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Paradilepis simoni n. sp., a Cestode Parasitic in the Osprey.
(Cestoda: Dilepididae).¹ROBERT RAUSCH².Department of Veterinary Science, University of Wisconsin, Madison³

(Text-figure 1).

The knowledge of helminths parasitic in North American birds is very incomplete, especially for the region west of the Mississippi. Not only is this true in regard to parasite-host ecology, but a little work with almost any group of birds discloses undescribed forms or species unreported from North America, as well. In fact, anyone wishing to carry out host-parasite studies must devote considerable time to describing species—time which could be more profitably spent otherwise. The osprey might be mentioned to illustrate this situation. Of this bird the writer has examined but three specimens, one each from Ohio, Wisconsin and Wyoming. From this small series of birds, four species of helminths were collected; of these, two species were undescribed and two had never been recorded from North America. While it is true that a comparable situation is not to be expected in every case, it soon becomes obvious from work with a given host-group that much remains to be done before the helminths encountered in birds can be readily identified.

The cestodes with which this paper is concerned were obtained from the small intestine of an osprey, *Pandion haliaetus carolinensis* (Gmelin), collected on June 3, 1948, near Moran, Wyoming. This osprey was one of 267 birds collected by the writer for helminthological study from the Jackson Hole region of Wyoming.

A total of more than 75 worms was obtained. Whole-mounts were prepared of specimens stained with Semichon's acetic carmine and Delafield's haematoxylin. Serial sections, cut at 15 μ , were also studied.

This cestode is named in honor of Mr. James Simon, Director of the Jackson Hole Wildlife Park, whose generous cooperation contributed much to the success of the field work in Jackson Hole.

Paradilepis simoni n. sp.

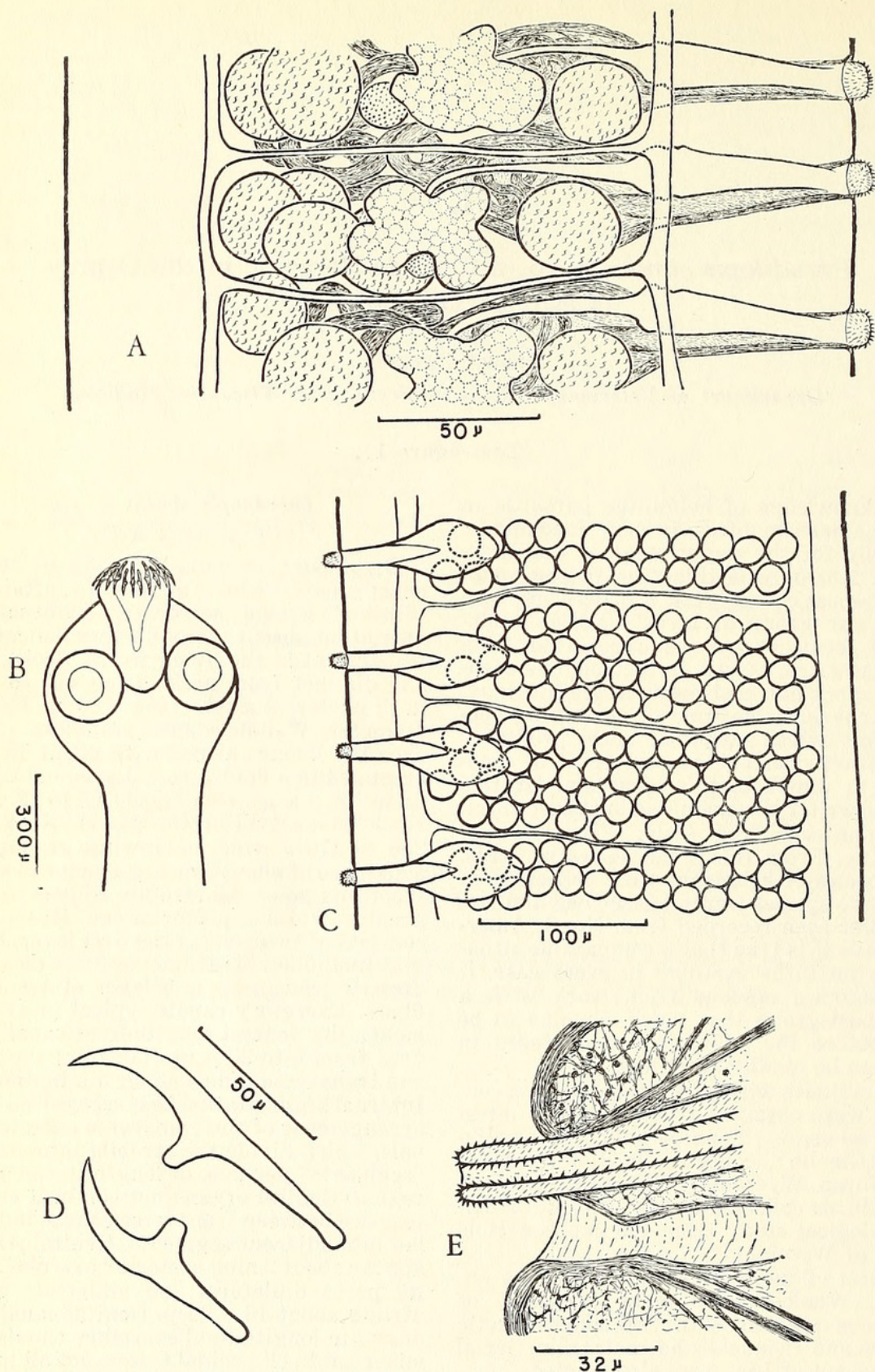
(Text-fig. 1 A-E).

Diagnosis: Strobila from 50 to 90 mm. long; greatest width, up to 450 μ , attained in terminal gravid segments. External segmentation absent; strobila very delicate and translucent in the living worm. Scolex large and distinct from neck; from 470 to 596 μ in diameter. Suckers from 180 to 220 μ in diameter. Well-developed rostellum slightly over 100 μ long; armed with about 36 hooks arranged in a double row. Large hooks from 98 to 102 μ long; small hooks 68 to 72 μ long. Hook shape typical for genus. Neck from 250 to 270 μ wide, narrowing gradually to a distance of about 2 mm. posterior to scolex; from this point the strobila widens to reach greatest width at posterior end. Musculature consists of two layers; the first layer, of longitudinal fibers, is from 1 to 3 bundles deep; directly beneath it is a layer of transverse fibers. Excretory canals typical in arrangement; the ventral longitudinal canal measures from 6 to 20 μ in diameter; the dorsal and transverse canals about 3 μ in diameter. Internal segmentation best recognized by the arrangement of the transverse excretory canals, which divide the strobila into about 30 "segments" per mm. of length in the mature region. Genital organs not confined entirely to space between transverse canals, but overlap into adjacent segments. Genital *Anlagen* appear about 2 mm. posterior to scolex. Genital pores unilateral and sinistral; genital atrium about 16 μ deep. Genital canals pass dorsal to longitudinal excretory canals. Five spherical to ellipsoidal testes, not all in same plane, in each segment; testes measure from 26 to 33 μ in diameter in mature segments. Usually 4 testes are aporal, and one is poral of female organs; at times 2 may be poral. Flask-shaped cirrus sac extends to middle of mature segments, or beyond, dorsal to testes; it measures from 100 to 132 μ long by 30 to 40 μ wide. Cirrus heavily spined. Internal and external seminal vesicles absent; ductus ejaculatorius coiled within bulb of cirrus sac.

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TEXT-FIG. 1. The morphology of *Paradilepis simoni* n. sp. The drawings were made in part with the aid of a projector. **A.** Ventral view of a typical mature segment. **B.** Typical scolex. **C.** Dorsal view of a section of gravid segments. **D.** Hooks from rostellum. **E.** Cross-section of genital atrium region, showing relation of cirrus to vagina.

Well-developed vas deferens with numerous convolutions situated in dorsal part of segment. Cirrus sac provided with strongly-developed retractor muscles. Thin-walled vagina opens ventral to cirrus sac; it enlarges gradually, attaining greatest diameter near place where longitudinal excretory canals are crossed; it narrows after this point and runs medially to join small seminal receptacle dorsal to ovary. Ovary rather variable in shape and position; usually 4-lobed, situated near middle of segment. Spherical to ellipsoidal vitelline gland dorsal to posterior part of ovary; it increases in size toward posterior end of strobila, attaining a maximum diameter of about 40 μ . Uterus develops as two lateral, spherical sacs situated ventral to ovary, and connected by a narrow neck. Gravid uterus fills entire segment; unlobed and sac-like when completely gravid. Cirrus sac and vagina persist into terminal gravid segments. Eggs, from 27 to 33 μ in diameter, are arranged in 3 to 4 rows across the segments. Embryonic hooks about 6 μ in length.

Host: *Pandion haliaetus carolinensis* (Gmelin) (Osprey).

Habitat: Small intestine.

Locality: Moran, Wyoming.

Type: Three slides of cotype material have been deposited in the Helminthological Collection of the U. S. National Museum, No. 46403.

DISCUSSION.

As far as could be determined, the genus *Paradilepis* Hsü, 1935, has not been previously recorded from North America. Neither has the writer discovered any record of cestodes parasitic in the osprey.

Cestodes of the genus *Paradilepis* are typically parasitic in pelicaniform birds, particularly in cormorants, *Phalacrocorax* spp. The genus *Paradilepis* was established (Hsü, 1935) for cestodes from a Chinese cormorant, with *P. duboisi* as type. Hsü also assigned *Dilepis scolecina* (Rudolphi, 1819) to the genus *Paradilepis*. According to Joyeux and Baer (1935), *P. duboisi* is identical with *P. scolecina*; consequently *P. scolecina* (Syn. *P. duboisi*) becomes type species. The examination of the original preparations of *Oligorchis delachauxi* Fuhrmann, 1909, led Joyeux and Baer (1935) to place it in the genus *Paradilepis*. It had been earlier assigned by the same writers (1930) to the genus *Dilepis* Weinland. Further study of their African material disclosed that they were dealing with two species, referred to as *Dilepis delachauxi* (Fuhrmann, 1909). As a result, a new name, *P. macracantha*, was proposed (Joyeux and Baer, 1935) for *Dilepis delachauxi* Joyeux and Baer, 1930 nec Fuhrmann, 1909.

Burt (1940) described *Paradilepis brevis* from a Ceylon cormorant, apparently without referring to the work of Joyeux and Baer (1935). It is possible that *P. brevis* is identical with *P. scolecina*.

Joyeux and Baer (1935) suggested that *Oligorchis longivaginosus* Mayhew, 1925, might also belong to the genus *Paradilepis*. This is of particular interest in connection with the present paper, since *O. longivaginosus* was collected from a white pelican from Yellowstone Park, Wyoming. Apparently this species has a single crown of hooks, instead of a double row as seen in *Paradilepis*; external segmentation also seems evident.

The number of species of the genus *Paradilepis* is at present indefinite, and must remain so until some of the material is studied further. Regardless of this situation, *P. simoni* is readily differentiated from any others previously assigned to the genus in that it possesses 5 testes in each segment, instead of 4.

Although the presence of 4 testes is considered a generic character by Joyeux and Baer (1935, 1936), we do not consider it justifiable to erect a new genus for *P. simoni* on the basis of this character alone. It is otherwise very similar to the other members of the genus. Since the previously known species have been described from pelicaniform birds, it is not strange that they are morphologically similar. If, in addition to *P. simoni*, cestodes of this genus are recorded from other host groups, a much better concept of morphological variation within the genus may be had.

It is possible that *P. simoni* is an "accidental" parasite of the osprey, and occurs naturally in cormorants. It would be of interest to examine cormorants from the colony north of Jackson Hole in order to determine whether they are parasitized by any species of *Paradilepis*. Since all the hosts are piscivorous, presumably species of fish might act as the intermediate hosts of cestodes of this genus. At present, there is no reason to doubt that the osprey is the natural host of *P. simoni*.

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