A New Kathlaniidae (Cosmoceroidea; Nematoda), *Megalobatrachonema (Chabaudgolvania) moraveci* sp. n. from the Intestine of the Rough-skinned Newt, *Taricha granulosa*

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**ABSTRACT:** *Megalobatrachonema moraveci* sp. n. is described from the intestine of the rough-skinned newt, *Taricha granulosa*. The new species most closely resembles *Megalobatrachonema waldeni* Richardson and Adamson, 1988, in having 3 small distinctly separate lips, a swelling at the posterior of the corpus, an elongated esophageal bulb, and lateral alae, but differs in that there are no cervical alae, cephalic papillae are raised on hypodermal peduncles, and the cuticle lining the inner surface of the lips is thickened. The new species further differs from *M. waldeni* in that the swelling at the base of the corpus is smaller, and the excretory pore and deirids are further posterior. *Megalobatrachonema moraveci* has 1 more postanal lateral and 3 more preanal papillae than *M. waldeni*. The spicules of *M. moraveci* are much more strongly alate, and the gubernaculum is hooklike. Female *M. moraveci* have more eggs in the uterus than those of *M. waldeni*.

**KEY WORDS:** Nematoda, Cosmoceroidea, Kathlaniidae, *Megalobatrachonema (Chabaudgolvania) moraveci* sp. n., newt, *Taricha granulosa*, taxonomy, morphology.

Moravec (1984) reported a nematode of the genus *Megalobatrachonema* in the intestine of *Taricha granulosa* from Vancouver Island, British Columbia. Because only a single female worm was found, the specimen was not given a species name. Recently, Richardson and Adamson (1988) described a species of *Megalobatrachonema* from *Ambystoma gracile* in the lower mainland of British Columbia. To determine whether Moravec's (1984) material was conspecific with that in *Ambystoma* we examined *Taricha* from the Nanaimo/Cambell River area. These were found to be infected with a new species that is described herein.

**Materials and Methods**

Twelve *Taricha granulosa* caught in the Nanaimo/Cambell River area between 4 to 8 May by Mr. Gordon Haas were donated to the authors. Specimens were examined on 11 May 1987. Parasites were fixed in hot alcohol/glycerine, preserved in 70% alcohol, and cleared and examined in factophenol. Figures were drawn with the aid of a drawing tube. The single specimen found by Moravec (1984), and the other following specimens were examined: *Megalobatrachonema tordeniatis* (syn. *M. campanae*) from the Paris National Museum ref. 620Q, and *Megalobatrachonema gigantica* (syn. *Aplectana gigantica*) #9054, *Megalobatrachonema elongata* (syn. *Falcaustra elongata*) #72190–72194, *Falcaustra muscula* (syn. *Spiroonura muscula*) #72195–72198 from the U.S. National Museum Helminthological Collection. References used included those by Baird (1858), Chabaud and Golvan (1957), Hartwich (1960), Skrjabin *et al.* (1976), and Baker (1980, 1986).

In the species description measurements are in micrometers unless otherwise specified; mean is given in parentheses.

**Results**

*Megalobatrachonema moraveci* sp. n.
(Figs. 1–14)

**GENERAL:** Oral opening triangular, surrounded by 3 distinctly separate lips. Cephalic sense organs located at end of hypodermal peduncles. Dorsal lip with 2 papillae; subventral lips each with single papilla and amphid. Inner papillae not observed. Cuticle lining inner surface of lips thickened. Anterior of esophagus bearing 3 onchia.

Esophagus long and narrow, with anterior pharyngeal portion and faintly separated corpus, isthmus, and bulb. Very slight swelling at posterior of corpus. Deirids at level of corpus swelling. Esophageal bulb lacking valves. Excretory pore located at level of esophageal bulb, opening into large sinus.

**MALE:** Caudal end curved ventrally. Preanal musculature consisting of 52–69 muscle pairs. Pseudosucker absent. Tail short. Caudal papillae arranged as follows: 7 pairs of preanal and median unpaired papillae on anterior anal lip, 5 pairs postanal (first and third pairs lateral). Holotype and 1 paratype showing the above papillae arrangement; 2 paratypes showing variation in papillae number. In these cases the fourth postanal pair (subventral) was absent in one specimen and represented by a single papilla in the other specimen. Phasmids between third (lateral) and fourth pairs of papillae. Spicules equal and broadly alate. Gubernaculum with rounded more dorsal end and crochet hook appearance on pointed ventral end.
FEMALE: Vulva in posterior third of body. Vagina muscular, anteriorly directed. Uteri amphidelphic. Ovary associated with posterior uterus originating in anterior of worm, running posteriorly, flexing anteriorly, then flexing posteriorly 15–22% body length behind esophageal bulb, and continuing to level of vulva before flexing anteriorly at oviduct. Oviduct emptying into uterus; uterus flexing anteriorly to join opposing uterus at vagina. Ovary associated with anterior uterus originating near rectum, extending anteriorly to within 1–13% body length from opposing ovary flexure, flexing posteriorly, coiling back on itself once then emptying into oviduct. Oviduct flexing anteriorly at junction with uterus; uterus flexing posteriorly and merging with opposite uterus at vagina.

MEASUREMENTS OF MALE (based on 4 speci-


**Measurements of Female** (based on 4 specimens): Length 32–37 (34) mm. Width at vulva 832–890 (869). Esophagus 2,340–2,629 (2,489) including pharyngeal portion 165–172 (169). Bulb

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width 230–280 (261). Nerve ring 680–752 (727), deirids 1,690–1,896 (1,813), and excretory pore 1,940–2,507 (2,245) from anterior end. Tail 676–820 (730) long. Vagina 440–560 (521) long. Vulva 8,861–10,100 (9,292) from posterior end.

Distance from most anterior flexure of ovary to esophageal bulb 4,828–7,018 (5,702). Total egg number 767–1,325 (1,050), eggs 69–82 (76) long by 60–70 (67) wide.

HOST: *Taricha granulosa*.

SITE: Intestine.

LOCALITY: Brannen Lake, Nanaimo and unnamed lake, Campbell River (sometimes referred to as Quarry Lake, found at 50°15' lat. by 125°40' long.), Vancouver Island, British Columbia, Canada.

SPECIMENS DEPOSITED: U.S. National Museum Helm. Coll. holotype #79940 and 7 paratypes #79941; Czechoslovakia Institute of Parasitology 5 paratypes #N-244.

ETYMOLOGY: The new species is named in honor of Frantisek Moravec of the Czechoslovak Academy of Sciences, who was the first to signal the presence of a *Megalobatrachonema* sp. in *Taricha* from this area.

PREVALENCe AND INTENSITY DATA: Six out of 12 (50%) adult *Taricha granulosa* were infected with *M. moraveci*. Mean intensity of infection was 5.8 worms/host.

**Discussion**

*Megalobatrachonema* includes 5 species in addition to *M. moraveci* sp. n. These are divided between 2 subgenera on the basis of presence or absence of esophageal valves. According to this scheme, the new species can be referred to *M. (Chabaudgolvania)*, which includes those species that lack esophageal valves. Other members of this subgenus are *M. elongata* (Baird, 1858) Baker, 1986, found in *Ambystoma* in Mexico, *M. terdentatum* (Linstow, 1890) Hartwich, 1960 (syn. *M. campanae* Chabaud and Golvan, 1957), found in *Triturus* spp. in Germany, Czechoslovakia, and France, and *M. waldeii* Richardson and Adamson, 1988, found in *Ambystoma gracile* in British Columbia, Canada. *Megalobatrachonema moraveci* resembles these species by its small lips, slender isthmus, and lack of valves in the esophageal bulb.

The present material agrees in all essential respects with that described by Moravec (1984). Moravec had at his disposal only a single female specimen and therefore could not give a complete description. He tentatively referred his material to *M. terdentatum*. However, *M. moraveci* differs from *M. terdentatum* by the distinct separation of the cephalic lips, presence of a labial cuticular thickening, more posterior position of the excretory pore, and slight swelling of the corpus. Male *M. moraveci* further differs from *M. terdentatum* in lacking a pseudosucker, in having 2 rather than 1 pair lateral postanal papillae, and in having 2 more preanal pairs.

*Megalobatrachonema moraveci* most closely resembles *M. waldeii* Richardson and Adamson, 1988, found in *Ambystoma gracile* of British Columbia. Both species have distinctly separate lips, a swelling at the base of the corpus, an elongate esophageal bulb, and lateral alae. *Megalobatrachonema moraveci* differs by its prominent hypodermal peduncles with raised cephalic papillae, labial cuticular thickening, and lack of cervical alae. Males of *M. moraveci* differ from *M. waldeii* by their hook-shaped gubernaculum, broadly alate spicules, and shorter tails. Males also have 1 more pair of postanal lateral papillae and 3 more preanal papillae than *M. waldeii*. Females differ in having more eggs than those of *M. waldeii*.

The labial cuticular thickening of *M. moraveci* is distinct from the cheilostomal ring found in members of *Falcaustra*, *Kathlania*, and *Tonaudia* (see Inglis, 1966), and in *Megalobatrachonema nipponicum* and *M. gigantica* according to Baker (1980). It lacks internal struts and tissue arcade characteristic of the cheilostomal ring but may be a convergent structure affording lip support.

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