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First Catch in Russian Waters of a Spinulated Specimen of *Lobotes surinamensis* (Bloch, 1790) (Percoidei: Lobotidae) with Notes on Taxonomy of this Species

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Abstract—The first capture in Russian waters of a spinulated specimen of *Lobotes surinamensis* with spinulation of opercular bones is reported. Morphology of two specimens is compared—with spines and without them. The description is composed. There are no significant differences between them. With consideration of the original and published data, we concluded that this character (spines) has no taxonomic value.

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During the last century and a half, the systematic position of the genus *Lobotes* has been a subject of discussion. Some authors believe that this genus is monotypical (Günther, 1859) with a sole species *Lobotes surinamensis* (Bloch, 1790) distributed circumglobally in the subtropics (Fowler, 1931; Tortonese, 1990). There is another viewpoint (Jordan and Evermann, 1898; Neslon, 2006) that the Pacific coast of Central America is inhabited by another species of this genus—*L. pacificus* Gilbert in Jordan et Evermann, 1898.

In a recent paper (Kharin et al., 2009), nine specimens of the genus *Lobotes* were analyzed. They suggested that presence (or absence) of spines on operculum in this genus is a diagnostic character of the species level. At the marine Biological Station *Vostok* of the Institute of Marine Biology (Far East Division, Russian Academy of Sciences) on July 30, 2009, the first specimen of *Lobotes* was caught in Russian waters, with spines on operculum. According to Kharin et al. (2009), it should be considered a new species for Russian waters.

The present paper presents the results of investigation of the taxonomic status of this specimen.

MATERIAL AND METHODS

The present study is based on a specimen of *Lobotes* with spines on operculum, with standard length (SL) 262 mm caught in Vostok Gulf (Peter the Great Bay, the Sea of Japan) on July 30, 2009, deposited at the museum of the Institute of Marine Biology (Far East Division, Russian Academy of Sciences) (MIMB 22288). For comparison, a specimen of *Lobotes* without spines from the collection of the museum of the Institute of Marine Biology (Far East Division, Russian Academy of Sciences) was used: MIMB 16573, male, SL 365 mm, the mouth of the Cherukhe River, gulf of the Expedition to Posiet Gulf (Peter the Great Bay, Sea of Japan), October 12, 2007, depth 0.5–1.0 m, collectors E.V. Terletskii and S.K. Belanchuk. In addition, x-rays of *Lobotes* are examined: ZM DVGU IV 7064/479 SL 196 mm, IV 7065/480 SL 233 vv, IV 7066/481 SL 259 mm—South China Sea, medium refrigerated side trawler *Timashevsk*, March 18–19, 1986, collectors Reznik and Naznankov; IV 7471-E 186/886 SL 250 mm—Sea of Japan, Kievka Gulf, August 25, 1983, collector A.E. Samuilov.

The number of vertebrae and ray in unpaired fins were counted by z-rays made in the installation Faxitron MX-20. Due to the large size of our specimens, the anal, caudal, and spiny and soft parts of the dorsal fin were x-rayed separately. Altogether, eight x-rays were made.

RESULTS

Material. MIMB 22288, juv., SL 262 mm, Vostok Gulf (Peter the Great Bay, Sea of Japan), July 30, 2009, depth 1.5–2.0 m, collectors S.V. Turanov and A.S. Advolodkin.

Description. D XII 15, A III 11, P 17, C 9 + 7, ll 50, vert. 11 + 13 = 24.

Deep body (41.6% SL), strongly compressed from sides (Table 1). Scales on the body are large, those on head and fin bases are smaller, and scales are absent on

Table 1. Morphological characters of two specimens of *Lobotes surinamensis*

Characters	MIMB 16573 (without spines)		MIMB 22288 (with spines)		Characters	MIMB 16573 (without spines)		MIMB 22288 (with spines)	
	mm	% SL	mm	% SL		mm	% SL	mm	% SL
SL, mm	365		262		hA	55	15.1	42	16.0
Plastic characters					hP	57	15.6	35	13.4
H	149	40.8	109	41.6	$hD_1 1$	13.5	3.7	10	3.8
c	103	28.2	72	27.5	$hD_1 2$	17	4.7	17	6.5
hc	94	25.8	53	20.2	$hD_1 3$	24	6.6	23	8.8
po	64	17.5	45	17.2	$hD_1 4$	35	9.6	32	12.2
ao	28	7.7	17	6.5	$hD_1 5$	32	8.8	34	13.0
lmx	43	11.8	29	11.1	$hD_1 6$	32	8.8	35	13.4
lmd	37	10.1	28	10.7	$hD_1 7$	33	9.0	32	12.2
o	13.5	3.7	12	4.6	$hD_1 8$	33	9.0	32	12.2
io	36	9.9	25	9.5	$hD_1 9$	31	8.5	29	11.1
lpc	35	9.6	23	8.8	$hD_1 10$	27	7.4	27	10.3
h	54	14.8	37	14.1	$hD_1 11$	24	6.6	24	9.2
aD	128	35.1	94	35.9	$hD_1 12$	22	6.0	26	9.9
aP	118	32.3	80	30.5	hD_2	55	15.1	41	15.6
aV	147	40.3	96	36.6	lpod	2.8	0.8	3.7	1.4
aA	252	69.0	172	65.6	Meristic characters				
lA	83	22.7	62	23.7	ll	53		50	
lD_1	132	36.2	93	35.5	D	XII, 15		XII, 16	
lD_2	84	23.0	67	25.6	V	I, 5		I, 5	
lV	15	4.1	11	4.2	A	III, 11		III, 12	
lP	21	5.8	13	5.0	P	17		16	
hV	45	12.3	37	14.1	C	9 + 8		9 + 8	

Note: SL—standard body length; c—head length; H—maximum body depth; hc—head depth (at the vertical of posterior edge of opercukum); ao—snout length; po—postorbital distance; o—horizontal eye diameter; io—interorbital distance; lmx—length of upper jaw; lmd—length of lower jaw; lD_1, lD_2—length of spiny and soft parts of dorsal fin base; lP, lV, lA—base length of pectoral, ventral, and anal fins; $hD_1 1$–$hD_1 12$—length of spines of D (from the first to the last, respectively); hD_2—length of the largest soft ray of D; hP, hA—length of largest rays of pectoral and anal fins, respectively; hV—length of spiny ray of ventral fin; lpc—caudal peduncle length; h—caudal peduncle depth; aD, aP, aV, aA—antedorsal, antepectoral, anteventral, and anteanal distances; lpod—length of spines of operculum; P, V, D, A—number of rays in pectoral, ventral, dorsal, and anal fins; C—number of branched rays in caudal fin; ll—number of perforated scales in lateral line; vert.—number of vertebrae.

preopercular part of head and jaws. Lateral line is complete, makes a curve in anterior body part, and is seem on scales extending onto base of caudal fin. Mouth is semi-superior, attaining the vertical of eye middle. Spine rays of dorsal fin fit into a shallow scaly sheath. Upper part of operculum has weakly expressed triangular pointed prominences (farther on, spines) covered with skin and felt only at fingering. Their size, form, and position fully correspond to the photograph in the article by Kharin et al. (2009). Edge of preoperculum is strongly serrated; length of the largest spine is 3.7 mm (Table 1).

There are no data on the skeleton of fins of *Lobotes surinamensis* in literature. Therefore, we supply the description of an x-ray. Praedorsalia number four; to the latter of them a strongly shortened interneuralium of the first spiny ray of D is attached. Together with the inteneuralium of the second ray it penetrates between spinous process of the second and third vertebrae (Fig. 1). Interneuralia of the third and fourth rays are situated between spine processes of the third and fourth vertebrae; other interneuralia of the spiny part of D are situated strictly one per an interneural space. Interneuralia and interhemalia of soft parts of D and A penetrate predominantly two per an interval between spinous processes. The third spiny ray of A is the longest; all three interhemalia of spiny rays of A penetrate between hemal processes of the last trunk and the first caudal vertebrae. Branched rays of the caudal fin number 17 (9 + 8). They are situated on hypurale 1–5, par-

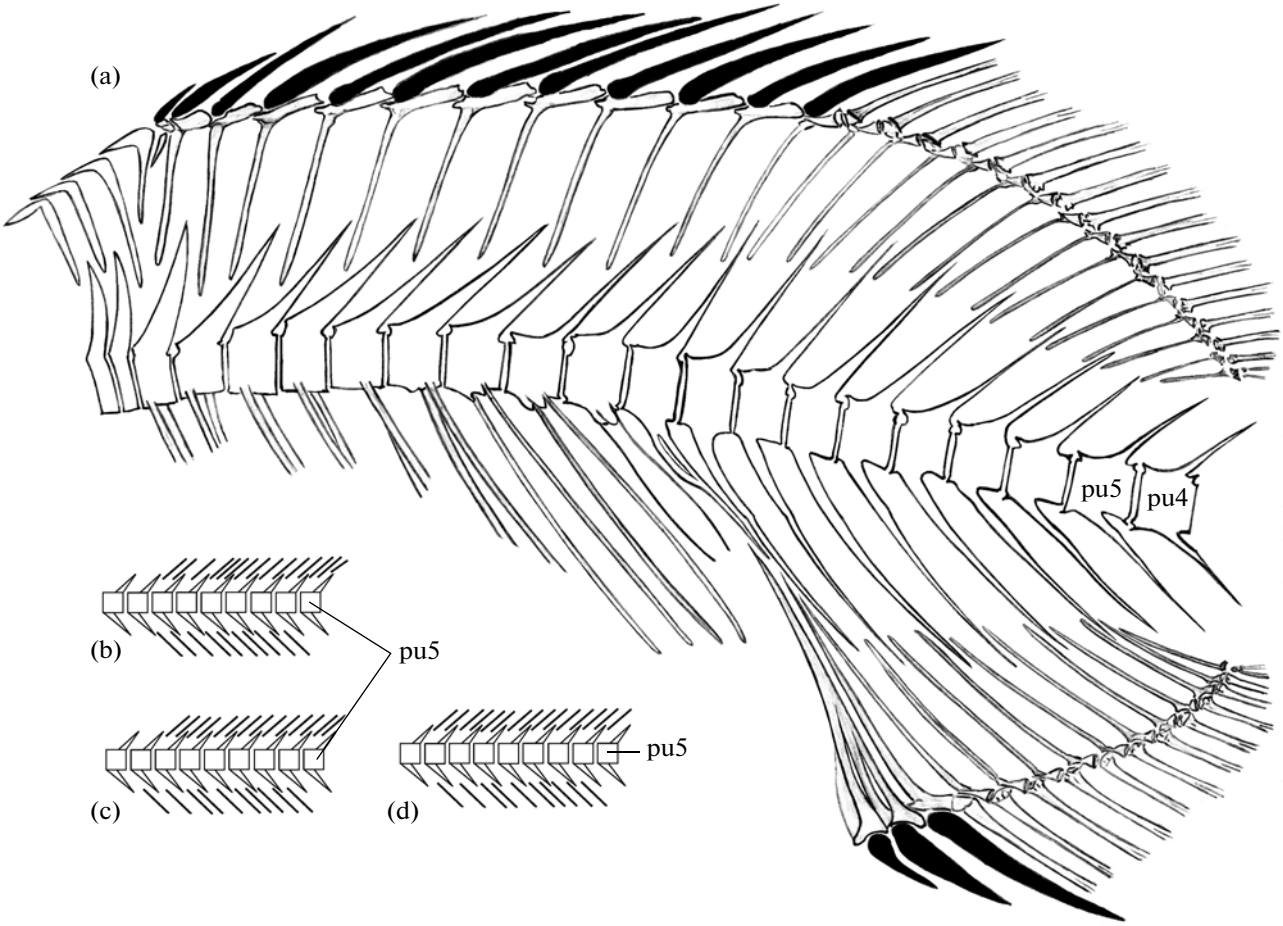


Fig. 1. Axial skeleton of *Lobotes surinamensis*: a—MIMB 22288; b—MIMB 16573; c—ZN DVGU 7064/479, 7066/481, 7471-E 186/886; d—ZN DVGU 7065/480. Designations: pu4, pu5—the fourth and fifth preural vertebrae; (■)—spiny rays.

hypurale, and hemal process of the second precaudal vertebra (Fig. 2). There are three (nonbranched) rays each on the upper and lower margins.

Comparative remarks. The specimen taken for comparison (MIMB 16573) differs from out specimen (Table 1) in a deeper head (25.8 vs. 20.2% SL in our specimen), smaller relative length of spiny rays of dorsal fin, more numerous scale in lateral; line (53 vs. 50), in position of interhemalia and interneuralia of soft part of dorsal and anal fins (Fig. 1), in shorter teeth on preoperculum (0.8 vs. 1.4% SL), and in absence of spines on the upper edge of operculum.

By other characters, including structure of the skeleton, there are no significant differences (Table 1). In addition, out specimen having spines on operculum and D XII combines the traits of both groups discerned by Kharin et al. (2009).

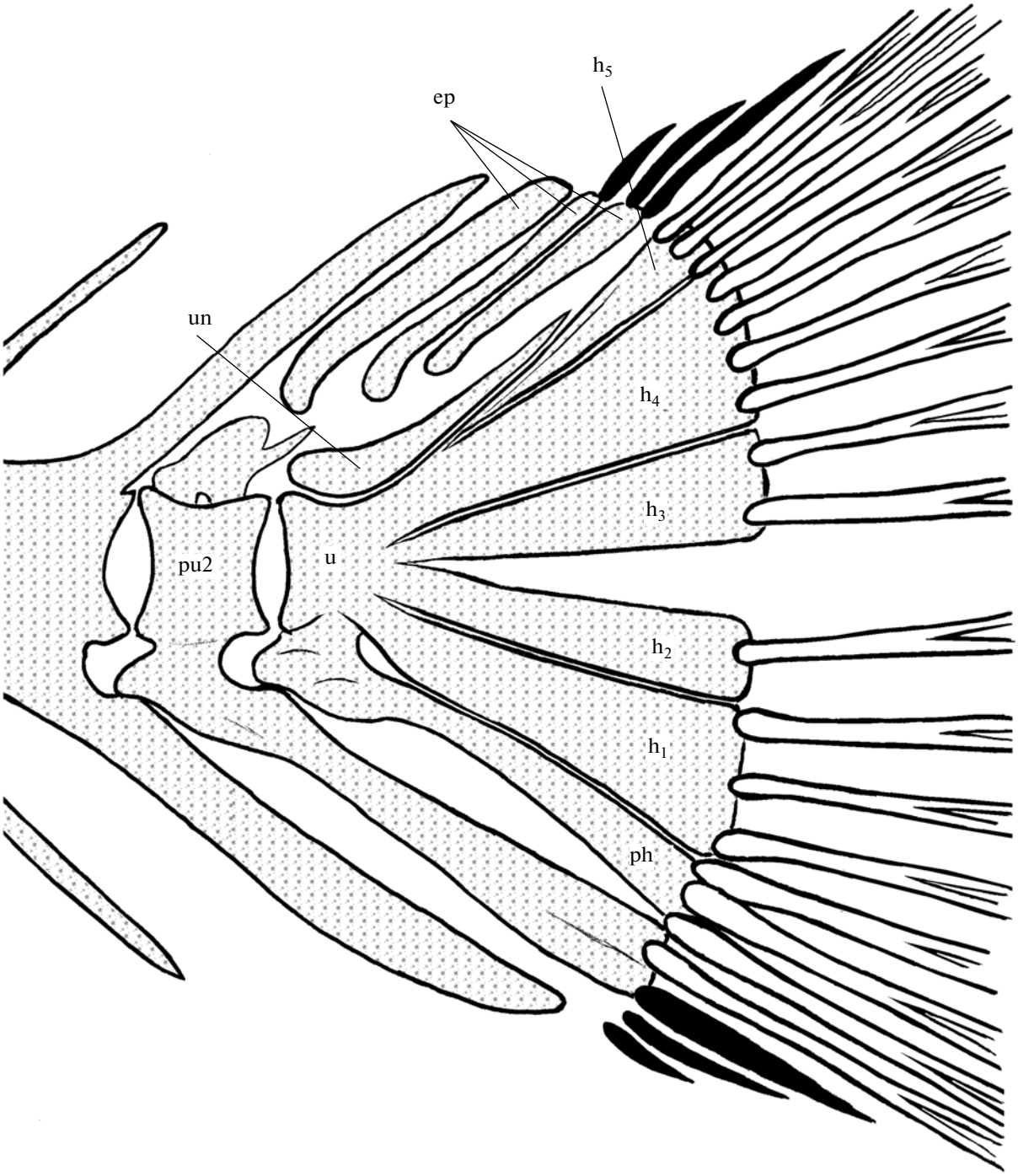
DISCUSSION

The differences by plastic characters (head depth, length of spines of D) are within variation limits indicated by Kharin et al. (2009) for specimens of *Lobotes* having no spines.

Differences in the number of scales in the lateral line cannot be assumed to be significant as analysis of the available data does not lead to a conclusion of a wide variation of this character in the genus *Lobotes*. According to various authors in the western Atlantic the number of scales in the lateral line of *Lobotes* varies from 45 (Jordan and Rutter, 1897) to 53 (Bean, 1903) and in the western part of the Pacific Ocean—from 42-54 (Carpenter and Niem, 2001) to 50–53 (Fowler, 1931; Kharin et al., 2009) (Table 2).

Comparison of x-rays demonstrated that in spinulated *Lobotes* from the South China Sea (specimens ZM DVGU IV 7064/479, 7065/480, 7066/481) the position of interhemalia corresponds to that in MIMB 16573, i.e., the observed deviation (Fig. 1) is not related in any was to presence of absence of spines on operculum. Generally, position of pterygiophores of soft parts of fins in *Lobotes* is considerably variable and this cannot have taxonomic value.

Differences in the length of spines on preoperculum follow from age morphological variation charac-



Fig, 2. The skeleton of caudal fin of *Lobotes surinamensis* from x-ray MIMB 22288: ep—epuralia; h_1–h_5—hypuralia 1-5; ph—parhypurale; pu2—preurostylar vertebra; u—urostyle; un—uroneurale; (■)—procurrent rays.

teristic of this species (Jordan and Evermann, 1898; Fowler, 1931; Lindberg and Krasyukova, 1969).

Obviously, absence or presence of spines on operculum can be also explained by age and individual morphological variation. Analysis of literature leads to a conclusion that this character does not suit for diagnostics of *L. pacificus*. Day (1865, p. 24) indicated to presence of blunt spines on operculum (literally: "opercle with a blunt point") in specimens of *L. surinamensis* caught off India. Besides, these spines in *Lobotes* from western Atlantic (the type locality of *L. surinamensis*) are noted in Jamaica (Jordan and

Table 2. Some morphological characters of *Lobotes surinamensis* (Bloch, 1790), from literature

Source	Site of collection	Characters		
		ll	*D*	*A*
Day, 1865	Indostan	48	XII, 15–16	III, 11–12
Fowler, 1931	Philippines, China	48–50	XI–XII, 15–16	III, 11
Bean, 1903	New York	53	XII, 16	III, 11
Jordan, Rutter, 1897	Jamaica	45	XII, 15	III, 11
Carpenter, Niem, 2001	Australia, China	42–45	XI–XIII, 13–16	III, 11–12
Харин и др., 2009*	Sea of Japan	53	XI–XII, 15–16	III, 10–11

Note: * specimens without spines.

Rutter, 1897), in South Carolina (Hollbrook, 1855), and in New York (De Kay, 1842).

In the description of *L. pacificus* Gilbert, 1898 the spines are indicated. However, neither in this or later publications Gilbert assigned no taxonomic significance to this character (Gilbert and Starks, 1904).

Populations of *Lobotes* from different regions of the World Ocean may belong to one species as they are not isolated from each other due to some traits of their biology. Pelagic larvae of the present species occur at a considerable distance from the coasts (Ditty and Shaw, 1994). Aggregating under floating algae and other flotsam (Gudger, 1931: cited after Ditty and Shaw, 1994, p. 42) and drifting with them the specimens of the present species were frequently found off oceanic islands both of the Atlantic (Bean, 1906; Sazima et al., 2009) and the Pacific Ocean (Carpenter and Niem, 2001). Thus the oceans do not make an impenetrable barrier for them. On the other hand, the life conditions of specimens living under flotsam in the open sea drastically differ from those in *Lobotes* settled to the bottom directly after termination of the larval stage. This may explain the discussed differences in structure of operculum. This is supported by the fact that abundance of *Lobotes* at the Pacific coast of the Isthmus of Panama (from where *L. pacificus* was described) is considerably higher than at the Atlantic coast (Meek and Hildebrand, 1925).

The final solution of the issue on the taxonomic position of the genus *Lobotes* needs a thorough revision connected with genetic investigations. From our specimen (MIMB 22288) a sample of muscle tissue is taken, stored at the Laboratory of Genetics at the Institute of Marine Biology, Far East Division, RAS (sample index LOS1-09). Until such revision will be made, the issue whether there is a second species in the genus *Lobotes* remains unsolved.

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