

Management and alternative crops as a means to reduce parasite infections in organic pig production systems

Ph.D.-student: Helena Mejer
Universty: Royal Veterinary and Agricultural University (KVL)
Department: Centre for Experimental Parasitology, Dept. of Veterinary Microbiology
Supervisors: Allan Roepstorff (KVL), Lis Eriksen (KVL)
Timeframe: 1 July 2001 – 31 August 2004
e-mail/phone: [hem\[a\]kvl.dk](mailto:hem[a]kvl.dk) / 35 28 27 89
Master's degree: Biology, University of Copenhagen

Background

Intestinal parasites is a potential problem of considerable importance for the production of out-door pigs. This is particularly true for the organic production systems that tries to minimize or completely avoid the use antiparasitic drugs. There is therefore an overall need for alternative methods of parasite control as parasite infections may have an negative effect on feed conversion and growth of pigs. Previous experiments have shown that it is possible to reduce infection levels by manipulating feed composition and it has been suggested that some plants may have antiparasitic effects. Ideally it would be possible for farmers to grow antiparasitic bioactive crops that could be used as roughage or other feed supplements.

However, bioaktive plants are probably not enough to control parasite infections. Future control strategies should be based on a good knowledge of parasite infection epidemiology and consist of not only selective feeding but also pasture management. Parasites such as the round worm and whip worm are transmitted between pigs as eggs that may survive in the soil for a minimum of 5 and 11 years, respectively. Pasture rotation may therefore only have a limited effect if contaminated pastures are not kept free of pigs long enough. It is therefore also of interest to examine if ploughing can reduce the availability of parasite eggs to pigs. In later years it has been shown that neonatal exposure to the round worm may increase the susceptibility to infections with the parasite. This means that pigs that are moderately infected at an early age does not become immune to this parasite to the same degree as pigs that are first exposed later in life. Overall, production losses is therefore expected to be larger in out-door herds where the piglets are born on contaminated pastures compared to an in-door intensive herd where parasite faeces containing eggs can be efficiently removed.

Objective

The project can be divided into 4 parts with the following aims:

1. To obtain knowledge on natural parasite infections in pigs that are born and raised on infected pastures.
2. To investigate the survival of free-living parasite stages on contaminated pastures in relation to ploughing.
3. To test extracts of bioactive plants for potential antiparasitic effects using a "Larval Development Assay (LDA)" (this has been taken out of the Ph.D., see below).
4. To examine if bioactive plants can be used to reduce parasite infections in fatteners.

Status October 2003

Part 1

The last samples have been analysed and the results are being compiled in a manuscript.

Part 2

In 2001, 6 farrowing pastures were contaminated with the 3 most common pig parasites (nodular worm, whip worm and round worm). Parasite naïve tracer pigs are then turned out and pasture samples are collected every spring and autumn of 2001, 2002 and 2003. The pasture samples are analysed for parasite eggs and larvae while the pigs are slaughtered for worm recovery. In the winter of 2002 and again in 2003, 3 of the pastures were ploughed and the resown the following spring. At present, it is planned that the last group of pigs in the project will be turned out on the experimental pastures in late October 2003.

Overall, the results show that the nodular worm died out on the pastures during the winter of 2001 and 2002. The original whip worm contamination was relatively low and only few eggs became infective in the first season of 2001. However, since the autumn of 2002 it has been possible to show a low but fairly constant level of infective eggs on the non-ploughed pastures. In contrast, the number of infective eggs of the round worm has increased dramatically until the spring of 2003 when the tracer pigs were shown to harbour the highest number of worms so far. Ploughing seems to reduce the short term availability of parasite eggs to pigs in but the long term result may be an increase in survival of parasite eggs. The eggs may be better protected further down in the soil than in the surface soil, although they may develop at a slower rate.

Part 3

It has been decided to omit this line of research from the current thesis. The reason is that the nodular worm, which has previously been used as the parasite model, is too unstable to use in the *in vitro* larval development assay. However, the research is continued outside the Ph.D.-project using sheep parasites that are easier to maintain in cultures.

Part 4

A second trial with bioactive plants has been carried out in collaboration with DIAS in Foulum. In the coming months the last samples will be processed and the results compiled.

Plans 2004

The practical experimental work will be finished in december 2003 and 2004 will therefore be spent writing articles and the Ph.D.-thesis.

Publications

Mejer, H., & Roepstorff, A. Non-medical control of parasitic worms in pigs. DARCOFenews, June 2003.

Mejer, H., & Roepstorff, A. Ikke-medicinsk kontrol af indvoldsorm i grise. FØJOenyt, August 2003.