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DEPARTMENT OF AGRICULTURE AND TECHNICAL
INSTRUCTION FOR IRELAND.

ON THE BRITISH AND IRISH SPECIES
OF THE FAMILY STROMATEIDAE.

BY

E. W. L. HOLT AND L. W. BYRNE.

(Appendix No. V. to Part II. of the Report on the Sea and Inland Fisheries
of Ireland for the Year 1901.)

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PLATES IV. AND V.

The occurrence upon our coast of a shoal of rudder fish, a species previously unrecorded from Irish, and only known from British waters by a single specimen, called for a note in this Report.

Although it is probable that several members of the family are not very rare visitors to this side of the Atlantic (if, indeed, one of them is not a constant resident on that biologically-defined, but by man undefinable, border which divides the ocean from littoral waters), but few authentic records of their occurrence exist. The species are not very easy to determine by reference to ordinarily accessible literature, and, as we have found, are liable to confusion in records which can only be checked by chance. We have therefore taken the opportunity to briefly define all the forms which are known to have occurred in our waters, in the hope that attention may be drawn to any instances of future occurrence, whereby our very scanty knowledge, not only of the life history and habit of the fish, but of the circumstances which induce their entry within the sphere of coastal fisheries, may be augmented.

AFFINITIES OF THE STROMATEIDAE.

As the description given by Regan* shows, the family *Stromateidae* must be placed in the sub-order *Percesoces*, as defined by Boulenger.† This sub-order is also represented in our fauna by the families *Scombresocidae*, *Ammodytidae*, *Atherinidae*, and *Mugilidae*, and is a group which marks the transition between the Haplomous fishes and the Acanthopterygians: at its two extremes it approaches both these sub-orders very closely, and it is almost impossible to find a combination of external characters, by which its members may be distinguished from those of the sub-orders *Haplomi* and *Acanthopterygii*. Anatomically the *Percesoces* resemble both these groups in (i.) the form of the roof of the skull, in which the parietals are separated by the supra-occipital, and (ii.) the nature and attachment of the pectoral girdle, which has no mesocoracoid arch and no clavicle (infraclavicle) distinct from the cleithrum (clavicle), and is suspended from the cranium: they differ from the Acanthopterygians in retaining the primitive feature of "abdominal ventral fins," that is, ventral fins whose supporting bones are either not attached to the pectoral arch or only attached to it by ligament, and from the *Haplomi* in having lost the open duct of the air-bladder. The fins are in some families devoid of spinous rays, as in the *Haplomi*, and in some they have acquired spinous rays, as in the more primitive Acanthopterygians.

* Ann. Mag. Nat. Hist., ser. 7, X., 115 (1902).

† Poissons du bassin du Congo, 348 (1901).

The *Stromateidae* (like the *Atherinidae* and *Mugilidae* in our fauna) have spinous rays in the dorsal, anal and ventral fins; but differ from the members of those families found in our seas (i.) in having the spinous portion of the dorsal fin continuous with its soft portion,* and (ii.) in having the ventral fins inserted so far forward that their "abdominal" nature is not apparent without dissection. They may be defined (so far as the genera already known to occur or likely to be found in our waters are concerned) as:—*Percesoces*: (1)† With ventral fins with one spine and five soft rays, situated below or only slightly behind the pectorals; (2) with spinous rays in the dorsal and anal fins,‡ which are in each case continuous with the soft articulated rays, but much fewer than the latter in number, and usually only feebly developed; (3)§ with the upper part of the head tumid and covered with a spongy porous integument; and (4) with lateral sacs in the oesophagus, which carry teeth internally.

As, however, the characters which show the *Stromateidae* to belong to the sub-order *Percesoces* are only apparent on an anatomical examination, and the external characters above alluded to may be of but little use in identifying damaged specimens, we consider that the most reliable diagnostic character of members of the family is the presence in the oesophagus of lateral sacs which carry teeth internally. So far as we know these are found in no other family of fishes,|| and, although not visible on an external examination, their presence may be ascertained without injuring the specimen examined by making a small incision above the origin of the pectoral fin. In all probability the sacs, which are large and muscular, can be easily felt from the outside in fresh specimens.¶

Genus *LIRUS*.

Body ovate or oblong-ovate, compressed; mouth small or moderate; palate without teeth; premaxillaries slightly protractile; maxillary more or less exposed, with small supplemental bone. Upper surface of head with a spongy porous integument. Scales small; lateral line curved anteriorly, becoming straight before reaching the caudal peduncle.** [Regan.]

* An approach to continuity has been noted by one of us as an occasional feature in the young of *Atherina* (Ann. Mus. Marseilles, V., 52 (1899)).

† The ventral fins are absent (in the adult) in three genera, one of which, *Stromateus*, occurs in the Mediterranean.

‡ This serves to distinguish members of this family from the *Carangidae*, which they sometimes resemble in external appearance, but in which the spinous rays of the anal are separated from the soft rays.

§ This character is not universal in the family.

|| The apparently allied *Tetragonurus* has, as Mr. Regan has shown us, similar sacs bearing soft papillae internally.

¶ We take this opportunity of expressing our indebtedness to Mr. Boulenger and to Mr. Regan for the assistance and information which they have given us, and to Dr. Günther for permission to copy the figure given by him of *L. medusophagus*.

** Among the members of the family known to occur in British and Irish waters a further distinction appears to be afforded by the process of the shoulder-girdle internal to the pectoral fins. In *Lirus* the upper edge of this projects from the side of the body, the skin being inflected over it. In *Centrolophus* the skin of the side passes over it without inflection, its outline being barely visible from the exterior.

Two species have occurred in our waters, but only as stragglers.

1. Dorsal spines not distinct, graduating to the soft rays and four in number; scales about 140. *L. medusophagus*.

2. Dorsal spines distinct, shorter than soft rays, and eight in number, scales, 80-90. *L. perciformis*.

Quite possibly other members of this genus may find their way to the British or Irish coast; a description of all the known members of the genus is given by Regan, Ann. Mag. Nat. Hist., ser. 7, X., 115 and 194.

LIRUS MEDUSOPHAGUS, Cocco.

PLATE IV.

Schedophilus medusophagus, Günther, T.Z.S., XI., 223 (1882); Day, II., p. 367 (1884). *Lirus medusophagus*, Regan, Ann. Mag. Nat. Hist., ser. 7, X., p. 196 (1902).

D. IV 41-46. A. III 24-27. Sc. 136-148, $\frac{26-30}{60-70}$.

Body, moderately stout, ovate, and strongly compressed; both the skeleton and muscular tissues very soft. Depth, $2\frac{1}{4}$ to $2\frac{1}{2}$; head, 3 to 4 times in total length.* Eye 3 to 4 times in head, equal to or slightly shorter than snout, and less than interorbital width. Length of caudal peduncle (measured from a vertical from the posterior end of the base of the dorsal) about twice in the length of the head. Dorsal spines, small and weak, connected with one another and with the soft rays by membrane. Preoperculum armed with spines (which are proportionately longer in the young), other opercular bones with radial ridges which may project beyond their edges as spines. Dorsal, anal and ventral fin rays proportionately longer in the young.

Pale olive green in colour, with darker marblings; vertical fins with blackish spots.

Attains a length of $9\frac{1}{2}$ inches (240 mm.).

This fish is pelagic in habit, and when young is met with at the surface of the open ocean,† but as Günther‡ has pointed out, the singular lack of firmness in the tissues and bones of the adult seem to indicate a deep-sea habitat; its food appears to consist of young fishes and other small pelagic organisms, and, like other members of the family, it is often found, especially when young, following large medusæ and floating weed or wreckage, seemingly for the sake of feeding upon the small organisms which accompany such objects. It is from this habit that it derives its specific name, but it is not definitely known to actually eat medusæ.

This species is a native of the Atlantic, Pacific, and Mediterranean; in August, 1878, a single specimen was captured in a salmon net at Portrush, whither it seems to have followed the shoals of herring-fry upon which it had been feeding.

Our figure is taken from that of the Irish specimen above alluded to, given by Günther (T.Z.S. XI., Pl. 47); the specimen itself is in the National Museum at Dublin.

* Exclusive, as throughout these notes, of the caudal fin, except when the maximum known size of the species is stated.

† Lutken, *Spolia Atlantica*, Vidensk. Selsk. Skr. Kbhv. r. 5, XII., 525 (1880), Pl. ii. fig. 9.

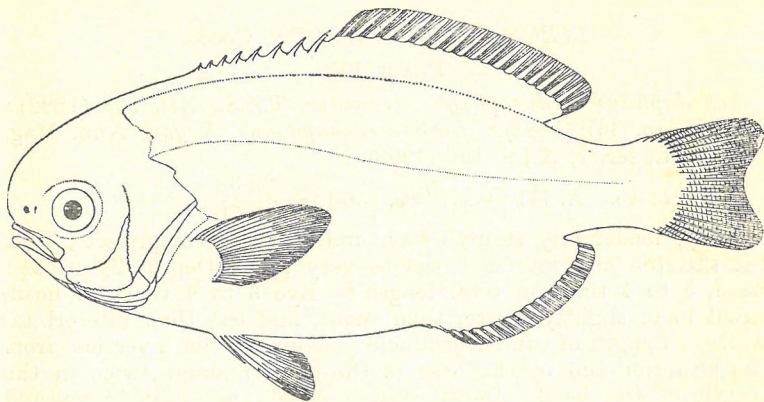
‡ Challenger, Deep-sea Fishes, 46.

LIRUS PERCIFORMIS, Mitchill.

BARREL FISH, LOG FISH, RUDDER FISH, BLACK RUDDER FISH.

Pimelepterus cornubiensis—Cornish, Zoologist (2) IX., 4255 (1874); *Pammelas perciformis*, Day, I., 130 (1884); *Lirus perciformis*, Regan, Ann. Mag. Nat. Hist., ser. 7, X., 202 (1892).

Centrolophus pompilus, Andrews, Proc. Nat. Hist. Soc. Dublin, VI., 70 (1871), Day, loc. cit., p. 111, *partim*.



Lirus perciformis, $\times \frac{1}{3}$.

D. VIII 19-21. A. III 16-18. Sc. 80-90, $\frac{12-14}{28-30}$ l.l. 72-75.

Body stout, ovate, and compressed. Depth, exclusive of the scaly sheath about the base of fin-rays, about $2\frac{4}{5}$ to $3\frac{1}{5}$; length of head about 3 to $3\frac{1}{2}$ times in the total length; snout obtuse,* equal to eye, 4 to $4\frac{3}{4}$ times in head, but much shorter than horizontal dimension of bony orbit;† bony orbit, about equal to length of upper jaw, about 3 times in length of head; caudal peduncle (from vertical of posterior end of base of dorsal to origin of central caudal rays), about 5 times in total length; bases of dorsal and anal fins concealed in a fleshy scale-clad sheath; dorsal spines stout and shorter than the soft rays, connected with each other in adults only by a triangular strip of membrane passing

* The profile of the head, correctly shown in our outline sketch, as also in the more detailed figures given by De Kay (Fauna of New York, Fishes, 118, pl. 42,) and Brown Goode (Fishery Industries, U.S.A. p. 334, pl. 112), appears to be due to the spongy nature of the cephalic integument and to the presence of muciferous chambers. Preservation in alcohol tends to reduce the profile to a slope from the highest part of the head to the snout, but in the old Dingle specimen, hereinafter referred to, the general shape of the head is not much altered. Day's figure, which is so unlike the natural condition as to be almost useless for identification, is a fairly correct rendering of the specimen from which it was taken, now in the British Museum. The collapse of the snout from an obtuse to an acute form is probably due, not only to the action of the preservative, but to the emaciation of the specimen, of which Day makes due note.

† The natural external dimensions of the eye are, we believe, correctly shown in our outline sketch; but in specimens which have been preserved in alcohol, the apparent dimensions may be considerably altered by shrinkage of the surrounding integument. In the old Dingle Bay example, for instance, the present external size of the eye is that of the bony orbit.

LIRUS PERCIFORMIS.

The description should read "depth, exclusive of the scaly sheath about the base of fin-rays, $2\frac{1}{2}$ or slightly more;" the error arose from measurements taken from the injured specimen mentioned below, but the proportions are correctly shown in the figures.

from the lower half of the posterior face of each spine to the base of the anterior face of the next;* colouration uniform purplish black, somewhat paler on the belly.

Attains a length of at least 13 inches.†

The complicated outline of the posterior face of the opercular apparatus, shown in Day's figure and in our sketch, is present in all the examples which we have seen. But Brown Goode's drawing, apparently taken from a specimen in good condition, suggests that in life the skinny covering of the scutes concerned completely masks their angularity. It would also appear from the figure that the colouration of the sides of the body may be diversified in life by irregular markings.

In America the fish, though not purposely sought by fishermen, appears to be regarded as possessing good table qualities.

A pelagic fish of the temperate North Atlantic, and by no means uncommon on the American coast, it shows a decided tendency to follow any floating object, probably for the sake of the barnacles thereto adhering. Its singular habit of ensconcing itself within floating barrels has attracted the attention of American fishermen, and is illustrated by the circumstances of capture of the first recorded British specimen, detailed below. Although it would appear (Brown Goode, *op. cit.*, p. 334) that it feeds also on other organisms, every known instance of its occurrence on the coasts of the United Kingdom can be associated with an object presumably covered with barnacles.

The earliest, and hitherto unrecorded, instance, we discovered by chance in examining the collections in the National Museum, at Dublin, in connection with the present notes. A jar bearing the legend "*Centrolophus pompilus*, Dingle Bay, presented by William Andrews, 1871," proved to contain perhaps the most perfect specimen of *Lirus perciformis* on this side of the Atlantic. It is possible to connect this specimen with Andrews' record (under *C. pompilus*), noted above, of a large shoal of fish playing over a piece of floating wreck on the Dingle coast in the summer of 1870.

A single specimen was captured off Penzance in October, 1874 (Cornish, *loc. cit.*) drifting in a broken fish-box, from which it was apparently unable to escape; it had been feeding upon the barnacles which were growing upon the box. On the 21st or 22nd September, 1901, a large shoal followed a barnacle-covered log ashore at South Island, Aran Islands, under the circumstances detailed by Mr. Colman Costello in the following letter:—

"They came after a log of timber covered with barnacles, and were thrown ashore at the north-west corner of the South Island, where the Congested Districts Board is after building a breakwater and clearing the shore. At the time, owing to the tide being low, it was like a horse-shoe, so that if the islanders took twenty fathoms of net and put it across the entrance they would save thousands upon thousands of fish; but, instead of that, when they saw the fish, from a high ledge

* Our specimens from Aran have the spines entirely free, but in the Dingle example the membrane, which is as noted in our diagnosis, appears to be well preserved on some of the spines. It is probable that young examples have the spines more completely connected by membrane.

† The Dingle specimen now measures—snout to origin of caudal rays, $10\frac{1}{4}$ in.; to extremity of central rays of caudal, $11\frac{3}{4}$ in.; to extremity of caudal fin, 13 in. It must have been slightly longer in life.

on one side, having the barnacles like a calf would have the teat of a cow in its mouth, they all got afraid, and said they were Sheeogues,* and then ran away, except one old man.

"At the time the log struck the shore about 400 of the fish jumped on dry land, and were hopping about on the shore, so that some of them got into the water again, while others died, and were carried away by the next tide, except two that the old man took home with him.

"When the old man came home, and his wife and sons saw the fish, they would not allow him to take them into the house, as they never saw the like before: they were no fish, but Sheeogues resembling fish. It was from this man that Mr. Costello† got them.

"When the log dried it appears the fish turned away to sea and scattered about. A man named * * *, with another, was fishing about half a mile from the shore in a canoe, with hand lines, a few days after, and was looking out over the side as the day was bright, and saw one of these fish swimming about very near the surface. He pulled ashore, and did not go out again for three days."

Genus *CENTROLOPHUS*.

Distinguished from *Lirus* by the elongated body and maxillary slipping under the preorbital for the entire length of its upper edge. Dorsal and anal spines slender, indistinct, and graduating to the soft rays.

Two species have been found in British and Irish waters:—

1. D. 45; A. 30.

C. britannicus.

2. D. 37-41; A. 23-25.

C. niger.

CENTROLOPHUS NIGER, Gm.

BLACKFISH, BLACK PILOT.

PLATE V.

C. pompilus, Day, I., 111 (1884); *Holt*, M.B.A. Journal II., 265 (1891).

C. niger, Regan, Ann. Mag. Nat. Hist., ser. 7, X., 195 (1902).

D. 37-41. A. III 20-22. Sc. 185-205 $\frac{23-28}{58-70}$.

Body moderately stout and subfusiform; depth, 4 to 5; head, $4\frac{1}{3}$ to 5 in total length. Snout, equal to or a little longer than eye, which is contained 4 to $4\frac{3}{4}$ times in head; interorbital width about $3\frac{1}{2}$ in head. Spinous portion of dorsal with about 3 spines, which are indistinct, and hardly pierce the skin. Bases of dorsal and anal fins masked by a fleshy scale-clad sheath, from which scales extend

* Sidheog, *Anglice* "little" or "young fairies," or dwellers in the lower world. It is a common belief that fairies, and even living people of occult powers, can assume the forms of animals.

† Mr. Michael Costello, of South Island, who, at the suggestion of Mr. Colman Costello sent these two fish, one of which is here figured, to the Congested District Board. They had been split and cleaned before coming into Mr. Costello's hands.

along the rays almost to their extremities. Colours variable; usually purplish or violet black, grey on the head and paler on the belly; sometimes with indistinct spots or marblings.*

Attains a length of 3 feet or more.

The blackfish is a pelagic fish of the Eastern Atlantic and Mediterranean, which is probably not uncommon on the offshore mackerel grounds at the mouth of the English Channel and on the west and south of Ireland, but is seldom recorded as British or Irish except when, like other members of the family, it follows ships or wreckage into shallow water, and is there captured. Several specimens have, in the course of the last year or two, been brought to us by mackerel boats fishing off Inisbofin, Co. Galway, and one of us has (*loc. cit.*) recorded the capture of several young specimens off the Scillies. Our figure is based on an Irish specimen about 34 inches long, captured off Port Salen, Co. Donegal. It has occurred in the North Sea as far north as Aberdeen. Nothing is definitely known of its habits, breeding, or food; the young specimens above alluded to had been feeding upon small pollack, and at the western edge of our mackerel grounds, schools of young poutassou (*Gadus poutassou*) are probably not uncommon at the surface.

CENTROLOPHUS BRITANNICUS, Gthr.

CORNISH BLACKFISH.

Günther, Cat. II., 402 (1860); *Couch*, II., 127 (1863); *Day*, I., 110 (1884).

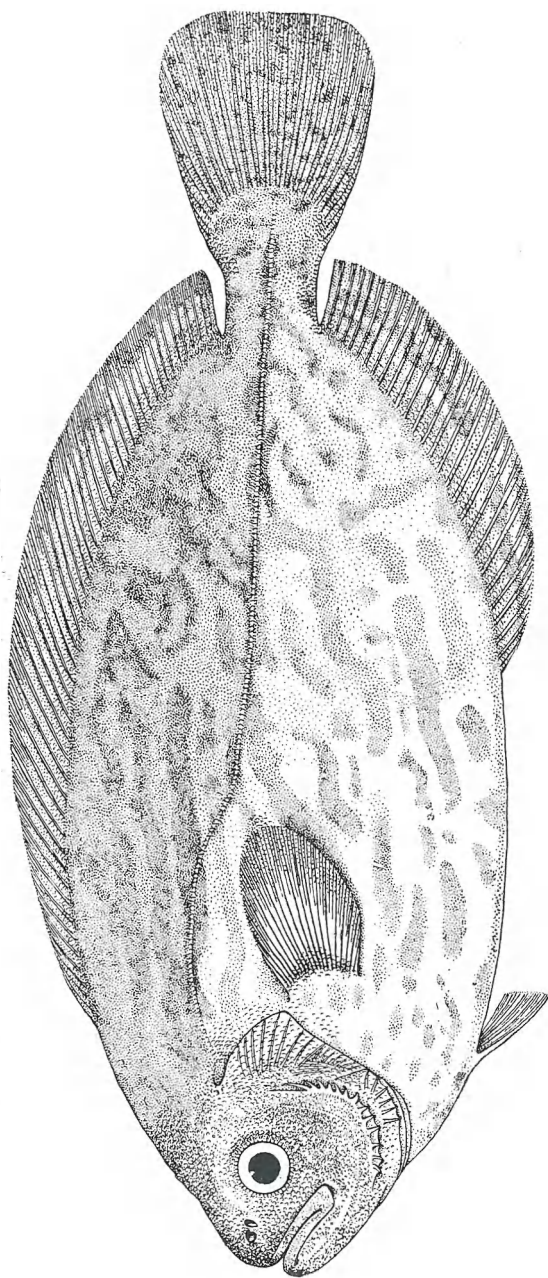
Regan, Ann. Mag. Nat. Hist., ser. 7, X. 194 (1902).

D. 45. A. 30.

A single specimen of this fish, 21 in. (520 mm.) long, came ashore at Polperro, on the south coast of Cornwall, in 1859. This specimen remains unique. It is in the British Museum Collection, and has suffered badly from indifferent stuffing and long exposure to the sun and the public, and no description or figure is likely to be anything but misleading. In its present condition it appears to differ from the last species in the more elongated form, the larger number of dorsal and anal fin-rays, and the shorter curve of the lateral line. We follow Regan in provisionally retaining it as a distinct species. It is possible that Couch's figure may correctly delineate its proportions, but the analogy of better-known species renders this far from certain, and even improbable.

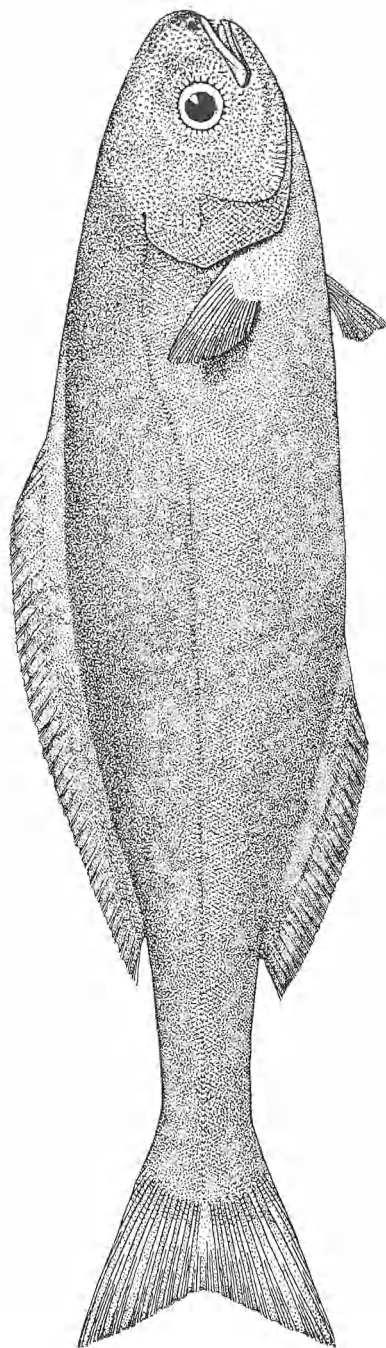
* The evidence of the most recently killed examples which have come under our notice suggests that the dark colour, usual *post-mortem*, may in life be to some extent replaced, by control of the chromatophores, by a pale turquoise blue.

Pl. IV



LIRUS MEDUSOPHAGUS × $\frac{3}{8}$

PL. V



CENTROLOPHUS NIGER $\times \frac{1}{5}$

