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## AVIAN CHOLERA IN COMMON CROWS, *Corvus brachyrhynchos*, FROM THE CENTRAL TEXAS PANHANDLE

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**Abstract:** An epornitic of avian cholera involving approximately 150 birds is described from a flock of common crows, *Corvus brachyrhynchos*, on a single playa lake utilized as a roost in Castro County, Texas, during early spring of 1980. There was a concomitant epornitic of avian cholera involving several hundred ducks and geese of several species on adjacent lakes in the same area. Crows scavenged extensively on waterfowl carcasses. Gross and histopathologic lesions in waterfowl were typical of acute avian cholera. Crows had a more chronic form of the disease, especially neurological involvement with the most common lesion consisting of a hemorrhagic meningitis. Other endemic species from which *Pasteurella multocida* was isolated included the short-eared owl, *Asio flammeus*, and cottontail rabbit, *Sylvilagus* sp. The role of crows in the dissemination and maintenance of avian cholera is discussed.

### INTRODUCTION

The Texas Panhandle and adjacent areas with the over 19,000 ephemeral shallow bodies of water regionally known as playa lakes are a major wintering ground for waterfowl. This region has long been recognized as a highly enzootic area for avian cholera<sup>2</sup> with substantial dieoffs occurring every year in late winter and early spring. In addition to the sizable duck and goose mortality observed in the central Texas Panhandle in 1979-80, the present paper reports a small epornitic of avian cholera in the common crow and documents the isolation of *Pasteurella multocida* in other bird and mammal species from the area.

### HISTORY

Mortality among common crows, *Corvus brachyrhynchos*, was noted on a dry wooded playa in western Castro County during pheasant census drives conducted 16 February 1980 on approximately 60 playa lakes in Castro and

Deaf Smith Counties, Texas. An estimated 300 to 500 birds were utilizing this area as a roost. On 29 February 1980, nine crows were collected from the playa including six recently dead and three moribund specimens. On 7 March 1980, a single sick crow was collected and 127 crow carcasses were counted. In addition, two house cats; one short-eared owl, *Asio flammeus*; three cottontail rabbits, *Sylvilagus* sp.; and two skunks, *Mephitis mephitis*, were found dead on the playa.

Concurrent with the crow epornitic, substantial waterfowl mortality was observed on adjacent wet playa basins. Mortality in snow geese, *Anser caerulescens*; Canada geese, *Branta canadensis*; pintails, *Anas acuta*; wigeon, *Anas americana*; blue-winged teal, *Anas discors*; green-winged teal, *Anas creca*; mallards, *Anas platyrhynchos*; and Franklin's gulls, *Larus pipixcan* was observed. On one closely adjacent playa, well over 200 waterfowl carcasses were noted. Flocks of common crows were observed scavenging fresh carcasses.

Numerous species of waterfowl, especially pintails, wigeon and Canada geese from the above playa showed signs of disease attributable to avian cholera. These included erratic and uncoordinated flight and weakness with reluctance or inability to undertake flight when approached. Occasionally, ducks were observed with their heads angled backward over the shoulder or moved forward in a prostrate position. These birds were in good flesh, the vent was unsoiled, the eyes were normal except for an occasional rapid blinking of the nictating membrane, and there was no oral or nasal discharge. Six apparently ill pintails with the above clinical signs, one cottontail rabbit which was lethargic and lame in the hindquarters and six apparently normal short-eared owls were collected in the vicinity of this playa.

#### MATERIALS AND METHODS

Blood from the four moribund and two of the recently dead common crows, six pintails, four short-eared owls, and one cottontail rabbit was cultured on chocolate blood agar plates or enriched growth media for isolation of *P. multocida*. Additionally, thin blood films were prepared for each of the above specimens.

Tissue from heart, lungs, kidney, and liver was fixed in 10% buffered formaldehyde solution. Four to 6  $\mu\text{m}$  sections were stained with hematoxylin and eosin. Blood films were stained with Giemsa and Gram stains.

#### RESULTS

*Pasteurella multocida* was isolated, usually in pure culture, from the heart blood of 6 of 6 common crows, 6 of 6 pintails, 3 of 4 short-eared owls, and 1 of 1 cottontail rabbit. Serotyping and animal inoculations were not attempted.

Living crows infected with *P. multocida* examined in this study appeared in good flesh, their vents were not soiled,

and there was no nasal or oral discharge. The consistent clinical signs were lethargy with inability or reluctance to fly and rapidly blinking nictating membranes indicating neurological involvement.

On necropsy, gross lesions were variable or absent. In some crows, there were hemorrhagic lesions in the lungs and petechial hemorrhages in the myocardium. The air sacs and pericardial sac sometimes contained a yellow fibrinous fluid. The heart, liver, spleen, intestine, and kidneys in some crows were edematous, and there was a pink ascitic fluid. The liver and spleen were mildly to severely hypertrophied, but there were no necrotic lesions. The most consistent lesion in all crows examined was a hemorrhagic meningitis sometimes accompanied by congestion of the vessels and/or edema of the brain.

Gross lesions in waterfowl were typical of those previously reported in acute avian cholera<sup>2</sup> with edema in most internal organs, a pink to straw-colored fluid in the abdominal cavity, air sacs, and pericardium, congested liver and spleen, petechial myocardial hemorrhages, gross distension of the vessels of the heart, and myocardial hypertrophy. The spleen and liver were congested and occasionally small white necrotic foci were present. Most abdominal vessels were engorged, especially those of the gizzard, large and small intestine, and kidneys.

No clinical signs or gross lesions were noted in the clinically normal short-eared owls collected from this playa. The single cottontail rabbit examined was lethargic, uncoordinated and dyspneic. Gross lesions were absent.

Histologic examination of infected crows and pintails revealed congestion and edema, small areas of focal necrosis, and an inflammatory response in most internal organs. Bacteria morphologically identical to *P. multocida* were observed in distended vessels. Stained blood films

did not reveal an overwhelming septicemia characteristic of acute cholera in waterfowl. Microscopic lesions were not observed in the short-eared owls or in the rabbit.

Although botulism is prevalent and causes substantial mortality in waterfowl in this area in late summer and early fall, the incidence seems to diminish sharply with the onset of winter and freezing temperatures. Laboratory confirmed cases using the mouse protection test and/or clinical signs of avian botulism such as paralysis of the flight and leg muscles, pasted eyelids, soiled vents with a foul-smelling yellowish discharge, and partial to complete paralysis of the cervical muscles (limberneck) were not observed in waterfowl from the area for over two months prior to the collection of the above hosts. Although sera from these hosts were not tested for botulism, the consistent gross and microscopic lesions and isolation of *P. multocida* from all sick birds were considered sufficient for the diagnosis of avian cholera as the cause of mortality.

#### DISCUSSION

This is the third confirmed outbreak of avian cholera in the common crow in North America. An epornitic involving about 3,000 crows in conjunction with a

waterfowl dieoff was reported in Nebraska in 1975.<sup>3</sup> A second dieoff involving approximately 650 crows from the same area was reported in 1979.<sup>1</sup> *Pasteurella multocida* has also been isolated from the common raven, *Corvus corax*, in Utah and the fish crow, *Corvus ossifragus*, in Florida.<sup>2</sup>

The occurrence of avian cholera in avian and mammalian species other than waterfowl indicates a potential reservoir for maintenance and transmission of this disease in highly enzootic areas. While the occurrence of avian cholera epornitics in species such as the common crow and various gulls usually is attributed to their scavenging on waterfowl which died of avian cholera, at least one epornitic of avian cholera in the crow has been observed to occur independently of a waterfowl dieoff.<sup>1</sup>

The present study substantiates the previous suggestion that crows in their scavenging of waterfowl carcasses during an avian cholera epornitic in the Central Flyway<sup>3</sup> may serve a similar role as gulls in the Pacific Flyway<sup>2</sup> in the transmission and spread of the disease. Certainly, the isolation of *P. multocida* from other apparently healthy avian and mammalian species, especially the short-eared owls which are common winter migrants in the Texas Panhandle, would bear further investigation.

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