Question: In a recent Bovine Practitioner Newsletter there was a practice tip on using a TS meter to check serum protein as a comparison against the zinc sulphate turbidity test. I believe they used the criteria of a TS reading of 5 on calves. Would you comment on that?

Dr. Hancock: The problem with measuring total protein with a refractometer is that it is less precise in measuring immunoglobulin content than is zinc sulphate inside immunodiffusion. And also it is heavily biased by the hydration status of the calf, so, if you're going into a herd to bleed every single calf between 2 and 14 days of age to assess management, if you are using a refractometer you would have to eliminate the calves that were dehydrated and if it is a high morbidity herd you would expect to have some of those. Therefore you would bias your assessment of management.

Question: The first part of the question, what disinfectants or type of chemicals can be used to disinfect equipment that is being used on multiple animals rather than using individual instruments or needles? The second part of the question, in high incidence areas where the infection rate may reach 70% and the clinical incidence may reach 5%, could vaccine be used to keep those herds intact without an eradication program?

Dr. Miller: With regard to the first question on disinfectants, there has not been much done, but as far as needles, Dr. Roberts in England showed the most effective thing in cleaning off a needle was dry cotton. When they used something with liquid on it, because of the surface change, it tended to keep the "fur" on the needle, so they felt the most effective way if you're not going to change needles is just to wipe them with something dry. The same problem goes with washing instruments with liquids. Most of the chemical disinfectants will kill lymphocytes, but it takes a certain period of time . . . several minutes, as much as 15 minutes with some that have been used. So that becomes fairly impractical too. Perhaps the best solution is just to do a good slushing with running water. As far as using a vaccine in herds, again we don't know why some animals develop tumor and others don't. The only thing we can do is try to get at the viral infection. So if a vaccine is developed which very clearly will protect from an infection, you protect against tumor, but if those herd owners are interested in the export market, that doesn't help them because they are sero-positive. Certainly where the tumor is a problem the vaccine would be helpful.

Question: The question on the slide regarding the culling procedure of the herds in Europe, what was the interval between the test periods?

Answer: On that particular one they said it averaged 5 months and it ranged anywhere from 4 to 8 months. But it varied from one country to another. Some of them applied much more aggressive programming. In the Netherlands, for example, they do the tests 6 weeks apart and then after they have three negative tests they consider them clean. In Germany they turn around and say they don't want to test any more frequently than every four months. They want to give plenty of time for those incubating the infection to develop the antibody. So as far as a recommendation, I would say anywhere from 2-3 months based on our experimental inoculations, because we usually get the antibody anywhere between 4 and 6 weeks after the infection. But some of them have gone as long as 12 weeks. You don't want to do it any oftener than 2 months, anyway.

Question: What about vaccine production for bluetongue?

Dr. Osburn: We were able to get an immunological response with the vaccine. I feel at this time we're probably going to look more at genetic engineering to find those types of viral proteins that are important for that type of resistance. Right now there are 21 different serotypes, as I mentioned. It looks even with the four serotypes we have in the United States there is a lot of genetic variability and we think that a good, effective vaccine is probably not immediately available for us at this time. There has to be some more basic work done on identifying those parts of the protein that will be important in resistance. So it is probably going to require some genetic engineering before we'll know.

Question: What is the importance of insect vectors, both within herds and between herds?

Dr. Miller: The insect vectors problem is quite a controversial subject. My own feeling is that I don't see how insects, as one of the mechanisms, can be ignored because anything that transfers a little bit of blood is capable of transmitting infection. But certainly everybody that works with it experimentally, where we do everything that we can to control all kinds of insect vectors and everything else, see transmission. And we see transmission in the dead of winter in Iowa and nor many insects are going to survive that! So insect vectors are probably important in the overall picture but not in terms of being the most important in transfer of infection, and especially when you talk about from herd to herd. Because even when there is transmission by insects, it could only be over a very short distance because we don't think there is any biological transmission. It is only mechanical. So it would have to be probably even where animals are in very close contact for them to move from one animal to another. Certainly the virus could be transmitted by any biting or blood sucking insect if there were enough of them and if the bites were frequent enough, but it is probably not the most significant mechanism.

Question: Up to 20% of fetal calves will develop antibodies. What percent of fetal calves will develop lymphosarcoma?

Dr. Miller: The fetuses born with lymphosarcoma are rare, but the interesting thing about it is when you get a fetus with lymphosarcoma it is not due to BLV; it is representative of the calf form. I think in every instance that we have investigated, where there was a fetus born with lymphosarcoma, the dam was negative for BLV and the fetus was negative for BLV. The other thing that is interesting about the calf form is that twins are frequently evolved with the calf form, not with the other forms. So I think that is some sort of a developmental abnormality and not anything to do with BLV. The

major thing I am concerned with is mortality in these herds. Morbidity of course is important, but the major factor I am concerned with is mortality. In terms of weight gains in these neonatal heifers, there has never been any study to show that weight gains correlate with productivity in later life and so I am not certain that at some age of some organisms that an interaction with host and environmental factors caused this calf not to gain any weight in the neonatal period. I am not sure that would have an economic impact in the herd but the major way I will answer your question is to say that all of these herds had these three agents we looked for and all did not have problems with mortality, morbidity, or weight gain problems or anything like that. So we know that we can have a symbiotic relationship in a herd between these three agents and the animal. Sometimes we think of a dairy farm as a one species farm. Actually when you really get started looking at it it is a community of species. They can co-exist fairly peacefully under certain circumstances.