

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Trematoda Taxon Notebooks

Parasitology, Harold W. Manter Laboratory of

---

1990

## Binder 190, Schistosomatidae H-Z [Trematoda Taxon Notebooks]

Harold W. Manter Laboratory of Parasitology

Follow this and additional works at: <https://digitalcommons.unl.edu/trematoda>



Part of the [Biodiversity Commons](#), [Parasitic Diseases Commons](#), and the [Parasitology Commons](#)

---

Harold W. Manter Laboratory of Parasitology, "Binder 190, Schistosomatidae H-Z [Trematoda Taxon Notebooks]" (1990). *Trematoda Taxon Notebooks*. 186.

<https://digitalcommons.unl.edu/trematoda/186>

This Portfolio is brought to you for free and open access by the Parasitology, Harold W. Manter Laboratory of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Trematoda Taxon Notebooks by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

*Heterobilharzia* Price, 1929

**Generic diagnosis.** — Schistosomatidae. Schistosomatinae. Male: Pre-acetabular portion short, subcylindrical; posterior portion with edges inrolled to form a deep gynaeceophoric canal. Suckers present. Cuticle covered with small tubercles. Intestinal caeca united near posterior extremity. Testes numerous, 70—83 in number, arranged in two irregular rows in posterior third of body anterior to cecal union. Cirrus pouch present, containing seminal vesicle. Genital pore situated at beginning of gynaeceophoric canal and to left of median line. Excretory vesicle short, with terminal pore. Female unknown. Parasitic in mesenteric veins of mammals.

**Genotype:** *H. americana* Price, 1929 (Pl. 99, Fig. 1193), in *Lynx* sp., probably *L. wiedii*, N. America. Redescribed in 1943 from *Lynx rufus floridanus*, Florida; also in *Procyon lotor*, Texas.

**HETEROBILHARZIA, new genus**

*Generic diagnosis.*—Schistosominae: Preacetabular portion of male short, subcylindrical; posterior portion with edges inrolled, forming a deep gynaeophoric canal. Suckers present. Cuticle covered with small tubercles. Intestinal ceca unite caudally near posterior end of body. Testes numerous, 70 to 83 in number, arranged in two irregular rows in posterior third of body anterior to cecal union. Cirrus pouch present and containing the seminal vesicle. Genital pore situated at the beginning of the gynaeophoric canal and to the left of the median line. Female unknown.

*Type species.*—*Heterobilharzia americana*, new species.

**HETEROBILHARZIA AMERICANA, new species PRICE, 1937**

Figures 33-34

*Specific diagnosis.*—*Heterobilharzia*:

*Male* 10 to 14 mm. long by 3 mm. wide. Cuticle covered with small tubercles. Oral sucker subterminal,  $350\mu$  to  $355\mu$  in diameter; acetabulum pedunculated,  $426\mu$  to  $453\mu$  in diameter, situated about  $565\mu$  caudad of oral sucker. Esophagus long and surrounded by the esophageal glands; intestinal ceca sinuous and uniting about  $500\mu$  to  $750\mu$  from posterior end of body; common cecum short and terminating  $140\mu$  to  $150\mu$  from posterior end of body. Testes 70 to 83 in number, arranged in two irregular rows between the intestinal ceca in posterior third of body. Cirrus pouch elongated transversely,  $210\mu$  to  $315\mu$  long by  $70\mu$  wide, and situated about  $568\mu$  caudad of acetabulum; seminal vesicle oval and lying entirely within the cirrus pouch. Genital pore  $370\mu$  caudad of acetabulum and to the left of median line. Excretory system consists of a short bladder which opens at excretory pore at the tip of the body, and of two slender branches extending cephalad on each side of body.

*Female* unknown.

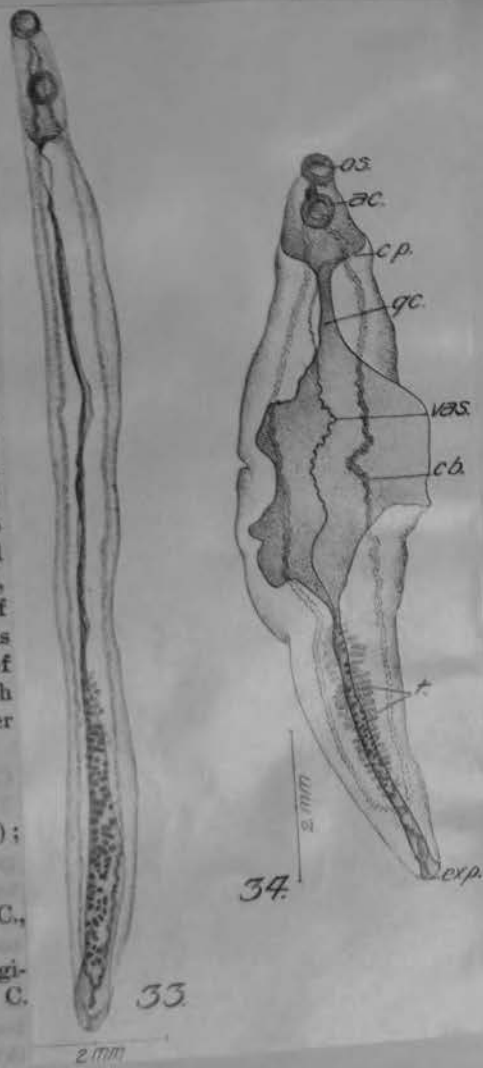
*Cercaria* unknown or unrecognized.

*Hosts.*—Primary, mammals (*Lynx* species, probably *L. vinta*); secondary, unknown.

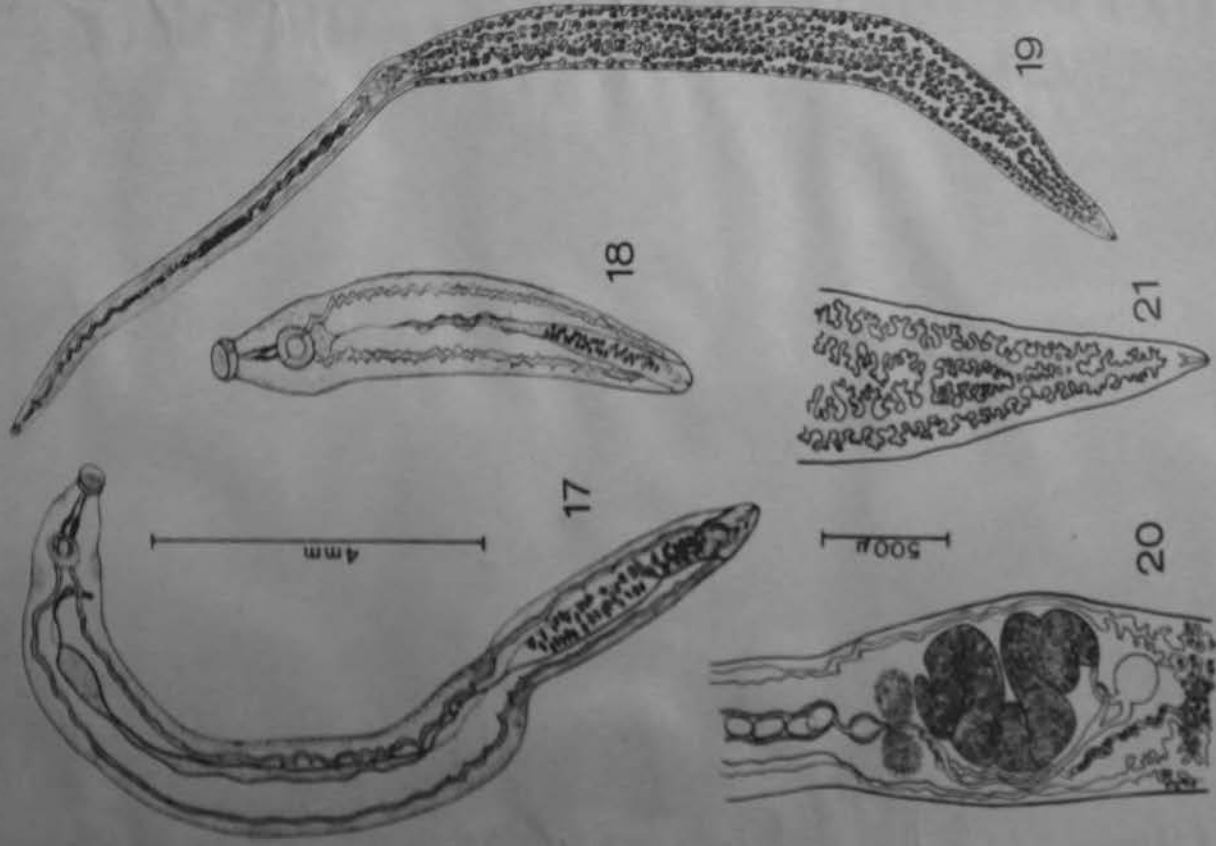
*Location.*—Mesenteric veins.

*Distribution.*—North America (United States (Washington, D. C., National Zoological Park)).

*Type specimens.*—United States National Museum Helminthological Collections No. 14532, collected August 27, 1907, by Dr. M. C. Hall and Dr. A. Hassall.



PRICE (1943) DESCRIBED & REDESCRIBED FROM RACCOON TAKEN IN TEXAS.  
MILLER & HARKEMA (1960) REPORT *H. AMERICANA* FROM N. CAROLINA; RACCOON



FIGURES 17-21. *Heterobilharzia americana*, camera lucida drawings. 17. "Sickle" form of the adult male, ventral view. 18. Straight, attenuated form of adult male, ventral view. 19. Adult female, ventral view. 20. Female genital complex, dorsal view. 21. Dentritic diverticula of intestinal caeca in posterior end of adult female.

HETEROBILHARZIA

*Microbilharzia* Price, 1929

Generic diagnosis. — Schistosomatidae, Schistosomatinae: Male longer than female. Gynaecophoric canal well developed, commencing in front of acetabulum. Suckers present in both sexes. Esophagus bifurcating immediately in front of acetabulum. Intestinal limbs uniting to form a short common caecum. Testes around 20 in number, arranged in two irregular rows in anterior half of body. Genital pore situated about midway between acetabulum and anterior testis. Female slender, almost cylindrical anteriorly, flattened posteriorly. Ovary loosely spiral, slightly pre-equatorial. Uterus long, containing single egg. Vitellaria occupying about one half of body length. Parasites of Lamelliroses.

Genotype: *M. chapini* Price, 1929 (Pl. 79, Fig. 964), syn. of *Austrobilharzia variglandis* (Müller et Northup, 1926) — Penner (1953), in mesenteric vein of *Marrula affinis*; U.S.A. Morphologically identical with *M. variglandis* (Müller et Northup, 1926) Stunkard et Hinchliffe, 1953, whose cercaria develops in *Nassa obsoleta*, causing swimmer's itch of ocean beaches; sexually mature worms recovered from mesenteric veins of experimentally infected canaries, pigeons, gulls and ducklings — Stunkard and Hinchliffe (1952).

Other species:

*M. canadensis* McLeod, 1936, in hepatic portal veins of *Nyroca valioneria*; Canada.

*M. mantidensis* McLeod, 1936, in hepatic portal veins of *Nyroca valioneria*; Canada.

MICROBILHARZIA, new genus

*Generic diagnosis*.—Schistosominae: Male longer than female. Gynaecophoric canal well developed, commencing in front of the acetabulum. Suckers present in both sexes. Digestive tract similar to that of *Schistosoma*. Testes 15 to 20 in number, arranged in two irregular rows in anterior half of body. Genital pore situated about midway between acetabulum and the anterior testis. Female slender, almost cylindrical anteriorly, flattened posteriorly. Ovary loosely spiral, slightly pre-equatorial in position. Uterus long and containing a single egg. Vitellaria occupy about one-half of body length. Larva unknown or unrecognized.

*Type species*.—*Microbilharzia chapini*, new species.

MICROBILHARZIA CHAPINI, new species

Figures 37-38

*Synonym*.—*Orcytrichobilharzia* species Chapin, 1924, p. 208.

*Specific diagnosis*.—*Microbilharzia*:

*Male* 3.25 to 4.25 mm. long by 626 $\mu$  wide. Anterior part of body short, subcylindrical; posterior part long and with the lateral edges infolded, forming a deep gynaecophoric canal which originates anteriorly a short distance in front of acetabulum and extends to posterior end of body. Cuticle lacking (apparently due to maceration) in all specimens available for study. Oral sucker subterminal, 152 $\mu$  in diameter; acetabulum pedunculated, 175 $\mu$  in diameter, situated 437 $\mu$  caudad of oral sucker. Esophagus simple, bifurcating in front of the acetabulum as in other schistosomes; intestinal caeca sinuous and uniting posteriorly about 390 $\mu$  from posterior end of body. Testes 15 to 20 in number, arranged in two irregular rows originating anteriorly about 540 $\mu$  to 550 $\mu$  caudad of acetabulum and extending slightly posterior to equator of body. Seminal vesicle small and situated about midway between acetabulum and anterior testis.

*Female* 3.7 mm. long by 100 $\mu$  wide. Cuticle smooth. Oral sucker poorly developed, 20 $\mu$  in diameter. Ovary slender, loosely spiral, 350 $\mu$  long when measured in a straight line and disregarding total length of spiral, and slightly pre-equatorial in position. The vitellaria consist of transversely elongated follicles, and extend from the distal pole of the ovary to the posterior end of body. Uterus long and apparently containing but one egg.

*Cercaria* unknown or unrecognized.

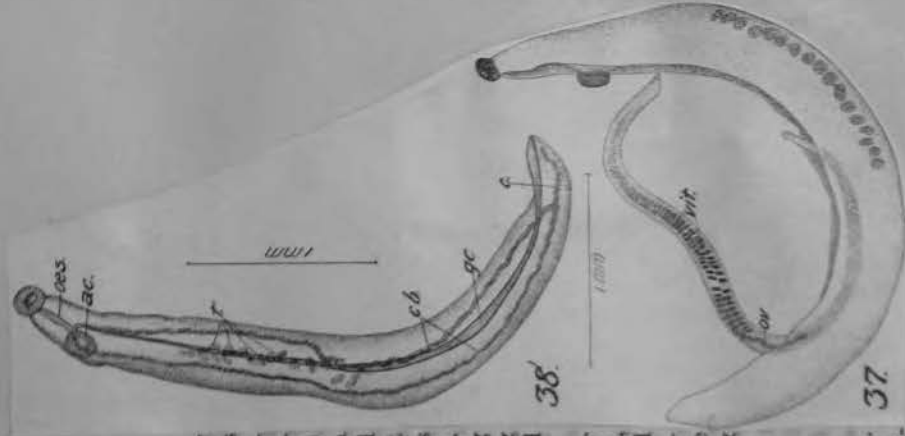
*Hosts*.—Primary, birds (*Marila affinis*); secondary, unknown.

*Location*.—Mesenteric veins.

*Distribution*.—North America (United States; Shadyside, Md.).

*Type specimens*.—United States National Museum Helminthological Collections No. 25169; paratype No. 27888; collected by Dr. E. A. Chapin, January 20, 1923.

This trematode appears to have closer affinities with species of *Austrobilharzia* than with those of any other genus. There are some characters in this species which differ from *A. terrigalemsis*, type of *Austrobilharzia*, to such an extent that the writer hesitates to place his species in this genus; a new genus, *Microbilharzia*, is therefore proposed for it. In proposing this genus the writer realizes that the characters given in the diagnosis may be of specific rather than of generic value, but in order to include this species in *Austrobilharzia*, or in any of the other genera, it would be necessary to amend the generic diagnosis more or less extensively; this is regarded as inadvisable until more material is available for study.



MICROBILHARZIA



## ORIENTOBILHARZIA Dutt and Srivastava, 1955.

*Generic diagnosis.* Schistosomatinae. Male and female almost of equal length. Pre-acetabular portion of male short and subcylindrical, the post-acetabular portion flattened, the edges infolded ventrally forming a gynaeceophoric canal, testes many (37-80) beginning a short distance caudad of the acetabulum, seminal vesicle present, cirrus pouch absent. Female filiform, both suckers present and well developed, ovary oval or with an oval posterior portion and a more slender anterior portion which may be spirally twisted, situated in the anterior or middle third of the body, Laurer's canal absent, uterus containing a single egg. Parasitic in mammals. Larva a nonocellate cercaria without furcal folds.

*Type species:* *Orientobilharzia dattai* (Dutt and Srivastava, 1952) Dutt and Srivastava, 1955.

1. Cuticle of male tuberculated, ovary in the anterior third, ova symmetrical, with a terminal spine ..... *O. bombordi*.
2. Cuticle of male tuberculate ..... 2.
3. Ova with a terminal spine at one end and a leaf like appendage at the other end ..... *O. turkestanicum*.
4. Ova slightly asymmetrical, with a terminal spine but without a leaf like appendage ..... *O. dattai*.

MORPHOLOGY OF THE ADULT

The material for the study of the adult flukes consisted of 229 males obtained from the portal veins of two guinea pigs infected experimentally, 664 males, twenty-eight females and seven pairs of pups from the portal and mesenteric veins of a buffalo calf infected experimentally; and seventy-eight males, eleven females and one pair in copula from three buffaloes infected naturally. The specimens were fixed in Gibco's mixture. Bouin's fluid and 2% formalin.

Male (Fig. 1)

Body 3.942-7.6 mm. long and 0.114-0.243 mm. in maximum width in the region of the testis. The acrobolus portion of the body about one-third of the whole length, flat, having two distinct free edges and a subventral suture. Spines 0.104-0.243 mm. long and 0.065-0.137 mm. wide. Ventral sucker polychaetate and tapeworm, 0.135-0.243 mm. in diameter. Distance between the oral and ventral suckers 0.3-0.637 mm. Post-acrobolar portion of the body long and flattened, with the lateral edges indistinct ventrally, forming a well-developed pyramidal shape. Uterus subterridate and spiracular. Oesophagus with a posterior swelling. Paired intestine long, posteriorly joined by transverse commissure before finally uniting to form the paired intestine. Post-cerebral portion of the body 0.067-0.168 mm. long. Testis 37-66 in number and 0.067-0.097 by 0.033-0.043 mm. in size, arranged dorsally in a single row. Seminal vesicle 0.067-0.098 mm. long, elliptical, situated a little distance in front of the most anterior testis. Ovipositor long, opening just posterior to the acrobolus.

Female (Figs. 2, 4 and 5)

Female, 3.91-7.31 mm. long, widest in the region of the ovary, where its width is 0.067-0.187 mm. Width between the oral and ventral suckers 0.027-0.094 mm. Width at the region of the caecal termina- tion 0.02-0.033 mm. Uterile spiny, especially on the oral and ventral suckers. Oral sucker subterridate, measuring 0.043-0.073 by 0.027-0.037 mm. Ventral sucker distinctly polychaetate, 0.027-0.037 mm. in diameter. Oesophagus with a posterior swelling. Paired intestine 2-23.4 mm. long, longer than the common caecum. Common caecum 1.37-3.97 mm. long. Post-cerebral portion of the body 0.057-0.143 mm. long. Ovary 0.2-0.266 mm. in length and 0.043-0.060 mm. in maximum width, situated in the posterior half of the body, equidistant of the caecal anus. It consists of a long, compact elliptical posterior portion and a more slender, slightly coiled tubular anterior portion. The coiled anterior part from the posterior end of the ovary and, after a short coil, courses, proceeds forwards. Uterus long, having a few loose-elliptical swellings containing a single egg. It is mainly posterior to which the ovary and the vitelline duct unite. Genital pore situated dorsally behind the acrobolus. The vitellaria consist of 22 unilaterally elongated follicles situated on each

side of the common caecum, extending from the caecal union to the posterior end of the body up to a little distance beyond of the caecal termination. Eggs unilaterally oval often with one side slightly flattened, with a terminal spine the distal end of which is slightly bent. The shape of the uterine eggs varies considerably. Some have typically the shape of the eggs of *S. bovis*; one side of oviducts is well flattened, while some are much shorter and broader. Uterine eggs 0.073-0.11 mm. long, including the spine, and 0.023-0.04 mm. broad, the spine being 0.007-0.017 mm. long. Vitelline eggs 0.12-0.137 mm. long with a maximum width of 0.043 mm.

The blood-fluke described in this paper is most closely related to the genus *Ornithobilharzia* Odlin et al., 1912. Members of this genus occur as adults in the circulatory systems of birds and mammals. The ten species known to parasitize birds are: *O. intermedia* Odlin et al., 1912, *O. conoidulata* (Rudolphi, 1819) Odlin et al., 1912, *O. kowalevskii* (Pavina & Aroola, 1896) Odlin et al., 1912, *O. odhneri* Faust, 1924, *O. pricei* Wetzel, 1930, *Ornithobilharzia* sp. Gogate, 1934, *O. fiji* McLeod, 1937, *O. atropis* McLeod, 1940, *O. flammulata* McLeod, 1940\* and *O. subvirescens* Vanaganti, 1941\*. The species which occur in mammals are: *O. boschovi* (Matsuyama, 1900) Price, 1929, *O. turkistanicum* (Skryabin, 1913) Price, 1929, *O. turkistanicum*, var. *fulviretada* Bhadani, 1942, *O. sp.* (Mudalur & Kumampuchari, 1943) Bhadani, 1947, and *O. dattai* n. sp. The new species can be distinguished from the various known species on the basis of several characters such as the nature of cuticle, relative sizes of the male and the number of testes and the proportions lengths of the paired uterus and the common caecum, etc. But the most important character which differentiates it from all the avian and mammalian species is the position of the ovary.

\* The full descriptions of these species have not so far been available to the authors. The variety of *O. dattai* is situated in the posterior half of the body, while in all the other species it is pre-equatorial in position. The species is assigned to the genus *Ornithobilharzia* Odlin et al., 1912, tentatively, with its generic diagnosis modified to include also forms with a post-equatorial ovary.

See article for description of cercaria, etc.

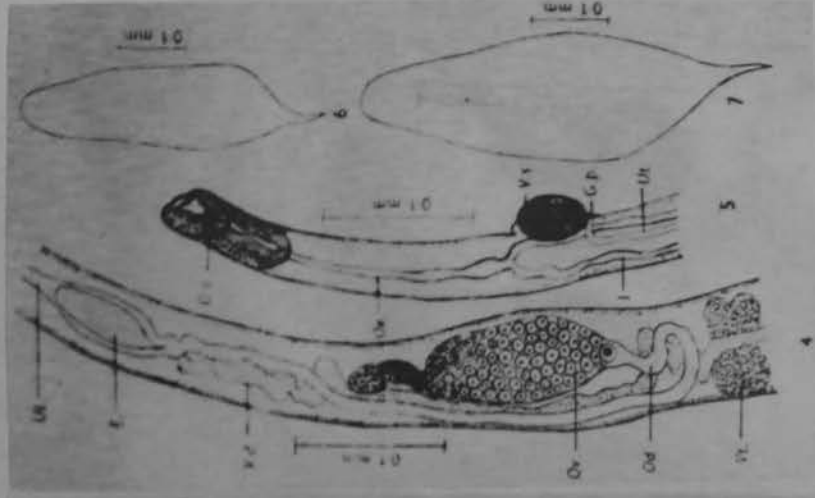


Fig. 1. *Oryzodendobacterium ditiosum*, male.  
 Fig. 2. *O. ditiosum*, female.  
 Fig. 3. *O. ditiosum*, male and female on rice.

Fig. 4. *O. ditiosum*, posterior portion of the female showing the ovary, oviduct, etc.  
 Fig. 5. *O. ditiosum*, anterior portion of the female showing the genital pore, etc.  
 Fig. 6. *O. ditiosum*, anterior portion of the female.  
 Fig. 7. *O. ditiosum*, mature egg from female.

From Durr and Sarinastava (1952)

FIGURES 51-52

*Synonymy*.—*Schistosoma bomfordi* Montgomery, 1906, pp. 143-147 (in *Bos indicus*; India).

*Specific diagnosis*.—*Ornithobilharzia*:

Male 7.989 mm. long; anterior portion of body 337 $\mu$  wide; posterior portion 492 $\mu$  wide in region of testes and 170 $\mu$  in diameter at caudal extremity. The anterior portion of the body is flattened and the posterior portion invaginated, forming the gynacophoric canal. Cuticle tuberculate and spiny; spines also present in suckers and in gynacophoric canal. Oral sucker cup-shaped, 306 $\mu$  in diameter; acetabulum pedunculated, 340 $\mu$  in diameter, and situated 850 $\mu$  caudad of oral sucker. Testes 61 in number, oval in shape, and measuring 100 $\mu$  by 90 $\mu$ , the total length of the chain of testes being 3.06 mm., or about three-sevenths of total body length. The seminal vesicle is situated in front of the testes, about 200 $\mu$  caudad of the union of the anterior and posterior portions of the body.

*Female* 7.31 mm. long by 172 $\mu$  wide at the ovary. Cuticle devoid of spines, except in suckers and at posterior end of body. Oral sucker subterminal, 46 $\mu$  in diameter; acetabulum slightly salient, 42 $\mu$  in diameter. Esophagus simple, 204 $\mu$  long; intestinal caeca unite posteriorly 1.819 mm. from the esophageal bifurcation; common caecum 5.109 mm. long and terminating 178 $\mu$  from posterior extremity. Ovary oval in outline, 309 $\mu$  long, and situated in front of cecal union. Uterus 1.4 mm. long; genital pore slightly salient and situated immediately caudad of acetabulum. The vitellaria lie on each side of the common oecum and extend from the cecal union to the posterior end of body. Egg oval and provided with a terminal spine; immature egg 100 $\mu$  to 115 $\mu$  long by 44 $\mu$  to 48 $\mu$  wide, spine 8 $\mu$  to 10 $\mu$  long; mature egg, containing a miracidium, 125 $\mu$  to 136 $\mu$  long by 53 $\mu$  to 60 $\mu$  wide, spine 6 $\mu$  to 8 $\mu$  long.

*Cercaria* unknown or unrecognized.

*Hosts*.—Primary, mammal (*Bos (Bubalus) bubalis* = *Bos indicus*); secondary, unknown.

*Location*.—Mesenteric veins.

*Distribution*.—Asia (India).

*Schistosoma bomfordi* Montgomery and *S. turkestanicum* Skrjabin are transferred to the genus *Ornithobilharzia* on the basis of morphological similarity to other species of the genus. The number and position of the testes in the male, and the shape and position of the ovary in the female are so similar to those in *Ornithobilharzia intermedia* Odhner, type of *Ornithobilharzia*, that they are obviously congeneric. The fact that both *O. bomfordi* and *O. turkestanicum* are at present known only from mammalian hosts does not appeal to the writer as being a matter of sufficient importance to justify their retention in the genus *Schistosoma*. In view of the morphological relationship of *O. bomfordi* and *O. turkestanicum* to species occurring in birds, it may be assumed that these parasites, which are of rare occurrence in their mammalian hosts, may be only accidental and facultative parasites of these hosts, and it may be surmised that they are normal parasites in birds of some sort.

The report of the occurrence of *O. bomfordi* as a parasite of cattle in France, by Marotel (1903), is apparently erroneous, as the species which he described has an egg with two spines, one at each end, which measures 80 $\mu$  to 100 $\mu$  long by 30 $\mu$  to 35 $\mu$  wide. Since *O. turkestanicum* is the only schistosome reported from cattle as having a large number of testes, and an egg of the type described, it appears that this was the species found by Marotel. Velu and Barotte (1924: p. 325) are apparently of this opinion as they give France as a locality for *O. turkestanicum* and their description of the egg of this species is essentially the same as that given by Marotel for *O. bomfordi*.



576 ORNITHOBILHARZIA TURKESTANICUM (Skrjabin, 1913), new combination

Figures 46-50

*Synonymy*.—*Schistosoma turkestanicum* Skrjabin, 1913, pp. 455-468 (in *Bos taurus*; Russian Turkestan); *Schistosoma bomfordi* Montgomery of Marotel, 1938.

*Specific diagnosis*.—*Ornithobilharzia*:

*Male* 4.2 to 8 mm. long by 340 $\mu$  to 476 $\mu$  wide. Cuticle without tubercles. Oral sucker subterminal, 255 $\mu$  long by 154 $\mu$  wide; acetabulum 289 $\mu$  by 278 $\mu$ , and situated about 425 $\mu$  caudad of the oral sucker. The esophagus shows two dilations and is surrounded by the esophageal glands; intestinal caeca unite caudally about 1.2 mm. from posterior end of body; in some specimens transverse commissures are present in posterior half of body which connect the two caeca. The testes, 70 to 80 in number, occupy a space about 3 mm. long in the median line. The genital pore lies immediately caudad of the acetabulum.

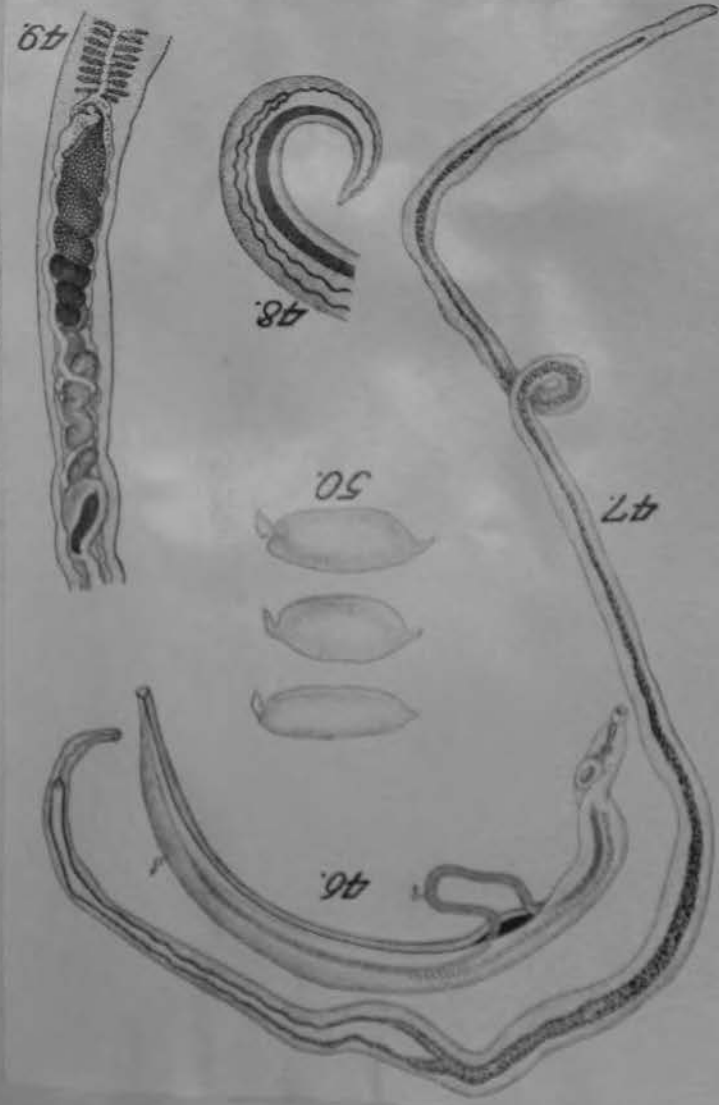
*Female* 3.4 to 5.5 mm. long by 102 $\mu$  wide in region of ovary; body slender and almost circular in cross section. The suckers measure 72 $\mu$  in diameter, and the acetabulum is situated about 170 $\mu$  caudad of the oral sucker. Esophagus simple; intestinal caeca unite 1.632 mm. from posterior end of body. Ovary spiral, 255 $\mu$  long, and situated anterior to cecal union. The vitellaria are composed of elongate follicles which occupy the space from the cecal union to the posterior end of body. Egg oval, 72 $\mu$  to 74 $\mu$  long by 22 $\mu$  to 26 $\mu$  wide, and provided with a spinelike prolongation at each pole.

*Cercaria* unknown or unrecognized.

*Hosts*.—Primary, mammals (*Bos taurus* and *Felis domestica*); secondary, unknown.

*Location*.—Branches of the portal vein.

*Distribution*.—Asia (Russian Turkestan) and Europe (France).



ORIENTOBILHARZIA

*Ornithobilharzia* Odhner, 1912  
Syn. *Macrobilharzia* Travassos, 1923

Generic diagnosis. — Schistosomatidae, Schistosomatinae: Male with well developed gynascophoric canal. Suckers present. Cuticle spinulate. Oral sucker well developed; esophagus bifurcating in front of acetabulum. Intestinal limbs long, with tendency to form anastomoses before finally uniting to form common cecum. Testes numerous (up to 250), intercecal, commencing a short distance posterior to acetabulum; cirrus pouch rudimentary or absent. Seminal vesicle free in parenchyma, prostate absent. Genital pore immediately or a little postacetabular. Female slender, subcylindrical, shorter than male. Ovary loosely or tightly coiled in anterior or middle third of body. Vitellaria extensive, occupying about two-thirds of body length. Laurer's canal present (at least in some species). Uterus short, containing but one egg at a time. Parasites of various birds (Longip., Passerif., Grallif., Steganop.).

Genotype: *O. intermedia* Odhner, 1912, in intestinal veins of *Larus fuscus*, *Hydrocoloeus melanocephalus*; Sweden. Also in *Fuffinus kuhli*, Europe; *Larus*, *Sterna*, *Hydrochelidon*; W. Siberia.

Other species:

- O. ariani* McLeod, 1940, in *Larus argentatus*; Manitoba.
- O. canaliculata* (Kud., 1819) Odhner, 1912, in intestinal veins of *Thalasseus maximus* = *Sterna galericulata*; Brazil. In *Larus*, *Sterna*, and *Hydrochelidon*; W. Siberia.
- Cercaria develops in *Batillaria minima* — Penner (1953).
- O. emberizae* Yamaguti, 1941, in intestinal vein of *Emberiza sulphurata*; Siryazaki, Japan.
- O. filamenta* McLeod, 1940, in *Larus delawarensis* and *L. argentatus*; Manitoba.
- O. hoeppli* Tang, 1951, in *Capella megala*; Foochow, China.
- O. kowalewskii* (Parona et Ariola, 1896) Odhner, 1912, in heart of *Hydrocoloeus melanocephalus*; Italy.
- O. lari* McLeod, 1937, in portal and intestinal veins of *Larus argentatus*; Nova Scotia; Canada, U.S.A. This species should be referred to *Macrobilharzia* in view of the number of testes as suggested by McLeod in 1940.
- O. macrobilharzia* (Travassos, 1923) Price, 1929 (Pl. 73, Fig. 890), syn. *Macrobilharzia macrobilharzia* Trav., 1923, in portal vein of *Anhinga anhinga* = *Plotus anhinga*; Brazil.
- O. odhneri* Faust, 1924<sup>1)</sup> (Pl. 81, Fig. 988), in portal vein of *Numenius arquatus*; China.
- O. pricei* Wetzel, 1930, in veins of *Brania canadensis*; Canada.
- O. baeri* Fain, 1955, in *Phalacrocorax africanus*; Belgian Congo.

<sup>1)</sup> Dutt and Srivastava (1955) proposed a new genus *Sinobilharzia* for this species.

Representatives from mammals:

*O. bonfordi* (Montgomery, 1906) Price, 1929 (syn. *Schistosoma b. M.*) in mesenteric veins of *Bos* (*Bubalus bubalis* = *Bos indicus*) and *Zebu*; India.

*O. dattai* Dutt et Srivastava 1952; adult males and females in naturally infected buffaloes (*Bos bubalis*, *B. indicus*); India; adult males obtained experimentally from portal veins of guinea-pigs.

Cercaria with 5 pairs of penetration glands and without eye-spots; *Lymnaea luticola* infected with miracidia from experimentally infected bull-calf — Dutt and Srivastava (1952).

Dutt and Srivastava (1955) proposed a new genus *Orientobilharzia* for this species.

*O. turkestanica* (Skrjabin, 1913) Price, 1929 (Pl. 81, Fig. 983), syn. *Schistosoma bonfordi* Montgomery of Marotel, 1908, in portal vein of *Bos taurus* and *Felis domestica*; Russian Turkestan and France. Also in cattle, buffalo, goat, sheep, horse, donkey, mule, zebu, camel; Iraq, China, Korea, Azerbaijan Republic. Experimentally in mice and rabbits. Snail host: *Limnaea tenera euphratica* — Machattis (1936).

*O. t.* var. *tuberculata* Bhalerao, 1932, in chévre; Bagdad — Neveu-Lemaire, 1936.

The genus *Ornithobilharzia* is thus emended to include only avian schistosomes with much elongated, tubular and loosely spiral ovary and many testes (25 or more).

SEE DUTT AND H.D. SRIVASTAVA (1961)



## CRITICAL NOTES ON ORNITHOBILHARZIA ODHNER

Until recently, five species of the genus *Ornithobilharzia* were recorded as parasites of gulls, namely: *O. ariani* McLeod, 1940; *O. canaliculata* (Rudolphi, 1819) Odhner, 1912; *O. filamenta* McLeod, 1940; *O. intermedia* Odhner, 1912, and *O. kowalewskii* (Parsons & Ariola, 1896) Odhner, 1912. The original descriptions, mostly based on a few specimens, failed to show the span of individual variations and were in general insufficient for exact identification.

As can be seen from Table I, there is apparently wide variability in the size of both male and female parasites. This in itself is not surprising in view of the great elasticity of their bodies. However, part of this variability may be due to the fact that some authors give the dimensions of the live worms while others, the present authors included, base their observations on fixed material. Another possible explanation may be the different ages of the measured specimens.

Odhner (1912) noted the similarity of *O. canaliculata* (as recorded in South America) to *O. intermedia* recorded in Europe, but in view of the smaller size of the latter he preferred to retain them as separate species. The recent paper of Macko (1963) dispels any doubts on their identity. This author compared the type-specimens of *O. canaliculata* from the original Brazilian host with new specimens recovered from gulls in Central Europe and after detailed analysis of their morphology concluded that *O. canaliculata*, *O. intermedia* and *O. kowalewskii* belong to the same species, namely, to *O. canaliculata* which, being the oldest name, has priority over the others.

After examining over 40 specimens from our collection and in view of the findings of Macko, *O. ariani* McLeod, 1940, and *O. filamenta* McLeod, 1940, should be regarded as additional synonyms to this species.

On the other hand, several schistosomid species parasitic in birds which previously have been referred to the genus *Ornithobilharzia*, should actually be assigned to other genera. Thus "*O. lari*" McLeod, 1937, regarded by McLeod (1940) as belonging to this genus, is to be assigned to the genus *Austrobilharzia* in view of the small number of testes (20-26). The same holds true for "*O. hoeppli*" Tang, 1951, considered by Tang (1951) as belonging to *Ornithobilharzia*, as well as for "*O. pricei*" Wetzell, 1930. "*O. emberizae*" Yamaguti, 1941, is regarded by Ito (1961) as synonymous with *Trichobilharzia corvi* Yamaguti, 1941.

In gulls, apparently, there is thus only one species of *Ornithobilharzia* namely *O. canaliculata*. This species was originally recorded in Brazil in 1819 by Rudolphi and later redescribed and excellently illustrated by Travassos (1942). Good drawings were also provided by Bykhovskaya-Pavlovskaya (1953, 1962) and, as previously stated, by Macko (1963).

The revised key to the species of the genus *Ornithobilharzia* is found on p. 203.

KEY TO SPECIES OF THE GENUS *ORNITHOBILHARZIA* ODHNER

- 1(2) — Majority of testes are in the posterior half of the body; a part of the yolk glands extends cephalad of the intestinal junction  
*O. odhneri* Faust, 1924\*
- 2(1) — Majority of testes are in the anterior portion of the body; yolk glands are confined to the space posterior to the junction of the intestinal branches . . . . . 3
- 3(6) — Over 130 testes; numerous eggs in the uterus . . . . . 4
- 4(5) — *Acanthobium* of male smooth; testes in two rows ovary in the posterior part of the body; American species  
*O. macrobilharzia* (Travassos, 1923) Price, 1929
- 5(4) — *Acanthobium* of male has a segmented appearance; testes in one irregular file ovary in the middle of the body; African species  
*O. buerri* Fain, 1955\*\*
- 6(3) — Less than 130 testes; uterus contains one egg at a time . . . . . 7
- 7(8) — Parasites of gulls (common caecum of male short or absent)  
*O. canaliculata* (Rudolphi, 1819) Odhner, 1912 . . . . . 9
- 8(7) — Parasites of mammals . . . . . 9
- 9(10) — Eggs pointed at the one pole, with a bent appendage at the opposite pole (ovary just in front of the middle of the body; testes in two interlocking rows)  
*O. turkestanica* (Skrjabin, 1913) Price, 1929+ . . . . . 11
- 10(9) — No appendage on the egg opposite its pointed pole . . . . . 12
- 11(14) — Ovary anterior to the middle of the body . . . . . 11
- 12(13) — Common caecum of female short; parasite of the Indian elephant+  
*O. nairi* (Mudaliar & Ramamujahari, 1945) Bhalerao, 1947++
- 13(12) — Common caecum of female 3-4 times as long as the paired intestinal branches; parasites of Indian cattle  
*O. bomfordi* (Montgomery, 1906) Price, 1929x
- 14(11) — Ovary slightly behind the middle of the body (common caecum of male is short, that of female—approximately half the body length). *O. dattai* Dutt & Srivastava, 1952x\*

\* Dutt & Srivastava (1955, 1961) proposed to separate *O. odhneri* into a new genus *Sinobilharzia*. The present authors regard this as superfluous.

\*\* Synonym: *O. phalacrocoraxi* Baugh, 1963.

+ Dutt & Srivastava (1955, 1961) proposed to assign the species numbered 9, 13, 14, to the new genus *Orientalbilharzia*, while Le Roux (1958), alternatively, proposed the genus *Eurobilharzia*.

++ The present authors regard both these steps as unwarranted. The assumption of Dutt & Srivastava (1961) that *O. nairi* has a double set of yolk glands and should therefore be removed to the genus *Bivitellobilharzia* is not substantiated by the original description of this species, and it is regarded by us here as belonging to the genus *Ornithobilharzia*.

x *Aber* (1950) presumed that *O. bomfordi* represents a case of mistaken identity, as it has no female again since it was recorded in 1906.

x\* *O. dattai* bears a striking similarity to *O. turkestanica*, differing from it only in the shape of the testes (in a single row) and in the shape of the egg (absence of the additional appendage).

*Synonym.*—*Macrobilharzia* Travassos, 1923, p. 18.

*Generic diagnosis.*—Schistosominae: Female shorter than male. Male with well developed gynacophoric canal, formed by an infolding of the lateral edges of the body. Suckers present. Cuticle covered with spines. Digestive tract similar to that of *Schistosoma*; intestinal ceca long and showing a tendency to form several anastomoses before finally uniting to form the common cecum. Testes numerous and extending into posterior half of body. Cirrus pouch rudimentary or absent. Seminal vesicle free in the parenchyma; prostate absent. Genital pore small and situated immediately caudad of acetabulum. Female elongate, slender, and flattened. Ovary elongated, loosely or tightly coiled, and situated in anterior third of body. Vitellaria extensive, occupying about two-thirds of body length. Laurer's canal present (at least in some species). Uterus short and containing but one egg at a time.

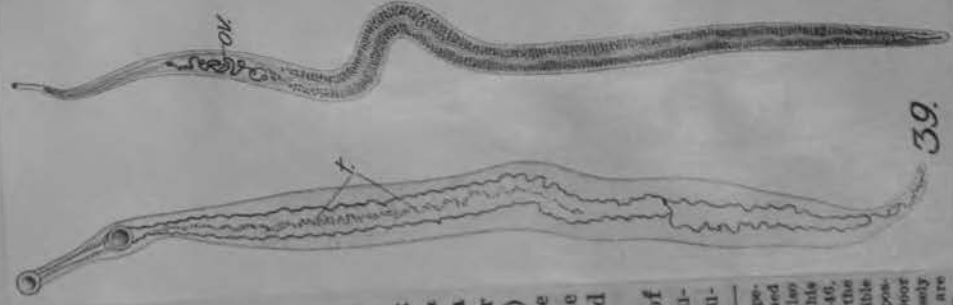
*Type species.*—*Ornithobilharzia intermedia* Odhner, 1912.

## KEY TO SPECIES OF ORNITHOBILHARZIA

- |   |                           |
|---|---------------------------|
| 1. Parasite in mammals.....   | 2.                        |
| Parasitic in birds.....   | 3.                        |
| 2. Cuticle of male smooth; testes 70 to 80 in number; egg 72 $\mu$ to 74 $\mu$ by 22 $\mu$ to 26 $\mu$ , with a spinous process at each pole.....   | 0. turkistanicum, p. 21.  |
| Cuticle of male tuberculate; testes 61 in number; egg 100 $\mu$ to 130 $\mu$ by 44 $\mu$ to 60 $\mu$ , with a spine at one pole.....  | 0. bomfordi, p. 22.       |
| 3. Species inadequately described.....  | 5.                        |
| Species adequately described.....   | 4.                        |
| 4. Male 14 mm. long; oral sucker 32 $\mu$ in diameter; acetabulum 500 $\mu$ in diameter; female unknown; in <i>Hydrocolonus melanocephalus</i> .....  | 0. kowalewskii, p. 19.    |
| Male 16 mm. long; oral sucker 31 $\mu$ by 104 $\mu$ to 19 $\mu$ ; acetabulum 450 $\mu$ in diameter; female shorter than male; in <i>Thalassus marinus</i> (= <i>Sternus palerianus</i> )..... | 0. canaliculata, p. 18.   |
| 5. Male 40 to 57 mm. long; testes 230 to 250 in number; female unknown.....   | 0. macrobilharzia, p. 21. |
| Male 11 mm. or less in length; female known.....  | 6.                        |
| 6. Male 8 to 10.6 mm. long; testes 90 to 110 in number; intestinal ceca in female unite posteriorly immediately caudad of ovary.....  | 0. intermedia, p. 18.     |
| Male 6 to 7 m. long; testes 65 in number; intestinal ceca unite posteriorly a considerable distance caudad of ovary.....  | 0. odhneri, p. 20.        |

## ORNITHOBILHARZIA INTERMEDIA Odhner, 1912

Figure 39

*Specific diagnosis.*—*Ornithobilharzia*:

*Male* 8 to 10.6 mm. long and 420 $\mu$  wide. Cuticle provided with thick blunt spines. Oral sucker 290 $\mu$  to 250 $\mu$  in diameter; acetabulum 300 $\mu$  to 350 $\mu$  in diameter. Testes 90 to 110 in number, commencing a short distance caudad of acetabulum and extending almost to posterior fourth of body; terminal portion of genital system (Endapparat) small and situated at posterior edge of acetabulum; seminal vesicle entirely outside of a rudimentary cirrus pouch; prostate absent. The genital pore is situated immediately caudad of the acetabulum and to the left of the median line.

*Female* 4.5 to 5.75 mm. long and 170 $\mu$  to 220 $\mu$  wide in region of ovary. Cuticle spiny. Oral sucker 40 $\mu$  to 50 $\mu$  in diameter; acetabulum 25 $\mu$  to 35 $\mu$  in diameter. Ovary long, spirally twisted, and situ-

<sup>1</sup> While this paper was in preparation, Linton (1928) described an *Ornithobilharzia* species from several water birds at Woods Hole, Mass. The writer has recently examined specimens of this species which were deposited in the U. S. National Museum, and also several additional specimens which Professor Linton kindly loaned for study. In this material there appear to be two species represented. The specimens (Cat. No. 7946, U. S. N. M.) from *Larus argentatus* is a species of *Ornithobilharzia*, but owing to the fact that the female is included in the gynacophoric canal of the male, it is impossible to make out the necessary specific characters. The remaining specimens, with the possible exception of the one from *Sycticorax speleocorus aestiva* (which is in such a poor state of preservation that some of the structures can be made out) appear to be closely related to, if not identical with, *Ornithobilharzia chapmani*. The males of these specimens are

ated in the anterior fourth of body. Vitellaria extend from a short distance caudad of ovary to posterior end of body. Egg  $70\mu$  long by  $50\mu$  wide.

*Cercaria* unknown or unrecognized.

*Hosts*.—Primary, birds (*Larus fuscus* and *Hydrocoloeus melanocephalus*); secondary, unknown.

*Location*.—Intestinal veins.

*Distribution*.—Europe (Sweden).

1) Ornithobilharzia Barri ~~sp. nov.~~ FAY, 1956

*Longueur* : *Ornithobilharzia* Oudarov, 1912.

*Mâle* : La taille des 18 exemplaires examinés varie de 7,5 à 11 mm, entre ses dimensions extrêmes. Nous trouvons tous les intermédiaires. A part la taille et toutes les dimensions qui sont en rapport avec celle-ci, il n'existe aucune différence appréciable entre tous ces exemplaires, sauf peut-être le nombre de testicules qui varie de 158 (exemplaire de 18,3 mm) à 221 (exemplaire de 41 mm), mais ici encore on trouve tous les intermédiaires et en examinant toute la série de nos spécimens on constate que ce nombre augmente régulièrement avec la longueur du ver. Tous ces exemplaires, à part les plus petits, paraissent sexuellement mâles, et nous avons découvert des mâles de moins de 10 mm accouplés avec des femelles dans les petites veines mésentériques. Au niveau de Facétabulum la largeur varie de 1,4 à 2 mm (spécimens de plus de 20 mm) et de 0,6 à 1,2 mm (spécimens plus petits). Vers le milieu du corps la largeur est de 0,6 à 0,7 mm dans les spécimens moyens à canal gynécophore fermé. Le corps est brusquement rétréci en arrière de Facétabulum, après cet étranglement il s'élargit légèrement et présente ensuite une largeur uniforme. Cuticule lisse et sans tubercules. Ventouses finement épineuses sur leur face interne. Ventouse buccale subterminale, empiliforme, circulaire ou subcirculaire, son diamètre variant de 0,26 à 0,55 mm (spécimens de moins de 20 mm) ou de 0,13 à 0,56 mm (spécimens plus grands). Acétabulum pédonculé, aplati dorso-ventralement, à bord découpé en 17 à 22 festons, son diamètre de 0,55 à 0,9 mm (spécimens de moins de 18 mm) ou de 1 à 1,2 mm (spécimens plus grands). Distance entre l'extrémité antérieure du corps et Facétabulum variant entre 1,1 et 2,205 mm, d'après la longueur du ver. Canal gynécophore bien marqué mais à lèvres peu musculuses et s'éversant facilement, celles-ci sont garnies sur leur face interne de petites épines mélangées à des écailles ou d'échelles seules d'après la taille des spécimens. Bifurcation de l'ovosphère située à une distance de 1 à 1,8 mm de l'extrémité antérieure du corps. Cœca relativement sineux sans diverticules ni anastomoses se réunissant à une courte distance de l'extrémité postérieure (0,4 à 1,4 mm). Cœcum unique très court. Le nombre de testicules varie entre 158 et 271, ils sont disposés sur une ligne sinuose, les premiers sont visibles à une courte distance du pore génital, les derniers vont jusqu'à une distance variable de l'extrémité postérieure d'après la taille des spécimens mais ils atteignent toujours le tiers ou même le quart postérieur du corps, ils sont arrondis et mesurent 0,075 à 0,125 mm de diamètre. Le canal défèrent se dilate, en avant du pore génital, en une vésicule séminale allongée à grand axe dorso-ventral. Elle prend naissance ventralement, se dirige vers la face dorsale du ver puis se recourbe vers l'arrière. Elle est suivie de la poche du cœce dont l'axe présente une direction opposée et qui vient se terminer au pore génital situé plus en arrière. La poche du cœce et la vésicule séminale décrivent ensemble une courbe à concavité postérieure.

*Femelle* : La longueur des 12 femelles que nous possédons varie entre 2,302 et 3,55 mm; plusieurs d'entre elles furent récoltées dans le canal gynécophore des mâles. Corps aplati dorso-ventralement, le diamètre local augmentant régulièrement d'avant en arrière pour atteindre un maximum au niveau de l'ovaire ou légèrement en arrière de l'ovaire (moyenne 0,16 mm). Plus en arrière le corps se rétrécit progressivement et se termine par une extrémité relativement étroite. Ventouse buccale un peu plus longue (0,065 à 0,09 mm) que large (0,055 à 0,073 mm), finement épineuse. Distance extrémité antérieure du corps—acétabulum : 0,45 à 0,54 mm. Acétabulum circulaire ou subcirculaire d'un diamètre de 0,07 à 0,09 mm, finement épineux. Bifurcation de l'ovosphère située près de Facétabulum, les deux cœca se réunissant à une courte distance de l'extrémité postérieure du corps; le cœcum unique est très court. Ovaire volumineux, long de 0,3 à 0,56 mm, lâchement spiralé, décrivant

(over)

6 à 10 boucles, situé au milieu ou légèrement en arrière du milieu du corps, plus rarement il est légèrement prééquatorial. L'oviducte s'abouche au pôle antérieur d'un petit réceptacle séminal ovoïde situé en arrière de l'ovaire, et en sort par le pôle opposé, il se dirige alors vers l'avant et se réunit au vitelloducte pour former l'ootype situé très près de l'extrémité antérieure de l'ovaire, et qui est long de 0,06 à 0,09 mm et large de 0,03 à 0,04 mm. Vitellogènes très développés chez certains exemplaires, remplissant tout l'espace compris entre les deux caeca en arrière du réceptacle séminal. L'utérus légèrement sinueux, débouchant immédiatement en arrière de l'acétabulum sur la ligne médiane. L'utérus renferme de nombreux œufs (11 à 14 chez deux exemplaires). Ces œufs intra-utérins, ovalaires ou elliptiques, sont longs de 0,073 à 0,085 mm et large de 0,01 à 0,015 mm (exemplaires en formol) et présentent un petit éperon pointu subterminal.

*Hôte et localisation* : veine porte et veines mésentériques du Cormoran *Phalacrocorax africanus* Gmel. (6 oiseaux parasités sur 8 examinés)

*Localité* : Astrida (Ruanda-Urundi). Août 1954, février et mars 1955.

Ornithobilharzia canaliculata (Rud., 1819) Ohhner, 1912  
from Witenberg & Lengy (1969)

**MALE.** Length — 9.7(3.3–16.5)mm, width — 0.7(0.6–0.8)mm; body when relaxed is C-shaped, when contracted — sausage shaped. Oral sucker 0.26 mm in diameter, its outside lip-like in extended specimens and its rim beset with rows of minute spines. Acetabulum is mushroom-shaped, 0.36 mm in diameter and situated 0.6–0.96 mm from the anterior extremity. In contracted specimens, the rims of both suckers, but especially of the acetabulum, assume a fluted appearance and show folds on the inside. Gynaecophoric groove commences at the level of the anterior part of the acetabulum. Along its inner edge on each side runs a strip of glandular tissue which apparently helps to fasten the groove about the enclosed female; the edges of the gynaecophoric groove do not meet in dead specimens.

Esophagus is 0.29–0.65 mm long and surrounded along its entire length by a glandular "muff". The individual glands are large and disposed in a single layer around the anterior part of the esophagus, but at its posterior part they broaden to form two voluminous masses at the slightly obtuse angles between the esophagus and the intestinal bifurcation (Plate I, 1). The beginning of the intestinal bifurcation is peculiar, not as in other trematodes: it appears as a voluminous, roughly oval or tricornuate chamber, and is situated transversely to the body axis just anterior to the acetabulum.\* This chamber will be referred to as *pseudocardia*. From its anterior wall at both sides of the esophageal opening, depend transversely elongated pads, conspicuous by their yellowish colour and frequent black pigment. These pads are possibly connected with the posterior esophageal glands.

The intestinal crura originate from the pseudocardia just in front of the acetabulum and run as narrow zigzags almost to the posterior extremity of the body. In extended specimens, their bends are more or less wavy, while in contracted ones they are tight, accordion-like (Plate I, 2). The ends of the crura vary in different individuals. In some specimens they unite to form a short common caecum, which may again be split in two, or they anastomose several times before ending as one or two short caecal appendages. In accordance with the state of relaxation or contraction of the specimens, the length of the intestinal crura may vary from 2.64 mm to 15.3 mm.

There are 86(60–115) testes which appear as roundish to conical follicles of variable size, 0.04–0.14 mm in diameter and dispersed irregularly between the intestinal crura from about the acetabulum to about three-fifths the body length from the anterior end.

**FEMALE** (Plate I, 3): is 5.1(3.4–6.8)mm long by 0.19(0.11–0.29)mm wide (at caecal junction); it is filiform or club-shaped, depending on the degree of contraction. Both the oral sucker and the acetabulum are very weakly developed and often are not discernible in fixed slides; their respective diameters are 36 and 32 microns. The esophagus [redacted] glands not as pronounced

\* McLeod (1940) noted that the esophagus "passes into a squarish cavity of considerable size".

as in the male. There is no pseudocardia. The intestinal crura are thin and rather smooth. They unite at about the end of the anterior third of the body to form the common caecum which runs in zigzag fashion to the posterior extremity. In relaxed specimens, its waves are smooth but in contracted ones they may show short dendritic outgrowths. In some specimens the common caecum may split and reunite several times before terminating near the posterior extremity (Plate I, 4-5).

The ovary is a sausage-shaped, tightly coiled gland of varying length, occupying an area of 0.3-1.05 mm just anterior to the junction of the intestinal crura. The uterus winds its way anteriorly almost till the acetabulum. It contains one egg only (almost always in the ootype). The egg is roughly oval,  $42 \times 25$  microns, and with a slight spine at one end.\*

The yolk glands fill up most of the free space on both sides of the common caecum and extend somewhat more anteriorly to it. They are grape-like follicles or oval to spherical clumps arranged irregularly. Anteriorly, the follicles tend to arrange as single, transversely-elongated bodies, but sometimes they are so tightly packed that their limits cannot be distinguished. There are usually about 150 such follicles.

\* It should be pointed out, however, that the intra-uterine egg is not yet fully developed and following fixation tends to shrink even further so that its size and shape are not truly representative. Unfortunately, extra-uterine eggs were not available to the authors.



PLATE I

1. Fully extended, large specimen of male *Ornithobilhargia canaliculata*. 2. Extremely contracted small specimen of male *O. canaliculata*. 3. Relaxed specimen of female *O. canaliculata*. 4.-5. Variations in the posterior extremity of the common caecum of a female *O. canaliculata*.



Ornithobilharzia canaliculata

From: Witenberg &amp; Lengy (1969)

DISTRIBUTION AND PATHOLOGICAL ROLE OF *O. CANALICULATA*

The geographical distribution of *Ornithobilharzia canaliculata* is also remarkable. It occurs in Central Europe (including Sweden and the southern part of U.S.S.R.) Western Siberia, the Mediterranean region and the Red Sea, and in both North and South America. The life history of this species is insufficiently known, but considering its ubiquity, it is apparently not particular with regard to the intermediate host.

The following are the records of *O. canaliculata*:

TABLE II  
RECORDS OF ADULT *O. canaliculata* FROM DIFFERENT HOSTS AND REGIONS

Host	Geographical Region	References
<i>Larus argentatus</i>	West Siberia	Bykhovskaya, 1953
<i>Larus canus</i>	Black Sea	(Panova, 1927) Bykhovskaya, 1962
<i>Larus delawarensis</i>	Canada	McLeod, 1940
<i>Larus dominicanus</i>	Brazil	Travassos, 1942
<i>Larus fuscus</i>	North Russia, Red Sea	(Shygin, 1954) Bykhovskaya, 1962
		Present authors
<i>Larus hepripichi</i>	Sweden	Odhner, 1912
<i>Larus ichthyometus</i>	Red Sea	Present authors
	Black Sea	Leonov, 1958
(Table II cont'd)		
<i>Larus melanocephalus</i>	Italy	Parona & Ariola, 1896
<i>Larus minutus</i>	Caspian Sea	(Saidov, 1953) Bykhov
<i>Larus ridibundus</i>	North Russia, Caspian Sea	(Shygin, 1954) (Saidov
		Bykhovskaya, 1962
<i>Sterna galericulata</i>	West Siberia	Bykhovskaya, 1953
<i>Sterna hirundo</i>	Brazil	Rudolphi, 1819
	Black Sea, North Russia	Leonov, 1958 (Shygin, 1954)
		Bykhovskaya, 1962
<i>Chlidonias hybrida</i>	West Siberia	Bykhovskaya, 1953
<i>Hydroprogne tschugrava</i>	Caspian Sea	(Saidov, 1953) Bykhovskaya, 1962
	Black Sea, Central Europe	Leonov, 1958; Macko, 1963
<i>Puffinus kadii</i>	West Siberia	Bykhovskaya, 1953
<i>Talasseus amshelchensis</i>	Red Sea	Witenberg, 1929
	Black Sea	Leonov, 1958

This spread of *O. canaliculata* may possibly have a public health significance for, as suggested by Penner (1953), cercariae of this species are one of the causes of dermatitis in man (in Florida).

The pathological role of *O. canaliculata* in avian hosts is not known. In our experience, the host birds harbour in most cases only a few specimens of these parasites, which possibly are only slightly harmful. However, in cases of heavy infections, considerable harm is feasible. A case of such infection is shown in Plate II, where about a dozen worms (pairs?) were observed clogging the veins of *Larus fuscus*.

Figure 40

*Synonymy*.—*Distoma canaliculatum* Rudolphi, 1819, p. 676 (in *Sterna* species; Brazil); *Bilharziella canaliculata* (Rudolphi, 1819) Braun, 1892, p. 142.

*Specific diagnosis*.—*Ornithobilharzia*:

*Male* 16 mm. long and from 1 to 1.4 mm. wide. Oral sucker sub-terminal, 312 $\mu$  long by 104 $\mu$  wide; acetabulum pedunculated, 450 $\mu$  in diameter and 100 $\mu$  to 150 $\mu$  in height, and situated about 1 mm. caudad of oral sucker. Testes numerous, originating caudad of copulatory apparatus and extending posteriorly to equator of body. The genital pore is situated in anterior part of gynaeophoric canal. The cirrus pouch (♂) lies at a right angle to the long axis of the body.

*Female* shorter than male, cylindrical, and thinner anteriorly than posteriorly, the anterior part of body being about 60 $\mu$  wide and the posterior part about 145 $\mu$  wide.

*Cercaria* unknown or unrecognized.

*Hosts*.—Primary, birds (*Thalasseus maximus* = *Sterna galericulata*); secondary, unknown.

*Location*.—Intestine (probably from intestinal veins).

*Distribution*.—South America (Brazil).



87.



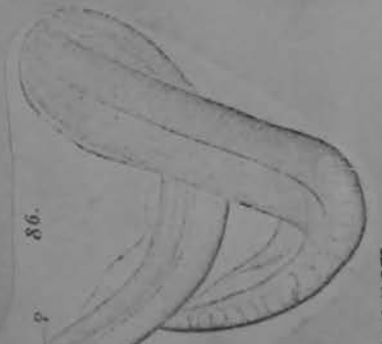
85.



88.



86.



Pl. STERNA GALEZICULATA  
FROM BRAUN, 1902

Description of *Ornithobilharzia hoepflii* n. sp. Tang, 1951

The male worm measures 4.5 to 7.4 mm in length by 0.27 mm in cross section. The oral sucker is 0.171 to 0.181 mm in diameter and the pedunculated acetabulum 0.234 to 0.252 mm. The mouth opening leads to an esophagus about 0.150 mm long. It bifurcates at some distance before the acetabulum. The intestinal crura unite into a single caecum at about one fourth body length from the posterior end. It terminates blindly at about 0.156 mm from the hind extremity. The gynecophoral canal is deep and well formed. The lateral margins of the body fold ventrally meeting in the medial line. The position of the female worm in the gynecophoral canal is essentially the same as in other species of schistosomes (Fig. 8.). There are 25 to 26 round testes lying in a single row beginning from a little distance posterior to the ventral sucker. The vas deferens lies ventrally to the whole series of testes. It bends toward the ventral side and turns abruptly forward enlarging into a seminal vesicle, which communicates with the genital pore through a slender tube. The seminal vesicle, lying free in the parenchyma, is filled with living spermatozoa. No cirrus organ or prostate glands were observed. The diameter of the testes varies from 0.072 to 0.081 mm.

The female is a delicate worm measuring 3.65 to 7.4 mm in length and 0.126 to 0.153 mm in cross section. The oral sucker is 0.060 to 0.067 mm. The esophagus is about 0.163 mm long. Before reaching the acetabulum it bifurcates into two intestinal crura. They extend to the posterior part of the ovary and then join together into a caecum ending blindly at about 0.156 mm from the posterior extremity. The ovary, situated in the middle region of the body, is loosely spiral, measuring 0.396 to 0.705 mm in length and 0.057 mm in its transverse diameter. It contains numerous round oögonia; the larger and more mature ones are found near the posterior part. The oviduct arises from its hind aspect. Joined by the duct of the seminal receptacle, it turns anteriorward along one side of the ovary and proceeds forward toward the oötype, where it joins with the vitelline gland duct. Inside the oviduct, several mature oocytes were found. The seminal receptacle is a round sac filled with living spermatozoa. It is connected with a Laurer's canal at its lateral aspect. The latter bends posteriorward, gradually attenuating itself and opening on the dorsal side (Fig. 9.). The vitellaria are situated posterior to the ovary. The large and round follicles are arranged in two longitudinal series, occupying about one half the body length from post-ovarian position to subdistal region. The oötype can be recognized by following the oviduct and the vitelline duct to their termination, where they meet and become surrounded by the unicellular Mehlis glands. The uterus is short and contains a single egg. It possesses a large spine, which is directed posteriorly (Figs. 6, 7.). The egg in the living and uncollapsed condition measures 0.132 to 0.172 mm by 0.089

mm in diameter. The large spine is about 0.057 mm long. The female genital pore is situated in the mid region just behind the acetabulum.

Odhner (1912) erected the genus *Ornithobilharzia* with *O. intermedia* as type. Price (1929) listed seven species under this genus. In comparing the structure it is found that the present species is most closely related to *O. aduncus* Faust, 1924, from which it differs in several important respects such as the position of ovary, the number of testes, the extent of vitelline follicles and the shape of seminal vesicle and Laurer's canal etc. Their different characters are tabulated as follows.

From the above table one can notice the essential differences between these two species of blood flukes. The fact that *O. hoepflii* possesses only 25 to 26 testes makes it differ from all other species of *Ornithobilharzia*. Wetzel (1930) described *O. pricei* from a Canadian goose, *Branta canadensis canadensis*. The male worm of this species has 28 testes, which is the smallest number of testes recorded hitherto for any species of the genus. *O. pricei* differs from *O. hoepflii* in several significant points, such as the abbreviated terminal spine of the egg, the much longer spirally coiled ovary and the arrangement of testes in two rows. The occurrence of species with only 25-26 testes makes it necessary to emend the description of the genus, which, according to Price (1929) possesses 60 or more testes.



Host: *Capella megala* Swinhoe  
Swinhoe's Snipe  
Nantai Island  
Foochow

Comparison of *O. slaveni* and *O. kuybyshevi*

*Draethobolus slaveni*

*O. kuybyshevi* n. sp.

(Female)		
Length and width	3.0 × 0.1 - 0.12 mm	3.77 - 7.1 mm × 0.126 - 0.153 mm
Oral sucker	0.07 mm	0.065 - 0.067 mm
Acetabulum	0.07 mm	0.065 - 0.072 mm
Position of ovary	anterior one fourth region of body	middle region of body
Seminal receptacle	present	present
Laurent's canal	opening dorsally to seminal receptacle	opening dorso-posteriorly to seminal receptacle
Vitelline follicles	occupying about two-third body length from posterior end	occupying less than one half body length from posterior end
Geminal pore	opening just below acetabulum	opening just below acetabulum
Egg	only one egg in uterus	only one egg in uterus 0.132 - 0.172 mm - 0.089 mm.
(Male)		
Length and width	6.0 - 7.0 mm × 0.22 - 0.26 mm	4.5 - 7.4 mm × 0.27 mm
Oral sucker	0.12 - 0.155 mm	0.171 - 0.181 mm
Acetabulum	0.16 - 0.175 mm	0.234 - 0.252 mm
Testes	oval in shape	globular in shape
Number of testes	65	25 - 26
Seminal vesicle	globular in shape connected with a short ejaculatory duct	narrowly elongated connected with a long ejaculatory duct
Integument	spinose	very finely spinose
Length of male in comparison with female	Male much longer than female	not much longer, some male and female worms equal in length

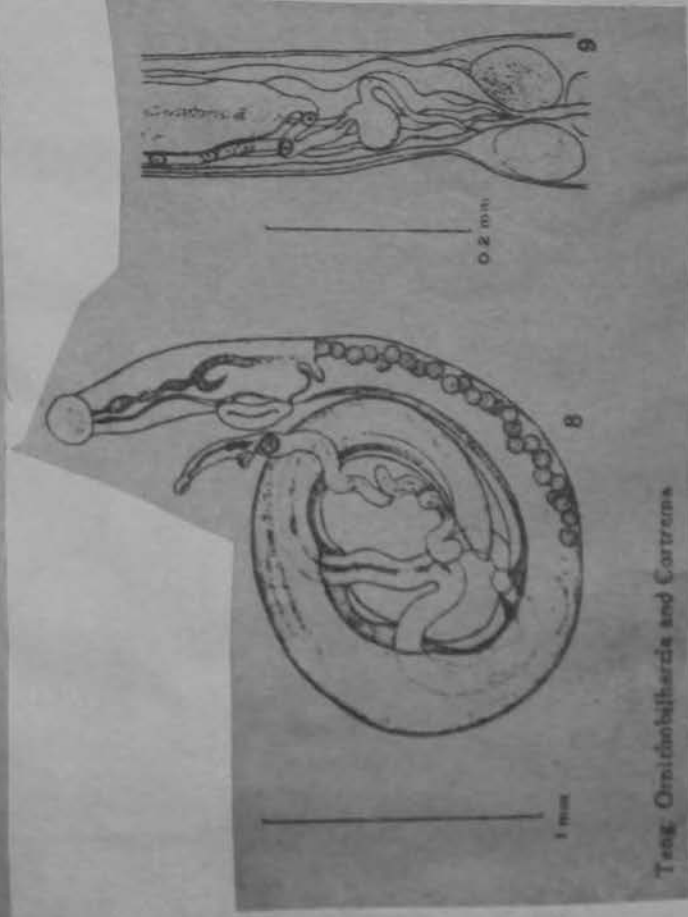


Fig. 8. *Ornithobilharzia* and *Ornithobilharzia*

*Synonym.*—*Macrobilharzia macrobilharzia* Travassos, 1923, pp. 18-19 (in *Ploctus anhinga*; Brazil).

*Specific diagnosis.*—*Ornithobilharzia*:

*Male* 49 to 57 mm. long and 3.5 mm. wide when folded. Posterior portion of body folded longitudinally but not permanently; preacetabular portion 4 mm. long and separated from posterior portion by a constriction. Oral sucker terminal, 740 $\mu$  in diameter; acetabulum salient, 1.3 mm. in diameter. Esophagus 1 mm. long; pharynx absent; intestinal caeca sinuous and uniting caudally near posterior end of body. Testes 230 to 250 in number, disposed in two rows in anterior half of body, and having an average diameter of 170 $\mu$  to 200 $\mu$ . Seminal vesicle present, pretesticular.

*Female* unknown.

*Cercaria* unknown or unrecognized.

*Hosts.*—Primary, birds (*Anhinga anhinga* = *Ploctus anhinga*); secondary, unknown.

*Location.*—Portal vein.

*Distribution.*—South America (Brazil).

This species was described by Travassos (1923) as the type of a new genus, *Macrobilharzia*. On analysis, the characters given by Travassos do not appear to differ sufficiently from those of the genus *Ornithobilharzia* Odhner to justify the recognition of *Macrobilharzia* as a distinct genus. The body form, the disposition of the large number of small testes, and the position of the seminal vesicle are the same as for species of *Ornithobilharzia*. Its size, admittedly, is unusual for this genus, but size alone can not be regarded as a character of generic value.

A NEW SPECIES OF TREMATODE WORM OF THE GENUS  
*ORNITHOBILHARZIA* FROM A CANADIAN GOOSE

By RUDOLF WETZEL,

College of Veterinary Medicine, Hannover, Germany

Price (1929) has recently published a synopsis of the trematode family Schistosomidae, including in it descriptions of three new genera and species from North American hosts. In the present paper an additional new species is described. This schistosome was collected from a Canadian goose (*Branta canadensis canadensis*) forwarded to the Zoological Division of the Bureau of Animal Industry by Mr. W. L. McAtee of the Bureau of Biological Survey, the bird having been caught at Back Bay, Virginia. This fluke belongs to the subfamily Schistosominae Stiles and Hassall, 1898, and to the genus *Ornithobilharzia* Odhner, 1912. For this species the name *Ornithobilharzia pricei* is proposed. The description is based upon three males and three females, one of the latter being immature and another incomplete.

The characters of the genus as given by Price (1929) are as follows:

*ORNITHOBILHARZIA* Odhner, 1912

*Synonym*.—*Macrobilharzia* Travassos, 1923.

*Generic diagnosis*.—Schistosominae: Female shorter than male. Male with well formed gynaecephoric canal, formed by an infolding of the lateral edges of the body. Suckers present. Cuticle covered with spines. Digestive tract similar to that in *Schistosoma*; intestinal caeca long and showing a tendency to form several anastomoses before finally uniting to form the common caecum. Testes numerous (60 or more), commonly a short distance caudad of acetabulum, and extending into posterior half of body. Cirrus pouch rudimentary or absent. Seminal vesicle free in parenchyma; prostate absent. Genital pore small and situated immediately caudad of acetabulum. Female elongate, slender, and flattened. Ovary elongated, loosely or tightly coiled, and situated in anterior third of body. Vitellaria



Leahy, U. Teheran, Iran  
47(2): 165-180, 1973

Family Schistosomatidae POCHÉ 1907

*Ornithobilharzia* sp. (Fig. 27)

Host: *Nyctanassa violacea* (Linn.), yellow-crowned night heron (new host record).

Location: Intrahepatic portal vein.

Locality: Goodhope oil field, near Norco, Louisiana (new locality record).

**Discussion.** A pair of preadult schistosomes were removed *in copula* from the intrahepatic portal vein of a yellow-crowned night heron, *Nyctanassa violacea*, collected near Norco, Louisiana. These trematodes are assigned to the genus *Ornithobilharzia* ODHNER, 1912, on the basis of the well developed gynaecephoric canal (extending from the caudal margin of the acetabulum to the posterior end of the body) and the number and position of the testes (over 45, between the hindmargin of the acetabulum and first cecal anastomosis). In all other genera of the subfamily Schistosomatinae STILES and HASSALL, 1898, in which males are known, the number of testes varies around 20. Our material closely resembles *O. caniculata* (Rud., 1819) ODHNER, 1912, though the immature condition of these worms precludes a specific identification. Dr. Emile A. MALEK (personal communication) has collected mature *O. caniculata* from royal terns, *Thalasseus maximus*, taken at Pass a Loutre, Louisiana, near the mouth of the Mississippi River. PENNER (1953) recovered adult schistosomes morphologically identical to *O. caniculata*.



*Ornithobilharzia tarkestanicum* (Skrjabin, 1913)

wrote J. Massoud, P.O. Box 1310, School of Public Health, U. Teheran, Iran  
for reprint of his article in *J. Helminthol.* 47(2): 165-180, 1973



Family Schistosomatidae POCHE 1907

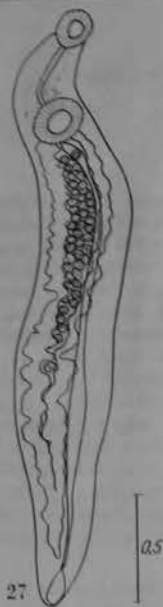
*Ornithobilharzia* sp. (Fig. 27)

Host: *Nycticorax violacea* (Linn.), yellowcrowned night heron (new host record).

Location: Intrahepatic portal vein.

Locality: Goodhope oil field, near Norco, Louisiana (new locality record).

**Discussion.** A pair of preadult schistosomes were removed in copula from the intrahepatic portal vein of a yellowcrowned night heron, *Nycticorax violacea*, collected near Norco, Louisiana. These trematodes are assigned to the genus *Ornithobilharzia* ODHNER, 1912, on the basis of the well developed gynaecophoric canal (extending from the caudal margin of the acetabulum to the posterior end of the body) and the number and position of the testes (over 45, between the hindmargin of the acetabulum and first cecal anastomosis). In all other genera of the subfamily Schistosomatinae STILES and HASSALL, 1898, in which males are known, the number of testes varies around 20. Our material closely resembles *O. caniculata* (Rud., 1819) ODHNER, 1912, though the immature condition of these worms precludes a specific identification. Dr. Emile A. MALEK (personal communication) has collected mature *O. caniculata* from royal terns, *Thalasseus maximus*, taken at Pass a Loutre, Louisiana, near the mouth of the Mississippi River. PENNER (1953) recovered adult schistosomes morphologically identical to *O. caniculata* from pigeons which had been exposed to dermatitis-producing cercariae from the marine snail, *Batillaria minima*, in Florida. Thus far, the examination of marine and brackish water gastropods in Louisiana has not revealed a natural molluscan host for avian schistosomes. The heron harboring *Ornithobilharzia* was also infected with *Parorchis*, the larval stages of which develop in marine snails. This suggests that the infection by *Ornithobilharzia* is of marine origin.



From: Lumsden & Zischke, 1963

ORNITHOBLHARZIA

*Paraschistosomatium* Price, 1929

*Generic diagnosis.* — Schistosomatidae, Schistosomatinae: Male unknown. Female slender, flattened, tapering toward extremities. Cuticle smooth. Oral sucker well-developed, acrotubulum pedunculated. Esophagus simple. Intestinal limbs without lateral branches, united near posterior extremity; common cecum very short. Ovary spirally curved, intercecal, in posterior third of body. Uterus long, filled with eggs. Vitelline follicles few in number, situated in postovarian intercecal field. Parasitic in Strepsipodes.

*Genotype:* *P. anthracis* Price, 1929† (Pl. 101, Fig. 1224), in portal vein of *Anthracis anthracis*, Texas.

†) *Syn. of Macrochikaria macrochikaria* Travassos, 1923 — Skrzabin (1961)

PARASCHISTOSOMATIUM, new genus

*Generic diagnosis.*—Schistosominae: Male unknown. Female slender, flattened, and tapering toward the extremities. Cuticle smooth. Oral sucker subterminal, well developed; acetabulum pedunculated. Esophagus simple; intestinal caeca without lateral diverticula and united caudally near posterior end of body; common caecum very short. Ovary spirally curved, in posterior third of body; uterus long and filled with eggs. Vitelline follicles few in number, situated posterior to ovary and between the cecal branches. *Type species.*—*Paraschistosomatium anhingae*, new species.

PARASCHISTOSOMATIUM ANHINGAE, new species

Figure 35

*Specific diagnosis.*—*Paraschistosomatium*:

*Male* unknown.

*Female* 6.9 mm. long by 325 $\mu$  wide. Body flattened and tapering gradually toward the extremities. Cuticle smooth and without spines except in suckers. Suckers equal in size, 143 $\mu$  in diameter; oral sucker subterminal; acetabulum pedunculated and situated 480 $\mu$  caudad of oral sucker. Esophagus simple, bifurcating in front of acetabulum; intestinal caeca unite caudally about 460 $\mu$  from posterior end of body; common caecum 200 $\mu$  long. Ovary spiral, 585 $\mu$  long as measured in a straight line and exclusive of length of spiral, and situated in the anterior part of the posterior third of body. Vitellaria consist of a few scattered follicles lying posterior to the ovary and between the cecal branches. Genital pore is situated immediately caudad of the acetabulum. Uterus long and filled with thin-shelled eggs which measure about 70 $\mu$  long by 43 $\mu$  wide.

*Cercaria* unknown or unrecognized.

*Hosts.*—Primary, birds (*Anhinga anhingae*); secondary, unknown.

*Location.*—Portal vein.

*Distribution.*—North America (United States (Texas)).

*Type specimen.*—United States National Museum Helminthological Collections No. 27857, collected by the writer, April 8, 1922, at Bryan, Tex.

This trematode is probably more closely related to species of the genus *Schistosomatium* than those of any of the other genera. The union of the intestinal caeca near the posterior end of the body is similar to that in *S. pathologicum*; in *P. anhingae*, however, the caeca do not have lateral diverticula, the ovary is more posterior, and the distribution of the vitelline follicles is very different from that in *S. pathologicum*. In view of these differences the writer has tentatively proposed the new genus *Paraschistosomatium* to include this species.



35



## PSEUDOBILHARZIELLA Ejsmont, 1929

Bilharziellinae. Males with elongated filamentous bodies having the anterior portion broader than that of the testicular; hinder region of the body bearing the testes relatively long and with sides almost parallel; oral sucker and acetabulum well developed and close together; epidermis spined; genital pore lies to the side considerably separated from the acetabulum; gynaecophoric canal begins in broader anterior region and extends to beginning of testicular region; testes numerous and fairly regularly arranged; intestine very similar to that of Bilharziella and Gigantobilharzia; the caecal branches unite in vicinity of genital pore and common caecum follows a zigzag course to almost hinder end of body.

Type species: Pseudobilharziella kowalewski Ejsmont,  
1929

PSEUDOBILHARZIA

Species:

- P. burnetti Brachett, 1942
- P. corvi Yamaguti, 1941
- P. filiformis Szidat, 1938
- P. horiconensis Brachett, 1942
- P. pegonensis Brachett, 1942
- P. kowalewskii Ejsmont, 1929
- P. waubensis Brachett, 1942
- P. yohogawai (Osio, 1927)
- P. tatiana Spasskaia, 1953

*Pseudobilharziella littlei* n. sp., a New  
Blood Fluke From the Chestnut-sided  
Warbler, *Dendroica pensylvanica*  
(Linnaeus)

ELSON E. BYRM, University of Georgia

In examining birds for helminths at Mountain Lake Biological Station, Mountain Lake, Virginia during the summer of 1947 one elongated, slender didymate trematode was found in the washings following the examination of the visceral organs of the chestnut-sided warbler. In studying the mounted specimens we are convinced it can not be assigned to any known species and hence represents a new form belonging to the genus *Pseudobilharziella* Eijssent, 1929. The worm is a male specimen and measures 5.10 mm. in length by a maximum width (behind the gynacophoric canal) of 0.19 mm. The cavity in each oral and ventral sucker is covered by many minute spines. The ventral sucker lies about midway between the oral sucker and the beginning of the gynacophoric canal. The esophagus bifurcates into the two ceca approximately 0.13 mm. in front of the ventral sucker and the two ceca reunite to form a common caecum approximately 0.12 mm. behind the ventral sucker. The common caecum ends about 0.16 mm. in front of the caudal end of the body. The seminal vesicle is a greatly dilated, sperm-filled duct which lies dorsal to and in front of the gynacophoric canal. The genital pore is at the posterior border of the gynacophoric canal. There are 122 tentacles in the posterior part of the body, beginning immediately behind the gynacophoric canal and ending approximately 0.48 mm. in front of the caudal end of the body. The testes vary in shape from round to transversely ovoid and in size from 25 microns in diameter to 50 microns long by 6.3 microns wide.



Pseudobilharziella tatarianae Spasskaja, 1953

Host: Rallus aquaticus

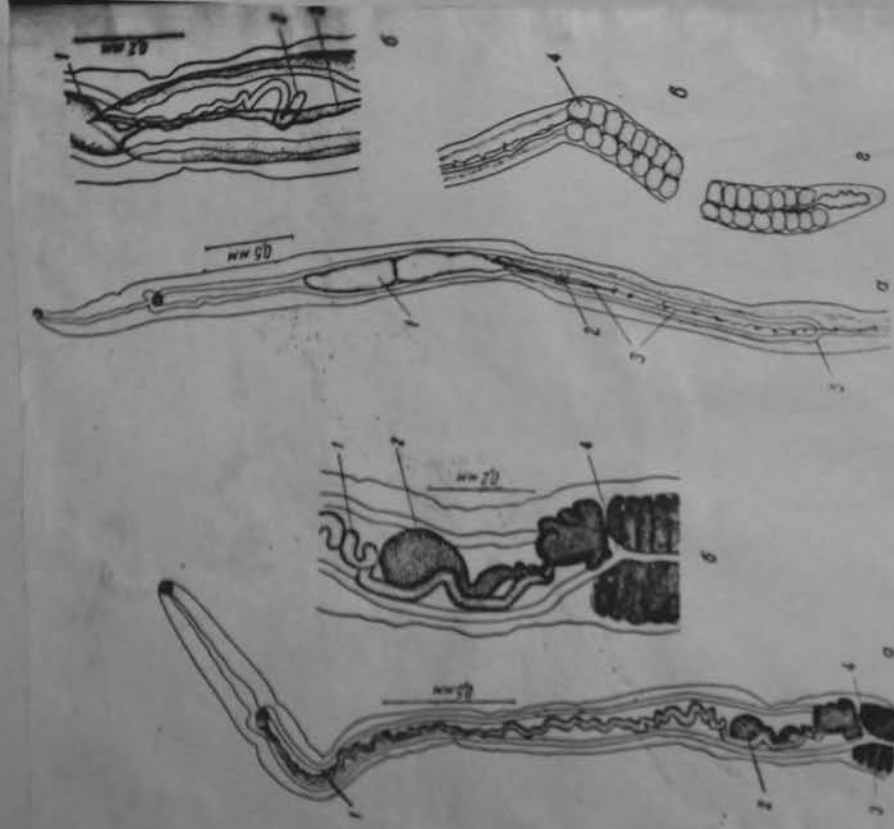


Fig. 1. *Pseudobilharziella tatarianae* sp. nov.

1 — cephalic region; 2 — anterior part of the body; 3 — anterior part of the body; 4 — anterior part of the body; 5 — anterior part of the body; 6 — anterior part of the body.

Fig. 2. *Pseudobilharziella tatarianae* sp. nov.

1 — cephalic region; 2 — anterior part of the body; 3 — anterior part of the body; 4 — anterior part of the body; 5 — anterior part of the body; 6 — anterior part of the body.

PSEUDOBILHARZIE-  
-LLA

*Schistosomatium* Tanabe, 1923

**Generic diagnosis.** — Schistosomatidae, Schistosomatinae. Male: Sucker well developed. Anterior two-fifths of body flattened, posterior three-fifths indented to form gynaecophoric canal. Posttesticular portion of caeca with lateral diverticula, united near posterior end of body. Testes 14 to 18 in number, arranged in two rows at anterior end of gynaecophoric canal. Genital pore median, immediately pretesticular. Female: Flattened. Ovary in anterior half of body. Entire postovarian portion of caeca with lateral diverticula and united near posterior end of body as in male, surrounded throughout by densely packed vitelline follicles. Uterus containing numerous oval, spineless eggs. Parasitic in portal system of mammals. Cercaria furcocercous, aphyaryngeal, oculate; excretory system consisting of six pairs of flame cells, one of which lies in the base of the tail stem.

**Genotype:** *S. pathologicum* Tanabe, 1923 (Pl. 100, Fig. 1214 a—d), syn. of *S. douliitti* (Curt) — Fenner (1942), in white rats and mice (experimentally).

Cercaria with 3 pairs of acidophilic penetration glands develops in *Lymanaea palustris*; U.S.A. — Tanabe (1923); *Lymanaea natalensis*, *Bulinus tropicus*; Transvaal — Porter (1938).

**Other species:**

*S. douliitti* (Curt, 1915) in *Microtus pennsylvanicus*, *Lepus americanus*, mice, N. America.

Experimentally in rat and cat; cercaria in *Lymanaea stagnalis* *appressa* and *L. palustris* — Price (1929, 1931); *Stagnicola emarginata angulata* — Curt, McMullen and Brackett (1937); cercaria — Hussey (1941); hermaphroditic female — Short (1951); development in *Stagnicola palustris elodes* (exper.) — Curt, Amsel and Olivier (1944); postcercarial development — El-Gindy (1951). Experimental infection of rhesus monkeys — Kagan (1953).

Genus SCHISTOSOMATIUM Tanabe, 1923

*Generic diagnosis*.—Schistosominae: Male larger and longer than female. Suckers present, well developed. Anterior two-fifths of body flattened; posterior three-fifths infolded to form the gynaecophoric canal. Intestinal caeca provided with lateral diverticula and united near posterior end of body. Testes 14 to 18 in number, arranged in two rows at anterior end of gynaecophoric canal. Genital pore median, in front of the anterior testis. Female flattened. Ovary in anterior half of body. Uterus containing numerous oval spineless eggs. Genital pore caudad of acetabulum. Vitellaria composed of lobulated, densely packed follicles extending from the distal pole of ovary to posterior end of body.

Larva a furcocercous, apharyngeal cercaria, with eye spots, and with an excretory system consisting of six pairs of flame cells, one pair of which is located in the base of the tail stem.

*Type species*.—*Schistosomium pathlocopticum* Tanabe, 1923.

*Synonym.*—*Schistosoma pathlocopticum* Tanabe in Strong, 1923, 516.

*Specific diagnosis.*—*Schistosomatium*:

*Male* 5.6 to 11.8 mm. long by 400 $\mu$  to 900 $\mu$  wide. Anterior portion of body flattened, 2.4 to 4.7 mm. long by 260 $\mu$  to 580 $\mu$  wide; posterior portion, 3.2 to 7.1 mm. long by 1.04 mm. wide when flattened, with edges infolded forming a gynaeophoric canal; between the anterior and posterior portions the body is narrowed and is 240 $\mu$  to 410 $\mu$  wide. Cuticle spiny but without tubercles. Oral sucker subterminal, 120 $\mu$  to 160 $\mu$  in diameter; acetabulum pedunculated, 250 $\mu$  to 260 $\mu$  in diameter. Esophagus simple, about 520 $\mu$  long; intestinal caeca provided with short lateral diverticula and united posteriorly about 600 $\mu$  from the caudal extremity; common cecum short and terminating about 140 $\mu$  from posterior end of body. Testes 14 to 18 in number, spherical, 100 $\mu$  to 180 $\mu$  in diameter, in two parallel rows in the median line and slightly pre-equatorial. Seminal vesicle large, semi-lunar in outline, and situated to the left of the median line. Genital pore situated at anterior end of gynaeophoric canal, slightly to left of median line. Excretory system consists of two slender, lateral tubes which unite to form a common tube opening slightly dorsad at the extreme posterior end of body.

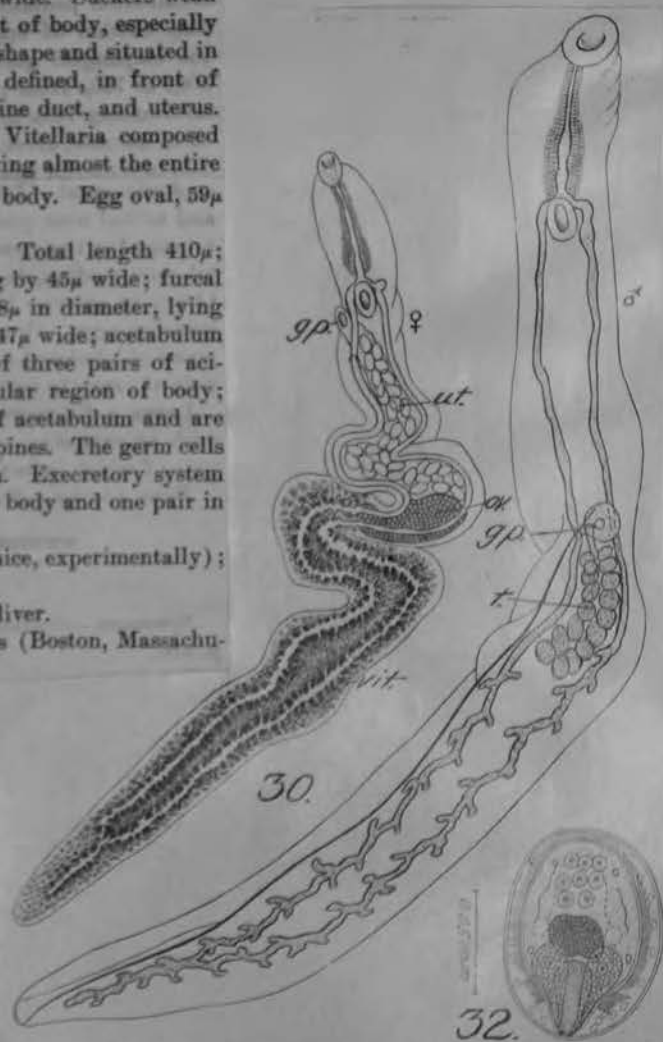
*Female* 4.5 to 10.2 mm. long by 180 $\mu$  to 380 $\mu$  wide. Suckers weak and rudimentary. Cuticle spiny in anterior part of body, especially around suckers and genital pore. Ovary oval in shape and situated in front of equator of body. Shell gland poorly defined, in front of ovary, and at the junction of the oviduct, vitelline duct, and uterus. Uterus about 500 $\mu$  long and filled with eggs. Vitellaria composed of densely packed lobulated follicles, and occupying almost the entire space from the ovary to the posterior end of the body. Egg oval, 59 $\mu$  long by 40 $\mu$  wide, without spine.

*Cercaria furcocercous*, apharyngeal, spinose. Total length 410 $\mu$ ; body 180 $\mu$  long by 80 $\mu$  wide; tail stem 230 $\mu$  long by 45 $\mu$  wide; furcal rami 100 $\mu$  long. Eyespots present, pigmented, 8 $\mu$  in diameter, lying near equator of body. Oral sucker 50 $\mu$  long by 47 $\mu$  wide; acetabulum 24 $\mu$  in diameter. Penetration glands consist of three pairs of acidophilic cells which nearly fill the postacetabular region of body; penetration gland ducts open at anterior end of acetabulum and are capped by an equal number of hollow piercing spines. The germ cells lie in the median line caudad of the acetabulum. Excretory system pattern consists of five pairs of flame cells in the body and one pair in the tail stem.

*Hosts.*—Primary, mammals (white rats and mice, experimentally); secondary, snail (*Lymnaea palustris*).

*Location.*—Intestinal veins, portal vein, and liver.

*Distribution.*—North America (United States (Boston, Massachusetts)).



### Unexpected Pachytene Behavior in *Schistosomatium douthitti*\*

MARGARET Y. MENZEL and ROBERT B. SHORT,  
*Florida State University*

In mitotic divisions throughout the life cycle of females of *S. douthitti*, a well-differentiated heteromorphic pair of sex chromosomes is present. The V-shaped (2-armed) Z is the longest chromosome of the mitotic complement, while the W is rod-shaped (effectively 1-armed) and about  $\frac{1}{2}$  as long. In contrast, at pachytene in the oocytes, all 7 II's are double and of even diameter throughout. Consideration of chromosome lengths and centromere positions leads to the conclusion that at this stage the W chromosome is also a long, 2-armed, euchromatic chromosome, similar to and intimately synapsed with the Z throughout its length. At metaphase I, the six largest II's (including the ZW) all appear to have chiasmata in both arms, and no heteromorphic II was detected in 49 oocytes. Seven metaphase II plates fell into two classes, 3 with a long V chromosome and 4 without, suggesting that the W is again visibly differentiated at this stage. ZZ and ZW karyotypes are clearly distinguishable at the first sygotic division.

\* ABSTRACT OF PAPER PRESENTED AT THE EIGHTEENTH ANNUAL MEETING OF THE ASSOCIATION OF SOUTHEASTERN BIOLOGISTS, ATHENS, GA., APRIL 18-20, 1957 AND PUBLISHED IN THE ASB BULLETIN 4 (1): P. 14, 1957.

SCHISTOSOMATUM

## SINOBIHARZIA Dutt and Srivastava, 1955.

*Generic diagnosis.* Schistosomatinae. Females shorter than males. Males with well developed gynaecephoric canal. Both the suckers well developed. Cuticle spiny. Intestinal caeca in both sexes very long and common caecum very short. Testes numerous (65) originating in front of the equator of the body but much behind the acetabulum, vas deferens long, seminal vesicle communicating directly with a rudimentary cirrus sac. Ovary elongate and loosely spiral, situated in the anterior third far ahead of the caecal union which is situated in the posterior fourth of the body; a prominent seminal receptacle and a Lauret's canal present; a single set of vitelline follicles, ootype near the acetabulum and containing a single egg, uterus short.

*Type species.* *Sinobilharzia odhneri* (Faust, 1924) Dutt and Srivastava, 1955.



Figures 42-45

*Specific diagnosis.*—*Orautobilharzia*:

*Male* 6 to 7 mm. long by 220 $\mu$  to 260 $\mu$  in cross section. Cuticle covered with spines. Oral sucker 120 $\mu$  to 155 $\mu$  in diameter; acetabulum 160 $\mu$  to 165 $\mu$  in diameter. The gynaecophoric canal is deep and broad. The esophagus branches immediately cephalad of the acetabulum; intestinal caeca sinuous, uniting caudally six-sevenths of body length from anterior end; common cecum short. Testes oval, about 65 in number, and lying in median line in equatorial three-sevenths of body. Seminal vesicle situated midway between anterior testis and acetabulum, and communicating directly with a rudimentary cirrus pouch which lies dorsad of the genital pore; ejaculatory duct rudimentary; prostate absent.

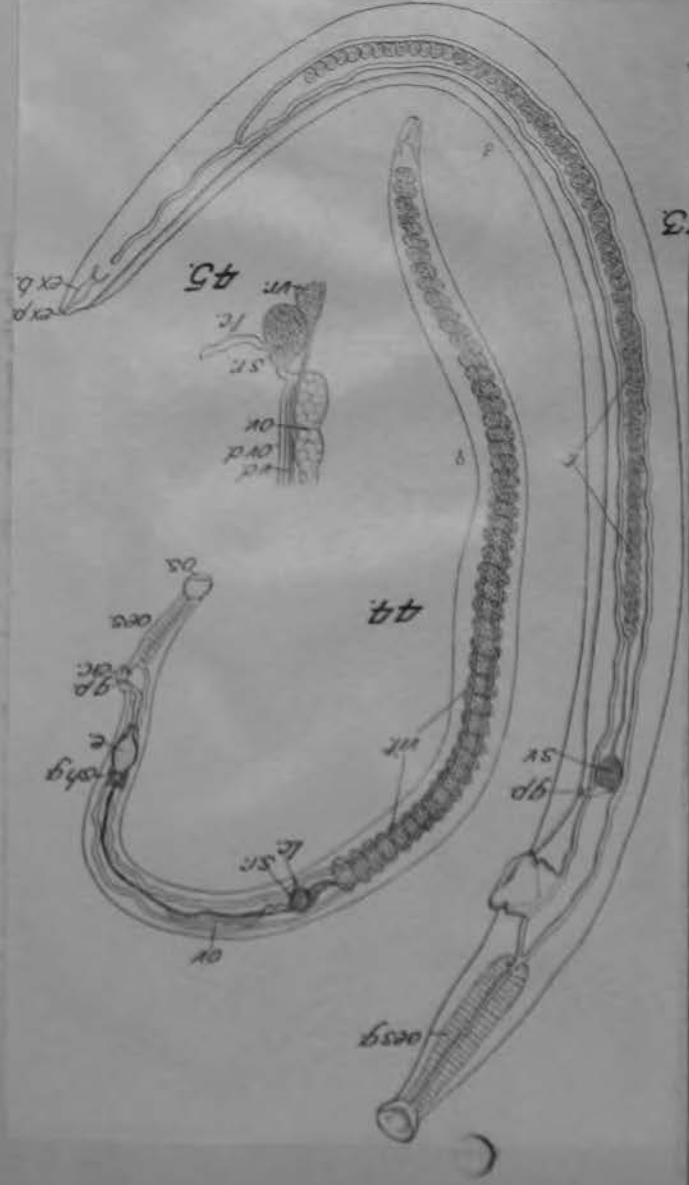
*Female* 3 mm. long by 100 $\mu$  to 120 $\mu$  in diameter in cross section. Cuticle covered with fine spines. Oral sucker and acetabulum equal in size and measuring 70 $\mu$  in diameter. The esophagus bifurcates cephalad of acetabulum, and the intestinal caeca unite about four-fifths of body length from anterior end; common cecum short. Ovary elongate, loosely coiled, and situated in anterior third of body. The oviduct arises from the posterior pole of ovary, bending laterad and continuing anteriorad to the ootype; seminal receptacle well developed, situated behind the ovary, and connected with oviduct by a short duct. Laurer's canal arises from dorsal aspect of seminal receptacle and opens through a minute pore on dorsal side of body. The vitellaria consist of paired follicles extending from a short distance caudad of seminal receptacle to near posterior end of body. The vitelline duct extends forward parallel with the oviduct and joins it at the ootype. Uterus short and containing a single egg. The genital pore occupies a median position immediately caudad of acetabulum.

*Cercaria* unknown or unrecognized.

*Hosts.*—Primary, birds (Asiatic curlew (*Nimeneis arquatus*)); secondary, unknown.

*Location.*—Portal vein.

*Distribution.*—Asia (China).



SINOBIHARZIA

Generic diagnosis. — Schistosomatidae, Bilharziellinae: Body slender, thread-like, and similar in both sexes, enlarged laterally at posterior extremity. Oral sucker terminal, with subterminal opening. Acetabulum a small, spined, solid organ that can be protruded from, or retracted into, body. Esophagus bifurcating anterior to acetabulum, reuniting near seminal vesicle in males, near seminal receptacle in females; common caecum extending into posterior end. Male: Gynaecophoric canal consisting of short expanded section some distance back of acetabulum. Testes numerous, in a single row, sometimes two or three rows, extending from behind gynaecophoric canal to posterior extremity or within short distance of it. Seminal vesicle long, winding, situated between acetabulum and gynaecophoric canal. Cirrus pouch membranous, enclosing part of seminal vesicle, pars prostatica, prostate cells and ductus ejaculatorius, often overlooked. Genital papilla at anterior end of gynaecophoric canal near median line. Female: Ovary coiled or convoluted, located in widest portion of body in about same position as gynaecophoric canal in males. Shell gland poorly developed. Receptaculum seminis elongate, more or less winding or convoluted, postovarian. Laurer's canal present. Vitelline follicles numerous, extending from region of seminal receptacle to near posterior end. Genital pore immediately postacetabular. Eggs produced singly, elongate or elongate oval, with sharp spine at one end. Cercaria furcocercous, oculate. Parasitic in birds. Miracidia worked out by Ameal (1953) for *T. elvae*, *T. physellae* and *T. stagnicolae*.

Genotype: *T. ocellata* (La Valette, 1855) Brumpt, 1931, syn. *T. kossarewa* Skrjabin et Zakharow, 1920 — McMullen and Beaver (1945), in *Anas circa*; Russia. Also in other anatids; Europe. Cf. *Cercaria ocellata* — Brumpt (1931).

<sup>1)</sup> Synonymy and diagnosis adapted from McMullen and Beaver (1945) with slight emendations.

Other species:

- T. burnetti* (Brackett, 1942) McMullen et Beaver, 1945, in cloacal veins of *Nyroca collaris*; Wisconsin.
- T. cameroni* Wu, 1953. Cercaria develops in *Physa gyrina* in 28 to 35 days, adults become mature in canaries and pass eggs in about 12 to 14 days; domestic ducks were found to become infected until they were at least four months old; no experiments with older ducks. Migratory birds are probably the source of the local infection — Wu (1953).
- T. corvi* (Yamaguti, 1942) McMullen et Beaver, 1945, in intestinal and mesenteric veins of *Corvus corone corone*; Japan.
- T. elvae* (Miller, 1923), syn. of *T. ocellata* (La Valette, 1855) — McMullen & Beaver (1945). Cercaria (dermatitis-producing) develops in *Lymnaea stagnalis*; Michigan. Experimental infection of pigeon — Brackett (1949), duckling, mallard and canary — McMullen and Beaver (1942); U.S.A. Man and ducklings infected experimentally — Macy, Moore and Price (1955).
- T. filiformis* (Szidat, 1938) McMullen et Beaver, 1945, in *Cygnus olor*; Germany.
- T. horiconensis* (Brackett, 1942) McMullen et Beaver, 1945, in cloacal vein of *Nyroca americana*; Wisconsin.
- T. kegonensis* (Brackett, 1942) in cloacal vein of *Nyroca valisineria*; Wisconsin.
- T. kowalewskii* (Ejsmont, 1929) McMullen et Beaver, 1945 (Pl. 72, Fig. 878), in *Anas querquedula* and *A. crecca*; Poland.
- T. oregonensis* (Macfarlane et Macy, 1946). Cercaria *oregonensis* (dermatitis-producing) develops in *Physa ampullacea*. Experimental infection of Pekin duck — Macy (1952).
- T. physellae* (Tallot, 1936) McMullen et Beaver, 1945, syn. *Pseudobilharziella querquedulae* McLeod, 1937, in *Querquedula discors*; N. America. *Physella gyrina*, *Dafnia acuta*, *Spatula clypeata*, Teal ducks — McLeod (1942).

91 *T. stagnicolae* (Talbot, 1936) McMullen et Beaver, 1945.

*Cercaria* (dermatitis-producing) develops in *Stagnicola emarginata undulata*; Michigan. Experimental infection of canaries — McMullen and Beaver (1942); of canaries, domestic duckling and herring gull — McMullen and Beaver (1945).

*T. axidati* Neuhans, 1952, in *Anas boschas* (natural and experimental infection). Oculate furcocercous cercaria with 5 pairs of penetration glands and flame cell formula  $2[(3+3+1)+2]$  develops in *Lymnaea stagnalis* and *Radix ovata*, penetrates human skin, (causing dermatitis), and cornea of leg as well as epidermis of tongue of duck.

*T. talianae* (Spasskaja, 1954) (Pl. 104, Figs. 1260—1263), syn.

*Pseudobilharzia t. S.*, in *Rallus aquaticus*; Russia.

*T. saubescensis* (Brackett, 1942) McMullen et Beaver, 1945, in intestinal and cloacal vein of *Nyroca collaris* and *Mareca americana*; Wisconsin.

*T. yokogawai* (Oiso, 1927) McMullen et Beaver, 1945 (Pl. 81, Fig. 989), in *Anas platyrhynchos domestica*; Formosa. Snail host: *Lymnaea radii*.

*T. adamsi* Edwards et Jansch, 1955, in duck (exper.) and *Physa c. f. coniformis* (exper.).

*T. onatina* Fain, 1955, in *Anas undulata undulata*; Belgian Congo.

*T. berghii* Fain, 1955, in *Anas undulata undulata*; Belgian Congo.

*T. nasicola* Fain, 1955, in *Anas undulata undulata*; Belgian Congo.

*T. rothaiwi* Fain, 1955, in *Hagedashia hagedash*; Belgian Congo.

*T. schoutedeni* Fain, 1955, in *Thalassornis leuconotus*; Belgian Congo.

*T. spinulata* Fain, 1955, in *Alopochen aegyptiacus*, *Plectropterus gambiensis*; Africa.

Genus TRICHOBIHARZIA Skrzjabin and Zakharow, 1920

*Generic diagnosis.*—Bilharziellinae; body slender and divided into two portions; the anterior wider portion separated from the posterior threadlike portion by a slight dilation. Oral sucker smaller than acetabulum. Gynaecophoric canal absent. Cirrus pouch and seminal vesicle present. Testes numerous and situated in posterior portion of body. Female unknown.

*Type species.*—*Trichobilharzia kosarevi* Skrzjabin and Zakharow, 1920.

TRICHOBIHARZIA KOSSAREWI Skrzjabin and Zakharow, 1920

Figure 55

*Specific diagnosis.*—*Trichobilharzia*.

*Male* 4 mm. long; anterior portion of body  $60\mu$  wide, posterior portion  $20\mu$  wide; between the anterior and posterior portions the body is dilated to  $150\mu$  in width and this part is covered with fine spines. Oral sucker  $30\mu$  in diameter; acetabulum  $50\mu$  in diameter, spiny, and situated  $690\mu$  caudad of oral sucker. Testes numerous,  $50\mu$  long by  $15\mu$  wide, and situated in the posterior, threadlike portion of body. Cirrus pouch  $200\mu$  long. Seminal vesicle  $220\mu$  long. Genital pore 1.26 mm. from anterior end of body.

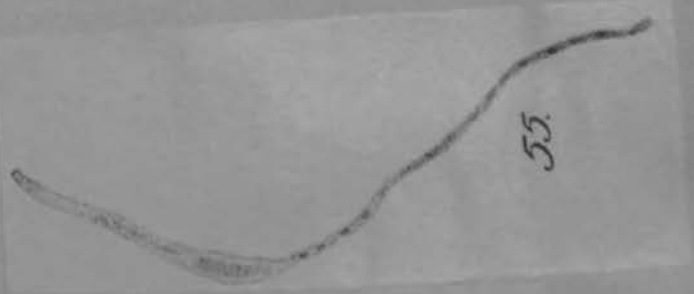
*Female* unknown.

*Cercaria* unknown or unrecognized.

*Hosts.*—Primary, birds (*Querquedula querquedula* (= *Anas circa*)); secondary, unknown.

*Location.*—Blood vessels.

*Distribution.*—Europe (Russia).



CLÉ DES ESPÈCES DU GENRE *TRICHOBIHARZIA*  
AU RUANDA-URUNDI (Congo Belge)

Pour terminer cette note préliminaire nous donnons ci-dessous une clé qui permettra de séparer aisément les différentes espèces dont il est question dans ce travail. Cette clé s'applique uniquement aux mâles.

1. Canal gynécophore très long mesurant de 1, 3 à 1,5 mm... *T. anatis* n. sp.
2. Canal gynécophore beaucoup plus court ..... 2.
2. Canal gynécophore long de 0,5 à 0,62 mm, pyriforme, nettement élargi dans sa moitié antérieure. .... *T. schoutedeni* n. sp.
3. Canal gynécophore ne dépassant pas 0,375 mm, pas nettement élargi dans sa moitié antérieure ..... 3.
3. Cuticule lisse, épaisse, présentant des petits nodules dans les parties antérieures et postérieures du corps. Dans les fosses nasales ..... *T. vodhaini* n. sp.
4. Cuticule normale, sans tubercules ..... 4.
4. Corps couvert de fines épines longues de 5 à 10  $\mu$ , très long (21 mm). Dans les fosses nasales ..... *T. spinulata* n. sp.
5. Corps ne présentant pas ces longues épines ..... 5.
5. Corps couvert de petites épines, long de 4,4 à 5,8 mm. Testicules au nombre de 40 à 65. Canal gynécophore bien formé. Dans le foie ..... *T. beghof* n. sp.

Corps non épineux ou à épines à la limite de la visibilité, long de 17 à 19 mm environ. Testicules au nombre de 170 à 200. Canal gynécophore peu profond. Dans les fosses nasales, ..... *T. muscoides* n. sp.

From FAIV 1 1955

4) *Trichobilharzia anatina* sp. Fairb., 1955

Diagnose : *Trichobilharzia* SKRJ. et ZAKL., 1920

**Mâle** : les 2 exemplaires complets que nous possédons mesurent respectivement 7,05 et 8 mm (colorés et montés au baume). Forme comme les autres espèces de *Trichobilharzia*, mais le corps est relativement large et nettement aplati, sa largeur au niveau de l'acétabulum est de 0,09 à 0,1 mm (en vue ventrale), elle est de 0,122 à 0,15 mm au niveau de la moitié antérieure du canal gynécophore et de 0,08 à 0,09 mm au niveau de la partie postérieure de ce canal (en vue latérale). En arrière du canal gynécophore le ver présente une largeur assez uniforme de 0,065 à 0,075 mm (vue ventrale). L'extrémité postérieure du corps est légèrement spatulée en vue dorso-ventrale, et sa largeur maximum est de 0,085 à 0,1 mm. Cuticule finement épineuse. Ventouses bien développées, épineuses. Ventouse buccale subterminale, plus longue (0,035 à 0,042 mm) que large (0,035 mm). Acétabulum plus large (0,043 à 0,052 mm) que long (0,036 à 0,043 mm), distant de l'extrémité antérieure du corps de 0,31 à 0,39 mm. Canal gynécophore long de 1,3 mm à 1,5 mm, situé à une distance de 0,75 à 0,9 mm de l'extrémité antérieure du corps. Ce canal est nettement plus large dans sa partie antérieure que dans sa partie postérieure, il se rétrécit progressivement vers l'arrière et ses lèvres s'effacent très progressivement. Face profonde du canal couverte d'épines plus grandes que celles du corps. La bouche est subterminale, l'œsophage se divise en deux caeca à une distance de 0,05 mm de l'acétabulum. Caeca sinueux, très courts, se réunissant à une courte distance de l'acétabulum (0,075 à 0,11 mm) en avant de la vésicule séminale interne. Caecum unique sinueux, passant alternativement à gauche et à droite des testicules, et se terminant en cul de sac à une courte distance de l'extrémité postérieure du corps. Testicules au nombre de 110 à 149, arrondis d'un diamètre moyen de 0,03 mm. La chaîne testiculaire commence à l'endroit où finit le canal gynécophore ou même un peu avant, ils sont disposés sur un rang et séparés les uns des autres par un espace variable. En arrière la chaîne testiculaire se termine à une distance de 0,15 à 0,25 mm de l'extrémité postérieure du corps. La vésicule séminale externe est très courte (0,09 à 0,11 mm) et forme 2 boucles; la vésicule séminale interne, un peu plus étroite que la précédente, est longue de 0,185 à 0,25 mm et forme 5 à 7 boucles. La poche du cirr se prolonge en arrière de la vésicule séminale interne à une distance de 0,035 mm environ. Quelques cellules prostatiques entourent le cirr et la dernière partie de la vésicule séminale interne. Canal éjaculateur long de 0,015 à 0,07 mm, aboutissant au pore génital placé sur une petite papille saillante. Celle-ci est située à gauche de la ligne médiane à la partie antérieure du canal gynécophore.

**Femelle** : inconnue.

**Hôte et localisation** : veine porte et ramifications, chez le Canard à bec jaune : *Anas undulata undulata* DUN.

**Localité** : Astrida (Ruanda-Urundi). Février et mars 1955. Cette espèce a été découverte en association avec *T. Berghiei* n. sp.

6) *Trichoabharzia nasicola* → FAVE, 1955

Diagnose : *Trichoabharzia* SARG. et TAMM, 1920

*Mâle* : Le plus long spécimen que nous possédons mesure 19 mm, il est incomplet étant cassé à son extrémité postérieure. Trois autres exemplaires également incomplets, sans extrémité postérieure, mesurent respectivement 17,5, 14 et 12 mm. Nous avons heureusement pu extraire aux prix de grands efforts, deux exemplaires mâles complets qui mesurent respectivement 17 et 18,5 mm. Toutes ces mensurations ont été prises sur des vers conservés en formol à 5 %. Ces vers étaient morts en extension et avaient été fixés immédiatement après la mort. Le corps est subcylindrique, légèrement aplati dorso-ventralement, il s'élargit progressivement jusqu'au niveau du canal gynécophore où il se dilate brusquement en forme de fuscau. En arrière du canal gynécophore le corps présente une largeur uniforme. Les dimensions que nous venons de donner ne peuvent plus s'appliquer à des spécimens colorés et montés au baume. Le passage par les alcoolés raccourcit les vers d'environ 1/5 de leur longueur. Toutes les dimensions qui sont suivies s'appliquent uniquement à des spécimens colorés, et montés. La largeur au niveau de l'acétabulum est de 0,05 à 0,07 mm (en vue ventrale) au niveau du canal gynécophore elle est de 0,06 à 0,08 mm en vue latérale et de 0,1 à 0,12 mm en vue ventrale. En arrière du canal gynécophore le ver présente une largeur uniforme qui varie de 0,01 à 0,06 mm d'après les spécimens. Extrémité postérieure nettement spatulée, large au maximum de 0,125 mm. La cuticule est lisse, chez certains exemplaires on distingue des épines extrêmement petites à la limite de la visibilité. Ventouses épineuses, la ventouse antérieure, terminale, est plus longue (0,038 à 0,046 mm) que large (0,03 à 0,038 mm). Acétabulum un peu plus large (0,04 à 0,047 mm) que long (0,035 à 0,041 mm) et il est situé à une distance de 0,38 à 0,475 mm de l'extrémité antérieure du corps. Canal gynécophore long de 0,3 mm à 0,35 mm de long, situé à une distance de 1 mm à 1,3 mm de l'extrémité antérieure du corps; il est relativement peu profond et ses lèvres sont souvent largement ouvertes. Sa face profonde est garnie de petites épines. Bouche subterminal, bifurcation de l'œsophage située à une distance de 0,015 à 0,1 mm de l'acétabulum. Les deux canaux se réunissent au niveau du tiers postérieur de la vésicule séminale, externe ou vers le milieu de la vésicule séminale interne. Chaque vésicule séminale, passant alternativement et de façon irrégulière, à une unique sinuose, passant alternativement et de façon irrégulière, à gauche et à droite des testicules. Il se termine à une courte distance de l'extrémité postérieure du corps. Les testicules sont au nombre de 170 à 200, ils sont arrondis et leur diamètre moyen est de 0,03 mm. Ils sont placés sur une ligne et sont généralement bien séparés les uns des autres. La chaîne testiculaire sinuose commence à une certaine distance en arrière du canal gynécophore (0,2 à 0,4 mm) et elle se termine dans la partie postérieure du corps à une assez courte distance de l'extrémité. La vésicule séminale externe est longue de 0,2 à 0,25 mm (exceptionnellement elle peut présenter une longueur nettement plus courte : 0,15 et 0,17 mm par exemple); elle décrit 4 à 6 boucles. Vésicule séminale interne longue de 0,25 à 0,31 mm, décrivant 4 à 6 boucles. Présence de cellules prostatiques et d'un cône enfoncé dans une petite poche membraneuse située en arrière de la vésicule séminale interne, cette poche est suivie d'un canal éjaculateur étroit et long de 0,07 à 0,08 mm, qui débouche au niveau du pore génital situé au centre d'une papille saillante. Celle-ci est située à gauche de la ligne médiane, tout à fait au commencement du canal gynécophore. Chez plusieurs spécimens nous avons vu le cône engagé dans le canal éjaculateur jusque près du pore sexuel, ou même sortant par l'orifice génital. Chez un

(over)



autre exemplaire 2 longs filaments très fins sortaient par cet orifice. Ces filaments ont également été observés par nous chez d'autres espèces de *Trichobiliazia*.

**Femelle** : elle est également filiforme comme le mâle mais encore plus étroite que ce dernier. Le corps est subcylindrique, légèrement aplati dans le sens dorso-ventral. La seule femelle complète que nous ayons pu extraire est longue de 15 mm, examinée en formol. Montée au bauge elle ne mesure plus que 12 mm. La largeur du corps au niveau de l'acétabulum varie, d'après les spécimens, entre 0,01 et 0,053 mm; au niveau de l'ovaire le corps est large de 0,01 à 0,07 mm et en arrière de l'ovaire la largeur n'est que de 0,035 à 0,05 mm. Cuticule comme chez le mâle. Ventouses comme chez le mâle, la ventouse antérieure est longue de 0,01 et large de 0,036 mm, l'acétabulum est plus large (0,031 à 0,038 mm) que long (0,05 à 0,056 mm) et est situé à une distance de 0,42 à 0,52 mm de l'extrémité antérieure du corps. Bifurcation de l'oesophage située à environ 0,06 mm de l'acétabulum. Les deux caeca fusionnent au niveau du réceptacle séminal ou immédiatement en arrière de celui-ci. Caecum unique sinuex. L'ovaire est long de 0,625 à 0,65 mm, il est spiralé et décrit 13 à 18 boucles, il est situé à 1,2 mm de l'extrémité antérieure du corps ou à 0,15-0,625 mm de l'acétabulum. L'ovaire se continue en arrière par un oviducte sinuex qui se réunit au large canal provenant de l'extrémité antérieure du réceptacle séminal situé en arrière de l'ovaire. L'oviducte décrit alors une boucle et se dirige vers l'avant où il va se réunir au vitellosucte à une certaine distance en avant de l'ovaire pour former l'ootype. Le réceptacle séminal est plus ou moins sinuex et long de 0,14 à 0,15 mm. Un canal de Laurer bien visible s'abouche à l'oviducte un peu après sa jonction avec le canal provenant du réceptacle séminal. L'ootype est situé à une distance de 0,15 à 0,2 mm de l'acétabulum, chez deux de nos exemplaires il mesure 0,2 mm chez un exemplaire et 0,23 mm chez l'autre. Glande de Mehlis visible un peu en arrière de l'ootype. Utérus légèrement sinuex débouchant sur la ligne médiane immédiatement en arrière de l'acétabulum. Oufs présents en grand nombre dans le mucus nasal et dans des petits nodules blanchâtres à l'intérieur de la muqueuse nasale recouvrant les cornets. Ces œufs sont souvent légèrement asymétriques et recourbés mais beaucoup moins cependant que chez *Trichobiliazia spinulata* n. sp. Ils mesurent 0,28 à 0,33 mm de long sur 0,05 à 0,07 mm de large. Les œufs libres dans le mucus nasal sont généralement les plus grands et ils contiennent un miracidium très mobile qui éclôt très rapidement dans l'eau.

**Hôte et localisation** : petites veines de la muqueuse et sous-muqueuse des fosses nasales chez le Canard à bec jaune : *Anas undulata undulata* DuR. Très fréquent (13 canards parasités pour 15 examinés).

**Localité** : Asinda et environs (Ruanda-Urundi), Janvier à avril 1955.

5) *Trichobalharzia* Rodhaini → Faiv, 1956

Diagnose : *Trichobalharzia* SKRJ. et ZAKL., 1920.

Mâle : Nous ne possédons pas de ver entier mais seulement 3 fragments de mâle appartenant probablement au même spécimen. Ces fragments furent obtenus en dilacérant les cornets nasaux d'un Ibis brunizé. Le ver est malheureusement un peu contracté mais il présente plusieurs caractéristiques qui permettent de le reconnaître aisément. Le plus long fragment, comprenant toute l'extrémité antérieure, est long de 1 mm. un autre fragment comprenant l'extrémité postérieure est long de 1,6 mm, le 3<sup>e</sup> fragment, enfin, est intermédiaire entre les deux autres et mesure seulement 0,5 mm de long. Le ver est large de 0,071 mm au niveau de l'acétabulum, de 0,09 mm au niveau du canal gynécophore (en vue latérale). En arrière du canal gynécophore il présente une largeur uniforme de 0,05 mm environ. L'extrémité postérieure du corps est fortement élargie transversalement et présente une largeur maximum de 0,16 mm ce qui équivaut à près de 3 fois la largeur moyenne du corps en arrière du canal gynécophore. Ventouses bien développées et épineuses. Ventouse buccale longue de 0,016 mm, large de 0,033 mm (vue latérale). Acétabulum long d'environ 0,01 mm, et distant de l'extrémité antérieure de 0,285 mm. La cuticule est très épaisse, sans épines mais elle présente des petits tubercules dans les régions antérieure et postérieure du corps. Canal gynécophore profond, long de 0,219 mm, de calibre uniforme, sa face profonde garnie de petites épines très serrées. Il est distant de l'extrémité antérieure du corps de 0,7 mm. Tout le canal digestif est large et il est bourré de fines granulations noirâtres. Bifurcation de l'oesophage située à 0,015 mm en avant de l'acétabulum. Jonction des caeca située à 0,2 mm en arrière de l'acétabulum. Caecum unique très sinueux passant alternativement à gauche et à droite des testicules, et se terminant à une très petite distance de l'extrémité postérieure du corps. Les 3 fragments présentent respectivement 157, 62 et 19 testicules, ceux-ci sont disposés généralement sur un rang, parfois sur deux rangs dans les segments très contractés. Dans les segments peu contractés les testicules sont arrondis et leur diamètre est de 0,03 à 0,035 mm. Le premier testicule est visible à environ 0,12 mm en arrière du canal gynécophore, le dernier testicule est situé à une très courte distance de l'extrémité postérieure du corps. Vésicule séminale

externe longue de 0,13 mm, spiralee, présentant 3 boucles. Vésicule séminale interne nettement plus longue atteignant 0,23 mm de long et décrivant 8 boucles. Poche du cire dépassant en arrière l'extrémité de la vésicule séminale interne comme dans les espèces précédentes. Le canal ejaculateur débouche au sommet d'une papille saillante située à gauche de la ligne médiane à la partie antérieure du canal gynécophore.

Femelle : seul un fragment de femelle a été découvert dans les fosses nasales du même oiseau, il est long de 0,56 mm et comprend la plus grande partie de l'ovaire ainsi que le réceptacle séminal. La largeur de ce fragment est d'environ 0,065 à 0,075 mm d'après les endroits. Le fragment d'ovaire est long de 0,195 mm, il est très sinueux et large; le réceptacle séminal décrit 2 boucles et mesure 0,11 mm de long. Le vitelligène est bien développé. Les caeca sont bourrés de granulations noirâtres, ils se rejoignent immédiatement en arrière du réceptacle séminal. Le caecum unique est très sinueux. Les crocs trouvés dans le mucus nasal de cet oiseau paraissent avoir des dimensions et souvent légèrement asymétriques, ils mesurent au minimum 0,28 mm de long sur 0,055 mm de large et au maximum 0,525 mm de long sur 0,07 mm de large. Ils présentent à l'une de leurs extrémités un petit appendice long de 0,005 à 0,008 mm. La uniqueuse nasale de cet oiseau possédait, surtout au ni-

2) *Trichobilharzia* Schouteden ← *Fain*, 1955

Diagnose : *Trichobilharzia* SARG. et ZAKH., 1920.

Mâle : Les 3 exemplaires complets que nous possédons mesurent entre 5,1 et 6,79 mm de long après coloration. Forme générale comme les autres espèces de *Trichobilharzia*. Largeur au niveau de la ventouse ventrale : 0,03 à 0,15 mm; au niveau du canal gynécophore : 0,11 à 0,19 mm dans sa moitié antérieure et 0,105 à 0,115 dans sa moitié postérieure. En arrière du canal gynécophore le ver se rétrécit progressivement et sa largeur qui est d'environ 0,1 mm immédiatement en arrière de ce canal, n'est plus que de 0,07 mm environ un peu avant l'extrémité postérieure. Extrémité postérieure légèrement spatulée, large de 0,08 à 0,1 mm. Cuticule finement épaisse. Ventouse buccale épineuse longue de 0,06 et large de 0,051 mm (moyennes). Acétabulum circulaire, épineux, d'un diamètre de 0,075 mm, échancré vers l'avant.

Distance entre l'extrémité antérieure et l'acétabulum : 0,475 mm en moyenne (extrêmes : 0,12 à 0,56 mm). Canal gynécophore bien marqué, piriforme, nettement plus volumineux dans sa moitié antérieure que dans sa moitié postérieure, long de 0,5 à 0,62 mm, ses lèvres sont garnies intérieurement de nombreuses petites épines plus grandes que les épines du corps. Distance du canal gynécophore à l'extrémité antérieure 1,2 à 1,5 mm. Bifurcation de l'œsophage située à une distance de 0,06 à 0,07 mm de l'acétabulum. Les deux caeca se réunissent en général un peu en avant du pore sexuel, chez un de nos exemplaires cependant la jonction caecale a été observée dans le tiers antérieur du canal gynécophore nettement en arrière du pore génital. Cæcum unique sinueux passant alternativement à gauche et à droite des testicules, et se terminant tout près de l'extrémité postérieure. Testicules au nombre de 92 à 125, placés sur un rang, parfois sur deux rangs dans la partie antérieure, assez rapprochés les uns des autres, arrondis, d'un diamètre de 0,035 à 0,045 mm. Chaîne testiculaire sinuose commençant assez près du canal gynécophore (0,05 à 0,07 mm) et allant jusqu'à une distance de 0,3 à 0,5 mm de l'extrémité postérieure. Il existe deux vésicules séminales bien distinctes et réunies par un fin canal, l'antérieure, que nous appellerons vésicule séminale externe par ce qu'elle est libre dans le parenchyme, est longue de 0,26 à 0,31 mm; elle est spiralee, décrivant 6 à 8 boucles (3 à 4 tours de spires) et son extrémité est très rapprochée de l'acétabulum. La vésicule séminale postérieure, un peu plus étroite et moins colorable que la précédente, est longue de 0,225 à 0,3 mm et décrit seulement 4 à 6 boucles; elle est enveloppée dans une mince gaine plissée qui représente la poche du cirre. Vers le quart ou le cinquième postérieur de cette vésicule séminale « postérieure », ou plus exactement « interne », cette membrane devient libre et forme une petite poche dépassant en arrière l'extrémité de la vésicule et contenant le cirre, plus ou moins long d'après son degré de déroulement, et quelques cellules prostatiques. A la poche du cirre fait suite un canal éjaculateur étroit qui débouche au niveau du pore génital. Cette disposition caractéristique des organes sexuels mâles a été observée dans toutes les autres espèces de *Trichobilharzia* que nous avons examinées et nous n'y reviendrons plus dans nos descriptions ultérieures. Le pore sexuel s'ouvre au sommet d'une papille bien développée située à droite de la ligne médiane au commencement du canal gynécophore.

Femelle : inconnue.

Hôte et localisation : veines méésentériques et foie du Canard rayé ou à dos blanc : *Thalassornis leucotis* EYT. (1 oiseau parasité pour 2 examinés).

Localité : Astrida (Ruanda-Urundi), Mars 1955.

7) *Trichobilharzia spinulata* Fain, 1963

Diagnose : *Trichobilharzia* Sackj. et Kassl. 1920.

**Mâle** : L'extrémité antérieure jusqu'au niveau du canal gynécophore est seulement légèrement aplati dans le sens dorso-ventral. En arrière du canal gynécophore le corps est plus nettement aplati et il est un peu plus large, en ventralment, que dans la partie antérieure (exemplaires examinés en formol sans montage). Nous avons pu extraire des petites veines des lésions nasales, un mâle complet qui mesurait, en formol, 21 mm de long; et après montage au baume 15 mm. Nous possédons en outre de nombreux autres spécimens mâles incomplets plus ou moins longs. Largeur du corps au niveau de l'acétabulum (vue ventrale) : 0,075 à 0,085 mm; au niveau du canal gynécophore 0,087 à 0,095 mm en vue latérale et 0,1 à 0,115 mm en vue ventrale. En arrière du canal gynécophore la largeur en vue ventrale est de 0,075 à 0,085 mm. Extrémité postérieure du corps progressivement élargie dans le sens latéral, l'apex caudal étant large de 0,14 mm. Tout le corps, sauf la partie tout à fait antérieure jusqu'à environ 0,1 mm en arrière de la ventouse buccale, est couvert de fines épines, longues de 0,006 à 0,01 mm et très apparentes. Ces épines sont implantées perpendiculairement dans la cuticule et sur les vésicules et moultés elles paraissent dirigées latéralement. Cette couverture épineuse peut faire défaut partiellement chez certains exemplaires par suite de frottement, ou de macération, mais elle ne manque jamais entièrement. Elle est surtout apparente dans la partie postérieure du ver. Ventouses épineuses. Ventouse buccale longue de 0,038 et large de 0,031 mm. Acétabulum un peu plus large (0,045 mm) que long (0,038 mm), distant de l'extrémité antérieure du corps de 0,55 à 0,45 mm. Canal gynécophore long de 0,25 à 0,325 mm, distant de l'extrémité antérieure du corps de 0,7 à 0,575 mm, sa face profonde est garnie de petites épines très acérées. Le canal gynécophore est relativement peu profond et très ouvert. Rétroaction de l'ovoplage à une distance de 0,01 à 0,07 mm de l'acétabulum. Jonction des caeca située en avant du pore génital généralement au niveau de la vésicule séminale interne, plus rarement au niveau de la vésicule séminale externe. Caecum unique sinuose passant sur la face latérale des testicules et se terminant très près de l'extrémité postérieure du corps. Testicules au nombre de 255 chez le seul mâle complet, arrondis, d'un diamètre de 0,035 à 0,015 mm. Ils sont disposés sur une ligne sinuose comme dans les autres espèces de *Trichobilharzia* et sont assez rapprochés les uns des autres sans cependant se toucher. La chaîne testiculaire commence à une distance de 0,1 à 0,3 mm du canal gynécophore et se termine à une distance variable de l'extrémité postérieure du corps (0,4 à 0,1 mm). Vésicule séminale externe décrivant 4 à 5 boucles, longue de 0,12 à 0,27 mm. Vésicule séminale interne décrivant également 4 à 5 boucles et environ de la même longueur que la précédente (0,146 à 0,219 mm). La poche du clire se prolonge au delà de la vésicule séminale interne sur une distance de 0,05 à 0,06 mm. Canal éjaculateur long de 0,05 mm. Pore génital s'ouvrant au sommet d'une papille saillante à gauche de la ligne médiane, au commencement du canal gynécophore. Chez certains exemplaires le clire est engagé dans le canal éjaculateur et apparaît au pore génital. Les glandes prostatiques sont relativement bien développées.

**Femelle** : notre plus long exemplaire, incomplet, mesure 17 mm (en formol). La largeur du corps en vue ventrale chez les exemplaires colorés est de 0,05 à 0,06 mm au niveau de l'acétabulum, de 0,01 à 0,06 mm au niveau de l'ovaire, et d'environ 0,05 à 0,07 mm en arrière de l'ovaire. Cuticule comme chez le mâle. Ventouses épineuses, l'antérieure plus longue (moyenne 0,055 mm) que large (moyenne 0,031 mm), la postérieure plus large (moyenne 0,058 mm) que longue (moyenne 0,03 mm), cette dernière distante de l'extrémité antérieure du corps de 0,32 à 0,37 mm.

0,373 mm. Bouches subterminales, bifurquées de l'oesophage situé un peu en avant de l'aréolabium (0,05 mm en moyenne); jonction des caeca située entre l'ovaire et le réceptacle seminal; carreau unique peu sinueux se terminant en cul de sac à une courte distance de l'extrémité postérieure du corps. Ovaire long de 0,1 à 0,5 mm, spiralé, décrivant 14 à 18 boucles. Réceptacle seminal situé en arrière de l'ovaire, long de 0,085 à 0,12 mm, sinués ou noué, sans canal se réunissant à l'oviducte comme chez *T. nairicola*. Canal de Laurer présent, comme chez *T. nairicola*. Distance ovaire-aréolabium 0,1 à 0,55 mm. Distance ootype-ovaire 0,125 à 0,2 mm. L'ootype peut renfermer un œuf qui peut mesurer 0,17 à 0,2 mm de long (préparations colorées). Vitellogène assez peu développé en général, formés de follicules arrondis, s'étendant jusqu'à environ 0,2 mm de l'extrémité postérieure du corps. En avant le vitellogène se réunit à l'oviducte immédiatement en avant de l'ootype. Œufs très nombreux dans le mésentère situés dans la profondeur de la muqueuse. Ces œufs fortement asymétriques sont en forme de noyau, ils ressemblent un peu à ceux de *Trichobilharzia ovalata* et présentent aussi un petit appendice terminal, mais leurs dimensions sont beaucoup plus grandes que dans cette espèce. Les œufs mûrs, contenant un miracidium mobile, qu'on rencontre dans le mucus nasal, mesurent entre 0,25 et 0,3 mm de long sur 0,05 à 0,07 mm de large. Les œufs plus jeunes, initialement plus petits: entre 0,21 et 0,24 mm de long sur 0,025 à 0,01 mm de large.

*Hôte et localisation*: Oie d'Égypte: *Aloposchen aegyptiacus* LASS., et Oie de Gambie: *Plectropterus gambensis* LASS., dans les fosses nasales.  
*Localité*: Oie d'Égypte: Assiout et environs. Oie de Gambie: Usimbura (Ruanda-Urundi). Février et mars 1955.

TRICHOBIKHAR  
ZIA