PARASITES OF RUMINANTS IN THE JACKSON HOLE AREA: DICTYOCAULUS HADWENI, LARVAE IN ELK AND CATTLE FECES

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A knowledge of current prevalence and intensity of lungworm infections in elk and domestic ruminants sharing the same range would be useful to wildlife managers, ranchers, forest service personnel and others.

Limited epidemiological studies of the interaction of hosts and their parasites and the possibilities of cross-transmission from wild to domestic ruminants or from domestic to wild ruminants have been conducted in Georgia (Davidson, et al., 1981) and on a similar scale in some other states but not in Wyoming.

Objectives

1. A continuation of the study of prevalence of Dictyocaulus sp. lungworm in elk in Teton and Yellowstone National Parks throughout the various seasons of the year.

2. Initiate research of the prevelence of Dictyocaulus sp. in cattle sharing ranges, usually summer ranges, with elk.

3. Analyze genera of nematodes recovered from vegetation taken from the cattle-elk ranges. Isolate Dictyocaulus sp. from the vegetation or from elk and cattle feces.

4. Continue studies of trichostrongylid nematodes in cattle in the areas adjacent to the national parks or forest service land where Dictyocaulosis has been a problem during the past few years.

Spring months are the time of heavy contamination of vegetation by lungworm larvae but spring-like conditions are encountered at higher elevations in the Rocky Mountains where infective larvae of stomach or intestinal worms as well as lungworm larvae may be important potentiators of disease much later in the season than at lower elevations.

Methodology

Lungworm larvae will be isolated from elk fecal material by a rapid, pellet-washing technique previously developed by the writer at the UW-NPS Research Center. Lungworm larvae will be isolated from cattle feces by the Baermann funnel technique.

Previously (1975-1982) we have not isolated the larvae of Dictyocaulus on vegetation within the Teton Park area north of the Jackson Hole Elk Refuge. Larvae have been found around the fecal material of elk along the Gibbon River area in Yellowstone Park. However, in that area, the elk feed within the same general area throughout most of the year. The biotic potential of the lungworm larvae or "infection pressure" along the Gibbon Meadows may be similar to that of the elk refuge during the spring months. However, in two small grass collections, infective larvae have not been found on the refuge vegetation. Such work should be continued. Vegetation from areas on elk-cattle ranges (mainly Forest Service permit areas of Teton-Fremont Counties) should also be checked for the presence of the infective larvae. Vegetation will be "Baermannized" and the parasitic larvae separated from the free-living larvae by adjusting the pH of the Baermann fluid to 2-2.5.

Previously, we have obtained fecal samples from elk in Yellowstone (Gibbon River area) but a limited number of elk fecal samples should be collected from the Lamar River herd during late May or June.

Fecal samples from cattle in Teton County and adjacent areas will be analyzed by the Baermann technique (isolation of larval forms from vegetation or fecal material) in order to see whether bovids are carrying lungworm at the same or different times of the year than elk. The bovids could be infected and act as carriers of Dictyocaulus and therewith posing problems for the elk and/or the elk may be reservoirs of infection for the bovids.

Previous work

From research results gathered during the past 10 years, the present investigators have shown the time of infection and re-infection of elk annually by Dictyocaulus sp. lungworm (Bergstrom, 1975). In general, the data published in 1975 resemble those of Worley and Barrett, (1964) who worked with the Lamar River elk in Yellowstone National Park. The reason for predictable annual infections of elk in the Tetons and in Yellowstone Park herds has not yet been shown.

Results

May 1985, Elk, Teton National Park. (West of Snake River, South of Signal Mt.)

Feces from forty-two elk, mostly mature, lactating cows, were checked by Baermann funnel analyses for the prevalence of Dictyocaulus viviparus=(D.

hadweni). Results indicate a prevalence of 73% in 1985 or slightly lower than the 84% positive recorded in 1984. Since the spring weather had been mild, many of the female wapiti did not show severe spring stress as in 1984 but apparently carried moderate numbers of lungworms since the larvae per gram numbers in fecal samples ranged from 0.3 to 190, mean 28. No large bulls were sampled and calving had not taken place. Many cows were ready to calve.

May, 1985 Elk, Gibbon River Meadows, Yellowstone National Park

Twenty fresh fecal samples from about 60 head of elk were collected from Gibbon Meadows north of Madison Junction during the forenoon (8:00 to 11:00 a.m.). Seventy-five percent of the cows represented by the fecal samples were positive for Dictyocaulus lungworm larvae with 0.02 to 90, mean 22 larvae/gram feces.

Summer, August, 1985, Teton National Park

As in past years, the prevalence of elk positive for Dictyocaulus lungworm dropped markedly from spring to and during the summer months. By early August the lactation stress is apparently diminished and the physical condition of lactating and non-lactating cows has visibly improved. By August, 41% of the lactating cows were positive for lungworm with a mean of 5.8 Dictyocaulus sp. larvae per g of feces.

Summer 1985, Gibbon Meadows elk, Yellowstone National Park

Feces from three bulls and three cows were analyzed with one bull and one cow positive for lungworms. Numbers of larvae per gram feces in the positive animals were very low (0.3 larvae/g).

Fall, 1985, Gibbon River elk (Dr. Worley's results)

Fecal samples from 10 head of elk (both sexes) were collected Oct. 29. One, or 10% was positive for lungworm.

Epidemiologic Surveys for Gastrointestinal and lungworms in Cattle; 1985, Fremont and Teton Counties.

Glen Taylor Ranch, Gros Ventre River area, Tetons.

Yearling heifers on dry range: Low numbers of tapeworm eggs per gram of feces were found. Very low numbers of stomach and intestinal worm eggs were noted (0-4 eggs per gram feces). On the same ranch, yearling steers, previously treated with an anthelmintic drug, Oct., 1984, and grazing a lush, irrigated meadow by the ranch buildings had a range of 6 to 348, mean 161 e.p.g. feces. One abomasal and one intestinal worm species were noted. Calves of three to four and one-half months of age had abomasal and intestinal worm eggs numbering zero to 14, mean 8 e.p.g. The steers carried clinical numbers of worms but the heifers and the calves did not.

Dictyocaulus lungworm larvae were found in two of 14 yearling heifers (14%

positive) on a ranch near the Snake River about 10 miles northwest of Jackson. The clinical signs, with 40 to 60% of the heifers coughing, agreed with the lab results and indicated the early stages of infection with the Dictyocaulus sp. lungworm. The rancher and his veterinarian were alerted.

Two other ranches in Teton County and two ranches in Fremont County were checked via fecal sampling. No clinical numbers of eggs of roundworms were noted on those ranches. The new anthelmintic drug, Ivermectin, was found to control most gastrointestinal worms but did not kill Nematodirus sp. or Strongyloides sp. in cattle and the anthelmitic was quite expensive.

Summary and Conclusions

More epidemiologic research with bovine herds and their parasites has been accomplished in Teton and Fremont Counties during the summers of 1984 and 1985 than during the previous 5 years of such research over the state of Wyoming. The minor costs of living as well as the continually improving laboratory facilities at the U.W.-N.P.S. Research Center permit increased research efforts within the field of wildlife and domestic animal parasitology. The writer can only hope that a similar research facility, plus housing, might be developed in the northeastern and southwestern areas of Wyoming.

References

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