Aflatoxins and Risks for Wildlife

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High levels of aflatoxin have been found in corn in many areas of the Southeast this year, especially in the lower Mississippi River region. As a result, SCWDS has received a flood of inquiries about the risks posed to wildlife. Aflatoxins are produced by fungi in the genus *Aspergillus*, and aflatoxin levels in corn usually are most severe in droughty years when plants are stressed and damaged by insects. The fungus can invade the crop in the field, but the highest levels of toxin production typically occur when contaminated grain is stored under warm, moist conditions. The U.S. Food and Drug Administration (FDA) monitors and restricts levels of aflatoxins that are allowed in foods such as corn, peanuts, and various cereal grains that are intended for animal or human consumption. The FDA action level is 20 parts per billion (ppb) for grain destined for consumption by humans, dairy cattle, and young livestock. Allowable levels for grain fed to beef cattle, adult swine, or poultry are higher at 100 to 300 ppb.

Spontaneous outbreaks of aflatoxicosis have occurred in a wide variety of domestic animals and humans. The primary toxic effect of aflatoxin is damage to liver cells. Experimental studies in livestock and poultry have demonstrated that aflatoxins can cause poor feed utilization, depressed weight gain, liver damage, blood clotting abnormalities, lowered immune responses, cancer, and death. Not all species are equally susceptible to aflatoxicosis; for example, turkeys and ducks are much more susceptible than cattle and chickens. However, it is a universal rule that young, rapidly growing animals are more susceptible than adults of the same species.

Wildlife biologists have expressed concern for wildlife health because they fear condemned grain is being diverted for use as wildlife feed, particularly where baiting for deer hunting is allowed. Their suspicions have some merit. In a previous high aflatoxin year (1993), a SCWDS survey revealed that over half of 39 corn piles used as deer bait in North and South Carolina were found to contain from 20 to 750 ppb of aflatoxin.

It has been difficult to respond to inquires about aflatoxin risks to wildlife because relatively little "hard" information is available. There is one publication on two occurrences of aflatoxin poisoning in ducks and geese in Texas. In addition, a field study showed that crop contents of bobwhite quail in Florida had fairly high aflatoxin levels (up to 468 ppb) when they were feeding on heavily contaminated cornfields (average 1,210 ppb). These quail did not display clinical disease, although microscopic liver damage was recorded. Feeding trials showed that adult bobwhite quail can handle relatively high aflatoxin concentrations, but egg production can drop. Experimental feeding trials by SCWDS revealed that young white-tailed deer can tolerate 800 ppb; however, 4-month-old wild turkeys appear to be more vulnerable. Turkeys had lower weight gains and feed consumption, liver function changes, and decreased immune capacity tests when fed levels of 100 to 400 ppb.

The aforementioned information, admittedly sparse, does not build a strong case that massive wildlife die-offs occur due to aflatoxin. Nevertheless, aflatoxin is an extremely potent toxin, and its potential to cause subclinical yet debilitating effects must be respected.

Aflatoxin could affect wildlife by causing immune suppression which would predispose animals to covert losses from other disease processes. Also, low-grade debilitation due to poor liver function could enhance predation.

Obviously, wildlife managers need better information on aflatoxin. We would encourage close monitoring of wildlife feeding in areas where crops are contaminated, and diagnostic efforts should be pursued if illness or deaths occur. Until better field data are available, SCWDS contends that feeds used for artificial feeding of wildlife should be held to the same standards as for domestic animal and human use. SCWDS also urges that people avoid practices that might enhance availability of contaminated grain to wildlife, such as mowing standing contaminated corn. (Prepared by Drs. Randy Davidson and Victor Nettles)