PARASITES OF UNGULATES IN THE JACKSON HOLE AREA: SCARABAEOID BEETLES ACTING ON LUNGWORM, *Dictyocaulus viviparus*, LARVAE IN ELK FECES SEASON OF 1976

Robert C. Bergstrom
Division of Microbiology and Veterinary Medicine
University of Wyoming
Project Number

Prevalence of *Dictyocaulus viviparus* lungworm in elk was previously determined, (1968-74) by elk fecal analyses during spring, summer and winter of each year and by elk lung dissections during the fall hunting season. Percentages positive for and numbers of *D. viviparus* larvae in elk feces was monitored during the fall hunting season of 1975. Fifteen percent (5 of 33) of the elk checked were positive for *D. viviparus* according to lung dissections conducted during the period of November 15-18, 1975, in Teton Park.

Winter work was planned for early February 1976, but was not carried out due to severe weather creating unfavorable traveling conditions.

During late May and early June, 1976, 100 of about 1,000 herd of elk in Teton Park were checked by fecal analysis for lungworm larvae. Seventy-two percent were positive for the lungworm.

Prevalence of infection is very high during the spring but invariably decreases during the summer and fall months. During December and January the prevalence of Dictyocaulus sp. is low (e.g. 8 - 16% '68, 1971, '73.

Elk fecal material was collected at about 10,000 feet elevation from 18 of 90 elk on or near Big Game Ridge, and the Snake River Ridges N.W. of Harebell Cabin, August 3 and 4. Twenty-two percent of the elk sampled were positive for the lungworm species. It is interesting to note that during the same week (Aug. 7-9) 50 percent of the elk (mostly cows) near Signal Mt. in Teton National Park at about 6,500 feet elevation were positive for *Dictyocaulus sp.* larvae in feces.

Experiments with Aphodius spp. beetles as micropredators of *Dictyocaulus viviparus* larvae were conducted as a part of the new project on interaction of dung beetles and the elk lungworm larvae in elk feces.

Data shown in Table I indicate the micropredatory or, perhaps, the accidental decimatory action of the beetles when they are exposed to lungworm larvae on the surface of elk feces. It would appear that small dung beetles (e.g. *Aphodius homisus* and *A. fimetarius*) ingest lungworm

larvae as the beetles ingest feces and/or other proteinaceous-carbohydrate material in feces. As few as 20 beetles spread elk fecal material over the soil surface so that a 3-pellet (6 g.) sample which previously occupied a 2-4 cm square area on vegetation or soil, will, after beetle action, occupy 6-12 cm areas but the depth of the fecal mass will decrease from 2-4 cm to .5-1 cm.

During the 4 experiments conducted at the station, the beetles decreased the numbers of lungworm larvae by 77-92%. Lesser decreases than these have been shown to be significant at the 1% level.

During the month of November, additional fecal material and/or elk lungs will be collected during the hunter harvest. More data should be gathered concerning fecal analyses on individual elk where the lungs of that same animal are available for dissection. In this way, the accuracy of fecal analyses/or lungworm prevalence can be determined. We previously found that fecal analyses are always conservative as an estimate of lungworm prevalence.

By February, 1977, another check, via fecal analyses, should be conducted on elk on the National Elk Refuge in Jackson. Further beetle-lungworm larvae research cannot be continued until May of 1977. The value of further work is obvious.

Table 1. Action of Aphodius spp. Beetles on numbers of Dictyocaulus viviparus larvae in elk feces: Laboratory conditions.

Trial no.	No. of Dictyocaulus larvae/g. feces	Hours Interaction	Dictyocaulus control (no beetles)	Dictyocaulus princ (20 beetles)	% dec. in larval no's due to beetle action
1	72	24	48	6	87
2	180	24	80	18	77
3	500	72	265	24	90
4	100	24	75	6	92