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Materials for the Revision of the Family Caristiidae (Perciformes): 3. Manefishes (Genus *Caristius*) from Moderate Warm Waters of the Pacific and Atlantic Oceans with a Description of Three New Species from the Southeast Atlantic (*C. barsukovi* sp.n., *C. litvinovi* sp.n., *C. walvisensis* sp. n.)

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Abstract—It is suggested to distinguish two natural groups in the taxonomic rank of the subfamily within the family Caristiidae—Caristiinae and Paracaristiinae. Based on a large amount of factual material (42 individuals) and published data, systematics of Caristiinae (genus *Caristius* of the nontropical zone of the Pacific and Atlantic oceans is considered. The description of *C. macropus* from the northern part of the Pacific Ocean and of *C. groenlandicus* from the north Atlantic is provided. From the southeast Atlantic, three new species—*C. barsukovi* sp. n., *C. litvinovi* sp. n., and *C. walvisensis* sp. n.—are described. Their diagnostic characters comprise specific features of the structure of branchial apparatus, dentation on the jaws, roof of the oral cavity, as well as body proportions and number of rays in unpaired fins. A preliminary key for the identification of Caristiinae in the Atlantic Ocean is presented.

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Keywords: manefishes, Caristiidae, *Caristus*, new species, systematics, morphology, distribution

As follows from recent publications on fish of the family Caristiidae (Trunov and Kukuev, 2004; Trunov et al., 2006; Stevenson and Kenaley, 2011; Kukuev et al., 2012), it is divided into two distinctly pronounced groups: Paracaristiinae with two genera (*Paracaristius* and *Neocaristius*) that include five species (Stevenson and Kenaley, 2011) and Caristiinae also with two genera (*Platyberyx* and *Caristius*) whose species composition has not been determined ultimately so far. Differences between these groups are so obvious that they should be given the taxonomic status of subfamilies within the family Caristiidae. This paper continues the series of publications (Trunov et al., 2006; Kukuev et al., 2012) dedicated to revision of this family. In the suggested third communication, Caristiinae of the genus *Caristius* of the extratropical zone of the Pacific and Atlantic oceans (northern parts of the Pacific and Atlantic oceans, southeast Atlantic) whose systematics has been obviously studied insufficiently so far are considered.

The first manefish (Caristiidae) was described according to an individual *SL* 110 mm from the northern part of the Pacific Ocean off the coast of Japan (Yokohama Province) under the name of *Pteraclis macropus* (Bellotti, 1903). Later, from the same area, according to fry *SL* 65 mm, the genus *Caristiius* with species *Caristius japonicus* was described (Gill and Smith, 1905). These two species were included into family Caristiidae that was new for that time (Smith and Pope, 1907). In 1911, near the Portugal coast, for the first time for the Atlantic, species *Platyberyx opalescens* was described (Zugmayer, 1911) that supplemented the list of fish of the family Caristiidae. Subsequently, a review and comparative analysis of all described at that time species within the family Caristiidae were provided (Regan, 1912; Jordan and Thompson, 1914; Jordan, 1919). Note that the northern Pacific species *Caristius macropus* was opposed to other known by that time species in the status of a peculiar genus *Elephenor* that was even included into a separate family Elephenoridae (Jordan, 1919) whose validity was not later acknowledged (Jordan, 1923; Jensen, 1941; Maul, 1954; Scott et al., 1970; Amaoka, 1983; Fujii et al., 1984; Post, 1986, 1990; Eschmeyer, 1997; Nel'son, 2009). In 1930, in the northwest Atlantic from the Gulf Stream zone, according to fry, species *Pteraclis fasciatus* was described (Borodin, 1930). Later this species was attributed to the genus *Caristiius* as a synonym of *Caristius groenlandicus* (Hartel and Triant, 1997). In 1941, according to an adult individ-

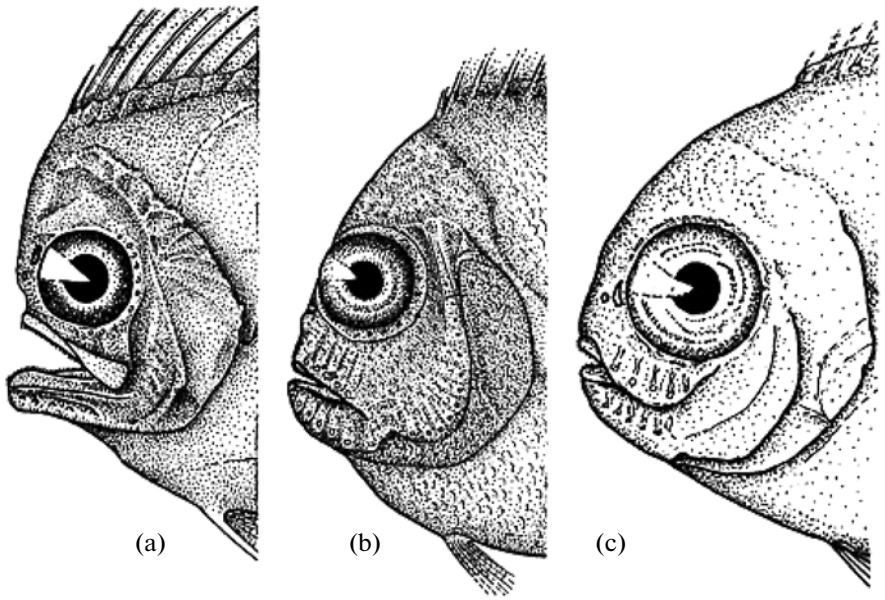

Fig. 1. Head structure in representatives of (a) Caristiinae and (b, c) Paracaristiinae (Caristiidae): (a) *Caristius barsukovi* sp. n.., Namibia; (b) *Paracarastius maderensis*, Walvis Seamount; (c) *Neocaristius heemstrai*, 42°36′ S 0°15′ E.

ual *SL* 150 mm from southeastern Greenland, species *Caristius groenlandicus* was described (Jensen, 1941). In 1949, Maul (1949) described a new species *Caristius maderensis* that was recently placed into the new genus of Paracaristinae *Paracaristius* (Trunov et al., 2006; Stevenson and Kenaley, 2011). In the same paper, Maul (1949) gave a description of an adult form of *Platyberyx opalenscens* that was recently described by us as a new species *Platyberyx mauli* (Kukuev et al., 2012). From the east Atlantic, species *Caristius andriashevi* was described (Kukuev et al., 2012).

MATERIAL AND METHODS

Forty-two individuals of Caristiinae of the genus *Caristius*—*C. macropus* (11 individuals), *C. groenlandicus* (24 individuals), *C. barsukovi* sp. n. (five individuals), *C. litvinovi* sp. n. and *C. walvisensis* sp. n. (one individual each)—stored in collections of the Zoological Institute (Russian Academy of Sciences) and AtlantNIRO were studied. Material of ZIN was fixed in 75% alcohol and that of AtlantNIRO was fixed in 4–6% solution of formalin. Evidence on separate individuals is provided in the description of the corresponding species.

In this paper, the following abbreviations and conventional designations are used: *SL*—standard length; *H*—largest body depth; *h*—depth of the caudal peduncle; *aD*, *aA*, *aP*, and *aV*—antedorsal, anteanal, antepectoral, and anteventral distances (from the snout tip to the beginning of the bases of the dorsal, anal, pectoral, and abdominal fins, respectively); *V–P*—ventropectoral distance (space between the verticals through the beginning of the bases of the pectoral and anal fins); *V–A*—ventroanal distance (between the verticals through the beginning of the pelvic and anal fins); *lV*—length of largest ray of pelvic fin; c—head length; *ao*—snout length; *o*—orbit diameter; lmx—length of the upper jaw ; *A*, *D*, and *P*—number of rays in the anal, dorsal, and pectoral fins, respectively; sp.br.—number of gill rakers on the first branchial arch; vert.—number of vertebrae.

Distances were measured along the straight line between the verticals. Drawings were performed by I.A. Trunov and photographs by E.I. Kukuev.

RESULTS AND DISCUSSION

Family Caristiidae

Subfamily Caristiinae

Type genus *Caristius* Gill et Smith, 1905.

Diagnosis. Mouth large, maxillary bone reaches vertical through posterior margin of orbit (Fig. 1a), infraorbital region narrow (width 2 to 4% *SL*); upper jaw completely free of suborbitalia; well-pronounced palatine and vomer teeth; lateral line well developed (presence of distinct tubular scales) or poorly pronounced (traces); vertebrae 36–49 (without urostyle); rays in fins flexible, elastic.

Subfamily Caristiinae includes two genera (*Caristius* and *Platyberyx*) and, according to preliminary data, eight species (possibly more).

Subfamily Paracarastiinae, n.

Type genus *Paracarastius*, Trunov, Kukuev et Parin, 2006.

Diagnosis. Mouth small, end of maxillary bone hardly extends beyond vertical through middle of eye; upper jaw totally covered by suborbitalia (Figs. 1b, 1c); suborbital region wide (width 9.5–14.5% *SL*); palatine and vomer teeth lacking or present only on vomer head (genus *Neocaristius*); lateral line not seen; vertebrae from 32 to 36 (without urostyle), rays in fins weak (breakable).

The subfamily Paracaristiinae includes two genera (*Paracarastius* and *Neocarastius*) and, according to recent investigations, five species (Stevenson and Kenaley, 2011).

KEY TO SUBFAMILIES OF THE FAMILY CARISTIIDAE

1(2). Suborbital region narrow (width 2 to 4% *SL*); upper jaw completely free of suborbitalia, its posterior end reaches end of orbit, vomer and palatine bones with teeth ..... **subfamily Caristiinae**

2(1). Suborbital region wide (width 9.5 to 14.5% *SL*); upper jaw almost completely covered with suborbitalia, its posterior end hardly reaches middle of orbit; vomer and palatine bones without teeth or teeth are present only on the vomer ..... **subfamily Paracaristiinae**

PRELIMINARY KEY TO GENERA AND SPECIES OF CARISTIINAE OF THE ATLANTIC OCEAN

1A. Number of rays in dorsal fin 25–32, in anal fin—17–19. Teeth in the upper and lower jaws small, weak, setiferous, in two or three rows, numerous on vomer head and palatine bones (up to 20 teeth). Lateral line present. Anterior head contour always sloped ... ***Platyberyx* (2).**

1B. Number of rays in dorsal fin 32–37, in anal—19–23. Teeth on upper and lower jaws strong, conical or hook-like, in one row, on vomer head and palatine bones few (no more than 10, usually less). Lateral line lacking or present. Anterior contour of head more frequently steep (upright), less frequently sloped at an angle of 60°–70° ..... ***Caristius* (3).**

2A. Gill rakers long (approximately 1.5 times in length of gill filaments), thin; *sp.br.* 20–23. Teeth on vomer located in two and more rows with total number of 11 to 15. Origin of pelvic fins at vertical through posterior margin of orbit; *V–P* is 6.8–11.0% *SL*. Eye diameter larger than caudal peduncle depth ..... ***Platyberyx opalescens***

2B. Gill rakers short (approximately two times in length of gill filaments), flattened and fleshy; *sp.br.* 16. Teeth on vomer located over entire head with total number of 20. Origin of pelvic fins at vertical through end of gill cover; *V–P* is 3.5% *SL*. Eye diameter smaller than caudal peduncle depth ..... ***Platyberyx mauli***

3A. Origin of dorsal fin at vertical through posterior margin of orbit. Anterior head contour sloped at angle of 60°–70° towards body midline **4**

3B. Origin of dorsal fin at vertical through anterior margin or middle of orbit. Anterior head contour more or less steep, its angle with body midline 90° to 70° ... **5**

4A. Lateral line extremely well pronounced. Scales in lateral line strongly enlarged, well developed, densely packed, bear tubular tubules. Eye diameter smaller than 10% *SL* and smaller than caudal peduncle depth. On vomer, 4–6 teeth ..... ***C. andriashevi***

4B. Lateral line as strokes on skin not bearing strongly increased and changed scales. Eye diameter larger than 10% *SL* and larger than caudal peduncle depth. On vomer, 9 teeth ..... ***C. litvinovi* sp. n.**

5A. Gill rakers short, nodular (are in length of gill filaments more than two times, in orbit—7–9 times); distance between them equal or greater than their length. In dorsal fin, 35–37 rays ..... ***C. barsukovi* sp. n.**

5B. Gill rakers long, flattened or thin (are in length of gill filaments less than two times, in orbit—three to six times); distance between them smaller than their length. In dorsal fin, 32–35 rays **6**

6A. Lateral line absent. Anteanal distance, as a rule, smaller than 45% *SL*; *sp.br.* 20–23. Rays in pelvic fins in adult fish very long, their length 54 to 92% *SL*, in some cases, they reach end of anal fin and origin of caudal peduncle..... ***C. macropus***

6B. Lateral line more or less pronounced. Anteanal distance, as a rule, more than 45% *SL*; *sp.br.* 17–20. Pelvic fins in adult fish do not reach the end of anal fin and origin of caudal peduncle, their length 32 to 52% *SL* **7**

7A. Gill rakers flattened, connivent, overlying each other (distance between them smaller than 1/3 of their length), jaw teeth strong, conical (throughout jaw), on vomer, less than 8 teeth (usually 3–5). Anterior contour of head steep, almost upright ..... ***C. groenlandicus***

7B. Gill rakers thin, rarified (distance between them equal to half of their length). Jaw teeth hook-like, in posterior part of jaws curved forward, on vomer 8 teeth located in two rows. Anterior contour of head sloped with respect to the body midline at an angle of approximately 70° ..... ***C. walvisensis* sp. n.**

Caristius macropus (Bellotti, 1993)

(Figs. 2, 3)

Pteraclis macropus: Bellotti, 1903, p. 137, Fig. VI (Japan, Iokohama).

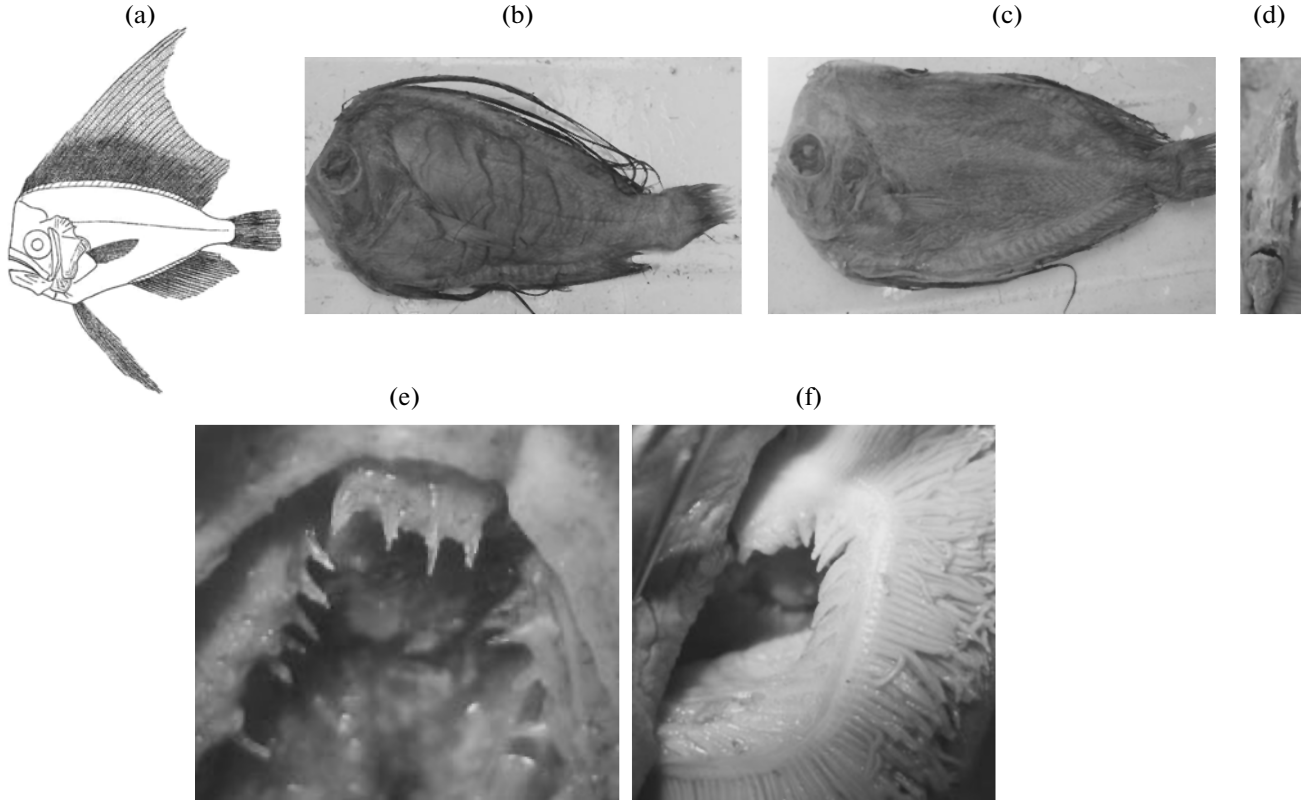

Fig. 2. *Caristius macropus*: (a) holotype *SL* 110 mm (according to Bellotti, 1903); (b) specimen SL 138 mm ZIN no. 50615, 43°36′ N, 147°14′ E'; (c–f) specimen *SL* 179 mm ZIN no. 45801, 37°27′ N, 142°06′ E; (c, d) frontal and lateral view; (e) roof of oral cavity; (f) branchial apparatus).

Caristius japonicus: Gill and Smith, 1905, p. 249; Smith and Pope, 1907, pp. 491–492, Fig. 10. *Caristius macropus*: Jordan and Thompson, 1914, pp. 205–313, Fig. 1; Hart, 1973, p. 291; Guschin and Kukuev, 1981, pp. 36–40; Kukuev, 1982, pp. 92–109; Amaoka, 1983, p. 128, Fig. 128; Fujii et al., 1984, p. 160; Post, 1990, pp. 765–766; Parin et al., 1995, p. 737; Mukhametov and Volodin, 1999, pp. 426–427; Balanov, 2000, pp. 850–851; Csepp and Stevenson, 2006, pp. 248–251, Fig. 1; Okamoto et al., 2010, pp. 398–405.

Elephenor macropus (Bellotti): Jordan, 1919, pp. 329–334.

Material. Total of 11 individuals *SL* 125–230 mm from the northern part of the Pacific Ocean; ZIN no. 50616—two individuals *SL* 207 and 185 mm, 41°40′ N, 147°01′ E, *Novoulyanovsk*, trawl 125, depth of 500–200 m, oblique fishery, collector V.V. Fedorov; ZIN no. 45370–one individual *SL* 182 mm, 37°43′ N 142°35′ E, collector V.V. Fedorov; ZIN no. 50615–four individuals *SL* 125–162 mm, 43°36′ N 147°14′ E, August 16, 1992, *Novoulyanovsk*, trawl 124, collector V.V. Fedorov; ZIN no. 45801–one individual *SL* 179 mm, 37°27′ N 142°06′ E; ZIN no. 45802–one individual *SL* 235 mm, 41°21′ N 141°45′ E, collector B.A. Sheiko; ZIN no. 42405–one individual *SL* 222 mm, 32°26′ N 142°19′ E, collector B.A. Sheiko; ZMMU P-20615–one individual *SL* 160 mm, 55°03′ N 170°58′ E.

Diagnosis. In anal fin, 21–23 rays, 20–23 gill rakers on first branchial arch. Gill rakers of moderate length (are less than two times in length of gill filament), densely packed on branchial arch (almost touching each other by their bases). Lateral line absent. Rays in pelvic fins very long, their length is 59 to 92% *SL*; in some cases, they reach end of anal fin and origin of caudal peduncle. Head rather large, its length 3.0–3.5 times in *SL*, and, as a rule, greater than ventroanal distance. Anteanal distance smaller than 45% *SL*.

Description. *D* 32–35, *A* 21–23, *P* 17–20, *sp.br.* (5–7) + 1 + (14–15) = 20–23 (more frequently 20–22), filaments on pseudobranchiale 16–21, *vert.* 37–40. Morphometric and meristic characters of *C. macropus* provided in Table 1.

Body deep, compressed laterally, gradually narrowing backwards, covered with scales. Dorsal and pelvic profiles as though outline an isosceles triangle with an apex in caudal part of body. Maximum body depth in area of vertical through pelvic fins (corresponds to base of this triangle) 1.9–2.0 times in *SL*. Caudal peduncle depth approximately equal to head diameter. Head high, its anterior (forehead) profile in some indi-

Fig. 3. *Caristius* cf. *macropus:* (a) *SL* 222 mm, ZIN no. 45802, 41°21′ N, 141°45′ E; (b) *SL* 235 mm, ZIN no. 42495, 32°26′ N, 142°19′ E.

viduals, as in holotype, sloped backwards at an angle of 65°–75° towards the body midline (Fig. 1a); however, in other part of individuals, it can be straight or even hanging over. Note that, in all our individuals, frontal part of head in area above nasal bones narrows forward, forming a peculiar acumenate carina, extending above nostrils up to origin of dorsal fin (Fig. 2d). Head rather large, its length 3.0–3.5 times in *SL*, and, as a rule, larger than *V–A*. Eye diameter 1.9–2.5 times in head length. Length of maxillary bone larger than eye diameter.

Origin of dorsal fin in some part of individuals at vertical of anterior margin of orbit; in others, it extends beyond this vertical. Pelvic fins in front of pectoral fins, approximately under 6th–10th ray of dorsal fin; pectoral fins located beyond vertical of pelvic fins, under 9th–12th ray of dorsal fin. Anteanal distance in most examined individuals less than 45 (33.3–45.0)% *SL*, and only in two studied by us mature individuals *SL* 222 and 235 mm is 55.8 and 51.1% *SL* (Table 1). Origin of anal fin under 14th–17th ray of dorsal fin. Space between pelvic rays and origin of anal fin small, as a rule, smaller than head length, except same individuals *SL* 222 and 235 mm. Abdominal dermal fissure well developed. Ends of rays of pectoral fins extend beyond vertical of origin of anal fin. Rays in pelvic fins very long, their length 59 to 92% *SL*; in some cases, they reach end of anal fin and origin of caudal peduncle. Lateral line not seen. Seismosensory pores on head and jaws well developed. Jaw teeth slightly curved, near symphysis in two rows, on jaws in one row, located as a uniform fencing. On vomer, 2 to 8 teeth, on palatine bones in each row 4–10 teeth (Fig. 2e). Gill rakers densely packed on branchial arch (distance between them four to six times in eye orbit, and no more than two times in length of gill filaments (Fig. 2g). Oral-branchial cavity light. Maximum length of *C. macropus* can reach 33 cm (Csepp and Stevenson, 2006). Coloration of fish caught previously with a bluish tint; fixed individuals brownish, fin membranes black.

Comparative remarks. Among individuals from the northern part of the Pacific Ocean present in our material, almost all correspond to the drawing and description of the holotype *SL* 110 mm caught off the coast of Japan (Yokohama Province) (Bellotti, 1903) (Fig. 2a). All of them were caught in the northwestern part of the Pacific Ocean between 37°–43° N and 142°–147° E, which also coincides with the latitudinal zone of the catch of the holotype. Note that some authors, describing *C. macropus* from the northern part of the Pacific Ocean (Hart, 1975; Balanov, 2000; Csepp and Stevenson, 2006), indicate a greater anteanal distance than in the individuals we studied. This can be explained by the methods of measurement (measurements could be made along the oblique line rather than between the verticals) or by the fact that *C. macropus* can be regarded as a collective species (the problem of validity of the species *C. macripus* has not

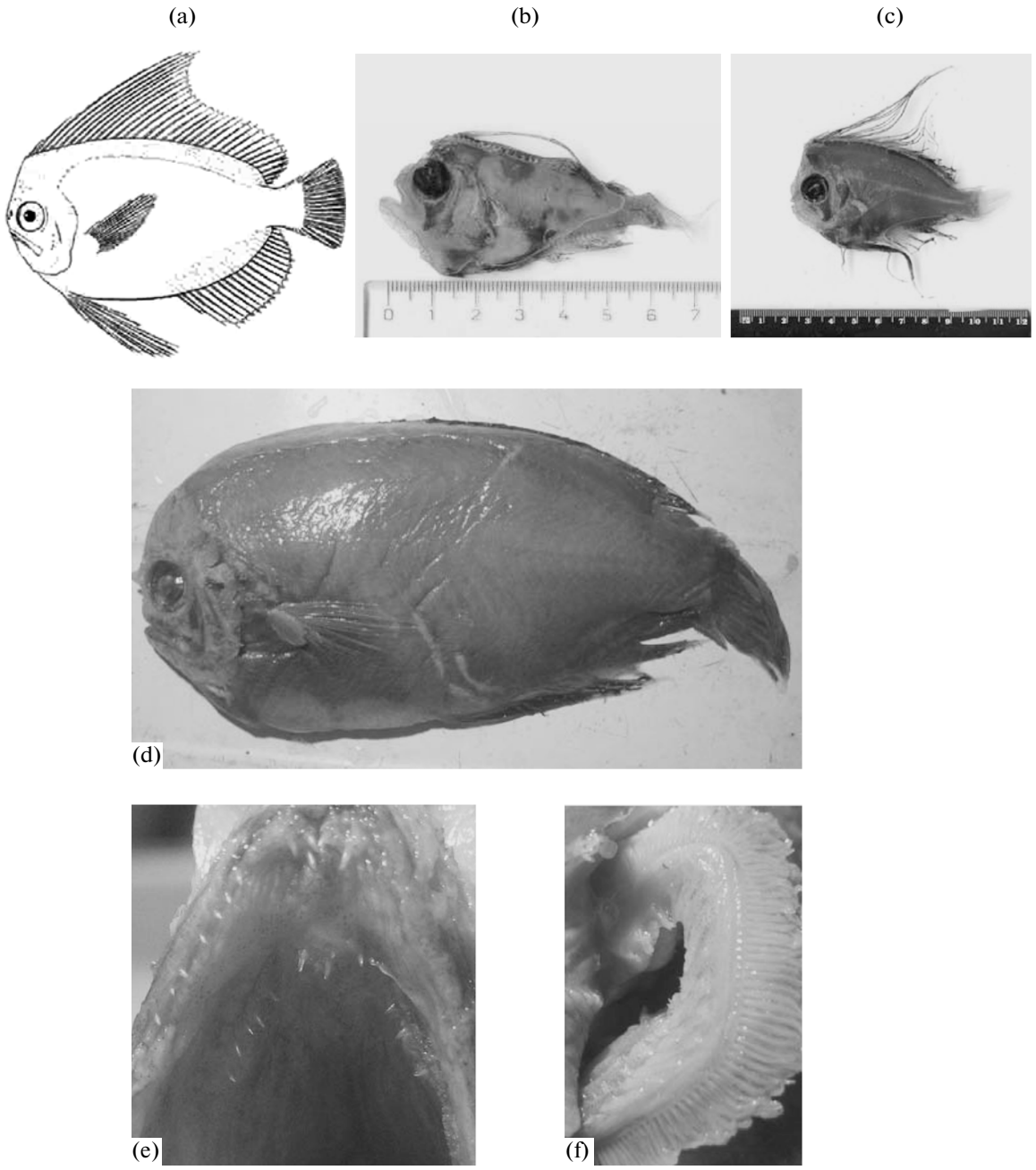

Fig. 4. *Caristius groenlandicus* (a) holotype *SL* 150 mm, Greenland (according to Jensen, 1941); (b) *SL* 61 mm, Gulf Stream (AtlantNIRO); (c) *SL* 82 mm, Gulf Stream (AtlantNIRO); (d) *SL* 181 mm, female, Irminger Sea (AtlantNIRO); (e) roof of oral cavity; (f) branchial apparatus.

been solved thus far, although there is an opinion that this taxon is a synonym of *C. macropus* (Csepp and Stevenson, 2006). In this connection, one should mention the paper of Jordan (1919), in which *C. macropus*, according to several characters (one of them is a short anteanal distance), was opposed to other known by that time fish (including also *C. japonicus*) as a separate genus *Elephenor* within the particular family Elephenoridae. However, later this suggestion was not accepted in the systematics of fish of the family Caristiidae (Jordan, 1923; Jensen, 1941; Scott et al., 1970; Amaoka, 1983; Fujii et al., 1984; Post, 1990; Eschmeyer, 1998; Nelson, 2009). From the Atlantic species *C. groenlandicus*, *C. macropus* differs in the absence of a lateral line, greater number of gill rakers (Table 2), greater number of rays in anal fin (Table 3), greater number of vertebrae (37–40 vs. 35–37) (Fahay, 2007), noticeably smaller anteanal and ventroanal distances, lower caudal peduncle, as well as in a longer head (Tables 1, 4) whose frontal part narrows above nasal

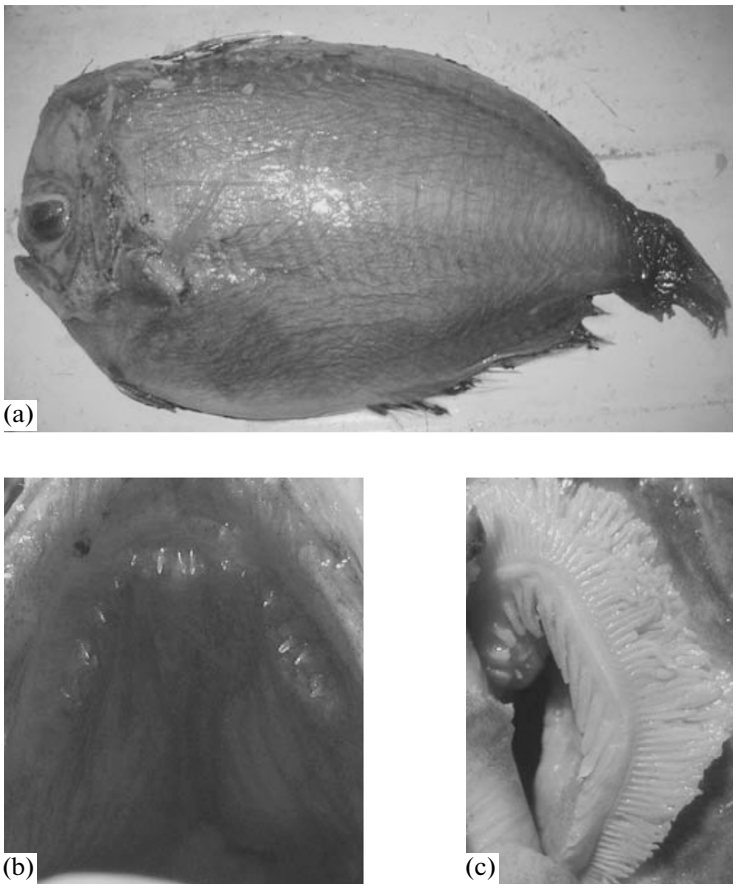

Fig. 5. Deep-body specimen of *Caristius* cf. *groenlandicus SL* 209 mm, Irminger Sea, 60°18′ N, 33°32′ W (AtlantNIRO): (a) female; (b) roof of oral cavity; (c) branchial apparatus.

bones and forms a peculiar carina extending above nostrils up to origin of dorsal fin (in other species of the genus *Caristris*, frontal part of the head is blunted).

From the recently described species *C. andriashevi* from the eastern Atlantic, it differs, besides absence of a lateral line, in a light oral-branchial cavity and a more frontal position of the origin of dorsal fin. From *C. barsukovi* sp. n., it differs in longer gill rakers and, according to this character, is similar to *C. groenlandicus*. From other species of the genus, it differs also in the fact that, in adult fish, rays of pelvic and dorsal fins are strongly elongated. The length of rays of pelvic fins can comprise up to 90% *SL*, and they can reach the caudal peduncle. In adult individuals of other species of the genus *Caristius*, rays of pelvic fins hardly reach the origin of the anal fin. According to several characters, *C. macropus* is most closely related to *C. groenlandicus*. In our material, two individuals (mature females) *SL* 222 and 235 mm (Table 3) are distinguished by black coloration and a large anteanal distance (55.8 and 51.1%, respectively, vs. 27.0–30.7% *SL*), greater anteanal distance (30.2 and 27.2% vs. 16.6–27.2% *SL*). Unlike other studied individuals, head length in them is equal or smaller than ventroanal distance (Table 1). By the listed characters, these two individuals resemble the Atlantic species *C. groenlandicus*.

Distribution. The species inhabits the mesopelagial of the northern part of the Pacific Ocean from subtropical waters to the Bering Sea and the coast of Alaska to where it is apparently drifted by warm currents (Csepp and Stevenson, 2006). Judging from catches of fry, it reproduces in the subtropical zone (Okamoto et al., 2010).

Caristius groenlandicus Jensen, 1941

(Figs. 4–6)

Caristius groenlandicus, Jensen, 1941, p. 49, Part 1 (Davis Strait, western Greenland, 62°53′ N 54°15′ E, depth of 1660 m); Scott et al., 1970, pp. 174–179; Heemstra, 1986, p. 636; Scott, W. and Scott, M., 1988, p. 386; Post, 1990, pp. 765–766; Okamura and Miyahara, 1995, pp. 186–187; Brickle and Laptikhovsky, 2002, pp. 492–494; Kukuev and Trunov, 2002, pp. 323–329.

Caristius macropus (Bellotti): Guschin and Kukuev, 1981, pp. 36–40; Kukuev, 1982, pp. 92–109.

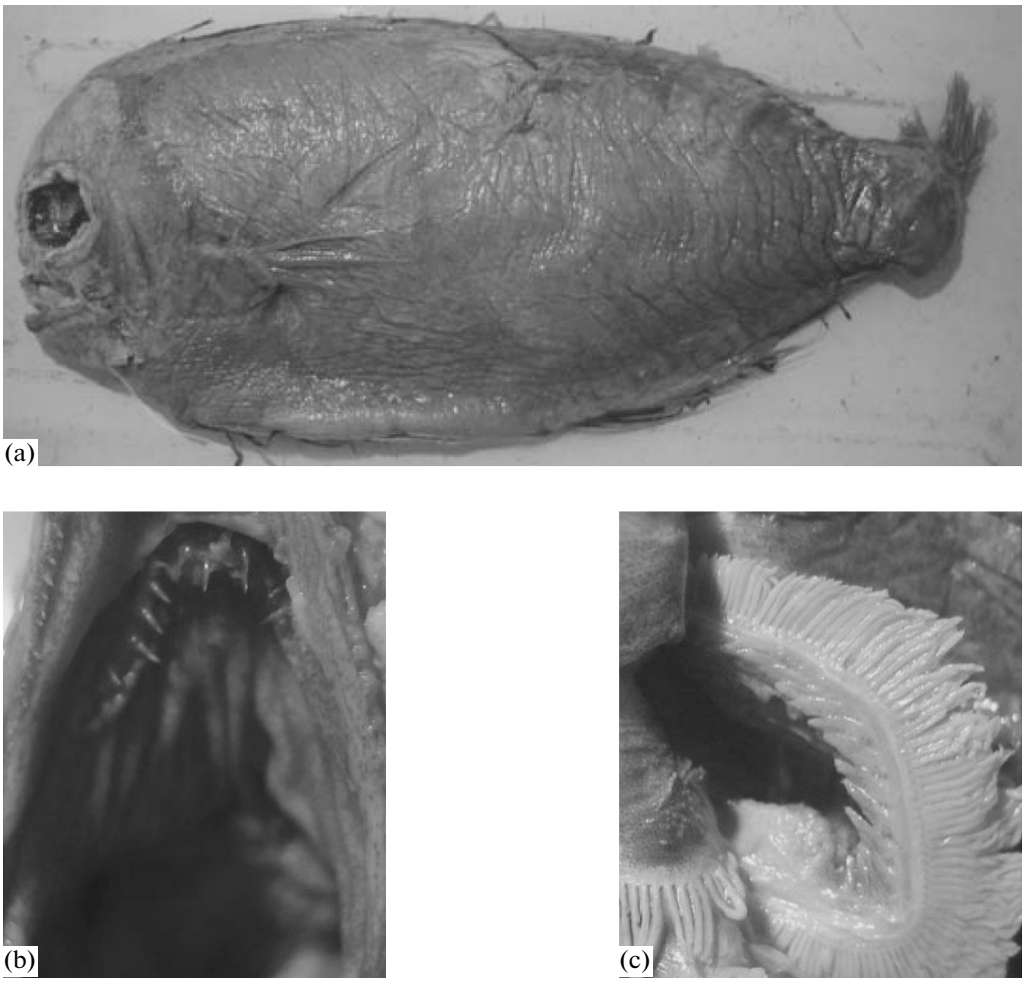

Fig. 6. Low-body specimen of *Caristius* cf. *groenlandicus SL* 213 mm, female, 60°33′ N, 33°43′ W: (a) lateral view; (b) roof of oral cavity; (c) branchial apparatus.

Pteraclis macropus Borodin, 1930: Hartel and Triant, 1998, p. 746.

Platyberyx opalescens Zugmayer, 1911: Møller et al., 2010, p. 58 (62°24′ N 31°05′ W).

Platyberyx groenlandicus (Jensen, 1941); Penrith, 1969, pp. 59–75; Lloris, 1986, pp. 341–343, Fig. 190 (7°–28° S 13°–14° E); Trunov, 1999, p. 467; Møller et al., 2010, p. 58.

Material. Total of 24 individuals *SL* 61–241 mm from the northern part of the Atlantic Ocean. ZIN no. 42990 *SL* 85 mm, 53°22′ N, 35°11′ W, depth of 950–1000 m, R/V *Artemiada*, September 12, 1974; ZIN no. 42917 *SL* 143 mm, 53°21′ N, 35°13′ W, depth of 780 m. Individuals of AtlantNIRO without number: *SL* 61 mm, Gulf Stream zone, 44°24′ N 47°35′ W, depth of 330 m, R/V *Evrika* April 22, 1982; *SL* 82 mm, Gulf Stream zone, 42°53′ N, 61°44′ W, R/V *Evrika*, March 23, 1982; two individuals *SL* 128 (male) 129 mm (female), Irminger Sea, R/V *Atlantida*, July 10, 2001; *SL* 134 mm, Irminger Sea 59°18′ N, 33°42′ W, R/V *AtlantNIRO*, summer 1999; two individuals AL 136 (male) and 147 mm (female), Irminger Sea, 55°01′ N, 36°28′ W, depth of 680–745 m, R/V *Atlantida*, June 28, 2001; two individuals *SL* 140 and 146 mm, females, 55°01′ N, 36°29′ W, depth of 680–745 m, R/V *Atlantida*, June 28, 2001; three individuals *SL* 142.5, 162.0, and 235.0 mm, females, Irminger Sea, R/V *Atlantida*, 2001; *SL* 162 mm, Irminger Sea, 55°21′ N, 43°42′ W, R/V *AtlantNIRO*, summer 1999; *SL* 164 mm, female, Irminger Sea, 56°41′ N, 32°21′ W, R/V *AtlantNIRO*, July 10, 2001; *SL* 170 mm, Irminger Sea, *SL* 172 mm, male, Azores banks; *SL* 174 mm, North Atlantic Ridge; *SL* 181 mm, female, Irminger Sea, July 10, 2001; two individuals *SL* 209 mm, females, Irminger Sea, R/V *Atlantida*, June 5, 2001; two individuals *SL* 213 and 233 mm, females, Irminger Sea, 60°18′ N, 33°32′ W, R/V *AtlantNIRO*, June 5, 2001; *SL* 241 mm, female, Angular Seamount, 34°38′ N, 49°44′ W, R/V *AtlantNIRO*, December 31, 2001.

Diagnosis. In anal fin, 19–22 (usually 20–21) rays; in dorsal fin, 32–35 (usually 32–34) rays; 17–20 gill rakers on first branchial arch. Gill rakers long,

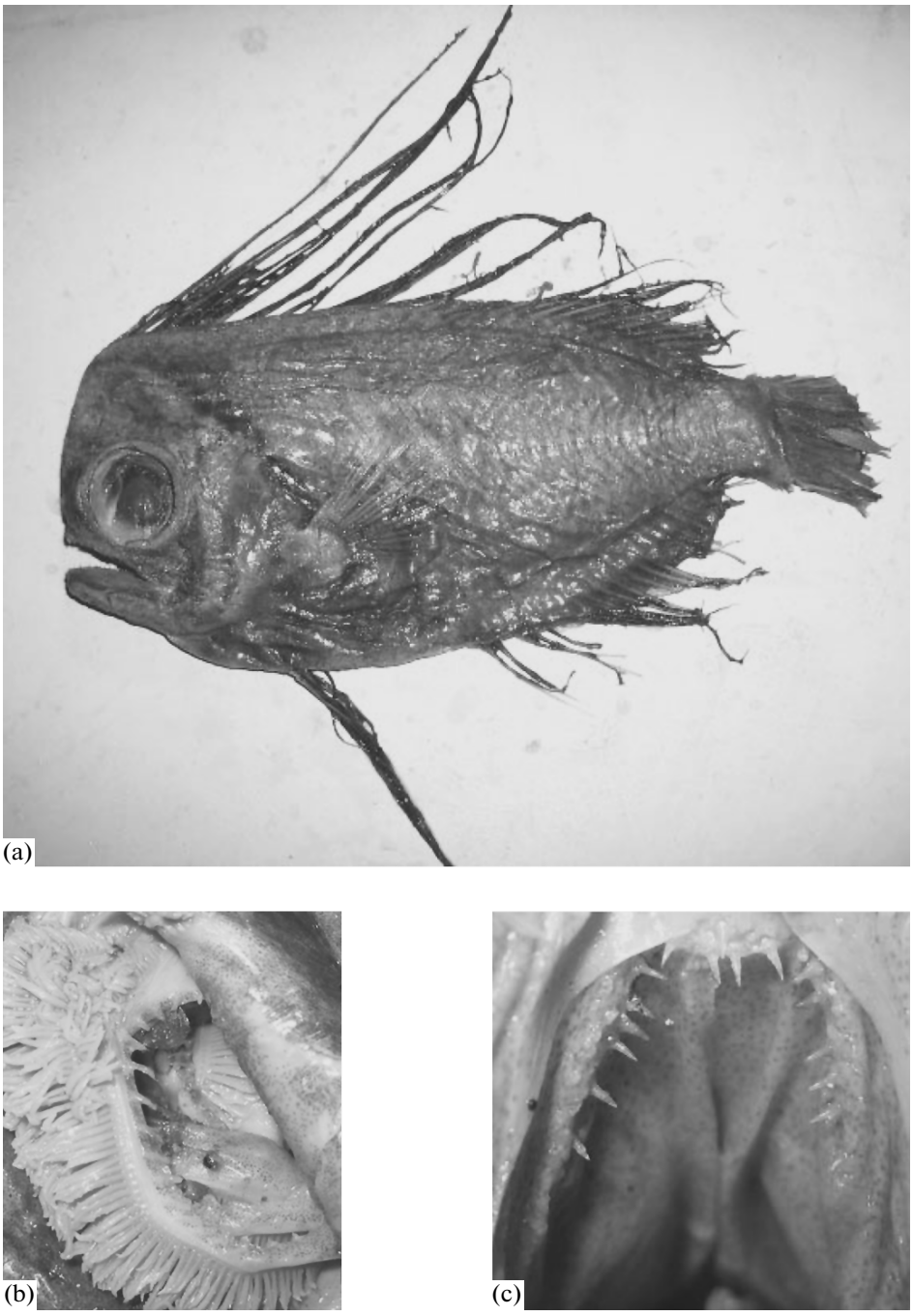

Fig. 7. Holotype *Caristius barsukovi* sp. n., *SL* 198 mm, ZIN no. 38318: (a) lateral view; (b) branchial apparatus, (c) roof of oral cavity.

flattened, slightly smaller than length of gill filaments, almost come in contact with their bases, 1.2–1.4 times in length of gill filaments and 3–5 times in orbit diameter. Head with blunt anterior profile, its length in adult fish 23.0–30.6% *SL*, 3.5–4.4 times in body length; in adult fish, as a rule, smaller than length of ventroanal distance. Rays of pelvic fins in adult fish do not reach end of anal fin and origin of caudal peduncle; their length varies from 30 to 50% *SL*.

Description. *D* 32–35 (usually 32–34), *A* 19–22 (usually 20–21), *P* 16–17, *sp.br.* (4–6) + 1 + (12–13) = 17–20 (usually 18–19), filaments on pseudobranchiale 18–25, vert. 35–36. Morphometric and meristic characters are provided in Table 4.

Body deep, compressed laterally, its maximum depth in area of pectoral fins in adult individuals 46–56% *SL* and 1.6–1.8 times in body length. Dorsal and pelvic contours of body in females almost parallel,

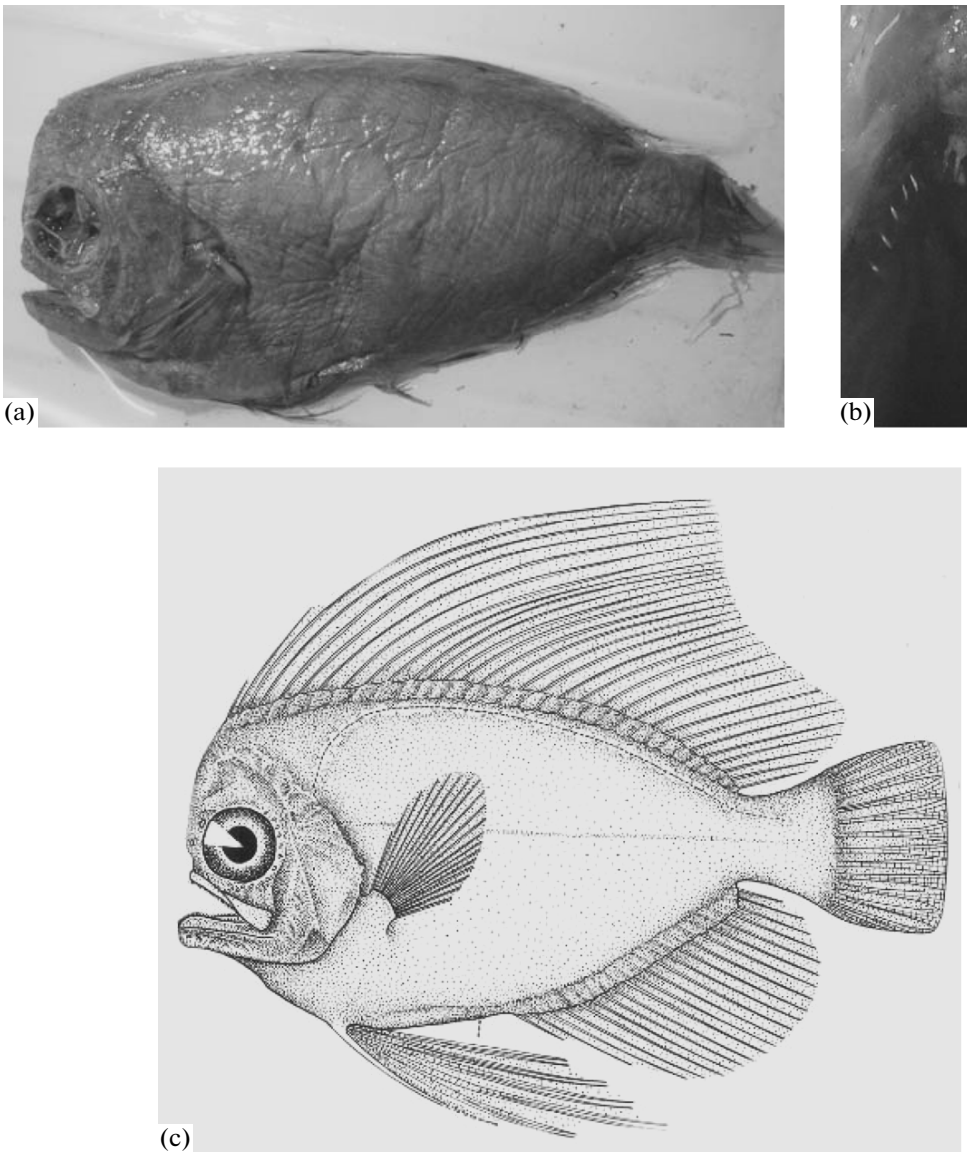

Fig. 8. Paratypes of *Caristius barsukovi* sp. n. (AtlantNIRO without number): (a) female *SL* 195 mm; (b) roof of oral cavity; (c) *SL* 153 mm (19°29′ S, 11°29′ E).

and, in males, can correspond to sides of a triangle, narrowing towards caudal part of body. Caudal peduncle depth greater than eye diameter. Contour of anterior part of head blunt, almost upright (comprises 80°–90° with midline of body). Head length in adult fish 23.0–30.6% *SL* and 3.5–4.4 times in *SL*; in juvenile individuals (*SL* 61–85 mm), head length 30.7–34.4% *SL*. Anteanal distance varies from 46.9 to 61.7% *SL* (in males smaller than in females). Head length in adult fish, as a rule, smaller than ventroanal distance (equal in males). Length of maxillary bone greater than eye diameter, its posterior margin reaches vertical through posterior margin of orbit. Eye diameter in adult fish 2.0–2.5 times in head length, smaller than caudal peduncle depth; in juvenile fish, greater than caudal peduncle depth. Pelvic fins located at same vertical with pectoral fins or slightly ahead of it. Origin of dorsal fin at level of anterior margin of orbit. Origin of pelvic fins under 7th–9th ray of dorsal fin; origin of pectoral fins under 8th–10th ray of D; origin of anal fin under 15th–19th ray of D. Ends of rays of pectoral fins in most individuals do not extend beyond vertical through origin of anal fin. Rays of pelvic fins in large individuals do not reach origin of anal fin; in smaller individuals, slightly extend beyond origin of anal fin, their length is 36.8–52.4% *SL*. Abdominal dermal fissure is well pronounced. Jaw teeth strong conical, sparsely located, up to 16–20 on each jaw. On vomer and palatine bones, teeth few, in one row (Figs. 4e, 5b, 6b). Gill rakers long (2.7–4.0% *SL*, 1.1–1.3 times in

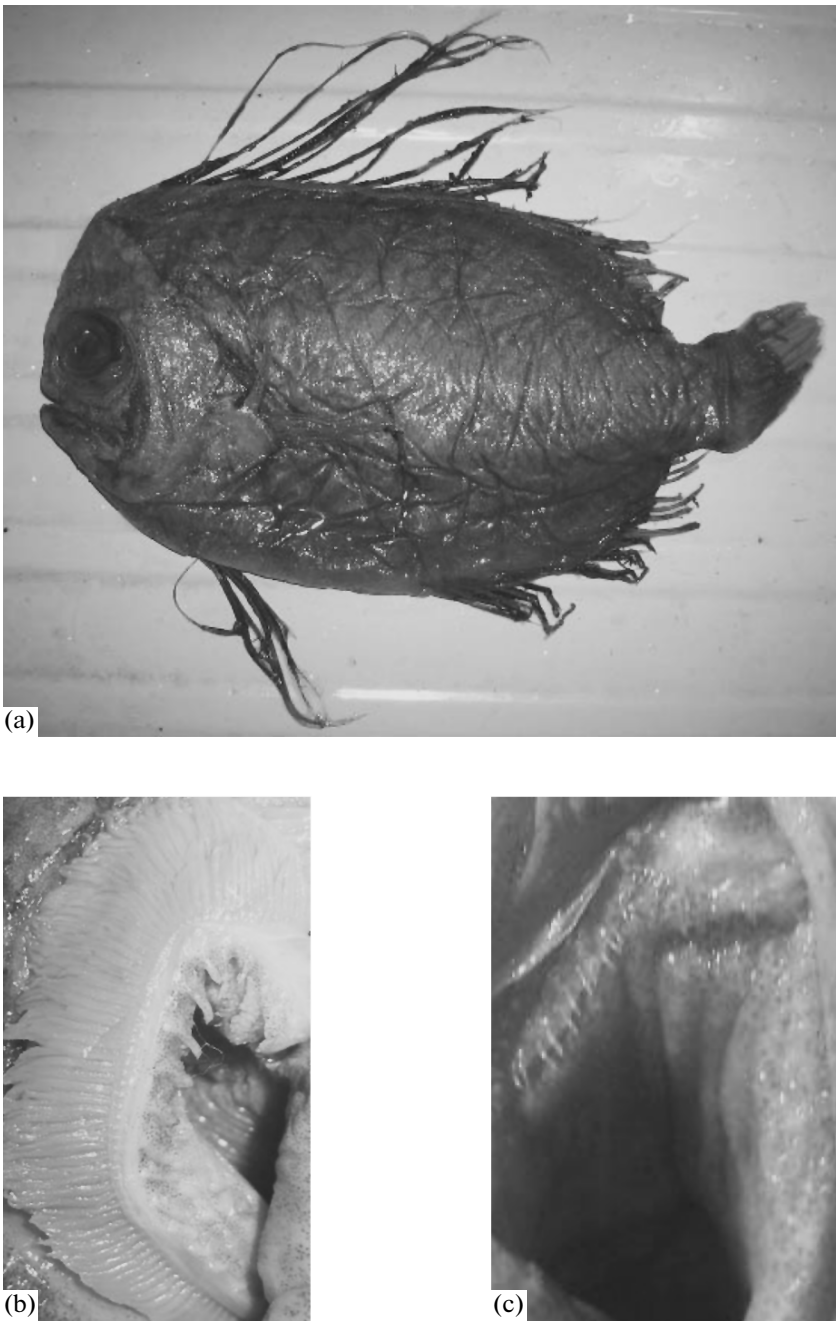

Fig. 9. Deep-body specimen of *Caristius* cf. *barsukovi* sp. n., female *SL* 216 mm, Discovery area (AtlantNIRO): (a) lateral view; (b) branchial apparatus; (c) roof of oral cavity.

length of gill filaments), closely located on branchial arch (distance between them smaller than 1/3 of their length), overlying each other (Figs. 4f, 5c, 6c), their length 3–4 times in length of eye orbit. Lateral line in most individuals as row of enlarged scale pouches. Seismosensory system on the head and jaws well developed. One can suggest presence in *C. groenlandicus* of sexual dimorphism: males smaller than females (they mature at a smaller length than females). At *SL* 128 and 136 mm, males have gonads at maturity stage III, while length of females with gonads at maturity stage III exceeds 200 mm (Table 5). In males, value of anteanal distance smaller, upper and lower contours of body from head to tail smoothly narrow; in females, more or less parallel. Maximum body length in females up to 30 cm. Coloration from grayish to brownish, fin membranes black.

Comparative remarks. Adult individuals of the fish we examined correspond to the description of the holotype of *Caristius groenlandicus* (Jensen, 1941)

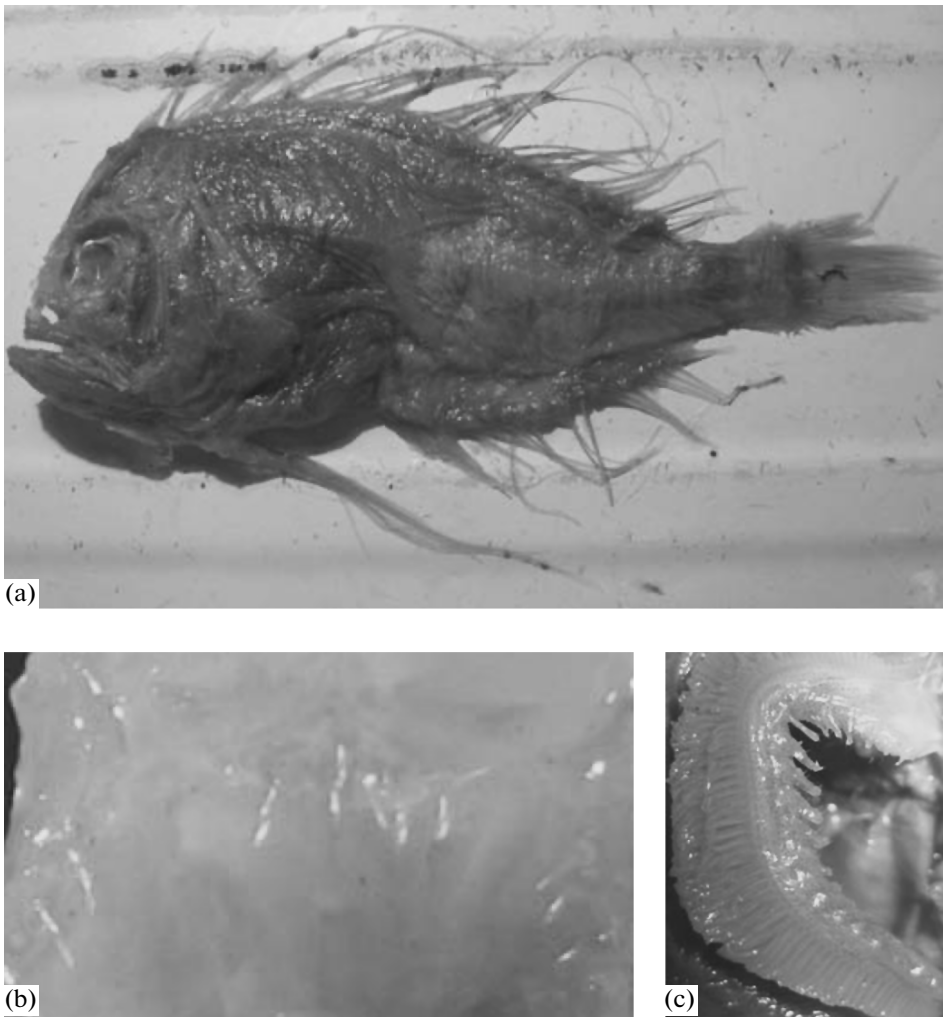

Fig. 10. Holotype of *Caristius litvinovi* sp. n., ZIN no. 55186—*SL* 130 mm (33°51′ S, 17°24′ E): (a) lateral view, (b) roof of oral cavity, (c) branchial apparatus.

(Fig. 4a). Fry from our material *SL* 61 mm caught in the zone of the Gulf Stream (Fig. 4b) completely corresponds to the description given by Borodin (1930) of fry under the name of *Pteraclis fasciatus* caught also in the Gulf Stream zone at coordinates 41°28′ N, 43°29′ W (Hartel and Triant, 1998). *C. groenlandicus* differs from *C. macropus* in a smaller number of rays in the anal fin, smaller number of gill rakers (Tables 2, 3), greater value of anteanal and ventroanal distances, smaller length of rays in dorsal and pelvic fins, presence of lateral line, shorter head, and a deeper caudal peduncle (Tables 1, 4, 6). From *C. barsukovi* sp. n., it differs in elongated and connivent gill rakers, shorter head, smaller number of rays in the dorsal fin, larger conical jaw teeth and their smaller number. From *C. andriashevi*, *C. litvinovi*, and *C. walvisensis* sp. n., it differs in a steeper contour of the forehead and more anterior position of origin of the dorsal fin. From *C. andriashevi*, it also differs in a less pronounced lateral line and a light oral-branchial cavity. According to several characters, *C. groenlandicus* is most closely related to *C. macropus* and *C. barsukovi* sp. n. Note that, in our material, there are individuals (*SL* 209, 213, 233, and 235 mm—adult mature females) caught in the Irminger Sea (Fig. 6) that differ from typical *C. groenlandicus* in a rounded anterior contour of the head (origin of dorsal fin at the level of posterior margin of the orbit), lower oblong body (*H* 44.9–47.2 vs. 48.0–56.6% *SL*) in typical individuals of *C. groenlandicus*), shorter head (21.7–25.9 vs. 24.3–30.6% *SL*), greater value of anteanal and ventroanal distances. These individuals possibly belong to a not yet described species or subspecies closely related to *C. groenlandicus* (Okamura and Miyahara, 1995; Kukuev and Trunov, 2002).

Distribution. According to our data, *C. groenlandicus* inhabits the mesopelagial of the north Atlantic on the external periphery of subtropical waters (30°–35° N) with drift to higher latitudes up to 60° N

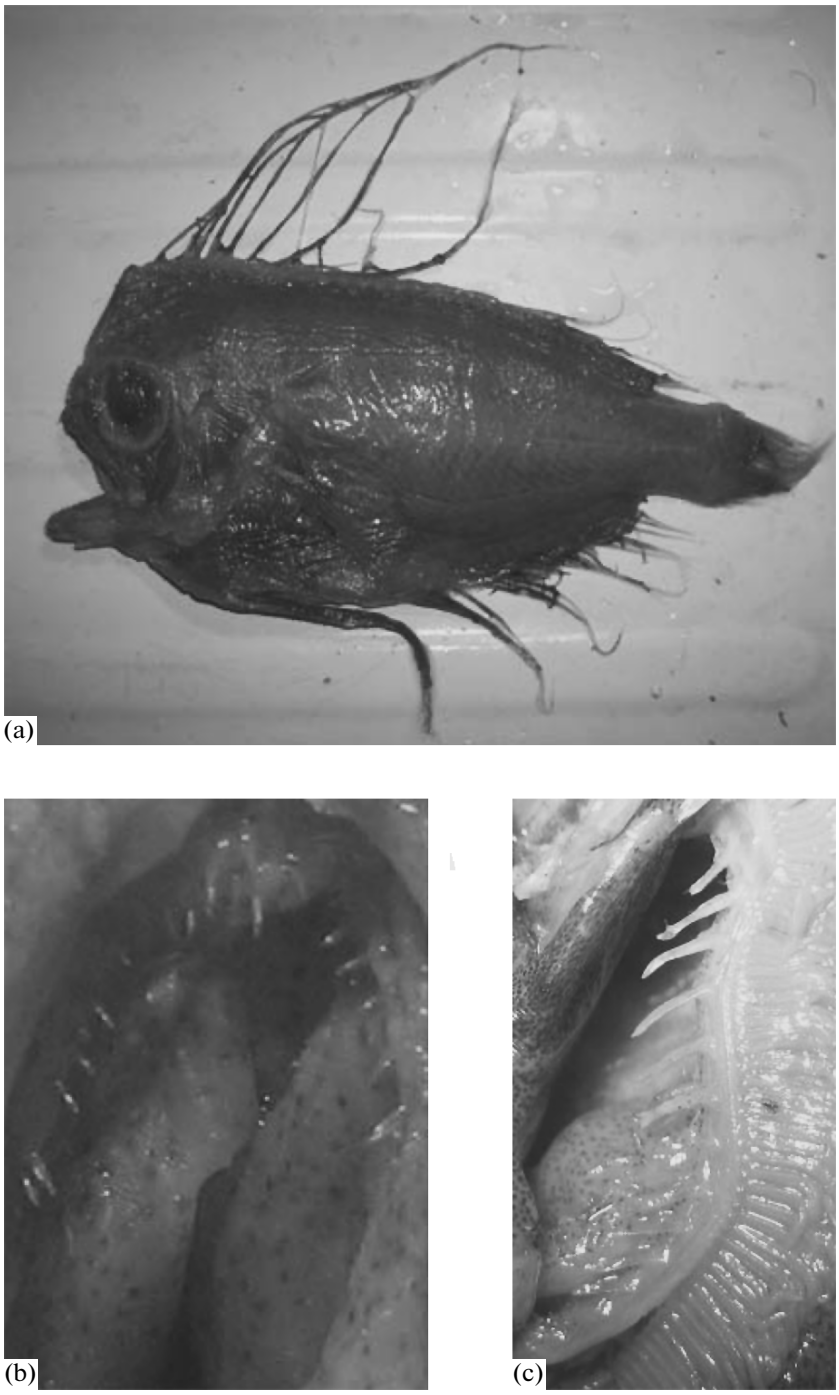

Fig. 11. Holotype of *Caristius walvisensis* sp. n., ZIN no. 55190–*SL* 129 mm, male: (a) lateral view, (b) roof of oral cavity; (c) branchial apparatus.

(coasts of Iceland and Greenland). It was rather frequently caught in the Irminger Sea and above the North Atlantic Ridge between 45°–60° N (Guschin and Kukuev, 1981; Kukuev, 1982; Okamura and Miyahara, 1995; Kukuev and Trunov, 2002; Møller et al., 2010). Judging from catches of mature females and juveniles, spawning occurs on the periphery of subtropical waters (in the Sargasso Sea, in the zone of the Gulf Stream and off the Azores).

***Caristius barsukovi* sp. n.**

(Figs. 7–9)

Platyberyx groenlandicus (Jensen): Penrith, 1969, pp. 59–75; Lloris, 1986, pp. 341–343, Fig. 190 (27°–28° S 13°–14° E); Trunov, 1999, p. 467.

Caristius groenlandicus Jensen: Heemstra, 1986, p. 1986, Fig. 208.1 (Republic of South Africa); Brickle and Laptikhovsky, 2002, p. 492.

Table 1. Some morphometric and meristic characters of the studied specimens of *Caristius macropus*

Characters	Specimens of ZIN RAN									
SL, mm	125	135	143	165	175	182	185	207	222	235
In % *SL*										
H	50.0	48.1	54.5	50.3	51.4	56.0	50.8	49.3	51.1	48.9
h	12.5	14.0	13.3	13.3	12.1	12.6	11.9	12.3	11.6	10.6
aV	25.0	25.9	30.4	30.8	22.8	22.2	28.6	27.7	23.5	29.4
aP	33.3	33.3	31.1	28.4	28.5	27.7	28.6	33.3	27.9	26.8
aD	24.4	21.0	26.6	25.9	23.3	28.0	25.1	25.6	28.4	25.1
aA	33.6	40.7	33.3	43.6	44.5	44.4	45.0	42.8	55.8	51.1
V–P	8.3	3.8	6.3	5.8	7.5	6.9	5.7	7.9	4.3	4.3
V–A	20.8	22.2	19.2	27.2	25.7	16.6	23.8	20.0	30.2	27.2
lV	77.6	72.5	92.3	72.5	82.1	59.3	82.7	–	54.1	60.9
c	29.1	29.6	30.1	30.8	28.4	29.4	27.0	28.0	25.8	27.0
ao	4.9	5.1	4.9	5.8	5.6	4.9	4.9	4.3	4.5	4.5
o	12.5	13.3	11.9	12.3	11.4	12.1	11.6	9.9	11.6	9.4
lmx	18.4	18.5	18.5	17.3	14.2	15.9	14.6	14.6	14.8	14.9
Ordinal number of ray of *D*										
Origin of *P*	9	17	11	12	10	9	12	11	12	10
Origin of *V*	13	14	8	8	7	6	10	9	9	9
Origin of *A*	16	17	15	15	14	15	16	16	20	17
Meristic characters										
A	22	21	23	21	22	22	22	22	21	22
D	35	35	32	34	32	32	33	34	33	34
P	19	18	18	17	17	18	20	17	17	18
sp.br.	22	21	20	20	22	20	21	21	21	20

Here and in Table 4, 5: *SL*—standard length; *H*—maximum depth of the body; *h*—caudal peduncle depth; *aD*, *aA*, *aP*, *aV*, *V–P*, *V–A*—antedorsal, anteanal, antepectoral, anteventral, ventropectoral, and ventroanal distances, respectively; *c*—head length; *ao*—snout length; *o*—orbit diameter; *lmx*—length of upper jaw; *A*, *D*, *P*—number of rays in anal, dorsal, and pectoral fins, respectively; *sp.br.*—number of gill rakers on the first branchial arch.

Table 2. Number of gill rakers (*sp.br.*) on the first branchial arch in different species of the genus *Caristius*

Species	*sp.br.*						
	17	18	19	20	21	22	23
C. macropus	–	–	–	5	6	3	1
C. groenlanducus	3	13	12	5	–	–	–
C. barsukovi sp. n.	2	5	1	–	–	–	–
C. andriashevi	–	–	2		1	–	–
C. litvinovi sp. n.	–	–	–	1	–	–	–
C. walvisensis sp. n.	–	1	–	–	–	–	–

Caristius cf. *opalescens* (Zagmayer): Trunov et al., 2006, p. 466, Fig. 1.

Material: five individuals from the southeast Atlantic.

Holotype: ZIN no. 38318–*SL* 198 mm, 36°20′ S, 14°02′ E, diesel-electric ship *Ob*, stn. 265, March 19, 1957, collectors V.V. Barsukov and Yu.E. Permitin.

Paratypes. Four individuals AtlantNIRO without number: *SL* 176 mm, female, 27°53′ S, 14°26′ E, large refrigerator trawler *Gizhiga*, January 29, 1974, collector Trunov, I.A.; *SL* 195 mm, male, 42°08′ S, 0°, depth of 900–800 m, R/V *Evrika*, stn. 193, March 29,

1981, collector I.A. Trunov; *SL* 216 mm, female, 42° S, 0°7′ W, depth of 900–800 m, Discovery, R/V *Evrika*, March 29, 1981, collector I.A. Trunov; *SL* 153 mm, 19°29′ S 11°29′ E, large refrigerator trawler *Gizhiga*, trawl 139, depth of 490 m, January 15, 1974, collector I.A. Trunov.

Diagnosis. Gill rakers very short, more than two times length of gill filaments and seven to nine times orbit; flattened, with two denticles on slightly widened apex, sparsely located on branchial arch (distance between rakers approximately equal to their length). In dorsal fin, 35–37 rays; in anal fin, 21–22 rays; 17–18 gill rakers on first branchial arch. Anterior contour of head steep, head rather large (with 27–31% *SL*), its length 3.5 times in *SL*; as a rule, greater or equal to ventroanal distance. Lateral line distinct.

Description. *D* 36 (35–37), *A* 23 (21–23), *P* 19 (17–19), *sp.br.* 5 + 1 + 12[(4–5) = 1 + (12–12)] = 17–18, filaments on pseudobranchiale 16, *vert.* 37. Morphometric and meristic characters of *C. barsukovi* sp. n. are provided in Table 6.

Body moderately deep, strongly compressed laterally, its maximum depth at vertical through region of pectoral fins, it comprises 43.8–57.4% *SL* and two times in *SL*. Upper and lower contours of head in male *SL* 195 mm narrow in caudal part; in females, they are more or less parallel. Anterior contour of head steep. Head rather large, its length 3.5 times in *SL*; as a rule, greater or equal to ventroanal distance. Eyes large, their diameter more than 70% of caudal peduncle depth and approximately 2.5 times in head length. Mouth large. End of maxillary bone reaches vertical through posterior margin of orbit. Origin of dorsal fin at level of anterior margin of orbit. Pectoral and pelvic fins approximately one under the other. Anteanal distance more than 50% *SL*; *V–A* smaller or equal to head length. Origin of pectoral and pelvic fins under 8th–13th ray of dorsal fin; origin of anal fin under 17th–19th ray of dorsal fin. Abdominal fissure between pelvic and anal fins well developed, with thickened cutaneous walls. Teeth acute, frequently located, in one row, near symphysis in one to three rows; on lower jaw, more than 20 teeth; on upper jaw, up to 30 teeth (at end of upper jaw curved forward). On vomer and palatine bones, teeth resemble jaw teeth. On vomer, up to 5–7 teeth; on palatine bones, up to 7 teeth. Gill rakers on first branchial arch very short (1.0–1.3% *SL*, 2.5–4.0 times in length of gill filaments, 7–9 times in diameter of orbit), sparsely located (distance between rakers approximately equal to their length), with two denticles on apex. Extreme gill rakers rudimentary. Oral-branchial cavity light. Tongue in the holotype weakly pronounced (possibly, dried in alcohol solution). In paratypes, normally developed. Body and head covered with small scales. Lateral line distinctly pronounced, does not reach base of caudal fin: in holotype, contains approximately 30 tubular easily falling scales. Seismosensory pores on head and jaws well developed. Ends of rays of pectoral fins do not reach origin of anal fin. Ends of rays of pelvic rays hardly reach origin of anal fin, their length 32.9–52.0% *SL*. Coloration of body of fixed individuals brown. Largest of studied individuals reaches 216 mm in length. Judging from maturity of gonads (stage IV–V in male *SL* 195 mm, stage II–III in female *SL* 216 mm) (Table 5), this species can reach greater sizes than North-Atlantic *C. groenlandicus*.

Table 3. Number of rays in anal fin (A) in different species of the genus *Caristius*

Species	*A*					
	18	19	20	21	22	23
C. macropus	–	–	–	4	8	3
C. groenlanducus	?	5	12	11	3	–
C. barsukovi sp. n.	–	–	–	2	4	2
C. andriashevi	–	–	1	1	1	–
C. litvinovi sp. n.	–	–	–	–	1	–
C. walvisensis sp. n.	–	–	–	1	–	–

Etymology. The species was named in honor of the well-known Russian ichthyologist and zoogeographer Vladimir Viktorovich Barsukov (1922–1989). In 1957, he was a participant of the Soviet expedition on diesel-electric ship *Ob*, from which the holotype of the described species was brought.

Comparative remarks. From the North-Atlantic *C. groenlandicus* and the North-Pacific *C. macropus*, the new species differs in shortened, sparsely located gill rakers (Fig. 7b) and greater number of rays in dorsal fin (Table 7), as well as in a greater number of jaw teeth. From *C. groenlandicus*, it also differs in a longer head and, according to this character, is similar to *C. macropus* (Tables 1, 4, 6, 8). The new species resembles *C. groenlandicus* and *C. macropus* in the pattern of distribution of teeth on the roof of the oral cavity (Figs. 2e, 4e, 7c). And, as was already mentioned, *C. barsukovi*, like *C. groenlandicus* and *C. andriashevi*, differs from *C. macropus* in a greater anteanal distance and presence of a well-pronounced lateral line. However, one can assume that *C. barsukovi* sp. n., according to several characters, is still more closely related to *C. groenlandicus* and *C. macropus*, forming together with them a natural group possibly close by origin. From the new species described from the southeast Atlantic (*C. litvinovi* sp. n. and *C. valvisensis* sp. n.), *C. barsukovi* differs in shortened gill rakers (Figs. 7b, 9b), greater number of rays in dorsal fin, pattern of teeth on the roof of oral cavity, steep

Table 4. Some morphometric and meristic characters of the studied specimens of *Caristius groenlandicus*

Characters	Specimens of AtlantNIRO																							
SL, mm	61	81.2	85	128	129	134	136	140	142.5	143	146	147	162	164	170	172	174	181	209	209	213	233	235	241
Cex	juv.	juv.	juv.	♂	♀	?	♂	♀	?	♀	♀	♀	?	♀	?	♂	?	♀	♀	♀	♀	♀	♀	♀
In % *SL*																								
H	50.8	49.2	54.1`	48.0	56.6	46.3	48.5	47.9	49.8	50.3	50.7	49.7	44.4	48.8	50.0	55.0	51.7	53.5	44.9	56.5	45.1	45.1	47.2	54.4
h	10.3	12.3	11.8	14.8	15.1	14.2	12.7	13.5	14.0	14.0	14.0	12.2	12 .5	14.0	14.0	13.4	14.4	14.1	13.4	15.3	13.6	13.3	13.4	14.5
aV	39.3	39.4	35.9	25.8	28.3	32.1	29.4	24.6	28.4	30.1	28.4	27.2	28.1	27.4	27.6	29.4	28.2	26.5	26.3	26.7	23.7	27.0	26.6	28.6
aP	37.7	34.4	34.7	29.3	30.6	31.3	30.5	27.8	30.5	29.4	26.2	27.8	27.8	25.6	27.6	29.4	27.6	27.3	25.1	25.3	24.9	24.5	26.2	25.3
aD	22.1	–	28.8	25.0	29.8	21.6	25.0	22.5	23.9	21.7?	22.6	23.8	21.2	24.3	24.1	24.4	24.7	23.5	23.6	24.4	23.5	22.3	21.7	20.7
aA	61.0	52.9	51.7	46.9	52.7	55.2	55.8	54.0	51.2	53.8	55.4	55.1	53.1	54.3	54.1	55.8	55.2	54.7	61.7	59.5	57.3	54.9	58.3	58.9
V–P	15.5	–	11.8	7.0	6.4	7.5	7.3	5.7	9.8	5.6	8.2	8.1	4.3	6.7	5.2	2.6	4.6	3.2	5.7	4.7	5.9	2.6	3.4	1.7
V–A	36.0	24.6	29.4	26.6	28.3	32.1	27.2	33.5	31.6	27.3	32.5	34.1	28.3	31.1	30.0	30.2	31.6	32.0	40.9	38.2	35.2	33.0	36.2	31.1
lV	36.8	–	42.7	39.8	47.3	45.5	–	42.8	–	39.9	–	–	42.2	42.2	45.5	45.9	40.8	46.4	43.3	–	46.0	52.4	45.5	42.3
c	34.4	30.7	33.5	29.3	30.6	27.6	27.9	25.3	26.7	28.0	26.0	25.8	25.4	27.4	25.3	27.3	25.3	24.3	21.7	25.1	23.0	22.3	25.1	23.4
ao	7.3	6.2	6.2	6.3	7.0	5.5	5.5	6.4	5.1	5.9	5.8	5.4	6.2	7.0	6.0	6.4	5.7	5.5	4.06	5.9	4.7	3.9	6.4	4.6
o	15.0	23.5	16.5	11.7	12.4	11.4	10.6	10.0	11.6	9.8	10.4	9.5	10.2	9.8	9.7	11.3	9.5	10.2	10.0	9.8	9.4	8.4	8.5	8.7
lmx	22.9	19.7	20.6	16.8	20.5	17.6	16.1	14.6	16.4	18.5	14.7	14.6	15.4	14.6	14.1	16.5	14.0	12.7	13.1	13.3	13.1	–	13.6	11.6
Ordinal number of ray of *D*																								
Origin of *P*	11	9	11	12	11	11	11	9	11	8	10	10	10	11	10	10	10	10	11	10	9	9	9	8
Origin of *V*	–	7	7	8	9	–	7	7	9	6	8	7	–	–	8	7–8	–	9	8	7	–	–	8	7
Origin of *A*	18	14	18	16	18	17	18	19	19	15	16	17	18	17	18	18	17	17	19	17	18	18	17	16
Meristic characters																								
A	20	21	21	19	21	21	22	20	22	21	20	22	21	21	21	20	20	21	19	20	20	20	20	20
D	34	32	33	33	35	33	33	34	34	33	34	34	35	32	33	33	32	33	33	35	32	33	32	34
P	18	18	19	19	19	17	17	19	18	19	18	17	18	17	18	18	18	18	18	18	18	17	18	18
sp.br.	19	20	20	18	19	20	18	18	19	18	18	20	20	18	19	19	19	18	19	19	19	19	17	18

juv.—juvenile specimen; ♂—male; ♀—female; ?—sex not identified

Table 5. Sex and stage of maturity of gonads of the studied specimens of species of the genus *Caristius*

SL, mm	Sex	Stage of maturity	Date of catch	Coordinates
		Caristius groenlandicus		
61	Not identified	Juvenile	Apr. 22, 1982	44°24′ N 47°35′ W
82	The same	The same	March 26, 1982	42°53′ N 61°44′ W
85	″	″	Sept. 12, 1974	53°22′ N 35°11′ W
128	Male	III	July 10, 2001	Irminger Sea
129	Female	II	″	″
136	Male	II–III	June 28, 2001	55°01′ N 36°28′ W
140	Female	I	″	55°01′ N 36°29′ W
146	The same	II	″	″
147	″	I	″	55°01′ N 36°28′ W
164	″	II	July 10, 2001	56°41′ N 32°21′ W
181	″	II	″	Irminger Sea
209	″	III	June 5, 2001	″
209	″	III	″	″
213	″	III	″	60°18′ N 33°32′ W
233	″	III	″	″
241	″	IV(IV–V)	Dec. 31, 2001	34°38′ N 49°44′ W
		Caristius barsukovi sp. n.		
176	″	II	Jan. 29, 1974	27°53′ S 14°26′ E
195	Male	IV(IV–V)	March 23, 1981	42°08′ S 0°
216	Female	II–III	March 29, 1981	42° S 0°7′ W
		Caristius walvisensi sp. n.		
129	Male	IV	Jan. 13, 1975	34°35′ S 7°20′ W

contour of the frontal part of the head, and position of origin of dorsal fin. Note that, from the area of Discovery (42° S, 0°7′ W, depth of 900–800 m), an individual *SL* 216 mm was brought (Fig. 9) that we assign to the described species. However, it differs from the holotype and three paratypes in a considerably deeper body (57.4 vs. 43.8–49.2% *SL*), greater anteanal distance (57.9 vs. 51.1–54.5% *SL*), greater number of jaw (45 vs. 30) and palatine (12 vs. 7) teeth, and shorter nodular gill rakers with five denticles along the posterior margin (Trunov, 1999).

Distribution. The species is described from individuals caught in the mesoplagial of the southeast Atlantic from Namibia to Discovery Seamount. One can suggest its circumnotal distribution.

Caristius litvinovi sp. n.

(Fig. 10)

Material: one individual from the southeast Atlantic.

Holotype. ZIN no. 55186–*SL* 130 mm, 33°51′ S, 17°24′ E, December 4, 1974, depth of 780–850 m, R/V *Evrika*, stn. 123, collector I.A. Trunov.

Diagnosis. Anterior profile of head strongly sloped at an angle of approximately 65° in midline of body. Origin of dorsal fin beyond vertical through posterior margin of orbit. Distance from origin of upper jaw to origin of dorsal fin (along forehead slope contour) greater than head length. Eye diameter greater than caudal peduncle depth. Gill rakers flattened, comparatively long (1.3 times in length of gill filaments), distance between them smaller than 1/2 of their length. On upper part of gill raker, up to five denticles, 20 gill rakers on first branchial arch. Head length exceeds ventroanal distance. In dorsal fin, 34 rays; in anal fin—22. On the vomer, nine teeth; teeth in one row on both jaws. Lateral line without strongly enlarged and modified scales.

Description. *D* 34, *A* 22, *P* 18, *sp.br.* 6 + 1 + 13 = 20, filaments on pseudobranchiale 18. Morpho-

Table 6. Morphometric and meristic characters of *Caristius barsukovi* sp. n.

Characters	Holotype ZIN no. 38318	Paratypes of AtlantNIRO without number			
SL, mm	198	153	176	195	216
Sex	Not identified	Not identified	Female	Male	Female
In % *SL*					
H	49.0	44.4	43.8	49.2	57.4
h	13.6	11.1	13.4	12.3	15.7
aV	32.8	22.4	29.0	26.7	30.8
aP	31.3	29.4	29.3	28.5	29.2
aD	24.7	23.9	21.6	23.6	28.5
aA	54.5	52.3	51.1	53.1	57.9
V–P	4.0	–	6.8	6.7	4.4
V–A	26.0	22.9	26.7	26.4	31.5
lV	52.0	32.9	–	46.2	40.7
c	29.8	27.1	29.0	28.0	28.2
ao	5.3	4.7	5.1	4.2	4.6
o	11.4	9.5	11.9	11.8	11.6
lmx	16.2	16.3	12.2	12.8	16.9
Ordinal number of ray of *D*					
Origin of *P*	13	8	12	11	10
Origin of *V*	12	12	–	11	–
Origin of *A*	19	19	18	19	17
Meristic characters					
A	23	22	21	21	22
D	36	34	36	36	35
S	19	18	19	17	17
sp.br.	18	18	17	18	17

metric and meristic characters of *C. litvinovi* sp. n. provided in Table 8.

Body moderately deep, strongly compressed laterally, its upper contour convex. Maximum body depth (in region of pelvic and pectoral fins and first rays of dorsal fin) slightly greater than 45% *SL* and slightly more than two times in *SL*. Anterior profile of head receding and sloped towards midline of body at an angle of approximately 65°. Head comparatively large; its length 3.4 times in *SL*; noticeably larger than ventroanal distance. Eyes large. Maximum eye diameter 12.3% *SL*; greater than caudal peduncle depth and slightly more than two times in head length. End of maxillary bone reaches posterior margin of orbit. Origin of dorsal fin extends beyond posterior margin of orbit. Pelvic fins attached in front of origin of pectoral fins, long; their rays extend beyond origin of anal fin and comprise 51.5% *SL*. Rays of dorsal and anal fins also elongated. Near base of caudal fin from each side of caudal peduncle seven well-developed short spinules. Origin of pectoral fin under 7th ray of dorsal fin; origin of anal fin under 15th ray of dorsal fin. Anteanal distance 48.1% *SL*. Teeth on upper and lower jaws acute, in one row, slightly curved. Their

number on each jaw 30. On vomer, nine teeth located in two rows; on palatine bones, nine teeth from each side (Fig. 10b). Gill rakers comparatively long, flattened (2.3% *SL*), slightly more than five times in eye orbit and 1.3 times in length of gill filaments; distance between them smaller than 1/2 of their length (Fig. 10c). On upper part of rakers, up to five spinules. Lateral line as easily noticeable strokes on skin. Fissure between pelvic fins and anal fin filled with glandular tissue. Coloration of body of fixed individual light brown. Maximum known length 130 mm.

Etymology. The species is named in honor of the well-known Russian ichthyologist Fedor Fedorovich Litvinov (1954–2011) who did much for studying oceanic ichthyofauna.

Comparative remarks. *C. litvinovi* sp. n., according to forehead slope and position of origin of dorsal fin, resembles *C. andriashevi* (Kukuev et al., 2012), but differs from it in the pattern of lateral line, greater eye diameter, low caudal peduncle, as well as in a greater number of teeth on the roof of oral cavity and a lighter tint of the oral-branchial cavity. *C. litvinovi*, according to pattern of forehead slope, has some similarity with *C. walvisensis* sp. n., from which it differs in a more backward position of origin of dorsal fin (Figs. 10, 11), lower caudal peduncle, smaller ventroanal distance (Table 8), structure of gill rakers (compare Figs. 10c and 11c) and other characters. Maximum differences, according to several characters, exist between *C. litvinovi* sp. n. and the triad (*C. macropus*, *C. groenlandicus*, and *C. barsukovi* sp. n.). Some similarity exists between *C. litvinovi* sp. n. and species of the genus *Platyberyx* (Kukuev et al., 2012), but differences include a greater number of rays in unpaired fins and structure of dentition.

Distribution. The species is known from the holotype caught on the continental slope of the southwestern extremity of South Africa.

Caristius walvisensis sp. n.

(Fig. 11)

Material: one individual from the southeast Atlantic.

Holotype. ZIN no. 55190—*SL* 129 mm, male (maturity stage of gonads IV), Walvis Seamount, 34°35′ S, 7°20′ W, October 13, 1975, medium refrigerator trawler *Salekhard*, depth of 0–1200 m, collector I.A. Trunov.

Diagnosis. Anterior profile of head moderately sloped, forming with midline of body an angle of 70°. Distance from origin of upper jaw to origin of dorsal fin (along the forehead slope) equal to head length. Head length equal to length of ventroanal distance. Origin of dorsal fin at level of orbit. Eye diameter approximately equal to caudal peduncle depth. Gill rakers thin, long (their length slightly smaller than length of gill filaments); distance between gill rakers equal to 1/2 of their length; on upper part of raker, only two spinules. Total number of gill rakers 18. Teeth on jaws acute, in one row, hook-like, and numerous in posterior part of jaws directed anteriorly. On vomer, 8 acute teeth located in two rows. Palatine teeth acute and numerous. Lateral line as row of enlarged scale poaches along dorsal fin base.

Table 7. Number of rays in dorsal fin (*D*) in different species of the genus *Caristius*

Species	*D*					
	32	33	34	35	36	37
C. macropus	5	5	4	3	–	–
C. groenlandicus	8	13	7	1	–	–
C. barsukovi sp. n.	–	–	–	1	5	3
C. andriashevi	–	3	–	–	–	–
C. litvinovi sp. n.	–	–	1	–	–	–
C. walvisensis sp. n.	–	1	–	–	–	–

Description. *D* 33, *A* 21, *P* 17, *sp.br.* 5 + 1 + 12 = 18, filaments on pseudobranchiale 15. Morphometric and meristic characters of *C. walvisensis* provided in Table 8.

Body moderately deep, weakly narrowing towards tail. Maximum body depth at vertical through origin of pelvic fins 48.4% *SL* and slightly more than two times in *SL*. Forehead sloped at an angle of approximately 70° in midline of body, inclined along straight line. Distance from origin of upper jaw to origin of dorsal fin (along forehead slope) equal to head length. Head length 31% *SL* and slightly more than three times in *SL*. Head length and ventroanal distance of approximately equal length. Eyes large. Their maximum diameter slightly more than 2.5 times in head length and approximately equal to caudal peduncle depth. End of maxillary bone almost reaches vertical through posterior margin of orbit. Origin of dorsal fin at level of orbit. Origin of pelvic and pectoral fins approximately at same vertical—approximately under 10th ray of dorsal fin; origin of anal fin—under 15th ray of dorsal fin, Value of anteanal distance 52.7% *SL*. Abdominal fissure well pronounced. Jaw teeth in one row, acute, hook-like; in first half, curved inwards, in second half–anteriorly. On upper jaw, 30 teeth, 27 on lower jaw. On vomer, 8 teeth in two rows; on palatine bones, 7–8 teeth in each row (Fig. 11b). Gill rakers 18. Gill rakers thin, long (2.7% *SL*), their length slightly smaller than length of gill filaments and five times in orbit; sparsely located (distance between them equal to 1/2 of their length) (Fig. 11c). On upper part of raker, two spinules. Lateral line as row of enlarged scale poaches. Body coloration brown, membrane between rays black. Oral-branchial cavity pigmented. Length of holotype 129 mm. Judging from state of maturity of gonads (Table 5), can be suggested that

Table 8. Some morphometric and meristic characters of holotypes of *Caristius litvinovi* sp. n. and *C. walvisensis* sp. n.

Characters	*C. litvinovi* sp. n. ZIN no. 55186	*C. walvisensis* sp. n. ZIN no. 55190
SL, mm	130	129
Sex	Not identified	Male
	In % S	
H	45.4	48.4
h	11.5	13.6
aV	28.5	32.6
aP	28.5	32.6
aD	28.5	27.1
aA	48.1	52.7
V–P	4.2	3.5
V–A	22.6	30.2
lV	51.5	24.8
c	28.8	31.0
ao	6.4	5.8
o	12.3	12.0
lmx	16.5	13.6
	Ordinal number of ray of *D*	
Origin of *P*	7	10
Origin of *V*	–	–
Origin of *A*	15	15
	Meristic characters	
A	22	21
D	34	33
P	18	17
sp.br.	20	18

maximum length of *C. walvisensis* sp. n. smaller than in other known species of genus *Caristius*.

Etymology. The species is named according to the site of its finding—in the south of the Walvis Seamount.

Comparative remarks. *C. walvisensis* differs from *C. litvinovi* sp. n., also described from the southeast Atlantic, in a more frontal position of origin of dorsal fin (Figs. 10, 11), slope of the anterior part of the head, higher caudal peduncle, greater ventroanal distance (Table 8), and thinner and more sparsely located on the gill arch gill rakers fitted with only two spinules (vs. five in *C. litvinovi*). From *C. andriashevi*, it differs in a slightly pronounced lateral line (Kukuev et al., 2012). From *C. barsukovi* sp. n., it differs in a smaller number of rays in dorsal fin (Table 7) and long gill rakers (Figs. 7, 11). From *C. macropus*, it differs in a greater anteanal distance (Tables 1, 8), specific features of dentition, and structure of thinner gill rakers and their smaller number. From *C. groenlandicus*, it differs in the structure of teeth and brachial apparatus (Figs. 4, 11) and some body proportions (Tables 4, 8).

Distribution. The species is known only from the holotype from the Walvis Seamount.

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