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Plan Ahead To Prevent Livestock Losses From White Muscle Disease

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Ranchers in Idaho and the surrounding Northwest States suffer serious economic losses each year from White Muscle Disease. Many ranchers recognize the disease and have taken steps to minimize their losses. Other ranches do not recognize the disease, and are losing livestock unnecessarily.

White Muscle Disease is characterized by weakening of certain muscles. The muscle tissue degenerates and is often replaced by white precipitates of calcium and other compounds causing white streaks through the muscle. From these characteristics of the disease came its name. Heart muscles are most commonly affected. Many calves and lambs die from heart attacks as a result of heart muscles weakened by White Muscle Disease. In other instances, animals may have weakened forequarter or hindquarter muscles and occasionally weakened throat muscles. These conditions can hamper the mobility of the animal as well as its eating. Without treatment, these conditions often become more severe until the animal dies. In some instances where the effect of the disease is mild, animals spontaneously recover.

In recent years it has been shown that in general animal feeds should contain a minimum of 0.10 ppm selenium to prevent White Muscle Disease. Where the selenium content of animal feeds is below that level, the occurrence of White Muscle Disease is common and serious economic losses are prevalent. The absolute minimal selenium level required in animal feed to prevent White Muscle Disease is not definitely established. Where all other substances in the feed are optimal, selenium concentrations as low as 0.05 ppm may be sufficient to prevent White Muscle Disease.

The selenium content of forage and hay crops produced in Idaho has been determined recently as part of a study of the selenium content of forage and hay crops in the Pacific Northwest. Figure 1 is a map of Idaho and adjacent areas showing regions of low, variable, and adequate selenium content in these crops. In general, alfalfa was used as the indicator crop because of its wide use for both forage and hay. At sampling sites where alfalfa was not available, clovers, grasses, or grass-legume mixtures were sampled. At each sampling site, the tops of at least ten plants were clipped for a sample.

The forage and hay produced in Idaho north of an east-west line, approximately at Grangeville, contain insufficient selenium to prevent White Muscle Disease in livestock. Nearly all samples collected from that area contained less than 0.10 ppm selenium. This is also true of adjacent western Montana, eastern Washington, and northeastern Oregon. Forage produced in much of the remainder of Idaho is variable in selenium content. Considerable farm-to-farm variation is common and occurs for several reasons. One is that some phosphate fertilizers sold in the West contain small amounts of selenium, and when these fertilizers are applied to the soil it is likely that forage and hay crops absorb sufficient selenium to accumulate a concentration greater than 0.10 ppm for one or possibly two seasons. A second possibility is that lands farmed for only a few years may have a greater selenium supply than lands farmed for many years because the selenium supply has been depleted in the latter.

There are two areas in Idaho where selenium concentrations in crops are generally adequate.

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One area is the Salmon River and Big and Little Lost River drainages from North Fork south to Arco and from Stanley east to near the Montana line. The other area is the Snake River drainage from Glenns Ferry downstream to near the Oregon border. Nearly all samples collected from these two areas contain more than 0.10 ppm selenium, and it is likely that the occurrence of White Muscle Disease in these areas is less than in other parts of the State. Some samples collected from these areas contain less than 0.10 ppm and some cases of White Muscle Disease should be expected.

In addition to the areas discussed, some mountain ranges above 7500 feet in elevation used for grazing produce forages that generally contain less than 0.10 ppm selenium. Livestock grazing on these high ranges likely are not getting sufficient selenium to protect their young from White Muscle Disease. If they are on these high ranges only 2 or 3 months of the year, serious outbreaks of White Muscle Disease should be minimal, because feeds obtained during the remainder of the year may provide the needed selenium to pregnant animals for protection of the young.

METHODS TO MINIMIZE LOSSES FROM WHITE MUSCLE DISEASE

Several management practices can be followed to minimize losses from White Muscle Disease. It is important to consult veterinarians to determine if livestock losses are from White Muscle Disease. Ranchers operating in northern Idaho should in general expect White Muscle Disease in beef cattle herds and in sheep. Also, where supplement feeding is not providing protective amounts of selenium, problems may also occur in dairy calves. About half of the ranchers in the remaining part of the State should also expect White Muscle Disease and plan to minimize losses.

Injecting young calves and lambs with selenium can prevent a large percentage of the deaths caused by White Muscle Disease. Animals not afflicted at the time of injection seldom exhibit symptoms of White Muscle Disease. Afflicted animals usually recover rapidly. Animals grow and gain weight normally after injection. All selenium injections must be done under the direction of a veterinarian because of a federal law controlling selenium use.

Injecting selenium is inconvenient and the material is costly. Dosage is based on animal weight and an estimated cost for calves is about $0.40 to $0.60 each. In addition, injecting new calves in normal ranching operations is inconvenient, and often some calves are missed.

Feeding concentrates of feed supplements may help to prevent White Muscle Disease. For example, cottonseed cake made from cottonseed grown in the Southern Plains may contain enough selenium to prevent the disease. Feeding such concentrates is not a sure prevention of the disease, but may help. Feeding concentrates made from grains may, in some instances, provide just enough additional selenium to prevent outbreaks of White Muscle Disease. However, not all grains and concentrates contain White Muscle Disease preventative selenium concentrations. For example, oats, wheat, dry beans, and some other concentrates often contain less than 0.10 ppm selenium and thus their use would not prevent the disease.

Another possibility is to import hay that is known to contain 5 or more ppm of selenium and use it as a feed supplement or to make supplements. For example, there are areas in central and eastern Montana, the Dakotas, Wyoming and parts of Colorado where hay produced may contain as much as 10 ppm of selenium. Such hay could be mixed with low selenium hay or with other low selenium feed materials and provide animal feed containing more than 0.10 ppm selenium. As an example, 10 tons of hay containing 10 ppm selenium could be mixed with low selenium hay to provide 100 tons of hay with an equivalent selenium concentration of 1 ppm, or 200 tons of hay with an equivalent selenium concentration of 0.50 ppm. However, shipping costs for hay are high and this may not be practical.

These important considerations should be used when preparing feed supplements or planning feeding programs for livestock. The feed industry should consider selenium content of mixture components when preparing mixed feeds for sale to ranchers. To provide feed mixtures of known selenium content the feed industry will require selenium analyses of their component feeds. Only a few laboratories are equipped to analyze for selenium because present methods are complex and special training is required. Without proper training and equipment, reliability of selenium analyses is questionable. Nevertheless, it may be necessary for the feed industry to equip for making selenium analyses or arrange for a commercial laboratory to make such analyses to meet the needs of the industry and as a service to ranchers.

The feed industry and ranchers should also remember that too much selenium is toxic. Animals consistently consuming feed with more than 5 ppm selenium will suffer from selenium toxicity. This can be a serious problem, but it should not occur naturally in Idaho because feeds grown contain selenium concentrations far below the toxic level.

Federal regulations currently prohibit adding selenium to animal feeds; therefore, it is necessary that natural selenium-containing feeds be used in the animal industry.

When cows and ewes are provided sufficient selenium during the gestation period, calves and lambs will not be afflicted by White Muscle Disease. The selenium can be provided in animal feed or by injecting the pregnant females. Pro-

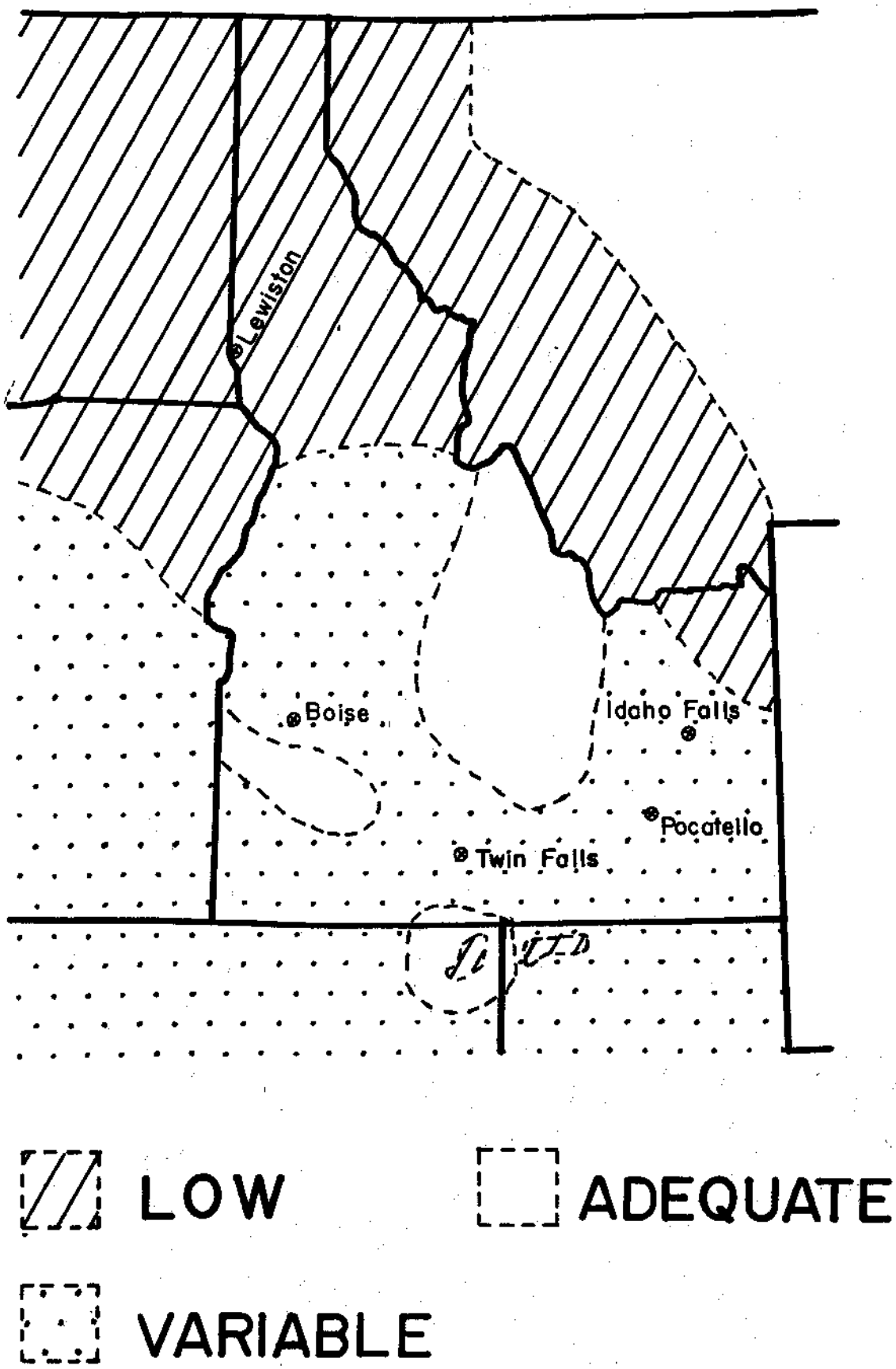

FIGURE 1. The selenium content of forage and hay crops in Idaho and surrounding area.

viding the selenium to the cows and ewes during gestation protects more calves and lambs from the disease than injecting the young animals after birth because in some instances damage from the disease occurs before birth. Some abortions and stillborns as well as some deaths very soon after birth probably result from such prebirth damage. However, injecting pregnant females may be too costly because selenium must be administered based on animal weight. Furthermore, it may not be possible for ranchers to provide animal feed with protective selenium concentrations. In these cases it would be wise to inject young animals with selenium soon after birth according to directions of a veterinarian.

Many serious economic losses suffered by ranchers as a result of losing young livestock from White Muscle Disease can be prevented. It is important that ranchers know that selenium concentration of the feed their animals are consuming in order to plan ahead to prevent or minimize losses. Often losses become heavy before the disease is recognized. Only the ranchers themselves can initiate the action to prevent these losses.

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