

From the Instituto de Investigaciones Biofísicas, Consejo National de Investigaciones Científicas y Técnicas, Buenos Aires, Argentina.

Results of the research cruises of FRV „Walther Herwig" to South America.

XLVIII. Revision of the South American Zoarcidae (Osteichthyes, Blennioidei) with the Description of three New Genera and five New Species.

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With 22 figures

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Kurzfassung

Ergebnisse der Forschungsreisen des FFS „Walther Herwig" nach Südamerika. XLVIII. Revision der südamerikanischen Zoarcidae (Pisces, Blennioidei), mit Beschreibungen von drei neuen Gattungen und fünf neuen Arten.

Die südamerikanischen Vertreter der Aalmutter-Familie Zoarcidae werden revidiert. Fünf neue Taxa, drei Gattungen mit ihren Typusarten — *Aiakas krefftii*, *Notolycodes schmidti* und *Piedrabuenia ringueleti* — sowie zwei weitere neue Arten — *Lycenchelys bachmanni* und *Ophthalmolycus stehmanni* — ergänzen das bisher bekannte Artenspektrum. Biologische Daten, soweit vorhanden, und Verbreitungsgebiete werden angegeben.

Eine Wertung morphologischer Merkmale, deren taxonomischer Wert in einigen Fällen bisher nicht erkannt worden war, macht eine Parallelentwicklung deutlich zwischen „Litoralisation" der Arten, Verminderung der Kopfporenzahl, Vorwärtsverlagerung der Rücken-flossenbasis und starker Asymmetrie der Wirbel.

Ein deutlicher Geschlechtsdimorphismus in der Bezahnung wird für mehrere Arten der Kiistenzone hier erstmals beschrieben und abgebildet.

Ein Bestimmungsschlüssel für alle behandelten Taxa ergänzt die Arbeit.

Resumen

Resultados de los cruceros de investigación del B/IP "Walter Herwig" a Sud America. XLVIII. Revision de los Zoarcidae Sudamericanos (Osteichthyes, Blennioidei) con la Descripción de tres nuevos Géneros y cinco nuevas Especies

Los zoarcidos sudamericanos, incluyendo cinco nuevos taxones (tres géneros y especies nuevas — *Aiakas krefftii*, *Notolycodes schmidti* y *Piedrabuenia ringueleti* — y dos especies nuevas — *Lycenchelys bachmanni* y *Ophthalmolycus stehmanni*) son descriptos o redescritos. Se dan sus distribuciones geográficas y datos biológicos cuando los hubiere. Las especies estudiadas aparentan pertenecer a uno u otro de dos grupos batimétricamente diferenciados: uno que ocupa la zona intertidal y la plataforma continental y el otro el talud continental.

La evaluación de los caracteres morfológicos, incluyendo algunos de valor taxonómico previamente no reconocido, puso de manifiesto una concomitancia (si no una correlación) entre la litoralización de las especies y, entre otros, una reducción en la porción cefálica del sistema de la línea lateral, una migración hacia adelante del origen de la aleta dorsal y la adquisición de una marcada asimetría en el cuerpo vertebral.

Se describe por primera vez un marcado dimorfismo sexual secundario en la dentición de algunas especies litorales.

Se suministra una clave de reconocimiento para los géneros y especies tratados.

Abstract

The South American eelpouts, including five new taxa (3 new genera and species — *Aiakas krefftii*, *Notolycodes schmidti* and *Piedrabuenia ringueleti* — and two new species — *Lycenchelys bachmanni* and *Ophthalmolycus stehmanni*) are described or redescribed. Biological data — when available — and distributional patterns are also provided.

The species studied appear to belong to one of two bathymetrically distinct groups: one inhabiting the intertidal zone and Continental Shelf, the other living on the Continental Slope.

The evaluation of morphological characters — the taxonomic value of some of which was previously not recognized — has provided evidence for a relationship (if not a correlation) between the littoralization of the species and, among other features, the reduction of the cephalic lateral-line system, the forward migration of the dorsal fin origin and the acquisition of a strong vertebral asymmetry.

A marked sexual dimorphism in the dentition in some of the littoral forms is described and illustrated for the first time.

A key to genera and species dealt with, is given.

A. Introduction

The family Zoarcidae is one of the best represented in number of genera and species among the various families comprising the marine fish fauna of the southern tip of South America.

These fish can be found over a great range of depths, from the intertidal zone to rather deep waters of the Continental Slope.

Although a great deal has been published about the South American Zoarcidae, including revisions of the subantarctic (and antarctic) forms (REGAN, 1913, NORMAN, 1937, 1938), knowledge about the particular species and the group as a whole is far from complete.

Furthermore, a number of undescribed forms, captured during the cruises of the FRV "Walther Herwig" to the South Atlantic between 1966 and 1971 notably broadens the list of species.

The high degree of generic endemism (only one genus — *Lycenchelys* Gill — present in the area is also known from elsewhere in the World's Oceans), points to the existence of a secondary distribution center off southern South America, and strongly enhances the interest in the research on the family. The geographical isolation of the "southern" zoarcids has long been established, but no attempts have yet been made in trying to establish their position within the family as regards their morphological segregation from the "northern" pool of genera. Any attempt at the latter can not be done without first making a critical evaluation of the morphological characters which are reputed to have taxonomical value within the family.

The study of a rather large collection of specimens of most of the inshore and deeper-water species of southern South America (including most of their holotypes) as well as that of a large number of Northern Hemisphere genera and species was undertaken with the above mentioned considerations in mind.

Financial support for the present research, for which the author is most grateful, was obtained from the following institutions:

The Consejo Nacional de Investigaciones Científicas y Técnicas (Buenos Aires) which gave a Research Grant for field and laboratory work at the Puerto Deseado Marine Biology Station (P. Deseado, Argentina) and Buenos Aires; the Gesellschaft für Kernenergieverwertung in Schiffbau und Schifffahrt (Geesthacht, W. Germany)*) and the Senate of the City of Bremen, which provided funds for two visits to the Institut für Seefischerei, Hamburg and to the British Museum (Natural History), London and the Museum Nationale d'Histoire Naturelle, Paris.

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B. Methods and material

Measurements (Fig. 1a) were taken with the help of a 1000 mm long measuring board, as projections on to a horizontal rule with mm scale, and with a 300 mm vernier caliper. Total length (1): from tip of snout to end of caudal fin; body depth (2): maximum distance between dorsal and ventral profiles of body, usually near a vertical through the pectoral fin bases; body width (3): horizontal distance through pectoral fin bases; head length (4): from tip of snout to most posterior tip of gill cover; head width (5): maximum transverse horizontal distance across the cheeks; snout (6): from tip of snout to anterior vertical edge of eye; eye length (7): maximum horizontal distance between anterior and posterior edge of eye; interorbital distance (8): minimum distance between rims of bony orbits, including overlying skin; interocular distance (9): minimum distance between dorsal edge of eyes; predorsal distance (10): from tip of snout to base of first dorsal fin ray; preventral distance (11): from tip of snout to a horizontal line joining the bases of the ventral fins; preanal distance (12): from tip of snout to base of first anal fin ray; prepectoral distance (13): from tip of snout to mid point of pectoral fin base; trunk length (14): from posterior end of gill cover to base of first anal fin ray; tail (15): from base of first anal fin ray to end of caudal fin; ventral fin length (16): from insertion to distal tip; pectoral fin length (17): from mid point of base to end of longest ray. Osteological observations as well as counts of rays and vertebrae were carried out on dissected material (alizarin stained or unstained) or through radiographs. The study of the cephalic lateral line system was carried out by means of two complementary methods: the one consisting of the temporary staining (with a dilute aqueous solution of methylene blue) of the involved area to make the openings more easily seen, and the other involving the dissection of the canals proper to follow their paths

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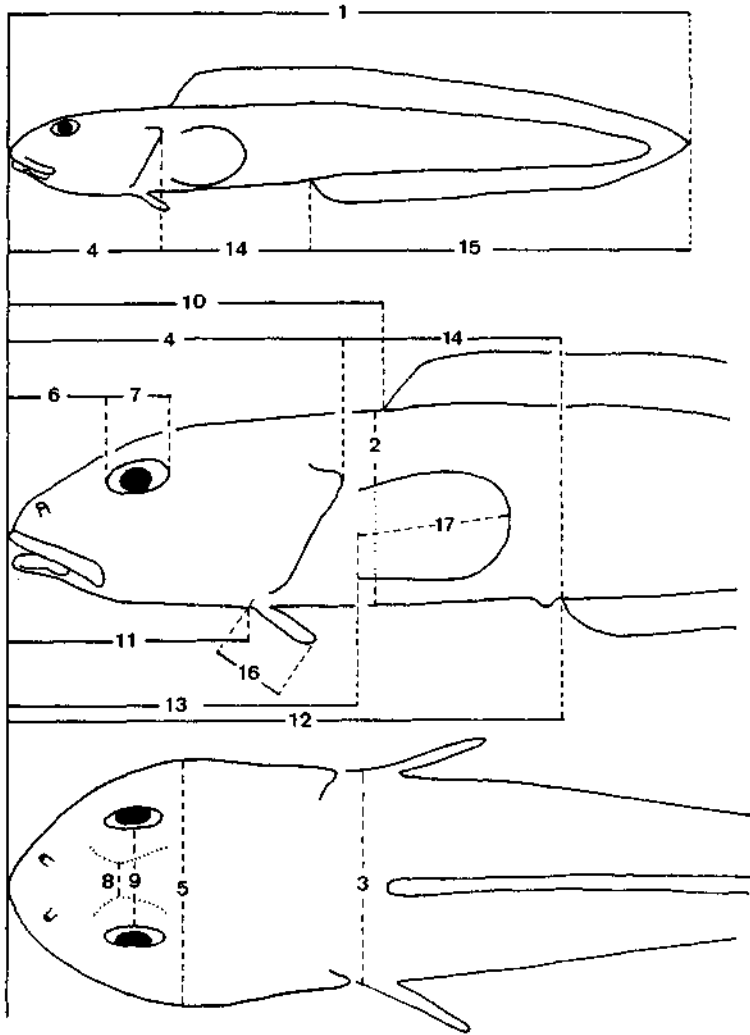


Fig. 1 a: Scheme of measurements used in the present paper.

below the skin and along the different bones. The arrangement of canals and openings is shown in Fig. 1 b.

The bulk of the inshore material examined was captured by hand in the intertidal zone of Patagonian and Fueguian localities between 1963 and 1974. The material from deeper water was obtained by various research vessels especially the FRV "Walther Herwig" in the South Atlantic.

Available type material was examined either at the repository institutions or on loan from their curators.

Collections, in which part of the studied material is kept, are identified throughout the paper by the following abbreviations: BMNH (British Museum, Natural History,

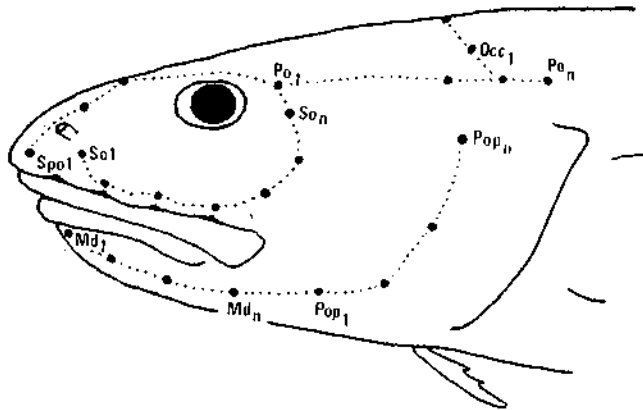


Fig. 1 b: Head of a hypothetical zoarcid fish showing the arrangement of cephalic lateral-line canals; So_{1-n} : suborbital canal, Po_{1-n} : postorbital canal, Pop_{1-n} : preoperculo-mandibular canal, Md_{1-n} : mandibular portion of the same, Spo_1 : first pore of supraorbital canal, Occ_{1-n} : occipital canal.

London); ISH (Institut für Seefischerei, Hamburg); MACN (Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires); MNHN (Museum Nationale d'Histoire Naturelle, Paris); NRMS (Naturhistoriska Riksmuseet, Stockholm) and ZMB (Zoologisches Museum, Berlin).

Besides South American material, for which the relevant data will be given in the chapter on systematics, Northern Hemisphere and Antarctic specimens examined were as follows:

Lycodes eudipleurostictus Jensen, 1901. ISH 145/59, 1: ♂, TL 323 mm. — ISH 113/59, 1: ♂, TL 360 mm. - ISH 21/58, 1: ♀, TL 195 mm. - *L. pallidus* Collett, 1878. ISH 146/59, 3: ♀, TL 171, ♂, 233, ♂, 227 mm. - *L. ? atlanticus*. ISH 104/73, 1: ♂, TL 425 mm. - ISH 106/73, 1: ?, TL 345 mm. - *L. frigidus* Collett, 1878. ISH 147/73, 1: ♂, TL 180 mm. - ISH 149/73, 2: ♂, TL 220, ♀, TL 166 mm. - ISH 8/74, 3: ♂, TL 182, ♀, TL 125, ♀, 116 mm. - *L. esmarki* Collett, 1875. ISH 100/59, 1: ♀, TL 421 mm. - ISH 114/59, 2: ♀, TL 215, ♀, TL 226 mm. - ISH 79/60, 1: ♂, TL 221 mm. - ISH 89/60, 1: ♀, TL 221 mm. - ISH 150/60, 1: ♂, TL 530 mm. - *L. lavalei* Vladykov & Tremblay, 1936. ISH 39/60, 1: ♀, TL 321 mm. - ISH 19/61, 1: ♀, TL 260 mm. - ISH 25/61, 1: ♀, TL 367 mm. - *L. seminudus* Reinhardt, 1837. ISH 101/59, 1: ♀, TL 269 mm. - *L. vahli* Reinhardt, 1831. ISH 293/59, 1: ♂, TL 202 mm. - *L. vahli maculatus*, Vladykov & Tremblay, 1936, ISH 57/62, 2: ♀, TL 284, ♂, TL 379 mm. - *L. vahli gracilis* Sars, 1867. ISH 19/60, 2♂, TL 224, ♂, TL 224 mm. — *L. reticulatus macrocephalus* Jensen, 1904. ISH 87/58, 1: ♂, TL 252 mm. - *L. r. reticulatus* Reinhardt, 1835. ISH 73/55, 1: ♂, TL 366 mm. - *L. Sagittarius* McAllister, 1975. BMNH 1974.10.5.1/1: ?, TL 215 mm, paratype.

Lycodon vermiformis Barnard, 1927. BMNH 1927.12.6.71, 1: ♂, TL 260 mm, paratype. — *L. mirabilis* Goode & Bean, 1883. ISH 102/73, 1: ♂, TL 305 mm. — BMNH 1896.2.10.51, 1: ♀, TL 315 mm. — *L. flagellicauda* (Jensen, 1901). ISH 9/74, 1: ♂, TL 184 mm.

Lycenbelys kolthoffi Jensen, 1904. ISH 13/74, 2: ♂, TL 173, ♂, TL 118 mm. *L. verrillii* (Goode & Bean, 1877). ISH 5/73, 1: ♀, TL 118 mm. - *L. antarcticus* Regan, 1913.

Royal Scottish Museum 1921.143.487, 1: ♀, TL 121 mm, holotype. — *L. albus* (Vailant, 1888). MNHN 1886/590-91, 2: ♀, TL 199, ♀, TL ?, syntypes. — *L. labradorensis* Geisdörfer et al., 1970, MNHN 1970/31, 1: ♀, 216 mm, holotype. — *L. nigripalatum* De Witt & Hureau (MS). MNHN 1974/86, 1: ♂, TL 280 mm, holotype. - *L. tristichodon* De Witt & Hureau (MS). MNHN 1974/87, 1: ♀, TL 304 mm, holotype.

Allohpis hollandi Jordan & Hubbs, 1925. BMNH 1970.2.12.5, 1: ♂, TL 150 mm.

Davidojordaniabrachyrhyncha (Schmidt, 1904). BMNH 1970.2.12.4, 1: ♂, TL 133 mm.

Gymnelus viridis (Fabricius, 1780). BMNH 1965.6.22.97-99, 3: ♂, TL 124, ♀, TL 132, ♀, TL 129 mm. - ISH 61/55, ♂, TL ca. 104 mm. - ISH 64/55, 1: ♀, TL ca. 70 mm. - ISH 71/55, 1: ♂, TL ca. 90 mm. - ISH 959/73, 1: ♂, TL 185 mm. - *G. retrodorsalis* Le Danois, 1913. BMNH 1970.2.12.7, 1: ♀, TL 97 mm. - *G. hemifasciatus* Andriashev, 1937. BMNH 1970.2.12.6, 1: ♀, TL 105 mm. - *G. pictus* Giinther, 1862. BMNH 1855. 9.19.1289, 1: ♂, TL 137 mm, holotype.

Zoarcetes viviparus (Linnaeus, 1758). ISH 36/56, 2: ♂, TL 160, ♂, TL 159 mm. - ISH 9/59, 2: ♂, TL 189, ♂, TL 189 mm. - *Zoarcetes americanus* (Bloch & Schneider, 1801). ISH 18/61, 1: ♂, TL 590 mm. - ISH 57/73, 1: ♂, TL 529 mm.

Austrolycichthys concolor (Roule & Despax, 1911). MNHN 1911/99, 1: ♀, TL 156 mm, holotype. - *A. brachycephalus* (Pappenheim, 1912). BMNH 1913.4.15.58-59, 2: ♂, TL 150, ♀, TL 155 mm, syntypes. — *A. bothriocephalus* (Pappenheim, 1912). BMNH 1939.9.21.159, 1: ♂, TL 114 mm.

Lycodichthys antarcticus Pappenheim, 1912. ZMB 18941, 5: ♂, TL 177, ♀, TL 108, ♀, TL 174, ♀, TL 192, ♀, TL 206 mm, syntypes. - BMNH 1913. 4.15.60, 2: ♂, TL 207, ♂, TL 177 mm, syntypes.

Rhigophila dearborni De Witt, 1962. BMNH 1965.1.21.1-5, 5: ♂, TL 166, ♂, TL 219, ♀, TL 178, ♀, TL 194, ♀, TL 205 mm, paratypes.

Lycodopsis pacifica Collett, 1879. Unreg. Indian Arm, British Columbia, Canada, 5: 148—183 mm.

Mqyneae californica Gilbert, 1915. Unreg. 36°48' N, 121°48' W, 6: TL 128-186 mm.

C. Systematics

In spite of the wealth of information gathered concerning particular genera and species, no subfamilial classification is intended. The characters used by previous authors e. g. the presence or absence of pelvic fins, dermal appendages on head etc., due to their erratic appearance are not considered useful enough to join genera in natural subfamilial groups.

The last published taxonomic list for the family in South American waters (RINGUELET et al. 1960) is here enlarged by the addition of three new genera (*Notolycodes*, *Piedrabuenia* and *Aiakas*), each with a new species, and two new species which belong to previously known genera (*Lycenchelys bachmanni* and *Ophthalmolycus stehmanni*).

The genus *Melanostigma* Giinther, 1881, following GOSLINE (1968: 63) is removed from the family on the grounds of its seemingly paradoxical share of very primitive characters, e. g., the presence of a basisphenoid bone and 7 branchiostegals, and very advanced ones such as the small gill openings (completely above the pectoral fin bases) and the reduced cephalic lateral-line system (no occipital canal and reduced postorbital, suborbital, preoperculo-mandibular and supraorbital canals).

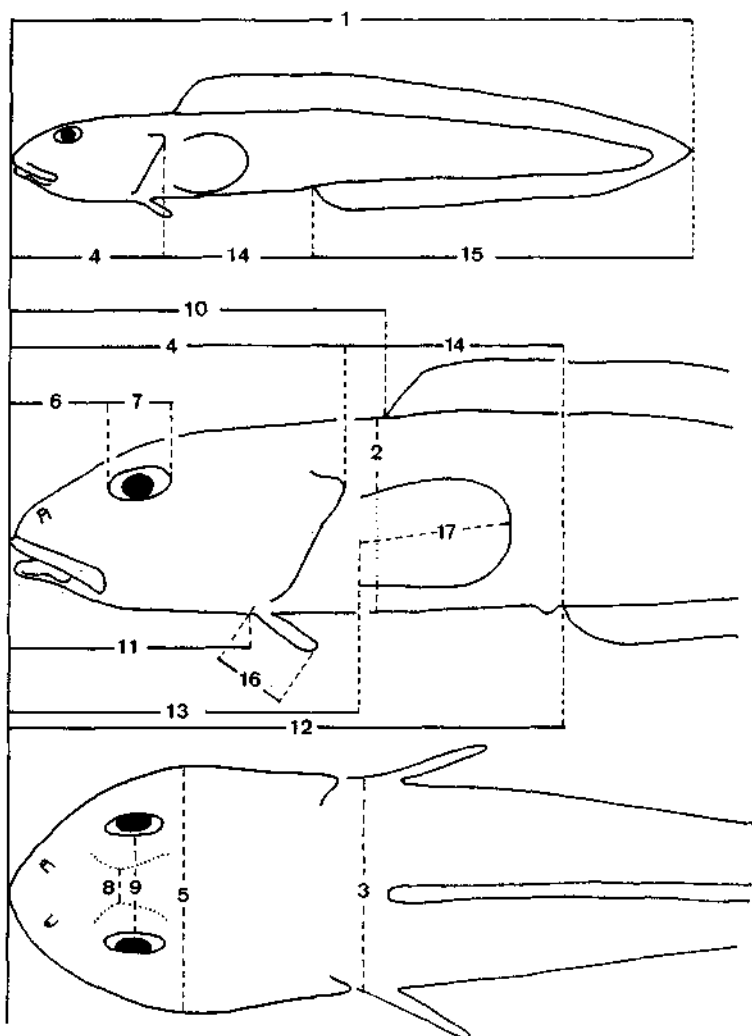


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- 13' — Circumbuccal fringes conical, cirriform. Pelvics not markedly reduced
Pogonolycus Norman, 1937
P. elegans Norman, 1937
- 14 — Colour uniform, without cross-bars. Nostrils short, not reaching upper edge of lip. Lobules on lips scalloped. Two dermal fringes behind nostril
C. chilensis (Steindachner, 1898)
- 14' — Yellowish transverse bars across body, tail and vertical fins. Nostrils long, reaching lower edge of lip. Lobules on lip smooth, not scalloped. Three dermal fringes behind nostril *C. fasciatus* (Lönnerberg, 1905)
- 15 — Skin naked. Dermal protuberances above eye and on sides of head. 58—64 vertebrae *Oidiphorus* McAllister & Rees, 1964
O. brevis (Norman, 1937)
- 15' — Skin with embedded scales. Head without dermal appendages. More than 90 vertebrae 16
- 16 — Six branchiostegals. Palate toothless. Palatal membrane absent
Aiakas n. g.
- A. *kreffti* n. sp.
- 16' — Five - branchiostegals. Palate toothed. Palatal membrane well developed
Maynea Cunningham, 1871 17
- 17 — Eight preoperculo-mandibular pores. Vertebrae 111—118. Pectoral fin with 14 rays *M. patagonica* Cunningham, 1871
- 17' — Six preoperculo-mandibular pores. Vertebrae 95. Pectoral fin with 9 rays
M. microphthalmia (Norman, 1937)

The species are dealt with in an alphabetical arrangement of generic names in the following descriptions. The abbreviations used throughout are TL = total length; HL = head length; "mod" and \bar{X} are respectively the modal and mean values for a given morphometric or meristic variable.

I. *Aiakas* gen. nov.

Type species *Aiakas kreffti* sp. nov.

Zoarcidae without pelvic fins. Scales embedded in skin. Dorsal fin origin above pectoral fin base. Mouth terminal, not surrounded by dermal fringes. Teeth conical, small, present on jaws only (vomer and palatines edentulous). Palatal membrane absent. Gill opening extending downward to middle of pectoral fin base. Cephalic lateral-line system with occipital canal and three postorbital pores. Six branchiostegal rays. Two large pyloric caeca. Vertebrae symmetrical.

One species.

Discussion.

The genus differs completely from all other South American zoarcids in the development of an occipital canal in the cephalic lateral-line system. It can further be distinguished from other genera also lacking pelvic fins, i. e. *Maynea* and *Oidiphorus*, by the absence of both vomerian and palatine teeth as well as a palatal membrane.

Aiakas can be distinguished from Northern Hemisphere genera without pelvic fins as follows: from *Krusensterniella* Schmidt, *Derjugina* Popow, *Gymnelopsis* Soldatov, *Gymnelus* Reinhardt, *Lycocara* Gill, *Comandorella* Taranetz & Andriashev and *Nemalycodes* Herzenstein by the absence of a palatal membrane, and from *Bothrocarichthys* Schmidt,

Lycogrammoides Soldatov & Lindberg, *Botbrocarina* Suvorov, *Pachycara* Zugmayer, *Bothrocara* Bean and *Allolepis* by its smaller gill opening which extends downward to the middle of the pectoral fin base.

Etymology: from the ancient "yamana" (Tierra del Fuego Indians) word "aiakasi" meaning "deep-sea fish". The name should be treated as masculine.

1. *Aiakas kreffti* sp. nov.

a) Material examined

Holotype ISH 385/71 "Walther Herwig" Station 191/71: 46°05'S, 59°54' W, 800 m, 17. 1.1971, ♂, 251 mm, (+ radiograph).

b) Description (Fig. 2)

Body elongated, slightly compressed. Depth 9.9 % TL; width 9.1 % TL. Head 13.9 % TL. Snout 2.8% TL, 20.0% HL. Eye 3.7% TL, 26.5% HL, its upper border almost reaching dorsal profile of head. Interocular 2.9% TL, 20.85% HL. Upper and lower jaw equal in length. Lips well delimited from adjacent regions. Lower lip continuous, without separate adnate portion near symphysis and without enlarged posterior free lobe. Teeth very small, conical, with tips turned slightly inward. Palatal membrane absent. Epiphyal-ceratohyal joint dentate.

Dorsal fin supported by 89 rays. Its origin slightly behind the pectoral fin base, at a distance of 15.5% TL from the tip of the snout. Anal with 68 rays, somewhat lower in height than dorsal. Its origin a distance of 40.2% TL from the tip of the snout. Pectorals supported by 18 rays, their length 9.5% TL, 68.3% HL, 36.2% trunk length.

Trunk 26.2% TL, 1.68 x HL. Tail 59.8% TL.

Cephalic lateral-line system. The most important feature is the presence of an occipital canal opening in 3 pores (a median coronal pore with one on each side). Postorbital canal opening in 3 pores (one just behind eye and two anterosuperior to dorsal apex of gill opening). Suborbital canal with six pores which form an arc along the upper jaw and postero-inferior edge of the eye. Supraorbital canal opening in two pores (one postero-superior to nostril and one near tip of snout, below and in front of the latter).

Body lateral-line medio-lateral on trunk and tail.

A dense scale cover, on trunk and tail, reaching forward to a vertical near the pectoral fin base. Head and pectorals naked.

Vertebrae 92 = 66 + 26. Ribs from 3rd and epipleurals from 1st vertebra onward. First interneural between 2nd and 3rd vertebrae.

Body light-brown, without special markings. Pectorals and margins of vertical fins whitish.

c) Distribution (Fig. 12)

Known only from the type locality on the Continental Slope off Golfo San Jorge, Argentina, in Central Patagonia.

Etymology. The author takes pleasure in naming this species for Dr. G. KREFFT, Institut für Seefischerei, Hamburg, who very kindly directed part of this research and made the critical review of the manuscript.

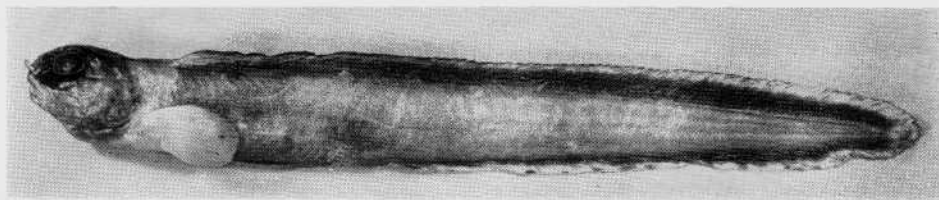


Fig. 2: *Aiakas kreffii* n. g., n. sp. Holotype, ISH no. 385/71.

II. *Austrolycus* Regan, 1913

Trans. R. Soc. Edinb. 49: 245 (Type: *A. depressiceps* Regan, by orig. design.)

Zoarcidae with pelvic fins and scales embedded in skin. Dorsal fin origin above pectoral fin base. Head depressed. No occipital canal in cephalic lateral-line system. One postorbital pore. Mouth subterminal, without peribuccal dermal fringes. Teeth conical, on jaws, vomer and palatines. No canini-form teeth. Palatal membrane well developed. Pseudobranchiae present. Gill opening extending downward to middle of pectoral fin base or slightly beyond. Six branchiostegal rays. Epiphyal-ceratothyal joint strongly serrated along whole length. No pyloric caeca. Vertebrae asymmetrical.

Two species.

1. *Austrolycus depressiceps* Regan, 1913

Austrolycus depressiceps Regan, 1913, Trans. R. Soc. Edinb. 49: 245 (Magellan Strait). Numerous syntypes in the BMNH collections. Lectotype BMNH 1868.1.15.25. as herein designated, although erroneously designated by NORMAN (1937: 103) as "holotype".

Phucocoetes latitans (non Jenyns): Günther, 1862: 321. — Smitt, 1898: 51, pl. V, fig. 37—39. — Garman, 1899: 138. — Delfin, 1901: 97. — Lönnberg, 1907: 12. — Lahille, 1908: 421, fig. 6.

Ljcodes latitans (non Jenyns): Günther, 1862: 321. — Cunningham, 1871: 471. — Vaillant, 1888: 21, pl. 3, fig. 1 (Tierra del Fuego). — Steindachner, 1898: 318 (T. del Fuego). — Boulenger, 1900: 53 (Malvinas). — Hussakof, 1914: 91 (Mouth of Coig River, Sta. Cruz).

Austrolycus depressiceps: Pozzi & Bordále, 1935: 176 (new combination only). — Norman, 1937: 103, fig. 52 (Patagonia). — Fowler, 1940: 796 (Orange Bay, T. del Fuego). — Fowler, 1945: 156. — Buen, 1959: 46. — Ringuet et al. 1960: 76. — Nybelin, 1969: 119 (Punta Arenas, Admiralty Sound, Chile). — Gosztonyi, 1970: 178 (Isla de los Estados, Argentina).

a) Material examined

BMNH 1868.1.15.25. Magellan Strait. TL 240 mm (+ radiograph), lectotype (see above). — BMNH 1868.9.16.22-23. Magellan Strait. 2: TL 107, 105 mm (+ radiographs), lectoparatypes. — BMNH 1842.2.12.2—3. Malvinas Islds. 2 specimens (+ radiographs). — BMNH 1879.8.20.14. Magellan Strait, Portland Bay. 1: TL ca. 285 mm (+ radiograph). — BMNH 1935.6.174-175. Pt. Stanley, Malvinas. 1: TL ca. 400 mm (+ radiograph). — BMNH 1965.11.6.8. Malvinas. TL ca. 460 mm. — NRMS 11111, -12, -13, -14, -15, -16, -17, -19, -20, -21, -22, -23, -24, -25, -26,

—27. Swedish Exped. to Tierra del Fuego. 16 specimens. — NRMS 9746. West Point Island (Malvinas), 5-6. 12. 1907. 7 specimens. - MNHN 1884.82. Orange Bay, T. del Fuego. 1: ♂, TL 350 mm.

Unreg. Isla de los Estados, Puerto Cook, from the intertidal zone, Nov.—Dec. 1967. 13: TL 60—175 mm, A. E. GOSZTONYI coll. — Same locality as above, 24. 5. 1971. 1: TL 140 mm, R. BULLA and R. RONDEROS coll. — Bahía Thetis (T. del Fuego), from the intertidal zone, Nov.—Dec. 1969. 15: TL 86—242 mm, A. E. GOSZTONYI coll. Of these 3 specimens (♂, TL 180, ♀, TL 179, ♂, TL 116 m) now in the collections of the Institut für Seefischerei, Hamburg, Reg. No. 2/75. — Ushuaia (T. del Fuego) from the intertidal zone, 1968—74, 4: TL 147—310 mm, P. MEDINA and A. E. GOSZTONYI coll.

b) Description

Body elongated, tail compressed. Depth 7—9% TL. Head depressed, 16.5—20% TL (mod. = 18). Eye 1.4-2.2% TL (mod. = 1.8), 7.5-11% HL (mod. = 10.0). Interocular 2.6—3.7% TL. Gill opening extending downward to middle of pectoral fin base. Mouth subterminal, with upper jaw protruding over lower. Both lips well delimited by grooves. The lower one divided in a short adnate portion extending to the second mandibular pore and a free lobe extending to the posterior angle of the mouth.

Teeth on premaxillary in one row laterally and in up to 3 near symphysis. Vomerian teeth in a group of about 15. Palatines with one or two rows on the rear part and up to 3 at the anterior end. Dentaries with about 3 rows near symphysis, these reducing laterally to one or two. No sexual dimorphism observed in the dentition.

Dorsal fin supported by 100—109 rays (\bar{X} = 106), about as deep as anal fin which is supported by 78—84 rays (\bar{X} = 78.9). Its origin a distance of 44.5—49% TL from tip of snout. Pectorals 10—12% TL (mod. = 11), 54—66% HL, 34—46% trunk length, supported by 15 — 19 ray (\bar{X} = 17). Trunk 26—32% TL, 1.3 — 1.8xHL. Tail 51-55.5% TL.

Cephalic lateral-line system. Postorbital canal without postocular pore, therefore opening in only one pore which is antero-superior to upper angle of gill opening. Suborbital canal with 7 pores in an arc along upper jaw. The first pore somewhat above the rest and behind the nostril. Preoperculo-mandibular canal with 8 pores: 4 along mandibular ramus and four along preopercular bone. Supraorbital canal opening in 2 pores: one on the tip of the snout and one posterosuperior to the nostril.

Body lateral-line median, starting in the postorbital pore and running along the edge of the upper angle of the gill opening from where it crosses the trunk somewhat obliquely to reach the mid-longitudinal line of the tail along which it extends almost to the end. Vertebrae 106-110 (\bar{X} = 107.8) = (30-33) + (73-78). Ribs from third to last precaudal vertebra. Epipleurals from second to last precaudal vertebra. First inter-neural bone between second and third neural spines.

Scale cover restricted to tail in adults. Scales most numerous in the middle third, extending up to the middle of the vertical fins. Ontogenetically, scales appear in specimens of around 90 mm TL, in the last third of the tail above the mid-longitudinal line. General colouration black or dark-brown, except for abdomen and lower side of head, which are usually yellowish white. Clearer cross-bands with well defined margins across nape and along dorsal part of trunk and tail. At times also small, irregular, round spots on head and body.

c) Biology

This species lives in the rocky intertidal zone in the Fuegian-Malvinian region. Younger specimens feed on small crustaceans (Isopoda, Sphaeromatidae, and Amphipoda). Larger ones are ichthyophagous. Six of the nine radiographs examined, including that of a 175 mm TL specimen, show fish remains in the stomachs or intestines. Among the fish eaten by this species are *Harpagifer bispinis* and *Notothenia* sp. (GOSZTONYI, 1970: 178).

Length: up to 480 mm TL.

d) Distribution (Fig. 3)

On the Pacific side of South America *A. depressiceps* reaches a latitude of 44° S, while on the Atlantic side it is found on the Fuegian and Malvinas (Falkland) Archipelago.

2. *Austrolycus laticinctus* (Berg, 1895)

Lycodes laticinctus Berg, 1895 An. Mus. nac. B. Aires (2) 4: 71, pi. 1, fig. 2 (Santa Cruz River Estuary, Argentina). Holotype MACN 3003.

Lycodes (Phucocoetes) platei Steindachner, 1898, Zool. Jb., Suppl. 4 (2): 320, pi. 19, fig. 8 (Cape Espiritu Santo, T. del Fuego). Holotype ZMB 15691.

Phucocoetes variegatus Smitt, 1898, K. svenska Vetensk. Akad. Handl., Bihang 24 (4/5): 44, fig. 35, partim (Rio Grande, T. del Fuego).

Lycodalepis morenoi Lahille, 1908, An. Mus. nac. Hist. nat. B. Aires 16: 413, pi. 6 (Cabo San Antonio, 36°20' S, Argentina). Holotype: apparently not preserved.

Lycodalepis laticinctus: Lahille, 1908: 417

Austrolycus platei: Regan, 1913: 246. — Pozzi & Bordalé, 1935: 176. — Bordalé, 1941: 190.

Austrolycus laticinctus: Pozzi & Bordalé, 1935: 176. — Norman, 1937: 103 (52°39' S, 69°53.5' W). - Bordalé, 1941: 190. - Fowler, 1945: 157. — Buen, 1959: 46.— Ringuélet et al., 1960: 78, fig. 42.—

a) Material examined

MACN 3003. Santa Cruz River Estuary, Argentina. ♂, TL 155 mm, holotype. ISH 1422/66 "Walther Herwig" Station 351/66: 52°46' S, 68°13' W, 80 m, 10. 7. 1966. male TL 114 mm (+ radiograph). — MRMS 11160. Swedish Exped. Tierra del Fuego 1896-97: Rio Grande, T. del Fuego, 16. 11. 1895. 2: ♂, TL 180 mm, ♀, TL 229 mm (+ radiographs), syntypes of *Phucocoetes variegatus macropus* Smitt, 1898. — Unreg. Puerto Deseado, Santa Cruz, Argentina, in the intertidal zone 1962—73: 99 specimens, TL 17.5—824 mm (48 ♂♂, 38 ♀♀, 2?), I. ZIZICH, P. MEDINA, J. NAVES and A. E. GOSZTONYI coll. Of these 2 specimens are now in the collections of the Institut für Seefischerei, Hamburg, Reg. No. 3/75 and 4/75.

b) Description

The species is closely related to *Austrolycus depressiceps*: externally only the more prominent upper jaw and the relatively longer pelvic and pectoral fins differentiate it from the latter. Meristic characters and especially the relatively higher number of precaudal vertebrae, offer good reasons to admit the validity of both species.

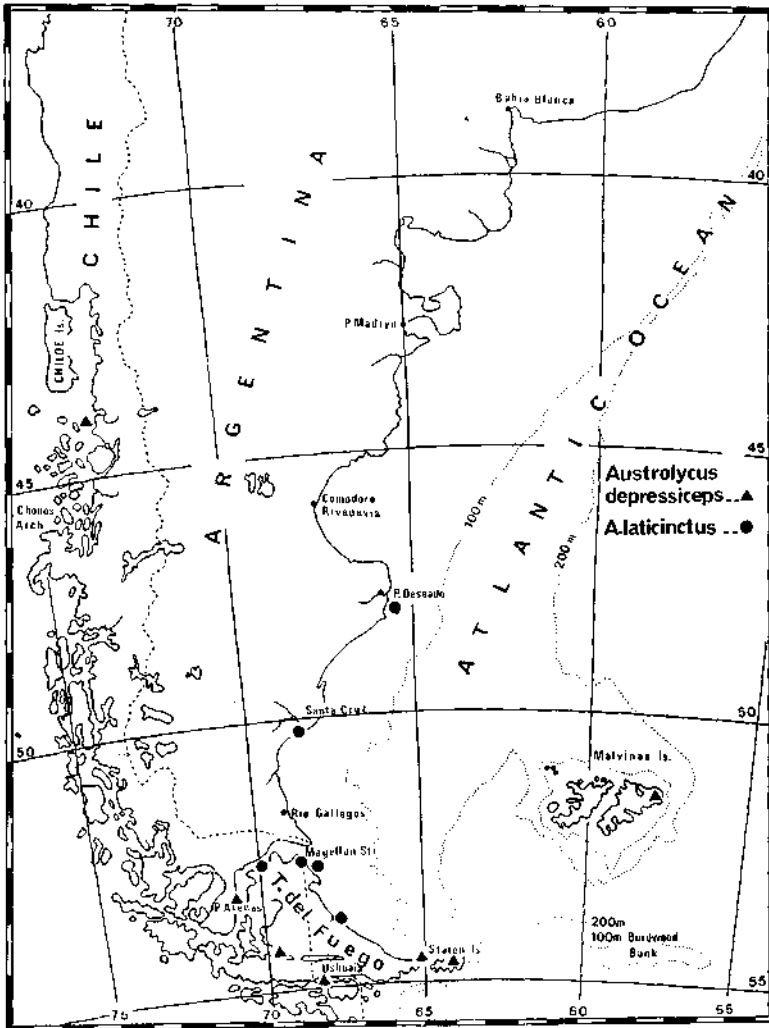


Fig. 3: Distribution of *Austrolycus depressiceps* and of *A. laticinctus*.

Body elongated, tail compressed. Depth 7.5–12% TL (mod. = 9). Head 11.5–22% TL. Eye 0.9–2% TL (mod. = 1.2), 5–13% HL (mod. = 7). Interocular 2.5–5.5% TL (mod. = 4.6), 17–28% HL. Gill opening as in *A. depressiceps*. Upper jaw greatly overhanging lower one. Dentition and palatal membrane as in *A. depressiceps*. Gill-rakers 14–18 = (2–5) + (11–15).

Dorsal fin with 107–115 rays (\bar{X} = 110.8), somewhat deeper than anal. The latter supported by 80–90 rays (\bar{X} = 86.48). Pectorals with 18–20 rays (\bar{X} = 19.12), their length 8–14.5% TL, 52–76% HL and 37–59% trunk. Pelvics 3.6–5.8% TL, 22–31% HL. Their tips easily reaching, and sometimes even extending beyond,

pectoral fin bases (as opposed to *A. depresskeps* in which they just reach this point, if they do so at all). Their insertion at a distance of 9–17% TL from the tip of the snout. Trunk 22–30% TL, 1–2.4 x HL (mod. = 1.4). Tail 54–60% TL.

Both the cephalic and body portions of lateral-line system exactly as in *A. depresskeps*.

Vertebrae 109–116 (\bar{X} = 113) = 27–31 (\bar{X} = 29.6) + (80–88). The vertebral formula is the most important feature for differentiating both species of *Austrolycus* from each other, the formula for *A. depresskeps* being 106–110 = (30–33) + (73–78). Ribs, epipleurals and first interneurals as in *A. depresskeps*.

Body colouration greyish or dark-brown. Lower part of head and trunk usually yellowish or whitish. Dorsal fin and upper parts of trunk and tail crossed by a series of paler irregular saddle-like bands. Other irregular whitish spots or blotches scattered over the rest of body and head. Scale covering similar to that of *A. depressiceps*, although somewhat better developed (in specimens of comparable size, scales start farther forward on the tail of *A. latinctus*).

c) Biology, Parasites and Reproduction

It is one of the largest zoarcid species, specimens of about 700 mm TL being not uncommon on the Patagonian littoral. In its adult life *A. latinctus* is mainly ichthyvorous. Stomach and intestinal analyses have shown specimens of Zoarcidae (*Iluocoetes* sp., *Phucocoetes latitans*) and Nototheniidae (*Notothenia* sp.) as well as Decapoda (*Cyrtograpsus* sp.), Polychaeta and Amphipoda.

A chondracanthid copepod, probably belonging to an undescribed species of *Acanthochondria* was regularly found under the gill cover of fully grown specimens, these also showed large masses of an undetermined cestode worm in the duodenum as well as a great number of acanthocephala, most probably belonging to genus *Hypoechinorhynchus* Yamaguti, 1939 in the rectum.

Egg-counts made on females of TL 650, 613 and 618 mm, gave respectively the following figures: 1147 eggs (mean diameter: 8.4 mm), 1100 eggs (m. d.: 7.5 mm), and 694 eggs (m. d.: 8.2 mm). These fecundity indices are rather high when compared with those of other species, which rarely exceed 100.

d) Distribution (Fig. 3)

Known from coastal and shallow water localities along the Atlantic side of southern South America and in the Magellan Strait.

III. *Crossostomus* Lahille, 1908

An. Mus. nac. Hist. nat. B. Aires, 16: 408 (Type: *Lycodes (Iluocoetes) fimbriatus* (non Jenyns) Steindachner, 1898 by orig. design. = *Crossostomus chilensis* (Regan)).

Crossolycus Regan, 1913: Trans. R. Soc. Edinb. **49**: 247 (Type: *Crossolycus chilensis* by orig. design.).

Zoarcidae with very small pelvic fins and scales embedded in skin. Dorsal fin origin above pectoral fin base. No occipital canal in cephalic lateral-line system. Two post-orbital pores. Mouth subterminal, surrounded by dermal fringes. Teeth on jaws conical. Vomer and palatines toothed (*C. fasciatus*) or toothless (*C. chilensis*). Palatal membrane well developed. Pseudobranchiae present. Gill openings extending downward to

middle of pectoral fin bases. Six branchiostegal rays. Epiphyal-ceratohyal joint highly serrated along whole length. One or two rudimentary pyloric caeca. Vertebrae asymmetrical.

Two species. NORMAN (1937: 106) expressed doubt about the validity of *Crossostomus fasciatus* (Lormberg, 1905), a species -which he considered as possibly being based on a young specimen of *Austrolycus depressiceps*. Examination of the holotype of LÖNNBERG'S species, of 56 other specimens of the same species, as well as of radiographs of the holotype and two additional specimens of *C. chilensis*, allowed this question to be settled. Both species should be considered as valid, for although very similar, they can nevertheless be differentiated by means of body colour and external morphology. The main differences between the two species can be summarized as follows:

<i>C. chilensis</i>	<i>C. fasciatus</i>
Colouration uniform, without yellowish cross bars.	Pale transverse bands across sides of body and dorsal fin.
Nostrils short, not reaching upper edge of upper lip.	Nostrils long, reaching lower edge of upper lip.
Vertical lobules of lips scalloped.	Lobules of lips smooth.

1. *Crossostomus chilensis* (Steindachner, 1898)

Lycodes (Iluocoetes) fimbriatus (non Jenyns) Steindachner, 1898. Zool. Jb. Suppl. 4 (2): 322 (Cape Espiritu Santo, Tierra del Fuego), holotype: ZMB 15693.

Crossostomus fimbriatus Lahille, 1908, An. Mus. nac. Hist. nat. B. Aires 16: 410 (New generic name only).

Crossolycus chilensis Regan, 1913, Trans. R. Soc. Edinb. 49: 247.

Crossostomus chilensis: Norman, 1937: 106 (New combination) — Fowler, 1945: 159 — Ringuelet et al., 1960: 78.

a) Material examined

Two radiographs of ZMB 16693. PLATE Expedition. Cape Espiritu Santo, T. del Fuego. TL 252 mm, holotype.

Unreg.: Bahía Thetis, Tierra del Fuego, from the intertidal zone. 21. 11. 1969. 1: ♂, TL 246 mm, I. ZIZICH and A. E. GOSZTONYI coll.

Ushuaia, T. del Fuego, from the intertidal zone. 30. 12. 1974: 1 specimen, ♂, TL 410 mm, P. MEDINA coll.

b) Description (Fig. 4)

Head subcylindrical, trunk and tail compressed. Depth of body 11.0–12.4% TL. Width 8.5–9.5% TL. Head 17–18% TL. Eye 1.7–2.1% TL, 9.6–12.6% HL. Snout 3.0–5.0% TL, 29.5–29.7% HL. Interocular 2.4–2.5% TL, 14.2–14.3% HL. Mouth subterminal; lower jaw much shorter than upper. Nostrils very short, when extended downward, falling short of the upper edge of upper lip. Lips with vertical striations, giving a folded appearance. Each "fold" scalloped (Fig. 4). Peribuccal fringes triangular. Two above each upper jaw, between each of the first three suborbital pores. Those on the lower jaw also triangular (three on each mandibular ramus, between first and fourth mandibular pores). A single process on symphysis is median. Teeth conical,

blunt, present on jaws only. Those on premaxillaries in three or four rows near symphysis, in a single row laterally. Outermost row most strongly developed. Lower jaw dentition consisting of two rows near symphysis and a single row laterally. Palatal membrane well developed, its proximal margin papillose, the distal one smooth. Gill rakers $10 = 2 + 8$. Dorsal fin supported by 96 rays, its depth about one third larger than that of anal, which has 68 rays. Its origin at a distance of 45.5—44.9% TL from tip of snout. Pectoral fin length 10-11% TL, 57.8-64.3% HL, 38.2-38.6% trunk length, supported by 16 rays. Ventrals very short, lacking in the two specimens actually examined, however present in holotype. Trunk 28.5—26.5% TL, 1.5—1.7 x HL. Tail 54.5-55.1% TL.

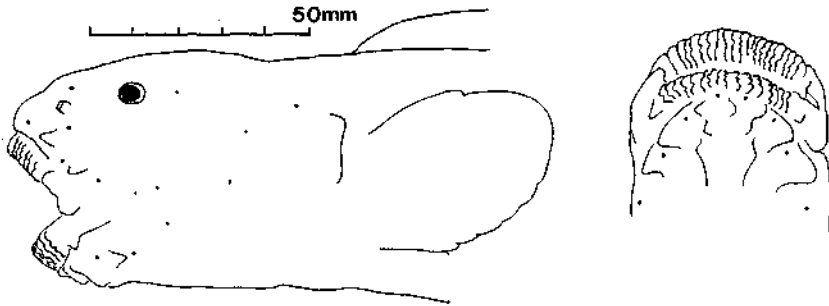


Fig. 4: *Crossostomus chiknsis*. Lateral view of head and anterior part of trunk, and ventral view of head of a 410 mm ♀.

Cephalic lateral-line system. Postorbital canal opening through two pores, one a short distance behind the eye, the other antero-superior to the upper corner of the gill opening. Suborbital canal opening through five pores; three along upper jaw and two behind posterior angle of mouth. These pores in a regular arc more or less parallel to upper jaw, except for the most anterior one which is situated much higher on the snout, behind and below the nostril. Preoperculo-mandibular canal with 8 pores, of which four are on the mandibular rami and four along the preopercular region. Supra-orbital canal opening only through two pores, one behind and above nostril and the other anterior to and below the latter.

The body lateral-line starts at the second postorbital pore, runs past the upper angle of the gill opening and drops gently to mid-lateral line of the body to extend posteriorly to almost the tip of the tail.

Vertebrae $95-101 = (28-29) + (67-72)$. First interneural between first and second neural spines. Ribs from 4th to last precaudal vertebra.

Epipleurals on the anterior two thirds of precaudal vertebrae, starting from the second one.

Scales small, round, strongly embedded in skin. Present on trunk, tail and proximal part of pectoral and unpaired fins.

Colour uniform dark-brown or blackish. Ventral part of head and trunk slightly paler. Vent surrounded by unpigmented tissue.

Data concerning reproduction and food habits not available.

Length to more than 400 mm TL.

c) Distribution (Fig. 6)

In shallow waters off Tierra del Fuego.

2. *Crossostomus fasciatus* (Lonnberg, 1905)

Iluocoetes fimbriatus subsp. *fasciatus* Lonnberg, 1905, Wiss. Erg. Schwed. Südpol.-Exp. 1901—1903, 5 (6): 20 (Green Patch, Port Louis, Malvinas (Falkland) Islands). Holotype NRMS 11089.

Crossolycus fasciatus: Regan, 1913: 247.

Crossostomus fasciatus: Pozzi & Bordale, 1935: 76 — Norman, 1937: 106— Fowler, 1945: 159 — Ringuélet et al., 1960: 78 — Karrer, 1968: 544 (South Atlantic Ocean).

Crossostomus sp.: Iwai et al., 1970: 27 (52°48' S, 68°00' W).

a) Material examined

NRMS 11089. Swedish Exped. Tierra del Fuego 1901-03: Malvinas Islds., Green Patch, Port Louis, among kelp, 27. 7. 1902, ♀, TL 74 mm, holotype (+ radiograph).

ISH 328/71 "Walther Herwig" Station 301/71: 49° S, 67° W, 55-60 m, 16.2.1971. ♂, TL 341 mm (+ radiograph). — Unreg. Puerto Deseado, Sta. Cruz, Argentina, in the intertidal zone, 1962—72: 56 specimens, TL 80.5—322 mm (25 ♂♂, 29 ♀♀, 2 ?), I. ZIZICH, P. MEDINA, J. NAVES and A. E. GOSZTONYI coll. Of these 3 specimens (TL 170, 179 and 190 mm) now in the collections of the Institut für Seefischerei, Hamburg, Reg. No. 7/75 and 8/75.

b) Description (Fig. 5)

Head and trunk subcylindrical, tail compressed. Depth 8.5—15% TL (mod. = 10). Head 12.5-17% TL (mod. = 15.5). Eye 1.4-2.6% TL (mod. = 2), 11-19% HL (mod. = 14). Interocular 2.2-3.8% TL (mod. = 2.6), 13.5-26.5% HL. Mouth subterminal, lower jaw much shorter than upper. Lips with transverse vertical grooves giving them a folded like appearance. Each fold smooth, not scalloped.

Nostrils very long, when extended downward reaching almost to the lower margin of the upper lip.

Peribuccal dermal processes more or less triangular in shape. A median on tip of snout, and three above the upper jaw, behind the nostril, between each of the first 4 suborbital pores. On lower jaw one median near symphysis and one between each of the first 5 mandibular pores.

Teeth conical. On premaxillaries and dentaries in 2 or 3 rows near symphysis, the rows decreasing to a single one laterally. In a group of about six on vomer, and in a short series of about four teeth on each palatine. Palatal membrane well developed. Gill rakers on first arch 7—11.

Dorsal fin, supported by 98—108 rays (\bar{X} = 101.8), about one third deeper than anal. The latter with 71—78 rays (\bar{X} = 74.6). Its origin at a distance of 41—48% TL from tip of snout.

Pectorals with 16-17 rays, their length 8-11% TL (mod. = 9.5), 54-76% HL and 28—34% trunk length. Rounded in profile. Lower four or five rays with tips protruding. Ventrals two-rayed, very short, 0.8—2.6% TL. Their insertion at a distance of 8.5—16.5% TL from tip of snout.

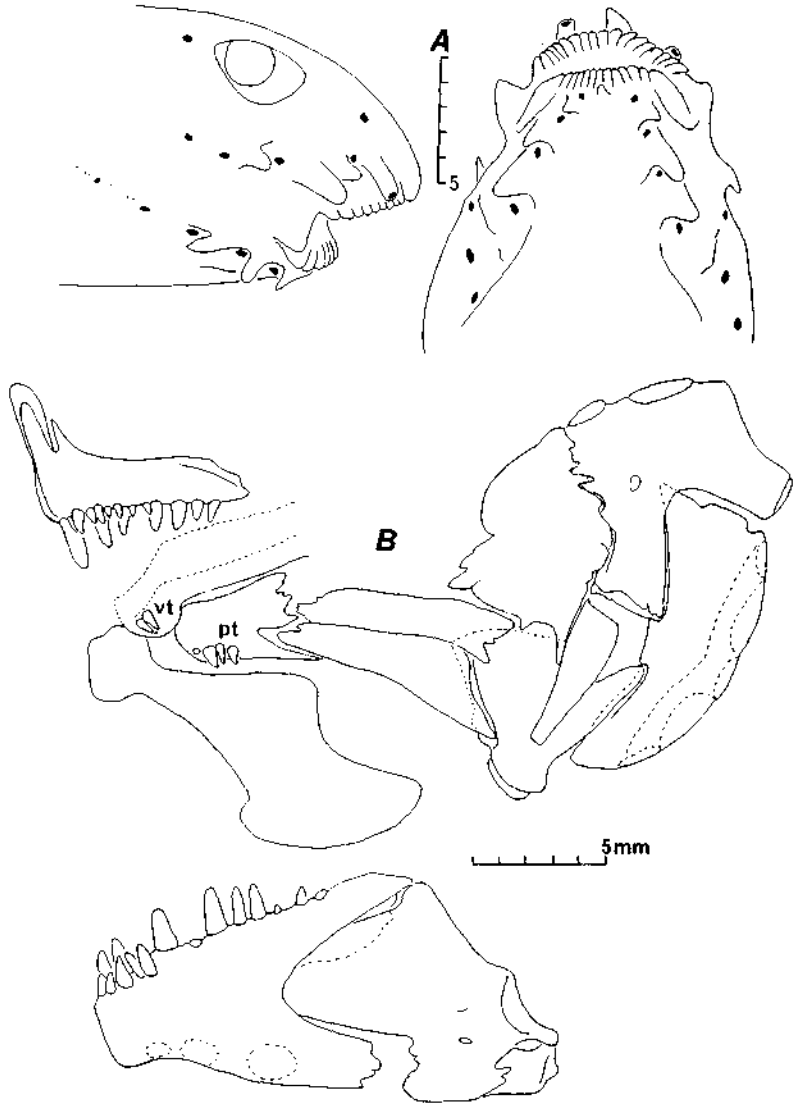


Fig. 5: *Crossostomus fasciatus*. A) lateral and ventral view of head of a 120 mm ♀; B) Suspensorium, vomer, palatine, premaxillary and dentary of a 296 mm ♂ stained with alizarin, pt palatine teeth, vt vomerine teeth.

Trunk 26.5-33% TL (mod. = 29.5), 1.5-2.3 xHL. Tail 52.5-59% TL (mod. = 57).

Cephalic lateral-line system. Two pores, one behind eye, the other antero-superior to upper angle of gill opening form the postorbital canal. Five suborbital pores, three along upper jaw and two postero-superior to corner of mouth. Eight preoperculo-

mandibular pores, four along mandibular ramus and four in an arc along preoperculum. Two supraorbital pores, one antero-superior to the nostril and one below the latter near the tip of the snout.

The body lateral-line runs along the median horizontal line of the body and tail, extending on to second half of the latter.

Vertebrae 99-106 ($\bar{X} = 102.4$) = 29-32 ($\bar{X} = 30.2$) + 70-76 ($\bar{X} = 72.6$). Ribs from third to last precaudal vertebra. Epipleurals from second vertebra on, extending backward to 6th to 8th vertebra before last precaudal. First interneural between skull and first neural spine. Second and third interneurals between second and third neural spines. Scale cover well developed and appearing at an early stage of development.

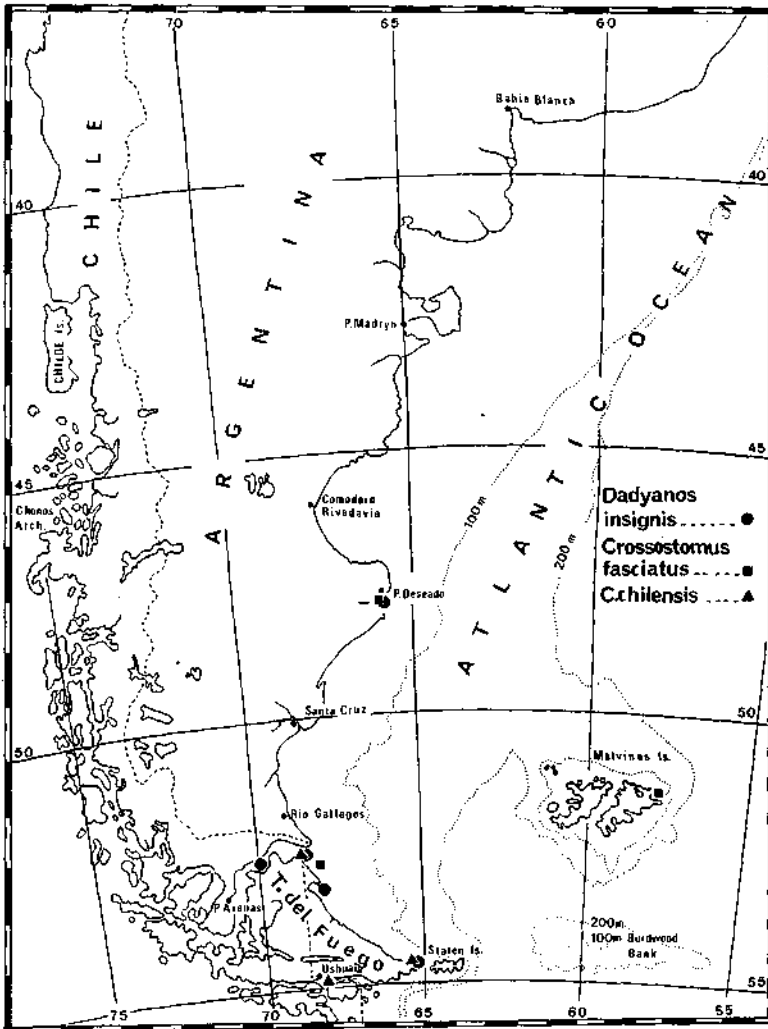


Fig. 6: Distribution of the species of *Dadyanos* and *Crossostomus*.

The smallest specimens examined, including the 70 mm TL holotype, already have a fair number of scales along the mid-horizontal line of the body. In adults, scales cover trunk and tail, leaving head, pectorals and belly naked.

Colour in adults more diffused and less contrasted than in juveniles. Ground colour dark-brown or yellowish-brown. Abdomen and lower side of head lighter. Pale irregular cross-bars across trunk and tail extending on to unpaired fins.

c) Biology

No breeding specimens have been collected from the littoral of Puerto Deseado, where this species is otherwise quite common. Young specimens are found during spring tides under stones and "kelp" (*Macrocystis pyrifera*) rhizoids.

It is worthwhile noting that this species is highly specialized in its feeding habits, all stomachs analyzed containing practically only Polychaeta.

Length: to about 350 mm TL.

d) Distribution (Fig. 6)

In shallow waters, including the intertidal zone, on the Eastern coast of southern South America (Patagonia, Tierra del Fuego and Malvinas Archipelago).

IV. *Dadyanos Whitley, 1951*

Proc. R. zool. Soc. N.S.W., 1949—50 (1951): 61—68, 2 fig. (type: *Platea insignis* Steindachner, 1898, by orig. design.).

Platea Steindachner, 1898, Zool. Jb., Suppl. 4 (2): 323, pl. 22, fig. 12 (preoccupied by *Platea* Brisson, 1760 (Aves)).

Zoarcidae with pelvic fins and almost naked skin. Dorsal fin origin above pectoral fin base. No occipital canal in cephalic lateral-line system. One postorbital pore. Mouth subterminal, surrounded by dermal processes. Both jaws with blade-like — incisi-form — teeth. Vomer and palatines toothless. Palatal membrane well developed. Pseudobranchiae present. Gill-opening extending downward to lower third of pectoral fin base. Six branchiostegal rays. Epihyal-ceratohyal joint highly serrated. One or two rudimentary pyloric caeca. Vertebrae asymmetrical.

One species.

1. *Dadyanos insignis* (Steindachner, 1898)

Platea insignis Steindachner, 1898, Zool. Jb. Suppl. 4 (2): 323, pl. 22, fig. 12 (Cape Espiritu Santo, East Tierra del Fuego). Holotype ZMB 15694.

Platea insignis: Hussakof, 1914: 91 (Bahia Policarpo, Tierra del Fuego) — Thompson, 1916: 417 (36°42' S, 56°23' W) - Norman, 1937: 107 (52°40' to 53° S, 68°-70° W).

Dadyanos insignis: Whitley, 1951: 68 (new combination) — Ringuélet et al., 1960: 78.

a) Material examined

Unreg. Puerto Deseado, Santa Cruz, Argentina, from the intertidal zone, 1969—1972: 25 specimens, TL 159—262 mm (12 ♂♂, 13 ♀♀), I. ZIZICH, P. MEDINA, J. NAVES and A. E. GOSZTONYI coll.. Of these 2 specimens (♂, TL 214, ♀, TL 172 mm) now in the

collections of the Institut für Seefischerei, Hamburg, Reg. No. 6/75. — Same locality and date: 64 larvae (collected with parents, ♂, TL 220, ♀, TL 187 mm), one egg clump (34 x 24 mm) formed by 90 eggs; 161 newborn larvae. — Cabo Irigoyen, Tierra del Fuego, from the intertidal zone, 13. 2. 1976, 1 ♂, TL 245 mm, P. MEDINA coll..

b) Description (Fig. 7)

Head 12—15% TL (mod. = about 14), slightly longer in males than in females. Eye 1.2-2% TL (mod. = 2.6), 11-19% HL. Interocular 2.2—3.8% TL. Mouth sub-terminal. Maxillary reaching posterior border of eye. Teeth on premaxillary and dentary in a single row. Teeth blade-like in adults, however there is an ontogenetic transition from normal conical teeth to the highly specialized ones (fig. 7, C, D, & E).

Dermal processes on snout more or less triangular, situated between 1st and 5th sub-orbital pores. A notch in the posterior end of the upper lip forms a forward directed lobule. Mandibular dermal processes bilobed, situated between 1st and 6th mandibular pores. Lower lips with large posterior free spatulate lobe. Palatal membrane well developed. Gill rakers on first arch: 9—12 = 1—2 + 8—10. Dorsal fin with 104—116 rays (\bar{X} = 108.3) as deep as anal. The latter supported by 89—95 rays (\bar{X} = 91.0). Caudal with 7—9 rays. Pectorals supported by 16—17 rays, their length 9.5—12% TL (mod. = 10.5), 62—80% HL. (When extended backward they reach the mid point of trunk.) Their lower part deeply scalloped. Pelvics 2.9—4.2% TL, 18.5—30% HL,

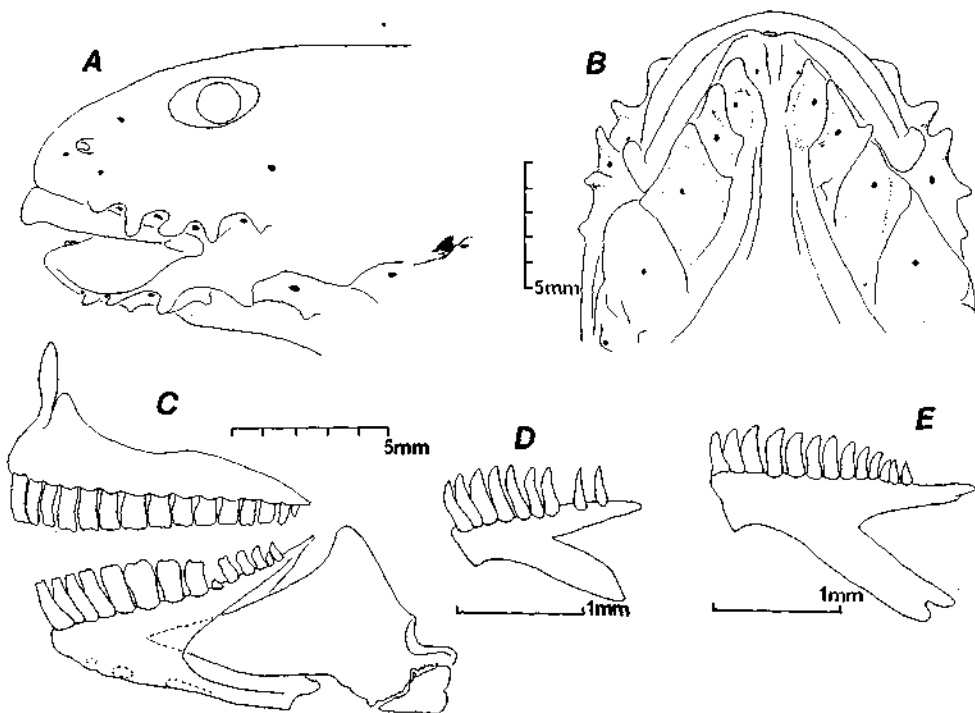


Fig. 7: *Dadyanos insignis*. A and B) lateral and ventral view of head of 171 mm ♀; C) jaws of a 235 mm ♀; D) dentary of a 32 mm, and E) of a 45 mm specimen.

their posterior tips reaching beyond the pectoral fin bases. Their insertion at a distance of 11-14% TL from tip of snout. Trunk 19-23% TL, 1.2-1.9 x HL. Tail 63-67% TL.

Cephalic lateral-line system. No postocular pore in postorbital canal, the latter opening in only one pore which is antero-superior to upper angle of gill slit. Suborbital canal opening in 6 pores, with four along upper jaw and two behind the angle of mouth, across the cheek. Preoperculo-mandibular canal with eight pores, with four along mandibular ramus and four along preopercular bone. Supraorbital canal opening in two pores, one postero-superior to nostril and one below the latter near tip of snout.

The body lateral-line is indistinct but can be traced along the mid-horizontal line of the trunk and tail almost to the tip. Vertebrae 107—116 ($\bar{X} = 109.3$) = 21—24 ($\bar{X} = 23.0$) + 84—93 ($\bar{X} = 86.38$). Ribs from third to last precaudal vertebrae. Epipleurals from second to 8th to 3rd last precaudal vertebra. First interneural bones, i. e. first and second together, between 2nd and 3rd neural spines. Scale covering very poorly developed with only a few minute scales on the tail of the largest of specimens. It may be noted that no scales have been reported before in this species.

It is one of the most brightly coloured species in South American waters. Further, unlike all other species, contrast and colour intensity do not seem to fade with growth of individuals. 7 to 10 vertical bands darker than the light brown ground colour cut across nape, dorsal fin, trunk and tail. Pectorals and the rest of the surface free of cross bars, mottled with darker spots.

c) Biology

Most of the specimens were collected during the breeding season, when individuals stop feeding, so that only a few stomachs were available for analysis. These yielded small isopod Crustacea as well as polychaeta. Maximum registered fecundity: 161, in an egg mass found with the supposed parents (♂, TL 244 mm, ♀, 230 mm). The average egg diameter was about 5.0 mm.

Mature adults with ripe gonads were observed in the intertidal zone of Puerto Deseado in late summer and early autumn. Spawning takes place before May.

Length to 267 mm TL.

d) Distribution (Fig. 6)

In the intertidal zone and shallow waters (down to 40 m) on the eastern coast of southern South America (Patagonia and Tierra del Fuego).

V. *Iuocoefes* Jenyns, 1842

Zool. "Beagle" Fish: 165 (type: *Iuocoetes fimbriatus* Jenyns, by monotypy).

Caneolepis Lahille, 1908, An. Mus. nac. Hist. nat. B. Aires 16: 431 (type: *Caneolepis acropterus* Lahille, 1908, by monotypy).

Zoarcidae with pelvic fins with three rays, and scales embedded in skin. Dorsal fin origin above pectoral fin bases. No occipital canal in cephalic lateral-line system. One or two postorbital pores. Snout and lower jaw without dermal fringes. Mouth sub-terminal. Teeth conical, present on jaws, vomer and palatines. Adult males with strongly developed canines on dentaries. Palatal membrane well developed. Pseudo-

branchiae present. Gill opening extending downward to lower end of pectoral fin base or beyond. Five or six branchiostegal rays. Epihyal-ceratohyal joint strongly serrated along whole length or on most dorsal portion only. No or two pyloric caeca. Vertebrae asymmetrical.

Two species.

1. *Iluocoetes fimbriatus* Jenyns, 1842

Iluocoetes fimbriatus Jenyns, 1842, Zool. "Beagle" Fish: 166, pl. 23, fig. 2 (Chiloe Archipelago, Chile). Holotype BMNH 1917.7.14.69.

Iluocoetes fimbriatus: Guichenot, 1848: 288 — Lönnberg, 1905: 8 (55°10' S, 66°15' W) — Lönnberg, 1907: 13 (Ushuaia, T. del Fuego) - Lahille, 1908: 430 - Regan, 1913: 243 (Malvinas Islds.) — Gotschlich, 1913: 204 (Seno Reloncavi, Chile) — Norman, 1937: 99 (Patagonia and Tierra del Fuego) — Angelescu, 1958: 136 (off Mar del Plata, Argentina) — Buen, 1959: 46 — Ringuélet et al., 1960: 78 — López, 1963: 118, 128 (distributional data) — Ringuélet et al., 1967: 34 (in fresh water) — Iwai et al., 1971: 27 (Patagonian shelf) — Roux, 1973: 68 (southern Uruguay and mouth of La Plata River).

Lycodes variegatus Günther, 1862, Cat. Fish 4: 322 (Malvinas Islds.), 2 syntypes, BMNH 1842.2.12.1.

Lycodes fimbriatus (Jenyns): Günther, 1862: 323 (based on Jenyns' species).

Caneolepis acropterus Lahille, 1908, An. Mus. nac. Hist. nat. B. Aires 16: 431 (Cabo San Antonio, 36°30' S, Argentina). No type material available.

Lycodes variegatus: Vaillant, 1888: 21 (Orange Bay, Tierra del Fuego) — Steindachner, 1898: 321 (Punta Arenas, Chile).

Phucocoetes variegatus macropus Smitt, 1898, K. svenska Vetensk. Akad. Handl., Bihang 24 (4/5): 44, pl. 5, fig. 36 *partim* (Punta Arenas, Chile).

Phucocoetes variegatus (Günther): Lönnberg, 1907: 12 (Ushuaia, T. del Fuego) — Devincenzi, 1924: 270 (La Plata River Estuary).

Caneolepis acropterus: Bordale, 1941: 189 (in fresh water, Lower Paraná River).

a) Material examined

BMNH 1917.7.14.69 "Beagle" Exped., Chiloe Archipelago, TL 145 mm (+ radiograph), holotype.

BMNH 1842.2.12.1 Malvinas Islds., 2: TL 100, 120 mm (+ radiographs), syntypes of *Lycodes variegatus* Günther, 1862. — NRMS 9365 Swedish Antarctic Expedition 1901—1903. Port Louis, Green Patch, Malvinas. 2 specimens. — NRMS 11159 Swed. Exped. Tierra del Fuego 1896—7, 1: TL 35 mm (+radiograph). — MNHN 1884. 831-33-35 and -36, Miss. Scient. Cap Horn 1882-3, Tierra del Fuego, 6: TL 57—125 mm. — ISH 1219/66 "Walther Herwig" Station 265/66: 39°55'S, 56°01'W, 400 m, 19. 6. 1966, 3: TL 340, 340, 370 mm (+ radiographs). - ISH 1285/66. "W. H." St. 278/66: 40°57' S, 56°52' W, 200 m, 20. 6. 1966, 1: ♀, TL 137 mm (+ radiograph). - ISH 1359/66. "W. H." St. 317/66: 48°16' S, 60°12' W, 400 m, 26. 6. 1966, 3: ♀, TL 310, ♂, 320, ♂, 350 mm (+radiographs). - ISH 1389/66 "W. H." St. 333/66: 52°04'S, 57°31'W, 200m, 30.6.1966, 1: ♀, TL 224mm (+radiograph). - ISH 1396/66 "W. H." St. 336/66: 51°57' S, 56°42' W, 600 m, 30. 6. 1966, 1: ♀, TL 260 mm (+ radiograph). - ISH 1401/66 "W. H." St. 337/66: 54°00' S, 58°21' W, 200 m, 1. 7. 1966, 3:

♀, TL 301, ♂, 260, ♂, 299 mm (+ radiographs). - ISH 161/71 "W. H." St. 200/71: 48°07' S, 61°10' W, 150-155 m, 19. 1. 1971, 1: ♂, TL 169 mm (+radiograph). - Unreg. R/V "Kaiyo Maru", Station 44: 49°55' S, 59°04' W, 196 m, 12. 1. 1970, 1: ♂, TL 170 mm. — Unreg. Puerto Deseado, Argentina, from the intertidal zone, 1969—71, 4: ♂, TL 87, ♀, 93, ♀, 104, ♂, 108 mm. I. ZIZICH, P. MEDINA, A. E. GOSZTONYI coll. — Ushuaia, Argentina, from the intertidal zone, 27. 3. 1963, 2: TL 118 and 118 mm. — R/V. "P. Mitre", off Mar del Plata, Argentina, ca. 200 m, 7. 10. 1954, 5: TL 316—424 mm. — R/V. "Prof. Siedlecki", on the Continental Shelf, south of Malvinas Islds.. 1973, 18: TL 315—435 mm (12 ♂♂, 6 ♀♀).

b) Description

Head moderately depressed, trunk and tail compressed. Depth 8—14% TL (mod. = 11). Head 16.5—21.5% TL (mod. = 15.5), longer in males than in females. Eyes large, 3—5% TL (mod. = 3.3), 15—25% HL. Their upper edge protruding slightly above upper profile of head. Interocular 2.2—3.8% TL (mod. = 2.6), 13.5—26.5% HL. Mouth subterminal. Upper jaw much longer than lower, leaving the premaxillary teeth and palatal membrane visible from below. Lips very large, fleshy and well delimited from adjacent integument by a deep groove.

Teeth conical, in 2 (in males) to 3—4 (in females) irregular rows near symphysis, and in a single row laterally in both upper and lower jaws. In males the first or 2nd premaxillary tooth, as well as some of those lying at some distance from the mandibular symphysis, are distinctly enlarged and canine-like. Vomerian teeth in a group of about 15, palatine ones in an irregular single row of about 12.

Gill rakers on first arch: 12—16 (\bar{X} 13.6) = 2—3 + 9 —14. Five branchiostegal rays. Epiphyal-ceratothyal joint smooth except on its most dorsal portion where it is serrated. Gill opening large, extending downward to beyond the lower end of the pectoral fin base and with its anterior angle reaching a point in front of the ventral fin insertion.

Dorsal fin with 87—98 rays (\bar{X} = 91.5). In males much deeper than in females. Anal supported by 69—82 rays (\bar{X} = 74.32). Caudal 7—9. Pectoral with 15—19 rays (\bar{X} = 17.11), its length 10-15% TL (mod. = 13), 47-78% HL (mod. = 68). Lower part not scalloped. Ventrals with three rays, short, their length 2—5% TL, 13.5—20% HL. Their insertion at a distance of 12.5—21% TL from the tip of the snout. Trunk 18-24% TL (mod. = 21), 0.5-1.4 x HL. Tail 55.5-65.5% TL (mod. = 60).

Cephalic lateral-line system. Two postorbital pores, one behind eye and one antero-superior to upper angle of gill opening. Seven suborbital pores, five along upper jaw and two above and behind hinder end of mouth. Eight preoperculo-mandibular pores, four along mandibular ramus and four along preopercular region. Two supraorbital pores, one above and behind nostril and one near tip of snout, below the latter. Body lateral-line running along mid-horizontal line of trunk and tail.

Vertebrae: 82-99 (\bar{X} = 90.7) = 19-22 (\bar{X} = 20.56) + 63-79 (\bar{X} = 70.4). Ribs from 4th to last precaudal vertebra. Epipleurals from second to about 10th precaudal vertebra. First interneural bone usually between 3rd and 4th neural spines, sometimes between 2nd and 3rd.

Scale cover well developed on trunk, tail and proximal part of pectoral fins.

Colour very variable. On a dark-brown ground colour (which is paler on abdomen), numerous circular, subcircular or vermiform whitish blotches. Also a series of darker

vertical cross-bars on upper part of sides. Edge of vertical fins black. A distinct darker band usually between antero-inferior edge of eye and upper jaw.

c) Biology

Young specimens have been found in the littoral zone as well as on the Continental Shelf and Slope, which suggests for this species a spawning area covering the whole of the Continental Shelf.

A specimen TL 430 mm had 287 eggs in the only ovary analyzed.

It is interesting to note that this species seems to feed mainly on small invertebrates, especially Amphipoda, in spite of the extremely well developed dentition, which is undoubtedly well suited for an ichthyovorous diet.

Length to about 600 mm TL.

d) Distribution (Fig. 9)

This is one of the most widely distributed zoarcids off southern South America, the northern distribution limits being respectively 35° and 41° S on the Atlantic and Pacific sides of the continent. The bathymetric distribution is also very wide with specimens regularly found from the intertidal zone to depths of 600 m.

2. *Ilucoetes elongatus* (Smitt, 1898)

Phucocoetes variegatus elongatus Smitt, 1898, K. svenska Vetensk. Akad. Handl., Bihang 24 (4/5): 44, pl. 5, fig. 34 (Puerto Madryn, Argentina, 42°45'S). Holotype NRMS 1158.

Phucocoetes variegatus effusus Smitt, 1898, K. svenska Vetensk. Akad. Handl., Bihang 24 (4/5): 44, pl. 5, fig. 32 (Río Gallegos, Santa Cruz, Argentina). Syntypes NRMS 1157a, 1157b (NEW SYNONYMY).

Phucocoetes variegatus micropus Smitt, 1898, K. svenska Vetensk. Akad. Handl., Bihang 24 (4/5): 44, pl. 5, fig. 33 (Rio Grande, Tierra del Fuego). Syntypes: NRMS 1156a, 1156b (NEW SYNONYMY).

Phucocoetes variegatus elongatus: Lahille, 1908: 424.

Phucocoetes variegatus effusus: Lahille, 1908: 424.

Phucocoetes variegatus micropus: Lahille, 1908: 424.

Ilucoetes elongatus: Pozzi & Bordale, 1935: 175 — Norman, 1937: 101 — Bordalé, 1941: 190 - Fowler, 1945: 156 - Buen, 1959: 46 - Ringuelet et al., 1960: 77.

a) Material examined

NRMS 1158. Swedish Exped. Tierra del Fuego 1896-97: Puerto Madryn, Chubut, 42°45' S. 1: ♀, TL 171 mm (+ radiograph), holotype.

NRMS 1156. Swed. Exp. T. del Fuego 1896-97: Río Grande, Tierra del Fuego. 2: TL 120, 121 mm (+ radiographs), syntypes of *Phucocoetes variegatus effusus*.

NRMS 1157. Swed. Exp. T. del Fuego 1896-97: Río Gallegos, Santa Cruz, 16. 11. 1895. 2: ♂, TL 156, ♀, TL 182 mm (+ radiographs), syntypes of *Phucocoetes variegatus micropus* Smitt.

Unreg. Puerto Deseado, Santa Cruz Province, Argentina, in the intertidal zone, 1964–72: 62 specimens, TL 95–191 mm (24 ♂♂, 32 ♀♀), I. ZIZICH, P. MEDINA, J. NAVES and A. E. GOSZTONYI coll. 7 of these specimens now in the collections of the Institut für Seefischerei, Hamburg, Reg. No. 25/70. — Same locality: egg masses and larvae with or without their supposed parents.

b) Description (Fig. 8)

Head and trunk subcylindrical, tail compressed. Depth 6.5–11% TL (mod. = 9). Head 14.5–22% TL. This index is much higher in males than in females. Eye 1–1.28% TL (mod. = 2.4), 10–16% HL (smaller in males than in females). Interocular 1.9–4.0% TL (mod. = 3.6). Mouth subterminal, upper jaw only slightly longer than lower. Lips poorly delimited. Premaxillary teeth extending along the whole length of the bone in a single row. Those close to symphysis somewhat enlarged, canine-like. Jaw dentition quite different in the sexes. In females, teeth are found along the whole length of dentary bone and none are markedly enlarged. In males, teeth are restricted to the first third or quarter of the bone from symphysis, and increase in height in a backward direction, with the last tooth of the series being the largest and usually quite different from the rest. Palatal membrane well developed. Dorsal fin with 84–88 rays (\bar{X} = 85.8), about as deep as anal fin. The latter supported by 65–69 rays (\bar{X} = 67.57). Caudal rays 7–9. Pectorals with 16–18 rays (\bar{X} = 17.29), their length 8.5–12% TL (mod. = 10.5), 48–71% HL and 35–59% trunk length. Ventrals three-rayed, their length 2.9–5% TL (mod. = 3.4) and 14–30% HL. They extend backward to beyond the base of the pectorals, their insertion at a distance of 11.5–18% TL from the tip of the snout.

Trunk 19–28% TL (mod. = 24), 0.9–1.7 x HL (mod. = 1.2). Tail 55.5–62% TL.

No postocular pore in cephalic lateral-line system. The only pore in the postorbital canal above and in front of the upper angle of the gill opening. Suborbital canal opening

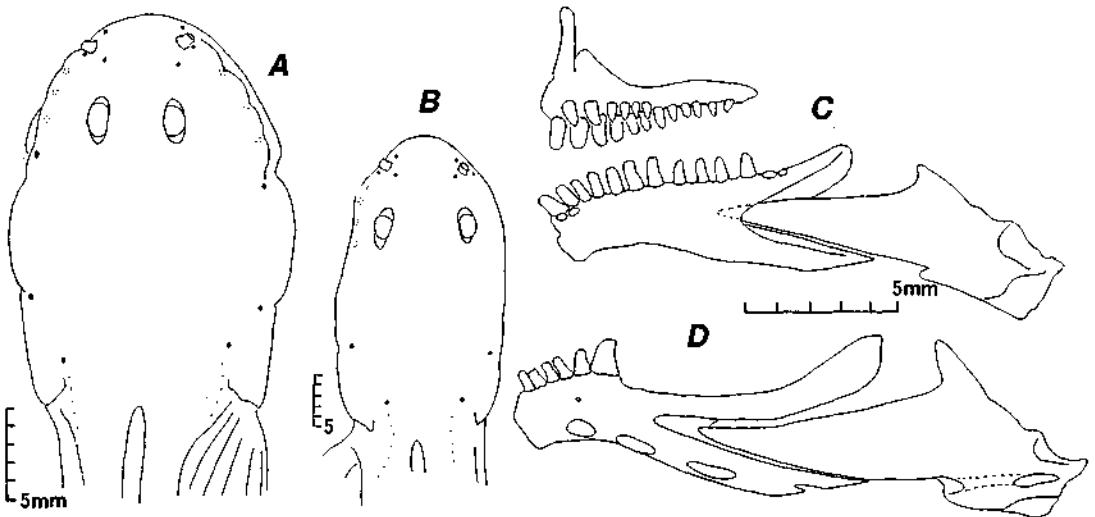


Fig. 8: *Iluocoetes elongatus*. A) dorsal view of head of 165 mm ♂; B) that of 148 mm ♀; C) jaws of a mature 126 mm ♀; D) dentary of a 159 mm ♂.

in six pores, with three along upper jaw and three above and behind the angle of the mouth. Preoperculo-mandibular canal opening through eight pores, with four along mandibular ramus and four along preopercular bone. Supraorbital canal with two pores, one in front of and below nostril and one above and behind the latter. The body lateral-line starts in the postorbital pore, continues around the upper angle of the gill opening and extends obliquely along the trunk and then along the median longitudinal line of the tail. Vertebrae 84.-90 (\bar{X} = 87.14) = 22-24 (\bar{X} = 22.29) + 62-69 (\bar{X} = 64.67). Ribs from 3rd or 4th to last precaudal vertebra. Epipleurals from 2nd to 5th—11th before last precaudal vertebra. First interneural bone between 2nd and 3rd neural spine.

Scale covering very poorly developed with only a few minute scales on trunk and sometimes on anterior third of tail.

Ground colour light-brown. Dark-brown irregular cross-bars across trunk and tail, continued on to both unpaired fins. Pectorals and head mottled with darker.

c) Biology

The food of this species consists mainly of small invertebrates such as Isopoda, Amphipoda and Polychaeta.

Since *I. elongatus* is one of the most common eel-pouts of the Puerto Deseado region a great deal of information is known about its reproductive biology. The most important features which have been established are that (1) eggs ripen between early December and late February with the ovaries so that (2) spawning can take place in early March with the eggs, 5.0—5.5 mm in diameter being laid in compact masses around which the females, usually accompanied by the males, are coiled. (3) Hatching takes place in early May, with the larvae guarded by the females for an undetermined length of time. (4) Fecundity against total length of female follows the equation: Number of eggs = 1.22 TL + 102 ($r = 0.840$). The maximum fecundity registered was 126 in a female TL 198 mm.

Length to about 200 mm.

d) Distribution (Fig. 9)

Known from coastal and shallow water (to about 40 m) localities of the Eastern Coast of South America, Tierra del Fuego and Magellan Strait.

VI. *Lycenchelys* Gill, 1884

Proc. Acad. nat. Sci. Philad., 36: 180 (Type *Lycodesmuraena* Collett, 1878 (Norwegian Sea, 66°41'N, 06°59'E) by subsequent design, by Jordan 1887). In this genus an undescribed species collected by the "Walther Herwig" Expedition of 1971, is included with some reluctance. Characteristics supporting the generic diagnosis are the very long tail, the large number of symmetric vertebrae (118), the posterior placing of the dorsal fin origin (also known in the antarctic species *L. antarcticus* Regan), the presence of a palatal membrane, of vomerian teeth and the large gill opening extending downward to beyond the lower end of the pectoral fin base.

The strongest arguments against including this new species in *Lycenchelys* are the presence of 5 branchiostegals (as opposed to six which is the normal number in the genus), and the absence of the very large peribuccal lateral-line pores, characteristic of the genus.

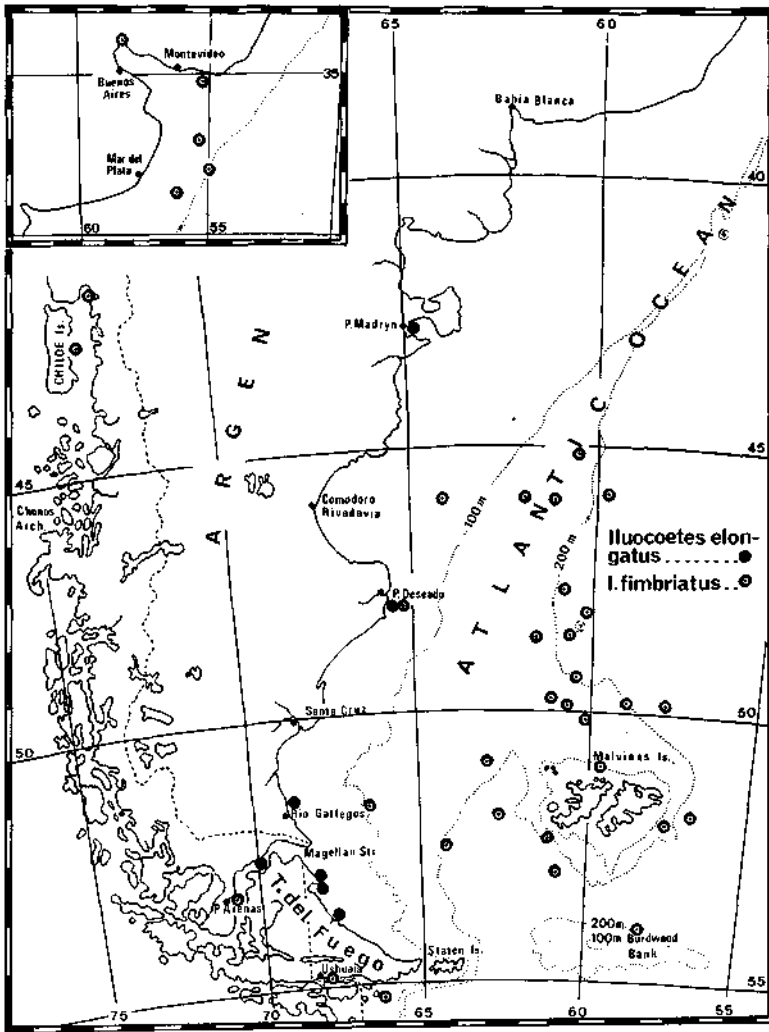


Fig. 9: Distribution of the genus *Iluocoetes*.

None of the aforementioned characters however seem to have enough weight to prevent the inclusion, at least provisionally, of the new species in the genus *Lycenchelys* Gill.

1. *Lycenchelys bachmanni* n. sp.

a) Material examined

Holotype: ISH 306/71, "Walther Herwig" Station 331/71, 41°05' S, 57°15' W, 800 m, 23. 2. 1971, , TL 318 mm (+ radiograph).



Fig. 10: *Lycenchelys bachmanni* n. sp. Holotype, ISH no. 306/71, a) lateral and b) dorsal view.

b) Description (Figs. 10, 11)

Body elongated, cylindrical. Posterior half of caudal region slightly compressed. Depth 6.6% TL. Width 6.6% TL. Head slightly depressed, 13.3% TL. Eyes oval, their upper edge reaching the dorsal profile of the head, their length 4.4% TL and 22.6% HL. Snout rounded in profile, 2.2% TL, 16.6% HL. Interocular 3.43% TL, 25.9% HL. Mouth subterminal. Maxillary reaching a vertical through the first quarter of the eye. Orobranchial cavity blackish. Premaxillary teeth conical, with tips turned slightly inward, in a single row laterally, and in two near symphysis. Palatal membrane well developed, with proximal part papillose and distal one smooth. Vomer with about ten teeth. Palatines with a single row of around 12 teeth. Dentary with two irregular rows near symphysis and a single row laterally.

Gill opening extending downward to a little below lower end of pectoral fin base. Its upper edge with a large free "opercular lobe".

Branchiostegals five. Gill rakers $10 = 2 + 8$. Pseudobranchiae present. Dorsal fin supported by 110 rays, its origin above the end of the pectoral fin. Anal fin with 100 rays, its depth equal to that of dorsal. Pectorals with 16 rays, rounded in outline, their lower half scalloped. Length 6.13% TL, 46.0% HL and 43.3% trunk length. Ventrals 1.86% TL, 14% HL, their insertion at a distance of 10.6% TL from the tip of the snout. Trunk 14.5% TL, 1.07 x HL. Tail 72.6% TL.

Cephalic lateral-line system. Postorbital canal opening in three pores on the right side or 4 on the left side, with one pore behind the eye and two or three in front of and above the opercular lobe. Suborbital canal opening through nine pores, with four along upper jaw, and five forming an arc across the cheek, with the last one just below the postocular pore. Preoperculo-mandibular canal with eight pores, four along mandibular ramus and four along an arc which ends slightly above the mid point of the

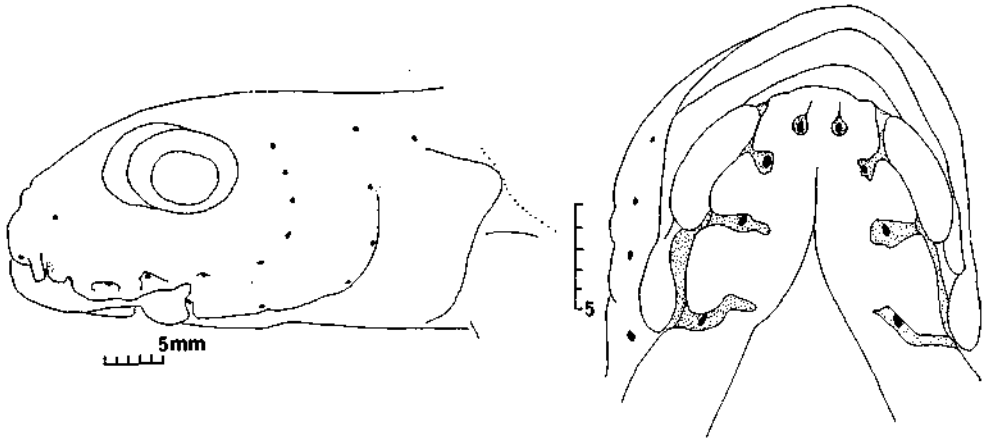


Fig. 11: *Lycenchelys bachmanni* n. sp. Holotype, lateral and ventral view of head.

preopercular bone. Supraorbital canal opening through two pores, with one below and in front of the nostril and one above and behind the latter.

Body lateral-line starting in the last (3rd or 4th) postorbital pore. As a closely packed line of genipores it runs around the opercular lobe, crosses the trunk obliquely to the lower half, from where it extends, zigzag-fashion along the lower half of the tail, to finally fade in the second half of the latter.

Vertebrae $118 = 23 + 95$. First interneural between 7th and 8th neural spines.

Three very short pyloric caeca. Peritoneum black. Mesenteria unpigmented.

Scale covering well developed on body and caudal region, extending on to unpaired fins in the last third of the tail only. Head and pectorals naked.

Colour dark-brown to blackish, except for the pectoral fins and five yellowish blotches across dorsal part of trunk and tail.

b) Distribution (Fig. 22)

Only known from the type locality on the Continental Slope off Río Negro Province, Argentina.

c) Etymology

The specific name honours Lic. Axel O. BACHMANN, from Buenos Aires University, Biology Dept., who very kindly helped the author in his early days in the biological sciences.

VII. *Maynea* Cunningham, 1871

Trans. Linn. Soc. Lond. 27: 471 (type: *M. patagonica* Cunningham, by monotypy).

Gymnelkhhthys Fischer, 1885, Jb. hamb. wiss. Anst. 2: 60 (type: *G. antarcticus* Fischer, by monotypy).

Zoarcidae -without pelvic fins. Scales embedded in skin. Dorsal fin origin above base of pectoral fin. Mouth terminal or snout slightly protruding. No peribuccal dermal fringes. Cephalic lateral-line system without occipital canal. Two postorbital pores. Teeth on jaws, vomer and palatines. Palatal membrane well developed. Pseudo-branchiae present. Gill openings above pectoral fins or extending downward to middle of pectoral fin bases. Five or six branchiostegal rays. One or two pyloric caeca. Vertebrae asymmetrical.

2 Patagonian species.

1. *Maynea patagonica* Cunningham, 1871

Maynea patagonica Cunningham, 1871, Trans. Linn. Soc. Lond. 27: 472 (Otter Islands, Magellan Strait). Holotype BMNH 1869.5.3.25.

Maynea patagonica: Giinther, 1881: 20 (Puerto Rosario, Magellan St.) — Perugia, 1891: 624 (Isla de los Estados) — Steindachner, 1898: 318 (Admiralty Sound, Magellan St.) — Lönnberg, 1905: 8 (55°10' S, 66°15' W and Port Williams, Malvinas) - Regan, 1913: 248 (re-examined holotype) — Hussakof, 1914: 92 (52° S) — Norman, 1937: 108 — Ringuelet et al, 1960: 77 — Nybelin, 1969: 120 (Punta Arenas and Admiralty Sound, Magellan St.).

a) Material examined

BMNH 1869.5.3.25. Otter Islands, Magellan Strait: ♀, TL 155 mm (+radiograph) holotype.

BMNH 1879.8.20.31. Puerto Rosario, Magellan Strait: ♀, TL 90 mm (+ radiograph). — Unreg.: Ushuaia, Tierra del Fuego, from the intertidal zone, 23. 11. 1968, 1: TL 152 mm. A. E. GOSZTONYI coll. — Unreg.: Same locality, 30. 12. 1974, 1: female, 213 mm, P. MEDINA coll.

b) Description

Body elongated, compressed. Depth 7—10% TL. Head 13—15% TL. Eye 2.1—3.6% TL and 16—20% HL. Interocular 1.7% TL. Mouth subterminal. Lips well delimited. Free lobe of lower lip extended far forward, almost to symphysis. Teeth conical, in a single row on both jaws. No canines differentiated. Palatal membrane well developed. Gill opening extending downward to middle of pectoral fin base. Five branchiostegal rays. Epiphyal-ceratohyal joint smooth almost along its whole length. Gill rakers (in one specimen) 3 + 10.

Dorsal fin with 119—120 rays. Anal with 95—97 rays. Both unpaired fins of about the same depth. Pectorals supported by 14 rays, their length 6—8% TL, 42—62% HL and 26—32% trunk length.

Trunk 23-26% TL, 1.6-1.9 x HL. Tail 61-64.4% TL.

Cephalic lateral-line system. Two postorbital pores, one behind the eye and one above and slightly in front of the upper angle of the gill opening. Suborbital canal opening through six pores, with 5 along upper jaw and one behind and above posterior end of maxillary. Preoperculo-mandibular canal with eight pores, four along mandibular ramus and four along preoperculum. Supraorbital canal opening through two pores, one above and behind nostril and one below the latter near tip of snout. Body lateral line starting in the second postorbital pore and running along mid-longitudinal line

of trunk and tail, to end in the second half of the latter. Vertebrae 119—121 = 29—30 + 89—90. Ribs from 3rd to last or second last precaudal vertebra. Epipleurals from 2nd to 11th—8th before last precaudal vertebra. First interneural bone between 2nd and 3rd neural spine.

Scale cover. Tail and trunk densely covered except for the lower side of abdomen which is naked. Vertical fins with scales on their lower third. Ground colour yellow or whitish. Broad brown cross-bars on sides of trunk and tail, extend on to dorsal and (less distinctly) anal fins. Also a transverse pale area across occiput. Greyish pectorals with white edges.

Length to about 300 mm.

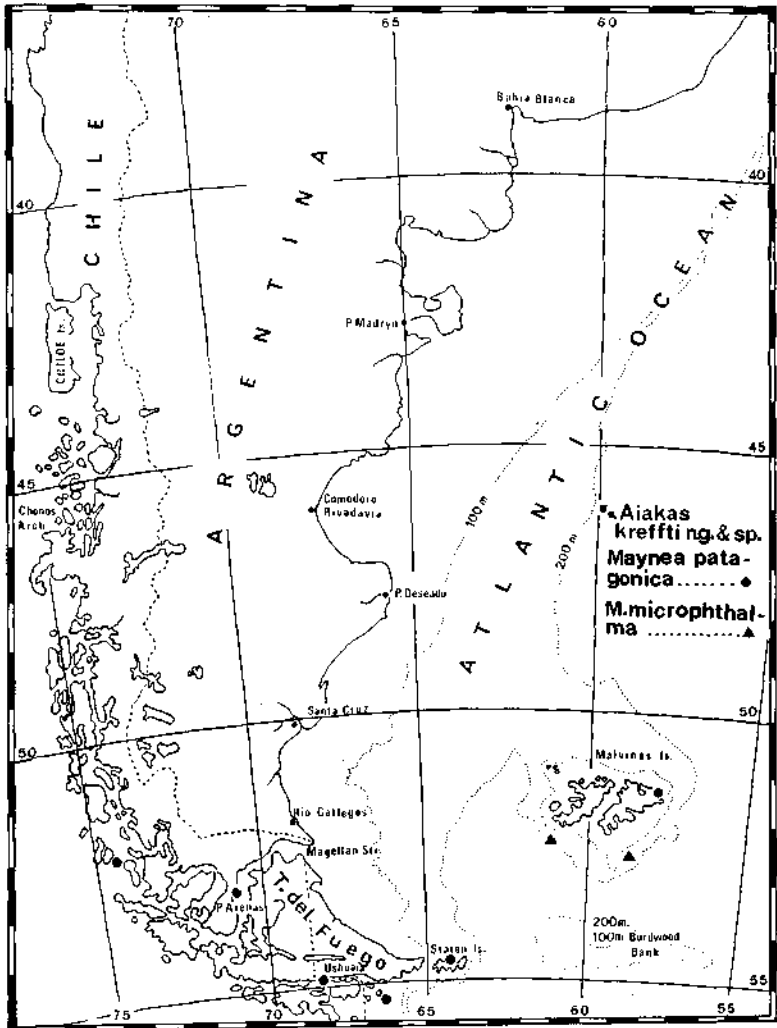


Fig. 12: Distribution of the genera *Aiakas* and *Maynea*.

c) Distribution (Fig. 12)

Found in the intertidal zone and shallow waters off Tierra del Fuego and Southern Patagonia.

2. *Maynea microphthalmus* (Norman, 1937)

Melanostigma microphthalmus Norman, 1937, "Discovery" Rep. 16: 110, fig. 58 (52°40' S, 58°30' W). Holotype BMNH 1936.8.26.

Maynea microphthalmus: McAllister & Rees, 1964: 106 (New combination)

a) Material examined

BMNH 1936.8.26. "William Scoresby" Station 248: 52°40'S, 58°30' W, 210-242 m, 20. 7. 1928, ♂, TL 85.3 mm (+ radiograph), holotype.

b) Description

Body and tail compressed. Depth 8.4% TL. Head 14.9% TL, its width 6.9% TL. Snout 3.4% TL, 22.8% HL. Eye 2.2% TL, 15% HL. Interocular 1.8% TL, 11.8% HL. Nostrils very long, reaching lower edge of upper lip. Mouth terminal, its posterior end reaching a vertical through the middle of the eye.

Upper jaw with a single row of teeth of roughly equal height. Two teeth on vomer. A single series on each palatine. Palatal membrane well developed. According to NORMAN (1937: 110) an enlarged canine tooth on each lower jaw. Gill rakers 8 = 1 + 7. Gill opening above pectoral fin base. Six branchiostegal rays.

Dorsal fin supported by 92 rays, its origin slightly behind pectoral fin base. Anal fin with 78 rays, about as deep as dorsal. Pectorals with 9 rays only, their length 6% TL, 40% HL and roughly 30% trunk length. Their margin scalloped.

Trunk 21.4% TL, 1.4 x HL. Tail 63.7% TL.

Cephalic lateral-line system greatly reduced. Postorbital canal opening through two pores, one behind eye, the other antero-superior to upper end of gill opening. Sub-orbital canal opening in only four pores, which form an arc between nostril and posterior edge of eye. Preoperculo-mandibular canal opening through six pores, with three on the mandibular ramus and three along the preopercular bone. Supraorbital canal with two pores, one antero-inferior to nostril near tip of snout and one behind and above the former. Body lateral-line running along mid-lateral line of trunk and tail, and fading on the second half of the latter.

Vertebrae 95 = 23 - 72. First interneural bone between 4th and 5th neural spine.

Scale cover poorly developed: minute scales on the tail extending on to the basal part of the vertical fins.

Colour (according to NORMAN (1937: 110)) "Back and sides brownish; abdomen and lower part of head pale yellowish-white, spotted or marbled with brown; in the holotype the pale colour of the abdomen extends posteriorly along lower part of side; median fins pale yellowish-white, with some irregular brown markings; pectorals yellowish".

Two small pyloric caeca. Peritoneum black.

Length to 85 mm TL.

c) Distribution (Fig. 12)

On the lower reaches of the Continental Shelf south of the Malvinas Islands.

VIII. *Notolycodes* n. g.

Type species *Notolycodes schmidti* n. sp.

Zoarcidae with pelvic fins and scales embedded in skin. Peribuccal region normal, without dermal processes. Dorsal fin originating above first half of pectoral fin. No occipital canal in cephalic lateral-line system. Two postorbital pores. Teeth on jaws conical. Vomer and palatines toothless. No canine teeth differentiated in either sex. Palatal membrane well developed. Pseudobranchiae present. Lower edges of dentaries greatly enlarged to form a broad submental prominence at the symphysis. Five branchiostegal rays. Epiphyal-ceratohyal joint smooth almost along its whole length, its most dorsal portion dentate. Pyloric caeca present, though rudimentary. Vertebrae symmetrical.

a) Discussion

The new genus bears a resemblance to *Lycodes* Reinhardt, *Lycodopsis* Collett, and *Petroschmidtia* Taranetz & Andriashev from the Northern Hemisphere, *Iluocoetes* Jenyns from southern South America and *Lycodichthys* Pappenheim from Antarctic waters.

The genus differs from *Lycodes* in the lack of palatal teeth, in the possession of a palatal membrane, in the morphology of the submental region and in the loss of the occipital canal of the lateral-line system. It can be distinguished from *Lycodopsis* by the same characters that distinguish it from *Lycodes* except for the palatal teeth which are also lacking in *Lycodopsis*. *Notolycodes* differs from *Petroschmidtia*, the genus it most closely resembles, in its well developed palatal membrane and in possessing pyloric caeca. The new genus is separated from *Iluocoetes*, another South American genus, in its lack of palatal teeth, its large submental prominence and in having symmetrical vertebrae. It can further be distinguished from the Antarctic genus *Lycodichthys* by the large submental prominence and in having only 5, not 6 branchiostegal rays.

Etymology. From Notos: the Greek word for South and *Lycodes*, a Northern Hemisphere zoarcid genus. The generic name should be treated as a masculine word.

1. *Notolycodes schmidti* n. sp.

a) Material examined

Holotype: ISH 1134/66, "Walther Herwig" Station 237/66, 36°00' S, 52°58' W, 800 m, 13. 6. 1966, tJ, TL 325 mm (+ radiographs).

Paratypes: ISH 1515/66 "W. H." St. 391/66, 38°53' S, 55°22' W, 400 m, 21. 7. 1966, ♀, TL 470 mm (+ radiographs) - ISH 1586/66 a & b "W. H." St. 439/66, 36°43' S, 51°02' W, 800 m, 31. 7. 1966, ♀, TL 352 mm, ♂, TL 304 mm (+radiographs) - ISH 1977/68, "W. H." St. 104/68, 22°30' S, 40°07' W, 800 m, ♂, TL 180 mm (+ radiograph).

b) Description of holotype (Fig. 13)

Body and head slightly compressed. Depth 10.45% TL, width 10.15%. Head 17.5% TL, its width 12.6% TL and 71.9% HL. Snout blunt, very convex, 4.9% TL

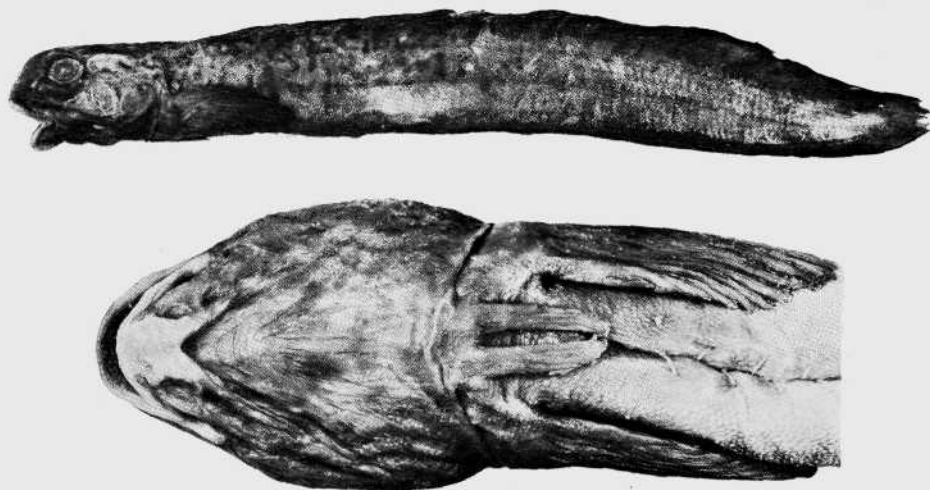


Fig. 13: *Notolycodes schmidti* n. g., n. sp. Holotype, ISH no. 1134/66, lateral view and ventral aspect of head and anterior part of trunk.

and 28% HL. Eye 3.9% TL, 22.1% HL. Interorbital 1.2% TL, 6.7% HL. Interocular 3.4% TL, 19.3% HL. Mouth subterminal. Premaxillary teeth in about six irregular rows, with no differentiated canines, though those of the most external row and those near symphysis somewhat enlarged. Palatal membrane well developed, its proximal part papillose.

Dentaries with five irregular rows of teeth near symphysis, the rows being reduced to a single row laterally. Gill opening extending downward to beyond lower end of pectoral fin base, with its lower apex in front of the ventral fin insertion. The gill rakers were not counted in holotype.

Dorsal fin supported by 87 rays, about twice as deep as anal. The latter with 72 rays, its origin a distance 39.4% TL from tip of snout. Pectorals rounded in outline, their length 13.1% TL, 74.9% HL and 60.1% trunk length, (the left one) supported by 21 rays. Ventrals 5.1% TL, 29.1% HL, their insertion a distance 15.7% TL from tip of snout.

Trunk 21.8% TL, 1.2 x HL. Tail compressed, 60.6% TL.

Cephalic lateral-line system. Postorbital canal opening through two pores, one behind the eye, and one antero-superior to apex of gill opening. Suborbital canal with eight pores; four along upper jaw and four along an arc on the cheek. Preoperculo-mandibular canal opening through eight pores, four on mandibular ramus and four in an arc along the preopercular bone. Supraorbital canal with two openings, one behind and slightly above nostril and one antero-inferior to the same, near the tip of the snout. The body lateral-line originates in the second postorbital pore, follows a short horizontal tract and turns gradually down to the mid-lateral line of the body to end on the last quarter of the tail.

Vertebrae 91 = 23 + 68. Ribs from 3rd to last precaudal vertebra. Epipleurals from 1st vertebra and restricted to the anterior half of the precaudal vertebral column. First interneural between 4th and 5th neural spines.

Scale cover very dense over whole body, extending on to basal third of unpaired fins, and proximal third of pectorals. The squamation extends forward to beyond the interorbital region on the head.

Body colour dark-brown, with darker vermiculations above mid-lateral line of trunk and head. Distal part of pectorals and unpaired fins black. A darker band between eye and upper jaw, as in *Iluocoetes fimbriatus*.

d) Variation observed in paratypes

Body depth 9.6-11.3% TL, width 8.9-10.9% TL. Head 15.6-20.4% TL, its width 10.3-13.4% TL and 54.7-84.0% HL. Snout 3.9-4.9% TL, 20.6-29% HL. Eye 3.0-5.1% TL, 19.1-27.0% HL. Interorbital 0.9-1.6% TL, 6.1-8.2% HL. Interocular 4.2-4.9% TL, 25.3-27.6% HL. Orobranchial cavity greyish or black. Premaxillary teeth in up to six irregular rows near symphysis, in a single row of gradual decreasing size laterally. Palatal membrane well developed in all specimens, its proximal part densely covered by papillae. Teeth on dentary in up to 6 rows near symphysis, and in a single row of somewhat enlarged but subequal teeth laterally. The dentary bone when dissected out, shows the greatly expanded lower margin (Fig. 14). Gill rakers 11-12 = (2-3) + 9, knob-like or triangular, some with inward directed spines.

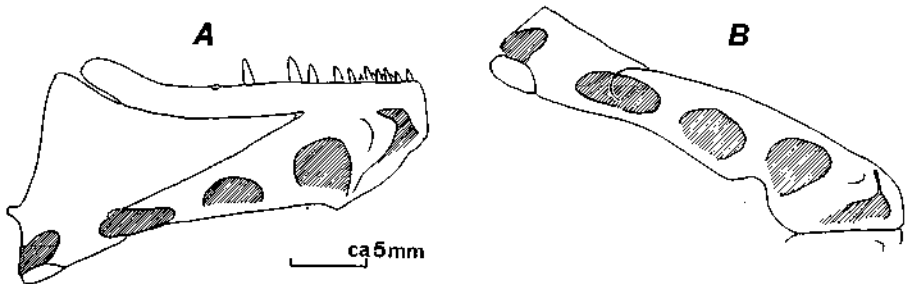


Fig. 14: *Notolycodes schmidti* n. g., n. sp. Diagram of lower jaw of a paratype. A) lateral, B) ventral aspect.

Dorsal fin with 84-89 rays, twice as deep as anal, its origin at a distance of 18.3-21.7% TL from tip of snout. Anal fin with 68-72 rays, its origin at a distance of 37.2-44.4% TL from tip of snout. Pectorals with 20-23 rays, their length 9.9-13% TL, 59-74.2% HL and 40.6-63.5% trunk length. Ventrals with three rays, 3.2-5.9% TL, their bases 13.4-17.8% TL from tip of snout.

Trunk 20.3-24.5% TL, 1.00-1.5 x HL. Tail compressed, 58.6-62.8% TL.

Cephalic and body lateral-line systems similar to those of the holotype, although in the larger specimens the cephalic pores are very small and difficult to detect.

Vertebrae 89-94 = 23-26 + 66-69. Ribs from 3rd or 4th to last precaudal vertebra. Epipleurals from 1st or 2nd vertebra on, restricted to anterior half of precaudal vertebral column. First interneural bone between 4th and 5th or 5th and 6th neural spine.

Scale cover similar to that of holotype.

Colouration somewhat variable, the ground colour being dark brown or blackish. The three larger paratypes ISH 1515/66, ISH 1586/66a and ISH 1586/66b show the same vermiculations as seen in the holotype, whereas ISH 1977/68 has no special markings.

Length to 470 mm TL.

e) Distribution (Fig. 15)

The species was found on the continental slope, in depths of 400 to 800 m from a latitude of 22° S (off Cabo Frío, Brasil) to about 39° S off the southern tip of Buenos Aires Province, Argentina. It appears to belong to the archibenthal stenobath fish community of the South Atlantic Ocean mentioned by KREFFT (1968: 37).

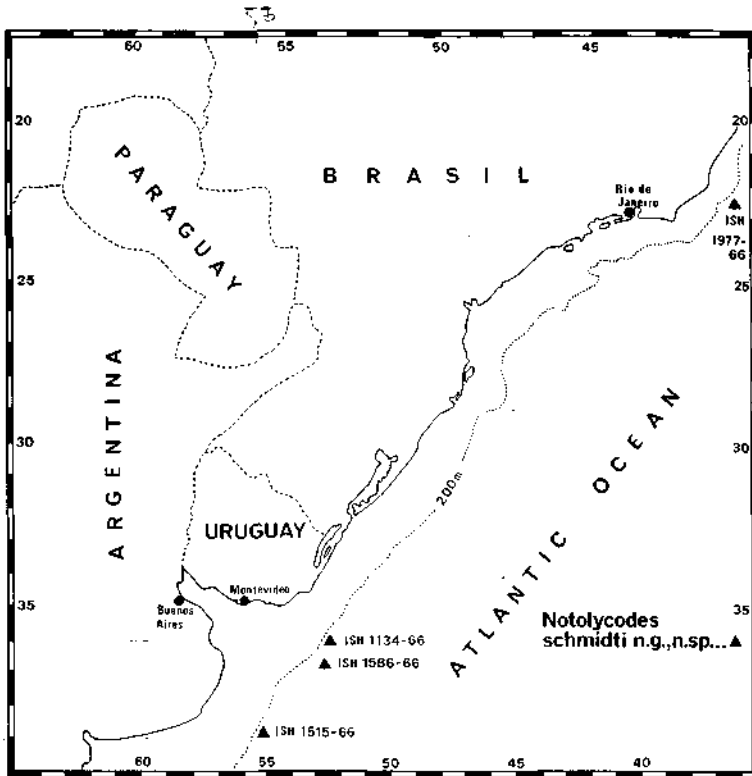


Fig. 15: Distribution of *Notolycodes schmidti* n. g., n. sp. (Instead of 1977—66 read 1977—68).

f) Etymology

The species is named to honour Prof. Dr. U. SCHMIDT, formerly Director of the Institut für Seefischerei, Hamburg, who made the author's trips to Europe possible.

IX. *Oidiphorus* McAllister & Rees, 1964

Bull. natn. Mus. Can., **199**: 104 (type: *Maynea brevis* Norman, 1937, by orig. design.).

Maynea: Norman, 1937: 108.

Gen. nov. Norman, 1957: 477.

Zoarcidae without pelvic fins, with dermal processes above eyes and on cheeks. Skin naked. Dorsal fin originating above pectoral fin base. Mouth terminal. No occipital canal in cephalic lateral-line system. Two postorbital pores. Teeth conical, present on jaws, vomer and palatines. Palatal membrane well developed. Gill opening extending downward to middle of pectoral fin base. Six branchiostegal rays. Pseudobranchiae absent. Epiphyal-ceratohyal joint smooth along its whole length. Pyloric caeca absent. Vertebrae symmetrical.

One species.

1. *Oidiphorus brevis* (Norman, 1937)

Maynea brevis Norman, 1937, "Discovery" Rep. 16: 108, fig. 57 (50°50' S, 57°15' W). Holotype: BMNH 1936.8.26.1044, paratypes: BMNH 1936.8.26.1042-43 and 1045.

Oidiphorus brevis McAllister & Rees, 1964, Bull. natn. Mus. Can., **199**: 104 (New combination.)

a) Material examined

BMNH 1936.8.26.1044, "William Scoresby" Station 825, 50°50' S, 57°15' W, 133-144 m, 28-29. 1. 1932, ♂, TL 90 mm (+ radiograph), holotype. — BMNH 1936.8.26.1042, "W. S." St. 216, 47°37' S, 60°50' W, 219-133 m, 1. 6. 1928, TL 44 mm (+ radiograph), paratype — BMNH 1936.8.26.1043, "W. S." St. 244, 50°00' S, 62°40' W, 253-247 m, 18. 7. 1928, TL 43 mm (+ radiograph), paratype. — BMNH 1936.8.26.1045, "W. S." St. 784, 49°47'45" S, 61°05' W, 170-164 m, 5. 12. 1931, ♀, TL 67.5 mm (+ radiograph), paratype.

ISH 1059/66, "Walther Herwig" St. 224/66, 34°01'S, 51°20'W, 600 m, 11.6.1966, ♀, TL 49 mm (+ radiograph). - ISH 1146/66 "W. H." St. 244/66, 36°51' S, 54°01' W, 800 m, 14. 6. 1966, ♀, TL 127 mm (+ radiograph). - ISH 1286/66 "W. H." St. 278/66, 40°57' S, 56°52' W, 200 m, 20. 6. 1966, ♀, TL 80 mm (+ radiograph). - ISH 1444/66 "W. H." St. 364/66, 50° S, 62°50' W, 145 m, 13. 7. 1966, ♂, TL 72 mm (+ radiograph). - ISH 184/71 "W. H." St. 340/71, 38°50' S, 54°25' W, 1000 m, 25. 2. 1971, ♂, TL 90 mm (+ radiograph).

b) Description

Body short, slightly compressed. Depth 11.7-15.9% TL. Width 8.1-12.3% TL. Head 18.2-24.2% TL. Snout 2.4-4.9% TL, 11.2-25% HL. Eye 4.3-5.7% TL, 21.8-28% HL. Interocular 6.9-7.3% TL, 28.6-34.6% HL. The skin is thickened above each eye into prominent dermal processes.

Mouth terminal. Maxillary reaching posterior edge of eye. Lips well delimited. Lower jaw with a short adnate portion near symphysis.

Teeth conical, with tips curved slightly inwards, smaller in females than in males. In a single row on premaxillaries, palatines and dentaries and in a group on vomer. Palatal membrane well developed. Eight gill rakers on first arch.

In larger specimens, jaws and occipital region with dermal protuberances, which are however much less defined than those in the peribuccal region of other Patagonian Zoarcidae.

Dorsal fin supported by 56-59 rays, slightly deeper than anal. The latter with 45-52 rays. Pectorals supported by 16-19 rays, their length 10.8-13.8% TL, 51.8-59.2% HL and 53.3-76.7% trunk length.

Trunk 18.7-20.4% TL, 0.77-1.03 x HL. Tail short, 52.1-59.8% TL.

Cephalic lateral-line system. Two postorbital pores, one behind eye, the other antero-superior to apex of gill opening. Suborbital canal opening through six pores, with three along upper jaw and three in an arc across the cheek. Preoperculo-mandibular canal opening through eight pores, four along mandibular ramus and four along preoperculum. Supraorbital canal opening in two pores, one above and behind nostril and one in front of and below the latter, near the tip of the snout.

Vertebrae 58—64 = (15—17) + (43—50.) Ribs from 3rd or 4th to last precaudal vertebra. Epipleurals from 2nd or 3rd to last precaudal vertebra. First interneural bone between 2nd and 3rd or between 3rd and 4th neural spine.

c) Distribution (Fig. 17)

The species has a wide latitudinal distribution in that it occurs from southern Brasil to southern Patagonia. With regards to its bathymetric distribution it is interesting to note that this species is found on the Continental Slope in the northern distribution area, whilst in the southern area it is found much shallower, on the continental shelf.

X. *Ophthalmolycus* Regan

Trans. R. Soc. Edinb. 49: 243 (type: *Lycodes macrops* Gunther, 1880 by monotypy).

Zoarcidae with elongated compressed body, with pelvic fins and scales embedded in the skin. Dorsal fin commencing behind pectoral fin base. No occipital canal in cephalic lateral-line system. Two or three postorbital pores. One or two supraorbital pores. Snout normal, without dermal appendages. Mouth subterminal. Teeth conical, present on jaws, vomer and palatines. Palatal membrane well developed. Gill opening extending downward to lower end of pectoral fin base (*O. macrops*) or beyond (*O. stehmanni* n. sp.). Five branchiostegal rays. Pyloric caeca absent. Pseudobranchiae present in at least one species (*O. macrops*). Vertebrae symmetrical.

Two species.

1. *Ophthalmolycus macrops* (Günther, 1880)

Lycodes macrops Gunther, 1880, "Challenger" Rep. Zool. 1 (6): 21 (Magellan Strait, near Puerto Bueno). Holotype BMNH 1879.5.14.48.

Lycodes macrops: Lahille, 1908: 412.

Ophthalmolycus macrops Regan, 1913, Trans. R. Soc. Edinb. 49: 243.

Ophthalmolycus macrops: Pozzi & Bordale, 1935: 175 — Norman, 1937: 98 — Fowler, 1945: 154 — Buen, 1959: 46 — Ringuelet et al., 1960: 78.

a) Material examined

BMNH 1879.5.14.48. "Challenger" Station 309, Magellan Strait, near Puerto Bueno (50°56' S, 74°15'-74°14' W), 73-256 m, ♂, TL 130 mm (+ radiograph), holotype.

b) Description

Depth of body 7.7% TL. Width 6.3% TL. Head 18.6% TL, its width 9.4% TL. Snout 4.3 TL, 23.1% HL. Eye large, 5.7% TL, 30.9% HL, its upper edge reaching dorsal profile of head. Interocular 2.9% TL, 15.7% HL. Mouth subterminal with

lips well delimited. Upper and lower jaws with about three rows of teeth near symphysis and a single row laterally. Vomer with three teeth and palatines with two on their anterior end. Palatal membrane well developed, papillose. Gill opening extending downward to lower end of pectoral fin base, its lower end halfway between pelvic and pectoral fin bases. Gill rakers on first arch: $10 = 2 + 8$, poorly developed.

Dorsal fin with 95 rays, originating above last quarter of pectoral fins. Anal supported by 84 rays. Its origin at a distance of 37.3% TL from the tip of the snout. Pectorals supported by 15 rays, their length 8.6% TL, 46% HL, and 46.1% trunk length. Lowest three or four rays projecting some distance beyond posterior margin of fin. Ventrals 3.3% TL, 17.7% HL, their insertion at a distance of 13.1% TL from tip of snout.

Trunk 18.7% TL, roughly equal in length to head. Tail 62.7% TL.

Cephalic lateral-line system. Postorbital canal opening through two pores, with one behind eye and one antero-superior to upper end of gill opening. Suborbital canal with six or seven pores, five along upper jaw and one or two above and behind corner of mouth. Preoperculo-mandibular canal opening in eight pores, with four along mandibular ramus and four along preopercular bone. Supraorbital canal with two pores, one anterior to and below nostril and above and behind the latter.

Vertebrae $102 = 23 + 79$. Ribs from third to last precaudal vertebra. Epipleurals on anterior 11 precaudal vertebrae only. First two interneural bones which correspond respectively to the 1st and 2nd dorsal fin rays, placed together between 8th and 9th neural spine. No free interneurals in front of first dorsal fin ray.

Scales embedded everywhere on skin except on head and distal half of unpaired fins. Body colour yellowish. Nine saddle-like brown cross-bars on upper part of trunk and tail, extending on to dorsal fin. A brownish band from posterior edge of eye to operculum.

Length 135 mm TL (of only known specimen).

c) Distribution (Fig. 17)

Only known from the type locality, north of the western entrance to the Magellan Strait.

2. *Ophihalmolycus stehmanni* n. sp.

a) Material examined

Holotype: ISH 317/71 "Walther Herwig" Station 294/71,14. 2. 1971, 49°13' S, 58°45' W, 485—506 m, ♂, TL 168 mm (+ radiograph).

b) Description (Fig. 16)

Body subcylindrical, tail compressed, the depth of the latter decreasing from its origin. Body depth 10% TL, width 9.5% TL. Head 16.7% TL, its width 11.9% TL, its dorsal profile convex. Snout 3.6% TL, 21.4% HL. Eyes large, 5.6% TL, 33.2% HL, their upper edge reaching the dorsal profile of the head. Interocular region flat 5.4% TL, 32.1% HL. Snout 3.6% TL, 21.4% HL.

Mouth subterminal, upper jaw slightly longer than lower. Premaxillary teeth in a single row, with two additional ones behind the main series near the symphysis. Vomer

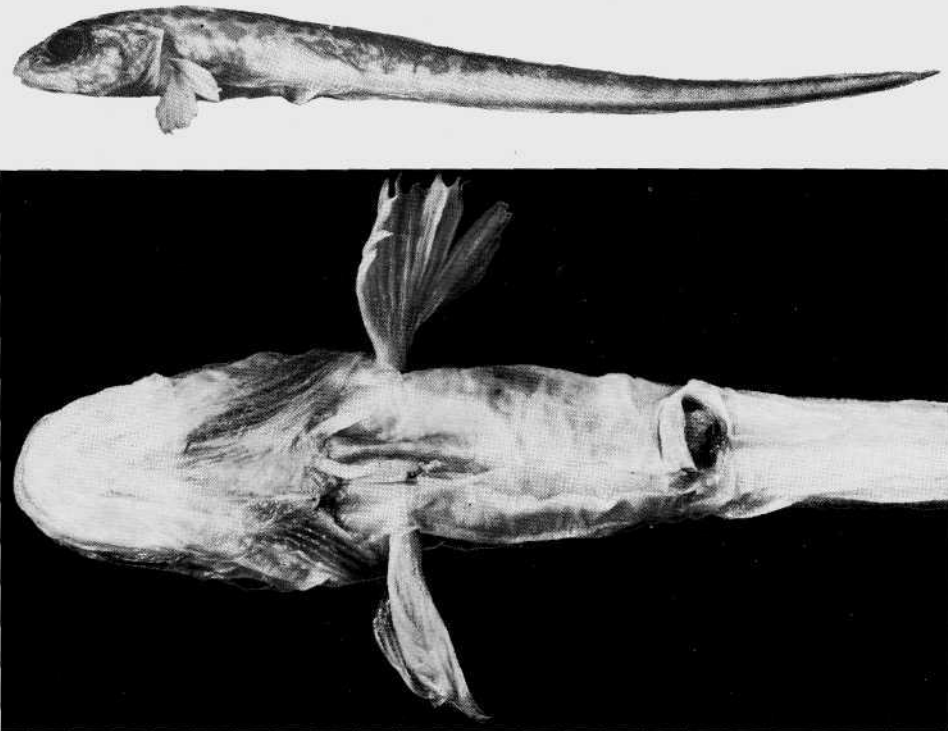


Fig. 16: *Ophthalmolycus stehmanni*, sp. Holotype, ISH no. 317/71, a) lateral and b) ventral view.

"with five teeth in a group and palatines each with a row of 6. Palatal membrane well developed, papillose. Teeth on dentary in two rows near symphysis and in a single row laterally. Mouth lining unpigmented. Gill rakers $9 = 1 + 8$, short, triangular. Gill opening very large, extending downward to far beyond the lower end of the pectoral fin base, its lower angle in front of the ventral fin insertion. Dorsal fin supported by 82 rays, originating above middle of pectoral fin, at a point 20.5% TL from tip of snout. Anal fin with 71 rays, its depth about equal to that of dorsal. Pectorals supported by 17 rays, their posterior border scalloped, their length 9.5% TL, 57.1% HL and 59.3% trunk length. Ventrals 3.3% TL, 19.6% HL, their insertion at a distance of 13.1% TL from the tip of the snout.

Cephalic lateral-line system. Postorbital canal opening through three pores, with one behind the eye and two in front of and slightly above upper angle of gill opening. Suborbital canal with six pores, four along the upper jaw and two in a horizontal line above the corner of the mouth. Preoperculo-mandibular canal with eight pores, with four along mandibular ramus and four along preopercular bone. In the supraorbital canal, as opposed to all other South American zoarcids, this species has only one opening, which is placed in front of and below the nostril, near the tip of the snout. The body lateral line starts in the last postorbital pore, follows the upper angle of the gill opening and drops abruptly to the mid-lateral line of the trunk, from where it runs horizontally to end on the first half of the tail.

Trunk 16% TL, about equal in length to head. Tail 67.2% TL, tapering abruptly at the origin over its whole end.

Vertebrae $88 = 21 \pm 67$. Ribs present on 4th to last precaudal vertebra. Epipleurals from 1st to 17th precaudal. First interneural bone between 5th and 6th neural spine.

Scale cover poorly developed, only on the last two thirds of the tail. Scales do not extend on to the vertical fins.

Upper part of head to occipital region uniformly light-brown. Ventral side of head and body whitish. Dorsal part of trunk and tail with irregular brownish patches limited by paler markings. Posterior dorsal part of tail uniformly brown.

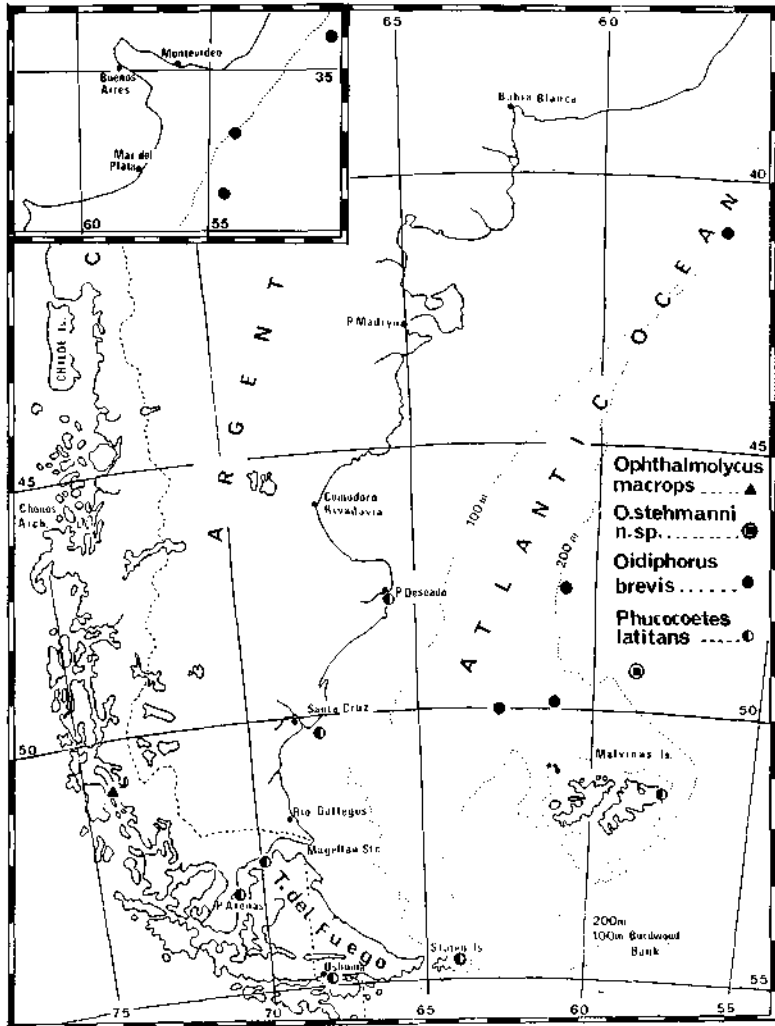


Fig. 17: Distribution of the genera *Oidiphorus*, *Ophthalmolycus* and *Phucocoetes*.

c) Distribution (Fig. 17)

Only known from the type-locality north of the Malvinas Islands on the Continental Slope at a depth of 485—506 m.

d) Discussion

The species differs from *O. macrops* by 1) the much larger gill opening, which in the type species only extends to the lower end of the pectoral fin base, 2) the three post-orbital pores as against 2 in *O. macrops*, 3) the single supraorbital pore, 4) the poorly developed squamation, and 5) by the abruptly tapering caudal region which is quite different from that of the type species.

e) Etymology

This species was named in honour of Dr. M. STEHMANN, Institut für Seefischerei, Hamburg, who not only collected half of the type material belonging to new taxa herein described, but also offered his kindest hospitality during the author's stay in Hamburg.

XI. *Phucocoetes* Jenyns, 1842

Zool. "Beagle", Fish: 168 (type *P. latitans* Jenyns, 1842, by monotypy).

Zoarcidae with pelvic fins; scales embedded in skin. Dorsal fin origin above pectoral fin base. Head and body compressed, elongated. No occipital canal in cephalic lateral-line system. Two postorbital pores. Snout and jaw normal, without dermal appendages. Mouth terminal. Teeth conical, present on jaws, vomer and palatines. Pseudobranchiae present. Gill opening almost above pectoral fin base. Six branchiostegal rays. Epihyal-ceratohyal joint strongly serrated along its whole length. One or two rudimentary pyloric caeca. Vertebrae asymmetrical.

One species.

1. *Phucocoetes latitans* (Jenyns, 1842)

Phucocoetes latitans Jenyns, 1842, Zool. "Beagle", Fish 4: 168 (Malvinas Islands). Lectotype BMNH 1917.7.14.67, herein designated. Lectoparatype BMNH 1917.7.14.68, herein designated.

Lycodes flavus Boulenger, 1900, Ann. Mag. nat. Hist. (7) 9: 53 (Malvinas Islds.). Holotype BMNH 1900.1.31.9.

Lycodes latitans (Jenyns): Boulenger, 1900: 53 (Malvinas).

Phucocoetes platej inon Steindachner: Lonnberg, 1907: 13 (Malvinas).

Phucocoetes latitans: Regan, 1913: 246 (Punta Arenas, Magellan Str.). — Pozzi & Bordalé, 1905: 175. - Norman, 1937: 105 (South of 50° S, down to 80 m). - Fowler, 1945: 157. - Buen, 1959: 46. - Ringuélet et al., 1960: 77. - Gosztonyi, 1970: 178 (Isla de los Estados, Argentina).

a) Material examined

BMNH 1917.7.14.67 "Beagle" Exped., Malvinas (Falkland) Islands, ♂, TL 118 mm (+ radiograph), lectotype. — BMNH 1900.1.31.9. Malvinas, 1: ♂, TL 108 mm (+ radiograph), holotype of *Lycodes flavus* Boulenger, 1900. — Unreg., Puerto Cook

(Isla de los Estados) from the intertidal zone, Nov.—Dec. 1967, 2: ♂, TL 137 mm, ♀, TL 129 mm, A. E. GOSZTONYI coll. — Unreg. Ushuaia (Tierra del Fuego), from the intertidal zone, 3.12.1968, 3 ♀♀, TL 123, 118.5 and 121 mm, A. E. GOSZTONYI coll. — Unreg. Puerto Deseado, Sta. Cruz, Argentina, in the intertidal zone, 1967—72, 52 specimens, TL 57.5—123 mm (21 ♂♂, 31 ♀♀) and numerous egg-masses and larvae, I. ZIZICH, J. NAVES, P. MEDINA and A. E. GOSZTONYI coll. Of these 3 specimens (TL 99, 98, 111 mm) now in the collection of the Institut für Seefischerei, Hamburg, Reg. No. 9/75 and 10/75.

b) Description (Fig. 18)

Head and body compressed. Depth 7–10.5% TL. Width 5–8.5% TL. Head 12–17% TL, longer in males (14.5–17% TL) than in females (12–16% TL). Eye 1.4–2.4% TL (mod. = 2), 11–16% HL (mod. = 14). Interocular 1.6–3.2% TL (mod. = 2.4), 12.5–20% HL. Snout 17–26% HL. Mouth terminal. Premaxillary and dentary teeth in two rows at anterior part and in a single row laterally. Vomer with one or two teeth. Palatines with a single row of about six teeth.

There is a marked sexual dimorphism in lower jaw dentition. Whilst there are no differentiated canine-like teeth in females, such teeth are present at some distance from the symphysis in males. The jaws as a whole are much more strongly developed in the latter sex. Lips well delimited from adjacent integument. A short adnate portion present on either side of the symphysis of the lower jaws. Palatal membrane well developed.

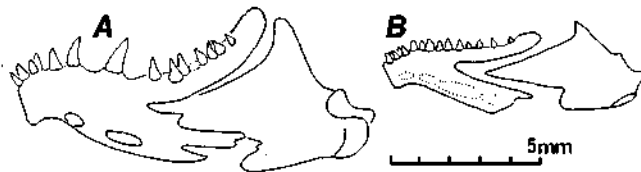


Fig. 18: *Phucocoetes latitans*. Tooth dimorphism in dentaries of A) 137 mm ♂, B) 118 mm ♀.

Dorsal fin supported by 100–107 rays (\bar{X} = 104.1). Its origin a distance 12–17% TL from tip of snout. Anal fin with 78–85 (\bar{X} = 81.34), about as deep as dorsal fin. Caudal 6–9 (\bar{X} = 7.62).

Pectorals supported by 14–16 rays (\bar{X} = 15.34), their length 7–10.5% TL (mod. = 10), 64–82% HL. Pelvics 2.4–4.8% TL (mod. = 3.8), 16.5–30% HL, their insertion a distance 10–14% TL from tip of snout. Trunk 21.5–29.5% TL, 1.2–2.2 x HL. Tail 57–62.5% TL (mod. = 60.5). Cephalic lateral-line system. Postorbital canal opening through two pores, one just behind the eye and one in front of and slightly above upper angle of gill opening. Suborbital canal with six pores, four along upper jaw, and two behind and above corner of mouth. Preoperculo-mandibular canal opening through eight pores, four along mandibular ramus and four along preopercular bone. Supraorbital canal opening in two pores, one in front of and below nostril near tip of snout and one above and behind the nasal tube. Body lateral-line extending, along mid-lateral line of trunk and caudal region, from second postorbital pore to almost the end of the tail.

Vertebrae 101-107 ($\bar{X} = 103.58$) = 24-27 ($\bar{X} = 26$) + 75-81 ($\bar{X} = 78.3$). Ribs present from 3rd to last precaudal vertebra. Epipleurals from first to 8th—6th before last precaudal vertebra. First interneural between 2nd and 3rd neural spine.

Scale cover poorly developed, the very small scales on sides of trunk and tail not extending onto either vertical or paired fins.

General body colour light-brown, sometimes with whitish mottles. Ventral surface of head and trunk whitish. Usually a well defined whitish horizontal band from tip of snout to upper angle of gill opening. Pectorals whitish.

c) Biology

This is one of the most common species in the Patagonian intertidal zone, where it is usually found throughout the whole year under rocks in tide pool as well as under the rhizoids of the giant kelp *Macrocystis pyrifera*. Since breeding also takes place in the above habitats, observation of the reproductive cycle is relatively easy. The fecundity is rather low. Eleven females of TL 82—108 mm were found with only 11—25 eggs or newly hatched larvae. The mature eggs measure about 4.5 mm in diameter, the newborn larvae having a length of about 20 mm.

Hatching was observed in May, the young fish reaching a length of around 35 mm in two months.

Length to about 140 mm TL.

d) Distribution (Fig. 17)

In the intertidal zone and from shallow waters (to 85 m) on the Continental Shelf of Patagonia, Malvinas Islds. and Tierra del Fuego.

XII. *Piedrabuenia* gen. nov.

Type species *Piedrabuenia ringueleti* sp. nov.

Zoarcidae with elongated subcylindrical body and with pelvic fins; scales embedded in skin. Snout and lower jaw with dermal processes. Origin of dorsal fin above posterior part of pectoral fin. Mouth subterminal. Teeth conical, present on jaws, vomer and palatines. No canine-like teeth. Palatal membrane well developed. Gill opening extending downward to lower end of pectoral fin base. Five branchiostegal rays. Epiphyllal-ceratohyal joint smooth along whole length. Pseudobranchiae present. Three or four postorbital pores. No occipital canal. Pores large. Pyloric caeca present. Vertebrae symmetrical, more than 120 in number.

One species.

Discussion.

The genus bears the greatest resemblance to *Lycenchelys* Gill and *Ophthalmolycus* Regan. It resembles the first in the large number of vertebrae and large circumbuccal lateral-line pores, and *Ophthalmolycus* in the posterior origin of the dorsal fin, but differs from both these genera in possessing peribuccal dermal appendages.

Piedrabuenia can be differentiated from other genera with peribuccal dermal fringes as follows: From the Alaskan *Lycinema* Gilbert by the lack of the occipital canal in the cephalic lateral-line system and also in having dermal processes on both jaws (in

Lyconema only the lower jaw bears barbel-like processes); from both *Dadyanos* and *Crossostomus* by the symmetry of the vertebral centra; from the former genus it can be further distinguished by its conical teeth and the presence of these on vomer and palatines; from *Pogonolycus* Norman by the morphology and distribution of dermal processes (compare Figs. 20 and 21).

Etymology

Piedrabuennia a patronymic honouring Captain Luis PIEDRABUENA (1833—1883), Argentine explorer of the southern regions of Patagonia and Tierra del Fuego.

1. *Piedrabuennia ringueleti* n. sp.

a) Material examined

Holotype: ISH 279/71. "Walther Herwig" Station 311/71, 46°54' S, 60°28' W, 480 m, 18. 2. 1971, ♀, TL 230 mm (+ radiograph). Paratype: ISH 369/71. "W. H." St. 197/71, 48°06' S, 60°10' W, 495-500 m, 19. 1. 1971, ♂, TL 237 mm (+ radiographs).



Fig. 19: *Piedrabuennia ringueleti* n. g., n. sp. Holotype, ISH no. 279/71.

b) Description of holotype (Figs. 19, 20)

Body subcylindrical, elongated, tail moderately compressed. Depth of body 7.4% TL, its width 7.0% TL. Head depressed, its length 14.4% TL, its width 7.8% TL. Snout 3.0% TL, 21% HL. Eye large, 4.6% TL, 32.1% HL. Upper edge of eye reaching dorsal profile of head. Interocular region flat, 1.8% TL, 12.1% HL. Mouth subterminal. Upper jaw reaching backward to a vertical through the first quarter of the eye.

There is a triangular dermal process on the maxillary region, between each of the first five lateral-line pores of the suborbital canal. The posterior ends of the upper lips bear a small forward directed process. On lower jaw, between each of the first five mandibular pores a pair of triangular dermal processes. There is also a short median appendage on the mandibular symphysis.

Teeth on premaxillaries and dentaries in two rows near symphysis and in a single row laterally. Those in the outermost row on upper jaw more strongly developed. Palatal membrane well developed, with a row of papillae on its proximal margin. Vomer with six teeth in two parallel rows. Palatines each with a single row of about 10 teeth. Gill rakers on first arch $11 = 1 + 10$.

Dorsal fin with 109 rays. Its origin at a distance of 21.8% TL from tip of snout. Its depth about equal to that of anal. The latter with 99 rays. Its origin at a distance of 32.2% TL from the tip of the snout. Caudal with 7 rays. Pectorals rounded in profile, their lower half scalloped, supported by 18 rays, their length 7.9% TL, 54% HL and 42.3% trunk length. Ventrals 2.2% TL, their insertion at a distance of 11.3% TL

from the tip of the snout. Trunk 18.7% TL, 1.3 x HL. Tail 67.5% TL, only moderately compressed. Postorbital canal opening through 3 pores, with one just behind the eye and two above and in front of apex of gill opening. Suborbital canal opening in 9 or 10 pores (on right side), with four along upper jaw and five or six in an arc parallel to lower and posterior edge of eye, the last pore being just below the first postorbital pore. Preoperculo-mandibular canal opening in 8 pores, four along mandibular arch and four along preopercular bone. Supraorbital canal opening through two pores, one in front of and below nostril, near tip of snout, the other above and behind the first. The body lateral-line originates in the last postorbital pore, runs close to the upper edge of the gill opening and drops obliquely to the mid-lateral line of the trunk from where it runs along the tail.

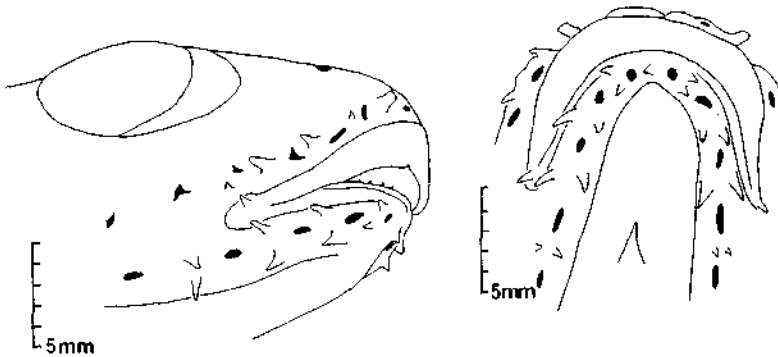


Fig. 20: *Piedrabuenia ringueleti* n. g., n. sp. Ventrolateral and ventral view of head.

Vertebrae $121 = 25 + 96$. First interneural between 9th and 10th neural spine. No free interneurals in front of the dorsal origin.

Scale cover well developed on trunk, tail and unpaired fins, but lacking on head and paired fins.

Upper part of head, trunk and tail brownish. Lower part of the same as well as pectorals and anal whitish. Dorsal pigmentation interrupted by six triangular extensions of the paler ventral colour.

c) Differences observed in paratype

The paratype, apart from slight differences in morphometry (with departures smaller than 2% of the typical indices) and meristics (with differences up to one unit in the counts), differs from the holotype in the following points: The vomerian teeth form an irregular group and not two parallel rows. There are four postorbital pores on the left and 3 on the right side of the paratype as against 3 on both sides of the holotype. The first interneural bone is placed between neural spine no. 10 and 11, not 9th and 10th as in the holotype. The upper part of the head has two whitish bands from the tips of the gill cover to the eyes.

d) Distribution (Fig. 22)

Known from the Continental Slope off Puerto Deseado, Central Patagonia, in depths of 480-500 m.

e) Etymology

This species was named to honour Prof. Dr. R. RINGUELET, La Plata University, La Plata, Argentina, who very kindly directed part of this research and in many ways helped and encouraged the author and also suggested the new generic name *Piedra-buenia*.

XIII. *Pogonolycus* Norman, 1937

"Discovery" Rep. 16: 106 (type: *P. elegans* Norman, by orig. design.).

Zoarcidae with pelvic fins; scales embedded in skin. Mouth terminal, surrounded by numerous short dermal tentacles. Teeth conical, present on jaws, vomer and palatines. Palatal membrane well developed. Gill opening extending downward to middle of pectoral fin base. Five branchiostegal rays. Two postorbital lateral-line pores. Occipital canal lacking. Dorsal fin origin above anterior half of pectoral fin. Pyloric caeca present. Vertebrae slightly asymmetrical.

One species.

1. *Pogonolycus elegans* Norman, 1937

Pogonolycus elegans Norman, 1937, "Discovery" Rep. 16: 106 (52°25'S, 61°00'W), holotype BMNH 1936.8.26.1031.

Pogonolycus elegans: Fowler, 1945: 195. — Ringuélet et al., 1960: 77.

a) Material examined

BMNH 1936.8.26.1031. "William Scoresby" Stat. 246 (52°25' S, 61°00' W), ♀, TL 156.5 mm (+ radiograph).

ISH 1445/66, "Walther Herwig" Stat. 364/66: 50°00' S, 62°50' W, 145 m, 13. 7. 1966, ♂, TL 66 mm (+ radiograph).

b) Description (Fig. 21)

Head and body compressed. Depth 8.0-8.4% TL. Width 5.8-7.3% TL. Head 14.5-16.9% TL. Eye 2.7-3.8% TL, 18.8-22.3% HL. Interocular 3.2-3.5% TL,

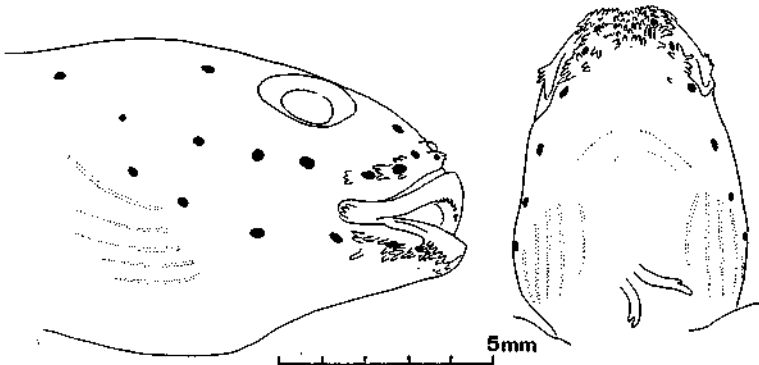


Fig. 21: *Pogonolycus elegans*. Lateral and ventral view of head of a 66 mm ♂.

20.3—20.5% HL. Mouth terminal, maxillary extending backward to about middle of eye. Teeth on anterior part of jaws in 5 to 8 irregular rows, in a single row laterally. Vomer with a group of 10 to 15 teeth. Palatines with an irregular row of teeth. Palatal membrane completely covered with papillae.

The areas between each of the first four suborbital pores bear a group of short digitiform tentacles. Symphyseal and lateral rami of lower jaws densely covered by dermal tentacles, which extend backward to 4th mandibular pore.

Upper and lower lips well delimited from adjacent integument by a groove. The lower lip has a free spatulate lobe a short distance from the symphysis, covered with a double row of tentacles.

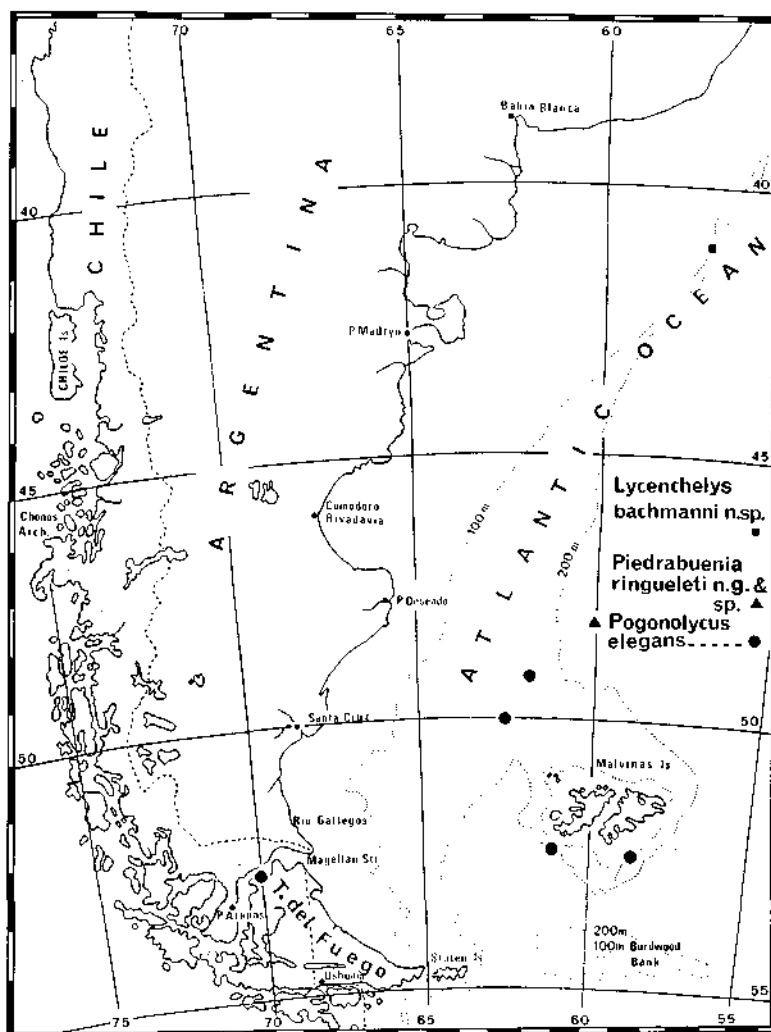


Fig. 22: Distribution of the genera *Pogonolycus*, *Piedrabuenia* and *Lycenchelys*.

Dorsal fin supported by 86–88 rays, its origin a distance 15.1–19.0% TL from tip of snout, its depth about the same as that of anal. The latter with 72–74 rays. Pectorals with 17 rays, their length 7.7% TL, 45.5% HL and 35.4% trunk length. Ventrals 3.6% TL and 21.4% HL, inserted at a distance 11.3–13.3% TL from tip of snout. Trunk 19.6–21.8% TL and 1.28–1.34 x HL. Tail 61.2–66% TL. Postorbital canal of cephalic lateral-line system opening in 2 pores, one just behind the eye and one in front of and above upper end of gill opening. Suborbital canal with six pores, three along upper jaw and three in an almost horizontal line along mid-line of cheek. Preoperculo-mandibular canal opening in 8 pores, four along mandibular ramus and four along preopercular bone, the dorsalmost one much smaller than the rest. Supraorbital canal with two pores, one above and behind nostril and one below and in front of the latter, near the tip of snout. Body lateral-line running along the mid-lateral line of trunk and tail. Vertebrae $90-92 = 20 + (70-72)$. Ribs from third to penultimate precaudal vertebra, Epipleurals from first to 17th vertebra (4th before last precaudal). First interneural bone between 3rd and 4th neural spines.

Head and pectorals free of scales. Trunk, tail and basal third of vertical fins scarcely squamated.

Ground colour yellowish. A brown band extends along mid-lateral line of trunk and tail. A similar but interrupted band along dorsum of back, extending on to dorsal fin. Both brown bands joined to one another on dorsum of head. Anal and pectorals yellowish.

Length: to ca. 160 mm TL.

c) Distribution (Fig. 22)

On the lower reaches of the Continental Shelf, down to ca. 280 m, in Southern Patagonia and in the Magellan Strait.

D. Taxonomical Evaluation of Morphological Characters

1. Gill opening

The membranes covering the gill opening are, in the species reviewed, broadly united to the isthmus. There is however great variation in the size of the opening due to differences in the downward extension. The size varies from very small, when the opening is almost completely above the pectoral fin base, to very large, when the extension is to beyond the lower end of the base, or as in some cases, when the lower end of the opening is situated in front of the pelvic insertion. The variation in size of gill opening is however not a random one, for reduction in size appears to be related to littoralization of the species and may therefore represent an evolutionary trend.

2. Branchiostegal rays and hyoid arch structure

The number of branchiostegal rays varies between 5 and 6, but is constant within a species. The hyoid bar, linked to the suspensorium by means of a small interhyal, is made up of a triangular epihyal and a ceratohyal which come together at a serrated or smooth joint, the nature of which, whether smooth or serrated, appears to be constant at least on a specific if not also on a generic level. The ceratohyal bears, at its distal end, two portions into which the hypohyal is divided. These in turn contact the median basihyal.

The branchiostegals articulate on the hyoid arch according to the pattern of two on the epihyal and either three or four on the ceratohyal. Those on the epihyal and the first two on the ceratohyal are attached to the latter's lower external edge, the remaining branchiostegals being joined to its interior lateral face. The reduction in the number of branchiostegals, i. e. from 6 to 5, is attained through the loss of the most ventral of the rays on the hyoid bar. Indirect myological evidence for this is found in the consistency in number of rays found in front of the insertion of the *protractor hyoideus* muscle, the insertion always being between the 4th and 5th branchiostegals. Whenever a ray is lost, it is one of the ones behind the muscle insertion.

3. Branchial basket

There is little variation in the osteology of the gill arches and related structures. There are in a dorsoventral direction a) 3 pairs of pharyngobranchials (in two separate groups on either side of the pharyngeal roof), b) 4 pairs of epibranchials (their proximal end covered by the pharyngobranchials, and 3rd and 4th pair with uncinat processes), c) 5 pairs of ceratobranchials (the 5th being represented by the toothed lower pharyngeals), d) 3 pairs of hypobranchials (the second pair bearing a forward directed ventral process), and e) a median series of 3 ossified and one unossified copulae joining the halves of the branchial basket. The 5th ceratobranchials, the lower pharyngeals, are joined to each other without a trace of bone or cartilage to separate them.

The gill rakers are attached to the epi-, cerato- and hypobranchials of each arch.

4. Dentition

The generalized dentition pattern in South American zoarcids is one of conical teeth on premaxillaries, vomer, palatines and jaws, and villiform teeth on upper and lower pharyngeals. However, marked departures from this basic pattern are the loss of vomerian and palatal teeth, the replacement of conical teeth by blade-like (incisiform) ones and the development of a sexual dimorphism of lower jaw dentition.

Although simplification of the dentition appears to be one of the evolutionary trends within the group studied, it takes place somewhat erratically, since some of the highly specialized littoral genera like *Iluocoetes*, *Austrolycus*, *Crossostomus* (in part) and *Maynea* and most of the genera from deeper water like *Oidiphorus*, *Ophthalmolycus*, *Lycenchelys* and *Piedrabuenia* retain palatal teeth, while the inshore genus *Dadyanos*, one species of *Crossostomus* (*C. chilensis*) and the two deep water genera *Notolycodes* and *Aiakas* have lost them.

The acquisition of blade-like teeth on premaxillaries and lower jaws is a very high degree of specialization peculiar to the genus *Dadyanos*, and is not known in any other zoarcid from South America or elsewhere.

The dimorphism in jaw dentition is a characteristic feature of some of the most conspicuously littoral species e. g. *Iluocoetes elongatus* and *Phucocoetes latitans*. It is also found in one eurybath species, *Iluocoetes fimbriatus* and in one species from deeper water, *Oidiphorus brevis*. This dimorphism not only affects the relative size of the lateral teeth, but also the relative length of the dentaries.

5. Cephalic dermal processes

The development of cephalic dermal appendages is a distinguishing feature of South American zoarcids. Whereas among the northern representatives of the family only

two genera — *Lyconema* Gilbert, 1895 and *Nemalycodes* Herzenstein, 1896 — bear dermal appendages on the jaw, 5 of the 13 southern genera have some kind of cephalic dermal processes.

The simplest processes are those of *Oidiphorus*, in which the skin is thickened in low protuberances above the eyes and on the cheeks.

There are more or less blade-like or triangular dermal appendages in *Dadyanos insignis*, *Crossostomus fasciatus*, *C. chilensis* and *Piedrabuenia ringueleti*, between the lateral-line pores on upper and lower jaw. The appendages are conical and more numerous in *Pogonolycus elegans* and forming bundles between the cephalic lateral-line pores on each side of maxillar and mandibular symphyses as well as on upper and lower lips.

The various types of peribuccal dermal appendages were not examined histologically. However, their function is probably sensory, connected with the search for food as appears to be indicated by *Crossostomus fasciatus*, a species with very small eyes but extremely well developed circumbuccal dermal fringes which are probably used by the animal to locate invertebrates buried in the sea-bed often in turbid waters.

6. Cephalic lateral-line system

The cephalic lateral-line system varies greatly among the forms studied, giving not only characters useful for diagnostic purposes but also clues to the probable evolution of the group.

The basic pattern within the family, including the Northern Hemisphere forms consists of a postorbital canal which runs between the posterior edge of the eye and a point a little short of the upper angle of the gill opening; supra- and suborbital canals which originate at the anterior end of the postorbital canal and respectively border the upper and lower edge of the orbit; an occipital canal running across the occiput to connect the postorbital canals to each other; and a completely independent canal — the preoperculo-mandibular — which runs dorsoventrally and horizontally along the preoperculum and lower jaw.

Each of the canals runs along a furrow or closed duct excavated in the skull-roof or splanchnocranial bones, the anterior portion of the postorbital canal for example in the frontal and pterotic bones, the proximal part of the supraorbital canal in the frontals, the preoperculo-mandibular canal in the preopercular, articular and dentaries. The canals may also pass through special hollow bones or ossicles, e. g. the occipital canal through the median and lateral extrascapulars, the suborbital canal through the chain of infraorbital bones and the posterior part of the postorbital canal through the lateral extrascapulars.

All the canals are connected to the external medium by means of canaliculi. These in turn end in pores which are distributed according to definite patterns that are almost constant within species.

In a generalized zoarcid (Fig. 1 b) the postorbital canal opens through 4 pores, the occipital in one median coronal and one at each side of the latter, the supraorbital in one median interorbital and two nasal pores, the suborbital in up to 9 pores and the preoperculo-mandibular in 8 (very rarely in 9) pores.

These patterns are subject to modification due not only to the obliteration of some of the pores but also to the disappearance of segments of the canals themselves.

The occipital canal is lacking in all South American zoarcids with the exception of *Aiakas krefftii*. When absent there is no trace of it on either the extrascapular bones, nor are there any grooves on the parietals, all bones which normally house the canal. Unfortunately a dissection of the occipital region of the holotype, the only known specimen of *Aiakas krefftii* was not possible, thus leaving an evaluation of the presence of the occipital canal in this species pending.

A reduction in the number of pores in the postorbital canal first affects the posterior portion, where, of 3 pores seen in deep water forms, only one remains in littoral forms. It is interesting to note that whilst the most posterior postorbital pore is always present in all the forms examined, the first or "postocular" pore may disappear in some littoral species like *Austrolycus laticinctus* and *A. depressiceps* and *Iluocoetes elongatus*.

In the suborbital canal, reduction involves pores in the vertical portion of the canal behind the eye. The lowest number of openings — 5 — is characteristic of *Iluocoetes elongatus*, *Crossostomus chilensis* and *C. fasciatus*, all of which are littoral species, whereas the highest number — 9 — is shown by *Piedrabuenia ringueleti*, a species from deep water on the Continental Slope.

The preoperculo-mandibular and supraorbital canal pores show the least variation in number among South American zoarcids. Thus in only one species, *Maynea microphthalmia* (Norman), are the preoperculo-mandibular pores reduced from 8 to 6. The number of supraorbital pores is also reduced in only one species — *Ophthalmolycus stehmanni* — the reduction being from 2 pores to one.

7. Vertebral column and associated structures

The most important variations in the vertebral column in South American zoarcids are those related to the number of vertebrae, their separation into precaudals and caudals and the asymmetry of the vertebral centra.

The number of vertebrae (excluding the urostyle) ranges from 58 in *Oidiphorus brevis* to 121 in *Mayneapatagonica*, with precaudals varying from 15 (*O. brevis*) to 33 (*Austrolycus depressiceps*) and caudals from 43 (*O. brevis*) to 100 (*Piedrabuenia ringueleti*). The relative number of caudal and precaudal vertebrae is useful in differentiating closely related and otherwise similar species, e. g. those belonging to *Austrolycus* and *Crossostomus*.

Ribs appear on the 3rd or 4th vertebra and extend backward to the last or second last precaudal vertebra. In no instance have the highly specialized massive ribs mentioned by MAKUSHOK (1958: 26, 1961: 204) in stichaeoids and some northern zoarcids been seen.

Epipleurals are present from the first or 2nd vertebra to somewhere between last precaudal and the 11th in front of the latter. The backward extension of the epipleurals seems to be constant within species.

With regards to the symmetry of vertebral centra, there are some species with symmetrical vertebrae and others with highly asymmetrical ones. The adaptational meaning of this is difficult to interpret. It may be significant that asymmetry is shared by genera which have adapted to life in the littoral zone or the shallowest waters of the Continental Shelf (*Iluocoetes*, *Crossostomus*, *Austrolycus*, *Dadjanos*, *Phucocoetes* and *Maynea*) but is absent in genera from deeper water (*Lycenchelys*, *Ophthalmolycus*, *Oidiphorus*, *Pogonolycus*, *Notolycodes* n. g., *Piedrabuenia* n. g., and *Aiakas* n. g.).

8. Origin of dorsal fin

The position of the first interneural bone, i. e. the one supporting the first dorsal fin ray, varies among the South American zoarcids, from an extreme forward position between skull and first neural spine to one as far back as the 11th neural spine.

The anterior positioning of the dorsal origin seems to be a secondary condition related to littoralization of the taxa. However it is not as marked as the forward shift of the vertebral constriction. All the inshore species have their dorsal fin origin far forward (above or almost above the posterior end of the head) but not all the deeper-water forms have theirs starting in the more backward position.

That the forward migration of the dorsal origin is a secondary feature is supported by the fact that there are no free interneurals in any of the species with a large gap between nape and dorsal origin. Furthermore not only is the first interneural situated between the skull and the first neural spine in *Crossostomus fasciatus* (in every way one of the most specialized littoral forms), but there are also two instead of a single interneurals between the second and third neural spines, suggesting that a secondary increase in the number of these bones might be possible.

9. Pelvic fins

A lack of pelvic fins is seen in various groups of zoarcids, but does not seem to have systematic significance above generic level.

There are 4 South American zoarcids without ventral fins (*Maynea patagonica*, *M. microphthalmia*, *Oidiphorus brevis* and *Aiakas krefftii*) and two in which the ventrals are reduced to only two fin rays (*Crossostomus fasciatus* and *C. chilensis*). Moreover, the pelvics may actually be lacking in the last species.

10. Pyloric caeca

The presence of pyloric caeca is, among the South American zoarcids, a constant feature within species. As many littoral forms as those living in deeper water do not possess them. When present, these organs, usually two in number, are rudimentary and shorter than one diameter of a pylorus. However they are much longer in at least one species (*Aiakas krefftii*).

E. Literature

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Addendum: When moving the fish collections of ISH to their new quarters at the Zoological Museum of the University of Hamburg, three additional zoarcid specimens from the 1971 cruise of FAV „Walther Herwig" to South America were found which, due to lack of time, could not be included in the present report. These specimens represent the first records of the genus *Lycodonus* Goode & Bean, 1883 from the Southwest Atlantik slope. They were taken at the following stations: St. 219/71, 49° 58'S, 55° 00'W, 1000m depth (2: 225 and 239mm SL), and St. 229/71, 52° 04'S, 56° 45'W, 800 m depth (1: 190 mm). They will be described in a coming paper.