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ISOLATIONS OF *Salmonella* FROM WILD TURKEYS IN FLORIDA[1]

FRANKLIN H. WHITE,[2] DONALD J. FORRESTER[2] and LOVETT E. WILLIAMS, JR.[3]

Abstract: During a 10-year study, *Salmonella* spp. were isolated from 18 of 411 (4.4%) wild turkeys *(Meleagris gallopavo)* examined in Florida, including five juvenile birds, one only 10 days old. Ten serotypes were found, with *S. typhimurium* being most frequently isolated. This is the first reported isolation of *Salmonella* spp. from the wild turkey.

INTRODUCTION

In 1961, the wild turkey *(Meleagris gallopavo)* population in Florida was estimated to be more than 75,000, and by 1964 it was at 80,000, with an annual harvest of approximately 30,000 birds.[5] Since 1965 the population has declined, perhaps mainly due to human population and development pressures and overhunting. In addition, wildlife biologists in Florida have observed unexplained reductions in turkey populations in several wildlife management areas. A number of reports of infections due to viruses, helminths, and blood protozoans in wild turkeys have been recorded;[3] however, there is little information available on bacterial diseases in this species, except for serologic evidence of *Salmonella* infections in wild turkeys in Texas.[4,6]

This report summarizes the bacteriologic results of a 10-year study of wild turkeys in Florida during which *Salmonella* spp. were isolated.

MATERIALS AND METHODS

Bacteriologic examinations were conducted on 411 wild turkeys collected throughout Florida from September, 1969 through November, 1979 (Fig. 1). Most were adult birds, but 70 were juveniles 4 days to 5 months of age. The birds were available for bacteriologic culture as a result of their capture for various management and disease studies. Two-hundred and sixty-two turkeys were examined at necropsy, including 70 juveniles. Cloacal swabs were obtained from 149 birds that were subsequently released.

The study of juvenile wild turkeys was conducted during the hatching and post-hatching seasons of 1970 and 1971. Broods were located by means of radio transmitters attached to hens. Because of distances involved, and collection schedules, all specimens were frozen and held for from one to several weeks before culture, thus making them unsuitable for histologic studies, and limiting the value of gross examinations.

The livers from 262 turkeys were cultured on sheep blood agar plates, MacConkey's agar, and in cooked meat medium. In 12 cases the spleen and lungs also were cultured. Large intestinal contents, and cloacal swabs from the remainder of the birds were cultured on

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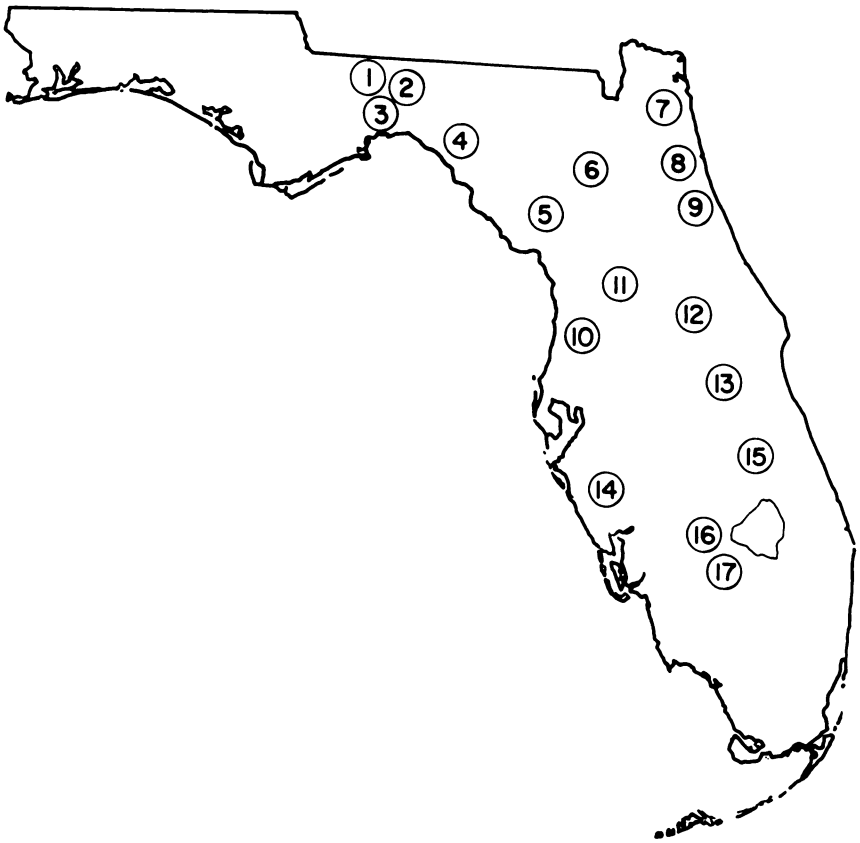


FIGURE 1. Collection sites for wild turkeys in Florida. Number of birds examined from each area are as follows: North Florida: 1. Gadsden Co., (n = 3); 2. Leon Co., (n = 2); 3. Wakulla Co., (n = 3); 4. Taylor Co., (n = 5); 5. Levy Co., (n = 2); 6. Alachua Co., (n = 40); 7. Duval Co., (n = 10); 8. St. Johns Co., (n = 1); 9. Flagler Co., (n = 4); 10. Pasco Co., (n = 1); 11. Sumter Co., (n = 2); 12. Orange Co., (n = 2). South Florida: 13. Osceola Co., (n = 36); 14. Sarasota Co., (n = 2); 15. Ockeechobee Co., (n = 1); 16. Glades Co., (n = 295); 17. Hendry Co., (n = 2).

MacConkey's agar and in Bacto-selenite enrichment broth.[1,2]

To survey for possible epizootiologic relationships between *Salmonella* in wild turkeys and in other free-ranging birds in Glades county, other species were captured in 1975 and examined for *Salmonella* spp. by the above methods. The intent was to see if common serotypes were present. These consisted of 20 rufous-sided towhees *(Pipilo erythrophthalmus)*, 25 common grackles *(Quiscalus quiscula)*, 42 common crows *(Corvus brachyrhynchos)*, 18 cardinals *(Richmondena cardinalis)*, 21 bluejays *(Cyanocitta cristata)*, 22 mourning doves *(Zenaida macroura)*, 21 red-winged blackbirds *(Agelaius phoeniceus)*, 21 ground doves *(Columbigallina passeriva)* and 5 bobwhites *(Colinus*

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virginianus). In addition, single fecal specimens were collected from 53 mixed-breed cattle on the same range.

All *Salmonella* isolates were serotyped by the Veterinary Diagnostic Laboratories, National Animal Disease Center, Ames, Iowa.

RESULTS AND DISCUSSION

A summary of all *Salmonella* spp. isolated from wild turkeys during this study, including juveniles and adults, is presented in Table 1. The overall isolation rate was 4.4%. Ten different serotypes were isolated, with *Salmonella typhimurium* most frequently found. The numbers of isolations of each serotype were as follows: *typhimurium* (4), *hartford* (2), *miami* (2), *rubislaw* (2), *newport* (2), *java* (2), *muenchen* (1), *manhattan* (1), *braenderup* (1), and *inverness* (1). The isolation rate in South Florida was 4.1% and in North Florida 5.2%.

From September, 1969 through 1970, *Salmonella* spp. were isolated from 3 of 171 (1.7%) adult wild turkeys examined, while in the hatching and post-hatching study during 1970, *Salmonella* spp. were isolated from the intestinal contents of 4 of 38 (10.5%) juvenile turkeys examined. On the other hand, during 1971 isolations were made from 5 of 39 (12.8%) adult wild turkeys examined, while an isolation was made from only 1 of 32 (3.1%) juveniles examined during 1971. The results of the 1970-71 juvenile study are given in Table 2.

From 1972 through 1979, five isolations were made from 131 (3.8%) adult turkeys examined, with one isolation from five (20%) examined during 1978 and 1979 (Table 1).

All *Salmonella* isolations from turkeys were made from the contents of the large intestine, except for an isolation from the liver and spleen as well as the intestine of one bird. This was the only isolation of extra-intestinal *Salmonella,* and could have resulted from post-mortem invasion. Since fresh tissues were not available for adequate pathologic examinations, we are limited to describing these *Salmonella* isolations as carrier-type infections only. However, these findings suggest that at least the potential for active salmonellosis in wild turkeys in Florida exists, *i.e.,* carrier birds and a comparatively large susceptible population.

In the survey of other birds and cattle on the same range with wild turkeys in Glades county, 4 of 9 avian species and cattle were found to be intestinal carriers of *Salmonella. Salmonella* spp. were isolated from the large intestinal contents of 2 of 20 (10.0%) rufous-sided towhees *(saint-paul, litchfield),* 2 of 25 (8.0%) common grackles *(hartford, litchfield),* 6 of 42 (14.3%) common crows *(miami, anatum, braenderup, hartford,*

TABLE 1. *Salmonella* Isolations from Wild Turkeys, 1969-1979.

Year	No. turkeys examined	Isolates	%
1969-70	209	7	3.3
1971	71	6	8.4
1972-74	45	0	0.0
1975	28	2	7.0
1976	8	0	0.0
1977	45	2	4.4
1978	3	1	33.3
1979	2	0	0.0
Totals	411	18	4.4

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TABLE 2. *Salmonella* Isolations from Juvenile Wild Turkeys, 1970-1971*

No. Examined	Age (Days)	Isolations No. (Age in Days)	Serotype Isolated
19	1-10	1 (10 days)	*S. manhatten*
25	11-50	0	—
2	51-60	1 (51 days)	*S. rubislaw*
4	61-90	0	—
8	91-100	1 (94 days)	*S. miami*
		1 (96 days)	*S. rubislaw*
2	101-110	1 (103 days)	*S. newport*
12	111-150	0	—

*5 isolations from 70 birds: 7.1%

muenchen, saint-paul), and 1 of 18 (5.5%) cardinals *(saint-paul).* Four of these serotypes *(hartford, miami, braenderup, muenchen)* also were isolated from wild turkeys on this range. *Salmonella* was not isolated from bluejays, mourning doves, red-winged blackbirds, ground doves, and bobwhites. *Salmonella* spp. were isolated from single fecal specimens from 4 of 53 (7.5%) cattle on this study area. These consisted of one *S. saint-paul* and 3 *S. litchfield,* neither of which were isolated from wild turkeys in the area.

The isolation of *Salmonella* spp. from the wild turkey has not been previously reported.

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