

Depression in agriculture spurs growth of number-one carcinogen

by Marjorie Hecht

The financial squeeze on American farmers has had a little-publicized though potentially devastating effect—an increase in the incidence and growth of aflatoxin, the most potent carcinogen known to man. According to agricultural scientists, this naturally occurring toxin, a substance produced by the fungus *Aspergillus flavus*, has been on the increase in grain crops as man-made improvements in crop cultivation have declined in the past 10 years.

In several areas of the United States, aflatoxin in the corn fed to chickens has affected their immune systems, drastically lowering egg production and eventually killing the affected poultry. Three years ago in Arizona, aflatoxin in cottonseed hulls fed to dairy cows caused one variety of the carcinogen, M-1, to show up in milk, and farmers were forced to dump huge quantities of milk.

The effect this aflatoxin increase has on the humans who consume animals which ingest these food products is not known. The few scientific studies that exist, however, show higher rates of esophageal cancer in certain African, Chinese, and Southeast Asian populations that consume peanut or other grain crops where there is a high aflatoxin content. In India, aflatoxin contamination of the corn supply led to widespread liver poisoning, taking thousands of lives.

The growth of this “natural” killer is directly related to the decline in capital-intensive farming as U.S. farmers have responded to the higher energy costs and the lack of cheap credit by cutting back on fertilizer and taking other shortcuts in order to stay in business.

Dr. Pat Hamilton, professor of microbiology and poultry science at North Carolina State University, an expert in mycotoxins like aflatoxin, specified in a recent interview several factors that lead to a higher aflatoxin level. The most important is the lack of proper fertilizer. The protein content in corn is directly related to the rate of fertilization, Hamilton said. In the past 10 years, corn used for animal feed has dropped from a 9 percent protein content to less than 8 percent in Midwest corn and 7.5 percent in southern and southwestern states. The higher carbohydrate, lower protein content supports the growth of fungi and mycotoxins, Hamilton said.

Other measures to cut costs also foster the growth of aflatoxin. In particular, water stress—drought and lack of irrigation—especially at pollination time and two weeks following (this is called silking time) makes corn more susceptible to aflatoxin. Animals are also more susceptible to mycotoxins when they are not well fed. When farmers don't

plow and cultivate their fields, and the weed and grass canopy is thus higher, the corn has to compete with weeds for water and nutrients. Farmers, to cut costs, also tend to leave the corn in the field longer to dry it without using energy-intensive drying methods. Both these measures support the growth of mycotoxins like aflatoxin in the crop.

The Entomological Society of America has compiled evidence to show that not using pesticides on a crop and thus allowing insect damage creates conditions that encourage the production of aflatoxin. A study carried out at the Southern Grain Insects Laboratory in 1980 showed that various corn insects enhance fungal infection and aflatoxin contamination by transporting the fungus both internally and externally and by preconditioning grain as a growth medium.

Grain companies profit

Dr. Hamilton places much of the blame for the current problems of aflatoxin in feed grains on the big grain companies. “The unfortunate thing is that nobody regulates the grain companies,” he said. “They make their money by selling water and trash.” The grain companies buy up grain from farmers at a discount if its aflatoxin level is high, Hamilton reports. About 20 percent of the grain from Iowa and Illinois last year was bought at such a discount. Then the grain dealers “blend” it with other grains and sell it at the normal price! (“Blend,” he said, is a euphemism for “adulterate.”)

The grain companies also add water to the grain to increase its weight and therefore its price. For this reason, Hamilton advocates regulations on grain dealers to sell grain on a dry rate basis, so that there is no incentive to add water. Now, Hamilton said, U.S. #2 standard animal usage corn can have up to 15.5 percent water content, and this watered corn gets the same market price as corn with only 10 percent water content. The higher water content, of course, helps support the growth of aflatoxin.

Who buys the bad feed grain? Farmers who know about the problem avoid it, and the bad material is shunted to those who are not aware of the problem, or it is sent abroad.

The Food and Drug Administration has had a wishy-washy stand on just how much aflatoxin is permissible in animal feed grains. The FDA standard is 20 parts per billion (ppb), but when there was a particularly bad year with cottonseed meal in Arizona and California, the FDA dropped this to 300 ppb. As for human consumption, the FDA says that the level permissible in cereal grains is 20 ppb, and that

milk cannot have more than .5 ppb of aflatoxin. The Dutch government, however specifies .05 ppb, while the Swiss specify .01 ppb. As Hamilton put it, "This is the most potent carcinogen known to humans, and nobody knows what safety is."

How can the aflatoxin level be limited? "We can do it," Hamilton said, "but it costs money, and as long as the agricultural segment is expected to subsidize other segments of the society, it won't happen." Ammoniation of stored grain destroys aflatoxin, but it costs 20 cents to 80 cents per bushel. Gamma ray irradiation would also work, he said, but there is no U.S. infrastructure in place to use irradiation to purify food stocks, so this method would require large start-up costs.

What is particularly ironic in the case of aflatoxin is that the environmentalists and the Environmental Protection Agency ignore the potential risk from aflatoxin because it is "natural." However, man's intake of natural toxins and natural pesticides is perhaps 10,000 times higher than the dietary intake of man-made pesticides, according to Dr. Bruce Ames, chairman of the biochemistry department at the University of California. Yet, Ames notes: "Many, if not most, of these plant toxins may be 'new' to humans in the sense that the human diet has changed drastically with historic times. By comparison, our knowledge of the toxicological effects of new man-made pesticides is extensive, and general exposure is exceedingly low."

A study done by the state of California in 1982 showed that aflatoxin has a potency of 200 on a scale comparing cancer causing substances for humans, while the chemical EDB, recently banned by the Environmental Protection Agency as a potential carcinogen, was rated at a level of 0.8.

More research needed

There are a few research programs ongoing to study the effects of aflatoxin on animals, but, according to Hamilton, there should be more interest in solving the problem and finding out how the carcinogen works. Agricultural research, Hamilton noted, is just one of the casualties of the U.S. Department of Agriculture's attempt to shut down American farming.

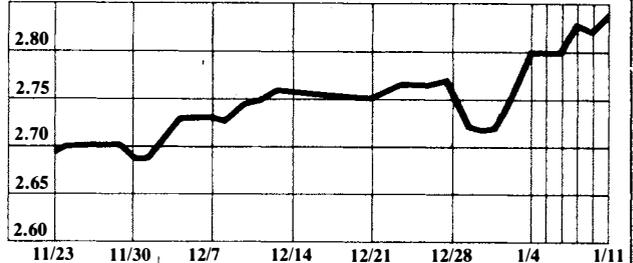
So far, the aflatoxin research has had some unexpected results, such as the finding that low amounts of the material have drastic affects on the immune system of various animals. But there are other areas left untouched. A study of how aflatoxin affects the immune system in chickens, for example, could be a model for a study of AIDS (acquired immune deficiency syndrome) in humans, but there is no work going on in this area.

In the larger sense, it is clear that a study of how aflatoxin in grains increases as austerity prevents the American farm sector from using man-made improvements in crop cultivation would provide specific data on just how quickly depression conditions move through the food chain, lower the health of the entire population, and increase the risk of death from certain types of cancer.

Currency Rates

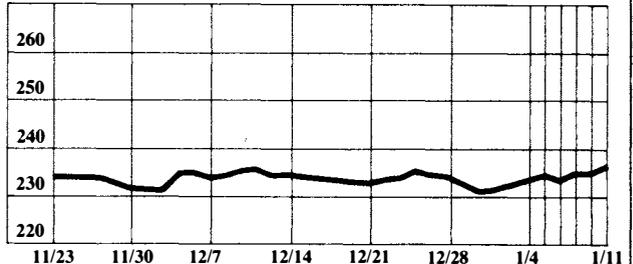
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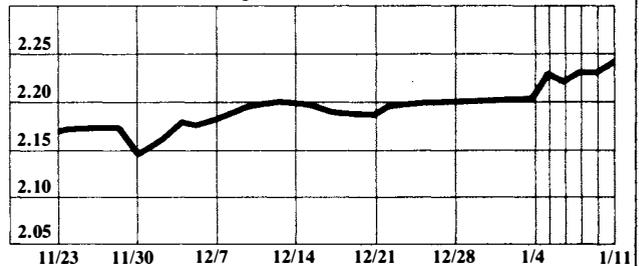
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