

Biosecurity on Finnish swine and cattle farms, with special emphasis on rodent control

Leena Seppä-Lassila¹, Heidi Rossow¹, Maria Simola², Jukka Niemimaa³, Otso Huitu³, Pirkko Tuominen¹

¹ Risk assessment unit, Finnish Food Authority, Helsinki, Finland

² Microbiology research unit, Finnish Food Authority, Helsinki, Finland

³ Forest and Animal Ecology, Natural Resources Institute Finland, Helsinki, Finland

BACKGROUND

External and internal biosecurity becomes more and more important as farm size gets bigger, production evolves and transport of animals increases. One important aspect of external biosecurity is rodent control.

We surveyed the rodent control measures on Finnish swine and beef cattle farms, and explore the efficacy of control measures by trapping the rodents on each farm participating.

MATERIAL AND METHODS

Cattle (n=18) and swine (n=20) farms from Southern and Western Finland were interviewed using structured questionnaire.

Rodents were trapped using approximately one hundred instantly killing traps for two consecutive nights, on fall 2017 and fall 2018. The traps were checked and emptied after each night. Linear regression model was built for exploring the effect of various rodent control measures. Catches of both years were added up and used as an outcome. Initial model included independent variables: swine or cattle farm, number of animals, education level of the farmer, age of the oldest animal premise, open or closed feed storage, number of cats, surface material or layout of the farm yard premises, maintenance of the vegetation on yard, old/unused machines on the premises, having a rodent control plan on paper, number of rodent observation per month by farmer during summer, preventing access of rodents on premises, use of ultrasonic rodent repellent.

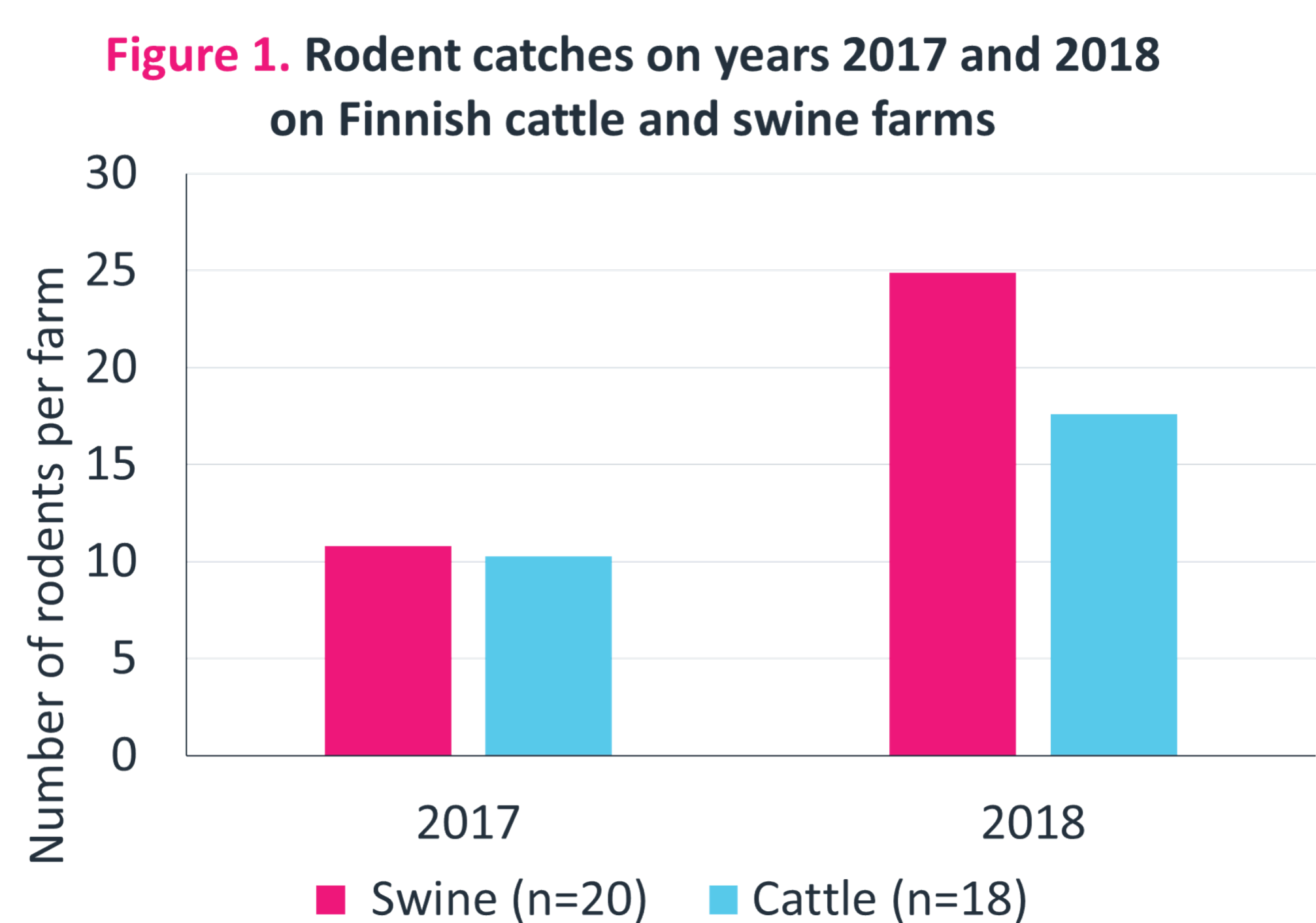


Table 1. Rodent control measures associated with rodent catches.

	Coefficient	95% Conf. level	P value
Cattle farm	-16.5	-33.1; 0.15	0.052
Number of animals, scaled	-0.000026	-0.0042; 0.0042	0.99
Having cart ways only on the yard	20.2	5.2; 35.2	0.01
Number of cats on the farm	-3.4	-6.9; 0.05	0.053
Preventing rodent access to animal premises	-12.3	-25.7; 1.0	0.069
Observations of rodents by farmer during summer	-0.55	-1.2; 0.11	0.099
Asphalt on farm yard	7.9	-6.9; 22.7	0.285
Education level of the farmer*			
0	Ref.		
1	-3.6	-26.5; 19.3	0.749
2	-6.7	-29.7; 16.4	0.558
3	10.9	-19.6; 41.5	0.469
4	-7.2	-33.0; 18.5	0.569

* 0 = Basic education 1 = Vocational upper secondary qualification in Agriculture 2 = Higher vocational level or University of applied sciences education
3 = Academic degree in agriculture 4 = Other

CONCLUSIONS

- Number of rodent catches varied between the farms and between the years.
- On a rodent peak year (2018) swine farms had more rodent catches than cattle farms.
- Having farm yard premises with no asphalt or gravel were associated with having more rodent catches.

RESULTS

Swine farms were bigger than cattle farms, with a median animal number of 950 pigs (mean 1630, SD 1710) and 205 head of cattle (mean 271, SD 184) per farm.

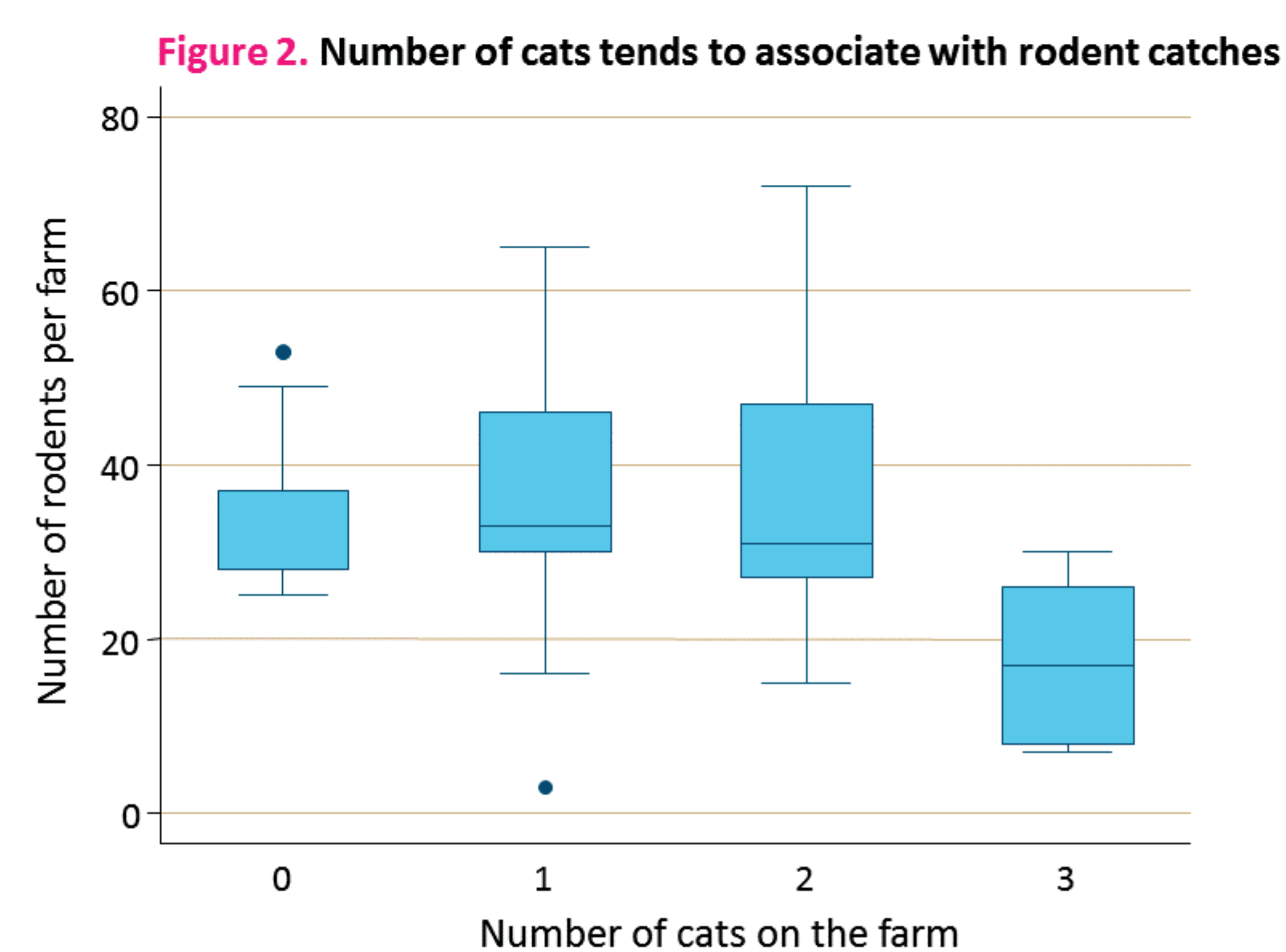
Mean catches of rodents was lower in 2017 than in 2018. In 2017 mean catches on swine and cattle farms were similar (Figure 1), but on year 2018 the number of catches was higher on swine farms (mean 24.9, SD 13.2) than on cattle farms (mean 17.6, SD 6.6). The number of rodent catches on each year on farms did not correlate ($p = 0.36$).

Most of the caught rodents and small mammals were mice (yellow-necked mouse, house mouse, harvest mouse; 65.2%) and voles (bank vole, southern vole, field vole; 23.2%). Only 4.0% of the yield were rats (brown rat) and 7.5% were shrews (common shrew, taiga shrew, pygmy shrew, Eurasian water shrew).

The regression model (Table 1) showed that farms with farm yard consisting of only cart ways, no gravel or asphalt had higher rodent catches ($p=0.010$). Cattle farms had a tendency for lower catches ($p=0.052$) and number of cats on farm tended to be negatively associated with number of rodents caught on farm ($p=0.053$, Figure 2). Also, trying to prevent rodent access to animal premises tended to yield lower catches ($p=0.069$).

Education level, having (or not having) asphalt on farm yard and observation of rodents by farmer confounded with some other variables, and were thus included in the model. Number of animals was also forced into the model.

For accounting the clearly different sizes of swine and cattle farms, farms were scaled so that large swine farms and large cattle farms were comparable, and smaller swine farms and smaller cattle farms similarly.



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