Two new species of snailfish genus Paraliparis (Pisces: Liparidae) from the Ross Sea, Antarctica

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Two new species of Liparidae (snailfish) Paraliparis macrocephalus sp. nov. and P. rossi sp. nov., captured in the south-western Ross Sea, Antarctica (74–75° S; 165–171° E), are described and illustrated. Paraliparis macrocephalus resembles, but is distinct from P. hubbsi, P. valentinae, P. somovi and P. aspersus. Paraliparis rossi is similar to P. macrocephalus in meristic counts, pectoral girdle structure and morphometry but differs in size of cephalic pores and nostril, shape of teeth, colour and other characters. Paraliparis macrocephalus was captured in the deepest locality in the Ross Sea, the Drygalski Trough, a 1200 m deep inner-shelf depression. As trawling was preceded by video camera tows, a description of the substratum and fauna of these little-studied trough habitats is also provided.

Key words: Liparidae; Paraliparis; taxonomy; inner-shelf depression; Antarctica.

INTRODUCTION

The 213 benthic fish species of the Antarctic Region include a highly endemic nototheniid component as well as representatives from cosmopolitan families such as the Liparidae and Zoarcidae (Eastman, 2000). With the recent accounts of new species, liparids now comprise 32% of fish species diversity on the Antarctic shelf and upper slope (Eastman, 2000) and are the most speciose family of Antarctic fish (Andriashev & Stein, 1998). Andriashev & Stein (1998) tabulated 64 liparids from the Antarctic Region, and four additional species have since been added (Matallanas, 1998, 1999; Matallanas & Pequeno, 2000). With 35 species, the liparid genus Paraliparis is the most speciose genus of fish in the Southern Ocean. Since this genus was last reviewed (Andriashev, 1986), many new species have been described (Stein & Tompkins, 1989; Stein 1991; Andriashev, 1992, 1994; Duhamel, 1992; Matallanas, 1999; Matallanas & Pequeno, 2000). In this paper two new species of Paraliparis from the Antarctic Region are described. Both were collected in the southwestern Ross Sea (74–75° S; 165–171° E), P. macrocephalus sp. nov. in the Drygalski Trough, an isolated inner-shelf depression 1200 m deep. Paraliparis rossi sp. nov. was taken near the Mawson Bank at a depth 465–466 m. Illustrations of both species and a colour photograph of a live P. macrocephalus are provided. As trawling was preceded by video camera tows, descriptions are also given of the substratum at

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the collecting sites and comments on the fauna of the little-studied inner-shelf depressions (Andriashev, 1977) as represented by the Drygalski Trough.

MATERIALS AND METHODS

The methods of counting and measuring and the terminology are those standard for liparid taxonomy (Andriashev, 1986; Andriashev & Stein, 1998). The rostral fold is a skin fold forming part of the ventral surface of the snout immediately anterior to the upper lip. Morphometric ratios are expressed as % of standard length ($L_S$) or % of head length ($L_H$). The right pectoral girdles were removed for clearing and staining with alizarin red. The type and comparative material is deposited in: National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A. (USNM); Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia (ZISP) and Museum National d’Histoire Naturelle, Paris, France (MNHN).

RESULTS

PARALIPARIS MACROCEPHALUS N. SP. [Figs 1 to 4(a)]

Holotype
USNM 361866. Adult male 116 mm total length ($L_T$), 104 mm $L_S$. Ross Sea, Drygalski Trough, RV Nathaniel B. Palmer, Cruise 97-9, St. 34, 75°03′60″–75°04′49″ S, 165°12′30″–165°10′16″0″ E, 28 December 1997, bottom depth 1181–1191 m. Otter trawl on soft sediment, bottom temperature −1·8°C (collected by J. T. Eastman).

Comparative material


Diagnosis

Counts
Vertebrae 56 (10+46), D 49, A 43, P 20 (14+2+4), C 9 (4/5), cephalic pores 2-6-7-1, gill rakers 7, pyloric caeca 6.

Morphometry in % $L_S$ (or % $L_H$)
Head length 28-0, its width 18·5 (66) and depth 20 (71), snout 12·0 (43), eye 5·6 (20), gill opening 7·8 (27-9), postorbital distance 12·8 (46), interorbital 17·0 (60-7), suborbital distance 5·8 (20-7), upper jaw 13·6 (48-6), lower jaw 13 (46-4),
body depth 21 (75), depth above anal fin origin 15·2 (54), predorsal 30·0, preanal 38·0, mandible to anus 18·2, anus to anal fin origin 17·2; pectoral fin: upper lobe (UPL) 16·8 (60), notch 7·0 (32% UPL), lower lobe 18·5 (110% UPL), caudal fin length 10·5.

Description

Head large, 3·6 in $L_S$, low and wide, with depth $\times$ 1·1 its width, not deep at occiput, dorsal contour declines evenly anteriorly. Snout large and gelatinous, clearly projecting, on dorsal view widely rounded; on lateral view blunt and deep, distance between a vertical to its tip and anterior margin of eye almost two eye diameters. Rostral fold deep and thick. Nostril large, tubular; tube length not less than its diameter which is almost equal to one third of eye; horizontal with mid-eye. Interorbital wide, three eye diameters, gelatinous. Eye moderate in size, $\times$ 5 in $L_H$, almost touching dorsal contour of head. Pupil round and large, about two thirds eye diameter. Mouth horizontal, subterminal; oral cleft reaching to below anterior margin of pupil. Lower jaw subterminal. Lips thick, fleshy. Chin very gelatinous, on ventral view widely rounded. Teeth simple [Fig. 4(a)], conical, not sharp; projecting moderately above the surface of the oral mucosa; arranged in about 9 oblique rows on upper, 11 on lower jaw, 5 teeth in a row near symphysis; diastema absent. Gill opening 1·4 eye diameter, ventral
end extending in front of pectoral rays 2–3. Opercular flap triangular with rounded tip, unnotched, not elongated. End of opercular bone level with middle of eye. Circumoral sensory pores large and distinctly contoured, slightly impressed in gelatinous tissue; the largest, nasal, infraorbital 1–4 and preopercular-mandibular (pm) 2–4 pores about equal to one third diameter of nostril; pm 6–7 small. Symphyseal pores not closely set, interspace pm1–pm1 only slightly less than distance pm1–pm2, their diameter slightly less than that of pm2 pore; not placed in a common depression or pit.

Body not humpbacked, low (depth only 75% \( L_H \)), with maximum depth 4·8 times in \( L_S \). Abdominal part large, preanal distance 38% \( L_S \).

Anterior half-length of dorsal and anal fins inserted entirely in thick gelatinous tissue. Vertical fins low, with maximum depth equal to about one third of body depth above anal fin origin. Posterior-most dorsal and anal rays confluent with caudal fin at one fifth of its length, anal extending slightly farther. Tip of the caudal fin vertical.
Pectoral fin notch well developed. Uppermost pectoral ray level with lower margin of eye. Lower lobe rays elongated, fleshy, united by common fin membrane about at proximal half of the longest ray. Base of lowermost ray below posterior margin of eye. Upper lobe reaching to anal fin origin, lower lobe rays not reaching to below end of the upper lobe. Pectoral fin membrane at medial surface of fin attaches to body not at bases of pectoral rays but more distally (in middle part of fin at about anterior one third of ray length).

Pectoral girdle (Fig. 3), ZISP P 787, holotype. Radials 3 (2+0+1), rounded, unnotched. Radials not entirely ossified as only their centres are stained by alizarin red. P 20 (14+2+4). An unusual additional rudimentary ray, appearing to be a ray base, present above uppermost pectoral ray (its ray probably broken and missing); possibly indicating presence of 21 pectoral rays on right; left with 20. Scapula with short process, coracoid with long helve.

Anus on a vertical through two thirds postorbital distance and at midway between chin and anal fin origin. Pyloric caeca 6, thick, short, with rounded tips, unequal in length, longest about 5% $L_S$. Subdermal gelatinous tissue well developed (Fig. 2). Skin thin, movable, naked, semitransparent but myosepta and myotomes cannot be seen (Fig. 2).


The holotype is an adult male with ripe semi-transparent testes. Prominent urogenital papilla present.

In preservative, specimen pale, slightly greyish and darker caudally. Under magnification, skin can be seen to contain widely separated melanophores. Ends of pectoral fin rays, margins of dorsal and anal fins posteriorly and marginal rays of caudal fin blackish. Peritoneum black, showing through body wall. Stomach pale without blackish network of blood vessels, intestine pale except for a small part proximal to black anus. Mouth dark grey, gill cavity and gill arches black. Urogenital papilla black.

Live colour two-tone, pale pink anteriorly and dark grey posteriorly, ventral surface entirely grey (Fig. 2). Head pale pink from snout to mid-body along flank; blackish around edges of mouth; mottled pink and grey laterally on head. Free margin of tubular nostrils black. Upper pectoral lobe light, nearly transparent but blackish at margin; lower lobe pink with free elongated rays black; all exposed pectoral rays with black tips, including those of notch and lower lobe. Caudal fin and most posterior 1–2 cm of dorsal and anal fins flecked or splotched with orange. Although still alive when photographed, orange had begun to fade; it is photographically represented as lighter spots on caudal fin. In lateral view eye appeared uniformly black with no demarcation between large pupil and narrow iris (Fig. 2). However, when fish was held in sunlight and tilted, lens could be seen when light fell on eye from dorsal or ventral direction.

**Distribution**

The single specimen of *P. macrocephalus* was caught in the south-western Ross Sea, in the Drygalski Trough, a deep (1200 m), isolated inner-shelf depression veering to the northeast along the shore of the Victoria Land Coast north of the Drygalski Ice Tongue. Bottom depth at this station was 1181–1191 m.
Etymology
The name is derived from Greek μακροζ—large and κεφαλη—head.

Comparative notes and relationships
Paraliparis macrocephalus belongs to the short-tailed Antarctic species group (Andriashev, 1986) with fewer than 64 vertebrae and D 35-58. Within this group it is most similar to three closely related species, P. hubbsi Andriashev, 1986 from the continental slope of Argentina, P. valentinae Andriashev & Neyelov, 1984 from the Cosmonaut Sea and P. somovi Andriashev & Neyelov, 1979 from the South Shetland Islands. It resembles these species in meristic counts, short gill opening, pectoral fin notched but without rudimentary notch rays, and the black peritoneum and gill cavity. Paraliparis macrocephalus differs from all three species in subterminal (v. distinctly inferior) mouth, pectoral radials 3 (2+0+1), small (v. four, very large), large head (28 v. 20–24% L_H), very large gelatinous snout (43 v. 19–35% L_H), broad interorbital distance (61 v. 33–46% L_H), gill opening extending down in front of pectoral rays 2–3 (v. 3–7), stomach pale without black network (v. pale with more or less black pigmented blood vessels). Also characteristic of P. macrocephalus is a large tubular nostril (pore-like with raised rim in P. hubbsi and P. valentinae) and symphyseal pores not closely set (closely set in P. hubbsi and P. valentinae). In meristic counts P. macrocephalus is most similar to P. hubbsi: vertebrae 56 (57–58 in P. hubbsi v. 59–63 in P. valentinae and P. somovi), A 43 (45–47 in P. hubbsi v. 49–53), but differs from P. hubbsi (characters mentioned above) by longer gill opening (28 v. 20–23% L_H), much smaller eye (20 v. 37–39% L_H), gill rakers 7 (v. 11–13), subdermal gelatinous layer well developed (v. weakly present). Paraliparis macrocephalus also differs from P. valentinae (characters mentioned above) by longer abdominal part (preanal 38 v. 33–35% L_S), distance from chin to anus 1·1 distance from anus to anal fin origin (v. two thirds of it) and also in colour, P. valentinae is distinguished from all other southern species of the genus by its distinctly black dorsal and anal fin rays and the pale (but red in life) fin membrane. Paraliparis macrocephalus differs from P. somovi in having a narrower body (body depth 21 v. 23–27% L_S), much smaller eye (20 v. 30–34% L_H), mouth cleft reaching to below anterior margin of pupil (v. behind centre of eye) and anus below two thirds postorbital distance (v. below gill opening).

Since Andriashev’s (1986) review of the genus Paraliparis from the Southern Ocean, 13 new southern species have been described (Stein & Tompkins, 1989; Stein et al., 1991; Andriashev, 1992, 1994; Duhamel, 1992; Matallanas, 1999; Matallanas & Pequen, 2000). Among these species, P. macrocephalus is similar only to P. aspersus Andriashev (1992) from bathyal depths off central Argentina (in pectoral girdle structure, number of pectoral fin rays, black peritoneum and symphyseal pores not closely set). Paraliparis macrocephalus differs from P. aspersus in having fewer vertebrae (56 v. 62–65) and D 49 (v. 55–58), subterminal (v. terminal) mouth, gill opening reaching in front of pectoral rays 2–3 (v. gill opening placed entirely above the base of pectoral fin), mandible to anus distance 1·1 times longer (v. 1·3–1·5 shorter) than length from anus to anal fin origin, anus to anal fin distance shorter (17·2 v. 22·8–27·4% L_S), eye smaller (20 v. 28–29·5% L_H), colour not speckled (v. speckled on the whole body), pyloric caeca and intestine pale (v. black) and other minor characters.
Miscellaneous collection information

The specimen was maintained alive in a bucket on deck for a short time after capture. It swam slowly using anguilliform locomotion and was negatively buoyant.

PARALIPARIS ROSSI SP. NOV. [Figs 4(b) to 6]

Holotype

USNM 361867. Adult female 124 mm $L_T$, 110 mm $L_S$. Ross Sea, RV Nathaniel B. Palmer, Cruise 97-9, St. 46, 74°16'04.0"–74°17'43.9" S, 171°59'23.9"–171°56'52.3" E, 30 December 1997, bottom depth 465–466 m (collected by J. T. Eastman).

Paratypes

Three: ZISP N 52104, female 110 mm $L_T$, 97 mm $L_S$ and USNM 361868, female 115 mm $L_T$, 110 mm $L_S$, and juvenile $L_T$ 70 mm, $L_S$ 62 mm. All were collected with the holotype.

Diagnosis


Counts (in parentheses for two largest paratypes, 97 and 110 mm $L_S$)

Vertebrae 56 (9+47), 54–55 (9+45–46); D 50 (49–50), A 44 (44), P 22 (16+2+4), 20–22 (15–16+2+2–4); C 9 (4/5), cephalic pores 2-6-7-1, gill rakers 8, pyloric caeca 7.

Morphometry in % $L_S$ (in parentheses for two largest paratypes, 97 and 110 mm $L_S$)

Head length 25·5 (27·8, 25·8), its width 18·6 (19·6, 19·5) and depth 18·6 (19·6, 19·1), snout 10·9 (10·4, 10·7), eye 5·5 (5·4, 5·5), gill opening 7·5 (7·0, 6·8), postorbital distance 12·0 (13·4, 12·5), interorbital 13·6 (17·1, 16·4), suborbital distance 4·8 (6·4, 6·2), upper jaw 11·8 (12·9, 12·7), lower jaw 11·4 (12·2, 11·4), body depth 22·7 (24·5, 22·7), depth above anal fin origin 17·3 (19·1, 16·8), predorsal 28·2 (28·4, 27·3), preanal 35·5 (34·5, 35·5), mandible to anus 18·2 (19·6, 16·4), anus to anal fin origin 19·1 (18·6, 22·3); pectoral fin: UPL 18·2 (17·5, 18·2), notch 8·0 (6·7, 7·2) or 43 (38, 40) % UPL, lower lobe 19·4 (18·4, 18·2) or 106·5 (104, 100) % UPL, caudal fin length 10·9 (12·9, 13·5). In % $L_H$: head width 73 (70, 76) and depth 73 (70, 67), snout 43 (37·4, 41·5), eye 21·8 (19·2, 21·1), gill opening 29·6 (25·2, 26·4), postorbital distance 47 (48, 48), interorbital 54 (61, 63),
suborbital distance 19 (23, 24), upper jaw 46·4 (46·3, 49·3), lower jaw 44·6 (44, 44), body depth 89 (88, 88), depth above anal fin origin 68 (68·5, 65), UPL 70 (63, 70).

**Description**

Head large, 3·9 (3·6, 3·9) in Lₛ, low, with depth equal to its width. Dorsal contour not deep at occiput, almost horizontal above eye, abruptly rounded at tip of snout. Snout not large; gelatinous, clearly projecting, overhanging upper jaw, in dorsal view widely rounded; in lateral view distance between vertical through tip and anterior margin of eye about equal to eye. Rostral fold deep and thick. Nostril tubular; tube length not less than its diameter and almost equal to one third of eye; horizontal with upper half of eye. Interorbital wide, 2·5 (3·1, 3·0) eye diameter, gelatinous. Eye moderate, 4·6 (5·2, 4·7) in Lₜ, not touching head dorsal contour. Pupil round, about two thirds eye diameter. Mouth horizontal, subterminal; oral cleft reaching to below anterior margin of eye. Lower jaw subterminal. Lips thick, fleshy. Chin very gelatinous, in ventral view widely rounded. Teeth relatively large, spear-shaped with weakly developed lateral shoulders [Fig. 4(b)], central cusps sharp. Projecting well above the surface of oral mucosa; arranged in about 9 (9) oblique regular rows in upper, 9 (9–10) in lower jaw, 5 (5–6) teeth in a row near symphysis; diastema absent. Gill opening 1·4 (1·3, 1·3) eye diameter, its ventral end extending to second or third pectoral ray. Opercular flap large, rounded, not elongated. Tip of opercular bone horizontal with mid-eye. Circumoral sensory pores small, one fifth to one sixth diameter of nostril, distinctly contoured, slightly impressed into gelatinous tissue. Symphyseal pores not closely set, interspace pm1–pm1 only slightly less than distance pm1–pm2, their diameter almost equal to that of pm2 pore; not placed in a common depression or pit. Chin and lower surface of head gelatinous.

Body not humpbacked, but low and elliptical in shape, depth 90 (88, 88) % Lₜ, maximum depth 3·9 (4·1, 4·4) in Lₛ. Abdominal portion not long, 35·5 (34·5, 35·5) % Lₛ.

Anterior half of dorsal and anal fins entirely embedded in thick gelatinous tissue; vertical fins low, maximum depth equal to about one third body depth above anal fin origin. Posterior-most dorsal and anal rays confluent with caudal fin at two fifths and three fifths of its length. End of caudal fin vertical.

Pectoral fin notch well developed. Uppermost pectoral ray close to horizontal through lower margin of eye. Lower lobe rays elongated, fleshy, united by common fin membrane near mid-point of longest ray. Base of lower-most ray below posterior margin of eye. Upper lobe rays reaching to near anal fin origin, lower lobe rays not reaching to below ends of upper lobe. Medial surface of fin membrane attaches to body not at bases of rays but more distally.

Pectoral girdle (Fig. 6), ZISP P 786, holotype. Radials 3 (2+0+1), rounded, unnotched, well ossified. Radial 2 close to posterior margin of basal cartilaginous lamina. P 22 (16+2+4) in holotype, 20–22 (15–16+2+3—4) in two paratypes: 15+2+3 left, 15+2+4 right and 16+2+3 left, 16+2+4 right, with 2 rays in the notch. Scapula with short process, coracoid with long helve.

Anus anterior to a vertical through gill opening about midway between chin and anal fin origin. Pyloric caeca 7, thick and short with rounded tips, not equal
in length, longest about 6·4% $L_S$. Subdermal gelatinous tissue well developed. Skin thin, movable, naked, semitransparent; myosepta and myotomes invisible because of thick gelatinous tissue.


Individuals 97–110 mm $L_S$ are adult females with a few ripe large eggs, largest 5·2 mm in diameter. Small but prominent urogenital papilla present.

Juvenile specimen 62 mm $L_S$ is similar to adults in all characters including shape of teeth and colour; head 26·6% $L_S$, preanal 36·5, snout 10·3 (39% $L_H$), eye 5·6 (21·2), interorbital 12·9 (48·5).

The colour of preserved specimens uniformly pale, including caudal part. Skin almost unpigmented, fins pale. Peritoneum black, visible through body wall. Stomach pale without blackish network of blood vessels, intestine pale. Mouth grey, inside of upper lip pigmented; gill cavity and gill arches black. Urogenital
papilla pale. Colour in life very pale pink, darker pink caudally; caudal fin in one specimen (USNM 361868) is orangish-pink. Pupil visible when alive.

**Distribution**

All four specimens were caught in the Ross Sea, south-west of the Mawson Bank, at bottom depth of 465–466 m.

**Etymology**

This species is named to commemorate the two hundredth anniversary of the birth of the famous polar explorer and researcher Rear Admiral James Clark Ross (1800–1862). His expedition in 1839–1843 collected the first fishes from the Antarctic Region, and his biological observations and scientific insights are still of great value (Andriashev, 1976, 1978).

**Comparative notes**

*Paraliparis rossi* is most similar to *P. macrocephalus* described above, but differs in having larger, spear-shaped teeth with weakly developed lateral shoulders (v. smaller, simple), much smaller sensory pores, symphyeal pores equal to pore pm2 in diameter (v. about 3 times smaller), and much shorter snout (about equal to eye v. much larger, almost two eye diameters). Colour uniformly pale (v. greyish and darker caudally), and vertical fins overlapping caudal to a greater extent (D 38–42 and A 40–60 v. 14 and 26% caudal-fin length). *Paraliparis rossi* also occurs in shallower water. In external morphology and some meristic counts, *P. rossi* also resembles *P. leucogaster* Andriashev, 1986 and *P. trilobodon* Andriashev & Neyelov, 1979 from West Antarctica. *Paraliparis rossi* differs from these species in pectoral radials 3 (v. 4), peritoneum and gill cavity black (v. light or mottled brown), and counts of pectoral, anal and caudal rays.

**Miscellaneous collection information**

The specimens were negatively buoyant when alive in a bucket on deck. They were collected in the Ross Sea off the edge of the Mawson Bank, a large relatively shallow bank (300 m) where bottom temperature was −1.9°C, and there was no ice cover. The trawl was on the bottom for 1 h; speed was c. 2 knots. A video camera tow prior to trawling showed that small rocks and occasional boulders (65%) dominated the bottom, with fine mud in between the rocks; in some areas there was a nearly continous cobble bottom. Diverse invertebrates were observed on video, including (in decreasing order of abundance); sponges, sea pens, ophiuroids, anemones, hydroids and holothurians. The percentage of animal cover on the bottom was three-fold higher than at the deep station in the Drygalski Trough.

In addition to these four specimens of *Paraliparis rossi*, the catch at station 46 included 77 other fishes representing 13 species: *Lycodichthys dearborni* DeWitt (11), *Ophthalmodiscus ambereonis* Tomo, Marschoff & Torno (5), *O. bothrioccephalus* Pappenheim (2), *Trematomus scotti* Boulenger (18), *T. lepidorhinus* Pappenheim (1), *Artedidraco orianae* Regan (3), *A. loembergi* Roule (4), *Pogonophryne marmorata* Norman (1), *Racovitza glacialis* Dollo (1), *Bathydraco marri* Norman (26), *Chionodraco myersi* DeWitt & Tyler (3),...
Pagetopsis macropterus Boulenger (1) and P. maculatus Barsukov & Permitin (1). Most of the fishes were small, probably because towing speed was slow.

**DISCUSSION**

**INNER-SHELF DEPRESSIONS**

Inner-shelf depressions are 1000–1600 m deep trenches eroded by outlet glaciers close to the continental margin of the Antarctic shelf (Andriashev, 1977). At 1200 m, the Drygalski Trough is the deepest and largest inner-shelf depression in the Ross Sea where the surrounding shelf averages 500–550 m (Andriashev, 1977; Anderson, 1999). Paraliparis macrocephalus was collected in the Drygalski Trough. The large cephalic sensory pores and nostril in this species suggest that it relies on non-visual senses and is adapted for life in the deepest shelf waters; they are more prominent than in P. devriesi Andriashev, a species living at 500–650 m in nearby McMurdo Sound (Eastman & Lannoo, 1998).

Video recordings from a camera towed at this station and trawled specimens documented the substratum and fauna of these little-studied habitats. The substratum in the Drygalski Trough was dominated by soft sediment (97%) with occasional boulders. There were many small holes on the bottom, probably made by unknown organisms. A sparse invertebrate fauna included (in decreasing order of abundance): ophiuroids, holothurians and sponges. Fish observed included a zoarcid, a large swimming Trematomus loennbergii Regan, a small B. marri and a large narrow-headed bathydraconid hovering off the bottom using both the pectoral and pelvic fins.

In addition to the specimen of Paraliparis macrocephalus, the catch included 38 other fish representing six species: Paraliparis antarcticus (1), T. loennbergii (18, most large), Dolloidraco longedorsalis Roule (5), Akarotaxis nudiceps Waite (3), B. marri (10) and Bathydraco macrolepis Boulenger (1) (Eastman & Hubold, 1999). Paraliparis antarcticus was probably captured as the net was raised or lowered; the other species are deep-living nototheniids, artedidraconids and bathydraconids.

**SUBDERMAL GELATINOUS TISSUE IN LIPARIDS**

With their soft bodies and fragile skin, liparids are a difficult group to study (Stein, 1978). Colour photographs of living liparids are valuable in documenting taxonomically important characters in these delicate fish (Duhamel, 1992), but also record body shape when the extensive subdermal gelatinous layer is intact (Fig. 2). The gelatinous layer is frequently damaged when the thin skin is torn by the net or by subsequent handling. It also becomes dehydrated during storage in ethanol and the body, especially the head where this layer is usually the thickest, then appears somewhat shrunk. Both P. macrocephalus and P. rossi have a well developed gelatinous layer, suggesting reduced density and habitation of the water column (Eastman et al., 1994).

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