Nutrient Management Proposals Challenge Future of Farming

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problems, especially with fetuses and newborns.

Traditional and long standing doctrine has held that phosphorus, while water soluable in some forms, mainly occurs in a relatively stable form and doesn't move easily from the soil.

Because of the physics of its chemistry, soil phosphorus has been largely considered to be attracted to soils particles, such as clay.

Like iron to a magnet, phosphorus has been thought to stick pretty close to the soil particles to which it attatches.

After a soil is saturated with phosphorus, any additional phosphorus is then free to form other compounds, some water soluable.

Sandy soils, naturally low in the electromagnetically charged clay particles that serve as a binder of phosphorus, reach saturation faster and can not handle as much phosphorus loading.

While those considerations weren't challenged by new information presented Tuesday to the advisory board, the new information was that erosion and sedimentation controls apparently don't have much effect on preventing the flow of phosphorus from crop fields, especially those that use conservation tillage practices.

Apparently, the biological community — soil microbes feeding on organic materials — that develops in the top layer of soils, especially in farm field where conservation tillage is practiced, such as no-till, readily converts phosphorus into an aqueous form.

Not only is that beneficial for growing plants, because they need phosphorus in the aqueous form, but that creates a steady flow of phosphorus in surface storm water runoff of those fields.

The information presented by Dr. Doug Beegle, Penn State University agronomist and advisor to the SCS NMAB, represents a complete turnaround on what had been considered scientific fact and a foundation of nutrient management.

However, phosphorus is not linked directly to human health concerns.

The EPA's concern with phosphorus, and Maryland's concern are tied into high soil tests and water tests, and several events over the past year — fish kills and lesions, and some apparently related human health problems were scientifically linked to the aquatic dinoflagillate, "pfiesteria piscacada."

The normally non-dangerous pfiesteria organism has been unscientifically linked to phosphorus pollution, but, because of nearby high density animal agricultural operations and high phosphorus findings, some consider the coincidental link to be evidence enough.

From information presented to the NMAB during its scheduled meeting in the state Department of Agriculture Building in Harrisburg, it was made clear that if federal initiatives to control livestock manure applications on land — based on plant needs of phosphorus, the phosphorus content of the manure, and the existing soil levels of the nutrient — were to be adopted, it would have the effect of raising the cost of farming beyond competitive levels, especially in world trade, where environmental restrictions on production (as well as government-mandated labor costs) are far from equal.

Theoretically, a change from nitrogen-based nutrient management to phosphorus-based nutrient management on farms with high levels of residual soil phosphorus would mean discovering some other means of disposing of animal manures instead of applying it to cropland.

Additionally, if phosphorus-based management were mandated, it would mean purchasing commercial nitrogen fertilizer and applying that to meet crop requirements (but no more).

That could easily means devastating additional costs of production.

It was discussed that feeding techniques recently initiated in the Mid West, such as to use phytase in poultry feeds, could be used to lower the amount of phosphorus in manure.

Also mentioned was the possibility of using some phosphorus-binding chemicals (such as iron sulfate) to effectively form biologically inert phosphorus compounds.

The switch to emphasizing phosphorus as the nutrient of equal or most concern has been sudden and unexpected, but recent soil research findings apparently support the switch in emphasis, according to Beegle, who said he was as surprised as anyone with the findings of the research.

The public health threat may well be completely unfounded.

There is no clear link between phosphorus and the health concern presented by the pfiesteria organism, but that hasn't stopped Maryland Gov. Parris Glendening from proposing legislation that could well drive the integrated poultry industry off of the Maryland Eastern Shore.

Glendening is up for relection, as is the entire slate of Maryland public officials. Maryland elects all of its state government at the same time, not staggered as in Pennsylvania.

Ironically, according to a Tuesday Wall Street Journal article, Glendening is considered to be at risk of losing because of poor voter perceptions and some early trouble over campaign funds.

According to Tom Simpson, an agronomist who holds a joint appointment with the University of Maryland and the Maryland Department of Agriculture, the aquatic organism was scientifically linked to human health problems (short term memory losses, a nuerological disorder), and was cited as the cause for a fish kill of juvenile menhadden fishes in the Maryland Pocomoke River estuary in August, and some fish kills in the Carolinas.

However, Simpson said that the fish kill coincided with the annual migration of the juvenile fish from the rivers into the estuaries, part of their life cycle.

He said that prior to the fishes' downstream migration, that the pfisteria organism were in the water feeding on algae.

Rather than phosphorus being the cause for the pfisteria switching from algae to fish flesh, Simpson said there is at least an equal possibility that the large schools of fish passing through the clouds of pfisteria stimulated the organism to change feeding strategies.

Perhaps some chemical in the waste of the fish triggers the response, he theorized.

However, a group of people tasked with investigating the situation did not have time in the few months last year to learn the truth about the pfisteria mystery.

In the meantime, front page newspaper stories about "pfisteria hysteria" are blamed for helping to create a $400 million loss in seafood sales for the Maryland Eastern Shore. He said tourism losses couldn't be estimated.

The event was basically a food scare, perpetuated by out-of-perspective reporting, and a lack of scientific effort to determine the cause.

Glendening has proposed a budget that includes allocations to help pay for hiring additional people to inspect farms, and to help pay for trucking manure out of the region.

According to statements of experts presenting information to the board, in some cases it could require as much time as the passing of a family generation or more on a farm before the amount of phosphorus would be reduced to allow a return to spreading manure.

The volunteer NMAB was created by Pennsylvania law to develop and recommend program design and regulations to carry out the state Nutrient Management Act, also known as Act 6.

It has largely met those initial responsibilities, but continues to meet to review program developments and address new issues related to nutrient management, as the program gets underway in its first full year of program operation.

The first official state nutrient management plan was approved late last year in Lancaster County.

Pennsylvania law makes planning and implementation of best management practices (BMPs) mandatory for those animal agriculture operations which exceed a set threshold for the number of livestock per acre available for crop or pasture production, including rented and owned land.

Pennsylvania law mandates nutrient management planning when livestock animal weights exceed 2,000 pounds per acre.

The EPA recommendations announced recently, are to require nutrient management plans nationally, based on a different calculation of stocking rate per acre.

The NMAB's meeting agenda included an update from a representative of the state Department of Environmental Protection on what the agency has been doing to work with EPA mandates for nutrient management.

The EPA had recently promulagated national nutrient management regulations in an effort to control the nutrient pollution problems associated with, for example, hog farms in North Carolina, poultry operations in the Mid West, and (closer to Washington, D.C.) the concentrated poultry industry on Maryland's Eastern Shore.

The EPA nutrient regulations require management plans and federal permits of farms considered Concentrated Animal Feeding Operations (CAFOs), as compared to Pennsylvania's Concentrated Animal Operations (CAOs).

It was known by DEP officials that the EPA was concerned with the nutrient phosphorus, but it was not known how much concern was attached to the nutrient.

Technically, Act 6 allows for further investigation and recommendations from DEP on the potential for trouble from the other two of the big three nutrients — nitrogen (N), phosphorus (P), and potassium (K).

(Every bag of fertilizer contains a listing of the percentages of N, P and K, in that order. For example, a 15-10-10 fertilizer would be 15 percent N-10 percent P, and 10 percent K.)

Plants require all three in adequate amounts to be healthy and high yielding. Soil tests can be used to guage how much of each nutrient should be applied to the soil to supply a plant with 100 percent of its needs.

It is also known that these nutrients can exist in the soils in various forms and in different molecular

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