNZ P.038579, 268 mm TL, male, Antarctica, Ross Sea, Iselin Bank, 72º 26.00'S, 176º 18.00'E, depth 1067–1316 m, stomach contents of *Dissostichus* sp. captured on a longline, FV *San Aotea II*, C. Morrish, OBS 1595A/045, 12 Feb. 2002; NMNZ P.038637, 243 mm TL, female, Antarctica, Ross Sea, SE of Pennell Bank, 75º 4.00'S, 176º 0.00'W, depth 844–1225 m, probably stomach contents of *Dissostichus* sp. captured on a longline but not recorded in database, FV *Janas*, T. Brunning, OBS 1593A/045, 02 Feb. 2002; NMNZ P.038650, 245 mm SL, female, Antarctica, Ross Sea, SE of Pennell Bank, 75º 8.00'S, 175º 13.00'W, 1200–1375 m, stomach contents of *Dissostichus* sp. captured on a longline, FV *Janas*, T. Brunning, OBS 1593A/088, 19 Feb. 2002; NMNZ P.041373, 286 mm SL, female, Antarctica, Ross Sea, SE of Pennell Bank, 75º 7.00'S, 175º 30.00'W, 1172–1311 m, stomach contents of *Dissostichus* sp. captured on a longline, FV *Janas*, Jamie Williamson, OBS 2012/055, 2 Jan. 2005. **Weddel Sea**: ZMH 25116/ ISH 1-1991, paratype, 193 mm SL, immature male, off Kapp Norvegia, Queen Maud Land, 71°06.2'S, 12°53.8'W, 771–793 m, bottom trawl, FFS *Polarstern*, 20 Feb. 1989.

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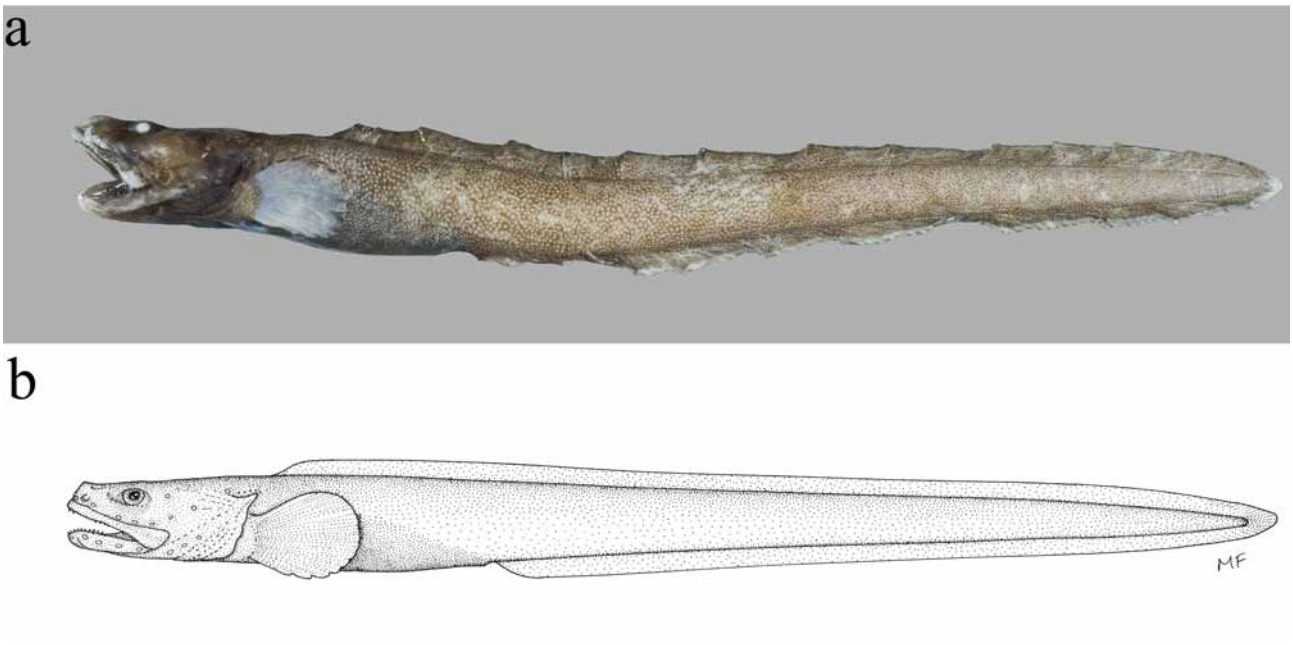

FIGURE 1. *Lycenchelys xanthoptera,* Iselin Bank, Ross Sea, Antarctica. **(a)** Colour image of NMNZ P.038579, 268 mm SL, male: 4 years after preservation**,** C. Struthers NMNZ**; (b)** Line drawing of NMNZ P.038575, 269 mm SL, male, drawing, Michelle Freeborn NMNZ.

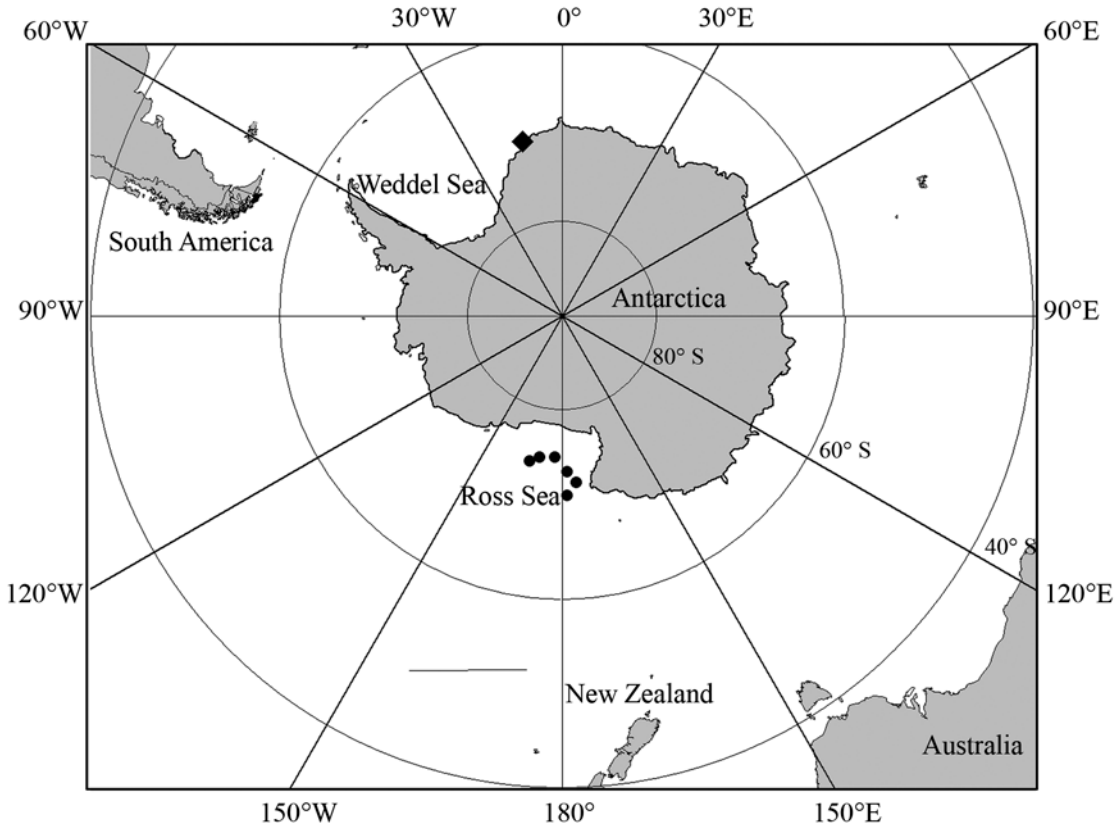

FIGURE 2. Capture sites of *Lycenchelys xanthoptera*. Weddel Sea (type locality) (♦); Ross Sea (●). Scale bar = 2000 km at 50° south.

Diagnosis. (including Ross Sea specimens). A species of *Lycenchelys* with the following combination of characters: vertebrae 23–26 + 89–96 = 114–119; dorsal-fin origin associated with vertebrae 3–4; pectoral-fin rays 14–17; pelvic fins absent; suborbital pores 5–7; interorbital and occipital pores absent; lateral line double, with ventral and mediolateral branches; vomerine and palatine teeth absent; scale rows from above anus to dorsal fin base 20–22; pectoral fin colour (in alcohol): pale; head, body and tail brown with faint light blotches.

Counts and measurements (ranges of six Ross Sea specimens followed by range of five Weddel Sea specimens in parenthesis when different): vertebrae 23–26 + 92–96 = 116–119 (24–26 + 89–93 =114–117); dorsal-fin rays 111–114 (109–111); anal-fin rays 94–97 (91–96); caudal-fin rays 12; pectoral-fin rays 15–17 (14–15); pelvic-fin rays 0; premaxillary teeth 23–34 (37) in 2–3 rows; vomerine teeth 0 (0–15); palatine teeth 0; dentary teeth 15–34; gill rakers 9–10 (10–12); branchiostegal rays 6; pseudobranch filaments 0 (0–2); suborbital head pores 6–7 (5–6); scale rows above anal fin origin 20–22.

Following proportions as percent SL: head length 12.3–16.0 (11.6–13.5); head width 4.5–8.1 ; head height 5.7–6.8 (5.5–6.8); snout length 3.3–5.1 ; nostril tube length 0.6–0.9 (0.8, n=1); eye diameter 1.9–2.3 ; pupil diameter 1.0–1.8 ; interorbital width 1.7–3.1 ; upper jaw length 4.5–9.2; lower jaw 4.3–8.0 ; preanal length 30.7–35.8 ; predorsal length 15.6–18.6 (14.9–16.3); dorsal fin height above anal fin origin 1.8–2.9); body depth at anal fin origin 4.9–7.8 (6.6–7.9); body width at anal fin origin 3.2–5.3 (2.7, n=1); pectoral-fin length 7.9–8.5 (8.7–9.2); pectoral fin base height 2.2–3.5 (3.3–3.8); gill slit length 3.6–4.6 (3.2–4.1); isthmus width 3.9–5.6 (3.3, n=1); snout to anterior scales 14.0–19.5 (11.4, n=1).

Following proportions as percent HL: head width 36.2–51.3 (36.6–55.1); head depth 40.5–50.3 (42.4–54.1); upper jaw length 30.4–58.3 (41.2–48.1); pectoral fin length 49.3–66.2 (66.5–75.3); caudal fin length 9.5–14.7 (16.7, n=1); snout length 26.2–32.6 (22.2–26.8); eye diameter 13.8–18.2 (16.6–21.6); nostril tube length 4.6–5.8 (6.4, n=1); gill slit length 26.9–31.0 (25.1–30.5); interorbital width (soft) 13.7–22.8.

Distribution. Known from a few banks and seamounts at 880–1056 m depth in the Ross Sea, Antarctica and from a single location in the Weddel Sea, at 771–793 m depth (Fig. 2).

Discussion

The two populations overlap in all meristic and morphometric characters, except pectoral-fin length (7.9–8.5 vs 8.7–9.2 % SL) and possibly the distance from snout to anterior scales. The diagnostic pale colour of the pectoral fin, however, is the same. All Ross Sea specimens lack vomerine teeth, whereas only the holotype is edentate among the Weddel Sea specimens (Anderson 1991). In contrast, the single Weddel Sea specimen examined by us has more premaxillary teeth (37 vs 23–34) than the Ross Sea specimens. The Ross Sea material are all naked anterior to the dorsal fin, whereas the Weddel Sea specimens are scaled. The abdomen is naked in the Ross Sea specimens and variable in the Weddel Sea material, probably becoming less dense or absent with age (Anderson 1991). This is consistent with the present study as the Ross Sea specimens are notably larger (243–286 mm SL) than those from the Weddel Sea type series (173–242 mm SL). This ontogenetic change is opposite to the typical pattern in Zoarcidae, where squamation becomes denser with size (Anderson, 1994; Møller & Gravlund, 2003). The pectoral fin base is scaly in Weddel Sea specimens and variably scaled or naked in specimens from the Ross Sea. These small observed differences may be due to natural variation and small sample size, or that two separate populations exist that may represent distinct species. However, until more specimens become available we cannot confidently describe the Ross Sea specimens as a new species.

It is presently unknown whether the current disjunct distribution is natural or just a result of insufficient sampling in the area between the known records. The Amundsen and Bellingshausen Seas are some of the least sampled areas in the Southern Ocean and often the zoarcids reported are not identified to species (e.g. Matallanas & Olaso, 2007). We consider it very likely (with additional sampling effort) that *L. xanthoptera* will be found in these areas in the future. However, the waters along the western part of the Antarctic Penninsula on the other hand are rather frequently fished and the paucity of records of *L. xanthoptera* from that area may be connected to their preference for rough bottom habitats, where trawling is difficult. The collection of a rare species like *L. xanthoptera* from longlined *Dissosticus* spp and *Amblyraja* spp, clearly demonstrates that this sampling method has great potential in future explorations of the Antarctic fish fauna.

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