

Ventral:

Length.....	12
Distance from snout.....	39
Dorsal rays.....	(ca) 12
Anal rays.....	(ca) 16
Number of scales in longitudinal series.....	45
Number of phosphorescent spots.....	33

SANTA BARBARA, CAL., July 15, 1880.

DESCRIPTION OF TWO NEW SPECIES OF FLOUNDERS (PAROPHYRYS ISCHYRUS AND HIPPOGLOSSOIDES ELASSODON,) FROM PUGET'S SOUND.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Parophrys ischyryus, sp. nov.

Body rhombic-oblong, less deep than in *Platichthys stellatus* or *Lepidopsetta bilineata*, and with the head more pointed and protruding, but less so than in *Parophrys vetulus*. Body tapering from the middle to the head and tail, the four bounding lines but little curved and quite regular. Caudal peduncle strong, compressed, and rather long. Head comparatively long, a slight angle over the eye, and the snout protruding and not obtuse. Lips full, simple. Mouth moderate, oblique, the lower jaw slightly projecting and somewhat more developed on the blind side,

Teeth about $\frac{5 + 25}{10 + 22}$ in number.

Teeth in one series, rather close set, some on both sides of the jaw, but more numerous on the blind side, somewhat irregular in length, some of them movable. In form the teeth are somewhat compressed and incisor-like and bluntish, but not as notably so as in some related species. No teeth on vomer and palatines.

Maxillary reaching past the front of the orbit, nearly to the pupil. Anterior nostril with a flap. Posterior nostril almost simple. Tongue free. Eyes rather large, the upper directed upward, the lower slightly in advance of the other. An area covered with smooth skin in and behind orbit of upper eye.

Interorbital space rather broad, somewhat elevated mesially, continuous, with a slightly marked ridge above the opercle and forking forwards, the lower branch ending in a blunt prominence.

Snout behind nostrils, interocular ridge, and posterior part of head covered with scales like those on the body, but smaller and rougher. Preorbital very narrow, naked. Skin of head continuous over the edge of the preopercle. Gill-openings above not continued forward. Gill-rakers short, slender, and weak, about 12 below the angle of the arch. Branchiostegals seven. Lower pharyngeal bones separate, each with two rows of coarse, blunt teeth.

Scales moderate in size, thick and firm, adherent, not closely imbricated, anteriorly separated. Those on the tail oblong and a little im-

bedded, those on the head and anterior regions rather regularly arranged, but not close together.

Scales strongly ctenoid everywhere, each with a semicircle of six to ten upward-directed spinules on its posterior edge. Those on the head and body are similar, the former being a little smaller and rougher, especially behind the eyes, where they are somewhat stellate.

Left or blind side of the body uniformly scaled like the eyed side, the scales similar and *almost as strongly ctenoid*. Preopercle nearly smooth. Rest of head with small rough scales, similar to those on the right side, but farther apart.

Caudal, middle part of dorsal and anal, and bases of pectorals and ventrals with small rough scales in series, running up the rays on the right side. On the blind side the base of the caudal with small rough scales. Other fins naked.

Lateral line conspicuous, its scales less rough than the others; a very slight curve anteriorly, otherwise straight. A distinct short accessory lateral line on both sides, extending to about the tenth dorsal ray. A series of pores around lower eye behind. No enlarged scales along lateral line or at the bases of the fins.

Lateral line with about 88 pores; about 80 scales in a longitudinal series above the lateral line.

Dorsal fin beginning over the pupil, its first rays turned slightly toward the blind side, low in front, the rays regularly increasing to behind the middle of the body, then similarly diminishing. Anal fin similarly formed, preceded by an antrorse spine. Highest rays of dorsal and anal about equal and nearly half the length of the head.

Caudal fin large, somewhat double-truncate, the middle rays produced Pectoral a little more than half the length of the head, that on blind side shorter. Ventrals reaching to anal. Rays of dorsal and anal all simple.

Dorsal rays, 79-76; anal, 52-57; ventrals, 6. Eyes and color on the right side.

Color above light olive-brown, vaguely clouded with light and dark Fins reddish-brown; a few roundish dusky blotches on dorsal and anal, resembling in position the black vertical bars found in *Platichthys stellatus*. Pectoral and caudal tipped with dusky. Blind side white, either immaculate or else with small round rusty spots. Left side of head sometimes rusty tinged.

This species is known to us from four examples obtained with a seine in the harbor of Seattle, Washington Territory. We place it temporarily in the genus *Parophrys*, inasmuch as it has the technical characters at present assigned to that genus, *i. e.*, the small mouth with blunt uniserial teeth, and the straight lateral line with its accessory dorsal branch. The character of cycloid scales assigned to *Parophrys* needs modification, as in *Parophrys vetulus* most of the scales on the cheeks and tail are slightly ctenoid.

It is, however, evident that there is no special affinity existing between the present species and *Parophrys vetulus*, and no very close relation between either and *Lepidopsetta isolepis* Lockington, which, by its technical characters, would be also a *Parophrys*. The nearest natural ally of *Parophrys ischyurus* is perhaps *Lepidopsetta bilineata*, and the present arrangement is to be accepted only until the relations of these forms can be more fully investigated.

Hippoglossoides elassodon, sp. nov.

Body oblong-elliptical, strongly compressed, the dorsal and ventral outlines regularly and pretty strongly arched. Caudal peduncle moderate, about as long as deep and growing wider behind.

Head rather large, bluntish, its upper profile continuous with the outline of the back. Depression over the eye slight. Mouth comparatively large, very oblique, the upper jaw somewhat concave in outline, the lower correspondingly convex, the gape considerably wider on the blind side than on the right side. Lower jaw rather strongly protruding, with a considerable symphyseal knob. Maxillary rather narrow, reaching to opposite the middle of the pupil or beyond, the maxillary on the blind side much longer than the other. Premaxillary anteriorly on the level of the interocular space.

Upper jaw with a *single series* of small conical teeth, which are not very sharp. These teeth are somewhat larger in front than on the sides, and also more widely set. Everywhere they are quite small, much smaller than in *Hippoglossoides jordani*, and not larger than in *H. exilis*. Lower jaw with a single series of rather close-set teeth similar to those in the upper jaw, or slightly larger; those on the sides smaller than the anterior teeth. Number of teeth about $\frac{35 + 45}{25 + 35}$.

Eyes large, nearly even in front, the upper eye directed somewhat upward, but not reaching the dorsal line. Interorbital space a narrow sharp ridge, with about two rows of minute scales; 10 to 15 rows of scales in an oblique series on the cheeks. A series of mucous pores around lower eye behind. Preorbital narrow. Anterior nostril with a rather long flap, posterior with a slight tube

Gill-rakers long, slender, and straight, 15 to 17 below the angle of the arch, their inner margins feebly dentate. Pyloric cœca 4.

Scales small, firm, less readily deciduous even than in *H. jordani*, rough to the touch, with the spinules short and firm. Scales on head similar, but more imbedded, those on the tail larger and rougher

Scales on blind side small, mostly smooth, except on the caudal peduncle, where they are larger and rough ctenoid, like the scales on the right side. The scales along the base of the dorsal and anal and those near the lateral line more or less ctenoid. Scales along left side of head small, non-imbricate, those on the preopercle and posterior part of the cheeks becoming obsolete. The amount of roughness on the scales below is subject to considerable variation.

Lateral line very prominent, as in *H. exilis*, the tubes coarse, their number (88 to 92) less than that of the transverse series of scales.

Scales: 41 to 50; 110 to 120; 35 to 44.

Lateral line slightly rising anteriorly, but without arch. No accessory lateral line. Rays of all the fins on the eyed side (except the posterior part of dorsal and anal) and of the caudal on the left side covered high up with series of narrow etenoid scales.

Fins well developed, of firm texture, the tips of the rays protruding.

Dorsal fin beginning immediately in front of the pupil, its anterior rays low, the others regularly increasing backwards to a point much behind the middle of the fin, then becoming rapidly shorter, the highest rays nearly half the length of the head and more than the length of the caudal peduncle.

Anal fin preceded by a spine, its highest rays opposite to or in front of those of the dorsal and equal to them, the others rapidly shortened. Caudal long, double-truncate or convex, the middle rays considerably produced, as in *H. exilis*, more than in *H. jordani*.

Pectoral fin half the length of the head, that on blind side shorter. Ventrals moderate, reaching past front of anal, their inner rays shortened.

Dorsal rays, 77 to 84; anal rays, 59 to 63; ventrals, 6.

Color light olivaceous brown, nearly uniform on the body. Fins grayish, obscurely and irregularly blotched with dusky. Blind side plain.

This species differs from *Hippoglossoides jordani* and *H. exilis*, the two species thus far known from the Pacific coast of the United States, in the presence of but a single row of teeth in the upper jaw. From *H. jordani* it further differs in the much smaller teeth, fewer fin rays, and more convex caudal. From *H. exilis* the small scales and firmer texture at once distinguish it. Its nearest relative is probably the Atlantic species, *Hippoglossoides platessoides*, which has a larger number of rays in the vertical fins.

Hippoglossoides elassodon is known to us by about 20 examples of different sizes, all obtained with hook and line from the wharves at Seattle and Tacoma, in Washington Territory.

Table of proportionate measurements.

Species	Parophrys ischyryus.				Hippoglossoides classodon.			
	Seattle.		Seattle.		Seattle.		Tacoma.	
	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length.
Extreme length.....	17.05		14.20		9.75		12.90	
Length to end of middle caudal rays.....	14.30		11.50		7.80		10.50	
Body:								
Greatest height.....		43½		45½		41		46
Least height of tail.....		9½		9½		9½		11
Length of caudal peduncle.....		10½		9½		10½		9
Head:								
Greatest length.....		26½		31		30		29
Width of interorbital area.....		1½		1½		1		1
Length of longest gill-raker.....						3½		3
Length of maxillary (from tip of snout).....						13		12
Length of maxillary (from tip of snout, blind side).....								14
Length of mandible.....						16½		15
Distance from snout to orbit.....		4½		6		5		6½
Diameter of orbit.....		5		5½		8		7
Dorsal:								
Distance from snout.....						8		6½
Height at longest ray.....		13		14½		14		14
Anal:								
Distance from snout.....						40		36½
Height at longest ray.....		13½		14½		15		13½
Caudal:								
Length of middle rays.....		19		22½		23½		22
Length of external rays.....						22		19
Pectoral, length.....		15		16		17		14
Ventral, length.....		7		9		11		11
Dorsal rays.....	76		70			77		84
Anal rays.....	57		52			59		61
Ventral rays.....	6		6			6		6
Number of tubes in lateral line.....	88		88			926		90
Number of transverse rows.....						120		110
Number of caecal appendages.....						4		

ASTORIA, OREG., June 16, 1880.

ON THE GENITALIA OF MALE EELS AND THEIR SEXUAL CHARACTERS.*

By S. TH. CATTIE, Arnheim, Holland.

As is well known, Darwin† has called attention to the experience of Günther that the females of fishes are in almost all cases larger than the males. This was perhaps the reason that Syrski, in 1874,‡ in investigating the reproductive organs of eels, directed his attention more especially to the smaller individuals, where he was fortunate in finding what is called by many the organs of Syrski, and also considered to be the male genital apparatus. Afterwards, in a variety which is known

* Ueber die Genitalien der männlichen Aale und ihre Sexualunterschiede, von S. Th. Cattie, Phil. nat. Cand., Dozent an der Realschule zu Arnheim (Holland). Extracted from the Zoologischer Anzeiger, 7th June, 1880, pp. 275-279. Translated by J. A. Ryder.

† Ch. Darwin, Descent of Man, translated into German by Carns, part ii, p. 5 et seq.

‡ Abhandl. d. kais. Akad. d. Wissensch., Wien, April Heft, 1874.