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Are the Nematodes Syngamus Trachea and Syngamus Merulae Synonymous?

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Are the Nematodes *Syngamus Trachea* and *Syngamus Merulae* Synonymous?[1]

HAROLD B. BATES, JR.[2]

SYNOPSIS: Are the Nematodes *Syngamus trachea* and *Syngamus merulae* Synonymous? *Proc. Iowa Acad. Sci.*, 79(2):90-91, 1972. Most criteria for differentiating species within the genus *Syngamus* have been found to be highly variable. Because of this high variability in morphological characteristics, some investigators feel that many of the species within the genus *Syngamus* are synonyms of *S. trachea*. Morphological and experimental studies were conducted to ascertain the taxonomic status of *S. merulae*. Both morphological and experimental data indicated that *S. merulae* should be maintained as a separate species.

INDEX DESCRIPTORS: *Syngamus trachea, Syngamus merulae.*

Syngamus trachea (Montagu, 1811) Siebold, 1836, and *Syngamus merulae* Baylis, 1926, are nematodes found in the trachea of avian hosts. In both of these species, the male remains permanently attached to the female by the copulatory bursa (Figures 1 and 2), hence the name *Syngamus* (Gr. syn = together; gamos = marriage).

S. trachea is very important economically because of the disease "gapes" which it causes in chickens, turkeys, and many game birds. Heavy infection by this gapeworm causes the host to gape for air (Figure 3) and may cause asphyxiation due to the blockage of the trachea.

Chapin (1925), Lewis (1928), and Madsen (1950) consider the criteria for differentiating species within the genus *Syngamus* to be highly variable. Ripple (1941) considered that gapeworms that he collected from robins were *S. trachea*. Goble and Kutz (1945) obtained one pair of gapeworms that Ripple had worked with and identified it, as well as those they have recovered from robins, as *S. merulae*. Madsen (1950) made *S. merulae* synonymous with *S. trachea*. Madsen's decision to place *S. merulae* in synonymy with *S. trachea* was based on finding *S. trachea* that lacked a cuticularized buccal rim in naturally infected hosts. The presence of a cuticularized buccal rim in *S. trachea* and its absence in *S. Merulae* was the criterion used by Goble and Kutz to separate these species.

Morphological and experimental studies were conducted to determine if *S. trachea* and *S. merulae* should be considered distinct species.

MATERIALS AND METHODS

Naturally infected common grackles (*Quiscalus quiscula*) and robins (*Turdus migratorius*) were the initial source of *S. trachea* and *S. merulae* respectively. Most of the hosts were collected at Iowa Lakeside Laboratory, Milford, Iowa.

Some gapeworms were fixed in hot glycerine-alcohol and mounted in glycerine jelly for morphological study, and others were sacrificed for eggs. These eggs were incubated according to Wehr (1937) and were then either fed to one-day-old chicks or mixed with earthworm-rearing media for subsequent exposure of earthworms (*Lumbricus terrestris*). Earthworms were exposed to 500-1,000 embryonated eggs for 10 days.

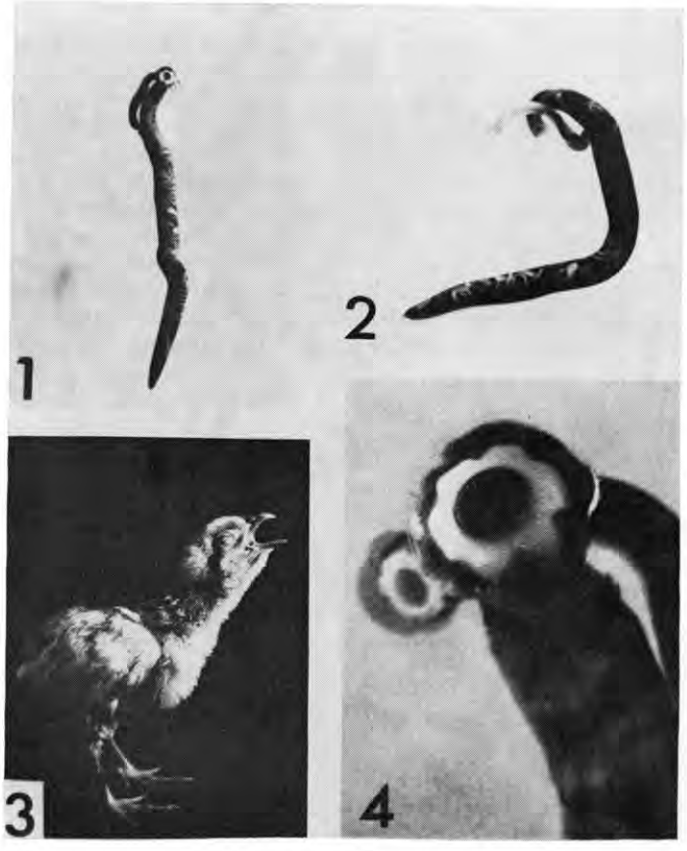

Plate I

Figure 1. Adult *S. trachea*, 27 days old, dissected from the trachea of a chicken fed juveniles when it was 1 day old. Approximately 5X.

Figure 2. *S. merulae* recovered from a naturally infected robin. Approximately 10X.

Figure 3. Chicken, 27 days old, showing typical symptoms of "gapes" disease. Chicken was fed *S. trachea* juveniles when 1 day old.

Figure 4. Anterior end of female *S. trachea*, showing cuticularized buccal rim and teeth. Anterior end of male at left. Approximately 65X.

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Twenty-four 1-day-old chicks were fed 151-450 *S. trachea* embryonated eggs and thirty 1-day-old chicks were fed earthworm pieces containing 151-450 *S. trachea* juveniles. The number of eggs ingested was determined by counting the number of eggs in a 0.5 cc water suspension of eggs and the number of juveniles ingested was estimated by making press preparations of pieces of earthworm body wall and counting the juveniles at 100X.

Forty 1-day-old chicks were fed 200-500 *S. merulae* embryonated eggs and seventy-six 1-day-old chicks were fed earthworm pieces containing 60-1,400 *S. merulae* juveniles.

S. trachea recovered from experimentally infected chicks 10, 12, 14, 16, 18, 20, 25, and 30 days post exposure were compared morphologically with *S. trachea* from natural infections and *S. merulae* from natural infections.

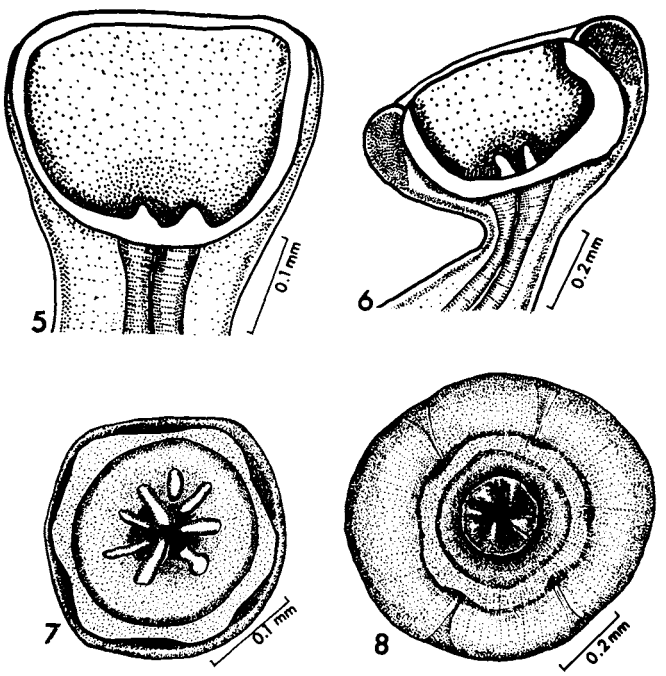

Plate II

Figure 5. *S. merulae,* buccal capsule, lateral aspect.

Figure 6. *S. trachea,* buccal capsule, lateral aspect. Note cuticularized buccal rim.

Figure 7. *S. merulae,* en face view of buccal region.

Figure 8. *S. trachea,* en face view of buccal region.

Results

All chicks fed *S. trachea* eggs and *S. trachea* juveniles developed infections averaging 6.1 pairs of worms for those fed eggs and 8.1 pairs of worms for those ingesting juveniles in earthworm pieces.

None of the chicks fed *S. merulae* eggs or juveniles developed infections.

A cuticularized buccal rim was not observed in *S. trachea* recovered 10 and 12 days post exposure, but was noted in *S. trachea* 14 days post exposure. All *S. trachea* recovered from naturally infected hosts possessed a cuticularized buccal rim (Figures 4, 6, and 8).

All *S. merulae* from robins lacked a cuticularized buccal rim (Figures 5 and 7).

Conclusions

Both morphological and experimental data provide compelling reasons for maintaining *S. merulae* as a separate species.

Acknowledgments

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