ISOLATION OF *SERPULINA PILOSICOLI* FROM ENVIRONMENTAL AND OTHER SOURCES ON A PIGGERY

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Introduction

The intestinal spirochaete *Serpulina pilosicoli* causes intestinal spirochaetosis (IS), a diarrhoeal disease of pigs and other species. This condition is widespread, though often undiagnosed, and causes losses to the pig industry through reduced growth rates and poor feed conversion (3). Very little is known about the epidemiology Introduction

Porcine intestinal spirochaetosis (PIS) is a diarrhoeal disease of weaners and growers, associated with a mild colitis. Control of the aetiological agent, *Serpulina pilosicoli*, has relied mainly on the use of antimicrobial agents. In contrast, besides the use of antimicrobials and appropriate management practices, it is our experience that the closely related *Serpulina hyodysenteriae* (the agent of swine dysentery) can also be partially controlled by bacterin vaccines (1), whilst experimentally-infected pigs totally resist challenge if fed a diet based on cooked white rice and animal protein (4, 5). This diet results in reduced microbial fermentation in the large intestine, and it appears that these conditions inhibit colonisation by the spirochaete. The purpose of the present study was to assess whether the use of a bacterin vaccine or a rice-based diet could similarly inhibit colonisation by *S. pilosicoli.*

Materials and methods

Three groups of weaner pigs were housed in adjacent pens. One group of six were vaccinated intramuscularly twice at a three week interval with 2 ml of a bacterin made from 10^{10} formalin-inactivated cells of a Western Australian porcine field isolate of *S. pilosicoli* (strain 95/1000) emulsified in Freund's incomplete adjuvant. The first vaccine was given three days after the pigs were weaned at three weeks of age. These pigs and the second group of eight unvaccinated controls were fed a commercial Western Australian weaner diet based on wheat and lupin. Six other unvaccinated pigs in the third group were weaned onto a cooked rice-animal protein diet, as previously used for the control of *S. hyodysenteriae* (5). All pigs were challenged orally with 10^{10} active mid-log phase cells of *S. pilosicoli* strain 95/1000 over the same three successive days, starting 10 days after the second vaccination. Pigs were monitored daily for signs of ill-health, and faecal swabs were taken every 2 to 3 days, and cultured on selective medium for *S. pilosicoli* (2). Selected spirochaete isolates were identified using multilocus enzyme electrophoresis (3), to confirm they were the same as the inoculated strain 95/1000. One control pig with severe diarrhoea was killed four days after the third oral challenge, and the rest were killed 3 to 4 weeks after this. All were subjected to a full post mortem examination. The mesenteric nodes draining the large intestine were incised with a sterile blade and swabbed, and then the caecum and colon were opened and the walls also swabbed. Histological sections were also prepared from both sites in all pigs.

Results and discussion

All pigs in all groups became colonised with *S. pilosicoli* at some stage, but this occurred later (mean onset at 14 days) and lasted for a significantly shorter period (mean of 13 days) in pigs fed cooked rice than it did in both groups fed the wheat-lupin diet. Mean figures for the unvaccinated pigs fed wheat-lupin were 3.6 and 20 days respectively, and for the vaccinates 5 and 20 days respectively. One unvaccinated pig fed wheat-lupin developed an acute severe watery diarrhoea, and at post mortem four days after the third oral inoculation a severe erosive colitis with *S. pilosicoli* cells attached end-on to the colonic epithelium was present. Pigs in all groups showed signs of a mild transient diarrhoea, and most showed evidence of a patchy mild colitis at post-mortem. Despite isolating *S. pilosicoli* from the caecum and colon of most of these pigs at post-mortem, end-on attachment of the spirochaetes was not observed. *S. pilosicoli* was isolated from the mesenteric nodes of three unvaccinated wheat-lupin fed control pigs (including the acutely affected animal), and from one vaccinated animal, but not from any of the rice-fed pigs. The mesenteric nodes appeared histologically normal in all animals.

In this experiment only one control pig developed severe and acute clinical signs, whilst the rest were only mildly affected. This pattern of disease in infected pigs is similar to that which we have observed in the field. This is the first report of the isolation of *S. pilosicoli* from mesenteric lymph nodes in pigs, and further work is required to investigate the extent and occurrence of extraintestinal spread of the spirochaete in pigs in infected herds.

Vaccination did not have an obvious protective effect against *S. pilosicoli* infection, although no acute disease was observed in this group and the spirochaete was only isolated from the mesenteric nodes of one of the vaccinates at slaughter. In contrast feeding a rice-based diet did significantly delay and reduce the duration of intestinal colonisation. Complete protection, as seen with *S. hyodysenteriae*, was not achieved with this diet, and this points to differences in the physiological and biological properties of the two species of pathogenic spirochaetes.

Acknowledgements

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