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PARATYPHOID (Salmonellosis) IN SHEEP

By C. R. TOOP, B.V.Sc., Chief Veterinary Surgeon

Except in imported rams exposed to conditions during transit which had rendered them susceptible to infection, paratyphoid had not until recently been encountered in sheep in Western Australia. During the past few years, however, a considerable number of outbreaks have been reported among flock sheep in the agricultural areas. All of these have occurred during the summer months and some of them have been responsible for serious mortality. It is probable of course that the disease has been present in the State for many years and that it has been confused with other conditions such as entero-toxaemia to which it may in some respects bear a superficial resemblance.

CAUSE

Paratyphoid results from infection with organisms of the *Salmonella* group over 180 closely related species or types of which are known to exist and all of these are able to produce disease in animals, birds and man. *Salmonella typhi-murium* has usually been incriminated in the outbreaks which have occurred among sheep in Australia.

Infection results from the consumption of contaminated food or water and it is most likely to occur during the summer months when water supplies become low and fouled with droppings or when grain or hay fed as a supplementary ration is distributed on the ground. Apparently healthy sheep may harbour *Salmonella* organisms in the intestinal tract and pass them out in the droppings and it is probable in many instances that these "carriers" provide the initial source of infection. Scouring is a prominent feature of the disease and once cases have become established in a flock, infective organisms are voided in enormous numbers in their excretions thus providing every opportunity for the rapid spread of infection by the contamination of pasture and fodder.

In a widespread series of outbreaks which occurred in South Australia in the summer of 1951 investigations revealed that the infection had been spread by carnivorous birds including crows and magpies which had fed upon the carcases of sheep dead of the disease and had afterwards polluted the water supplies with their droppings. Mice and rats are commonly infected with *Salmonella* organisms, particularly *S. typhi-murium* which may be present in their faeces, and fodder infested with these rodents must be regarded as a danger.

Many outbreaks of paratyphoid have been reported from other States among rams transported long distances by rail, and there have been several mortalities amongst stud sheep consigned both by rail and sea to this State from Eastern Australia. There is evidence to show that prolonged starvation during transit and the considerable period which elapses thereafter before the appetite is fully regained, reduces the resistance of the animals to infection and predisposes them to the disease. There seems little doubt that "carriers" have been present in these consignments and that the contamination of fodder fed from the ground and perhaps water supplies at spelling points where sheep are untrucked for attendance, has played an important part in the spread of infection.

These mortalities have been largely confined to rams running on succulent green pastures before consignment.

SYMPTOMS

Affected sheep become dull and dejected are "tucked up" and cease to feed. The temperature is elevated, respiration is rapid and the eye membranes are red and congested. Scouring accompanied by the passage of yellow or greenish evil-smelling fluid droppings is a prominent symptom.
Death occurs from 24 hours to three to five days of the onset of symptoms and is preceded by progressive weakness and rapid loss of condition. Mortality rarely exceeds 5 per cent. in flock sheep but may approach and at time exceeds 25 per cent. in rams during and immediately following rail transport.

Many affected animals recover from the disease and may thereafter remain carriers of infection.

Convalescence is prolonged and a period of six to eight weeks may elapse before complete recovery occurs and condition is fully regained.

Where it is desired to confirm the diagnosis a sheep showing advanced symptoms of the disease should be delivered to the Animal Health and Nutrition Laboratory or fresh specimens of liver, kidney, spleen or mesenteric lymph nodes should be submitted for bacteriological examination.

POST MORTEM APPEARANCES

At postmortem examination, inflammatory changes with a variable degree of congestion and reddening of the lining membranes will usually be observed in the fourth stomach and intestines and the associated mesenteric lymph nodes are swollen and contain an excessive amount of fluid. The liver is congested and small haemorrhages may be present on the surface of the heart and beneath the capsule of the kidneys.

PREVENTION

Precautions should be taken against the consumption of contaminated food and water. The water supply should be clean and wholesome and stagnant dams or soaks in which the water has become reduced to a low level should be avoided. Grain fed as a supplementary ration from the ground should be distributed on a clean area and the site of distribution should be changed at frequent intervals. Hay, where practicable, should be fed from racks. Fodder infested with mice or rats should be regarded with suspicion. When an outbreak is in progress sheep with symptoms of scouring should be removed from the flock immediately so as to reduce contamination of the pasture to a minimum and each fresh case as it occurs should be similarly removed and segregated. Under the hot dry conditions of summer the infection is unlikely to survive for more than a few days whereas in moist soil or water it may persist for several months.

Rams intended for transportation over long distances should be removed from succulent pastures and fed a fibrous ration of hay or chaff for two to three weeks prior to consignment and the same bulky ration should be fed to capacity from troughs or racks at spelling points. Feeding from the ground in holding yards fouled with droppings should be avoided and water troughs should be drained and cleaned at frequent intervals. Any animals which develop symptoms of scouring should be removed from the consignment.

TREATMENT

For the treatment of affected sheep, sodium sulphamezathine administered either by mouth or by subcutaneous injection is recommended. The drug is available in a 33 1/3 per cent. solution which should be injected in a dosage of 3 ccs. per 10 lb. liveweight on the first day of treatment followed by 1 1/2 ccs. per 10 lb. liveweight daily for the next four days. It may also be procured in the form of half-gram tablets to be given by mouth in a dosage of 1 gram (2 tablets) per 10 lb. liveweight on the first day followed by half a gram (1 tablet) per 10 lb. liveweight daily for the succeeding four days. The results of treatment are variable and it is most likely to prove successful if commenced early.
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