Some nematode parasites of frogs (Rana spp.) from North Viet Nam

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ABSTRACT. Small samples of three species of frogs, Rana rugulosa Wiegmann, R. limnocharis Boie and R. kuhlii Tschudi, collected in Hanoi, North Viet Nam were examined for helminths. A total of 8 species of parasitic nematodes, including one new to science, were recorded: Rhabdias nipponica, Cosmocerca japonica, Aplectana macintoshii, Oswaldocruzia hoeplii, Omeia vietnamensis sp.n., Spinitectus ranae, Ochoterenella sp., and Anchotheca buccalis, O. vietnamensis sp.n. from Rana kuhlii is characterized mainly by the length and shape of spicules and a gubernaculum (0.88-1.06 mm and 0.27-0.30 mm, respectively) and by the markedly inflated, elevating posterior lip of the cloaca, Paracosmocerca mucronata Kung et Wu, 1945 is considered a junior synonym of Cosmocerca japonica Yamaguti, 1938. All the species except O. hoeplii were recorded for the first time from Viet Nam. All the parasite species are redescribed and illustrated, and some problems concerning their taxonomy and geographical distribution are discussed.

KEY WORDS: Parasitic nematodes, Rhabdias nipponica, Cosmocerca japonica, Aplectana macintoshii, Oswaldocruzia hoeplii, Omeia vietnamensis sp.n., Spinitectus ranae, Ochoterella sp, Anonchotaenia buccalis, morphology, taxonomy hosts Rana spp., Viet Nam.

In spite of the fact that the territory of Viet Nam is of special interest from the zoogeographical viewpoint, little known of the parasite fauna of Vietnamese amphibians. Until now there are no detailed and systematic investigations from Viet Nam in this respect, and most amphibian species occurring in this country have not yet been examined helminthologically. The available data on the occurrence of parasitic nematodes in this group of vertebrates in Viet Nam are also scarce (see MATHIS and LÉGER 1911, HSÜ 1935, HOUDEMER 1938, LE-VAN-BOA and PHAM-NGOC-KHUE 1971). In 1984, during his short-term stay in Viet Nam from 16 May until 17 June, the junior author (O. SEY) examined occasionally for helminths several specimens of the three frog species (Rana rugulosa Wiegmann, 1835, R. limnocharis Boie, 1835 and R. kuhlii Tschudi, 1838*) collected in Hanoi; a total of 8 species of parasitic nematodes were recorded in them. Since these parasites represent interesting findings mostly from the taxonomical and zoogeographical points of view, the results of their systematic evaluation are presented in this paper. The nematodes were fixed in 70% ethanol and were cleared with glycerine for examination; en face views were prepared according to ANDERSON’s (1958) method. All drawings were made with the aid of a camera lucida. All specimens have

*The names of host frogs are in accordance with a recent publication, "Amphibian Species of the World", edited by D. R. FROST, University of Kansas, Association of Systematics Collections, Allen Press Inc., Lawrence, 1985.
been deposited in the helminthological collection of the Institute of Parasitology, Czechoslovakia. In the following account of the species encountered, measurements are given in millimetres.

REVIEW OF SPECIES
Fam. Rhabdiasidae Railliet, 1915

1. Rhabdias nipponica Yamaguti, 1935 (Figs 6-9)
Host: Rana rugulosa Wiegmann.
Localization: lungs.
Locality: North Viet Nam (Hanoi).
Prevalence: on 1 out of 4 R. rugulosa examined (intensity: 1 specimen).

DESCRIPTION (1 specimen - parasitic female): Small, whitish nematode. Surface of cuticle almost smooth, somewhat folded on cephalic inflation only. Length of body 3.89, maximum width 0.217. Head end rounded, without distinct mouth papillae; mouth somewhat depressed. Cuticle forming distinct inflation on head end, its thickness being 0.006-0.009. Small buccal capsule present, size 0.006 x 0.006. Oesophagus muscular, being somewhat expanded only at its posterior portion; length of oesophagus 0.333, its width near anterior end 0.095, at its posterior part 0.204. Length of oesophagus representing some 9% of body length. Nerve ring and excretory pore 0.159 and 0.207, from anterior extremity, respectively. Vulva postequatorial, situated 2.14 from anterior end of body. Uterus containing great number of oval, thin-walled eggs; advanced eggs larvated; size of eggs 0.081-0.105 x 0.036-0.039. Tail conical, 0.228 long, ending in sharp cuticular spike.

COMMENTS: The only available specimen of the present material corresponds on the whole to the description of R. nipponica Yamaguti, 1935. This species was originally described by YAMAGUTI (1935) from Rana rugosa and R. nigromaculata from Japan, later it was also reported from R. nigromaculata, R. guentheri and R. limnocharis from China (KUNG and WU 1945, WANG et al. 1978). According to YAMAGUTI (1941) the specimens from Rana japonica, R. nigromaculata and R. planciy, recorded by LU (1934) in China and identified as Rhabdias incerta Wilkie, 1939, should also be referred to R. nipponica. In its morphology R. nipponica resembles the European species R. bufonis (Schrank, 1788) and it cannot be excluded that subsequent studies will prove their conspecificity; the nematodes from the type hosts of R. nipponica were originally identified in Japan as R. bufonis by MORISHITA (1926), R. nipponica had not previously been reported from Viet Nam and R. rugulosa is a new host record.

Fam. Cosmocercidae Travassos, 1925

2. Cosmocerca japonica Yamaguti, 1938 (Figs 1-5)
Syn.: Paracosmocerca mucronata Kung et Wu, 1945.
Hosts: Rana limnocharis Boie, R. rugulosa Wiegmann, and R. kuhlii Tschudi.
Localization: intestine.
Locality: North Viet Nam (Hanoi).
Prevalence: in the only R. limnocharis examined (intensity: 25 nematodes), in 2 out of 4 R. rugulosa (intensity: 3-5 nematodes), and in the only R. kuhlii (intensity: 1 nematode).

DESCRIPTION: Small, whitish nematodes of fusiform body. Oesophagus anteriorly with short pharynx, posteriorly with bulb provided with valvular apparatus. Excretory pore situated approximately at level of posterior end of bulb or slightly below it.

Male (1 specimen): Length of body 1.50, maximum width 0.177. Numerous somatic papillae present. Length of entire oesophagus 0.282, length of pharynx 0.015, of bulb 0.051; width of bulb 0.045, of anterior narrow portion of oesophagus 0.018. Distance of nerve ring from anterior extremity 0.141, of excretory pore 0.255. Well sclerotized 0.105 long gubernaculum, present; spicules rudimentary, weakly sclerotized. Five pairs of plectanes present in region...
Figs 1-5: Cosmocerca japonica Yamaguti, 1938 (1 = head end of female, 2 = posterior end of male; 3 = tail of female, 4-5 = plectane, lateral and ventral views);
Figs 6-9: Rhabdias nipponica Yamaguti, 1935 (6 = general view, 7-8 = head end, 9 = tail);
Figs 10-11: Aplectana macintoshii (Stewart, 1914) (10 = head end of male, 11 = posterior end of male).
anterior to cloaca; rosettes of their papillae provided with 6-8 minute, posteriorly directed processes. Oblique, paired subventral muscle bands present in region of plectanes. Tail bearing some 34 ventrally, subventrally, laterally and subdorsally distributed postanal papillae. Tail conical, 0.153 long, with its end bearing two papillae and slender cuticular spike 0.015 long. Lateral cuticular alae reaching posteriorly approximately to level of second pair of plectanes (counting from cloaca).

Female (10 specimens): Length of body of gravid females 3.54-5.07, maximum width 0.245-0.394. Length of entire oesophagus 0.366-0.489, that of pharynx 0.015-0.021, that of bulb 0.087-0.123; width of bulb 0.117-0.0141, that of anterior narrow portion of oesophagus 0.045. Nerve ring and excretory pore 0.150-0.204 and 0.369-0.525, from anterior extremity, respectively. Uterus prodelphic. Vulva situated near mid-length of body, 1.70-2.49 from anterior end. Eggs oval, thin-walled, size 0.081-0.093 x 0.045-0.060; uterus also containing free larvae. Tail conical, 0.351-0.416 long, ending in long, slender cuticular spike. A pair of small papillae (outlets of phasmids) situated somewhat below mid-length of tail. Lateral cuticular alae ending posteriorly in mid-length of tail.

COMMENTS: The nematodes of the present material more or less correspond to a description of the species C. japonica Yamaguti, 1938. This was originally described by YAMAGUTI (1938) from Rana nigromaculata, R. rugosa, R. japonica and Hyla japonica from Japan, later it was reported from Japan and China (Taiwan) also from members of Bufo (B. bufo japonicus, B. melanostictus) (see UCHIDA 1975), SCHMIDT and KUNTZ (1969) reported C. japonica from several species of frogs (Oodozyga laevis, Bufo biporusquis Philippinus and Rana spp.) from Oceanica (Palawan, Luzon).

In 1945 KUNG and WU described a new species and a new genus Paracosmocerca mucronata based on specimens from Rana nigromaculata, R. guentheri, R. limnocharis, Bufo bufo asiaticus and Microhyla ornata from China (Szechuan); the only difference between Cosmocerca and Paracosmocerca was allegedly the presence of a single spicule and absence of a gubernaculum in the latter, CHABAUD (1978) however stated that "in many species of the Cosmocercinae spicules are more or less completely atrophied and some authors have mistaken the gubernaculum for a spicule"; therefore, CHABAUD (1978) synonymized Paracosmocerca with Cosmocerca. However, there are no substantial differences in the descriptions of C. japonica and P. mucronata and their type host (R. nigromaculata) are also identical; from this reason we consider P. mucronata Kung et Wu, 1945 a junior synonym of C. japonica Yamaguti, 1938. This species (as P. mucronata) has also been reported from South China by WANG et al. (1978). C. japonica had not previously been reported from Viet Nam, Rana kuhlii and R. rugulosa are new host records for this species. In its morphology C. japonica is almost indistinguishable from the European species C. ornata (DuJardin, 1845) (see MORAVEC and VOJTKOVÁ 1974). The only difference seems to be body length in the females (2.5-5 mm in C. japonica and 5-10 mm in C. ornata. Moreover, the uterus of C. japonica females of the present material also contained, in addition to shelled eggs, eggs without shells and free larvae, whereas only shelled eggs have always been found in C. ornata females. The ovoviviparity of C. japonica was also observed by SCHMIDT and KUNTZ (1969). Nevertheless, it cannot be excluded that C. japonica is only a subspecies of C. ornata.

3. Aplectana macintoshii (Stewart, 1914) (Figs 10-11)

Host: Rana limnocharis Boie.
Localization: Intestine.
Locality: North Viet Nam (Hanoi).
Prevalence: in the only R. limnocharis examined (intensity: 1 nematode).

DESCRIPTION (1 specimen - male): Small, whitish nematode of fusiform body. Lateral alae extending from anterior end of body to tail. Numerous somatic papillae present. Length of body 1.31, maximal width 0.136. Length of entire oesophagus 0.390, of pharynx 0.015, that
of bulb 0.060; width of bulb 0.057, that of anterior narrow portion of oesophagus 0.030. Nerve ring and excretory pore 0.159 and 0.255 from anterior extremity, respectively. Two moderately sclerotized spicules (length 0.228) and gubernaculum (length 0.069) present. Genital papillae indistinguishable from somatic papillae. Approximate number of postanal papillae 23; these being localized subventrally, laterally and subdorsally. Tail conical, 0.186 long, ending in sharp spike.

Figs 12–20: Oswaldocruzia hoeplii Haü, 1935
(12 = head end of male, lateral view, 13 = head end of female, dorsal view, 14 = deirid, 15 = dorsal ray of male, 16–17 = spicule, 18–19 = posterior end of male, lateral and ventral views, 20 = female tail).
COMMENTS: According to BAKER (1980) this species, described originally by STEWART (1914) from Rana tigerina and Bufo stomaticus from India, is widely distributed over Europe, Asia and Africa. In Asia A. macintoshii is known from many host species from northern India, Bangladesh, Burma, Malaya, southeast China, Taiwan, and the Philippines. It had not previously been recorded from Viet Nam. Under its synonyms, A. macintoshii was also previously reported from Rana limnocharis by WALTON (1933) from the Philippines and by YUEN (1965) from Malaya (see BAKER 1980).

Trichostrongylidae Leiper, 1912

4. Oswaldocruzia hoeplii Hsü, 1935 (Figs 12-20)

Locality: North Viet Nam (Hanoi).
Prevalence: in the only R. limnocharis examined (intensity: 15 nematodes), in the only R. kuhlii (1 nematode) and in 1 out of 4 R. rugulosa (7 nematodes).

DESCRIPTION: Medium sized nematodes, Cephalic cuticular inflation present, but not well developed, being almost indistinct in some female specimens. Head papillae typical of genus. Cuticle with numerous fine longitudinal crests (synlophe). Cervical alae absent. Excretory pore somewhat anterior to level of posterior end of oesophagus, small deirids situated approximately at level of excretory pore.

Male (7 specimens): Length of body 2.95-6.12, maximal width 0.082-0.136. Length of cephalic inflation 0.075-0.090, width of its broader anterior portion 0.027-0.039, that of its posterior portion 0.027-0.033. Length of entire oesophagus 0.318-0.405. Distance of nerve ring and excretory pore 0.150-0.210 and 0.285-0.330 from anterior extremity, respectively; deirids situated 0.300 from anterior end (at excretory pore level) in one specimen 4.37 long. Prebursal pair of papillae inconspicuous. Length of bursa 0.141-0.180. Antero-ventral and postero-ventral rays close to each other, reaching to rim of bursa; antero-lateral ray isolated, anteriorly bent, not reaching to rim of bursa; two other lateral rays close to each other, reaching to rim of bursa. Dorsal ray dividing into four branches at its distal end; ends of branches of posterior pair further subdivided into two processes. Genital cone large, with two papillae. Spicules equal, 0.180-0.210 long, with thick proximal shaft; posterior end of spicule dividing into three sharply pointed processes. Gubernaculum absent.

Female (10 specimens): Body length of gravid females 4.49-12.92, maximal width 0.136-0.231. Length of cephalic inflation 0.075-0.096, width of its broader anterior portion 0.044-0.045, that of its posterior portion 0.038-0.042. Length of oesophagus 0.408-0.510. Distance of nerve ring from anterior extremity 0.192-0.186, that of excretory pore 0.380-0.411, that of deirids 0.380-0.394. Vulva postequatorial, 1.02-4.55 from posterior end of body. Eggs oval, thin-walled, size 0.084-0.105 x 0.054-0.057. Tail conical, 0.126-0.240 long, ending in sharp cuticular spike 0.009-0.015 long.

COMMENTS: The morphology of the specimens was identical in all the three host species, only the males from R. rugulosa were distinctly smaller (body length 2.95-4.37 mm) than those from R. kuhlii and R. limnocharis (5.10-6.12 mm); these differences may be associated with a different advancement of the nematodes, this being suggested also by the fact that the only available female from R. rugulosa (length 3.2 mm) was nongravid. 

O. hoeplii was originally described by Hsü (1935) from Bufo melanostictus in Viet Nam (Hanoi and Ha-Dong (Tongking)), from where it was also reported from the same host species by HOUDEMER (1938). Later on O. hoeplii was also recorded from South China from Bufo melanostictus, Rana rugulosa, R. limnocharis and Kaloula palchra (Koo 1939, Kung and Wu 1945, Wang et al. 1979), from Taiwan from Bufo spp. and Rana longicrus (Yamaguti and Mitunaga 1943, Myers and Kuntz 1970) and from Singapore from B. melanostictus and Rana spp. (Yuen 1963). BAKER (1981) reports this species from Bufo spp. from Thailand.
(Bangkok) and also from B. regularis from Africa (Gabon). The author also mentions that Oswaldocruzia indica Lal, 1944, O. hëpäria Koo, 1939 and O. melanosticti Gupta, 1960 may be synonymous with this species.

Figs 21-30: Omeia vietnamensis sp. n.
(21 = anterior end of male, 22 = head end of female, apical view, 23 = head end of male, 24 = vulva, 25 = egg, 26 = gubernaculum, 27 = distal tip of spicule, 28 = posterior end of male, 29 = tail of male, 30 = tail of female).
5. *Omeia vietnamensis* sp. n. (Figs 21-30)

Host: *Rana kuhlii* Tschudi.

Localization: Intestine.

Locality: North Viet Nam (Hanoi).

Prevalence: in the only *R. kuhlii* examined (intensity: 6 nematodes).

Deposition of type specimens: Institute of Parasitology, Czechoslovak Academy of Sciences, Ceské Budejovice, Czechoslovakia, helm. coll. cat. no. N 161.

DESCRIPTION: Medium sized nematodes of brownish colour when fixed. Cuticle with irregular longitudinal striation, lateral alae absent. Mouth surrounded by three small lips inner edges of which being provided with fine dentigerous ridges; denticles very small, not well visible. Four large submedian papillae with double nerve endings and two lateral amphids present. Buccal capsule well developed, thick-walled, being triangular in apical view. Oesophagus muscular throughout, its posterior end somewhat expanded. Nerve ring situated approximately at border of first and second fourths of oesophagus length, excretory pore almost at its level. Deirids not located. Intestine forming long anterior caecum reaching approximately to mid-length of oesophagus. Tail conical in both sexes.

**Male** (3 specimens) (measurements of holotype in brackets): Length of body 14.08-17.00 (17.00), maximal width 0.462-0.544 (0.544), Length of lips 0.015-0.018 (0.018), length of buccal capsule 0.018 (0.018), width 0.039-0.045 (0.039) thickness of its wall 0.006 (0.006). Length of oesophagus 1.54-1.90 (1.90). Distance of nerve ring from anterior extremity 0.313-0.455 (0.435), that of excretory pore 0.354-0.476 (0.476). Length of intestinal caecum 0.843-1.115 (1.115), width 0.095-0.108 (0.108). Spicules well sclerotized, 0.884-1.061 (1.061) long, each of them provided with broad ventral ala; distal tip of spicule rounded; width of spicules including ventral ala 0.027 (0.027). Gubernaculum well sclerotized, 0.270-0.300 (0.300) long and 0.045-0.048 (0.045) wide in lateral view; distal end of gubernaculum narrowed, provided with dorsal barb. Eight to fifteen pairs of preanal subventral papillae and four pairs of post-anal subventral papillae present. Tail conical, length 0.195-0.261 (0.261); body region around cloacal opening elevated, posterior lip of cloaca greatly inflated, forming conspicuous lobe.

**Female** (1 complete specimen - allotype and 1 specimen with missing anterior body end) (measurements of allotype in brackets): Length of body 20.26 (length of fragment 17.68), width of body 0.639 (0.721). Length of lips 0.018, length of buccal capsule 0.018, width 0.054, thickness of its wall 0.009. Length of oesophagus 2.15. Distance of nerve ring from anterior extremity 0.490, that of excretory pore 0.612. Length of intestinal caecum 1.25, width 0.122. Vulva postequatorial, 9.52 (9.38) from posterior end of body; anterior lip of vulva somewhat elevated. Vagina narrow, muscular, being first directed posteriorly, then anteriorly up to certain distance in front of vulva level, and then curved again posteriorly. Uterus amphidelphic, in space between ovaries; both ovaries forming numerous coils; anterior ovary at considerable distance below end of oesophagus, posterior ovary far in front of anal pore level. Eggs oval, size 0.060 x 0.039 (0.060-0.066 x 0.036-0.039). Tail conical, 0.394 (0.370) mm long; pair of small lateral papillae (outlets of phasmids) present at border of second and third thirds of its length.

COMMENTS: At present the genus *Omeia* Hsü, 1933 comprises four species (see IVASHKIN and KHROMOVA 1976): *O. hoeplii* Hsü, 1933, *O. papillocauda* Rankin, 1937, *O. chickasawi* Walton, 1940, and *O. ambocaeca* (Chabaud et Brygoo, 1957). Of these *O. papillocauda* and *O. chickasawi*, both described from North-American caudate amphibians, differ expressively from *O. vietnamensis* sp. n. in having conspicuously smaller body measurements, a very small gubernaculum, the length of spicules not exceeding 0.2 mm, and in the presence of only three pairs of preanal papillar in the male; moreover, the female tail in *O. papillocauda* is provided with a number of papillae. *O. ambocaeca* from frogs of the genus *Racophorus* from Madagascar differs from *O. vietnamensis* sp. n. in larger sizes of the body (male 27 mm, female 52 mm) and the buccal capsule (length 0.055 mm), smaller measurements of the spicules (length 0.680 mm), and in the shape and size of the gubernaculum (length 0.220 mm).
Morphologically the species most similar to O. vietnamensis sp. n. is O. hoeplii, described by HSÜ (1933) from Rana tibetana from China (Szechuan); but O. hoeplii is noted for its considerably larger body measurements (length of males 23-33 mm, that of females 32-58 mm) and, on the contrary, substantially smaller spicules (length 0.460-0.550 mm) and a gubernaculum (length 0.130-0.200 mm); in addition, the shapes of the gubernaculum and spicules of O. hoeplii are different from those in O. vietnamensis sp. n. and in contrast to the latter.

Figs 31-32: Spinitectus ranae Morishita, 1926 (31= head end of female, 32= posterior end of female);
Figs 33-38: Ochotereneella sp. female (33-34= head end, lateral and apical views, 35= posterior end of body, 36-37= anterior end of body, 38= tip of tail).
species the posterior cloacal lip is not markedly inflated and elevating in O. hoeplii; also the eggs of O. hoeplii are a somewhat smaller (0.054 x 0.037 mm) than those in O. vietnamensis sp. n.

Fam. Cystidicolidae (Skryabin, 1946, subfam.)

6. Spinitectus ranae Morishita, 1926  
(Figs 31-32)
Host: Rana rugulosa Wiegmann.
Localization: stomach.
Locality: North Viet Nam (Hanoi).
Prevalence: in 1 out of 4 R. rugulosa examined (intensity: 1 nematode).

DESCRIPTION (female 1 specimen): Small whitish nematode; length of body 5.87, maximal width 0.218. Head end rounded, posterior end pointed. Cuticle provided with small, posteriorly directed spines arranged in transverse rings; total number of rings 142, of which 8 on tail. First two rings close to each other, length of their spines 0.009; largest spines present in third, fourth and fifth rings (length 0.015); size of spines gradually decreasing in posterior direction; length of spines in mid-length of body 0.008. Some 30 spines present in anterior rings. Distance of first ring of spines from anterior extremity 0.096. Mouth formed by two small lateral pseudolabia, mouth papillae indistinct. Vestibule, including anterior funnel-shaped prostom, 0.069 long; length of prostom 0.015, its width 0.018. Length of muscular oesophagus 0.360, width 0.036, length of posterior glandular oesophagus 1.37, width 0.081. Distance of nerve ring from anterior extremity 0.162, that of excretory pore 0.264; latter opening between fourth and fifth rings of spines. Intestine undulating, brown in colour; short colourless rectum present. Vulva situated 0.449 from posterior end of body and 0.354 from anal pore. Muscular vagina directed anteriorly. Uterine coils containing numerous eggs filling in major part of body. Size of immature eggs 0.024 x 0.018. Length of tail 0.096.

COMMENTS: The morphology of the only available female corresponds to the original description of S. ranae Morishita, 1926. This species had been originally described from Rana nigromaculata from Japan (MORISHITA 1926) where it was later also recorded from the same host species by YAMAGUTI (1941); it is known from Bufo melanostictus in Taiwan as well (see YAMAGUTI 1961); it had not previously been found in Viet Nam. Rana rugulosa is a new host record for S. ranae.

Fam. Onchocercidae (Leiper, 1911)

7. Ochoterenella sp.  
(Figs 33-38)
Host: Rana rugulosa Wiegmann.
Localization: body cavity.
Locality: North Viet Nam (Hanoi).

DESCRIPTION (female, 5 specimens): Body narrow, whitish, tapering somewhat to both ends. Length of damaged (incomplete) gravid female nematodes 14.42-17.14, maximal width 0.585-0.680. Cuticle longitudinally striated, without distinct lateral alae. Head end rounded; mouth part 0.009-0.015 long, distinctly separated by cuticle constriction. Mouth opening dorsoventrally oval, surrounded by small cuticular ring with two small papillae on lateral margins. Four large papillae in outer circle, two on each lateral lobe of head present. Inner circle with four rounded papillae. Two large lateral amphids present. Buccal cavity absent. Oesophagus divided into anterior muscular portion 0.313-0.408 long and posterior glandular, latter portion 2.72-3.31 long, dark in colour. Distance of nerve ring from anterior extremity 0.204-0.286. Anterior end of intestine relatively wide. Tail conical, 0.201-0.240 long, with rounded tip sometimes bearing several small papilla-like tubercles; sometimes this end of tail (0.006-0.024 long) separated by constriction of cuticle. Vulva situated near mid-length of oesophagus, 1.44-2.01 from anterior extremity. Vagina pointing backwards. Uterus amphidelphic. Numerous uterine coils filling in almost whole space of body, anteriorly reaching nearly to nerve ring and posteriorly to anal pore. Body length of microfilariae 0.120-0.126, width 0.006, their ends rounded; cuticular sheath not observed.
Figs 39-48: Aonchotheca buccalis (Yamaguti, 1943)

(39 = head end of male, 40 = stichocytes in middle part of stichosome, 41 = vulva region in female, 42 = posterior end of young female, 43 = immature egg, 44 = distal end of spicule, 45 = posterior end of male, 46-47 = posterior end of male, ventral and lateral views, 48 = male tail, lateral view).
COMMENTS: In the taxonomic evaluation of these nematodes here we follow the system by ANDERSON and BAIN (1976), according to which our nematodes belong to the genus Ochoterenella Caballero, 1944; their specific identification was not possible due to the absence of males and a poor condition of female specimens in the present material. Members of this genus had not previously been recorded in VietNam; it is probable, however, that the Microfilaria sp. reported according to WITENBERG and GERICHTER (1944) by MATHIS and LÉGER from Rana rugulosa from Tonkin were conspecific with Ochoterenella sp. of this material. The character of the cephalic papillae and the mouth elements in Ochoterenella sp. of our material are fairly reminiscent of the structure of the head end of Japanese and Malayan members of the genera Icosiella Seurat, 1917 (I. innominata Yuen, 1962, I. kobayashi Yamaguti, 1941, I. nassai Hayashi, 1960); in these genera, however, two pairs of minute, dentiform or spike-like projections are being described instead of papillae of the inner circle. In bearing two small papillae on the lateral margins of the cuticular ring surrounding the mouth opening, Ochoterenella sp. also resembles the species described by SCHMIDT and KUNTZ (1969) as Foleyella confusa from Rana limnocharis vittigera from the Philippines. It is possible that some species from amphibians, described in the genera Icosiella or Foleyella in fact belong to Ochoterenella; according to ANDERSON and BAIN (1976), the genus Foleyella includes only the species parasitizing reptiles.

Fam. Trichuridae (Ransom, 1911) Railliet, 1915

8. Aonchotheca buccalis (Yamaguti, 1943) (Figs 38-48)
Syn.: Capillaria buccalis Yamaguti, 1943.

Host: Rana kuhlii Tschudi.
Localization: Intestine.
Locality: North Viet Nam (Hanoi).
Prevalence: in the only R. kuhlii examined (intensity: 3 nematodes).

DESCRIPTION: Comparatively very small nematodes with smooth cuticle. Head end narrow, rounded, oral papillae indistinct. Two fairly wide lateral bacillary bands present, starting at nerve ring level and extending posteriorly to posterior extremity; bacillary bands apparently composed of numerous hypodermal round formations (cells), each containing a small central, highly refractile papilla. Stichosome consisting of single row of mostly short stichocytes provided with conspicuously large cell nuclei; stichocytes subdivided into several (mostly 4-6) transverse annuli. Two wing-like cells at junction of oesophagus and intestine well developed.

Male (1 specimen): Length of body 4.87, maximal width 0.054. Maximal width of lateral bacillary bands 0.024. Length of entire oesophagus 2.11 (45% of body length), that of muscular oesophagus 0.309, that of stichosome 1.80; distance of nerve ring from anterior end 0.075. Stichocytes 35 in number. Spicule slender, smooth, moderately sclerotized; its proximal end simple, slightly expanded, distal end narrow, rounded. Length of spicule 0.543, its width near proximal end 0.015, at distal end 0.003. Spicular sheath non-spiny, invaginated, transversely folded. Posterior end of body rounded, with well developed membranous bursa and two wide lateral precloacal cuticular alae; length of alae 0.036, their width 0.009; right ala containing narrow papilla-like formation analogous to those found in bacillary bands. Caudal bursa itself distinctly asymmetrical, 0.009 long and 0.024 wide, supported by two elongate, rounded massive lateral lobes directed posteriorly, each bearing small, less distinct, ventrally directed process. Cloacal opening subterminal, length of tail itself 0.003, including membranous bursa 0.018.

Female (1 young specimen without eggs and short body fragment of gravid one): Length of body of young female 4.98, maximal width 0.054. Length of body fragment of gravid female 2.18, maximal width 0.068. Maximal width of lateral bacillary bands 0.024. Length of entire oesophagus 2.41 (46% of body length), that of muscular oesophagus 0.270, that of stichosome 2.14; distance of nerve ring from anterior extremity 0.087. Stichocytes 39 in number. Posterior end of body rounded, anal pore almost terminal, length of tail only 0.003. Rectum 0.072 long. Ovary reaching posteriorly approximately to mid-length of rectum. Vulva situated 0.030 below stichosome end level. Anterior vulvar lip provided with distinct cuticular...
flange covering vulva; size of flange 0.003 x 0.003 in lateral view. Vagina muscular, pointing backwards. Eggs arranged in two longitudinal rows in posterior part of uterus. Eggs elongate-oval, with markedly protruding polar plugs. Egg wall colourless, 0.0015 thick, with smooth surface. Size of eggs including polar plugs 0.054-0.057 x 0.021-0.024; width of polar plugs 0.003, their total height 0.006, height of their protruding part 0.004. Content of eggs uncleaved.

COMMENTS: This species was first described from Japan by YAMAGUTI (1943) according to the specimens from the buccal cavity and oesophagus of Bufo bufo japonicus; it has not been recorded since. The male specimen of the present material is noted, in contrast to the original description, for its slightly smaller body measurements and a somewhat asymmetrical caudal end with a single papilla-like formation in the region of the lateral caudal alae; this may be considered as intraspecific variability. Somewhat smaller measurements of eggs from the recovered body fragment of female are influenced, undoubtedly, by the fact that only not fully mature eggs were measured. A different localization of the Vietnamese nematodes (intestine) may be associated with the type of the host. The morphology of the nematodes examined has confirmed an assignment of this species to the genus Aonchotheca López-Neyra, 1947 (see FREITAS et MENDONCA 1961, MORAVEC 1982, 1986); this genus comprises many species parasitizing mammals and birds, A. buccalis being hitherto the only member known from cold-blooded hosts. A. buccalis is now reported for the first time from the territory of Viet Nam and Rana kuhlii is a new host record for this species.

It is apparent from the above survey that most nematode species recorded in frogs in North Viet Nam are typical of the anuran nematode fauna from southeastern Asia, being mostly known from South China and Japan. However, more information is necessary before true affiliations of the Vietnamese nematode fauna of amphibians can be evaluated.

MORAVEC, F.—SEY, O.: Néhány parazita fonalféreg észak-vietnami békkából (Rana spp.)

A szerzők három, Észak-Vietnamban (Hanoi) gyűjtött béka faj (Rana rugulosa Wiegmann, R. limnocharis Boie, R. kuhlii Tschudi) néhány példányának helmintológiai vizsgálatát végezték el. Nyolc nematode faj (Rhadinias nipponica, Cosmocerca japonica, Aplectana macintoshii, Oswaldocruzia hoeplli, Omelia vietnamensis sp. n., Spintectus ranae, Ochoterenella sp. és Aonchotheca buccalis) előfordulását mutatták ki. O. vietnamensis sp. n., amely a R. kuhlii-ból került elő, fontosabb faji bélyegei: a szpikulum és gubernáculum hossza és alakja (0.86-1.06 mm, illetve 0.27-0.030 mm), valamint a kloák megduzzadt, megemelkedett hátsó ajka. Paracosmocerca mucronata Kung et Wu, 1945 a Cosmocerca japonica Yamaguti, 1938 junior szinonimájának tekintendő. Az O. hoeplli kivételével az összes többi a vietnami fauna nélküli faj, az egyes fajok leírásán és illusztrálásán kívül a dolgozat foglalkozik taxonómiai és földrajzi elterjedésük problémáival is.
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