Live-traps vs. Rodenticides on Organic Farms: which method works best?

B.G. Meerburg, H.G.M. Reimert, and A. Kijlstra

***Abstract* – Rodent control is important from a food safety perspective, especially on organic farms. However, extermination using cats and poison have their disadvantages. Therefore we were searching for a better method of rodent control on organic farms. Live-traps might be an alternative: it fits better in the organic philosophy. But does it work? In this study we compared application of poison with use of live-traps by determining their efficacies on 20 organic pig farms. We found no difference between treatments, thus live-traps can form an alternative for poison.[1]**

Introduction

Beside causing structural damage and spoiling feedstuffs, rodents can impose serious threats to food animals and consumers of their products. They carry a number of zoonotic pathogens, such as e.g. *Salmonella* and *Campylobacter* (Meerburg et al., 2006), and *Toxoplasma gondii*.

Organic farms offer an ideal environment: the production system is relatively open and the application of roughage and straw will certainly attract rodents. Moreover, some organic farmers are less-willing to use rodenticides as they perceive rodent presence as integral part of the agro-ecosystem. Thus, for food safety reasons, exterminating rodents is important. However, the use of cats (as many organic farmers do) should not be propagated because of possible *T. gondii* transmission by felines to food animals. Use of rodenticides is generally seen as efficient, but may lead tot poisoning of non-target species (i.e. birds of prey) and can have severe implications for individual rodent welfare. Clearly there is a need for rodent control method that is better in line with the organic farming philosophy, but that works as efficient as poison, is relatively cheap and requires minimal farm labour. Trapping by mean of live-traps could be such an alternative, but until now its efficacy was not compared with the efficacy of rodenticides. This was therefore the purpose of our study.

Material & Methods

Two different house mice control methods (rodenticide vs. use of livetraps) were applied on twenty organic pig farms in The Netherlands in November-December 2005. In this trial, farms were randomly appointed to each treatment: 10 farms used rodenticide and 10 farms live-traps. Maximum temperatures in the study period varied between 0.1°C and 11.2°C, and minimum temperatures between –2.9°C and 6.4°C. Daily precipitation varied between 0 and 42.6mm (Royal Netherlands Meteorological Institute, KNMI).

The trial consisted of three phases. For both treatments, total duration was 552 hours (23 days). The first phase (96h) was meant to determine the population of house mice by means of feed consumption. Ten wooden rodent bait boxes (with lids) were filled with 50 grams of non-poisonous pealed oat and placed throughout the stable on sites were rodents were frequently spotted. After 48h, bait boxes and their remaining contents were weighed and consumed feed was filled up to the original starting weight. Bait boxes were then placed back and after another 48h total consumption was calculated. During weighing, bait boxes were also weighed empty to correct for potential water uptake of the wood.

The second phase (360h) the rodent control took place. On farms with treatment "rodenticide", bait boxes were emptied and the non-poisonous oat was replaced by a popular rodenticide based on the active substance Bromadiolone (Super Caid grains, Bayer Environmental Sciences, SAS, Lyon, France). This rodenticide was selected as it is less poisonous compared to other rodenticides and it is the only rodenticide that (in special bait boxes) can be used outside according Dutch regulations. Farmers had to check the availability of poison every 48 hours.

On farms with the treatment "live-traps", bait boxes were replaced by ten live-traps (Pro-Ketch® Multiple Catch Mousetraps, Kness Mfc. Co. Inc., Albia, USA). Peanut butter was streaked on the inside of the live-trap and they were placed at the same location as were had been the bait boxes earlier. The live-traps are made of metal and have a window in their lid, which enables farmers to see whether a mouse was caught.

The third phase (96h) was similar to the first phase. The total remaining house mice population was assessed by placing the wooden bait boxes with 50 grams non-poisonous oat. Again, farmers had to weigh and register feed consumption every 48h. We assume that the difference in food consumption between the first and third phase demonstrates to

Bastiaan G. Meerburg is with the Animal Sciences Group of Wageningen University and Research Centre, P.O. Box 65, NL-8200 AB Lelystad, The Netherlands (Bastiaan.Meerburg@wur.nl).

Henny G. M. Reimert is with the Animal Sciences Group of Wageningen University and Research Centre, P.O. Box 65, NL-8200 AB Lelystad, The Netherlands (Henny.Reimert@wur.nl).

Aize Kijlstra is with the Animal Sciences Group of Wageningen University and Research Centre, P.O. Box 65, NL-8200 AB Lelystad, The Netherlands (Aize.Kijlstra@wur.nl).

what extent the rodent control method during the second phase was successful. For statistical analysis, a Student's t-distribution for independent samples (α=0.05) was used.

RESULTS

The efficacy of rodenticides and live-traps was compared (n=20 farms), but no significant difference was encountered between both treatments on these farms (p=0.196, t=1.37, α=0.05). As can be seen in Figure 1, in 10 cases the amount of feed consumed in Phase 3 was higher than the amount consumed in Phase 1.

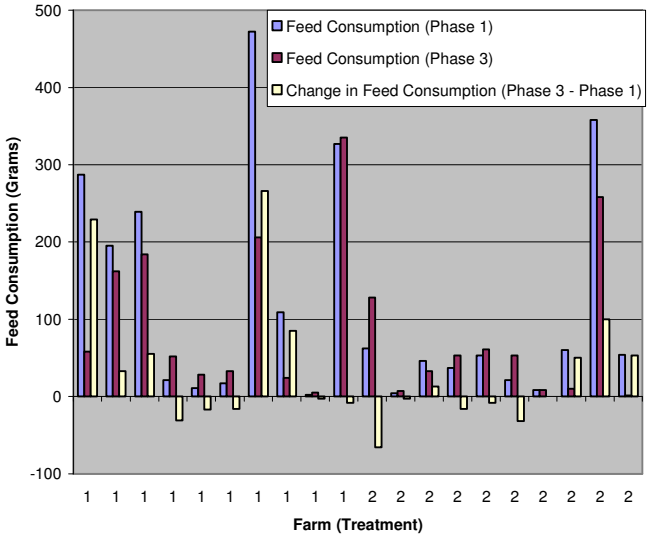

Figure 1. Feed consumption of rodents per farm (n=20, treatment 1=rodenticide, treatment 2= live-traps)

We also compared the efficiency of both methods specifically on those farms that suffered from a large feed consumption (>100 grams) during either Phase 1 or Phase 3. In total, 8 out of the 18 farms were in this group (6 farms with treatment "poison" and 2 farms with treatment "life-traps"), but no significant differences in efficacy could be determined between treatments (p=0.35, t=1.01, α=0.05).

DISCUSSION & CONCLUSION

Rodent numbers in stables can fluctuate between farms (e.g. depending on previous rodent control measures, proofing, farm cleanness and local weather conditions) and structural differences exist between farms (e.g. concerning farm size), we can assume that both groups of farms in our treatments were similar. Although probable presence of a time effect (linked to weather conditions: i.e. temperature and precipitation; which may imply that rodents that originally stayed outside of the stable during Phase 1 were attracted by the presence of shelter and have entered the stable during Phases 2 and 3) we assume that this time effect is involved in both treatments. Thus, although the difference in feed consumption is perhaps a relative factor, this has no consequence for our conclusion.

Our finding that the efficacy of live-traps does not differ with application of a rodenticide is a positive development from the organic perspective. Use of live-traps better fits in the organic philosophy, as there is less chance for poisoning non-target animals in the farms' environment. With live-traps, farmers can (depending on their own way of life) determine whether they want to kill the house mice by drowning them in a bucket of water, or want to transport them to a location far from their farm where they produce less harm. Other advantages of the use of live-traps is that physiological resistance of rodents against rodenticides (Pelz and Klemann, 2004) will not occur and that there is less chance of uptake of weakened rodents by pigs.

So, at ecosystem level, the use of live-traps can be preferred. However, for the individual rodent it is questionable whether the use of live-traps produces less suffering compared to application of rodenticides. When trapped, rodents can be in the trap for longer periods of time and the stress of the impossibility to escape from the trap may be just as high as the stress of discomfort through the accumulation of blood in vital organs caused by anticoagulants. Therefore, if farmers already have the idea to kill trapped rodents, other traps than live-traps are more humane (Mason and Littin, 2003) and should be preferred from an animal welfare point of view, e.g. snap traps or electrocution traps. However, when farmers (despite the extra labour) want to deport the rodents to another location, the opportunity of a second chance for rodents to lead a natural life in new environment may counterbalance the stress of trapping. Farmers should always wear gloves to protect them against the transmission of hazardous pathogens (e.g. Leptospira), while in countries were hantaviruses reside in rodents application of live-traps should be dissuaded.

Concluding, we have found that use of live-traps can be an alternative to use of poison on organic farms. It is advantageous for welfare of non-target animals and causes less environmental pollution. These aspects are in line with the organic farming philosophy. On the other hand, the improvement of animal welfare for the trapped rodent compared to poisoning is questionable and it costs more efforts for farmers to control traps. Also traps are more expensive on the short term (cost-efficiency). Farmers have to decide which aspects they consider as important and should apply a rodent control method that is best in line with their philosophy.

REFERENCES

Mason, G., Littin, K.E. (2003) The humaneness of rodent pest control. *Animal Welfare* **12**, 1-37.

Meerburg, B.G., Jacobs-Reitsma, W.F., Wagenaar, J.A., Kijlstra, A., 2006, Presence of *Salmonella* and *Campylobacter* spp. in Wild Small Mammals on Organic Farms. *Applied Environmental Microbiology* **72**, 960-962.

Pelz, H.-J., Klemann, N., 2004, Rat control strategies in organic pig and poultry production with special reference to rodenticide resistance and feeding behaviour. *NJAS-Wageningen Journal of Life Sciences* **52**, 173-184.