HIGH MORTALITY OF A POPULATION OF COWBIRDS WINTERING AT COLUMBUS, OHIO[1]

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ABSTRACT

High mortality was experienced during two heavy rainfalls by a wintering population of Cowbirds in Columbus, Ohio. Their death was associated with a soaking of their feathers, and their inability to fly and to remain on their perches in the roost. Causes of death may be associated with the lowering of their body temperature, enhanced by bathing in streams containing detergents.

An unusally high mortality was observed in a population of Eastern Cowbirds (*Molothrus ater ater*) that formed a part of a large blackbird roost on The Ohio State University Farm during the winter of 1963–64. This paper represents an investigation of the cause of death in these birds.

An estimated one million birds roosted in a second-growth woodland until late in December, 1963. During January and February, 1964, about 100,000 of these birds (cowbirds and starlings) moved to a new roosting site, in a plot of evergreens about a mile east, where they were joined in March by migrating grackles and red-winged blackbirds; the high cowbird mortality occurred in the evergreen roosting site.

The weather during late 1963 and early 1964 had been very dry (only 5.64 inches of precipitation were recorded during the period September 1, 1963 to March 1, 1964 at the U. S. Weather Station on The Ohio State University Farm adjacent to the study area), and temperatures were moderate for this area. However, rain started to fall during the morning of March 4 and continued until early the next day. No additional rainfall was recorded until March 8, when rainfall started at about 10:00 AM and continued almost incessantly until about 5:00 AM of March 10. During the period of March 4 to March 10, 7.64 inches of rainfall was recorded in this area. On March 9 alone, a total of 3.40 inches was recorded. This was the greatest rainfall ever recorded in this area for March 9, and also the greatest monthly rainfall for any March on record at Columbus. Figure 1

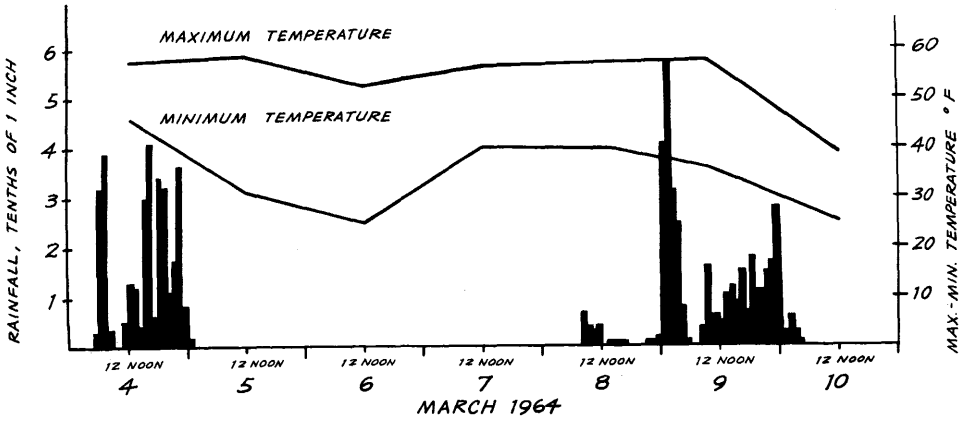

FIGURE 1. The rainfall and the minimum and maximum temperatures at Columbus, Ohio between the 4th and 10th of March, 1964 when cowbirds experienced a high mortality.

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shows the hourly rainfall and the maximum-minimum temperatures during the periods under consideration.

Many birds remained in the roost and in the immediate vicinity of the roost on the mornings of March 5 and 10. These birds appeared to be in a weakened condition; their feathers were soaked and many were unable to sustain flight. Later in the day, some of these birds were found beside nearby buildings where they had succumbed. On March 4, after a rainfall which continued well into the next day, 3,468 cowbirds, 11 grackles, and 3 starlings were found dead under the roosts. Many live but abnormal cowbirds were on the ground "huddled" against the trunks of trees and against buildings. Some birds were found dead several hundred yards from the roosts. Their feathers were very wet, and they appeared to have lost their ability to shed water.

Similar mortality of cowbirds took place after the heavy rainfall of March 9. The day after this rainfall, which exceeded 1.63 inches, more than 4,000 cowbirds were found dead under the roosts and many more were on the ground unable to fly. The following day, 578 more cowbirds were found dead. Presumably, many of these were birds which had been on the ground and unable to fly the day before.

Approximately 150 cowbirds of the 12,000 banded on the University Farm were either found dead following these storms or were reported dead, soon after recovery elsewhere, through the regular channels of the United States Fish and Wildlife's Migratory Bird Populations Banding Station at Laurel, Maryland.

Figure 2 indicates the dates on which the recovered birds were banded and also the dates and locations from which they were recovered. Banding dates were between October 5, 1963, and March 6, 1964. Recoveries started in November, 1963, and came slowly until the period of early March, 1964, when the high mortality was experienced on The Ohio State University campus. (There may be some discrepancy in the recovery date due to the fact that the birds were not recovered on the exact date when death occurred). One hundred fifty-three of the 8,046 cowbirds found dead had been banded.

The data in figure 2 clearly show that most of the birds recovered locally died during the same period, irrespective of the dates on which they were banded. Others banded on the same date were recovered as far south as Louisiana and Alabama, and as far north as Ontario, Canada. Few of the birds that left the area and were recovered elsewhere died at the same time as those that stayed in the study area. Because of the high mortality of the cowbirds in the Columbus area and the fact that the returns throughout the country show no unusual mortality of this group of birds elsewhere at this time, we feel that common factors were operating adversely on the local population during March.

Several possible causes of death were investigated. Approximately 200 of these birds were autopsied, but no clues as to cause of death were found. Examination showed that the birds were fat and apparently in good physical condition. In all but one of the birds examined, the alimentary canal was completely devoid of food. Evidently that single bird had fed during the day on which death occurred or had died soon after entering the roost, because past studies have shown that the alimentary canal is emptied very rapidly after eating. Stevensen (1933) found that small birds quickly enter a postabsorptive state after being deprived of food. Fecal material resulting from ingested grain that had been stained for identification began to be eliminated by sparrows within 1.5 hours, and the alimentary tract was entirely cleared within 2.5 hours. Benedict (1933) worked with Canaries (*Serinus canarius*), which he force-fed just before experimentation. A Respiratory Quotient indicating completion of fat metabolism was obtained after only four hours.

The minimum temperature during the two periods of death was 7.7°C (46°F) during the first and 2.2°C (36°F) during the second. Perhaps physiological reactions stimulated by the extended periods of rainfall, even at these temperatures,

were sufficient to cause death. Kendeigh (1944) states that air temperature is one of the most important evironmental factors controlling the distribution, migration, abundance, time and extent of breeding, as well as many other activities of birds. He found that there is a straight-line relationship between the rate of energy metabolism and air temperature at all temperatures below 37°C (98.6°F).

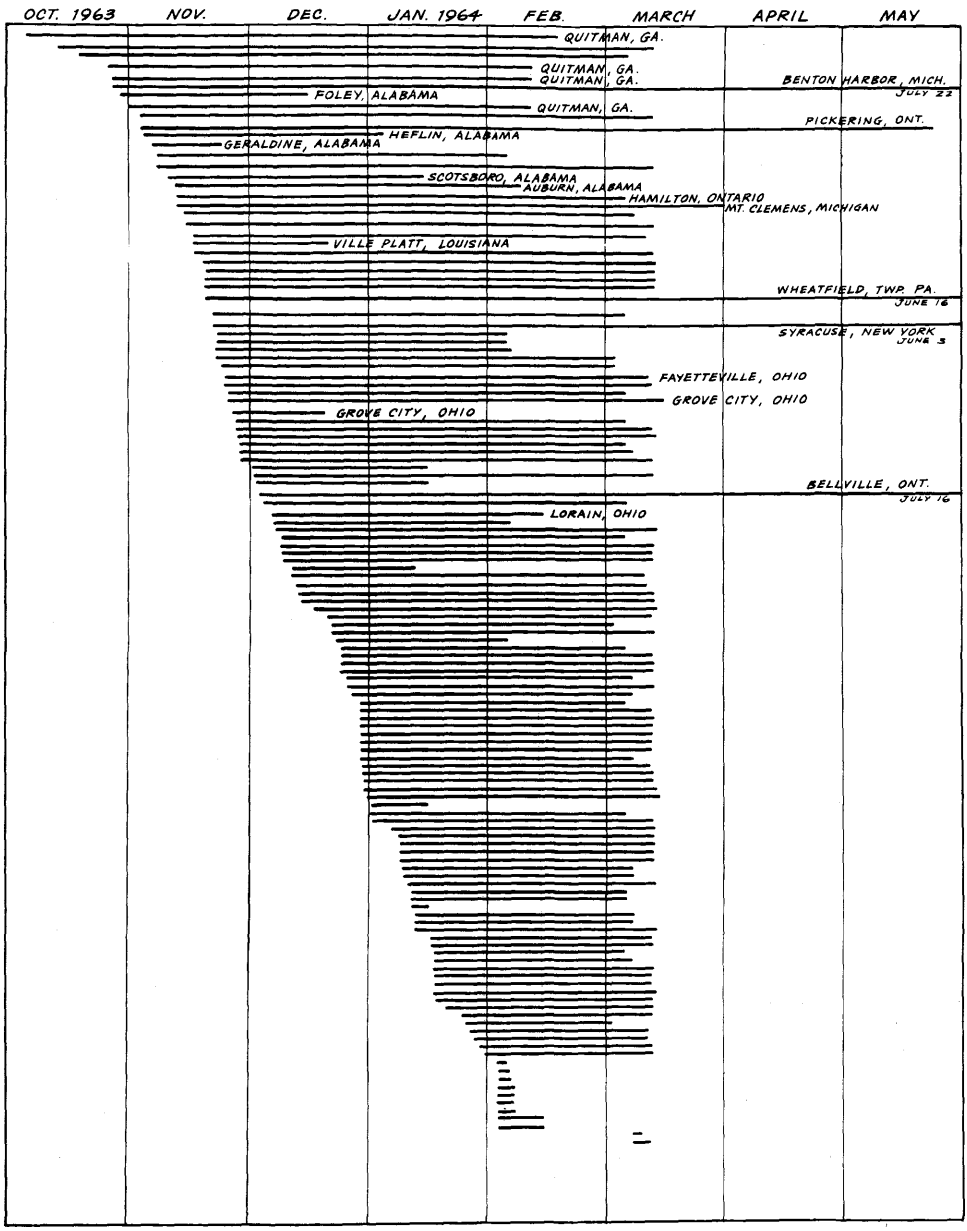

FIGURE 2. The length of time between banding and recovery of Cowbirds. Lines start on the day of banding at the left and stop on the recovery date of that bird on the right. Lines without sites are recoveries made at Columbus.

Toleration at very low temperatures averaged only about 6 hours, after which there was a rapid decline in metabolism resulting in death.

The summer and fall had been very dry. The streams in the area were heavily laden with washing detergents, as was evidenced by the color of the streams' waters and the foam on the surfaces. Before entering the roost, cowbirds had been seen bathing in these streams. Perhaps the concentrated detergents in the streams had reduced the water-repellent qualities of their feathers, making them more susceptible to wetting, with consequent lowering of body temperature and subsequent death of the birds.

Preliminary investigations by the U. S. Fish and Wildlife Service (personal communications with Bureau Personnel, January, 1966) indicate that blackbirds, especially cowbirds, cannot tolerate soaking with a wetting agent under certain weather conditions. Birds treated with wetting agents often died within 10 minutes, and their death was preceded by their inability to fly and their huddling against tree trunks and other ground objects. The behavior of the birds which died in Columbus following the heavy rains was similar to this pattern prior to their deaths.

Wurster, Wurster, and Strickland (1965) found a high mortality in birds after spraying for Dutch Elm disease in Hanover, New Hampshire. The mortality at Hanover was presumed to be due to the ingestion of invertebrate food by robins (*Turdus migratorius*). In 1960, observations similar to those at Hanover occurred on The Ohio State University campus following the spraying of trees for control of Dutch Elm disease.

Stickel (1965) fed 50 cowbirds a diet of 40 parts per million DDT in oil for eight weeks and only clean food thereafter. At the end of the feeding period, the birds were periodically subjected to stress by catching and caging for 40 minutes and then were released. After each stress period, some of the birds experienced tremors and died. This investigation demonstrated the significance of the residual effects of DDT and the effects of stress on the birds.

Investigation in the spring of 1964 showed that no similar spraying program had been undertaken, either on the campus or in the city of Columbus. Furthermore, it is doubtful that DDT from invertebrates was involved in the death of these birds, because the diet of cowbirds consists largely of seeds. Bent (1958) states that cowbirds' food consists of 77.7 per cent vegetable and 22.3 per cent animal matter. Bent's conclusions were based on a study by Beal (1900) during which 544 cowbirds' stomachs were examined.

Other possible forms of poison were available in Columbus and the surrounding area as a chemical control of numbers of starlings in feedlots. In order to determine whether the toxicant sodium fluoride might be associated with the deaths of the cowbirds, 25 were held in an outdoor aviary for 30 days and fed sodium fluoride pellets and cracked corn and none of them succumbed. It is not known how sub-lethal amounts of sodium fluoride would affect a bird during both a period of adverse weather conditions and a relatively short feeding day.

SUMMARY

The possible cause(s) of death of cowbirds which were found dead after periods of inclement weather were investigated. Within the period during which the birds died, there was very heavy rainfall and the temperature dropped to 2.2°C (36°F). Food was present in abundance. There was no evidence of the widespread use of insecticides which might have been toxic to the birds.

The most likely cause of death appears to have been associated with the lowering of the body temperature due to prolonged exposure to heavy rainfall. Perhaps the lowering of the body temperature was enhanced by the destruction of the natural water repellency of the feathers by detergents in streams in which the birds had bathed.

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