

*WELLCOMIA PEROGNATHI* N. SP. (NEMATODA:  
OXYURIDAE) FROM POCKET MICE, *PEROGNATHUS*  
*INTERMEDIUS* (MERRIAM, 1889) OF THE  
GRAND CANYON, ARIZONA

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INTRODUCTION

A species of nematode with the general characteristics of the Syphaciinae was recovered from 13 of 26 *Perognathus intermedius* examined during a 1954 expedition to the Grand Canyon National Park, Coconino County, Arizona. A vulva anterior to the middle of the body of the female, the subulate tail, and the absence of cuticular mamelons in the male indicated that these oxyurids belong to the genus *Wellcomeia* Sambon, 1907. Further preliminary examination strongly indicated that the specimens differed from the other described species of *Wellcomeia*. The differential study of the nematodes was therefore undertaken.

The expedition was sponsored by the Natural History Museum of the University of Illinois. It was organized and directed by Dr. Donald F. Hoffmeister, Director of the museum. Three hundred and ninety-six animals were examined for parasites. Mammals from ten families of three orders were represented. Every effort was made to examine representatives of all species of these mammals.

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Health, Public Health Service. Financial support was also furnished by the Graduate Research Board of the University of Illinois.

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MATERIALS AND METHODS

The individual organs of the mammals were examined separately. Parasites were segregated in accordance with tentative identification and individual host. The nematodes were killed in hot 70% alcohol when field conditions permitted or at prevailing temperatures in the absence of an adequate source of heat. They were preserved in 70% alcohol to which 5% glycerine was added upon the return to Urbana, Illinois. Subsequent procedures necessitated further segregation, but the identity of the source and association of the specimens were carefully maintained.

Skins and skulls of host animals are preserved in the University of Illinois Natural History Museum. Final identification of hosts, as reported herein, was made by Dr. Hoffmeister and his staff. Type hosts are identified in this report by the number assigned to them in the museum collections.

## OBSERVATIONS

*Wellcomia perognathi* n. sp.

*Description: Males* (parenthetics indicate average values): length, 2.4-3.48 mm. (3.0); width, 0.259-0.348 mm. (0.314); anterior esophagus, 0.278-0.343 mm. (0.313) by 0.042-0.057 mm. (0.051); esophageal bulb, 0.095-0.116 mm. (0.108) by 0.095-0.116 mm. (0.102); total length of esophagus, 0.391-0.459 mm. (0.421); distance from anterior end to excretory pore, 0.770-0.990 mm. (0.850), to nerve ring, 0.105-0.192 mm. (0.143), to end of cervical alae, 0.270-0.532 mm. (0.442); length of tail, 0.037-0.042 mm. (0.039); length of spike-like posterior cuticular projection of tail, 0.132-0.166 mm. (0.147); length of caudal alae, 0.047-0.066 mm. (0.055); length of spicule, 0.095-0.110 mm. (0.105); length of gubernaculum, 0.018-0.023 mm. (0.021). One pair of large preanal, one pair of lateral, a single median postanal, and paired, large bursal papillae are present.

Proportions: Length/width, 5-8; length/total esophagus, 6-10 (7); length of anterior esophagus/width of anterior esophagus, 5-8 (6); length/length of tail, 50-90 (74); length/distance from anterior end to excretory pore, 3-4 (3.5); length/distance from anterior end to nerve

ring, 16-34 (21); length of esophageal bulb/width of bulb, 0.95-1.1 (1.0); length/length of spicule, 22-37 (27.5); length of spicule/length of gubernaculum, 4-6 (5).

*Description: Gravid females* (parenthetics as above): Length, 10.04-15.8 mm. (11.21); width, 0.331-0.441 mm. (0.366); anterior esophagus, 0.499-0.557 mm. (0.534) by 0.081-0.103 mm. (0.092); bulb of esophagus, 0.132-0.158 mm. (0.145) by 0.147-0.176 mm. (0.162); total length of esophagus, 0.631-0.715 mm. (0.679); distance from anterior end to nerve ring, 0.158-0.198 mm. (0.175), to excretory pore, 179-185 mm. (182), to vulva, 3.53-4.8 mm. (4.3), to end of cervical alae, 0.174-0.708 mm. (0.381); length of tail, 1.29-1.53 mm. (1.38); eggs, ovoid, flattened on one side, 0.089-0.105 mm. (0.098) by 0.029-0.037 mm. (0.031), side view, 0.026-0.029 mm. (0.027).

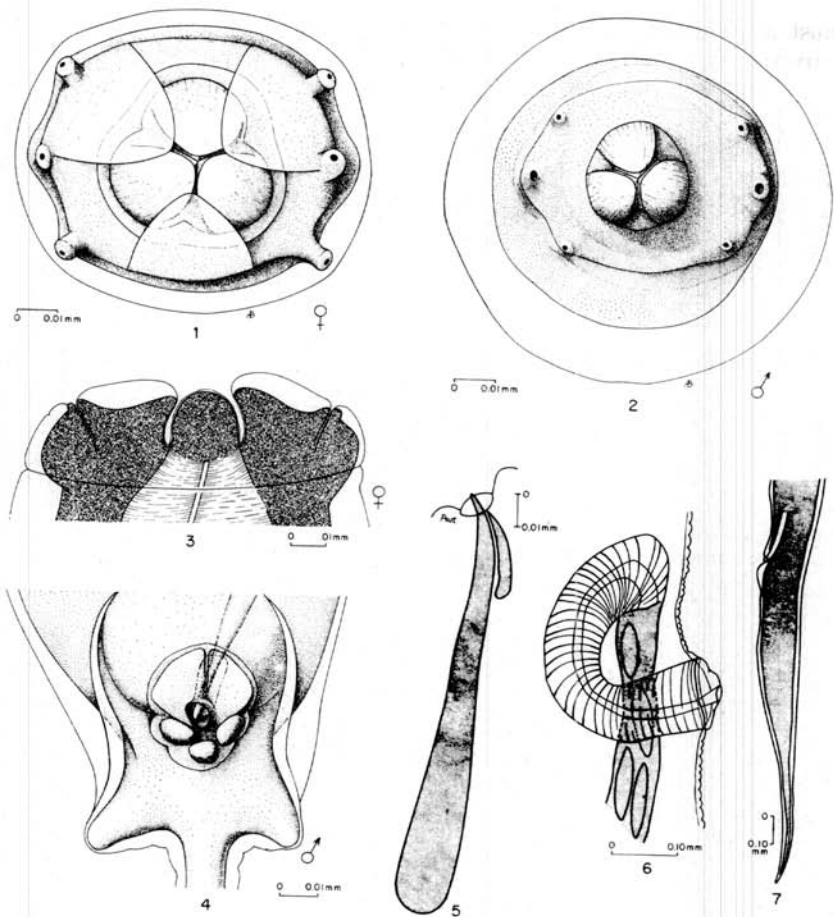
Proportions: Length/width, 28-39 (35); length/total esophagus, 14-24 (19); length of anterior esophagus/width of anterior esophagus, 5-7 (6); length/length of tail, 7-10 (9); length/distance from anterior end to nerve ring, 54-95 (73); length/distance from anterior end to excretory pore, 7.8-8.5 (8.1); length of esophageal bulb/width of bulb, 0.8-1.0 (0.89); length/distance from anterior end to vulva, 2.4-3.7 (2.9); length of egg/width 2.8-3.2 (2.9).

*Host: Perognathus intermedius* (Merriam, 1889). Ill. Nat. Hist. Mus. No. 10602.

*Habitat: Intestine* (cecum).

*Locality: Coconino County, Arizona* (Grand Canyon National Park).

*Holotypes: U.S. Nat'l. Mus. Helm. Coll. No. 38306.*



*Wellcomia perognathi* n. sp. Fig. 1.—Head, *en face*, female; Fig 2.—Head, *en face*, male; Fig. 3.—Head, lateral view, optical section, female; Fig. 4.—Posterior end, ventral view, male; Fig. 5.—Spicule and gubernaculum, lateral view; Fig. 6.—Vagina-vulva complex, lateral view; Fig. 7.—Tail, lateral view, female.

*Remarks:* Fifteen mature males and 13 gravid females were analyzed in detail for the preceding characterization. All females less than 10 mm. in length were non-gravid.

Six readily visible structures surround the mouth opening (Fig. 1) of female *W. perognathi*. Three of these correspond to the divisions

of the immediately underlying, tri-radiate esophagus. Therefore, one is dorsal and two are subventral in location. The three remaining, lobed structures partly overlies and alternate with these and include two subdorsal and one ventral units. In accordance with the terminology employed by Smith (1908) for *O. ovo-*

*luta* (= *W. evaginata*), the dorsal and subventral units are lips while the subdorsal and ventral units are liplike (interlabial ?) units. In the contrary terminology of Hall (1916: 70) for the same species, the subdorsal and ventral units are lips, the others "intermediate lip structures". The latter appear to be the proper interpretation for female *W. perognathi*.

Three relatively large units surround the mouths of male *W. perognathi* (Fig. 2). These correspond to the closely associated parts of the triradiate esophagus. One is thus dorsal and two are subventral. Small, triangular thickenings between their bases may represent the alternating (two subdorsal, one subventral) prominent labial structures of the female. A thin, non-lobate, slightly irregular membrane encircles the circumoral units of the male. It may attach to the bases of the small "thickenings". Further study of the circumoral apparatus in the genus *Wellcomia* is needed.

The cuticular lining of the esophagus is corrugated, giving the appearance of small teeth when seen in optical section. All our specimens possess this corrugation, apparently regardless of the state of contraction of the worms.

Three pairs of outer circumoral papillae (Figs. 1, 2) are present in both sexes. The middle unit of each group is amphidial. A lateral papilla and an amphid associate with each subdorsal labial unit of the female; the remaining papilla appears to be located at the base of the subventral unit. Corresponding papillae in the male appear to be similarly situated, but the loss or

reduction of labial units obscures parallel interpretation.

The spicule and gubernaculum are chitinized. The spicule is enlarged proximally and slightly recurved ventrally. The gubernaculum is moderately heavy, club-shaped, and grooved toward the spicule except at its innermost end. The distal portion is gently curved ventrad and ends in two small but distinct lateral processes or points. It parallels the course of the spicule (Figs. 4, 5). No specialization of the posteroventral cuticula of the male specimens, such as noted for *W. evaginata*, is present.

The vagina of *W. perognathi* is never everted. The terminal 0.064 mm. are cuticularized. The vagina enters the vulva at right angles to and across the long axis of the body. The terminal uterus (Fig. 6) loops anterior to the vulva, entering the vagina from its anterior aspect.

The tails of female *W. perognathi* are elongate and pointed (Fig. 7) but no spiral markings, as described for *W. evaginata*, are present.

#### DISCUSSION

The males of *W. perognathi* are smaller than the males of all other described species of *Wellcomia* except *W. taylori* Abdussalam, 1938. They are distinctly larger than the males of the latter. The spicule and gubernaculum are smaller than in all other described species of *Wellcomia* with the exception of *W. evaginata*. They reach the minimum described for the latter species as described by Hall (1916) but are smaller by two-thirds than comparable structures described by Mao (1939). Numerous other differences

confirm the identity of these forms.

The females of *W. perognathi* are the only members of the genus, except *W. taylori*, whose vaginae do not evert. The females of the former are appreciably longer. The eggs of *W. Perognathi* are larger than those of any other described species of *Wellcomia* except *W. longejector* Hannum, 1943. They are smaller than the eggs of the latter species. Other differences are also present.

*W. longejector* was described from a wide variety of rodents in Arizona. These include the cottontail rabbit ("*Sylvilagus audubonii*") . . . "the jackrabbit (*Lepus alleni*), the domestic rabbit (*Lepus cuniculus*), pocket mice (*Perognathus baileyi*, *P. intermedius* and *P. penicillatus*) and the kangaroo rat (*Dipodomys merriami*)" according to Hannum (1943: 50). Its presence in pocket mice in Arizona makes necessary a clear and more detailed differentiation from *W. perognathi*.

The males of *W. perognathi* differ from the males described by Hannum (*op. cit.*) in their sexual dimorphism of labial structure, presence of caudal alae, presence of distinct gubernaculum placed along distal portion of spicule, and in possession of a different complex of caudal papillae. The females of *W. perognathi* do not have the everted vagina so prominent in *W. longejector*; the circumoral papillae of *W. perognathi* are prominent and no dentition is visible at the opening to the esophagus. Thus *W. perognathi* clearly differs from *W. longejector*.

The wide distribution in its various hosts, the question concerning even the presence of a gubernaculum

(Hannum, 1943: 51), and the nature of its tail indicate that further study of *W. longejector* should be undertaken.

#### SUMMARY

*Wellcomia perognathi* n. sp. is described from the pocket mice of the Grand Canyon National Park, Coconino County, Arizona. The differentiation of this species of oxyurid from other members of the genus *Wellcomia* is presented.

The sexual dimorphism described for the oral apparatus of *W. perognathi* is the only described instance of this phenomenon in the genus. It renders precise interpretation of the labia difficult and indicates need for further study of the oral apparatus of other members of the genus. This is more apparent when one considers the several interpretations of the oral apparatus of *W. evaginata* presented by Smith (1908) and Hall (1916) as noted above (see also Mao, 1939, and Olsen and Tolman, 1951, for further interpretations).

The desirability of further studies of *W. longejector* is indicated.

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