Thoughts on Current Anthelmintic Needs and Usage

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Introduction

It is generally agreed that infection with nematodes is common in the United States. The degree of severity and economic impact is not commonly agreed on by experts. When we think of parasitism we are generally thinking in terms of a production disease rather than one affecting life and death situations. Certainly, clinically obvious parasitism does occur and signs are recognizable, especially in cattle originating from areas in which climatic conditions favor the survival and development of these parasites.

The practicing veterinarian is thus faced with recommending to his/her clients treatments to prevent sub-clinical infections which may or may not be cost effective for that client. Most beef cows are not infected by large numbers of internal parasites and do not serve as a major source of infection for their calves. However, many studies have shown that weaning weights of calves have been increased by anthelmintic treatment of the dams, although performance parameters of the cows themselves did not indicate benefit. There is some indication that this increased weight could be the result of increased milk production by the dam. Few well conducted studies have been performed to substantiate this claim.

It is generally agreed that sub-clinical parasitic infections affect the young more than the adults. Results of trials to demonstrate the degree of benefit of deworming regimens in these animals varies considerably. The losses are subtle and affected by many variables. Also, in some trials it appears that the timing of measurement of the benefits affects the results. Cattle showing gains for a period of time following deworming do not always show those benefits throughout the growth or finishing periods.

In spite of these rather negative introductory remarks it must be stated that the available evidence does point to the fact that sub-clinical parasitism is important and as such most veterinarians find it of benefit to their practice to use some deworming regimens for their clients. Certainly, they are helped in these efforts by the drug companies selling the products who have produced impressive justification for the use of their products. Many of these studies are well done and well presented, but one must realize the results presented by companies will provide a regimen which best fits the attributes of the product(s) they have on the market. The company technical service veterinarians are good sources of information concerning the products their companies sell. It is recommended that the practicing veterinarian feel free to contact and utilize these people for information concerning anthelmintic needs for their areas.

Parasites of Concern

Stomach worms:

Included in this category are Haemonchus (barber's pole worm, large stomach or wire worms), Ostertagia (medium or brown stomach worm) and Trichostrongylus (small stomach worm). In a recent study conducted by Hoechst-Roussel Agri-Vet Co. as part of their Parasite Evaluation Clinic Program these parasites far outrank others in incidence. These parasites shed large numbers of worms that survive best in lush, moist pastures. Heavily grazed irrigated pastures provide excellent environment for survival of the larvae. All ages of cattle will be found to be shedding eggs with calves as young as 3 months of age infected when on infested permanent type pastures.

Threadnecked worm

These are Nematodirus. In the survey listed above these parasites were second in incidence to the stomach worms. This parasite is found (by egg count) in the highest numbers in younger animals since there is some degree of immunity established in the host animals. The eggs are quite hardy surviving up to three years on pasture and survive well in confinement management conditions. Since this parasite sheds few eggs it can be missed or suspected to be present in low incidence. It is often suspected as the cause of diarrhea, depressed appetite and poor weight gains in dairy heifers which may be more severe if the infection occurs in combination with Ostertagia, one of the common stomach worms.

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Coopers worm

This was the next prevalent worm found in the survey. It is Cooperia. They were found most frequently in northern dairy units in the yearling cattle. The damage done by this worm does not appear to be as serious as the above categories.

Hookworm

These are Bunostomum. These were found in relatively low incidence on beef operations but were more prevalent in dairy units, particularly in the south. The authors speculated that this was due to the fact that most dewormers commonly used in dairy operations are not labeled for hookworms. In cattle these parasites are not as serious in terms of both pathology and prevalence.

Others

Nodular (Oesophagostomum), Lungworms (Dictyocaulus), Tapeworms (Monezia), Whipworms (Trichuris) may occur but are of low concern for the upper Midwest.

Products and Regimens

Characteristics of an ideal cattle dewormer include the following: It will have a wide margin of safety for the target animal and for the food chain. It will be compatible with other compounds. It will have a broad range of activity to include both the immature forms of the parasites as well as the mature forms. It will be easy to administer to large groups of animals. It will be economical to use on a cost/benefit basis. The latter is difficult to establish in an unbiased setting.

Products are grouped into Class I Dewormers and Class II Dewormers with the class I being those products that kill only the adult worms while the class II kill both adult and immature forms. Products in the class I include those that contain Lavasmisole hydrochloride, Thiabendazole and Morantel tartrate. Those in the class II category include products containing Ivermectin, Fenbendazole, Albendazole and Oxfendazole. It is suggested that a class III dewormer definition might be instituted to include those killing the adults, the immatures and the inhibited stages.

This brings up the question of the importance of the inhibited stages of the significant gastrointestinal parasitic worms of cattle. These worms will, under the right conditions, go into an "arrested" stage during its life cycle wherein it will be harbored in the gut but is not active allowing the parasite to survive for longer periods of time. It does little or no damage during this stage but causes its damage when it emerges and continues its growth. The ability of a product to kill inhibited stages has long been used as a promotional feature for a product. There is not full agreement as to the true significance of the inhibited stage in terms of damage to a group of animals and thus the economic significance. It is suggested that with strategic deworming practices which result in maintaining cattle and pastures with low parasitic loads that there are few inhibited larve that develop.

For preventive parasite control in northern cow/calf herds it is recommended to treat in spring (cows, bulls and replacement heifers), treat calves in mid-summer and all groups of animals in the fall. Stocker cattle are recommended to be treated before being put on pasture (with a second treatment at mid-pasture season if heavy stocking is practiced) and when they are taken off pasture. For dairy replacement heifers it is recommended that treatment be given three and eight weeks after turn out on pasture and again in the fall. Each company has its own recommendations for timing and usage of their products but most stress that the main goal is prevention and therefore reduction of the pasture load is the important goal. One must consider, in this regard, the use of class I dewormers which kill only the adults and the class II dewormers which kill the adults and the immature stages. The goal is to time treatments to seasonal grazing patterns so that the adults are killed before grazing and immature worms killed before they begin egg shedding. The companies selling the products for deworming each have strategies that they recommend for using their products in preventive programs.

The following is a review of some of the main products presently in use:

Ivomec

Ivermectin, derived from the avermectins (a family of parasiticide compounds with a wide range of efficacy). This Merck & Co. product is one of the most successful animal health products with use and sales at very high levels throughout the world. Several companies have been busy trying to find and duplicate the efficacy of this product (or family of products). Its strengths are its broad range of efficacy for both internal and external parasites. It is provided in injectable, oral and pour-on formulations. Its efficacy includes all of the above listed parasites with the exception of a weakness in the Threadworm area. It is not a tapeworm product. In the pour-on formulation efficacy against hookworm is also a weakness. The level of efficacy is recognized as good for all labeled parasites. Some feel there are strains of Haemonchus that are showing up to be resistant but the significance of this is not clear. With the higher price of the product the competition is mainly in the cost-benefit arena. The product is not labeled for breeding age dairy cattle.

Safe-Guard / Panacur

Fenbendazole, a benzimidazole compound is a product of Hoechst-Roussel Agri-Vet Company. It is presented in many oral dosage forms including paste, drench, free choice minerals, molasses block, crumbles, pellets and cubes. It has a broad range of activity against the important gastrointestinal parasites of cattle. For inhibited Ostertagia the dosage has to be doubled. This product is not labeled for dairy cattle of breeding age. Since the product is not active against grubs and other external parasites, the company has developed combination strategies to cover the desired parasites on a cost competitive basis. It is not to be used in dairy cattle of breeding age.

Synanthic

Oxfendazole, a benzimidazole product of Syntex Animal Health. It is one of the more recent clearances and has oral administration formulations along with an intra-ruminal injection system. It has a tapeworm claim on the label and is safe in pregnant animals at any stage of pregnancy. It has a claim against inhibited Ostertagia but not other immature stages of significant cattle worms. The company demonstrates that there are higher plasma concentrations than with the use of fenbendazole with the implication that this provides higher levels to the gut for increased efficacy. It is not to be used in dairy cattle of breeding age.

Valbazen

Albendazole, a benzimidazole product sold by SmithKline Beecham Animal Health. This product has claims for all of the significant worms in cattle with the exception of immature stage of the Thrichostrongylus, hookworm and nodular worms. It has the advantage of claims for lungworm and liver fluke for areas in which these parasites are of significance. The product is not for use in dairy cattle of breeding age. Also cattle should not be treated during the first 45 days of pregnancy.

Lavamisole Thiabendazole and Morantel products

These have been available for many years and have served the cattle industry well. They still have a place in management programs wherein only adult parasites need to be eliminated. Thiabendazole and Morantel products can be used in lactating dairy cattle. These products are sufficiently well known to allow limited coverage in this presentation.

Efficacy and Expectation

As stated in the introductory section the results of the many many trials conducted do not allow solid statements of efficacy and cost/benefits on an objective basis. The reason for this is the very large number of variables which affect responses to these products. The first is not product or environment but the very large variation in the protocols used to conduct these studies. Often there is a specific point to be proven by a trial resulting in a design relatively devoid of objectivity. Also, many of the studies do not use statistical planning and analysis (or inappropriate statistics) to give consistently comparable conclusions.

Management variables affecting performance of the products include timing of the administration, grazing systems used, numbers of animals on the pasture, plane of nutrition along with which products are used. This couples with season of deworming, climate, types of pasture and soil type. There also are differences in which parasites are most prevalent in an area, differences in worm densities and levels of parasite resistance. Coupling these with the variations in host immunologic status, general health and genetic makeup results in a very real challenge in designing and conducting meaningful studies.

However, in spite of all the unknowns the following can be recommended:

1. Determine what parasites are prevalent in your practice area.
2. Study the comparative efficacy data available related to the parasites of interest.
3. Determine the cost of the products and associated expenses of available treatments and treatment combinations.
4. Using expectations of reasonable efficacy for claims on the label estimate a potential cost/benefit using these figures to arrive at a decision as to which product(s) to use.

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