

Salmonella infantis in Cattle Feedlot Runoff

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Ten isolates of *Salmonella infantis* (serologically typed) were found in litter and runoff collected from two experimental feedlots near the Kansas State University campus. Pathogenic implications are discussed relative to recreation water sites. Agricultural runoff maybe a source of viable salmonellae.

Increases in the number of reported salmonellosis outbreaks have intensified efforts to identify environmental sources of *Salmonella*. *Salmonella* has been isolated previously from both contaminated food and water. Spino (10) isolated *Salmonella* in the Red River as far as 73 miles, 4 days' flow, below the Fargo, N.D., sewage discharge.

Salmonellae were isolated from the intestines of cattle as early as 1908 (4). Galton (2) reviewed several cases of salmonellosis in cattle and its spread among confined animals. She reported that approximately 80% of the infected cases were due to *Salmonella newport*. Nottingham and Urselmann (9) reported that 4% of the beef animals checked in a New Zealand study contained salmonellae.

S. infantis has been identified as a causitive agent of gastroenteritis. Kohler (5) reported on an outbreak of gastroenteritis that struck 17 patients and 6 hospital personnel in a Minnesota hospital. The source was infected scrambled eggs. He further observed infection by direct personal contact. Angelotti et al. (1) described a gastroenteritis outbreak in which *S. infantis* was isolated from ham and from stools of patients.

This investigation was part of an overall study of the water pollution potential of cattle feedlot runoff. It was instituted to determine whether salmonellae are present in feedlot runoff; if so, feedlot runoff could be of public health significance.

MATERIALS AND METHODS

Samples of both feedlot litter and runoff were collected from two experimental beef feedlots near the Kansas State University campus during July, 1966. These lots are constructed so that other runoff is excluded from the sample collection point. Twenty-six steers, equally divided in two lots and each weighing approximately 320 kg, were being fed a high grain ration at the time. The steers had been purchased from a commercial sale barn in western Kansas on 4

June. None was reported to have shown symptoms of *Salmonella* infection.

Except for added pre-enrichment with proteose peptone, as described by Narasimham et al. (8), the *Salmonella* isolation procedure outlined by Galton et al. (3) was used. Isolates suspected of being *Salmonella* were delivered to the Public Health Laboratory, Kansas State Department of Health, Topeka, for serological typing and confirmation.

TABLE 1. Sources of confirmed *Salmonella* isolates

Date of collection (1966)	Sample source	Sample quantity	No. of isolates
30 June	Concrete feedlot runoff	10 ml	4
29 July	Concrete feedlot runoff	1 ml	1
29 July	Concrete feedlot runoff	10 ml	1
29 July	Nonsurfaced feedlot runoff	0.1 ml	1
29 July	Nonsurfaced feedlot runoff	1.0 ml	1
24 June	Nonsurfaced feedlot litter	10 g	1
21 July	Nonsurfaced feedlot, loose dry litter	10 g	5
21 July	Concrete feedlot, loose dry litter	0.1 g	1
21 July	Concrete feedlot, loose dry litter	1.0 g	6
21 July	Concrete feedlot, loose dry litter	10 g	3
21 July	Compacted litter	0.1 g	2

RESULTS

Twenty-six isolates, from 14 separate feedlot runoff and litter samples, were biochemically confirmed to be *Salmonella* (Table 1). Ten of the isolates casually selected were typed serologically. All were *S. infantis*.

DISCUSSION

Cattle feedlot runoff and litter were shown to contain *Salmonella*. The regularity with which *Salmonella* was found discounts the possibility of occasional or chance human contamination. Since all *Salmonella* strains are considered pathogenic, feedlot runoff must be recognized as potentially implicated with disease. Potential dangers would multiply with feedlots located in watersheds of recreational streams and reservoirs.

Since all cattle in the lots studied were purchased simultaneously from a single source, and only one *Salmonella* type was isolated, a common source of infection was indicated. These studies were not designed to determine how many cattle in each lot were *Salmonella* carriers.

The growth in size and numbers of commercial cattle feedlots in this country has been shown previously to have definite water-quality implications (7). Future bacteriological studies below known municipal and industrial waste discharges should include considerations of feedlot wastes. The appearance of specific pathogenic organisms in streams below the discharges may be due to previously unsuspected agricultural runoff.

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