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should be considered together; supplementing the one usually helps with deficiencies of the other.

Selenium deficiencies in cattle, sheep and goats result in degeneration of muscle (especially the heart muscle), general stiffness, loss of hair, separation of hoof tissue, liver and pancreas damage, laying-down, death, mortality of newborn calves, interference with normal growth and reproduction, retained placenta, impaired immune function, slow recovery from uterine and mammary infections, and increased susceptibility to mastitis.

Research has shown that supplementation with selenium and vitamin E can reduce — even prevent — mastitis, because of their essential role in the mobilization of leukocytes against pathogenic invasions. In several studies, supplemented heifers had significantly fewer mastitis infections at calving and during lactation, with shorter duration of the infection and lower somatic cell counts than unsupplemented control heifers. Cows fed supplementary selenium at 6 milligram per day had more rapid recovery from E. coli infections.

Recommendations, therefore, have been made for dry cows to receive 3 milligrams selenium plus 1,000 units of supplementary vitamin E per day; milking cows need 6 milligrams selenium and 300 to 500 units vitamin E per day. Generally, selenium plus vitamin E treatments (injections) to dry animals — that is, pregnant animals — has been considered safe. Occasionally I hear of abortions in goats, so use caution.

Generally, forages are not good sources of vitamin E because of storage loss. Forages will also be poor sources of selenium in the northeast and mid-Atlantic reg-

ions, and in those states listed above. In addition, only about 40 percent or less of fed selenium is actually absorbed by cattle, because of the interfering influence of some digestive factors and ingredients, especially calcium and a few other minerals.

Therefore, it is necessary to supplement with trace-mineralized salt blocks or mineral self-feeders, with long-release rumen boluses, with fortified concentrate rations, or with intramuscular injections. Injections usually offer only short-term benefit. A popular practice in recent years has been the routine commercial fortification of concentrate rations at a rate of 0.14 milligram per pound (0.3 parts per million), equivalent to the normal daily needs of dairy cattle with average concentrate intake. This is a legal limit, according to the Food and Drug Administration, and it is recognized that selenium is toxic when taken in excess.

The range between safe minimum and maximum contents of other essential microelements in feeding ration dry matter is, in many cases, at least tenfold; for example, iron, manganese, copper, zinc, iodine. In the case of selenium, it is 50 times that — between 0.045 milligram and 2.27 milligram per pound.

Some years ago, the Food and Drug Administration recognized the legal supplementation limit of concentrate rations at the rate of 0.045 milligram per pound, because of the widespread selenium deficiency in U.S. soils and the demonstrated benefits in reproduction and mammary health of dairy animals. This limit was eventually raised to the present 0.14 milligram per pound level for greater (and still safe) preventative benefits.

So-called "white muscle" disease, the best known selenium dis-

order, can be cured by a supplementation of 0.045 milligram per pound ration dry matter (0.1 parts per million) selenium in the form of sodium selenite. For long-term treatment other than in feed or by injection, the use of forestomach heavy pellets, glass boluses, or osmotic pumps has become common for ruminants in some countries, especially Australia. In New Zealand, where the soil is selenium-deficient, fertilizer amendment to increase forage selenium levels has led to acceptable animal health. Sodium selenate rather than selenite is used, because it is more readily available for plants. Fertilizer application of selenium eliminates the individual animal treatment.

In our knowledge of animal and human nutrition, the subject of selenium is relative young, about 25 years old. We need much more research to understand better how selenium functions in the human body and in what amounts. When farm-grown feeds are tested for nutrients before formulating a suitable dairy ration, no routine analyses for selenium are included. Therefore, while we know precisely how much our dairy animals eat in protein or fiber or energy, we do not know precisely what they actually eat in terms of selenium.

Also, we do not know how much selenium usually is excreted

in milk, while we know very well how much fat, protein, lactose, total minerals, or even calcium or phosphorus are in our milk. We only know that we are supplementing with a certain, presumably safe, amount of selenium

based on average feed intake data. But what about those dairy animals that eat more than the average amounts of supplemental concentrates? It will be important to the income of our farmers to pay renewed attention to this subject.

## Pork Expo Feb. 11

**NORTH CORNWALL** (Lebanon Co) — The 20th annual Keystone Pork Expo will be held Feb. 11 at the Lebanon Valley Expo Center at the Lebanon Fairgrounds.

This year's meeting will feature a trade show with more than 40 exhibits, and educational seminars for producers.

The Expo will once again sponsor a "Pork Bowl" contest and public speaking competition for competing FFA and 4-H members.

Greg Andrews, an attorney from Grimes, Iowa, will speak on nuisance complaints and law suits. Andrews represents clients and coordinates the Pork Producers Environmental Law Education Network, a project funded by the National Pork Producers Council. He will answer questions on nuisance law, zoning, and environmental regulation of the Pork Producers Environmental Law Hotline. At the Keystone Pork Expo, Andrews will address legal

issues, community relations, how to avoid lawsuits, and strategies producers should develop if they are sued.

Doug Goodlander, Bureau of Plant Industry, Pennsylvania Department of Agriculture, will provide highlights of the recently implemented Nutrients Management Act. Many livestock producers had to comply with the new regulations on Oct. 1, 1997. For some farmers, there are questions that remain regarding the new law.

Lou Moore, Penn State professor of agricultural economics and continuing Pork Expo favorite, will be on hand to deliver his hog market outlook.

At 1:30 p.m., results of the seventh annual Legislative Activity Fund Auction will be announced. This year, all items will be sold by silent auction.

Keystone Pork Expo programs will be available in mid-January in most county extension offices.



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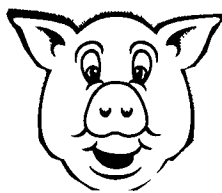
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