Spread of CSF by the time of detection in Finland

TAPANI LYYTIKÄINEN & S. M. RAULO
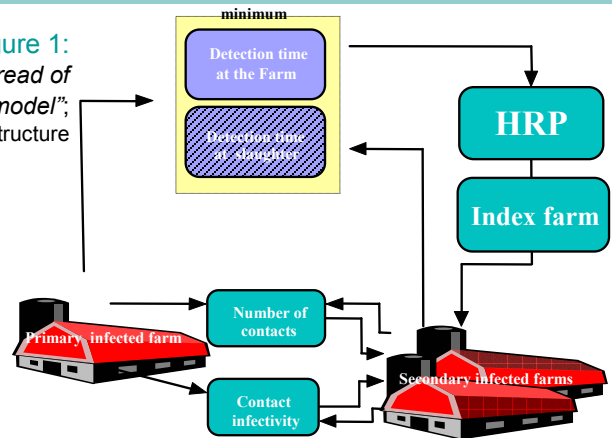
NATIONAL VETERINARY AND FOOD RESEARCH INSTITUTE (EELA), HELSINKI, FINLAND. E-MAIL: *TAPANI.LYYTIKAINEN@EELA.FI*

Abstract

Finland has in total 4,128 pig farms, and 54 % have no neighboring pig farms within 1km. Spreading of CSFV before the first detection is one of the key factors defining the final size of an epidemic. By simulating the course of spreading, the distribution for the number of infected farms and the length for the high risk period (HRP) were estimated. According to results, expected duration for the HRP is 8-10 weeks and the number of infected farms by that time will remain mainly under 10 in Finland.

Materials and methods

- Monte Carlo simulation model (MatLab™)
- Farm register for farm location, size and type
- Contact patterns according to pig movement register and questionnaires
- Contact infectivity according to publications as in The Netherlands -97-98
- Adjunction model for detection time
- HRP = $\min_{infected}$ (infection + detection time)
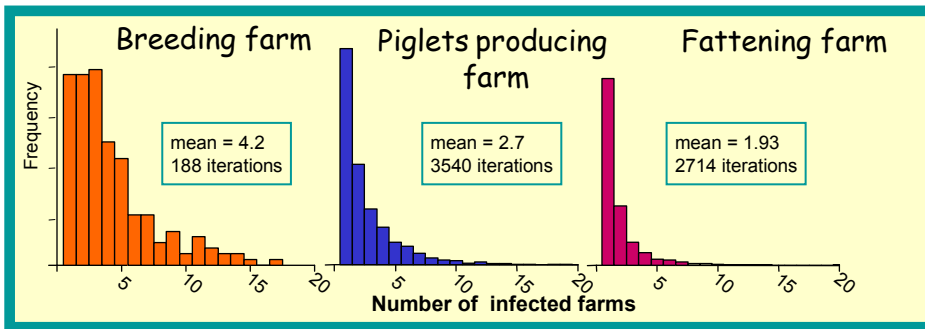
Figure 1:
"Spread of CSF-model"; logical structure

minimum

Detection time at the Farm

Detection time at daughter

HRP

Index farm

Primary infected farm

Number of contacts

Contact infectivity

Secondary infected farms

Results

Breeding farm — mean = 4.2, 188 iterations

Piglets producing farm — mean = 2.7, 3540 iterations

Fattening farm — mean = 1.93, 2714 iterations

Number of infected farms

Frequency

Figure 2: Effect of primary infected farm-type on the number of farms infected during the HRP

Table 1: Proportions of contact types in simulated secondary CSF outbreaks
(9 995 iterations; 13 929 secondary outbreaks)

Infected by-	% of secondary outbreaks
neighborhood spread 0-0.5 km	28.1
neighborhood spread 0.5-1 km	12.3
direct animal contact	14.3
vehicle contact	40.3
professional contact	3.0
other personal contact	1.8

Piglets producing farm — median 72, 95%<142

Fattening farm — median 55, 95 %< 98

/ days

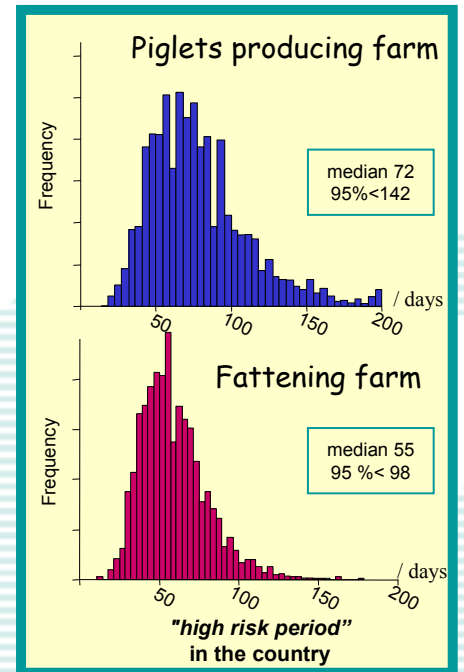Frequency

"high risk period" in the country

Figure 3: Effect of primary infected farm-type on the duration of the high risk period of an CSF epidemic

Conclusions

- The number of farms infected during the "high risk period" remains low
- Primary infected farm-type influences duration of HRP and the number of infected farms
- Animal transportation and "neighborhood spread" are the main infection routes