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On the taxonomy and nomenclature of some representatives of the
genus Ascarophis (Nematoda: rhabdochonidae)

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[Abstract]

A detailed redescription and analysis of the morphological characters of the nematode *A. pacifica* Zhukov in Spassky and Rakova, 1958, is provided. *A. curilica* Zhukov, 1960 is reduced to a synonym of this species.

While working on the collection of helminths made from fish from the Pacific Ocean in the region of the lesser Kurile island chain by the staff of the Laboratory of Parasitology of Marine Animals of TINRO during the expedition of the scientific research vessel "Akademik Berg" in 1973, nematodes of the genus Ascarophis Van Beneden, 1871, were found. Identification of these nematodes indicated that based on a series of morphological characters it is possible to refer individual specimens both to Ascarophis pacifica Zhukov, 1960¹ and to Ascarophis curilica Zhukov, 1960. Moreover, there were nematodes combining characters of both the first and second species. All this gives us grounds to doubt the independence of the species A. curilica.

The principal characters on which Zhukov (1960) differentiates the species A. curilica from A. pacifica, which it most resembles, and from other species of the genus are "the extension of the loops of the ovary and uterus far beyond the level of the beginning of the intestine, the character of the striations of the cuticle, the structure of the projection of the lip, and the size of the eggs, plugs, and filaments." But these characters have great variability. According to our data, the loops of the ovary can reach to various distances beyond the beginning of the intestine (up to 2.76 mm), they can reach the level of the transition of the esophagus to the intestine, or can fail to reach (by up to 0.74 mm) the beginning of the intestine (Fig. 1). The cuticular striations in A. pacifica as well as in A. curilica are of the spiral type, in which in both species the grooves of the striations are rather deep and highly visible, and only in the males the striations are weak. In structure of the eggs we did not observe any particular diversity; their size and also the size of the plugs and filaments are almost the same. Comparing morphological characters given by Zhukov (1960) for A. curilica and A. pacifica with measurements of our nematodes and also with Spassky and Rakovā's (1958) published description of A. pacifica (Table 1 and Fig. 1), we came to the conclusion that the name A. curilica is a junior subjective synonym of the species A. pacifica. Statistical treatment of the morphological data of A. pacifica and A. curilica confirms the accuracy of our conclusions (Table 2).

Under the specific name A. pacifica two descriptions have been published. Spassky and Roytman (1958) gave a description of the species based on specimens from the region of the Commander Islands; they gave the species the name "Ascarophis pacificus Zhukov," having compared their material with the unpublished data of Zhukov. Formally, in accordance with article 51(c) of the International Rules of Zoological Nomenclature, the author and year of publication of this name must be cited in the following way: A. pacifica Zhukov in Spassky and Rakova, 1958. Two years later, on the basis of his material from the South Kurile Islands being a new species, Zhukov (1960), without reference to the article mentioned above, published the description of A. pacificus Zhukov, 1960; this name has also appeared in a number of other helminthological papers. Both of the stated names refer to one and the same species, with the valid one being A. pacifica Zhukov in Spassky and Rakova, 1958. We consider it is essential to give a description of the nematode from our material (Fig. 1, 2).

¹The generic name Ascarophis is grammatically a female genus; therefore it should not be written "A. pacificus," as was done by Zhukov (1960), but "A. pacifica" (see International Rules of Zoological Nomenclature, par. 30).

Ascarophis pacifica Zhukov in Spassky and Rakova, 1958
Syn.: Ascarophis pacificus Zhukov, 1960; A. curilicus Zhukov, 1960
Hosts: Liparis cyclostigma, Crystallias matsushima
Localization: Stomach, intestine
Locality: Pacific Ocean, lesser Kurile island chain.
Material: 74 females, 12 males, 20 larvae.

Description. Body of the nematode filiform, tapering towards anterior and posterior ends. Cuticle thin, its surface striated. Grooves of striations particularly well marked behind the excretory pore; they have an oblique direction, forming spirals on the surface of cuticle. Mouth opening terminal, surrounded by two lips, the extensions of which have a spear-shaped form in lateral view of the nematode and the form of a leaf with broadened base in dorsoventral view. Length of the rod-shaped extensions 0.008 mm. Mouth opening leads to the pharynx, which is slightly expanded anteriorly to form a small, funnel-shaped buccal capsule. Esophagus long, composed of two sections, a short muscular and a long glandular, with an inconspicuous boundary between them. Ratio of lengths of the sections of the esophagus 1:4-5. Nerve ring encircles the first third of the muscular section of the esophagus. Excretory system has five glandular cells with well developed nuclei. Each gland cell has its own excretory duct. The ducts unite in a common excretory canal. Excretory pore opens behind the nerve ring. Tail conical, with small terminal papilla. Female larger than male.

Female. Body length 10.02 (10.02-24.3) mm,² maximum width of body in region of the vulva 0.168 (0.1-0.2) mm. Width of body at level of end of pharynx 0.028 (0.028-0.032) mm, at level of nerve ring 0.064 (0.06-0.088) mm, and at level of anus 0.076 (0.056-0.084) mm. Pharynx length 0.164 (0.124-0.208) mm and width 0.008 mm. Muscular section of esophagus 0.44 (0.402-0.62) mm in length and 0.024 (0.02-0.024) mm in width; glandular, correspondingly 2.048 (1.96-3.14) and 0.04 (0.036-0.048) mm. Excretory pore opens 0.3 (0.28-0.384) mm from anterior end of body. Nerve ring situated 0.212 (0.196-0.28) mm from anterior end of body. Intestine thin, its width 0.036 (0.036-0.06) mm. Vulva without developed lips, opening 9.05 (6.48-11) mm from anterior end of body. Uterus double, amphidelphic type, its loops occupying entire body width. Anterior loops of ovary usually reach up to 0.38 (0.2-2.76) mm beyond junction of glandular esophagus and intestine or do not reach to beginning of intestine. Posterior loop of ovary reaches to end of intestine, sometimes reaching to end of rectum. Eggs in uterus arranged one behind the other. Size of eggs 0.052 × 0.032 (0.044-0.052 × 0.028-0.032) mm. Eggs with plugs at both poles. Plugs of unequal size, 2 long filaments arising from each plug. In mature eggs fully developed embryos occur. Both plugs and filaments appear only in mature eggs. Length of tail 0.076 (0.052-0.104) mm.

²Measurements outside the parentheses represent the size of the most typical representative of A. pacifica, in the parentheses, the minimum and maximum size of the nematodes found by us.

Male: Body length 7.139 (5.54-9.8) mm. Maximum width 0.083 (0.066-0.116) mm (at level of intestine). Width at level of nerve ring 0.056 (0.056-0.064) mm, at level of pharynx 0.024 (0.023-0.028) mm, at cloaca 0.056 (0.044-0.08) mm. Cuticular striations more weakly expressed than in female. Nerve ring lying 0.204 (0.192-0.223) mm from anterior end of body. Pharynx length 0.14 (0.132-0.18) mm. Length of muscular section of esophagus 0.44 (0.332-0.568) mm, width 0.016 (0.016-0.02) mm, and length and width of glandular esophagus 2.12 (1.5-2.48) mm and 0.04 (0.04-0.044) mm. Excretory pore 0.308 (0.272-0.348) mm from anterior end of body. Tail length 0.136 (0.08-0.136) mm, curved ventrally. It bears 4 pairs precloacal and 5 pairs postcloacal papillae. Precloacal papillae drawn together in pairs. Spicules of unequal size, the larger 0.292 (0.220-0.328) mm; its distal end pointed, proximal end slightly expanded; at some distance from the base an oblique ridge. Smaller spicule length 0.096 (0.064-0.1) mm, slightly curved, its distal end rounded. Caudal alae well developed. From cloacal opening longitudinal cuticular ridges extend anteriorly on ventral side. They turn towards the lateral surface of the nematode and head for the dorsal side, gradually disappearing.

Larva. Length of body 4.32 (4.12-5.98) mm, maximum width in region of the intestine 0.06 (0.06-0.092) mm. Width of body at beginning of pharynx 0.02 (0.02-0.024) mm, at level of nerve ring 0.044 (0.044-0.056) mm and at level of anal opening 0.072 (0.036-0.072) mm. Cuticle with fine transverse striations with a tendency to proceed in spirals. Pharynx length 0.128 (0.116-0.144) mm. Length of muscular esophagus 0.304 (0.304-0.416) mm, width 0.016 mm. Length of glandular esophagus 1.4 (1.18-1.76) mm, its width 0.032 (0.036) mm. Excretory pore opening 0.256 (0.228-0.28) mm from anterior end of body. Nerve ring surrounds muscular part of esophagus 0.18 (0.156-0.18) mm from anterior end of body. Tail conical, terminating in an ampoule-like papilla. Length of tail 0.124 (0.056-0.124) mm, length of caudal papilla 0.012 mm.

A more detailed description of the larva of A. pacifica from intermediate hosts (amphipods, an isopod and a decapod), Anisogammarus kygi (Derzhavin), A. tiuschovi (Derzhavin), A. ochotensis (Brandt), Idotea ochotensis Brandt, and Pagurus middendorffii (Brandt), was given by Tsimbalyuk, Kulikov and Tsimbalyuk (1970). We found larvae, evidently recently ingested with the intermediate host, as already noted, in the stomach and intestine of the definitive host.

Literature

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[English Abstract]

A comparative analysis of morphological and morphometric characters has shown that Ascarophis curilica Zhukov, 1960 is a synonym of the species A. pacifica Zhukov in Spassky et Rakova, 1958.

A description and figures of studied specimens are given.

Table 1. Comparison of morphological characters of *A. pacifica* and *A. curilica*, based on data from different authors (measurements in mm).

Character	<i>A. pacifica</i>						<i>A. curilica</i>
	Our data		from Spassky and Rakova (1958)		from Zhukov (1960)		from Zhukov (1960)
	♀	♂	♀	♂	♀	♂	♀
Length of body	11.12-24.3	5.45-9.8	11-16	15	12.4-20	6.3-10.2	9.56-11.0
Width of body at level of end of pharynx	0.028-0.032	0.023-0.028	0.054-0.063		0.054-0.075	0.041-0.066	
Width of body at level of anus	0.056-0.084	0.044-0.08	0.090-0.120	0.088	0.11-0.13		0.1-0.125
Maximum width of body	0.1-0.2	0.066-0.116	0.144-0.176	0.12	0.13-0.21	0.062-0.133	0.079-0.083
Excretory pore	0.28-0.384	0.272-0.348	0.283	0.356			
Cuticular striations	Well marked	Less developed than in female	Fine striations, spirally arranged	Weaker than in female	Grooves spirally arranged, well marked	Grooves spirally arranged, well marked	Well marked striations
Length of pharynx	0.124-0.208	0.132-0.18	0.144-0.180	0.153	0.14-0.19	0.12-0.18	0.069-0.1
Total length of esophagus					2.03-4.4	2.0-3.0	
Length of muscular esophagus	0.402-0.62	0.332-0.568	0.38-0.5	0.360			0.354-0.360
Length of glandular esophagus	1.96-3.14	1.5-2.48	1.6-2.13	2.5			2.77-3.4
Nerve ring from anterior end	0.196-0.28	0.192-0.223	0.189-0.223	0.252	0.2-0.27	0.15-0.21	0.11-0.14
Vulva from anterior end	6.48-11		4.41-5.3		5.7-8.3		3.67-3.84
Eggs	0.044-0.052× 0.028-0.032		0.036-0.054× 0.027-0.03		0.043-0.050× 0.025-0.03		0.039-0.041×0.022
Length of larger spicule		0.22-0.328		0.314		0.272-0.313	
Length of smaller spicule		0.064-0.1		0.106		0.087-0.104	
Length of tail	0.052-0.104	0.08-0.136	0.041-0.063	0.113	0.046-0.071	0.092-0.142	0.062-0.083

Table 2. Degree of variability of morphological data of *A. pacifica* and *A. curilica*.

Character	Male				Female			
	Sum of variants	Arithmetic mean	Standard Deviation	Coefficient of variation (in %)	Sum of variants	Arithmetic mean	Standard Deviation	Coefficient of variation (in %)
	X	\bar{X}	σ	Y	X	\bar{X}	σ	Y
Length of body	52.93	7.56	1.564	2.95	181.69	16.5	3.925	2.16
Maximum width of body	0.613	0.08	0.015	2.44	1.514	0.151	0.030	2.02
Length of muscular esophagus	2.761	0.345	0.139	5.03	5.546	0.504	0.064	1.16
Length of glandular esophagus	16.92	2.11	0.280	1.65	28.098	2.554	0.354	1.26
Length of tail	0.928	0.116	0.014	1.57	0.752	0.068	0.014	1.95
Length of larger spicule	2.46	0.307	0.015	0.6	-	-	-	-
Length of smaller spicule	0.668	0.083	0.012	1.9	-	-	-	-
Length of ovary relative to intestine	-	-	-	-	12.836	1.16	0.737	5.74
Length of egg	-	-	-	-	0.536	0.048	2.41	0.4
Width of egg	-	-	-	-	0.336	0.030	2.69	0.8

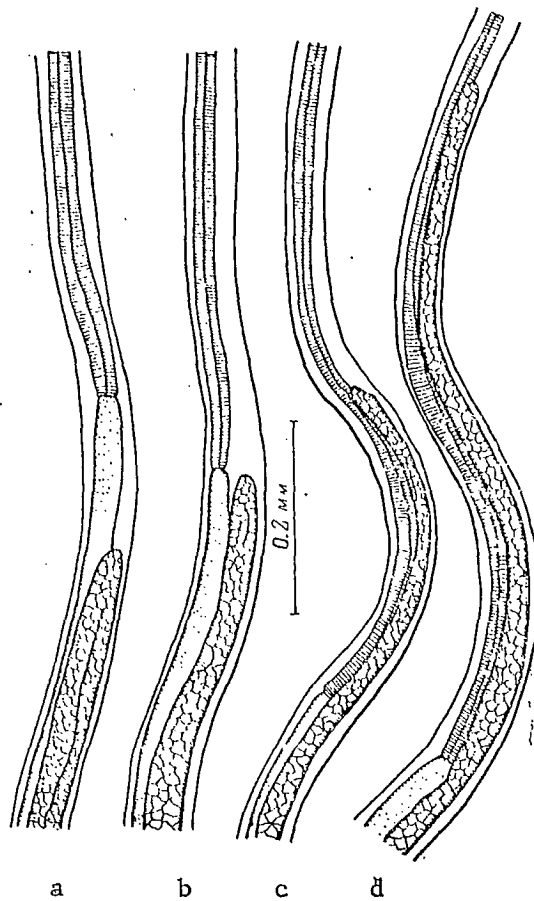


Fig. 1. Position of the ovary relative to the level of the junction of esophagus and intestine in Ascarophis pacifica Zhukov in Spassky and Rakova, 1958.

a - ovary not extending to the beginning of the intestine; b - ovary reaching to the level of the junction of esophagus and intestine; c,d - ovary extending anteriorly to different levels beyond the beginning of the intestine.

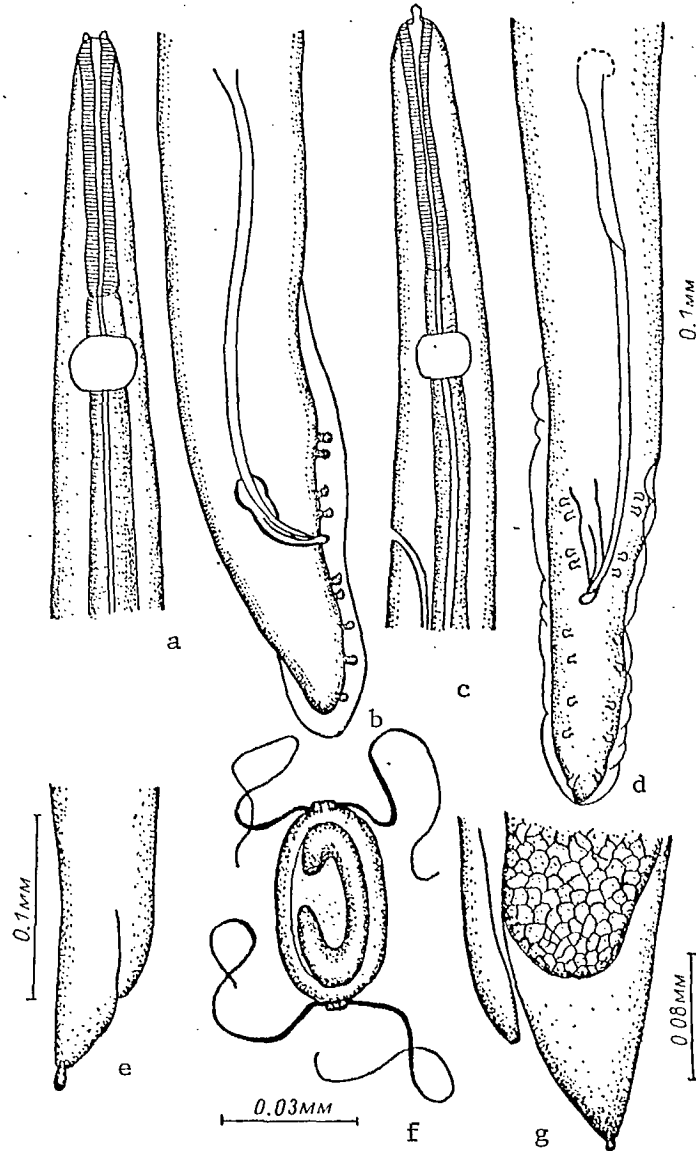


Fig. 2. Ascarophis pacifica Zhukov in Spassky and Rakova, 1958.

a - anterior end of the body of female, dorsoventral; b - posterior end of the body of male, lateral; c - anterior end of the body of female, lateral; d - posterior end of the body of male, ventral; e - posterior end of the body of a larva, lateral; f - egg with filaments; g - posterior end of the body of female, lateral.