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DESCRIPTIONS OF THE YOUNG AND ONE IMMATURE ADULT
SPECIMENS OF COSTER DORY, *ALLOCYTTUS VERRUCOSUS*
(GILCHRIST) FROM THE NORTHERN PART
OF THE PACIFIC

Kiyu KOBAYASHI*, Masao MIKAWA** and Jun ITÔ***

The coster dory, *Allocyttus verrucosus* (GILCHRIST), family Zeidae, has not only been described by Gilchrist ('06, '22), McCulloch ('14) and Smith ('53) from depths of about 1,800 m off the coasts of Africa and Australia, but also by Welander et al ('57) from a gill net in the North Pacific (about Lat. 50°N, Long. 150°W; surface water temperature about 10.0°C: Fig. 1, ⊙).

More recently, Abe and Hotta ('62) obtained a specimen from a depth of about 600~700 m off Cape Kinkazan, Tōhoku prefecture, Japan, from a tow-ship trawler in mid-October 1961 and thereby recorded the species in a new locality in the north-western Pacific (Fig. 1, ●).

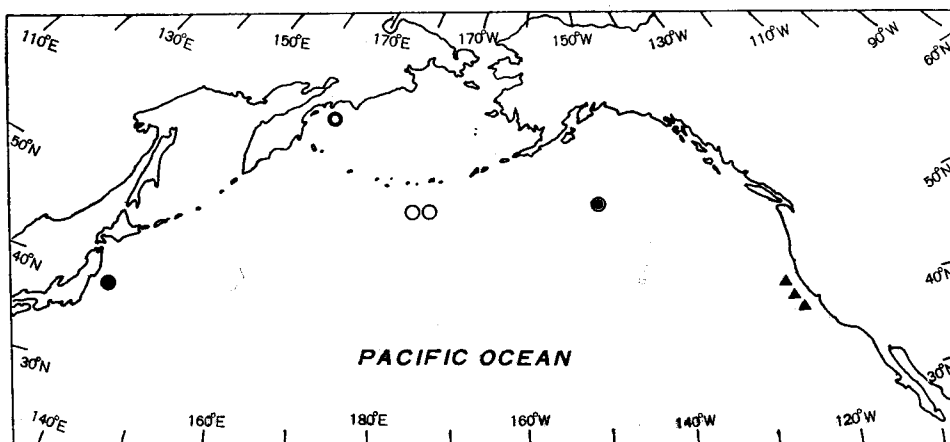


Fig. 1. Collection sites of the coster dory *Allocyttus verrucosus* (GILCHRIST), in the North Pacific

- : Immature specimen of authors
- : Young specimen of authors
- : Specimen of Abe & Hotta ('62)
- ⊙: Specimen of Welander et al ('57)
- ▲: Specimen as *Allocyttus folletti*, by Myers ('60)

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It was not long after that before an immature female and two young specimens of the same species were obtained by one of the present authors. The immature female was collected by Mikawa at noon on July 2nd, 1961 in a catch by trawling of the research vessel "No. 19 Taiyō Maru" from a depth of 485m in the north-western Bering Sea (Lat. 59°07'N, Long. 166°12'E: Fig. 1, ○). The young specimens were obtained by Itō on May 3rd, 1967 by a salmon gill net of the research vessel "Hokkō Maru" in the middle of the northern Pacific (Lat. 45°58'N, Long. 170°58'W; surface water temperature 6.1°C Fig. 1, ○). The present paper intends to describe these specimens in detail.

Before going further, the authors express here their cordial thanks to Prof. Shun Okada of the Faculty of Fisheries, Hokkaido University for his advice and criticism concerning this manuscript. They are also indebted partially to the grants from the Japan Society for the Promotion of Science as part of Japan-U.S. Cooperative Science Program and from the Japanese Ministry of Education.

Descriptions of the specimens collected by Mikawa and Itō

Measurements and counts on the three specimens are given in Table 1. These specimens are now deposited in the Fisheries Museum, Faculty of Fisheries, Hokkaido University.

Immature adult: F-858 (PLATE I, a)

Body rather rhomboid and compressed in form. Head, large in size and rather wide. Eyes very large and projecting. Prefrontal and nasal bones protrude anteriorly.

Anterior nostril is large in diameter and triangular in shape, posterior one is rather small and round. Frontal bone is exposed, widely between the frontals. Interorbital space is covered with rough skin, the upper orbital margin having a saw-like edge. There are about four hollows on the preorbital bone.

The sides of the body and cheeks are covered with small cycloid scales (Fig. 2, a).

There are scattered ctenoid scales on the occipital, dorsal surface breast and abdominal margin. Several large rough ctenoid scales (Fig. 2, b) with about nine ctenies each are present at the base of the dorsal and anal fins. Alongside these large scales there are an equal number of smaller ctenoid scales. There are about five large and rough irregular scales (Fig. 2, c) along the abdomen between the pectoral and anal fins.

A lateral line runs along the dorsal in the anterior part and along the middle of the side in the caudal part.

There are minute teeth in a row on each jaw and in several rows on the vomer. Palatines toothless.

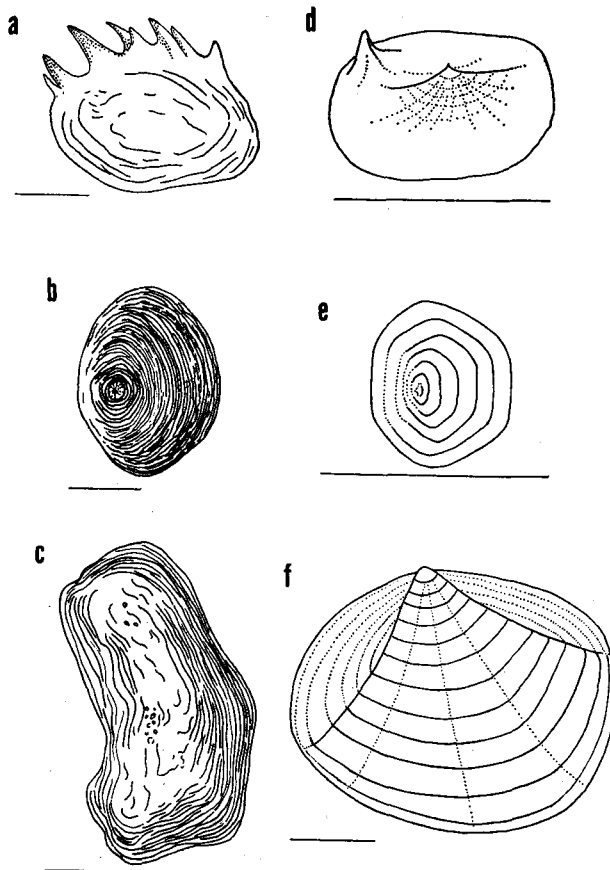


Fig. 2. Scales and scutes on several parts of the body of the coter dory, *Alloctytus verrucosus* (GILCHRIST)

a. b. c. : Immature specimen of F-858

d. e. f. : Young specimen of F-1643

[presented bars are shown as 1 mm]

Vertebrae as counted from an X-ray film are 14+26 in number.

The body is dark brownish black. The marginal portion of the fins and the marginal edge of the opercle are blackish.

The specimen is an immature female, having very small ovaries.

Young: F-1643 (PLATE I, b)

Body oval and compressed in form. Length of head and diameter of orbit are as large as that of an adult.

Two nostrils rather large in diameter. Prefrontal and nasal bones do not project like those of the adult specimen. Interorbital space is covered with rough skin, upper orbital margin having a saw-like edge.

Body is covered with wart-like pointed scutes which are perhaps rudimentary cycloid scales (Fig. 2, d). There are large 10~14 scutes on the abdominal edge between the ventral and anal fins and several rough ctenoid scales with one or two ctenies (Fig. 2, e) along the dorsal and anal bases. Four large tubercles with sharp points (Fig. 2, f) are on the upper margin of belly between the lower end of the pectoral base and origin of the anal fin.

The form of the lateral line is the same as on the adult specimen, running along the dorsal in the anterior part and along the side in the posterior part.

Teeth on each jaw and vomer are rather minute in size. Palatines toothless.

The number of vertebrae could not be counted on the X-ray film. It was determined to be 13+26 by counting the exenterate muscules in the right side of the body of the other specimen (No. F-1644).

The body is light brown with some dark eyebole-sized speckles on the dorsal side. The abdominal side of the body is rather pale. All fins are colorless.

Discussion

Apart from the above-mentioned species, Myers ('60) has reported on a new species, *Allocyttus folletti*, found in the waters off the pacific coast of the U.S.A. He offered three specimens for his description, the first being collected by a trawl net from a depth of about 421 m on a ridge just north of the submarine canyon of the Eel River in 1949, the second from the California waters off Fort Bragg on 18th December, 1953, and the last from off the coast of Mendocino Country, California between Fort Bragg and Shelter Cove (Fig. 1, ▲).

Data on the specimens collected by the present authors is shown in Table 1, along with the data presented by Myers ('60). In the table, the data of Welander et al ('57), Myers ('60) and Abe and Hotta ('62) are also inserted for comparison. These data are arranged according to total length.

As can be seen in Table 1, there is no variation in the number of fin rays and the lateral line pores et al. among the specimens. The proportion of body depth to body length of the adult specimens is smaller than that of the young ones. And, the distance from the tip of the snout to the dorsal origin, the distance from the tip of the snout to the anal origin, the length of the thoracic edge and the length of the abdominal edge vary proportionally according to the body depth. These variable characters are shown in gothic type in Table 1.

These obvious differences of external features between the adult and young are perhaps due to adaptation to a life pattern. The young having rather rounded bodies and comparatively long fin rays are adapted for swimming near the surface. The adults having rather oval bodies and comparatively short fin rays are adapted for living at greater depths.

In the young, some pointed scutes which are very large in size are scattered

on the underside and many wart-like cycloid scales cover about all of the body surface. In the adult, the large pointed scutes on the belly are shed leaving some traces, and the scales are not wart-like, but typically cycloid. The morphological features of the young seem to be adaptations for surface living as seen in the planktonic stage of the sunfish, Molidae, et al.

Considering the present data with careful attention, it seems that the different characteristics of the species, *Allocyttus folletti* described by Myers ('60), characteristics of the species, *Allocyttus folletti* described by Myers ('60), i.e. more concavity of predorsal profile, flatter belly, less smoothly rounded down snout, more prominent and rugose nasal boss, etc. could be due to allometric growth change or individual variance. Therefore, the present authors think that the species described as *Allocyttus folletti* by Myers ('60) ought to be arranged as a synonym of *Allocyttus verrucosus* (GILCHRIST).

Fig. 1 shows the sites in the Pacific Ocean, at which the eight specimens were collected. The three specimens of Myers ('60), *Allocyttus folletti* are included. One specimen given by Welander et al. ('57) and two obtained by Itō were collected from the surface layer of the water and were less than 105 mm in length. Other specimens were obtained from depths of about 400~700 m, and were adult or immature fishes more than 162 mm in length. And, the specimen collected by Mikawa in 1961, is becomes the northern recorded limit of the distribution of this species.

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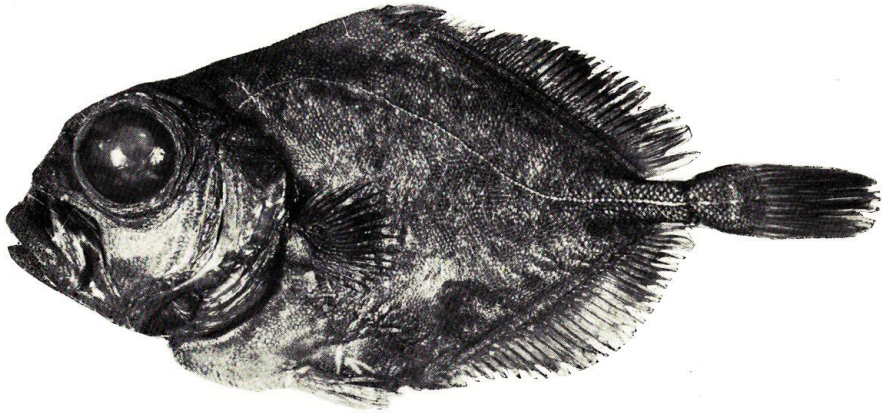
Explanation of Plates

PLATE I

Immature and young specimens of the coster dory, *Allocyttus verrucosus* (GILCHRIST)

- a : Immature specimen of F-858, 268 mm in total length
- b : Young specimen of F-1643, 95 mm in total length

a



b

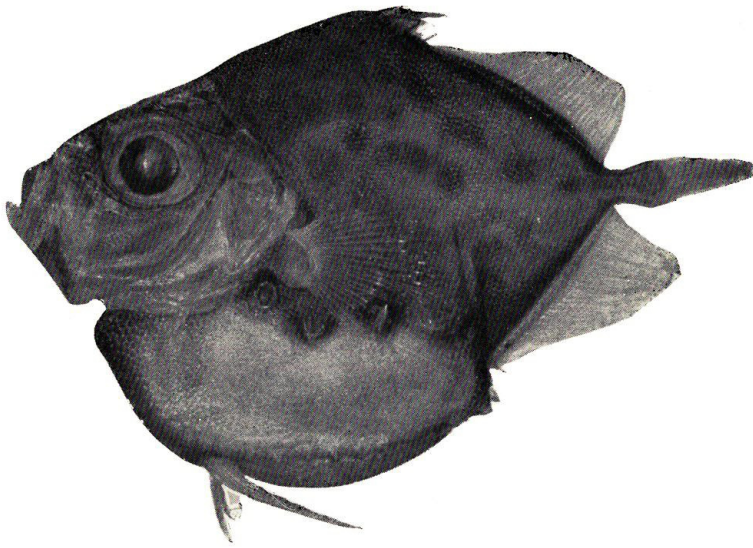


Table 1. Measurements and counts of the coster dory, *Allocyttus verrucosus* (GILCHRIST), obtained from the North Pacific

Author	Myers ('60)	Myers ('60)	Authors ('61)	Abe & Hotta ('62)	Myers ('60)	Welander et al. ('57)	Authors ('67)	Authors ('67)
Specimen No.	SU 15377	UCLA W 57-13	F-858	'61-1208	CAS 25988		F-1643	F-1644
Sex			♀					
Total length (mm)			268	221			95	97
Body length (mm)	347	259	222	181	162	105	78	78
Ratio to body length in %								
Body length minus premaxillary	98.4	97.3	96.5	97.8	98.9		96.2	97.5
Depth of body at dorsal origin	53.3	55.2	51.7	50.8	58.6	77.1	75.7	80.8
Length of head	36.3	38.2	37.8	39.8	42.0	38.1	43.6	42.3
Width of body			19.4	19.3			17.9	20.5
Distance from tip of snout to dorsal origin	51.0	56.1	52.7	56.9	58.0	56.2	60.2	64.1
Distance from tip of snout to anal origin	62.9	63.1	58.1	56.3	63.7	85.7	79.5	79.5
Length of thoracic edge	17.1	18.5	17.5	16.0	18.5		28.2	29.5
Length of abdominal edge	18.4	19.6	18.0	18.2	18.5		46.1	44.9
Depth of caudal peduncle	5.7	5.8	5.4	6.0	6.1		5.1	6.4
Length of snout	10.0	10.8	11.2	11.0	12.3	10.4	11.5	11.5
Length of maxillary	15.8	15.4	15.7	18.2	17.9	13.3	17.9	15.3
Interorbital width	11.2	11.5	12.1	13.2	12.9	11.4	12.8	15.3
Horizontal diameter of orbit	17.0	16.9	18.4	19.3	21.6	15.2*	17.9	17.9
Vertical diameter of orbit			17.5	19.3			15.3	16.7
Length of dorsal fin base	49.3	46.0	44.6	45.8	48.1		44.9	50.0
Length of anal fin base	40.1	37.8	37.8	39.8	41.0		38.5	42.3
Length of pectoral fin base (left)			6.7	7.2			8.9	10.2
Length of pectoral fin base (right)			6.7	7.2			8.9	10.2
Length of 1st dorsal spine	3.4	2.3	3.6	37.0**	4.9	11.4	6.4	5.1
Length of 2nd dorsal spine	8.3	8.8	10.8	13.2	11.7		12.8	8.9
Length of 3rd dorsal spine			7.2	9.9			6.4	6.4
Length of longest dorsal ray	11.8	10.8	12.6	14.9	13.5	14.2	17.9	16.6
Length of 1st anal spine			7.6	8.2		7.6	6.4	6.4
Length of 2nd anal spine			5.4	6.0			5.1	3.8
Length of longest anal ray	13.2	12.7	14.8	16.0	16.0		17.9	19.2
Length of longest pectoral ray (left)	16.4	15.4	15.3	16.5	19.1	18.0	21.8	20.5
Length of longest pectoral ray (right)			14.4	17.6			20.5	21.8
Length of ventral spine	12.9	15.8	17.1	21.0	22.2		28.2	25.6
Length of longest ventral ray			17.5	19.8		25.7	26.9	30.8
Length of longest caudal ray			(16.6)	23.2		18.1	20.5	24.3
Number of dorsal fin rays	VII, 32	VII, 30	VI, 33	VII, 33	V, 33	VI, 34	VI, 36	VI, 33
Number of anal fin rays	III, 31	III, 32	III, 31	III, 31	III, 31	III, 32	III, 30	III, 30
Number of pectoral fin rays (left)	21	19	21	20	21	20	20	19
Number of pectoral fin rays (right)	21	19	20		21		20	20
Number of ventral fin rays (left)	I, 6	I, 6	I, 6	I, 6	I, 6	I, 6	I, 6	I, 6
Number of ventral fin rays (right)	I, 7	I, 6	I, 6		I, 6			
Number of caudal fin rays	1+6+5+1	1+6+5+1	2+1+6+5+1+3	2+1+5+6+1+2	1+6+5+1	1+11+1	3+1+10+1+3	2+1+11+1+2
Number of pores in lateral line (left)	95+5	88+4	91+4	85+3	85+5	88	87+4	91+4
Number of pores in lateral line (right)	97+3	93+4	88+4	86+3	90+7		85+4	91+3
Number of gill rakers (left)	6+19	6+20			7+25***			
Number of gill rakers (right)	6+19	6+19	3+15 6+20		6+24***	25	3+16 5+19	3+15 6+18
Number of pyloric appendages			9				9	9
Number of scutes below the pectoral fin			(5)			4	4	4
Number of scutes along to abdominal edge			(5)			10	14	10
Number of rough scales along to dorsal base			29				29	29
Number of rough scales along to anal base			33				33	32
Number of vertebrae			14+26					13+26

* diameter of eye

** may be miss measurement

*** difarent from other specimens in large number

() damaged or inclearly