

does a very good job, but at times a follow-up treatment with a pout or spray for lice is needed after two or three months.

Internal parasites can be a problem and is becoming a more and more serious one for ranches and lots, causing reduced weight gains. These particular groups of cattle are monitored with egg counts. If deemed necessary, they are treated with injectable or oral wormers. Some use the pellet wormers but, in this instance, the animal that needs the medication the most gets the least.

Coccidiosis is of major concern in calves kept in lots after a month or two of exposure to fecal material from contaminated waterers and feeders. An outbreak can be very explosive under these conditions and necessitates herd treatment with medicated water or feed with sulfas, elimination of concentrates from the ration, feeding a good grass hay if available, and reducing the exposure by providing more area or clean lots until immunity has developed. Individual cases are isolated and treated, usually with sulfas and supportive therapy when indicated. I have found no treatment effective to date for the so-called "nervous" form of coccidiosis when an animal is down and in convulsions.

Urinary calculi is of considerable importance in the western plains area of the United States in steer calves. To date, the true cause of the problem remains to be determined. The incidence in some groups may reach as high as 10%. Dehydration from

other causes, such as bovine respiratory diseases, weaning, etc., leads to the problem. Controls consist of delayed castration for better development of the urinary tract, providing an adequate salt intake, even force feeding it at times to increase water consumption. The use of force feeding ammonia chloride apparently in certain instances is beneficial.

Early observation and diagnosis is of great importance because the results of early treatment with antispasmodic drugs or surgical intervention is much more gratifying.

Eye infections and ulcerations are common problems due to IBR, BCD, bacterial infections, grass awns, etc. These are handled by treating with antibiotic and cortisone powders, injection earlier, or suturing the eye closed if ulcerations are present.

Ringworm is usually a common problem of the winter months and, other than unsightly, causes very little problem. If it gets severe enough, a spray of 1% Captan (plant fungicide) is used on the calves, corals, and feed bunks.

Central nervous system diseases seen are polioencephalomalacia, TEM, aberrant bacterial infections, but usually not as a herd problem. They are diagnosed as individual cases, usually on post-mortem.

In summary, the problems of wintering calves are the same in the north as anywhere else in the United States. Prevention and control of these problems are accomplished by previous histories, observations and proper diagnosis.

Panel Discussion

Dr. Paul Nicoletti
Dr. Paul Becton
Dr. Ben Plummer

Dr. Jodie Blackwell
Dr. Jack Ward
Dr. B. R. Clay

Question—You didn't say anything about supplementing calcium.

Answer—That is the secondary problem in the pathogenesis. In other words the decreased magnesium results in an impairment in calcium homeostasis, so if you can get at the primary problem you have the secondary problem licked. But in our case we have found that wheat pasture is not adequate in calcium, we definitely do supplement calcium.

Question—Reference has been made to the influence of transaconitic acid, you made no reference to that. I wondered if you could comment on that.

Answer—The subject of wheat pasture poisoning or grass tetany is something that has been worked on for many, many years and there are many angles that are being approached. Aconitic acid is one of the intermediary compounds in the tricarboxylic acid cycle. The "trans-" form is very high in some plants. It is not readily utilizable by rumen microbes. It takes

an adaptive population to handle it. So what happens, you get a build-up of aconitic acid which will act as a chelator of metal ions. That has been one of the theories relative to impaired absorption of magnesium. It can work two ways, directly as a chelating agent as transaconitic acid or it can work as a competitive inhibitor for the enzyme aconitase which is necessary for citrate to go to isocitrate. Therefore you get a build-up of citrate and citrate too can become a chelator. So you can have a two-way effect. In summary: Yes, there are some possibilities that aconitic acid may be involved and we find that the wheat plant during cold periods builds high levels of transaconitic acid. Other cool season grasses do, too.

Question—The gentleman from Wyoming got his calves weaned and without any bad winter storms. I wondered if he would care to include those in a weaning and wintering program.

Answer—If you are in an area where you have bad

winter storms, you sure put yourself up a place to get cattle in. When you get cattle in and crowd them you do get all the problems that go with it. But a strange kind of thing occurs, it seems that the more likely you are to have a real bad storm, the more equipment you'll have to cope with it, and the more likely you'll listen to the weather situation. Last spring we had a real bad storm on March 28, I think the worst 24 hour storm I ever saw. Strangely enough you fellows who were in the very worst part of it were the ones that had the least losses because you are used to coping with this type of situation. There is one thing about it. A well bovine animal is a remarkable beast. A well animal, say at least after the rumen becomes well developed, has a remarkable ability to take on more forage and regulate body heat. When you deal with sick calves in bad winter storms, there is one beautiful thing about it, it eliminates the weak ones and you don't have to worry about them again next week.

Question—Dr. Nicoletti, are you advocating a widespread adult vaccination program?

Answer—I thought this was in the summary in which I indicated that my conclusion was, insofar as a future use of adult vaccination, that it would be limited to those herds in which there is infection and in which the standard procedures were not satisfactory in eliminating the disease.

Question—What are going to be the allowable titers for brucellosis and also regarding anaplasmosis treatment, the carrier cow—you can remove the titer and will she become susceptible again? I was wondering if this could be done with brucellosis? For example, you can take a dog and treat it and remove its titer, and if a human being, like I had brucellosis and I was treated for three weeks, am I susceptible again?

Answer—Well, let's answer your last question first. There is no evidence whatsoever that titer is related to immunity. As a matter of fact, it is quite the opposite. Titer is a reflection of present or immediately past experience with brucella antigens. So let us never make the mistake of equating titer with immunity in brucellosis. I can't tell you if you are immune to brucellosis at this point. There is no way to tell you other than challenge you, and I doubt that you would submit to this. The first question, insofar as what will be the titer allowances for brucellosis next year. As you probably know, the regulations, at least the recommendations for regulations for the brucellosis program, are those which are recommended by the National Brucellosis Committee of the Animal Health Association. In other words, it is in their hands as far as recommendations for what would be the titer in any year.

Question—There have been no changes?

Answer—No.

Question—Dr. Benton, I'd like to ask you two questions concerning the national picture as far as implementing a program. First I'd like to get your thinking on the approach that Texas cattlemen have taken on controls as opposed to eradication and in

another area, since I do sale barn testing, where, as you know, we have at this particular sale as many as 3000 head that are assembled beginning from somewhere in the neighborhood of 10 o'clock Sunday morning until 1:30 Monday afternoon for the sale. Now, if a program to implement testing at the point of first assembly were a part of this program, I don't see how you could practically conduct a sale and test these cattle.

Answer—Well, I don't really know what specific answer you want about the Texas approach. The only thing that Texas has done or failed to do is two years ago the U.S. Animal Health Association strengthened the uniform methods and rules by requiring that animals known to be exposed to brucellosis be identified with a hot iron S brand on the left jaw before moving into market channels destined either for slaughter or to a quarantine feedlot. Varying states have adopted this as their state regulations since that time. Some already had it prior to that time, but most of the states have adopted it by now, in fact all of them except Texas have adopted it as part of their procedures in their states. Texas has not adopted this. This is the only thing where they are short. They are allowing animals known to be exposed that move into livestock markets to move without identifying them as being exposed and thereby they get back into clean herds even though they are sold supposedly for slaughter or for quarantine feedlots. You know we have a lot of people who buy cattle two ways, they buy all kinds of cows, and they sell them to wherever they can get the most money once they get them home. So at this point, this is where they stand. They want to continue everything else they are doing, this is the official stand of the Texas Animal Health Commission. They are willing to continue everything else they are doing, but they don't want to identify these exposed cattle. There are different individuals or groups in Texas saying they would rather go with a control program and not have an eradication program.

Now your second question concerning testing cattle at first point of concentration. I never said that it would be easy, but I think it is a better way to find infection than what we are doing now. I do know that at your sale probably you have 3000 animals, you very seldom would have 3000 cows, or animals that are old enough to test, but even if you did, it could still be done if you really wanted to do it. It might take more than one, two or three people. You may need one, two or three test chutes and you've got to start the day before or if you had that many, maybe two days before, but that is still better than living with the disease or going down the road and testing everybody's cows on the farm. This is just one approach to improve our capability of finding the disease.

Question—Dr. Becton, frequently we hear about doing away with the eradication program and going to a control program, the part that Texas has elected to omit—the control of exposed animals and probably in-

infected animals. Would this or would this not be an integral part of the control program?

Answer—My thinking about it is that any control program is going to have built into it most of the inconveniences that are in an eradication program. I mean if you stopped to analyze what's involved in a program, in an approach to brucellosis eradication excuse me, brucellosis control, it depends on the thinking of the person who makes the statement. A lot of people are thinking of control as nothing but vaccination, in other words vaccinate as many calves as possible and build a resistant population, but at the same time, at this point in the move toward brucellosis eradication, much of the country would not accept cattle from an area that was doing nothing but vaccinating. If known infected herds were not quarantined, if known exposed animals were not identified and restricted, most states would not admit cattle from an area that had nothing but vaccination and turned everything else loose. So if you think about a control program that could be acceptable, you've got your quarantines, your infected herds that have to be retested, you've got movement restrictions to be complied with—the same things that you have in an eradication program. The only difference being, in an eradication program you put it all together and do it in a more vigorous manner and at the same time, as I said earlier, we need to improve the effectiveness of some of the things we are doing.

Question—I want to ask Dr. Clay a question. You were talking about protein in wheat approaching 30%, so I have three questions. What will the feed analysis show, let's say first in wheat, in calcium and magnesium?

Answer—The wheat plant analyses that we have run show that the magnesium runs about 0.2% of the dry weight. Now, that's an average of a lot of samples; some 30% or so will be under that. The 0.2% is considered the minimum requirement that a cow must have in her daily intake in order to maintain her magnesium serum levels. Our data has shown that

the calcium level is down to around 0.15% which is very low for a lactating cow which needs around 0.3% (about 0.27%). So we know that those figures are out of line, but our magnesium is not all that bad on an average basis. Of course potassium is very high around 2.6%.

Question—In regard to the protein, this time I'll ask Dr. Clay, how much of that represents actual protein, and how much some intermediate product in the reduction of say nitrates before you get to protein?

Answer—Of that total crude protein of 30% about one-fifth is nonprotein nitrogen. Of course, the ruminant can handle the large percentage of nonprotein nitrogen, but the unfortunate thing relative to the wheat plant is that it is not very high in carbohydrate, which is typical of most grass plants. So it is necessary for the animal that eats wheat as the sole diet to convert a lot of the protein, or deaminate the protein, and utilize it as carbohydrate.

Question—On this wheat pasture poisoning, can you feed some sort of roughage?

Answer—Yes, if you can feed a legume forage or roughage. Legumes are high in both calcium and magnesium. You can prevent wheat pasture poisoning if you can assure magnesium intake. That is one of the ways of doing it. I might mention that one other thing that one can do to improve the availability, or absorption, is to give a little grain. With a little grain in there you lower the pH and with a lower pH you improve the absorption.

Another Speaker: Can I comment on that? We live in grass tetany country. We take round bales of hay and set them up straight and take hot molasses or hot syrup and pour it on them before we spread them out to eat because hay is not a good competitor with fresh green grass. The other thing is to take corn on the cob and just throw it out on the pasture, throwing it a different place every day, and this sort of thing will work, if you work at it.

(Dr. Clay's paper will be published in the 1976 Bovine Practitioner.)