

Capture of *Hydrolagus* cf. *purpurescens* (Gilbert, 1905) (Chimaeriformes: Chimaeridae) off Southeastern Sakhalin

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Abstract—The capture in waters off southeastern Sakhalin of a male of *Hydrolagus* TL 122 cm is described. It is tentatively identified as *Hydrolagus* cf. *purpurescens*, a new species for the fauna and the second representative of the subclass in far eastern waters of Russia. The captured specimen is briefly described and its photographs are published. Unsolved problems of taxonomy of the group *purpurescens* complex do not permit to make a unanimous determination of this specimen. These problems are discussed and some items concerning the nomenclature of this group are specified.

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Ratfishes (the genus *Hydrolagus* Gill, 1862), along with *Chymaera* Linnaeus, 1758, make the family of shortnose ratfishes Chimaeridae which comprises about 28 valid species and not less than 15 waiting for their description (Didier, 1995; Didier and Séret, 2002; Nelson, 2006). Representatives of the first genus differ from representatives of the second genus in the absence of emargination in the subcaudal lobe of the leptocercal caudal fin. At least, in some species of *Hydrolagus*, there are poison glands along the posterior surface of the spine of D1 whose poison may be dangerous for man (Didier, 1995; Nelson, 2006). The genus *Hydrolagus* comprises over 20 species occurring everywhere except Arctic and Antarctic waters (Didier, 1995). Most species of this genus are recorded from Pacific waters of Japan and New Zealand. In areas situated to the north of California and Japan, the species composition of the genus *Hydrolagus* is very scarce. Thus, in Californian waters three species are recorded (Love et al., 2005) and, in the Gulf of Alaska, only one—spotted ratfish *H. colliei* (Lay et Bennett, 1839) (Mecklenburg et al., 2002). At the Pacific coast of Japan, five species are known (Nakabo, 2002) and, in Russian far eastern waters (off southeastern Sakhalin and the southern Kurils), only *H. barbouri* (Garman, 1908) (Dolganov, 1982; Borets, 2000; Kin Sen Tok, 2000; Sheiko and Fedorov, 2000; Balanov, 2003). One more specimen of *H. barbouri* was found by the first author in the catch of a bottom trawl (length of the top rope 34.1 m, codend mesh 90 mm) taken off Shikotan Island (43°19′–43°31′ N, 147°04′–147°07′ E, depth 481–688 m, the temperature at the bottom 2.9°C, June 21, 1996). In reality, the

present communication demonstrates that the species composition of the genus *Hydrolagus* in the Russian waters is not confined to one species.

MATERIAL AND METHODS

The material is collected during the netting of *Sebastolobus macrochir* on board *Akvanavt* from May 18th to October 16th, 2005 in waters off southeastern Sakhalin. A sole specimen of *Hydrolagus* is found in the catches of the line of nets set in the bathyenthal of this area within 47°27′ N and 145°28′–145°29′ E and within depths 800–1200 m (Fig. 1) lifted on August 3. The fishing gear was bottom gill nets produced in Japan of monothread 0.30–0.35 mm in diameter, bright red in color. The depth of a net with 45 × 45 mm mesh was 9 m, length 36 m. The line comprised 30 nets. The position of a possible situation of nets was determined by an echosounder FURUNO FCV-291. The *Hydrolagus* was photographed by a camera Canon PowerShot G3.

RESULTS AND DISCUSSION

Solitary mode of life of representatives of the genus *Hydrolagus*, the preferred meso- and bathyenthal, and their large size result in the rarity of their captures and obtaining in museum collections. In its turn, this leads to insufficient knowledge of not only of their biology but also the systematics of this group. At present there are a few more fish genera with not less than ten new not yet described species per 20 valid species (Didier,

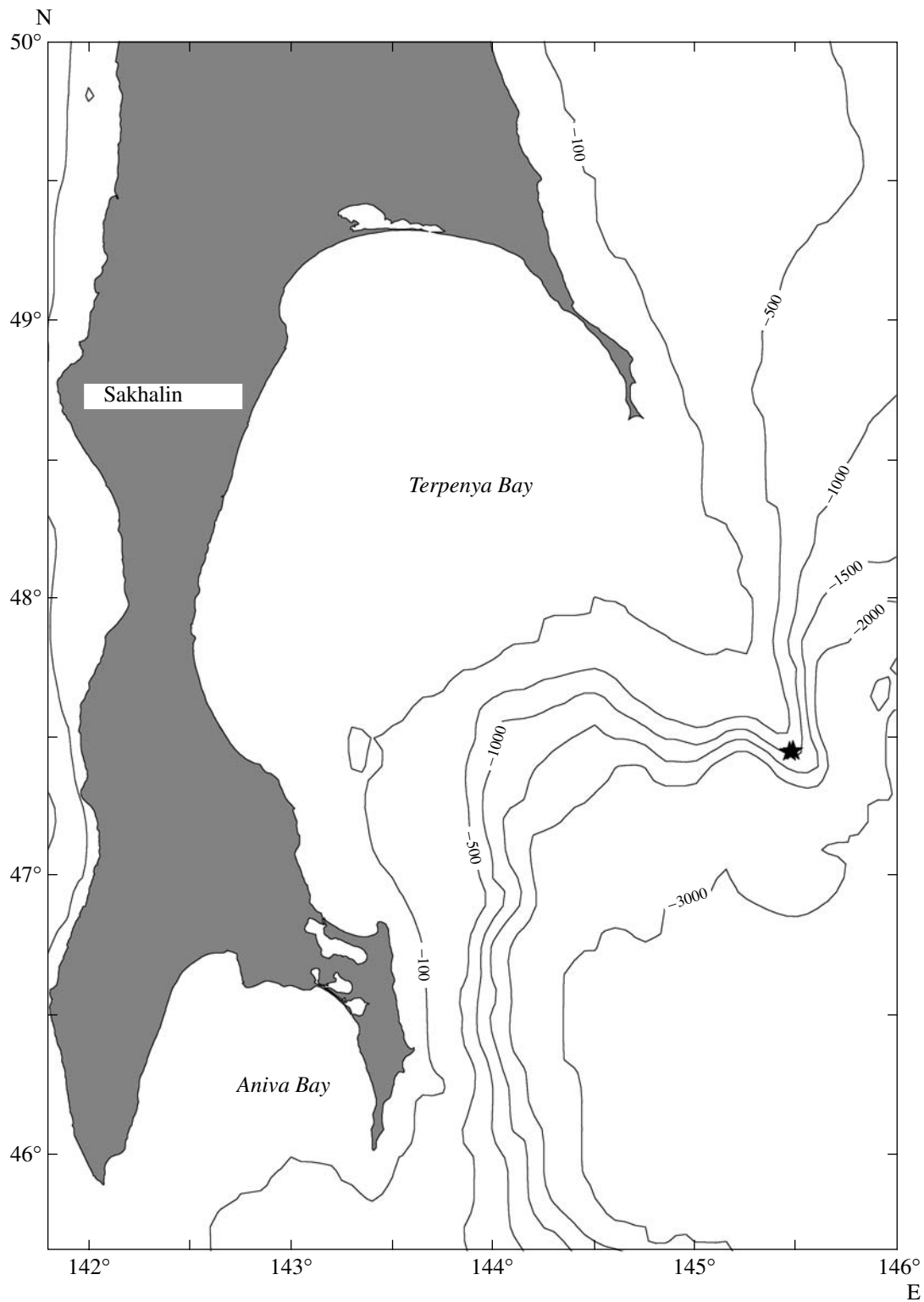


Fig. 1. Locality of record of *Hydrolagus cf. purpurescens*. Thin lines designate isobaths.

1995; Didier and Séret, 2002; Love et al., 2005; Nelson, 2006). Moreover, some of them are found just recently (Didier and Séret, 2002; Barnett et al., 2006), due to intensification of deepwater investigations.

In our case, a representative of this interesting genus was captured exactly by a deepwater haul. The catch of the line of nets where *Hydrolagus* was found consisted predominantly of fish (95.9% by biomass). Crustaceans

made only 2.9% and cephalopods, 1.2%. The bulk of the catch consisted of *Sebastolobus macrochir* (Table 1).

Hydrolagus was a male 122 cm long (TL) and 6.9 kg in weight. No other measurements were made and so large a specimen, unfortunately, was not retained (only tenacula and tooth plates are kept and will soon be transferred to the Zoological Institute). However, some photographs were made supplying some important characters and proportions and, thus, permitting estimation of generic and species affiliation of this specimen. This was favored by its excellent external appearance and the retained natural body coloration (Fig. 2).

Head length almost twice in anteventral distance. Upper outline of head straight all along. Anterior edge of eye approximately midway of head (Fig. 3). By six crests on each maxillary plate. Depth of mandibular plate maximal at second crest from symphysis, somewhat decreases to symphysis, and decreases almost by half to posterior third of plate (Fig. 4). Trunk canal of seismosensory system behind D1 straight, not undulating. First dorsal fin begins almost at the vertical of gill slit. Spine of D1 slightly longer than soft part and free from D1 by 7% of its length. Length of spine of D1 1.9 times in head length and 1.9 times in length of upper edge of P (Fig. 3). Outline of D2 almost straight. Maximum depth of D2 7.2 times in head length. P slightly reaching beyond base of V. Subcaudal lobe of caudal fin not subdivided by emargination. No caudal thread. Coloration of trunk and fins uniformly dark brown, without light spots and vertical rows of dots; head and all fins with dark blue shade (Fig. 2). Frontal tenaculum between anterior edges of orbits, well developed, clavate, the area of recurved numerous spines on its convex anterior–inferior edge (Fig. 5). Prepelvic tenacula in front of V bases, flat, with pointed distal end, with a row of five spines bent forward on each side (Figs. 6 and 7).

According to published data (Didier, 1995; Nakabo, 2002; Nelson, 2006), there were no special revisions of this genus for the northern part of the Pacific Ocean. As all information on diagnostic characters of species of the family Chimaeridae of the northwestern part of the Pacific Ocean is summarized by Nakabo (2002), this key was used in the primary identification of our specimen. Additionally, original descriptions and regional species descriptions of related species were also examined (Gilbert, 1905; Jordan and Hubbs, 1925; Nakaya, 1984).

Absence in our specimens of emargination in the subcaudal lobe of the caudal fin (Fig. 2) indicates that it belongs to the genus *Hydrolagus*. Nakabo (2002) indicated five valid species of this genus for Japan and adjacent waters: *H. ogilbyi* (Waite, 1898), *H. barbouri* (Gartman, 1908), *H. mitsukurii* (Jordan et Snyder, 1904), *H. purpurescens* (Gilbert, 1905), and *H. eidolon* (Jordan et Hubbs, 1925).

Table 1. Species composition of the catch of the line of nets with *Hydrolagus* cf. *purpurescens*

Species	Part on the catch, % of weight
Fish	95.9
<i>Hydrolagus</i> cf. <i>purpurescens</i>	2.1
<i>Albatrossia pectoralis</i>	3.4
<i>Coryphaenoides cinereus</i>	5.2
<i>Lycodes soldatovi</i>	0.9
<i>Bothrocara soldatovi</i>	14.2
<i>Bothrocara brunnea</i>	1.4
<i>Sebastolobus macrochir</i>	63.4
<i>Malacocottus zonurus</i>	<0.1
<i>Careproctus colletti</i>	0.2
<i>Paraliparis grandis</i>	0.6
<i>Reinhardtius matsuurae</i>	4.0
<i>Clidoderma asperrimum</i>	0.5
Crustaceans	2.9
<i>Sclerocrangon derjugini</i>	<0.1
<i>Pandalopsis</i> sp.	<0.1
<i>Paralomis verrilli</i>	1.7
<i>Chionoecetes angulatus</i>	1.2
Cephalopods	1.2
<i>Berrytheutis magister</i>	1.1
<i>Octopus</i> sp.	0.1

In *H. ogilbyi* the lateral line (ll) is undulating, continues up to the middle of the trunk, numerous vertical rows of dark dots above it. In *H. barbouri* the outline of D2 is clearly concave and there are nine to ten light spots on the trunk. In *H. mitsukurii* the upper outline of the head in front of the eyes is directed steeply downwards and, judging by the figure of Nakabo (2002: 114), there is a long caudal thread—by two to three times longer than the head.

Our specimen is most close to the group *H. purpurescens*—*H. eidolon*: it has the same outline of the head, trunk, and D2 and character of ll and of the caudal thread, body coloration. According to the key composed by Nakabo (2002), these species differ only in two proportions: ratio of length of spine of D1 and of the maximum depth of D2 to the head length (Table 2). Having compared the original descriptions and drawings of the holotypes of both species (Gilbert, 1905: 582, Fig. 231; Jordan and Hubbs, 1925: 117–118, pl. 5, Fig. 1), we may tentatively suggest three more characters which might become diagnostic ones with accumu-



Fig. 2. *Hydrolagus cf. purpurescens*, male 122 cm TL—total view, southeastern Sakhalin, the Sea of Okhotsk.



Fig. 3. *Hydrolagus* cf. *purpurescens*, male 122 cm TL—head and anterior part of the trunk.

lation of new material: position of the origin of D1 in relation to the gill slit; the ratio of head length to the anteventral distance; mutual position of the tip of P and the base of V.

Table 2 demonstrates that, by all five characters, our specimen is noticeably closer to *H. purpurescens* than to *H. eidolon*.

At the same time, our specimen cannot be attributed to *H. purpurescens* indisputably by the following reasons. First, the type locality of *H. purpurescens* is the bathy-benthal of Hawaii; some more not retained specimens were recently caught there and underwater observations were made (Novikov et al., 1981; Chave and Mundy, 1994; Mundy, 2005). Taking into consideration specific traits of the biology of fish of this family, life in the bottom layers on continental and insular slopes is noticeably higher than the ocean bed, slow habits, and the distance between the Japan and the Hawaii; the existence of an entire population in all of this area is slightly probable. More realistic is the suggestion on the existence in waters of both archipelagoes of close but independent species. Indirectly, this is supported by the recent discovery of a species new for science *H. mccooskeri* whose area is confined only to the water area around the Galapagos Islands (Barnett et al., 2006).

On the other hand, the majority of the aforementioned characters are the ratios of lengths of particular body lengths (Table 2), i.e., the parameters unavoidably liable to age and probably sex variability. Meanwhile,

up to now only a few specimens of both species are retained and examined and nothing is known on variability of their morphometric characters. Our specimen does not confirm the diagnostic value of such previously suggested character (Nakaya, 1984) as the ratio of length of the spine of D1 to the length of the upper edge of P (Table 2). The meristic characters are more stable and promising in taxonomy and are almost not studied even in the few described specimens.

Thus, only with accumulation of sufficiently large samples of fish of various age and of different sex for the whole region, it will be possible to outline the variability limits of the characters in the Hawaiian population of *H. purpurescens* and, accordingly, to define the taxonomic status of both *H. eidolon* from southern Japan and of the Japanese population of *H. "purpurescens"* to which our specimen seems to belong.

Remarks on nomenclature. Jordan and Snyder (1904) indicate one specimen of chimaera (CAS-SU 12902) among deepwater fish collected off southern Japan by Owston. Assuming that it belongs to the same species which Gilbert was going to describe from Hawaii, they indicated it as *Chimaera purpurascens* Gilbert MS. Gilbert published his description in August 1905 under the name *Chimaera purpurescens* for his single specimen, holotype USNM 51594. Later, specimen CAS-SU 12902 was used by Jordan and Hubbs (1925) as the holotype for description of *H. eidolon*.



Fig. 4. *Hydrolagus* cf. *purpurascens*, male 122 cm TL—head, front view.

The authors write (p. 117) as the account given by Jordan and Snyder was not intended as a description, but merely as an indication that a black chimaera occurred also in Japan, the name *purpurascens*, dating from 1904, must be regarded as *nomen nudum*, until the appearance of the paper by Gilbert. However, in this essay (Jordan and Snyder, 1904: 235) some characters are indicated: coloration of the specimen (“fine purplish black when fresh”) and its length (“132 centimeters”), which formally makes a description. Thus this name “meets all criteria of availability for species-group names” published before 1931 (ICZN, 2004: articles 11.1–5, 11.9, 12.1). As Jordan and Snyder are responsible for this name and for satisfying the criteria of availability, they should be the authors, not Gilbert (ICZN, 2004, art. 50.1). The names *purpurascens* Jor-

dan and Snyder, 1904, and *purpurascens* Gilbert, 1905, are not homonyms (ICZN, 2004: art. 57.6, 58).

Thus the name *eidolon* Jordan et Hubbs, 1925, is a junior objective synonym of the name *purpurascens* Jordan et Snyder, 1904, and, therefore, the objectively invalid name (as based on the same specimen CAS-SU 12902). At the same time, as far as we know, the name *purpurascens* Jordan et Snyder, 1904, was used in the literature as a valid name only twice (Tanaka, 1905 and Garman, 1911—cited after Jordan and Hubbs, 1925) and *eidolon* Jordan et Hubbs, 1925, was used much more often and up to the present. Therefore, to support the stability of the nomenclature, we find advisable to suspend the Principle of Priority, to maintain the prevailing usage, and to consider the name *eidolon* Jordan et Hubbs, 1925, valid. As the “senior synonym has been



Fig. 5. *Hydrolagus* cf. *purpurescens*, male 122 cm TL—forehead tenaculum, left-side view.

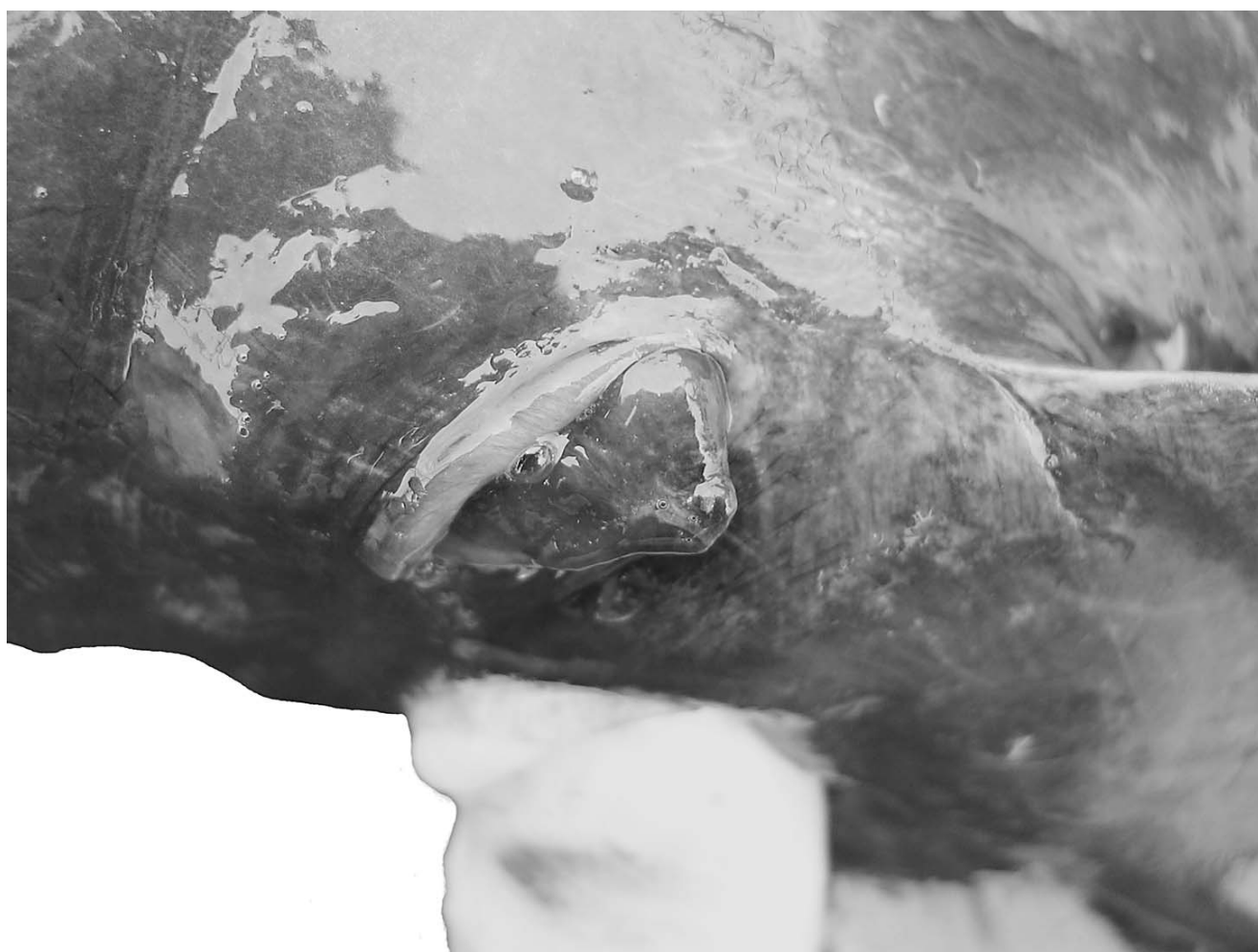


Fig. 6. *Hydrolagus* cf. *purpurescens*, male 122 cm TL—left prepelvic tenaculum in its pocket.



Fig. 7. *Hydrolagus* cf. *purpurescens*, male 122 cm TL—left prepelvic tenaculum bent forward.

used as a valid name after 1899,” its use may be suspended only by the decision of the International Com-

mission on Zoological Nomenclature (ICZN, 2004, art. 23.9.1, 23.9.3). It is advisable to refer this matter to the

Table 2. Some characters of our specimen and of the holotypes of *Hydrolagus purpurescens* and *H. eidolon*

Characters	<i>H. purpurescens</i> USNM 51594, ♀ 90 cm TL, off Hawaii	Our specimen, ♂ 122 cm TL, off southeastern Sakhalin	<i>H. eidolon</i> CAS-SU 12902, ♀ 128.5 cm TL, Sagami Bay
Depth of D1 in head length, times	1.7–1.8	1.9	1.3
Depth of D2 in head length, times	5.1–6.4	7.2	4.5
Position of origin of D1 in relation to the vertical through upper edge of gill slit	on it*	on it	behind it by orbit length
Head length in anteventral distance, times	2.0*	2.0	2.5*
Mutual position of the tip of P and base of V	noticeably surpasses	slightly surpasses	not reaches
Depth of D1 in length of upper edge of P	much > 2	1.9	much < 2

* By drawings of Gilbert (1905: Fig. 231) and Jordan & Hubbs (1925: Fig. 1).

Commission for a ruling under the plenary power only after a full-value revision of the taxonomic status of all populations of this group of species.

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