

Andrya communis Douthitt, 1915 (Anoplcephalidae), a parasite of *Clethrionomys* spp. (Arvicolidae) in the Nearctic region

F. TENORA

Department of Zoology, Mendel University of Agriculture and Forestry, 613 00 Brno, Czech Republic

Received November 19, 1994

Summary

The species *Andrya communis* Douthitt, 1915 (Anoplcephalidae) is redescribed from the material of Cestoda of *Clethrionomys gapperi* (Vigors, 1830) and *C. rutilus* (Pallas, 1778) from several localities in the Nearctic region. The taxonomical status of *A. communis* is discussed.

Key words: Anoplcephalidae; Cestoda; *Andrya communis*; *Clethrionomys gapperi*; *C. rutilus*

Introduction

Examining the material of Cestoda from two *Clethrionomys* spp. from three localities in the Nearctic region (material collected by R. L. Rausch and V. R. Rausch), the species *Andrya communis* was found. A redescription on this material and the taxonomical status of *A. communis* are given in the present study.

Material and Methods

Host: *Clethrionomys gapperi*, 1 km east of Saskatoon, Saskatchewan, Canada.

Cestoda: 2 incomplete specimens (gravid segments are missing).

Host: *Clethrionomys rutilus*, 25 km on Chena Hot Springs Road, east of Fairbanks, Alaska.

Cestoda: 1 complete specimen (scolex, strobila, gravid segments).

Host: *C. rutilus*, 25 km on the Nabesna Road (Wrangel Mts., eastern Alaska).

Cestoda: 3 incomplete specimens (scolex and gravid segments are missing).

Specimens were fixed in 70 % alcohol and later stained in borax-carmin. The description and comparison with related species follow, measurements are presented in mm. In the specimens from *C. gapperi*, the dimensions of cirrus pouch and vesicula seminalis interna and externa were not recorded.

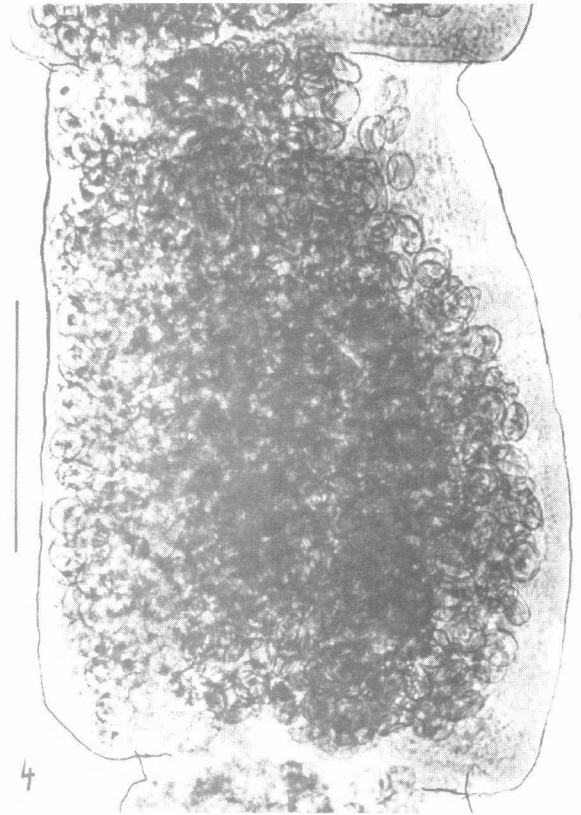
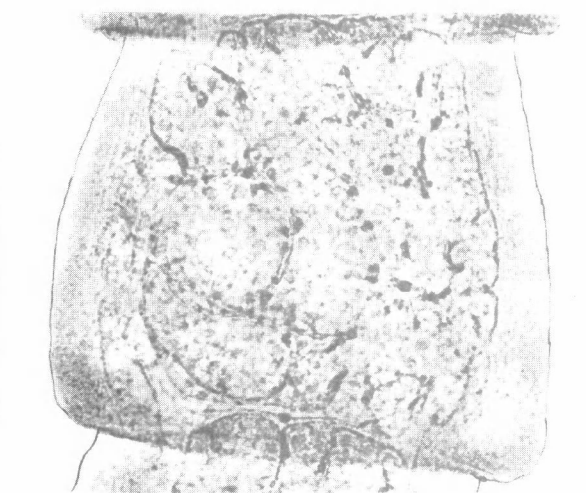
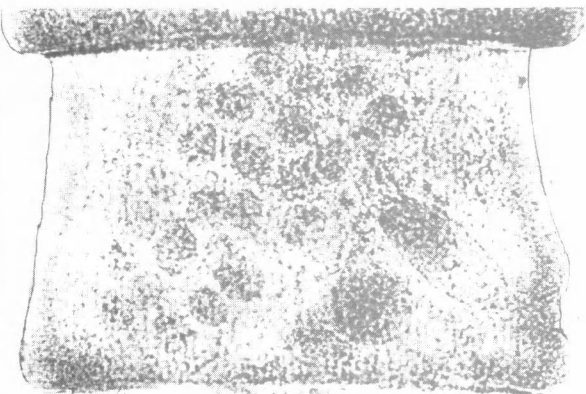
Results

Andrya communis Douthitt, 1915

Description and dimensions of the material from *C. gapperi* (original host) - 2 specimens; in the parentheses the material from *C. rutilus* - 4 specimens: Strobila length 53—62 (32—101), maximum width near posterior end of strobila 0.515—1.20 (0.512—1.10). Strobila increases in width towards posterior end, it is trapezoid. All proglottides are narrower anteriorly than posteriorly. Immature proglottides are about half as long as wide. In anterior part (width anteriorly - w. a.), immature proglottides measure 0.216—0.422 (0.309—0.469), in posterior part (width posteriorly - w. p.) 0.484—0.607 (0.543—0.568). Length of proglottides (l. p.) 0.151—0.300 (0.200—0.321). Mature proglottides almost equally long as wide, or a little longer: w. a. = 0.321—0.390 (0.309—0.518), w. p. = 0.432—0.543 (0.412—0.592), l. p. = 0.518—0.617 (0.309—0.370). Fully gravid proglottides always longer than wider: w. a. = 0.226—0.412 (0.493—0.566), w. p. = 0.824—1.030 (0.566—0.731, l. p. = 1.056—1.358 (0.649—0.772). Scolex 0.412 x 0.144 (0.660—0.628) (Fig. 1), with suckers of 0.149 x 0.144 (0.284 x 0.299), tapers posteriorly uniform until it merges into the neck. Nonsegmented part of strobila 0.500 (0.515).

Genital porus always one-sided, very close to posterior end of proglottides (Figs. 2, 5). Cirrus pouch 0.103—0.175 long and 0.061—0.092 wide, well across the ventral excretory canal. Cirrus without spines. Vesicula seminalis externa and interna present. Testes dorsal mostly occupying the entire median field to the left of anterior part to ovary, vitelline gland and receptaculum seminis. Testes partly underlying the latter. In aporal part of proglottides some testes can extend beyond ventral excretory canal, 20—26 testes measure 0.041—0.046 (0.041—0.051).

Vagina 0.072—0.103 long, situated posteriorly to cirrus pouch. Seminal receptacle nearly circular 0.083—0.175, ovary semicircular measuring 0.055—0.165



Figs. 1—4: *Andrya communis* Douthitt, 1915. 1—scolex; 2—mature proglottis; 3—gravid proglottis; 4—fully gravid proglottis with eggs. Scale bar = 0.200 mm

(0.155—0.196), near the median field or in some proglottides limited to the median field. Vitelline gland circular, 0.041 in diameter. Uterus forms a network (being typical

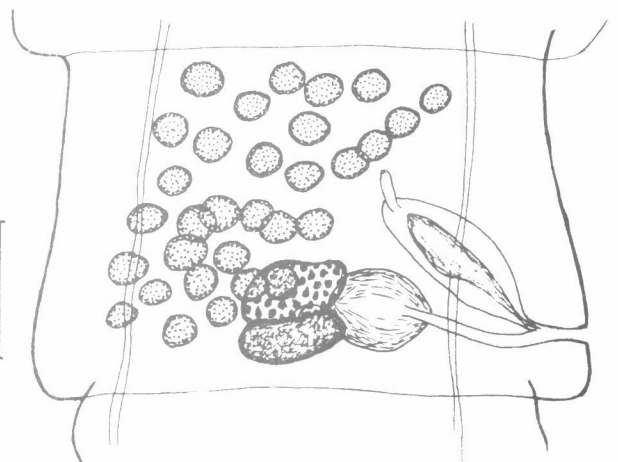


Fig. 5. *Andrya communis* Douthitt, 1915. Mature proglottis. Scale bar = 0.120 mm

Tab. 1.

Andrya communis and some related species

Species	Hosts	Distribution	Cirrus	Genital opening	Testes	Eggs (mm)	References
<i>Andrya communis</i>	<i>Clethrionomys gapperi</i> <i>C. rutilus</i> <i>Microtus oeconomus</i> <i>Microtus agrestis</i>	N, P	aspinose	unilateral	20—41	0.032—0.046	1, 2, 3, 4, 5
<i>Andrya primordialis</i>	<i>Taeniasciurus hudsonicus</i>	N	aspinose	unilateral	30—55	0.052—0.066 x 0.040—0.056	1, 2
<i>Andrya montana</i>	<i>Microtus arvalis transcaspicus</i> <i>Microtus nivalis</i> <i>Microtus</i> spp. <i>Clethrionomys</i> spp. <i>Mus musculus</i> <i>Apodemus flavicollis</i>	P	aspinose	unilateral	20—25	0.027—0.035	6, 7
<i>Andrya arctica</i>	<i>Dicrostonyx groenlandicus</i> <i>Lemus mucronatus</i> <i>C. rutilus</i> <i>Microtus miurus</i>	N	spinose	alternating irregularly	40—50	0.050—0.065	2
<i>Andrya gundi</i>	<i>C. gundi</i>	P	spinose	alternating irregularly	70—80	0.058—0.070	11, 12
<i>Andrya kalelai</i>	<i>C. rutilus</i> <i>C. rufocanus</i> <i>C. glareolus</i>	P	spinose	alternating irregularly	22—35	0.027—0.043	13
<i>Andrya biardi</i>	<i>M. crotorhinus</i> <i>Phenacomys intermedius</i>	N	spinose	unilateral	31—35	0.040	8, 9, 10

Abbreviation: N—Nearctic; P—Palearctic; 1—Douthitt 1915; 2—Rausch 1952; 3—Egorova, Nadochii 1957 (*A. primordialis*); 4—Tenora, Murai 1980 (Figs. 4, 5); 5—present paper; 6—Kirschenblat 1941; 7—Ryzhikov *et al.* 1978; 8—Schad 1954; 9—Rausch 1957; 10—Rausch personal communication (*P. intermedius*); 11—Spassky, 1951; 12—Quentin 1979; 13—Tenora, Hauskialmi, Hantonen 1985

for *Andrya*) in proglottides (Fig. 3), situated laterally beyond ventral excretory canal. Uterus in gravid segments full of eggs (Fig. 4) measuring 0.036—0.046, pyriform apparatus present.

Material deposited in the Helminthological Collection of the U. S. National Museum, Beltsville, USA, Nos. 84447, 86174.

Discussion

Andrya communis Douthitt, 1915 is a species described insufficiently, and, therefore, its systematical status was evaluated by various authors in different ways. For instance, Rausch (1952) draws attention to the obscure taxonomic status of this species when, before him, already Baer (1927), Rausch and Schiller (1949) and later Spassky (1951) included it in the

synonyms of the species *A. primordialis* Douthitt, 1915. Tenora *et al.* (1986) consider to be species inquirenda. Similarly to Baer (1927), e.g. Yamaguti (1959), Ryzhikov *et al.* (1978) and Schmid (1986) approached to this problem. Except for Rausch (1952), all authors drew their conclusions without studying the material only from the imperfect description by Douthitt (1915). Various authors had also a different generic classification of *A. communis* (cf. Douthitt, 1915; Rausch, 1952; Quentin, 1979; Tenora *et al.*, 1986).

The new material described in the present study demonstrates several significant morphological and metrical characters being coincident with those of *A. communis*. Among those, we present, e. g., the body length (30—40 mm in the original description : 32—101 mm in the new material), scolex size (0.560 : 0.412—0.660), body width

(1.5—2 mm : 0.512—1.20 mm) and the number of testes (24—41 : 20—26). The other feature is also the characteristic external variability of proglottides. Douthitt (1915) wrote: "The proglottides vary in shape from 12 times as long as broad shortly before sexual maturity to longer than broad in case of ripe proglottides". Several other coincident features are characterized by Douthitt (1915) as follows: "Testes are all dorsal on the left they may extend across both excretory ducts, or they may strictly be limited to the median field."... "The uterus is a typical reticulum" ... "Genital pores are all on the right margin near middle of the proglottides". ... "Cirrus pouch is separated by a distance equal to its own length from the ventral excretory duct, in others its median end extends across both ducts."

The material of *A. communis* described in the present study is also from the original host (*C. gapperi*), in addition from *C. rutilus*, from the same zoogeographical region (Nearctic). The finding of the species *A. communis* in both *C. rutilus* and *C. gapperi* is not extraordinary, since *C. rutilus* is of Eurasian origin and spread from Beringia during the post-glacial period. *C. gapperi* evidently represents an earlier dispersal from Eurasia. However, the two species come in contact in Canada, *C. rutilus* having spread southward and *C. gapperi* northward after the continental ice disappeared ca. 10 000 years ago. These facts are in agreement with the opinion of Rausch (1982), explaining in certain way the speciation of cestodes of the family Anoplocephalidae to their hosts.

In the connection with the species validity of *A. communis*, several very closely related taxa of this species are also to be mentioned (Tab. 1). They are:

A. primordialis Douthitt, 1915 is a species to which *A. communis* is frequently arranged as a synonym (see the previous text), but it is a different species. It was described from *Sciurus hudsonicus* (= *Tamiasciurus hudsonicus*). Practically only two, and namely even incomplete descriptions of *A. primordialis* are known (cf. Douthitt, 1915; Rausch, 1952). Rausch (1952, 1957) and Schad (1953) pointed out to the indefinite status of *A. primordialis*. The descriptions of *A. primordialis* presented by Baer (1927), Spassky (1951) and Ryzhikov *et al.* (1978) are of compiling character and without any value for taxonomic consideration. Egorova and Nadtochii (1975) give the description of the species *A. primordialis*, namely from *Microtus hyperboreus* and *M. oeconomus* (Arvicolidae) from the former U.S.S.R. With the specific characters - number of testes, size of eggs, genital openings, location of sexual organs and aspinose cirrus, it resembles much more *A. communis* (or *A. montana* Kirschenblat, 1941) as *A. primordialis*. *A. communis* differs from *A. primordialis* in principle by the number of testes and egg size (cf. Rausch, 1952). The hosts differ as well.

While *A. primordialis* is the typical parasites of the mammals from the family Sciuridae, the species *A. communis* parasitizes the mammals of the family Arvicolidae.

A. montana Kirschenblat, 1941, seems to be conspecific with *A. communis* Douthitt, 1915. In the descriptions of both species (*A. communis* and *A. montana*), no differences can be found at the species level. Ryzhikov *et al.* (1978) separate the both species only symbolically according to their egg size. That, of course, is not significant.

A. gundi (Joyeux, 1923) differs on principle from *A. communis* by a greater number of testes, by the egg size, host and geographical distribution; *A. bairdi* Schad, 1953 differs principally by its cirrus provided with spines and by the position and number of testes. *A. arctica* Rausch, 1952 was confused formerly (cf. Rausch, 1950, 1951) with *A. primordialis*. From *A. communis*, it differs by its cirrus provided with spines and by genital pores alternating irregularly. Similarly to that, it is in the case of the species *A. kalelai* Tenora, Hauskismalmi, Henttonen 1985.

Acknowledgements

The author expresses his great thanks to Prof. Dr. R. Rausch who has kindly provided the material of *A. communis*. He is also grateful for letters and personal discussions on the taxonomic position of *A. communis*.

References

- Baer, J. G. (1927): Monographie des Cestodes de la Famille des Anoplocephalidae. *Bull. Biol. France Belgique*, Paris, 10: 1—241
- Douthitt, H. (1915): Studies on the Cestode Family Anoplocephalidae. *Ill. Biol. Monogr.* 3: 1—84
- Egorova, T. P., Nadtochii, E. V. (1975): Helminths of some rodents in Kolyma Upland. *Tr. Biol. pochv. Inst. Sevastopol.* 33—35
- Kirschenblat, Ja. (1941): New tapeworm species from voles in Transcaucasus, *Andrya montana* sp.n. *Soobschenia Akad. Nauk Gruz. SSR*, 3: 272—276
- Quentin, J. C. (1979): Anatomia et taxonomie d'*Aprostotandrya gundi* (Rothman). *Bull. Nat. Hist. Natur.*, Paris, 4: 251—256
- Rausch, R. L. (1950): Observations on a cyclic decline of lemmings (*Lemmus*) on the Arctic Coast of Alaska during the spring of 1949. *Arctic*, 3: 166—177
- Rausch, R. L. (1951): Biotic interrelationships of helminth parasites. *Publ. Health Repts.*, 66: 928—934
- Rausch, R. L. (1952): Studies on the helminth fauna of Alaska. VI. Helminth parasites of microtine rodents - taxonomic considerations. *J. Parasitol.*, 38: 415—444

- Rausch, R. L.** (1957): Distribution and specificity of helminth in microtine rodents: Evolutionary implications. *Evolution*, 11: 361—368
- Rausch, R. L.** (1976): The genera *Paranoplocephala* Lühe, 1910 and *Anoplocephaloides* Baer, 1923. *Ann. Parasit. hum. comp.*, 5: 513—562
- Rausch, R. L.** (1982): Cestodes in mammals: The zoogeography of some parasite-host assemblages. *Mém. Mus. Nat. Histoire Naturelle*, Paris, ser. A, 123: 179—183
- Rausch, R. L., Schiller, E. L.** (1949): A critical study of north american cestodes of the genus *Andrya* with special references to *A. macrocephala* Douthitt, 1915. (Cestoda: Anoplocephalidae). *J. Parasitol.*, 35: 306—314
- Ryzhikov, K. M., Gvozdev, E. V., Tokobaev, M. M., Schaldybin, L. S., Macaberidze, G. V., Merkusheva, I. V., Nadtochii, E. V., Chochlova, I. G., Scharpilo, L. D.** (1978): *Identification of helminths of the rodents in the USSR. Cestoda and Trematoda*. Publ. House Nauka, Moscow
- Schad, G. A.** (1953): Helminth parasites of mice in northeastern Quebec and the coast of Labrador. *Can. J. Zool.*, 32: 215—224
- Schmidt, G. D.** (1986): *CRC Handbook of tapeworm identification*. CRC Press, Inc. Boca Raton, Florida
- Spassky, A. A.** (1951): *Fundamentals of cestodology*. I. *Anoplocephalata*. Publ. House Nauka, Moscow
- Tenora, F., Hauskisalmi, V., Henntonen, H.** (1985): *Andrya kalelai* sp. n. and (?) *Anoplocephaloides* sp., Cestoda, Anoplocephalidae, parasites of *Clethrionomys* rodents in Finland. *Ann. Zool. fenn.*, 22: 411—416
- Tenora, F., Murai, É., Vaucher, Cl.** (1986): On *Andrya* Railliet, 1893 and *Paranoplocephala* Lühe, 1910 (Cestoda, Monieziinae). *Parasitol. hung.*, 19: 43—75
- Yamaguti, S.** (1959): *Systema helminthum. The cestodes of vertebrates*. Vol. 2. Interscience, New York