SANDHILL CRANE MORTALITY AT CEDAR LAKE, TEXAS - AN OVERVIEW

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Abstract: An estimated 5,000 sandhill cranes (Grus canadensis) died from undetermined cause(s) at Cedar Lake and surrounding area in Gaines County, Texas, in January and February, 1985. At least 2,000 deaths occurred at Cedar Lake, a major roosting area used by an estimated 25,000 cranes. The balance of the mortality was distributed primarily between two feeding areas 4.5 km away. Dead cranes were picked up in cotton, peanut, and sorghum fields. No pathogenic bacteria or viruses were isolated from tissues and brain cholinesterase was not inhibited, ruling out most organophosphate pesticides and carbamates. Mycotoxins seem the most likely cause of this die-off and laboratory assays are continuing.

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Sandhill cranes traditionally migrate from their nesting grounds in the tundra and boreal forests of northern Canada, Alaska, and the Soviet Union each fall to western Texas. Thousands of cranes winter in western Texas roosting in shallow lakes and feeding in nearby harvested agricultural fields, grasslands, and pastures (Iverson et al. 1985). Cranes often arrive before harvesting is complete and can cause crop depredations. As a result of these depredations, a hunting season was implemented in the early 1960's.

The lesser sandhill crane (G. c. canadensis) is the predominate subspecies using the Gaines County area in western Texas, and Cedar Lake is a major roost site for these cranes.

Major outbreaks of infectious diseases have not been noted previously in this area, but local Texas Parks and Wildlife Game Wardens have reported annual losses of 100-300 sandhill cranes at Cedar lake for several years. Aflatoxicosis was believed to have been the cause of mortality of approximately 450 cranes at Cedar Lake in 1982 (National Wildlife Health Laboratory [NWHL] files). The source of the aflatoxin was not established. In other parts of southern United States many types of crops, including peanuts, corn, and sorghum are known to grow molds that produce aflatoxins (Edds 1973). Waterfowl losses from aflatoxicosis have been attributed to feeding on moldy peanuts (Robinson et al. 1982).

Peanut production has increased in portions of Gaines County in recent years and crane usage of these fields after harvest has increased accordingly. Time and method of harvest affects the percentage of peanuts that are not recovered; 20 to 30% may remain on the surface of the field.

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STUDY AREA

Cedar Lake is approximately 47 km southwest of Lubbock, Texas. It is 1.3 km wide and 2.5 km long. Less than 20% of the lake had standing water (2.5 to 10 cm) present during January and February, 1985 when this die-off occurred. The lake is highly alkaline and does not readily freeze; cranes used the mud flats for roosting where they were safe from predators. Cranes leave the lake each morning, dispersing up to 7 to 9 km to feed, and return each evening. Cranes roosting on the lake do not drink the highly alkaline water but stop at freshwater ponds or marshes to drink either enroute to the feeding area or on their return to the roost.

Mortality occurred primarily on two feeding areas approximately 4.5 km from Cedar Lake. Both feeding areas where cranes were observed dying had been irrigated by pivot irrigation systems but other fields used by cranes also had been irrigated. Crops consisted of peanuts and cotton, with the pivot turn corners planted in milo, black-eyed peas, and winter wheat. During the die-off, winter wheat was the only crop that was growing, the other crops had been harvested the previous fall.

METHODS

Areas where cranes were feeding were surveyed for carcasses by air and ground checks in late January and early February. Carcasses were collected for examination and to prevent further contamination of the area if an infectious disease was involved. All-terrain-vehicles were used to expedite carcass retrieval from the area. Nine sick cranes were caught by hand and blood samples and cloacal swabs were taken before euthanasia. These carcasses were then sent to NWHL for necropsy. An additional 12 cranes found dead were necropsied in the field and 14 others at NWHL. The remaining carcasses were incinerated in the field with a portable gas incinerator. An additional 18 cloacal swabs were taken on dead cranes for viral examination. Gizzards were removed from 120 cranes in the field for food and lead shot ingestion analyses.

Dead cranes on the mud flats at Cedar Lake could not be removed because of the deep mud. Carcasses accessible by foot through the deep mud were marked with red paint and the area checked periodically to detect new mortality.

RESULTS AND DISCUSSION

We estimate 900-1,000 sandhill cranes died on roost sites at Cedar Lake in late January and the first week of February, 1985. Additional losses of 1,200-1,500 were lost on shorelines and uplands immediately adjacent to the lake and in feeding areas. Texas Parks and Wildlife personnel stationed in the area estimate 2,500 more cranes died later in February making a total of approximately 5,000 sandhill cranes that succumbed during the die-off.

Sick and dead sandhill cranes were found in only two of the numerous feeding areas being used even though other areas contained similar crops. The two feeding areas were approximately 4.5 km west of the roost site and about 1.2 km from each other. At these two feeding areas, 474 carcasses were picked up in cotton fields, 156 in peanut fields, and 88 in milo, wheat, and soybean fields. Other feeding fields in the same vicinity were checked for sick and dead cranes, but less than six were found in any of the other fields.

Very few or no carcasses were found in other fields although the same crops mentioned above were being used by cranes. One harvested peanut field, for example, was being used by an estimated 12,000 birds and only 1 scavenged carcass was found. Similar findings occurred in other feeding areas although none of the others were observed to receive such heavy use. Mortality continued until the cranes migrated northward in late February and early March.

Sick cranes, if able to fly, could do so only with great difficulty. In flight, the birds were incapable of holding their necks horizontal and were observed flying with head, neck, and occasionally legs drooped perpendicular to the body axis. Affected cranes were uncoordinated and often landed with difficulty. Cranes incapable of flight would stand motionless with head drooped low to the ground; when approached, they were often unable to raise their head or neck.

Various lesions were noted at necropsy. The most predominant were submandibular edema, congested oral cavity, and hemorrhages in the lower intestinal tract. Kidneys from several birds were swollen and pale; hemorrhages were often observed in the breast musculature and upper muscles of the legs. Peanuts were present in about 95% of 120 gizzards examined from sick and dead cranes. None of the gizzards contained ingested lead shot. All birds examined were in good flesh indicating that a chronic disease process or poisoning was not the cause of the die-off.

Laboratory assays continue in an attempt to determine the cause of this die-off. The most likely etiology is a mycotoxin associated with ingestion of moldy peanuts. Aflatoxin, ochratoxin, and zearalenone, (the most common mycotoxins) have been eliminated from consideration. Pathogenic viruses or bacteria were not isolated nor was evidence of an infectious disease observed in microscopic examination of tissues. Organophosphate and carbamate pesticides frequently used in the area were also eliminated because brain cholinesterase was not inhibited. Arsenic, used as a defoliant in cotton production, was also eliminated by chemical analysis of crane tissues.

Additional analyses of tissues, gizzard content, and muscle for less common and newly discovered mycotoxins are being done at the USDA National Peanut Research Laboratory in Dawson, Georgia, and at the USDA's Mycotoxin Laboratory in Peoria, Illinois.

LITERATURE CITED

Edds, G. T. 1973. Acute aflatoxicosis: A review. J. Am. Vet. Med. Assoc. 162:304-309.

Iverson, G. C., P. A. Vohs, and T. C. Tacha. 1985. Distribution and abundance of sandhill cranes wintering in western Texas. J. Wildl. Manage. 49:250-255.

Robinson, R. M., A. C. Ray, J. C. Reagor, and L. A. Holland. 1982. Waterfowl mortality caused by aflatoxicosis in Texas. J. Wildl. Dis. 18:311-313.