

PROJECT SUMMARY

Apart from consuming and spoiling animal feed, and damaging infrastructure in and around farm buildings, rodents are a considerable threat to animal health and One Health. They can cause direct stress on pigs and poultry but are mainly important as carriers of pathogens. These include economically very significant diseases like Swine dysentery, Aujeszky's Disease, PCV2 and Encephalomyocarditis. Wild brown rats can carry Influenza A and might act as an intermediate for the transmission of avian influenza between wild birds and poultry. For some other diseases like African Swine Fever, rodents may act as mechanical reservoirs or they may support ticks that can carry ASF. Rodents also play a role in the epidemiology of leptospirosis and salmonellosis or in spreading antibiotic resistant bacterial strains such as livestock-associated MRSA. They can pick up the infection from infected pigs or poultry and spread it within and between farms, they can act as a bridge between wild fauna and livestock, and they can maintain the infection locally when a farm is emptied and decontaminated after a disease outbreak or livestock turnover. Thus, there are very good reasons for rodent management on pig and poultry farms. An important approach has always been the use of rodenticides. However, concerns about the environmental safety of the most common rodenticides has led to changes in the European and national regulations that restrict their use and pose new challenges for efficient rodent management on farms. There is also the problem of resistance against these poisons. This project RODENTGATE will investigate the rodent-related risks for animal health in the pig and poultry industry and how this might change with altered rodent control.

Ecologically-based rodent management is a strategy that combines an Integrated Pest Management approach with a thorough knowledge of the rodent ecology, enabling interventions to be precisely targeted in time and space, whilst being ecologically and economically sustainable. This requires a very good understanding of the rodent demography, life history, space use, dispersal capacities as well appropriate documentation of pathogen presence and transmission patterns in the rodent population. Proper understanding of transmission mechanisms is crucial since killing hosts may have unexpected effects on the spreading of an infection.

RODENTGATE's specific objectives are 1) to document changes in disease risk for pigs and poultry when classical rodent management around farms is prevented and rodent populations around farms change in abundance or composition and 2) to propose appropriate evidence-based and economically sustainable strategies for the ecologically-based management of rodents and rodent-borne infections around farms.

Working towards these objectives raises a number of questions:

- What is the current status of rodent-borne pathogens in pigs and poultry, kept under different husbandry styles in different parts of the EU?
- What is the presence and diversity of relevant pathogens in wild rodents in and around pig and poultry farms?
- What is the role of rodents in spreading pathogens between farms, especially after disease outbreaks and subsequent culling or seasonal emptying of a farm?
- How will pig and poultry health be affected if rodent population composition and/or abundance around farms changes following a ban on rodenticides?
- How can the efficiency of rodent management practices on farms be maintained under restricted or no-rodenticide situations?

These questions will be addressed by a multidisciplinary consortium of scientists from Belgium, UK, Germany, The Netherlands, and Poland, using a combination of analysis of existing data, sampling rodents, environment and livestock on farms, molecular diagnosis of pathogens, field work on rodent population biology and movements, ecological modelling, control strategy development and communication with the pig and poultry industry and pest control industry.