External Parasites— What's New That You Need to Know

Bill C. Clymer, *Ph.D.*
Clymer Research & Consulting, Inc.
P.O. Box 7513
Amarillo, Texas 79114

The livestock industry is an interesting and very complex system. Oftentimes we lose sight of how complicated it really is. We have come a long way from our initial involvement in the cattle industry. Our ranchers many years ago ran cattle out on the open range, and spent most of their time on horseback. Now we use cellular phones and may round up cattle with a helicopter.

Our industry has changed a lot. We've gone to more of a sohpisticated system. We now have beef factories, as we often call the feedlots. We have trucks that move these cattle around. This is one of the things that causes a great deal of concern in our parasite control program in the cattle industry. We seldom ever know the exact origin of the calf, where it came from nor how many places it has been before it becomes involved in our particular operation. We may have cattle come out of the southeast United States, come to the Texas panhandle on wheat, go to New Mexico or southern Oklahoma or the flint hills in Kansas for summer grass and end up in the feedlot from Texas to California.

The geographic locations of our operations too have a great deal of bearing on the type of internal and external parasite problems that we have. Many of our operations are cow/calf and will have different problems than the feedlot. But, because of all this movement that we have in the cattle industry, it is difficult to know the specific problems until we know the geographic area and a little bit of the history of the cattle.

Our industry has come a long way scientifically also. We started out with very few pesticides to use. When we were able to find some products that could be used, they were used widely and not too astutely. They oftentimes contaminated man and our environment because of their misuse. We became a little more modern and as we became more modern we developed new techniques, new products and that trend still continues today. Because of the EPA and FDA regulations, we have lost many of the excellent tools that we had. And, we are in danger of losing a lot more if we don't very judiciously use these products.

Horn Flies

One of the other problems that we have in the cow/calf and stocker industry is the horn fly. This is a pest that you're all very familiar with; you had it in your parasitology in vet school and you've known "what a horn fly is" for many years. But what do you really know about a horn fly? We know that a few years ago, you could say the word pesticide and this particular pest just disappeared. Now we have a pest that has become resistant to many of our commonly used products and one that is much more difficult to control.

The horn fly life cycle is quite short, less than two weeks. They spend most of their life on the host. They fly down to a fresh manure pat to lay their eggs and return immediately to the host. In about 9-12 days, adults will be emerging from the manure pat. When they do emerge from the manure, they will fly long distances so that we have constant reinfestation pressure. At one point in time, we felt that this was not a problem and that if the flies could be controlled on one side of the fence there would be little migration.

Bulls harbor the largest number of flies. In more semi-arid regions, the fly numbers often drop during the hot part of the summer and then increase in the cooler fall of the year. Many tests have been done on these flies trying to determine the exact economic loss and this is extremely difficult to measure. We do feel that horn flies are definitely an economic problem. There is much discussion as to how many flies constitute an economic infestation. It is pretty well accepted around the industry that if you have 50 or more flies per animal, it will be to your benefit to control flies.

When the pyrethroids first came in, we could put one eartag on every fourth or fifth cow and completely eliminate the fly problem. As a result of that and other management practices, we soon saw that we were not getting as good control. We started putting a tag on every animal, then two tags on every animal, then we realized that we had a resistance problem. Some of the first signs of resistance that showed up were found in the Stillwater area of Oklahoma. This was one of the first areas that we started testing the pyrethroid eartags. We were told by some geneticists some time ago that we would have resistance to the pyrethroids by the horn flies and sure enough, this came to pass.

When you get heavy fly numbers, you will find that a lot of irritation and blood loss occurs. The animal is constantly fighting flies and does very little grazing. They will lose weight. If it is on a cow, milk production will drop. The calves will not weigh up as heavy and on yearlings, the same result will be the case. Eartags have come a long way. We started out working with an old tag called a Rabon tag many years ago. It was real heavy and migrated through the ear causing a large percent to fall off. Resistance did develop to the pyrethroids and they were very short lived as far as the number of years that we were able to use those products.

There is a constant battle going on between the companies that are trying to develop new products that will afford the type of control that we've had in the past. We are going to have to re-educate many of our producers; they had gotten used to receiving 100% or near 100% control. Now, we need to think in terms of just controlling the population and not eliminating that population. I think this is a much more realistic goal to reach and has less chance of resistance problems developing.

We've seen a variety of different eartags, with many new ones being tested at this time. We have just built a new research facility at our location south of Amarillo, where we have animals inside environmentally controlled rooms and we're testing eartags on a year-round basis. There is a great deal of effort being put into new products for horn fly control. I think that in the next few years, we're going to see more and more developement as far as products are concerned, not only in new products but also in method of delivery or method of attachment. I think this is a real important part of the total industry picture in the future. It may not necessarily be a new product on the market, but new uses for old products in innovative ways to deliver the pesticides to the animal.

Many of the tags that have been tested have not proved to be satisfactory and have not entered the market place. Some are close to the market; others are still at the drawing board. Some of the problems that develop are: retention of the tags, resistance, tags breaking off, short termed payout of the chemical and irritation to the animals.

Horn flies are one of our major problems that we see in the cattle industry in the cow/calf area. It's not a very big problem in the feedlot. In our cow/calf and yearling operations, this is one of the major problems that we need to face. It is a warm season problem. As soon as cold weather arrives, the flies tend to disappear, going into a winter hibernation period, and then will be around in the spring, as soon as warm weather returns. Horn flies can still be controlled with conventional sprays, dips, and pour-ons, as well as oral treatment. But, this is a short-lived control and does not afford the quality of control that most operators would like because of the additional labor. Dust bags are still very effective in many areas, if the cattle can be trained to use them.

The horn fly situation has some bright spots, but we are aware that this insect went for many years with no resistance to organophosphates and then "all of a sudden", had almost area wide resistance to the pyrethroids. We thing there are some new products on the horizon; we feel that there are some new methods of delivering those products that will afford us horn fly control. You, as a practicing veterinarian, should be tuned into the problem of resistance in your area, and tell your producers not to buy the tags that aren't effective. Average tag life is something like 3½-4 months. We have some that will last longer and some that don't last quite that long. Unfortunately, our release rate has been quite rapid on many of these tags. We see a spike in the release rate, followed by a slow rate for a long period of time. This is one of the things that has contributed to the resistance problem.

Scabies

Another problem I would like to address at this time is cattle scabies. It is not near the large political problem it was for a few years; but Psoroptic mites are very important throughout much of the cattle raising area. Some states have not had a scabies outbreak. If you haven't, you don't really know what you have missed---political implications, federal quarantines and other headaches.

The *Psoroptes ovis* mite is small, less than 1/40 of an inch long, but it causes a great deal of irritation to the animal. It is very detrimental to weight gains, milk production, and feed conversion. Scabies mites are fairly active as far as moving around on the animal; they are not a burrowing mite like the sarcoptic mite or the demodectic mite. They feed and mate on the animal. The life cycle is about 10-12 days. Scabies mites are spread very easily from contact.

When we first see scabies infestation showing up on an animal, it may look very much like an infestation of lice. We'll start seeing some small patches of hair gone; the animal will start licking or rubbing. These areas gradually spread and soon may become lesions, showing the elephant-hide appearance, loss of hair, and heavy crusting. Oftentimes the animals will injure themselves. One of the key factors is the constant irritation with that animal licking and rubbing, trying to relieve the itching.

If you look at a pen of animals that has scabies, you will see animals doing all sorts of contortions trying to relieve the itching. Fat cattle will lay on the ground and rub. Younger cattle will scratch and rub on everything around, almost pushing the fences down. Scabies has no respect for breed or size of animal. We have said that it was a cold season pest, but we've found that hair length probably has more to do with scabies infestations than temperatures. We are able to get a very severe scabies infestation in the middle of July if we restrict those animals from grooming themselves. Animal grooming is probably responsible for 80% or more control of Psoroptic mites. The mites will gradually spread over the entire body and may not actually kill the animal, but will pre-dispose that animal to respiratory problems and ultimately death, if left uncontrolled. There is no part of the animal that is not susceptible to having scabies mites present, from the tip of the nose to the tip of the tail. We've seen some animals almost completely denuded of hair because of the heavy scabies infestations. Many times the animals injure themselves causing bad abscesses, bruises and cuts trying to relieve the itching. I've seen animals actually lick until the hide was raw with blood running down their legs.

Scabies mites are spread by contact, either direct or indirect. They can be controlled with the limited products that are currently on the market. We need to use these products at the label rates and follow that label very

carefully in order to obtain control. Current products include Ivomec, CoRal, and GX 118.

We artificially infest animals in our research facility. These animals will start showing lesions within 24 hours which rapidly spread over the body. We have yet to put an animal in our confinement facility that we could not give scabies mites to by just taking mites from one animal and physically putting them on another animal. Scab formation is so heavy that oftentimes the thickness of the hide is nearly double on an animal that has severe scab.

The best way to determine if you have scabies mites, is to take a scraping in an ointment tin or some other container, and either send it to the Diagnostic Lab, or you may look at the sample yourself. We have a wash system that we use to determine if live mites are present. We need to know if live mites are there and we can't use the digestion method. We take the sample, put it in soapy water and agitate it very vigorously, then place it in a double Buchner funnel, with the upper funnel catching the hair and the larger pieces of scab exudates. The mites are washed through with a wash bottle into the second funnel on to black filter paper. This is done with the aid of a vacuum pump. The filter paper is then placed under a microscope and examined carefully to see if live mites are present, what the stages are, the number of eggs, etc. This technique is very easy to perform.

Scabies can be a very damaging pest and is one that does not directly kill the animal or at least we didn't think it did for several years. We have found that a heavy scabies infestation affects the white blood cell count of the animal tremendously, eventually affecting the bone marrow and ultimately may create respiratory problems. And, of course, we don't like to see animals leave in the dead wagon, but that is what may happen if they are left uncontrolled. Animals may starve to death standing in front of a full feed trough with feed consumption dropping by over 50% because of severe scabies infestations. If you do end up with a scabies infestation, do not hesitate to call the federal authorities because they will ultimately find out about it and **it is a reportable, quarantinable disease** and one that we need to stay constantly on top of.

There are other mites, such as the Sarcoptic, Chorioptic and Demodectic mites that occur from time to time. These are not nearly the economic problem that we see with the Psoroptic mites. Infestations spread by physical contact, secondary contact, which can include loading chutes, fences, ropes, hot shots, etc. The life cycle is as follows: the eggs hatch in about 3-5 days, the larval stage takes 2-3 days, the nymphal stage which is the nonsexual form of the adult, 3-5 days, and then the sexually mature adult is ready to mate and start laying eggs from 1-2 days. Each female will lay about 15-24 eggs, and the eggs will hatch in 10-14 days. This is the reason for the two treatments with two of the products approved for scabies control on a 10-14 day interval.

The symptoms, once again, are constant tail switching, licking, and loss of appetite. You may find small papules or little knots on the withers, and visible lesions with hair loss. Ultimately, you will have weight loss, reduced milk production, and oftentimes, reduced weight gains. Also, the animal will become more susceptible to other diseases and if left uncontrolled, death will be the ultimate result.

Lice

We have two different types of lice—the blood sucking louse, and the biting louse. There are four different types of blood sucking lice and one type of chewing lice. Our louse problems are primarily a cool season problem. We see them starting to show up in the fall and usually reach peak numbers sometime in the late winter. The losses are difficult to measure. We've had a lot of discussions in our peer group about this and have really been unable to come up with the exact economic losses. The animals that are severely infested definitely need to have control applied. Those animals lightly infested will rub on the fences and cause a lot of other problems. I very strongly recommend louse control on all of your animals. Because of our cattle movement, we have continual reinfestation pressure. If we do a good job controlling lice, we can control our winter louse problem just by treating all of the new animals that go into a herd and keeping those herds isolated. Lice can be passed through a fence, where animals rub on each side of the fence, but most often, we will have some carrier animals in our herd that maintain light to heavy populations of lice through the winter months and very light populations in the summer months. These have been reduced greatly with some of our products that we have on the market today. We still have a tremendous louse problem in certain years across the United States.

The louse eggs are called nits; they glue the eggs to the hairs and there they hatch. Populations take about three weeks to develop from egg to egg laying adult, depending on the specific species. Generally it will take two treatments for most of the products to get very effective louse control. Some of the animals become very heavily infested. We see animals that are almost blue from the lice present on the animal's body. We know that these animals are having a great deal of blood loss and irritation and therefore control is necessary. Different species are located on different parts of the body. The chewing louse is primarily along the top line, while the long-nosed cattle louse, short-nosed cattle louse, and little blue louse will most often be found on the face, brisket, and the under line of the animal. Oftentimes we see such heavy infestations that you can't put your thumb on the animal without touching a lot of nits. If we look closely underneath next to the skin, we will find heavy populations of sucking lice. It seems as if some of the animals that have heavy louse infestations are often irritable. This may be due to the infestation and the constant irritation. Carrier animals show a little high headed wild eyed appearance. Oftentimes producers will not realize that they have a louse problem until large patches of hair start coming off in late winter. When this occurs, much of the damage has already been done. It can be eliminated at that time, but often times we

wait too late to encourage our producers to carry out some type of louse control program.

The four species of sucking lice are the long-nosed cattle louse, the short-nosed cattle louse, little blue louse, and cattle tail louse and are all ones that we normally see. The only species of chewing louse is the little red biting louse.

The cattle tail louse normally occurs in South Texas and South Florida. Occasionally we will see it in other areas, and as the name implies, it is predominantly found in the switch of the tail. If it is a real heavy infestation, it will be clear up toward the tail head.

The other three species are found in varying degrees across the United States. Different types of animals, such as dairy animals, may have a different population present, but many times, you may have two or three different species of lice present on one animal.

The chewing louse causes a lot of irritation; it is not a blood feeder but it does feed on the hair, skin, and skin exudates. It is a very mobile louse and often when you're taking a scab scraping, this is the little pest that you will find.

Ticks

We need to be aware of the various problems that we have. Ticks are one that we oftentimes overlook. The Lone Star Tick is one that is pretty well spread across the United States but does not occur in the semi-arid regions. Ticks are an interesting pest depending on the particular geographic region in which you reside. The Gulf Coast ear tick is very small in its geographic distribution but has become one of the major problems that we see as far as tick losses today. Its habitat is an area where we have had screw worm problems in the past. In the last 2 or 3 outbreaks of screw worms in the U.S., about 80% came from strikes at tick feeding sites.

There are several other species of ticks that may be a problem. Ticks require continual treatment because the animal is constantly being reinfested each time it goes to the field. I did my dissertation work on ticks and can say that it is a real challenge to get tick control on an animal out in the pasture. Many times products have to be applied every three weeks or so to keep tick numbers down. In our deer population, we have seen areas where 40% or more of the fawn crop is lost each year from the heavy tick infestation. So, in the southeastern and southern U.S. area with a little higher rainfall, tick problems are a very major consideration.

Unfortunately, we do not have a wonder drug or one particular product that is very effective for tick control. Even our dips and sprays, as well as our injectible products that we have available now will give only temporary results as far as controlling infestations of ticks. The Spinose ear tick is predominantly a problem in the more semi-arid region; and it seems to be spreading its range. It is a problem that is also difficult to control; none of the products are real effective except individual ear treatment, with either a spring bottom oiler or a puffer duster. Systemic materials, because of the feeding habits of the Spinose ear tick, afford little control of this pest.

Other Parasites

Horse flies are a problem in many areas. With systemics, if the blood level is high, we may see some suppression after they take a blood meal. There are no real effective means for horse fly control in pastures where they are a serious problem. Deer flies are much like the horse flies except a little smaller. They are also blood feeders and also very difficult to control because of their infrequent feeding habits. Mosquitoes fall into that same category. In some areas, particularly in the salt marshes, we see vast amounts of irritation and blood loss caused from heavy mosquito infestatins.

The screw worm for all practical purposes has been eliminated from the U.S., but from time to time it rears its ugly head. Many of you younger persons in the group have never seen a screw worm infestation and I can say from experience that I hope you never see one. We should be aware of what these problems are. If you have an animal brought in from a client and it has worms (maggots) present in a wound in the body, they need to be checked out to make sure of the identity. We don't want an occurence such as the one we had caused by the dog that brought screw worms in from South America to the U.S. just a few months ago.

One of the areas I would like to concentrate on is "our problem analysis". What are our problems? We know that we have parasite problems. We know that there are products that will kill those particular parasites. But, let's look at how we apply those products. What is the proper administration? What's the proper dose rate? What is a Friday afternoon Syndrome? Are you interested on Friday afternoon in going out to treat a bunch of ol' cows for grubs? If so, will you do as good a job as you'd do on Wednesday morning at 10 o'clock? What are the climatic conditions? All of these things enter in for us to do an effective job. We need to guard against letting ourselves fall into a trap where we are not as effective in furnishing the information for our clients that they need. Proper safety equipment is not only the ideal...it is necessary!

I do a lot of litigation work and because of the many litigation problems that I have seen, I assure you that one of the main things that we need to concentrate on is following the proper safety precautions that are on that label. It is not very comfortable to be attired in a wet suit and respirator and goggles and rubber gloves when it is 90 degrees, but I would much rather take my chances with a heat stroke as with an organophosphate or some other type of pesticide poisoning. Many of our pour-ons are very effective on the animal but they are a little messy to work with; we need to be very careful. If any of you say that you can treat 100 head of cattle and not get treated a little bit yourself with most of the products, I would challenge you to prove that to me. It is

extremely difficult with most of our working facilities to do this without getting the product on non target areas. Therefore, we should use the proper safety equipment. Even while working with spray dip machines, or sprayers, respirators are in order, and rubber suits are in order. Goggles are a must! OSHA would be very upset with us if they could see the ways and some of the methods we go about mixing our chemicals, and stirring our vats. We need to be very aware of these precautions because many times we are financially *and* morally responsible if accidents do occur. Proper safety equipment, proper knowledge of the symptoms if accidental poisonings do occur and also knowledge of pest control is imperative. If you do have an accidental poisoning, take the label of the product with you so that the physician will know what to use as an antidote.

Many times we have products that are applied through self treatment devices and these products are only as good as we maintain them. If we don't do a good job on keeping those items in shape, we can run into some real problems. Also, all of our products are dangerous. We need to treat them that way.

We would like to be able to just turn and walk away from all of these problems. But, they are real problems. They are not problems that we can just skip over. I think many of us in school took those courses and learned a little about the parasites and got on with the medicine! We overlook a real important part of our practices as far as being effective in helping our clients with their various problems.

In the cattle industry, we make our mark on our cattle by a brand. And, I think we in this industry can make our mark on society and on the cattle industry as well by following the safety practices that we need to follow, by knowing a little bit about the parasites and being able instead of making tracks on the beach with hundreds of people, to make our own tracks in the sand. It is up to each and every one of us to see that we follow the proper safety precautions, properly analyze the problem, and recognize the parasite. If you don't know what the parasite is, call someone in that does and let us be professional in helping our clients with the various external parasite problems that exist today!

Abstracts

Assessment of an oxfendazole pulsed release bolus for control of parasitic gastroenteritis in calves in a rotational grazing system

G. B. B. Mitchell

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A group of 71 Friesian bullocks, aged six to nine months, vaccinated against lungworm, were randomly allocated on a liveweight basis to two groups of 40 and 31 animals. At turn-out each calf in the group of 40 calves was dosed orally with a pulsed release bolus designed to deliver five doses of oxfendazole at regular intervals during a period of up to 130 days, the first dose being released about 21 days after administration. The group treated with the bolus grazed 2·4 ha and the control group grazed 3·6 ha of permanent pasture for six weeks before having additional access to similar areas of silage aftermath. The control group was treated 99 days after turn-out and when they were housed with fenbendazole (7·5 mg/kg). Faecal worm egg counts, plasma pepsinogen activities, pasture larval counts and liveweights were recorded fortnightly. Significant reductions in worm egg counts and plasma pepsinogen activities were recorded in the calves dosed with the pulsed release bolus together with significant improvements in the liveweight of younger calves compared with control animals. Pasture larval counts were lower in the fields grazed by animals treated with the bolus.

Use of an oxfendazole pulse release bolus in calves exposed to natural subclinical infection with gastrointestinal nematodes

I. V. Herbert, A. J. Probert

Veterinary Record (1987) **121**, 536-540

During the first grazing season a group of calves treated with an oxfendazole pulse release bolus achieved a mean (±sem) weight gain of 140·7 (±6·7) kg compared with 106·5 (±5·7) kg by a group treated once with ivermectin mid-season, and 116·9 (±6·9) kg by a group which received no treatment. This economic advantage was maintained during the period of winter housing. By the end of the second grazing season, during which the animals received no anthelmintic medication, they weighed on average 20 kg more than the wholly untreated group, a difference which was not statistically significant. No signs of clinical disease were observed in either the animals dosed with a pulse release bolus or the undosed control animals during the two year trial period. The treatment with the oxfendazole pulse release bolus greatly reduced the degree of pasture contamination in the first year but in the second year those animals that had been treated in the first year developed higher worm egg counts ($P < 0·001$) and thus augmented the levels of pasture