Nitrates

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spreads to the fingers and toes. Along with the above symptoms, livestock may exhibit a staggering gait, rapid heartbeat and labored breathing. "It's a potentially fatal disease," said Makuch, "but it can be treated rather easily."

Because the bacteria capable of performing the nitrate-nitrite conversion are not present in adult humans, adults do not normally contract the disease. Infants younger than six months, however, lack the acidity in their digestive tracts necessary to kill the bacteria.

Like human infants, ruminant livestock (cattle and sheep) of all ages are susceptible to nitrate poisoning. Horses are also susceptible, as are young swine and poultry.

The acceptable limit of nitrate content in drinking water, as outlined by the Environmental Protection Agency, is 10 parts per million of nitrate nitrogen, also expressed as 45 ppm of nitrates, according to water resource specialist William Sharpe.

Though no legal limits have been established for livestock, researchers generally use a figure of 100 ppm nitrate-nitrogen, Sharpe said. Above this level, nitrate poisoning has been associated with increases in abortions, lower growth rate and reproductive problems, according to a nitrate report issued by Penn State University.

Though septic systems can contaminate private drinking water supplies, the biggest problem is overfertilization resulting from excess manure application to crop fields, said Makuch. "Nitrate dissolves easily, and if the plants don't use it, it's subject to leaching," he pointed out.

The problem is particularly acute in the southeastern part of the state, where large numbers of livestock produce more manure than existing cropland can utilize. The problem is intensified by the area's soils and geology, said Makuch. The area's fractured rock and porous soils speed the movement of excess nitrates to groundwater supplies, he noted.

Lancaster County Extension director Jay Irwin put the manure problem into perspective by comparing the county's livestock numbers in 1970 to a 1983 census. Whereas dairy cattle numbered 67,000 in 1970, 13 years later the number had nearly doubled to 112,000. A similar increase was noted in laying hen numbers, and the broiler population increased from 18 million to 44 million during that period. Cattle and calf numbers (includes young dairy stock and all beef cattle) jumped from 127,000 to 188,000, and hog numbers exploded, reaching 340,000 from a 1970 figure of 109,000.

"Every time you increase livestock numbers, you better be finding some more land to put that manure on," Irwin cautioned, noting that in 1983 the county needed about 340,000 acres of cropland to dispose of its manure at recommended application rates. In fact, only about 274,000 acres were available, he said.

The excess manure dilemma is reflected in statistics presented by Lancaster Laboratories microbiologist Earl Custer. "In 1978, 25 community water systems (including small municipal supplies and mobile home parks) were faced with the problem of elevated nitrates," Custer said, pointing out that the number has risen to about 30 to 35 systems currently.

He noted that nitrate levels of 50 to 70 milligrams per liter (roughly equivalent to parts per million) have been documented in private water supplies throughout the county.

Water specialist Karen Mancl listed three basic water treatment methods currently in use to combat high nitrate levels. Both the reverse osmosis and distillation systems are demineralization methods that work well for family water supplies but are incapable of servicing livestock operations, Mancl said.

A third system, based on ion exchange, is compatible with livestock requirements. "It's really the only one that will give you enough water," said the specialist.

But the cost of installing an ion exchange unit may be prohibitive for some operations, Mancl said. The resin required to remove nitrate from drinking water is about three time more expensive than the comparable material used in water softeners.

Can the cost of such a system be justified on the basis of increased milk, meat or egg production? As yet no numbers are available to answer that question. But Lancaster Extension dairy specialist Glenn Shirk feels that nitrate removal may prove to be beneficial. "I hear a number of farmers comment that when they install systems they see an improvement in (dairy) production," Shirk said. "I'm one who doesn't rule it out."

Ethanol market for corn grows 40%, NCGA says

ST. LOUIS — Corn used for fuel ethanol production is projected to account for 240 million bushels of corn in 1985 compared to 172 million bushels in 1984, a 40% increase.

"Increasing one of our corn markets by 40% per year is one of the few bright spots in agriculture, and that's what fuel ethanol did in 1985," says Dain Friend, National Corn Growers Association (NCGA) president from Warrensburg, Illinois.

Sighting data released by the Washington based Information Resources Incorporated (IRI), Friend says, "IRI projected 759 million gallons of sales for 1985 with 625 million gallons produced domestically. Of that, approximately 25 million gallons were produced from non-corn sources leaving 600 million gallons from corn. Calculating 2.5 gallons per bushel — that's 240 million bushels!"

John Pellet, NCGA vice president for market development and a farmer from Chesterfield, Missouri, calls this great news for U.S. corn growers. "Anytime a market grows at nearly 40%, that's exceptional because normally 5 to 6% growth is considered good," says Pellet. "This shows farmers can make a difference by working through their commodity organization to promote their products. Nobody is going to do it for us, especially in the ethanol market when we have the U.S. Customs Service allowing Brazilian ethanol imports to avoid the 60 cents per gallon duty and some oil companies trying to take this market away from us."

"U.S. corn growers can't let up because a 40% jump again in 1986 would consume nearly 350 million bushels of corn if we can sustain this growth," says Friend. "The opportunity to reach our billion bushel goal in 1990 is there, but not without a fight. Clearly, we must have new long term markets if we are ever to see profitable agriculture again and this is one market farmers have created and only farmers can sustain."