Mycoplasma Gallopavonis in Eastern Wild Turkeys

Authors: Luttrell, M. Page, Eleazer, Thomas H., and Kleven, Stanley H.

Source: Journal of Wildlife Diseases, 28(2) : 288-291

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-28.2.288

Journal of Wildlife Diseases, 28(2), 1992, pp. 288–291

Mycoplasma Gallopavonis in Eastern Wild Turkeys

M. Page Luttrell,[1] Thomas H. Eleazer,[2] and Stanley H. Kleven,[3] [1] Southeastern Cooperative Wildlife Disease Study, Department of Parasitology, College of Veterinary Medicine, The University of Georgia, Athens, Georgia 30602, USA; [2] Clemson University, Livestock Poultry Health Division, P.O. Box 102406, Columbia, South Carolina 29224, USA; [3] Poultry Disease Research Center, College of Veterinary Medicine, The University of Georgia, Athens, Georgia 30602, USA

ABSTRACT: Serum samples and tracheal cultures were collected from eastern wild turkeys (*Meleagris gallopavo sylvestris*) trapped for relocation in South Carolina (USA) during 1985 to 1990. Sera were tested for *Mycoplasma gallisepticum* and *M. synoviae* by the rapid plate agglutination and hemagglutination inhibition tests and were found to be negative. Tracheal cultures were negative for all pathogenic *Mycoplasma* spp., including *M. gallisepticum*, *M. synoviae*, *M. meleagridis*, and *M. iowae*. However, *M. gallopavonis* was isolated from every group of wild turkeys tested in 1986 to 1990. These data suggest that *M. gallopavonis*, which is generally considered nonpathogenic, may be a common microorganism in eastern wild turkeys.

Key words: *Mycoplasma gallopavonis*, *Mycoplasma* spp., wild turkey, *Meleagris gallopavo*, survey, prevalence.

Recent attention concerning the occurrence of *Mycoplasma* spp. in wild turkeys (*Meleagris gallopavo*) has focused primarily on pathogenic species, particularly *Mycoplasma gallisepticum*. For example, use of the rapid plate agglutination test (RPA) to screen for *M. gallisepticum* has been recommended as an important precautionary measure for wild turkey restoration programs in the United States (Wildlife Disease Association, 1985). Since the first report of *Mycoplasma* species in wild turkeys by Trainer (1973), attempts to identify these organisms have concentrated on detection of known pathogenic species, and many isolates of *Mycoplasma* sp. have not been identified.

Currently, four species of *Mycoplasma* are considered pathogenic for turkeys: *M. gallisepticum*, *M. synoviae*, *M. meleagridis* (Jordan, 1979), and *M. iowae* (Bradbury and McCarthy, 1983; Bradbury et al., 1988). Other species, considered nonpathogenic, have been isolated from dead turkey embryos (Rhoades, 1981a) and are known to cause mild airsacculitis in turkey poults (Dierks et al., 1967). However, a general lack of information on these nonpathogenic species of *Mycoplasma* and their potential pathogenicity in domestic fowl is acknowledged (Rhoades, 1981a). Strain variability, stress, environmental conditions, and other microorganisms may interact with these species of *Mycoplasma* to create conditions favorable for disease (Jordan, 1979).

A *Mycoplasma* sp. considered nonpathogenic and found only in turkeys is *M. gallopavonis*. This organism was first identified by Roberts (1963) from a culture of air sac lesions in domestic turkeys. When this isolate was experimentally inoculated into the air sacs and sinuses of domestic turkeys, it produced moderate air sac lesions in some birds but no sinusitis (Roberts, 1963). Wise et al. (1970) experimentally infected chickens and turkeys with the same isolate but found no signs of clinical disease nor any significant pathogenicity. After its initial discovery, *M. gallopavonis* was classified as serotype F and described as a nonpathogenic species of *Mycoplasma* (Yoder and Hofstad, 1964; Dierks et al., 1967).

Pathogenic species of *Mycoplasma* rarely have been reported in wild turkeys, but there is increasing interest in the apparently common occurrence of *M. gallopavonis*. *Mycoplasma gallopavonis* in wild turkeys was first reported by Rocke and Yuill (1987) during a disease survey of Rio Grande wild turkeys (*M. gallopavo gallopavo*) in Texas. No evidence of disease due to the presence of this organism was noted in adult wild turkeys, but *M. gallopavonis* isolates were lethal when in-

jected into embryos of domestic chickens and turkeys (Rocke, 1985). Luttrell et al. (1991) later reported a high prevalence of *M. gallopavonis* in a healthy population of wild turkeys (*M. gallopavo silvestris*) on Cumberland Island, Georgia (USA).

This report presents data on *Mycoplasma* spp. isolations from eastern wild turkeys in South Carolina from 1985 through 1990. Birds were captured via cannon netting in 17 piedmont and coastal plain counties for relocation within the state by the South Carolina Wildlife and Marine Resources Department during January to March of each year. A 3-ml sample of blood was collected from the wing vein of each bird. After samples were allowed to clot at 25 C, serum was removed and refrigerated until testing. Tracheal swabs were obtained from all birds and placed into 2.5 ml Frey's medium (GIBCO Laboratory, Grand Island, New York, USA) with 12% swine serum (FMS) (Yoder, 1980). All samples were sent to the Poultry Disease Research Center (PDRC) (College of Veterinary Medicine, The University of Georgia, Athens, Georgia 30602, USA) for analysis.

Sera were tested for *M. gallisepticum* and *M. synoviae* using both the RPA and hemagglutination inhibition (HI) tests with laboratory-prepared antigens from PDRC. If enough serum was available, the RPA and HI tests also were performed for *M. meleagridis*. Tests were interpreted as described in Avakian et al. (1988).

Tracheal cultures were incubated at 37 C for 2 wk or until a phenol red-indicated color change, then streaked onto FMS agar. After incubation at 37 C for 5 to 7 days, agar plates were checked for growth, and colonies were identified using a direct fluorescent antibody (FA) technique (Baas and Jasper, 1972). Every culture showing growth of *Mycoplasma* sp. was checked for *M. gallisepticum*. Once a culture was demonstrated to be negative for this organism, attempts for further identification were made on isolates from a subsample of randomly selected individuals representing each group of turkeys. Additional FA conjugates used in testing each group of turkeys included *M. synoviae*, *M. meleagridis*, *M. iowae*, *M. pullorum*, *M. gallinaceum*, *M. gallopavonis*, *M. gallinarum*, *M. iners*, *M. cloacale*, and *Acholeplasma laidlawii*.

All turkeys tested negative serologically for *M. gallisepticum*, *M. synoviae*, and *M. meleagridis*, and cultures tested for these organisms were likewise negative. However, *M. gallopavonis* was identified from every group of wild turkeys from 1986 through 1990 (Table 1). Although a complete identification was not attempted for every isolate because of economic and time constraints, subsampling procedures disclosed that 173 of 177 (98%) turkeys tested positive for *M. gallopavonis*. Because *M. gallopavonis* was isolated at some time from turkeys at every location and was present in most of the turkeys subsampled, those turkeys not tested specifically for *M. gallopavonis*, but which harbored *Mycoplasma* sp., were believed to have been infected with *M. gallopavonis*. The infrequent identifications of *M. gallopavonis* in 1985 may have been due to a faulty FA conjugate (Talkington and Kleven, 1984) coupled with an initial lack of awareness concerning the prevalence of *M. gallopavonis*.

The occurrence of unidentified isolates in 1985, 1987 and 1989 indicates that other species of *Mycoplasma* may have been present in these turkeys. These unidentified *Mycoplasma* spp. may have been overgrown by *M. gallopavonis*, making FA staining incomplete, or they may be undescribed organisms.

These data suggest that *M. gallopavonis* is a common tracheal microorganism of free-ranging eastern wild turkeys. Although more information is needed to precisely assess the importance of *M. gallopavonis* to the health of wild turkeys, absence of apparent disease among wild populations infected with this organism suggests that *M. gallopavonis* has little impact on wild turkeys. The lack of reports of pathogenicity in domestic poultry fur-

TABLE 1. Prevalence of *Mycoplasma gallopavonis* in wild turkeys from 17 counties in South Carolina from 1985 through 1990.

Year	County	Number of *Mycoplasma* spp. isolations/ number birds tested	Number positive/ number tested for *M. gallopavonis*
1985	Aiken, Bamberg, Berkeley, Chester, Edgefield, Fairfield, Saluda, Union	56/94	2/4[a,b]
1986	Colleton, Jasper, McCormick	16/16	16/16
1987	Aiken, Berkeley, Chester, Fairfield, Jasper, Laurens, Newberry, Union	106/106	102/102[b]
1988	Allendale, Chester, Edgefield, Fairfield, Jasper, McCormick	112/114	19/19
1989	Allendale, Edgefield, Fairfield, Florence, Hampton, McCormick, Union	85/87	27/29[b]
1990	Allendale, Fairfield, Georgetown, Newberry, Union	26/40	7/7
	Total	401/457	173/177

[a] Isolates of *M. gallopavonis* were from Bamberg and Saluda counties.
[b] Some cultures contained unidentified *Mycoplasma* species.

ther substantiates its status as a nonpathogenic organism. However, wildlife biologists should be aware that synergistic effects can occur between nonpathogenic species of *Mycoplasma* and bacteria or viruses (Bradbury, 1984; Rhoades, 1981b). The interaction of *M. gallopavonis* with other microbial agents has not been studied.

The prevalence of *M. gallopavonis* is important to consider when screening wild turkeys for pathogenic species of *Mycoplasma*. The more rapid and vigorous growth of *M. gallopavonis* may hamper attempts to isolate pathogenic species of *Mycoplasma*, such as *M. gallisepticum* and *M. synoviae*, which are more slowly growing and fastidious. If serology or clinical signs indicate the possibility of infection with pathogenic *Mycoplasma* sp., addition of *M. gallopavonis* antisera to culture media may inhibit cultural competition. In the future, efforts should be made to identify isolates of *Mycoplasma* spp. from wild turkeys in the United States to help determine prevalence and potential impact of these microorganisms on wild turkey populations.

This work was supported by funds from the Veterinary Medical Experiment Station, The University of Georgia; the Federal Aid in Wildlife Restoration Act (50 Stat. 917); and by funds administered through Contract Number 14-16-0004-89-912, Fish and Wildlife Service, U.S. Department of the Interior. The authors wish to thank D. Baumann with the South Carolina Wildlife and Marine Resources Department for directing the field work, and B. Hall, P. Gibbs, and P. Smith at the Poultry Disease Research Center for their technical assistance.

LITERATURE CITED

AVAKIAN, A. P., S. H. KLEVEN, AND J. R. GLISSON. 1988. Evaluation of the specificity and sensitivity of two commercial enzyme-linked immunosorbent assay kits, the serum plate agglutination test, and the hemagglutination-inhibition test for antibodies formed in response to *Mycoplasma gallisepticum*. Avian Diseases 32: 262–272.

BAAS, E. J., AND D. E. JASPER. 1972. Agar block technique for identification of mycoplasmas by use of fluorescent antibody. Applied Microbiology 23: 1097–1100.

BRADBURY, J. M. 1984. Avian mycoplasma infections: Prototype of mixed infections with my-

coplasmas, bacteria, and viruses. Annales de Microbiologie 135A: 83–89.

———, AND J. D. MCCARTHY. 1983. Pathogenicity of *Mycoplasma iowae* for chick embryos. Avian Pathology 12: 483–496.

———, A. IDERIS, AND T. T. OO. 1988. *Mycoplasma iowae* infection in young turkeys. Avian Pathology 17: 149–171.

DIERKS, R. E., J. A. NEWMAN, AND B. S. POMEROY. 1967. Characterization of avian mycoplasma. Annals of the New York Academy of Science 143: 170–189.

JORDAN, F. T. W. 1979. Avian mycoplasmas. *In* The mycoplasmas, Vol. II, Human and animal mycoplasmas, J. G. Tully and R. F. Whitcomb (eds.). Academic Press, New York, pp. 1–40.

LUTTRELL, M. P., S. H. KLEVEN, AND W. R. DAVIDSON. 1991. An investigation of the persistence of *Mycoplasma gallisepticum* in an eastern population of wild turkeys. Journal of Wildlife Diseases 27: 74–80.

RHOADES, K. R. 1981a. Pathogenicity of strains of the IJKNQR group of avian mycoplasmas for turkey embryos and poults. Avian Diseases 25: 104–111.

———. 1981b. Turkey airsacculitis: Effect of mixed mycoplasmal infections. Avian Diseases 25: 131–135.

ROBERTS, D. H. 1963. The isolation of a previously unreported avian *Mycoplasma* serotype and some observations on the incidence of *Mycoplasma* in poultry. The Veterinary Record 75: 665–667.

ROCKE, T. E. 1985. Mycoplasmosis in wild turkeys. Ph.D. Dissertation, University of Wisconsin, Madison, Wisconsin, 107 pp.

———, AND T. M. YUILL. 1987. Microbial infections in a declining wild turkey population in Texas. Journal of Wildlife Management 51: 778–782.

TALKINGTON, F. D., AND S. H. KLEVEN. 1984. Additional information on the classification of avian mycoplasma serotypes. Avian Diseases 28: 278–279.

TRAINER, D. O. 1973. Some diseases of wild turkeys from Texas and Wisconsin. *In* Wild turkey management, G. C. Sanderson and H. C. Schultz, (eds.). University of Missouri Press, Columbia, Missouri, pp. 160–173.

WILDLIFE DISEASE ASSOCIATION. 1985. Advisory statement on disease monitoring in wild turkeys. Wildlife Disease Newsletter (Supplement, Journal of Wildlife Diseases) 21: 1–3.

WISE, D. R., J. R. FULLER, AND M. K. BOLDERO. 1970. The role of mycoplasma WR1 as a primary pathogen of poultry. The Veterinary Record 87: 505–506.

YODER, H. S., JR. 1980. Mycoplasmosis. *In* Isolation and identification of avian pathogens, 2nd ed., S. B. Hitchner, C. H. Domermuth, G. Purchase, and J. E. Williams (eds.). The American Association of Avian Pathologists, College Station, Texas, pp. 40–42.

———, AND M. S. HOFSTAD. 1964. Characterization of avian mycoplasma. Avian Diseases 8: 481–512.

Received for publication 1 June 1990.