A C T A  I C H T H Y O L O G I C A  E T  P I S C A T O R I A
Vol. XXIX, Fasc. 2 Szczecin 1999

Alexei M. *ORLOV*

**Fish systematics**

# NEW NORTHWEST PACIFIC RECORD OF THE PACIFIC BLACK SCABBARDFISH *APHANOPUS ARIGATO* (TRICHIURIDAE, PERCIFORMES) IN THE VICINITY OF SOUTHEASTERN KAMCHATKA

# NOWY PRZYPADEK WYSTĘPOWANIA CZARNEGO PAŁASZA PACYFICZNEGO* *APHANOPUS ARIGATO* (TRICHIURIDAE, PERCIFORMES) W REJONIE POŁUDNIOWO-WSCHODNIEJ KAMCZATKI

**Laboratory of Bioresources of Foreign Economic Zones and High Seas, Russian Federal Research Institute of Fisheries and Oceanography, Moscow, Russia**

The Pacific black scabbardfish *Aphanopus arigato* Parin, 1994 is reported from a new site in the northwestern Pacific off southeastern Kamchatka, Russia. This record represents a significant range extension of about 81 km for the species. Some notes on morphology, habitat, and species association are provided.

## INTRODUCTION

The Pacific black scabbardfish, *Aphanopus arigato* Parin, 1994 (Fig. 1) was described (Parin 1994) from six specimens collected in the North Pacific Ocean from northern Japan, southern Kuril Islands, and Oregon. Since the original description only two additional specimens have been collected (Lauth 1997), and those from northern California. Moreover, only depths, latitude range, and rank order of the relative abundance for additional specimens were provided. This work contains a report on a single additional specimen collected by the present author from the Pacific waters off southeastern Kamchatka, Russia during a bottom trawl operation. Some notes on morphology, habitat, and species association one also provided.

* proposed Polish name

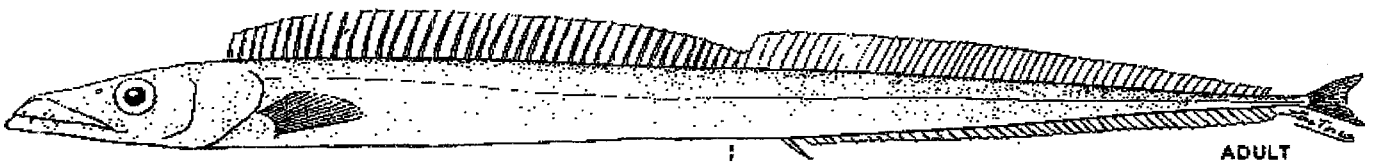


Fig. 1. Adult specimen of *Aphanopus arigato* (adapted from Nakamura and Parin, 1993)

## METHODS

Counts and measures follow Parin and Becker (1972) and Nakamura and Parin (1993). Standard length (SL) is used throughout. Data on the type material used for original description of the species were taken from Parin (1994). Localities, depths, and SL of additional specimens were taken from the literature (Fitch and Gotshall 1972; Parin and Becker 1972; Peden 1974; Clark and Wagner 1976; Gorbunova 1977; Howe et al. 1980; Parin 1983, 1984; Borets 1986; Evseenko et al. 1994 and from the NMFS survey database). Sex of specimen was not determined.

## RESULTS

*Aphanopus arigato*—Pacific black scabbardfish

*Aphanopus carbo* (non Lowe) Parin et Becker, 1972 (Parin and Becker 1972; p. 166; description, record; North Pacific Ocaean); Fitch and Gotshall (1972; p. 12; description, record; California); Peden (1974; p. 47; record; British Columbia); Clarke and Wagner (1976; p. 636; record; Hawaii); Gorbunova (1977; p. 143; description, record; North Pacific Ocean); Howe et al. (1980; p. 702; description, record; Oregon); Nakamura (1984; p. 227, pl. 224-C; description; Hokkaido); Borets (1986; p. 214; record; Emperor Seamount Chain); Lauth (1997; p. 24; record; California).

*Aphanopus* sp. (Parin 1983; p. 364; description, record; North Pacific Ocean).

*Aphanopus intermedius* (non Parin) Nakamura et Parin, 1993 (Nakamura and Parin 1993; p. 66; description, geographical distribution; only specimens from the North Pacific Ocean); Evseenko et al. (1994; p. 416; description; Hawaii).

*Aphanopus arigato* Parin, 1994 (Parin 1994; p. 741; original description, geographical distribution; North Pacific Ocean).

**Table 1**

Some meristics of *Aphanopus arigato* specimens collected in the southeastern Kamchatka (IMBV uc), the holotype (HUMZ 78109), paratypes (ZIL 50587-88, OSUO 2352-54), and additional specimens (Parin 1994)

| Counts | IMBV uc | Holotype HUMZ 78109 | Paratypes, add.specimens |
|---|---|---|---|
| No of specimens | 1 | 1 | 10 |
| No precaudal vertebrae | 44 | 43 | 43–46 |
| No caudal vertebrae | 59 | 62 | 59–62 |
| No total vertebrae | 103 | 105 | 103–105 |
| No dorsal spines | 39 | 42 | 39–43 |
| No dorsal rays | 58 | 57 | 54–58 |
| No total dorsal-fin elements | 97 | 99 | 95–99 |
| No anal rays (without spines) | 50 | 50 | 47–50 |

**Table 2**

Some morphometrics in percent of standard length of *Aphanopus arigato* specimens collected in the southeastern Kamchatka (IMBV uc), the holotype (HUMZ 78109), and paratypes (ZIL 50587-88, OSUO 2352-54) of Parin (1994)

| Measurements | IMBV uc | HUMZ 78109 | ZIL 50587 | ZIL 50588 | OSUO 2352 | OSUO 2353 | OSUO 2354 |
|---|---|---|---|---|---|---|---|
| Standard length, mm | 710 | 651 | 504 | 385 | 507 | 535 | 540 |
| Head length | 19.1 | 18.5 | 19.4 | 18.9 | 19.4 | 20.0 | 18.2 |
| Body depth | 8.9 | 8.7 | 6.6 | 5.6 | 6.5 | 8.4 | 6.7 |
| Distance snout-anus | 54.9 | 53.7 | 53.2 | 52.3 | 53.2 | 54.4 | 52.4 |
| Orbit diameter | 3.2 | 3.1 | 3.4 | 3.2 | 3.0 | 3.2 | 3.3 |
| Interorbital width | 3.1 | 2.3 | 2.4 | 1.7 | 2.5 | 2.6 | 2.3 |
| Snout length | 8.3 | na | 8.0 | 8.5 | 8.4 | 8.7 | 7.8 |
| Maxillary length | 8.3 | 8.6 | 8.4 | 8.3 | 8.7 | 9.1 | 7.9 |
| Anal spine length | 1.8 # | # | 2.3 # | 3.2 | 2.4 | 2.5 | 2.4 |

na—not available;
#—broken fully or partly

## New material examined

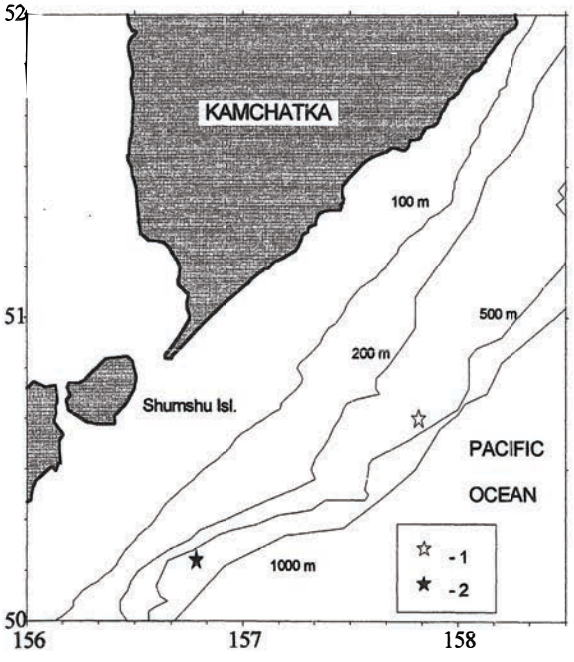


Fig. 2. Map, showing locations of new (1) and previous (2) records of *Aphanopus arigato* in the Pacific waters off the North Kuril Islands and Southeast Kamchatka Lines and numbers indicate isobaths

One adult, 710 mm SL and 0.65 kg, was collected on 12 May 1995 off the southeastern coast of Kamchatka (Fig. 2), extending the known range by 81 km (Parin 1983). The specimen was collected in a bottom trawl (5–7 m vertical opening, about 25 m horizontal opening) at 50°40' N 157°49' E, 84 km southeast of the tip of Kamchatka peninsula at 519-540 m depth (Japanese trawler Tora Maru No. 58, tow No. 26). The specimen currently uncatalogued is deposited in the collection of the Institute of Marine Biology, Far East Branch of the Russian Academy of Science, Vladivostok, Russia.

## Morphology

The morphology of the present specimen of *A. arigato* corresponds well with the description of the holotype (Parin 1994) and other described specimens (Howe et al. 1980; Parin 1983; Nakamura and Parin 1993; Parin 1994), with a minor exception being the slightly wider interorbital (Tabs. 1, 2). The interorbital width of 3.1% SL greater than in the holotype and in the paratypes, with a measurements of 2.3% and 1.7–2.6% respectively (Parin 1994). The wider interorbital in our specimen is probably related to its greater length (710 mm vs. 385–651 mm in the type material). This specimen constitutes the most northerly record of the species, so the differences may reflect the extreme range of variability in the species.

## Species and habitat associations

Specimen of *A. arigato* reported here was captured in commercial bottom trawl operation targeting thornyheads (*Sebastolobus*) and rockfishes (*Sebastes*) (Tab. 3). The species groups captured with the black scabbardfish specimen are typical of the fishes taken in bottom trawls off the northern Kuril Islands and southeast Kamchatka at these depths (Orlov 1998).

**Table 3**

Species composition of catch by weight containing *Aphanopus arigato* from the southeastern Kamchatka

| Taxon | Percent of catch |
|---|---|
| *Sebastolobus alascanus* (shortspine thornyhead) | 29.2 |
| *Atherestes evermanni* (Kamchatka flounder) | 19.6 |
| *Elassodiscus tremebundus* (snailfish) | 15.5 |
| *Sebastolobus macrochir* (broadbanded thornyhead) | 11.6 |
| *Sebastes borealis* (shortraker rockfish) | 5.5 |
| *Bathyraja matsubarai* (Matsubara skate) | 3.9 |
| *Albatrossia pectoralis* (giant grenadier) | 3.2 |
| *Sebastes aleutianus* (rougheye rockfish) | 2.1 |
| *Reinchardtius hippoglossoides* (Greenland turbot) | 1.8 |
| *Careproctus melanurus* (blacktail snailfish) | 1.8 |
| *Bothrocara brunneum* (twoline eelpout) | 1.3 |
| *Clidoderma asperrimum* (roughscale flounder) | 1.2 |
| *Careproctus furcellus* (forktail snailfish) | 1.0 |
| *Coryphaenoides cinereus* (popeye grenadier) | 0.7 |
| *Elassodiscus obscurus* (snailfish) | 0.6 |
| *Careproctus cypselurus* (indigo snailfish) | 0.3 |
| *Antimora microlepis* (Pacific flatnose) | 0.3 |
| Other species combined | 0.3 |

The bottom temperature during trawling, when the present specimen of *A. arigato* was caught, was 3.5–3.6°C. The specimens captured off California were found in the bottom temperatures ranging from 3.9 to 5.0°C. No other information on the bottom temperature is available for specimens recorded previously in the literature.

The reported depth for this specimen (519–540 m) is typical of that for previously collected material. Adults of the species have been reported from 146–1015 m (mean depth 631.2 m). Only two specimens were captured in shallow waters off Oregon (146 and 183 m; Howe et al. 1980). Other specimens were found deeper than 400 m (Howe et al. 1980; Parin 1983, 1994). Most frequently *A. arigato* was caught in depth range of 400–500 m (3 records), and of 600–700 m (3 records).

All adult specimens of *A. arigato* reported were 385–720 mm SL, with the average of 576 mm. My specimen with 710 mm SL is among the largest. A larger specimen of 720 mm SL (Parin 1983) was captured off the northern part of Paramushir Island, northern Kuril Islands (Fig. 2). A smaller specimen of 385 mm SL was found off the southern Kuril Islands (Parin 1994).

*Aphanopus arigato* is a bentho-pelagic species (Parin 1994). Larvae and juveniles have been collected in the mesopelagic zone (200–500 m and deeper) only in subtropic and tropic waters of central northern Pacific ocean, most often off Hawaii (Fig. 3). Adults have been caught more often during bottom trawls and occasionally during pelagic trawls over deep depths. All adult *A. arigato* (except for a single 504 mm SL specimen from the Emperor Seamount Chain) were recorded from coastal areas. I suggest that spawning areas of this species are coastal waters in the vicinity of northern Japan and southern Kuril Islands off Asian shore, and in vicinity of Oregon and northern California off American shore. After spawning, the eggs and larvae from spawning areas are transferred by deep-water currents (Galerkin 1982) to central part of northern Pacific where they further developed. When the specimens are able to active movements, they start reverse migration to coastal waters. Some specimens arriving to the areas with underwater mountains (for example, Emperor Seamount Chain) may probably to linger on there. The records of *A. arigato* from most northern areas (northern Kuril Islands, Kamchatka, British Columbia) are probably associated with periods of rise of the water temperature.

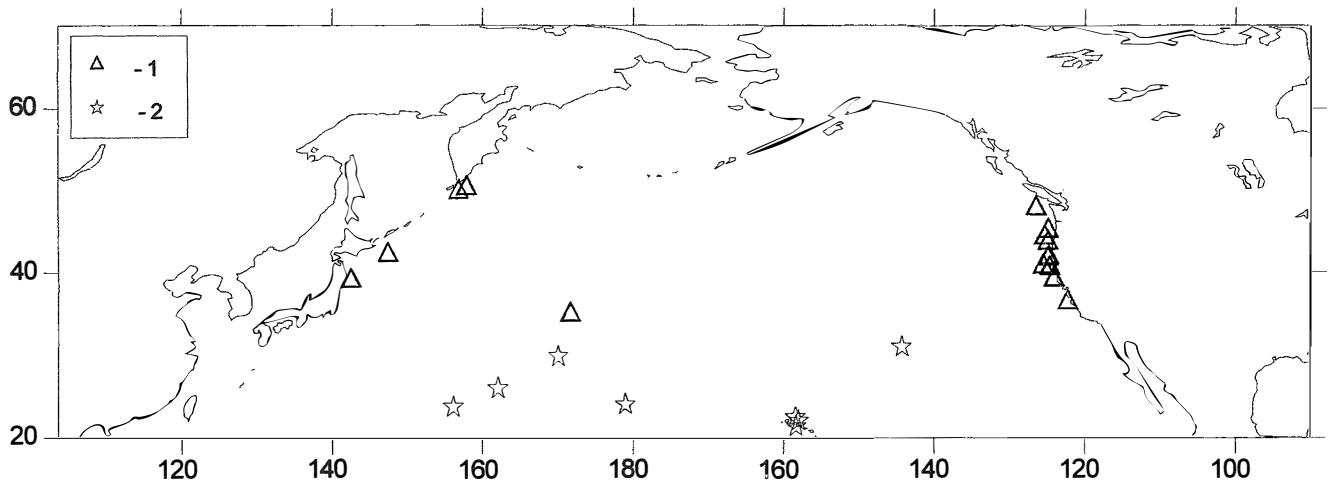


Fig. 3. Map of geographical distribution in the North Pacific Ocean adults (1) and juveniles (2) of *Aphanopus arigato*

ACKNOWLEDGEMENTS

Dr. T. Agafonova (Russian Federal Research Institute of Fisheries and Oceanography, Moscow)—helped to made counts and measures of the specimen. Dr. V. Tzinovsky (Shirshov Institute of Oceanology, Moscow)—radiographed the specimen. Dr. A. Kotlyar (Shirshov Institute of Oceanology, Moscow)—provided data on three stations of R/V «Vitiaz», on which the larvae and juveniles were captured. Dr. J. W. Orr (National Marine Fisheries Service, NOAA, Alaska Fisheries Science Center, Seattle)—provided data on depths and locations of seven records of *A. arigato* from the waters off Oregon and northern California, and reviewed early version of the manuscript.

REFERENCES

**Borets L.A.,** 1986: Ichthyofauna of the Emperor Seamount Chain and Hawaiian Submarine Ridge. Vopr. Ichtiol., **26** (2): 208–220. (In Russian).

**Clarke T.A., P.J. Wagner,** 1976: Vertical distribution and other aspects of the ecology of certain mesopelagic fishes taken near Hawaii. Fish. Bull. **74** (3): 635–645.

**Evseenko S.A., N.V. Parin, A.V. Suntsov,** 1994: Larvae of *Aphanopus intermedius* (Trichiuridae) from northern Pacific Ocean. Vopr. Ichtiol., **34** (3): 416–419. (In Russian).

**Fitch J.E., D.W. Gotshall,** 1972: First record of the black scabbardfish, *Aphanopus carbo*, from the Pacific Ocean with notes on other Californian trichiurid fishes. Bull. South. Calif. Acad. Sci., **72**: 12–18.

**Galerkin L.I.,** 1982: Climatic and hydrologic characteristics of Pacific Ocean. In: Pacific Ocean [O.K. Leontiev (ed.)]. Mysl', Moscow: 15–96. (In Russian).

**Gorbunova N.N.,** 1977: Larvae of some trichiuroid fishes (Pisces, Trichiuroidae: Gempylidae, Trichiuridae). Trudy IOAN SSSR, **109**: 133–148. (In Russian).

**Howe K.M., D.L. Stein, C.E. Bond,** 1980: First records off Oregon of the pelagic fishes *Paralepis atlantica*, *Gonostoma atlanticus* and *Aphanopus carbo*, with notes on the anatomy of *Aphanopus carbo*. Fish. Bull., **77** (3): 700–703.

**Lauth R.R.,** 1997: The 1995 Pacific West Coast upper continental slope trawl survey of groundfish resources off southern Oregon and northern California: Estimates of distribution, abundance, and length composition. U.S. Dept. of Commerce, National Marine Fisheries Service, Alaska Fisheries Science Center, NOAA Technical Memorandum 80, Springfield, VA.

**Nakamura I.,** 1984: Scombrolabracoidai, Scombroidei. In: Masuda H., K. Amaoka, C. Araga, T. Uyeno (eds.). Tokai University Press, Tokyo: 224–228.

**Nakamura I., N.V. Parin,** 1993: Snake mackerels and cutlassfishes of the World (families Gempylidae and Trichiuridae). FAO Fisheries Synopsis **15** (125): 1–136.

**Orlov A.M.,** 1998: Demersal ichthyofauna of Pacific waters off the northern Kuril Islands and southeastern Kamchatka. Biol. Morya, **24** (3): 146–160. (In Russian).

**Parin N.V.,** 1983: *Aphanopus mikhailini* sp. n. and *A. intermedius* sp. n. (Trichiuridae, Perciformes)—two new species of black scabbardfishes from temporal waters of southern hemisphere and tropical Atlantic Ocean. Vopr. Ichtiol., **23** (3): 355–365. (In Russian).

**Parin N.V.,** 1994. Three new species and new records of black scabbardfishes of genus *Aphanopus* (Trichiuridae). Vopr. Ichtiol., **34** (6): 740–746. (In Russian).

**Parin N.V., V.E. Becker,** 1972: Materials on systematic and distribution of some trichiuroid fishes (Pisces, Trichiuroidae: Scombrolabracidae, Gempylidae, Trichiuridae). Trudy IOAN SSSR, **93**: 110–204. (In Russian).

**Peden A.,** 1974: Rare fishes including first records of thirteen species from British Columbia. Syesis **7**: 47–62.

Alexei M. *ORLOV*

NOWY PRZYPADEK WYSTĘPOWANIA CZARNEGO PAŁASZA PACYFICZNEGO APHANOPUS ARIGATO (TRICHIURIDAE, PERCIFORMES) W REJONIE POŁUDNIOWO-WSCHODNIEJ KAMCZATKI

STRESZCZENIE

Odnotowano występowanie czarnego pałasza pacyficznego *Aphanopus arigato* Parin, 1994 w nowym miejscu w północno-zachodnim Pacyfiku u wybrzeży południowo-wschodniej Kamczatki (Rosja). Opisywany przypadek znacząco rozszerza zakres występowania tego gatunku o około 81 km. Praca zawiera informacje na temat morfologii, środowiska życia oraz współwystępujących gatunków ryb.

Received: 9 February 1999

Author's address:

Alexei M. Orlov, Senior researcher
Laboratory of Bioresources of Foreign Economic Zones and High Seas
Russian Federal Research Institute of Fisheries and Oceanography
VNIRO 17, Verkhnaya Krasnoselskaya, Moscow, 107140, Russia

e-mail: *akrovin@mx.iki.rssi.ru*