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Non-poisonous means for reducing rodent pest problems in organic pig farming

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Occurrence of rodents in stables is a well-known phenomenon and the rodents are traditionally controlled with chemicals (rodenticides) or with traps. All rodenticides used for rat control in Denmark belong to the group of anticoagulants. For control of mice anticoagulants and chloralose are used. The latter gives best effect at temperatures below 16 °C.

In organic farming anticoagulants are still allowed for rat control. According to the basic concept of organic farming, any use of chemicals should be avoided. Therefore, there is a need for developing non-chemical methods and strategies with the aim of reducing occurrence and problems with rodents.

Organic pig farming includes having pigs in open fields with relatively close contact to the wild fauna. The risk of transmission of parasites and diseases to the pigs (e.g. *Salmonella*, *Leptospira*, *Yersinia*, *Erysipelothrix rhusiopathiae*, and *Brachyspira hyodysenteria*) is therefore higher than in traditional pig farming with pigs in indoor pigsties, which give a more easily controlled environment. Newborn and sucking pigs are also exposed to predators that may cause losses to the farmers. In a (not yet finished) **DARCOF project** we have focused on the type of problems that arise from rodents and other animals occurring in the open field together with the production pigs. A second part of the project involves a field study of the biology and behaviour of rodents in two selected organic pig herds but that part will not be described here.



Norway rat on drinking trough. Photo: H. Leirs

Questionnaire survey

The first step in this project for developing strategies for pest management in organic pig farming was a questionnaire survey in Denmark. We asked farmers (organic farmers and non-organic farmers as well) with pigs in open fields. Traditional non-organic farmers were included in the survey because the problems do not depend on whether the farmer has been certified as organic farmer or not.

The farmers were asked questions about what they considered as problems arising from the natural environment. Details could be given about where, when during the year, and how often (every year or rarely) the problems occurred. They were also asked to describe how they offered fodder and water, which types of huts they used etc. The surroundings should be described regarding factors that were thought to influence the natural fauna, such as e.g. distance to hedges, forests, streams and watercourses.

Only one rat species occurs in Denmark, i.e. the Norway rat (*Rattus norvegicus*). A single Danish word "mus" covers the group of smaller rodents, which comprise several species of mice and voles, but there was no differentiation between species in the questionnaire survey.

The results of the survey are based on 158 respondents (98 of them certified as organic farmers) having pigs in open fields.

The answers given by the farmers were analysed as to possible relationships between occurrence of / problems with rodents and the practice regarding the pig farming.

Problems with rats and foxes

The highest scoring mammals as regards occurrence often or regularly during the whole year were rats in 38.0% of the herds; smaller rodents (mice and voles) in 65.1%, foxes in 54.4%, and hares in 49.3% of the herds.

Concerning the issue of regarding these animals as causing problems in the herds 21.6% of the respondents said yes to rats, 7.6% to smaller rodents, 36.1% to foxes, and only 1.3 % said yes to hares. Rats and foxes are thus considered as bigger problems than smaller rodents and hares despite of the rather frequent occurrence of the latter two groups. Only two farmers considered hares as causing problems. Both of them described that the reason for this is the potential risk of infection with the bacterium *Brucella suis*. This bacterium was last found in hares and pigs in 1999 in a district in northern Jutland.

Control of pest mammals is carried out or organised by the farmers in falling order against rats, foxes and smaller rodents.

Analyses of possible relationships between occurrence of / problems with rodents and the practice regarding the pig farming showed some significant positive and negative correlations.

There was a significant positive correlation between occurrence of rats and

- occurrence of and problems with smaller rodents
- occurrence of and problems with foxes
- use of automatic feeding systems
- use of open drinking troughs
- stacks of hay and straw in the fields
- a distance of less than 100 m between pigs and hedges

A significant negative correlation was found between occurrence of rats and

- use of drinking cups

A significant positive correlation was found between occurrence of smaller rodents and

- occurrence of and problems with rats
- occurrence of and problems with foxes
- occurrence of birds of prey
- stacks of hay and straw in the fields

A significant negative correlation was found between occurrence of smaller rodents and

- use of huts with a bottom
- use of huts made of hard materials

Special shelters for the pigs exclusively made of bales of straw did not give a significant positive correlation with occurrence of rodents.

Regardless of type of feeding system in use (on ground, in troughs or automatic feeders) rats were reported to occur often or during the whole year in roughly 40-50% of the herds. Smaller rodents occurred similarly in

70-80% of the herds.

Occurrence of rats is reported significantly more frequently in organic pig farming than in traditional pig farming in open fields.

The farmers reported traps, shooting, cats and dogs as the most frequent non-chemical ways of controlling rodents.

Preventive measures

The results indicate factors that are practicable as preventive measures against rodents. Preventive measures are to be considered when planning and laying out the fields for the pigs and when running the farm as well.

Important factors to consider:

- Avoid having pigs less than 100 m from hedges
- Use drinking cups instead of open drinking troughs
- Avoid stacks of hay and straw in the fields
- Use huts with a bottom
- Use huts made of hard materials

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