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Schistosomatium douthitti, the third species of schistosome found in this survey, commonly utilizes *L. stagnalis* as its intermediate host and thus it may be a problem in swampy areas. The cercaria of this parasite differs morphologically from the other two schistosomes, its tail being considerably shorter. A striking behavioral characteristic of *S. douthitti* is that after emergence it swims directly to the surface film. It is thought that, unlike other schistosome species, *S. douthitti* produces a relatively small number of cercariae which escape from the snail for but a short time (Cort, et al., 1944).

It is clear that the data gathered from Minnesota thus far are not adequate to provide a clear picture of the factors involved in swimmer's itch in this state. Particular effort is required to elucidate the various intermediate and definitive hosts involved and to understand the life history patterns of the parasites and their hosts.

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Effect of Feedlots on Water Quality

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ABSTRACT — The effect of feedlot runoff on water quality was examined. Samples were collected from river feedlots and offshore from lake feedlots and compared with samples from appropriate control sites. Bacterial contamination, as measured by the total coliform test over two successive summers, exhibited significant variation between feedlot and control sites. Coliform levels at lake sites adjacent to feedlots were double the levels at control sites; while in river systems average coliform levels downstream from feedlots were approximately 17 times the upstream controls.

The effects of feedlots on adjacent waters has long been of concern to environmentalists, farmers, and health officials. Feedlots, enclosed areas where large numbers of animals can be maintained efficiently and fed, presently occupy more than 100,000 acres of land in the United States (Swanson et al., 1971). Although effective in terms of productivity and convenience, feedlots often pose serious environmental problems, especially with regard to quality of nearby water.

It has been estimated that a single steer produces thirteen to sixteen times more fecal waste and ten times more liquid waste than a human (Reynolds, 1971). Therefore, a feedlot of one-hundred animals, common in southwestern Minnesota, is approximately equivalent to a community of 1,000 people. The potential deleterious environmental influence of even a small number of improperly constructed or poorly designed feedlots thus seems readily apparent.

Many factors influence the extent of feedlot runoff, including the number of animals contained, intensity and duration of precipitation, soil porosity, surrounding vegetation and topography (Loehr, 1970; Weber, 1971). Feedlot runoff can, however, be controlled by the construction of holding basins and by the location of feedlots in areas where drainage

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TABLE 1. Total Coliform Levels for River Feedlots
Total Coliform (MPN/100 ml)

Feedlot	Upstream	Downstream	Net Increase
1	8,356	14,213	5,857
2	5,313	7,442	2,129
3	29,725	50,074	20,349
4	24,013	125,694	101,681
5	5,140	52,882	47,742
6	4,137	16,500	12,413
7	43,579	2,162,429	2,118,850
8	8,737	10,402	1,665
9	9,813	16,822	7,010
Average	15,424	272,945	257,521

into lakes and rivers does not occur (Meyer et. al., 1972; Loehr, 1970).

The purpose of this investigation was to measure the extent of water pollution from selected feedlots using total coliform as a general indicator of water quality. Feedlots were selected on the basis of their proximity to a lake or river and on the stated intent of feedlot owners to install holding systems to control runoff problems. A long range goal of this study will be to monitor the same lakes and rivers after the holding systems have been installed to evaluate their effectiveness.

Samples were collected on a weekly basis for two consecutive summers and analyzed for total coliform bacteria. Coliform levels were measured using the multiple tube fermentation technique (Standard Methods, 1965) and the results are expressed as the most probable number (MPN) of coliform organisms per 100 ml of sample.

Nine river systems containing adjacent feedlots were studied, with samples being taken approximately one-half mile upstream and downstream from the feedlot locations.

Two lake systems were also studied with eight sample sites chosen in each lake. Samples were collected 100 feet offshore from existing feedlots and at distant points throughout the lake. The latter sites were less likely to be directly affected by feedlot runoff and therefore served as controls.

The results obtained from the analysis of river and lake feedlot systems are presented in Tables 1 and 2. Samples collected downstream from river feedlots all showed significant increases in total coliform. The average downstream increase for all feedlots was 257,521 MPH/100 ml. The smallest increase observed was 1,665 MPN/100 ml and the largest

TABLE 2. Coliform Levels for Feedlots
and Control Sites in Two Lakes
Total Coliform (MPN/100 ml)

Lake	Control Sites	Feedlot Sites	Net Increase
1	314	1,817	1,503
2	417	754	337

increase was 2,118,850 MPN/100 ml.

Both lakes studied showed higher total coliform levels at the feedlot sites than at the control sites (Table 2). The amount of increase was substantially smaller than observed for river feedlots. This reduced difference was attributed primarily to a greater dilution effect in lakes than in rivers.

The results of this study indicate that these feedlot operations are contributing to the deterioration of water quality as measured by levels of total coliform organisms. Feedlot influences are especially notable in the river systems studied. The magnitude of the increase in coliform levels is sufficiently great to present a health hazard to individuals seeking to use such waters for contact recreational activities. The evaluation of holding basins and other corrective measures was not determined in this study.

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