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### **PINE NEEDLE ABORTION**

Ponderosa pine needles have long been associated with abortion in cattle. Abortions have usually occurred in the third trimester of pregnancy (the last three months). The abortions have been characterized by a mucous discharge from the vagina, weak uterine contractions, incomplete cervical and vaginal dilation, dystocia (difficult birth which requires assistance), and retained placenta. After aborting, the cattle often have severe uterine infections (metritis) which requires treatment and may prevent the cow from becoming pregnant again in a reasonable period of time. Additionally, some cattle experiencing pine needle abortion become very ill and a few become paralyzed. Occasionally, a calf will be born alive; however, they tend to be small, weak, and susceptible to respiratory disease.

Recently, a component of pine needles has been shown to be the probable cause of the abortions. It is a chemical compound called **isocupressic acid** (eye-SO-Que-pres-ik' acid). When this compound is fed to pregnant cattle in the third trimester of pregnancy, it would predictably cause abortions. These abortions were identical to those seen in nature caused by Ponderosa pine needles. Also, the isocupressic acid caused abortions in a dose-related manner. That is to say, there was a critical dose at which the abortions occurred. At lower doses of isocupressic acid there were fewer abortions. Above the critical dose of isocupressic acid, the abortions occurred rapidly—often within three to four days of the time the pregnant cows were first dosed with isocupressic acid. The isocupressic acid in the Ponderosa pine needles appear to be the most important chemical component that causes abortions. However, there are a number of other compounds in the pine resins that may also cause disease in cattle. Materials found in the pine tips or new pine growth contain toxins that cause severe kidney damage and paralysis in cattle.

One of the problems encountered has been that the amount or concentration of these toxins varies greatly in the Ponderosa pine needles, tips, and the new growth. Also, routine testing of the pine materials is not currently available. Additionally, the total amount of the toxin ingested per day seems to be the critical factor that results in abortion or the other problems. It is complicated as to whether abortions will occur in a given year, as it depends on the concentration of the toxins in the Ponderosa pine needles **and** the amount of pine needles that the cattle consume. Thus, in some circumstances the cattle could eat a large amount of pine needles with low concentrations of toxins and have no problems, in other circumstances, a small amount of pine needles with high concentrations of toxins would cause illness within a couple of days and abortions within three days. One other factor to consider is that cattle do not appear to develop resistance to Ponderosa pine needle abortion. If they abort one year, they could abort the next year. However, many aborting cattle become ill and die or do not become pregnant again.

Pine needle abortion must be differentiated from other causes of abortion such as Foothill Abortion (EBA), Neospora abortion, Leptospirosis, BVD virus abortions, IBR virus abortions, selenium deficiency, and a host of other possible causes. Your veterinarian can be very helpful in making sure you know what the problem really is. Also, the kidney failure that can also occur with intoxication caused by ingestion of excess pine materials must be accurately diagnosed.

For preventing this disease problem, the most important factor is to avoid ingestion of Ponderosa pine needles. Fencing off those areas during late pregnancy might be a practical method for some. Providing ample feed is necessary to be sure that cattle are not "driven" to eating pine needles because they are hungry. Also, providing plenty of space when feeding cattle is important to be sure that some cattle are not forced out of the feeding area and have only pine needle areas available for foraging. Also, feeding hay on top of pine needles may cause involuntary eating of pine needles that could lead to abortion. At the present time, there are no drugs or vaccines that would be helpful in preventing pine needle abortions. Eating the pine needles is central to avoiding the problem.

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