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## PREVALENCE OF *Bordetella bronchiseptica* IN CERTAIN WILD MAMMALS AND BIRDS IN CENTRAL IOWA

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**Abstract:** *Bordetella bronchiseptica* was isolated from 6 of 13 short-tailed shrews (*Blarina brevicauda*) and 1 of 47 house sparrows (*Passer domesticus*) trapped in the vicinity of a swine *Bordetella* rhinitis experimental area. The organism was found in four of 50 foxes (*Vulpes fulva*), 2 of 36 opossums (*Didelphis marsupialis*) and 1 of 37 raccoons (*Procyon lotor*) trapped in the Ames, Iowa area. This bacterium was not culturally isolated from 14 deer mice (*Peromyscus maniculatus*), 64 house mice (*Mus musculus*), 10 masked shrews (*Sorex cinereus*) and 54 starlings (*Sturnus vulgaris*).

### INTRODUCTION

*Bordetella* rhinitis is a chronic disease of swine caused by infection with *B. bronchiseptica*.<sup>2</sup> A previous study has indicated that *B. bronchiseptica* respiratory tract infection is widespread in the wildlife of Iowa.<sup>6</sup> The organism was isolated from the Norway rat (*Rattus norvegicus*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis marsupialis*), red fox (*Vulpes fulva*), raccoon (*Procyon lotor*) and feral domestic cat (*Felis catus*).<sup>6</sup> These results indicate that *B. bronchiseptica* can occur as a common infection in a local wild mammal population and may constitute a potential source of infection for swine. Conventional and germfree rats develop pneumonia from *B. bronchiseptica* infections.<sup>1</sup> They are generally quite resistant but a carrier state may develop. Swine inoculated with Norway rat, domestic cat and domestic rabbit (*Oryctolagus cuniculus*) isolates developed turbinate atrophy.<sup>3</sup>

A nasal swab culture procedure can be used to control *B. bronchiseptica* nasal infections in swine herds.<sup>4,5</sup> However, a discouraging aspect of developing such a *B. bronchiseptica* free herd is the possibility that the herd will become reinfected at a later date from some external source.

The purpose of this investigation was to sample the small mammal and bird population in the proximity of a swine research area infected with *B. bronchiseptica* to determine the possibility of a wild small mammal or bird reservoir for this organism. Additionally, red fox, opossum, raccoon and starlings trapped in the Ames, Iowa area were cultured to determine the potential role of wildlife vectors.

### MATERIALS AND METHODS

The study was conducted intermittently from October, 1973, to January, 1975. Twenty-five snap-type mouse traps were used in the immediate vicinity of the *Bordetella* rhinitis research unit housing *B. bronchiseptica* infected swine. The traps were placed at 20 meter intervals along fence rows adjacent to the swine housing area and in strategic spots around the swine unit itself. The birds were trapped using Havahart multicatch bird traps.<sup>7</sup> The red foxes, raccoons and opossums were live trapped with the aid of box traps and offset jaw, steel, leg hold traps. All house sparrows were trapped in the vicinity of the infected swine unit. The nasopharyngeal area of the captured small mammals and birds

<sup>7</sup> Havahart, P.O. Box 551, Ossining, New York 10562, USA.

was swabbed by the use of sterile cotton-tipped toothpicks. The raccoons, opossums and foxes were tracheal swabbed. The secretions obtained were streaked on a selective modified MacConkey agar medium.<sup>6</sup> Further identification of suspicious colonies was based on an alkaline reaction in dextrose broth, hydrolysis of urea within 4 to 12 hrs, utilization of citrate, and a positive hemagglutination reaction.

#### RESULTS

The results of the tracheal and nasopharyngeal swab culturing is presented in Table 1. *B. bronchiseptica* was isolated from 6 of 13 short-tailed shrews and 1 of 47 house sparrows. Four of 50 foxes, 2 of 36 opossums and 1 of 37 raccoons yielded this organism. Fourteen deer mice, 64 house mice, 10 masked shrews and 54 starlings were culture-negative.

TABLE 1. Prevalence of *Bordetella bronchiseptica* in Certain Wild Mammals and Birds in Central Iowa.

Species	Number Culture-Negative	Number Culture-Positive
Deer Mouse ( <i>Peromyscus maniculatus</i> )	14	0
House Mouse ( <i>Mus musculus</i> )	64	0
Short-tailed Shrew ( <i>Blarina brevicauda</i> )	7	6
Masked Shrew ( <i>Sorex cinereus</i> )	10	0
Raccoon ( <i>Procyon lotor</i> )	36	1
Opossum ( <i>Didelphis marsupialis</i> )	34	2
Red Fox ( <i>Vulpes fulva</i> )	46	4
House Sparrow ( <i>Passer domesticus</i> )	46	1
Starling ( <i>Sturnus vulgaris</i> )	54	0

#### DISCUSSION

Possible reinfection from uncontrollable external sources may make eradication of *B. bronchiseptica* from infected swine herds difficult to achieve. Many wild mammals, and in some cases birds, may carry *B. bronchiseptica* in their respiratory tracts. Investigations have shown many associations between infected rodents and disease in domestic animals.<sup>2</sup> The data accumulated in the present study indicates that among four species of small mammals inhabiting the same general area, at least one (short-tailed

shrew) was a reservoir for *B. bronchiseptica*. The rate of infection in this insectivorous mammal may be correlated with the finding that certain species of ants and flies may carry this organism.<sup>5</sup>

The single culture-positive sparrow harbored large numbers of *B. bronchiseptica*. Due to this species close association with animal housing, it may be a source of premises contamination.

The low prevalence of infection in the other wild species is in accordance with a previously published report.<sup>6</sup>

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