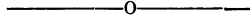


Texas material of *Apus aequalis* also came from the same source.

Shortly after Belfrage's collection of these species of phyllopod in Bosque County, Jacob Boll⁶, a naturalist resident in Dallas County, collected at Dallas for the Museum of Comparative Zoology (Dec. 7, 1874) individuals of the species *Streptocephalus texanus*, *Estheria belfragei*, and *Limnetis gracilicornis*, all of Packard; 1871. It is probable that these species are very widely distributed in Texas, and concerted efforts to determine their geographical and seasonal distribution would be highly desirable.

⁶ For an account of the life and work of Jacob Boll, see two papers by the present writer: "Naturalists of the Frontier, I. Jacob Boll," in *Southwest Review* 14:184-198, 1928; and "Professor Jacob Boll and the Natural History of the Southwest", in *Amer. Midl. Nat.*, 11:435-452, 1929.



VARIATION IN THE PARASITIC WORM, ASCARIDIA LINEATA, FROM DALLAS COUNTY, TEXAS

Francis Marion Adams

In the course of a recent study¹ of the helminth parasites of domestic fowl in Dallas County, certain interesting variations were observed in the number and distribution of the caudal papillae of one of the parasites, *Ascaridia lineata* (Schneider). These are described below and illustrated in the accompanying figures.

According to Cram², worms belonging to this species are large, thick, and yellowish, with two very prominent white lateral lines. Lane³ describes his (*n. s.*) *Ascaridia hamia* [*A. lineata*] as having no lateral membranes, but a rope-

¹ Adams, F., & Geiser, S. W. (1929). "Intestinal Parasites of the Chicken in Dallas County, Texas." *Anat. Rec.*, 44:266; (1933) "Helminth Parasites of the Chicken (*Gallus domesticus*) in Dallas County, Texas." *Amer. Midl. Nat.* 14. [May, 1933.]

² Cram, E. B. (1927). "Bird Parasites of the Nematode Suborders Strongylata, Acaridia, and Spirurata." *Bull.* 140 U. S. Nat. Museum.

³ Lane, C. (1914). "Suckered Roundworms from India and Ceylon." *Ind. Jour. Med. Research* 2:655-669.

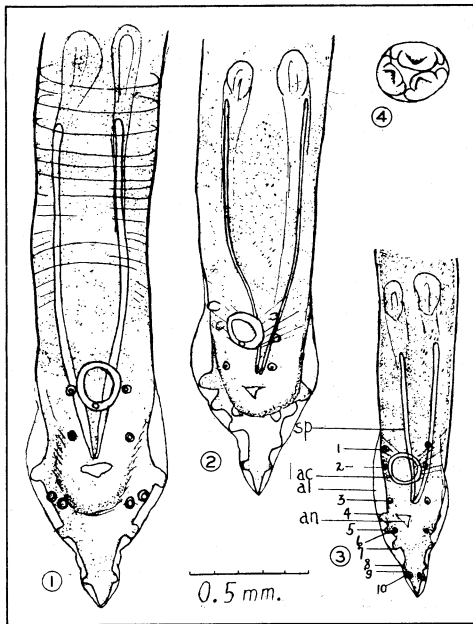
like twist down the middle of the lateral lines, and a head separated from the body by a slight neck. The head possesses three large, subequal lips with only two dentigerous ridges [the second one being very small]; it is thereby distinguishable from *Ascaridia galli* (Schrank), according to Schneider⁴. Lane says that *A. hamia* has three large lips, each consisting of a central mass and two lateral flaps and bearing two papillae, those on the dorsal lip being larger than the others. On the median face each lip bears a sharp horizontal ridge; close to the head are five to six cervical or nuchal papillae on each.

The male worm is from 55 to 68 mm. long; Lane describes *A. hamia* as 70 mm. long x 0.9 mm. wide. According to Cram, the anal sucker is from 200 to 250 micra in diameter, with a strong chitinous wall having a papilliform interruption on its posterior rim. The tail has narrow bursal membranes and ten pairs of caudal papillae⁵. There are three pairs of preanal papillae located ventrally; one pair anterior to the sucker, one pair opposite the sucker and the cloacal aperture. The next pair of caudal papillae is lateral, but seems to have a variable relationship; it is figured for *A. hamia* by Lane as preanal; and for *A. lineata* by Travassos⁶ as adanal; by Schneider as postanal, and by Boulenger as somewhat adanal and somewhat postanal. Close behind this pair is a pair figured as ventral by Schneider and Boulenger, and as lateral by Travassos and Lane. This is closely followed by a ventral pair, and this in turn by a lateral pair. Toward the tail end, in a secondary expansion of the caudal alae, are two pairs of lateral papillae with a pair of ventral papillae occupying variable positions between them; it is this posterior group that seems most characteristic of *Ascaridia lineata*, and distin-

⁴ Schneider, Anton (1866). *Monographie der Nematoden*. Berlin.

⁵ Since the present paper was written, Ackert: "The Morphology and Life History of the Fowl Nematode, *Ascaridia lineata* (Schneider)," *Parasitology*, 23:360-379, w. 2 plates, 1931), has given an admirable discussion of the anatomy of this species, illustrated it with excellent figures, and has called attention to the variability to be found in number and position of caudal papillae. G.

⁶ Travassos, L. (1913). "Sobre as Especies Brasileiras da Sub-familia Heterakinae Railliet & Henry." *Mem. Inst. Oswaldo Cruz* 5:271-318.



EXPLANATIONS OF THE FIGURES

NOTE: All figures are drawn by the aid of the camera lucida to the same scale, which is indicated on the plate.

Figures 1-3. Distribution of caudal papillae of *Ascaridia lineata* from different hosts (*Gallus domesticus*). sp, copulatory spicules; ac, acetabulum, or preanal sucker; al, lateral alae; an, anus; 1-10, the successive pairs of caudal papillae in the individual showing the greatest number.

Figure 4. Anterior view of the mouth of *Ascaridia lineata*.

guishes it in particular from *A. galli*, in which the ventral pair is lacking. The cloacal aperture is 540 micra from the tip of the tail. The spicules are equal and narrow, with slightly enlarged, rounded points, 1.6 to 2.4 mm. long.

The female is 60 to 95 mm. long. The vulva occurs about a third of the distance from the anterior end (in *A. hamia*, at about the middle of the worm). The tail is 1.08 mm. long; in *A. hamia* (*vide* Lane), it is 1.3 mm. long, and there are lateral papillae 0.5 mm. from the tip. So much for the accepted descriptions of this species.

In the materials collected in Dallas County, the rope-like twist of the lateral-line structures is emphasized. The body narrows considerably immediately back of the head. The lips are as shown in the accompanying plate, Figure 4. It will be noted that there is a central flap with two lateral flaps and ridge beneath. No papillae were discerned on the lips. In males, the acetabulum measures from 175 to 230 micra in diameter. Spicules vary according to the size of the worm, from 0.7 to 1.67 mm. The arrangement of the caudal papillae is rather indefinite. Figure 3 is almost precisely like that of Boulenger for *A. lineata*. In Figure 1 the preanal papillae are entirely lacking. In Figure 2 they are present; but both of the individuals illustrated in Figures 1 and 2 differ from that of Figure 3, in the condition of the most posterior pairs of papillae. Unless some of the papillae are lost in old age by the worm, it is unlikely that these differences are associated with development, since the smaller worm, which shows the typical display of papillae, is taken from a lot containing immature worms, and is probably young.

BIOGRAPHICAL NOTE ON MR. F. M. ADAMS

FRANCIS MARION ADAMS was born Feb. 14, 1902, at Regan, Texas, and died by drowning on August 4, 1928, near Uvalde, Texas. He took his A.B. degree in 1926 and his M.S. degree in the summer of 1928 from Southern Methodist University (the degree being conferred posthumously). He was Fellow in Biology (1926-7) and Instructor (1927-8). During the summer of 1927 he studied parasitology and mammalogy at the University Biological Station at Douglas Lake, Michigan. Accepting an appointment to a graduate fellowship in Biology at the Rice Institute in May, 1928, he planned to work for the Doctorate in the field of Parasitology, under Professor Asa C. Chandler.

His Master's Thesis, entitled, "A Statistical Study of the Internal Parasites of the Domestic Chicken in Dallas County, Texas," was accepted by the Department of Biology of Southern Methodist University as satisfying the requirements for the degree.

Mr. Adams met his death in line of duty while working in company with Dr. Walter E. Dove as a member of the U. S. Bureau of Entomology. For some time they had been studying an outbreak of screw-worm maggots in cattle in the neighborhood of Uvalde, Texas, and in the course of their work had occasion to cross the Dry Frio River, north of Uvalde. This suddenly rose in a wall of water, due to a cloudburst in the upper basin, and Mr. Adams's death followed. Dr. Dove barely escaped with his life.

In the death of Mr. Adams, Biology has lost a young man of great promise. He combined philosophical insight, technical skill, and intellectual curiosity to a rare degree.

[S. W. G.]