The Quail-Tech Alliance

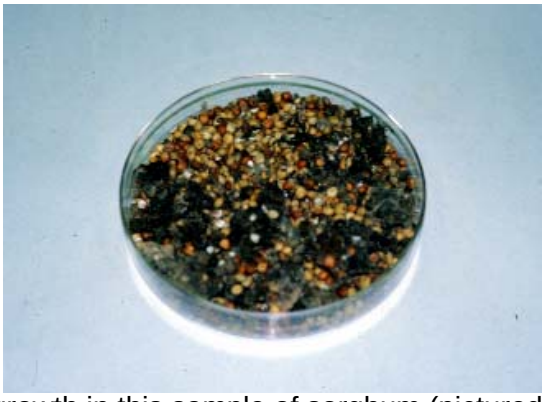
e-bulletin

Supplemental feeding of quail using grain such as corn or milo is a common practice throughout the state. While the jury is still out concerning the positive benefits of supplemental feeding (a topic the Quail-Tech Alliance will be studying this year), the potential presence of mycotoxins in supplemental feed is a recognized concern which can cause significant damage to your quail population. In this bulletin, I provide you some detail about what mycotoxins are and what you can do to minimize the chance of feeding them to your quail populations.

Mycotoxins are toxic metabolites produced by various species of fungi, such as those of the genera *Aspergillus, Fusarium,* and *Penicillium*, as the they grow in substrates such as grain. You are probably already familiar with the aflatoxin, a type of mycotoxin, because of its media attention and labeling on deer corn. Unfortunately, aflatoxin is not our only concern. Fumonisin, T-2 toxin, vomitoxin, ochratoxin, and zearalenone are other examples of mycotoxins. Mycotoxin consumption can cause a wide range of problems in birds including acute hepatitis, hemorrhagic disease, inhibition of protein synthesis, paralysis, tumor formation, decreased body weight, reduced fertility, reduced metabolic efficiency, kidney enlargement, decreased resistance to disease, and direct mortality. The effect of these toxins is mainly dependent upon their concentration, but can also be affected by cocontamination by other mycotoxins and the metabolic state of the bird. For instance, cold temperatures and cocontamination with aflatoxin can both increase the rate of ochratoxin caused mortality.

Quail can be harmed by mycotoxins, because grain is widely used for supplemental feed. Fungal growth before grain harvest is the most common way in which grain sources can become contaminated with mycotoxins. Thus it is essential that you have your grain tested for potential mycotoxin contamination before you provide it to your birds. For instance, one Anchor Ranch reported to us this fall that their supply of corn contained 60 ppm fumonisin. Studies suggest this level of fumonisin would be very dangerous for quail. Because of their prudent testing, this problem was avoided. We can provide you with contact information for a laboratory which can test your grain samples if you do not already have such a relationship.

Though your first step is to make sure that your grain begins mycotoxin free, your diligence can't end there. Research in our laboratory indicates that given adequate moisture and a sufficient temperatures, fungal growth, and thus mycotoxin production, can occur while grain is in the feeder or on the ground. Most feeders have open feeder ports that allow direct access of moisture to grain within the feeder. *Aspergillus*, the fungus which produces aflatoxin, requires temperatures between 42 and 115 °F and a relative humidity between 70 and 90%. *Aspergillus* can grow with lower relative humidity if the moisture content of the substrate is between 12 and 17%. Thus, environmental conditions sufficient for fungal growth can occur throughout the year in the Rolling Plains of Texas. The fungal growth in this sample of sorghum (pictured



above) occurred in a quail feeder in Wheeler County, Texas during a time period between November and February. Fungal growth is most related to times of high relative humidity. Thus it is important to clean and maintain your feeders throughout the season. If you spread grain on roads try to provide small amounts more frequently so you can minimize the long –term exposure of grain to the rapidly changing environmental conditions that can occur in the Rolling Plains.

To confuse matters, grains are not the only sources of mycotoxins for quail. Studies in our laboratory, which were published in the journal *Ecotoxicology*, revealed that native seeds can also be sources of mycotoxins. We detected aflatoxins present in native seeds from the crops of hunter-killed quail. These native seeds contained relatively low levels of aflatoxins as compared to concentrations which can occur in highly contaminated grain samples. Nevertheless this finding complicates our understanding of the exposure dynamics of wild quail to mycotoxins. We will use crops from hunter-killed birds supplied by Anchor Ranches in the Quail-Tech Alliance program to further our understanding of this complex interaction. Further, we have engaged a team of toxicology and nutritional scientists to aid us in developing nutritional supplements targeted to increase bird health and mitigate the influence of mycotoxins.

QUAIL-TECH ALLIANCE BEST PRACTICES

- Test all grain shipments for mycotoxins prior to feeding
- Monitor your feeders for fungal growth and excess moisture
- Remove moist or moldy grain during the season as necessary
- Clean out your feeders at the end of the season
- When spreading grain on roads, spread smaller amounts more often, rather than larger amounts less frequently