

Quail Bronchitis 1

Author: DuBOSE, R. T.

Source: Bulletin of the Wildlife Disease Association, 3(1) : 10-13

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-3.1.10>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

17. McKEEVER, S., G. W. GORMAN, J. F. CHAPMAN, M. M. GALTON, and D. K. POWERS. 1958. Incidence of leptospirosis in wild mammals from southwestern Georgia, with a report of new hosts for six serotypes of leptospire. *Rep. Amer. J. of Trop. Med. and Hyg.*, 7 (6): 646-655.
18. McKEEVER, S., J. H. SCHUBERT, G. W. GORMAN, and R. D. GRIMES. 1959. Comparison of bacteriological and serological techniques for detection of leptospirosis in wild mammals. *Amer. Jour. Vet. Res.* 20 (74): 192-197.
19. PAVLOVSKI, E. N. 1944. Natural focal localization of human transmissible diseases and the concept of landscape as an epidemiological factor. *Med. Parasitol. Moscow.* 13 (6): 29-38. (Abstracted in *Trop. Dis. Bull.* 1946, 43 (1): 65-66).
20. PAVLOVSKI, E. N. 1946. On the theory of natural foci of diseases transmissible to man. *J. Gen. Biol. Moscow.* 7 (1): 3-33.
21. ROTH, E. E., and B. B. KNIERIEM. 1958. The natural occurrence of *Leptospira pomona* in an opossum - A preliminary report. *J. of Am. Vet. Med. Assoc.* 132 (3): 97-98.
22. ROTH, E. E., W. V. ADAMS, G. E. SANFORD, BETTY GREER and PATRICIA MAYEUX. 1961. Leptospirosis in wildlife and domestic animals in the United States. *Trans. of 26th No. Am. Wildlife and Nat. Con.* pp. 212-219.
23. ROTH, E. E., W. V. ADAMS, and DONNA LINDER. 1963a. Isolation of *Leptospira canicola* from skunks in Louisiana. *Publ. Hlth. Re.*, 76 (4): 335-340.
24. ROTH, E. E., W. V. ADAMS, G. E. SANFORD, MARY MOORE, KAY NEWMAN, and BETTY GREER. 1963b. Leptospiruria in striped skunks. *Pub. Hlth. Re. (Wash.)* 78 (11): 994-1000.
25. SANDERSON, G. C. 1961. Estimating opossum populations by marking young. *J. Wildl. Mgt.* 25 (1): 20-27.

Quail Bronchitis¹

R. T. DuBOSE

*Department of Veterinary Science, Virginia Polytechnic Institute,
Blacksburg, Virginia*

Received for publication 28 August, 1966

ABSTRACT

Quail bronchitis is an acute, contagious, respiratory disease of bobwhite quail. Tracheal rales, coughing, sneezing and mortality over 50 per cent is often observed in young infected birds. Quail bronchitis virus infects chickens and turkeys with no signs of disease. A similar agent, called chicken embryo lethal orphan virus, has been isolated from embryonating chicken eggs. Quail experimentally infected with chicken embryo lethal orphan virus have developed bronchitis. Airborne, mechanical and contact transmission of quail bronchitis virus is suspected. Diagnosis is based on signs, lesions of the respiratory system, and isolation and serological identification of the virus. No specific treatment is known. Additional research on this disease, both as it affects captive quail and the wild or released quail, is needed.

INTRODUCTION

Quail bronchitis is an acute, highly contagious, respiratory disease of bobwhite quail (*Colinus virginianus*, Linne). Mortality due to this disease can approach 100% in captive quail chicks. Quail bronchitis was first described by Olson¹⁰ from an epornitic on a game farm in West Virginia in 1949. He iso-

lated the causative agent, identified it as a virus and reproduced the disease in quail. Epornitics on game bird farms in Texas, one in 1956 and 4 in 1957, were reported by DuBose, Grumbles and Flowers^{4 5}. DuBose (unpublished evidence) also diagnosed an epornitic in Virginia in 1959. That prior occurrences in the U. S. were observed, possibly as

¹ Presented at the Annual Meeting of the Wildlife Disease Association, Univ. of Md., College Park, 14-19 August, 1966.

early as 1933, is indicated in personal communications cited by Olson¹⁰. Since 1959, diagnosis of quail bronchitis in a number of states has not been rare. The incidence and effect of this disease on the wild bobwhite quail population is not known, but it has caused great economic loss on some game bird farms. Published information on quail bronchitis was reviewed by Hofstad⁸. The present report is based on information from the literature, on diagnostic laboratory records in Texas and Virginia, and on the author's observations.

SIGNS

Characteristic signs in naturally-infected young quail are tracheal rales, coughing and sneezing^{4 10}. Birds experimentally inoculated or exposed by contact with infected cagemates also have shown conjunctivitis and swelling of the infra-orbital sinus³. Nasal discharge usually is not observed, but congestion of the nasal passages may cause oral respiration or a bellowing in and out of the skin over the infraorbital sinus. Neural signs - bending of the neck, turning flips or falling over - occasionally occur in a few birds of a group. Depressed attitudes, ruffled feathers and huddling as if chilled may also be seen. In natural epornitics, mortality in quail chicks under 4 weeks of age has ranged from 10 per cent to 96 per cent, but usually is over 50 per cent. Mortality and severity of signs apparently is markedly less in older quail. The negligible mortality in experimentally-infected quail¹⁰, even in those less than a week of age³, has not been explained.

ETIOLOGY

Quail bronchitis virus (QBV) is filterable^{4 10} and multiplies in chicken embryos inoculated via the allantoic sac^{3 4 10}. The embryos become curled and stunted. The amnionic sac thickens and becomes tightly wrapped around the embryo^{4 10}. Necrotic foci may appear in the liver¹⁰ and urates may accumulate in

the mesonephros^{4 10}. In chicken embryos, mortality rate and rapidity of deaths increases with serial passage^{4 10}.

In 1957, Yates and Fry¹² reported isolation of an endogenous virus from embryonating chicken eggs, described it as chicken embryo lethal orphan virus (CELO) and demonstrated its similarity to QBV in serological characteristics and in the lesions and death pattern induced in chicken embryos. Their studies on serum collected from many states indicated a widespread occurrence of CELO infection of commercial poultry in the U.S. DuBose and Grumbles³ confirmed the similarities between QBV and CELO virus and reproduced bronchitis in quail by inoculation and by exposure to infected cagemates with either agent. They also isolated a virus indistinguishable from QBV or CELO virus from uninoculated embryonating chicken eggs³. In their effect on the chicken embryo, QBV and CELO virus have not been differentiated from each other nor from infectious bronchitis virus of chickens. They have been differentiated from infectious bronchitis virus, however, by their greater heat stability⁵ and by serological differences^{4 5 12}. Neither QBV nor CELO virus has been shown to cause disease in species other than the bobwhite quail, but asymptomatic or latent infections have been demonstrated in chickens and turkeys^{3 10 12}. On the other hand, infectious bronchitis virus has been isolated only from the chicken⁹. Both QBV and CELO are classified as avian adenoviruses and infectious bronchitis is classified as a possible myxovirus¹¹.

In this report, the term *quail bronchitis virus* is applied to the agents initially isolated from bobwhite quail and the term *chicken embryo lethal orphan virus* to the agents isolated from either chicken embryos or from avian species other than quail.

TRANSMISSION AND IMMUNITY

Specific information on the mode of transmission in field epornitics is

limited. In the epornitic reported by Olson¹⁰ and in 2 of the 6 epornitics investigated by DuBose^{4, 5}, the flock owners reported that "colds" occurred in their adult quail a year prior to onset of bronchitis in their young quail. Chukar partridges, pheasants, and Coturnix or "Japanese" quail were on the premises in 4 of the 7 outbreaks, but showed no signs of disease. A week or two before onset of the disease, chickens from a neighboring flock wandered onto one farm and pheasants were placed with the quail on another. The possibility that avian species other than quail act as reservoirs of infection or as latent carriers should not be disregarded. In the epornitic reported by Olson¹⁰, new brooders were used in the season during which young quail first showed bronchitis, and were about 150 feet from the breeding pens. DuBose⁴ found hatching and brooding houses containing infected young birds within 225 feet of and down-wind from adult birds. Until evidence to the contrary is produced, airborne transmission should be considered possible. Resistance of QBV to heat⁵ lends some support for assuming that mechanical transmission is possible. Contact transmission from inoculated quail to uninoculated cagemates has been demonstrated^{3, 10}.

Extended trials on duration of immunity have not been reported. Quail that survived artificial inoculation resisted challenge 2 months later¹⁰. Adult quail that survived a natural outbreak as chicks, were resistant to challenge with QBV at least 6 months later⁴. Adult quail that exhibited "colds" the previous year, did not develop bronchitis at the time they were adjacent to young quail which had the disease⁴.

DIAGNOSIS

A provisional diagnosis of quail bronchitis may be based on speed of onset, signs, lesions, mortality, a known possible exposure and incubation period, and on absence of evidence pointing to other causes. In young quail, a sudden onset,

rapid spread of tracheal rales, sneezing and coughing, and a high mortality is characteristic. Spread may be slower and signs less severe in older birds. Necropsies should reveal mucus in the trachea or air sacs and cloudiness of air sacs in some quail^{3, 4, 10}. An incubation period of 2 to 7 days and a course of 1 to 3 weeks may be expected^{3, 10}. Unfortunately, Newcastle disease might present portions of the above picture and either Newcastle disease virus or quail bronchitis virus might cause signs of nerve disorders in a few birds.

A conclusive diagnosis is based on isolation of the virus in chicken embryos and its identification. The isolation method described for infectious bronchitis virus^{2, 9} has been used with good results^{3, 4, 10}. Infectious material for embryo inoculation may be obtained from aqueous humor^{3, 11}, tracheas, air sacs or lungs of infected birds^{3, 4, 10}. The presence of Newcastle disease virus in inoculated embryos is indicated by early deaths of the embryos, often in the first passage, and by agglutination of chicken red blood cells by virus from the allantoic fluid¹. The presence of QBV is indicated by later deaths and by curling and stunting of the embryos and thickening of the amnionic membrane, usually within the first 3 serial passages. QBV will not agglutinate chicken red blood cells.

Identification of the isolated virus is provided by neutralization of its infectivity for chicken embryos with specific antiserum. Further evidence, such as neutralization of a proved strain of QBV by serum collected from convalescent or recovered quail, would indicate their previous infection with QBV. Eggs from CELO- or QBV-free chicken flocks are preferable for virus isolations and neutralization tests.

TREATMENT AND PREVENTION

No specific treatment has been reported for quail bronchitis. Supportive treatment similar to that described by Hofstad⁹ for infectious bronchitis of

chickens, such as increased warmth, adequate ventilation without drafts, and ample feeder and water space, was recommended by diagnosticians in the Texas and Virginia epornitics. Broad spectrum antibiotics may ward off complicating secondary infections.

At present, prevention is based on keeping susceptible birds from being exposed to either quail bronchitis virus or CELO virus. Strict isolation of the flock from outside sources of infection and isolation of one age group from another is needed. Raising bobwhite quail on the same premises with other species should be avoided. Other effective management practices which emphasize disease prevention have been described by Hinshaw⁷. Because little is known about the incidence of this disease in wild quail, efforts should be made to prevent free-

living birds from coming in proximity to captive quail.

ECONOMIC SIGNIFICANCE

In the United States, the availability of the wild, self-propagating bobwhite quail population for hunting is being decreased by the consolidation of small, diversified farms into larger, mechanized, clean-tilled farms and by the rapid spread of suburban housing into quail-populated areas. The current trend is toward raising bobwhites on game bird farms for release on paid shooting preserves. As the number, size and proximity to each other of such farms goes up, so does the potential danger from quail bronchitis. Additional research on this disease, both as it affects the captive quail and the wild or released quail, is needed.

LITERATURE CITED

1. BRANDLY, C. A., and R. P. HANSON. 1965. Newcastle disease. Chapter 22 in Biester and Schwarte, *Diseases of Poultry*. 5th. ed., Iowa State College Press, Ames.
2. CUNNINGHAM, C. H. 1963. *A Laboratory Guide in Virology*. 5th ed., Burgess Publishing Co., Minneapolis, Minn.
3. DuBOSE, R. T., and L. C. GRUMBLES. 1959. The relationship between quail bronchitis virus and chicken embryo lethal orphan virus. *Avian Dis.* 3, 321-344.
4. DuBOSE, R. T., GRUMBLES, L. C., and A. I. FLOWERS. 1958. The isolation of a nonbacterial agent from quail with a respiratory disease. *Pou. Sci.* 37, 654-658.
5. DuBOSE, R. T., GRUMBLES, L. C., and A. I. FLOWERS. 1960. Differentiation of quail bronchitis virus and infectious bronchitis virus by heat stability. *Am. J. Vet. Res.* 21, 740-743.
6. FLOWERS, A. I., GRUMBLES, L. C., and J. P. DELAPLANE. 1957. Isolation of infectious bronchitis from the aqueous humor of chickens. *Southwestern Vet.*, 10, 135-136.
7. HINSHAW, W. R. 1965. Principles of disease prevention. Chapter 5 in Biester and Schwarte, *Diseases of Poultry*. 5th ed., Iowa State College Press, Ames.
8. HOFSTAD, M. S. 1965. Quail bronchitis. In chapter 20 in Biester and Schwarte, *Diseases of Poultry*. 5th ed., Iowa State College Press, Ames.
9. HOFSTAD, M. S. 1965. Infectious bronchitis. Chapter 20 in Biester and Schwarte, *Diseases of Poultry*. 5th ed., Iowa State College Press, Ames.
10. OLSON, N. O. 1950. A respiratory disease (bronchitis) of quail caused by a virus. *Proc. U. S. Livestock San. Assoc.*, 54th Ann. Mtg., 171-174.
11. WILNER, B. I. 1965. Adenoviruses. In *A Classification of the Major Groups of Human and Other Animal Viruses*. 3rd. ed., Burgess Publishing Co., Minneapolis, Minn.
12. YATES, V. J., and D. E. FRY. 1957. Observations on a chicken embryo lethal orphan (CELO) virus. *Am. J. Vet. Res.* 18, 657-660.