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AN EPORNIC OF AVIAN POX IN WILD BOBWHITE QUAIL [□]

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Abstract: An outbreak of avian pox, with an estimated 12-fold increase in the incidence of infection, occurred among wild bobwhites (*Colinus virginianus*) in the southwestern Georgia/northcentral Florida region. The outbreak was first detected in July, 1978, and continued at least until March, 1979. During this period, 26 separate clinical case accessions involving 43 bobwhites from 8 counties in Florida and Georgia were diagnosed as avian pox. A survey of 2,586 bobwhites from 6 southeastern states revealed avian pox infections in 312 bobwhites from Florida, Georgia, North Carolina and Tennessee. Seventy-seven percent of the infected birds in the survey had only mild lesions on the legs and feet; however, 23% had more extensive lesions on the head. Severely affected birds had lesions around the eyes, nares, and in the mouth which impaired vision, respiration, and/or feeding. Infection rates were not related to age or sex of the birds but varied greatly among locales, even on adjoining properties. A morbidity rate of approximately 2% and a mortality rate between 0.6 and 1.2% were estimated for a 13,000 km² region in Georgia and Florida.

INTRODUCTION

Avian pox occurs sporadically in captive bobwhite quail (*Colinus virginianus*) and at times becomes a problem.^{1,5} In wild bobwhites, however, reports of disease due to avian pox are infrequent. In 1916, Gallagher² reported an outbreak of avian pox in a group of 400 wild-caught bobwhites imported from Mexico. His report provides the only detailed description of the disease in bobwhites. In 1931, Stoddard⁶ noted two individual bobwhites from Georgia and South Carolina clinically affected by avian pox. Stoddard further alluded to a low level of infection in wild bobwhites with his notation that pox-like lesions were present on the legs and feet of less than 2% of several thousand bobwhites from the southern Georgia/northern Florida region.

Similar to Stoddard's observations, we also have found a low level of avian pox in bobwhites in the Southeast. Between 1957 and 1977, only a single case of clinical disease due to avian pox in wild bobwhites had been submitted to our regional wildlife disease laboratory.³ Since 1969 we have monitored population trends, diseases, and parasites of wild bobwhites on Tall Timbers Research Station, Leon County, Florida, and have encountered mild, and apparently transient, pox lesions on the legs and feet of less than 1% of over 8,300 bobwhites examined.

This report describes an epornitic of avian pox in wild bobwhites in the southwestern Georgia/northcentral Florida region during 1978 and provides information on the occurrence of pox in bobwhites in other areas in the Southeast.

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MATERIALS AND METHODS

The first bobwhite with avian pox submitted to our laboratory during the outbreak was obtained from Thomas County, Georgia, during July, 1978. Additional sick, dead, or hunter-killed bobwhites were submitted for diagnostic purposes intermittently between October, 1978, and March, 1979. All cases originated from the southwestern Georgia/northcentral Florida region. Tentative diagnoses of avian pox were made on the basis of typical gross lesions and were confirmed by histologic demonstration of inclusion bodies and/or by virus isolation.

During studies at Tall Timbers Research Station in January and February, 1979, numerous bobwhites with pox lesions also were encountered, and it became obvious that an outbreak of avian pox was occurring in bobwhites throughout this region. Consequently, a survey was initiated in mid-February to determine the extent and severity of the outbreak. A memorandum was sent to wildlife biologists and landowners requesting assistance in collection of samples from hunters. Cooperators were asked to remove the head, unfeathered portions of the legs and feet, and one wing of bobwhites and to package, label, and freeze these samples from individual birds. Age and sex of birds sampled were ascertained by plumage characteristics,⁶ and pox infection was determined on the basis of gross lesions with histologic confirmation only of questionable lesions.

RESULTS

Twenty-six separate clinical case accessions involving 43 wild bobwhites were diagnosed as avian pox infection. The states and counties of origin and the number of birds were as follows: Georgia — Brooks Co. (2), Decatur Co. (4), Dougherty Co. (2), Grady Co. (4), and Thomas Co. (26); and Florida — Gadsden

Co. (2), Jefferson Co. (1), and Leon Co. (2). Lesions were confined to the unfeathered portions of the legs and feet, skin around the eyes and beak, and the oral and nasal cavities. Lesions on the legs consisted of circumscribed, raised hyperplastic nodules 1 to 5 mm in diameter. Removal of loosely attached scabs from leg lesions left smooth light colored scars. Lesions involving the eyes included proliferative nodules externally on the eyelids and hyperplasia of the palpebral conjunctiva. Secondary infections and inflammation were common with eye lesions. Occasionally, the eyelids were completely sealed by dried exudate. Severe eye involvement in two birds included unilateral masses 1 cm in diameter in the periorbital region. The nasal passages and infraorbital sinuses often were completely occluded by hyperplastic nodules. Oral lesions ranged from discrete hyperplastic nodules to extensive diphtheritic ulcers and were most common on the base of the tongue, pharynx and palate. Lesions on the pharynx and palate occasionally occluded respiratory orifices. Birds with severe eye and mouth lesions often were emaciated.

During the survey portion of the investigation, 2,586 bobwhites from 54 locations in 34 counties in 6 states were examined. The number of bobwhites examined per county and the number and percent infected are presented in Table 1. In addition to birds considered positive on the basis of active gross lesions, 37 (2.6%) birds had scars on the legs and feet suggestive of recent pox infection. The prevalence of infection in specific locales varied from 1 to 39% and often differed markedly over short distances. For example, bobwhites from two adjoining 200 ha study areas on Tall Timbers Research Station had infection rates of 1% (4 of 320) and 15% (47 of 324). Within the latter study area, infected birds were not randomly distributed but tended to originate from discrete foci. The prevalence of infection and distribution of lesions in 1,606 bobwhites of known age and sex

TABLE 1. The prevalence of avian pox in 2,586 wild bobwhites from various locations in southeastern states.

State County	Number of Quail Examined	Number of Quail Infected	Percent of Quail Infected
Florida			
Citrus	18	0	0
Jefferson	114	4	3.5
Leon	902	80	8.9
Osceola	3	0	0
Georgia			
Brooks	24	6	25.0
Decatur	308	40	13.0
Dougherty	493	56	11.4
Lee	6	0	0
Screven	34	13	38.2
Sumter	6	0	0
Thomas	413	88	21.3
Toombs	23	8	34.8
Truetlan	18	7	38.9
Washington	12	1	8.3
North Carolina			
Bladen	21	1	4.8
Chatham	4	0	0
Craven	4	0	0
Edgecombe	1	0	0
Green/Pitt	20	1	5.0
Halifax	2	0	0
Jones	8	0	0
Lenoir	53	5	9.4
Northhampton	32	2	6.3
Richmond	6	0	0
Robeson	15	0	0
Scotland	3	0	0
South Carolina			
Hampton	23	0	0
Marlboro	3	0	0
Tennessee			
Fayette	6	1	16.7
Henderson	9	0	0
West Virginia			
Mason	4	0	0
Total	2586	312	12.1

from pox-positive populations are presented in Table 2. The frequency of head lesions did not differ significantly ($X^2_{0.95} = 3.841$; $df = 1$) in various

segments of the population, although the higher frequency of head lesions in immature bobwhites approached the level of significance ($X^2 = 3.820$; $df = 1$).

TABLE 2. Frequency and location of avian pox lesions on 1,606 wild bobwhites segregated by age and sex.

	Immature Males		Immature Females		Adult Males		Adult Females		Total	
	Head	Legs	Head	Legs	Head	Legs	Head	Legs	Head	Legs
Number Infected/ Number Examined*	26/629	71/629	23/632	70/632	5/206	23/206	1/139	19/139	55/1606	183/1606
Percent Infected	4.1%	11.3%	3.6%	11.1%	2.4%	11.2%	0.7%	13.7%	3.4%	11.4%
Percent Infected With Head Lesions	26.8%		24.7%		17.9%		5.0%		23.1%	

*The number given under head includes all birds with lesions on the head; the number given under legs includes those birds with lesions on the legs only.

DISCUSSION

Lesions observed during this investigation were consistent with previous descriptions of avian pox in bobwhites^{2,6} and were similar to lesions in domestic poultry.¹ The majority of infected birds had lesions that were not debilitating. A similar frequency and severity of lesions among the various age and sex categories suggested that all segments of the population were equally susceptible to infection.

If data acquired previously on Tall Timbers Research Station are representative of the usual status of avian pox in wild bobwhites in the southwest Georgia/northcentral Florida region, there was an approximate 12-fold increase in the incidence of avian pox in bobwhites in this area during the outbreak. This increase in the incidence of infection appeared to be accompanied by an increase in pathogenicity. Insufficient data were available to determine with certainty if the incidence of pox infection was higher than usual in bobwhites from other areas of the Southeast; however, the detection of prevalences of infection of 5 to 39% in bobwhites from some areas, along with debilitating lesions in some birds, suggests that there was a general increase of avian pox in bobwhites throughout much of the Southeast.

An attempt was made to evaluate the impact of the epornitic on bobwhite populations in an approximately 13,000 ha region in southwestern Georgia/northcentral Florida (i.e., Decatur, Dougherty, Thomas, and Brooks counties, Georgia; Leon and Jefferson counties, Florida). Excluding clinical case accessions, 274 of 2,254 (12.2%) bobwhites from this region had pox lesions, a rate of 122 birds per 1,000. Utilizing the 23.1% frequency of head lesions in infected birds (Table 2), it was calculated that 28 birds per 1,000 (2.8%) would be expected to have head lesions. Based on field and necropsy observations, an estimated 66% of all head

lesions caused some degree of debilitation. Incorporation of this factor (66%) yielded an estimated 18 moribund birds per 1,000, a morbidity rate of approximately 1.8%. Although more difficult to assess, it was estimated that between 33 and 66% of the moribund birds ultimately would have died due to infection, either directly (i.e., via starvation or suffocation) or indirectly (i.e., via increased susceptibility to predation). Mortality was thus estimated at 6 to 12 deaths per 1,000, a mortality rate of approximately 0.6 to 1.2%. The authors recognized that the above estimates of morbidity and mortality are somewhat speculative. However, even allowance for an error of 100% magnitude, which would project 36 moribund and 12 to 24 dead birds per 1,000, would not significantly alter the implications for bobwhite populations on a regional basis. These estimates are compatible with morbidity and mortality rates commonly associated with avian pox infection in domestic poultry.¹

Our annual monitoring of bobwhite populations at Tall Timbers Research Station provided additional indications of a low mortality rate. Census of bobwhite populations in November, 1978, and February, 1979, showed a substantial increase since a similar census in February, 1978, and did not reveal any detectable mortality between November, 1978, and February, 1979. Although on a local basis mortality may have been less or more than indicated above, variations probably were not extreme. In this regard, the larger number of clinical case accessions from Thomas County, Georgia, were due more to increased awareness of the problem and an emphasis on specimen collection than to an actual difference in severity of the outbreak. Thus, presently available data indicate that the impact of the epornitic on bobwhite populations was not extreme, although continued monitoring will be required to fully assess the long-term significance of avian pox for bobwhites in this region.

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