Preventive Veterinary Medicine 117 (2014) 59–67

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

Biosecurity on Finnish cattle, pig and sheep farms – results from a questionnaire

Leena Sahlström*, Terhi Virtanen, Jonna Kyyrö, Tapani Lyytikäinen

Risk Assessment Research Unit, Finnish Food Safety Authority Evira, Mustialankatu 3, 00790 Helsinki, Finland

ARTICLE INFO

Article history:
Received 25 November 2013
Received in revised form 27 June 2014
Accepted 7 July 2014

Keywords:
Biosecurity
Questionnaire
Cattle
Pig
Sheep
GLM

ABSTRACT

Biosecurity is important in order to prevent disease transmission between animals on farms as well as from farm to farm. Personal biosecurity routines such as hand washing and the use of protective clothing and footwear are measures that should be used at all farms. Other measures are for example related to purchasing new animals to the farm.

A questionnaire-based survey was undertaken to study the frequency of use of different biosecurity measures on cattle, pig and sheep farms in Finland. Information about which biosecurity measures are in use is needed for contingency planning of emerging diseases or when combating endemic diseases. Knowledge about the level of biosecurity of a farm is also needed in order to assess if and where improvement is needed. Information regarding biosecurity levels may benefit future animal disease risk assessments.

A total of 2242 farmers responded to the questionnaire resulting in a response rate of 45%. The implementation frequencies of different biosecurity measures are reported. The results revealed differences between species: large pig farms had a better biosecurity level than small cattle farms. There were also differences between production types such as dairy farming versus beef cattle farming, but these were not as remarkable. Sheep farming in Finland is sparse and the large number of hobby farmers keeps the biosecurity level low on sheep farms. This might represent a risk for the entire sheep farming industry.

The Finnish farmers were satisfied with their on-farm biosecurity. Eighty percent of the farmers report that they were satisfied even though the biosecurity level was not particularly high. The implementation of biosecurity measures could be further improved. Even though the disease situation in Finland is good today, one must be prepared for possible epidemics of threatening diseases.

1. Introduction

1.1. Biosecurity

The animal health status in Finland is very good regarding epizootic diseases. However, the situation can change very rapidly as we have seen in other countries such as in the foot-and-mouth-disease epidemic in Great Britain and bluetongue epidemics in many northern European countries. Some infectious agents are transmitted via direct contact between animals, whereas others can also be transmitted indirectly through contaminated equipment, vehicles, people and vector animals (Amass and Clark, 1999). FAO defines biosecurity as: "The implementation of measures that reduce the risk of the introduction and spread of disease agents" (FAO, 2010). The importance of biosecurity is underlined in the European Union health strategy for 2007–2013 "Prevention is better than

* Corresponding author. Tel.: +358 404 893375.
E-mail address: leena.sahlstrom@evira.fi (L. Sahlström).

http://dx.doi.org/10.1016/j.prevetmed.2014.07.004
0167-5877/

cure" (European Commission, 2007; Dekker, 2011). Biosecurity measures prevent both direct disease transmission between animals and indirect transmission between farms (Ellis-Iversen et al., 2011). Contacts such as transports and visits between farms and especially trade of animals facilitate disease spread. All precautions in animal trade, like quarantine, buying animals from a limited number of farms, etc. decrease the risk of disease transmission. Also biosecurity actions, including hygienic measures such as washing hands and using boots and coveralls (Amass et al., 2003, 2004), as well as transport logistics and "all-in-all-out" systems, to mention a few, decrease the risk of spreading diseases (Madec, 2001).

On-farm biosecurity measures are implemented differently depending on the farm. Biosecurity routines on pig farms have earlier been examined in different countries; e.g. Denmark (Boklund et al., 2003/2004; Boklund et al., 2004), Belgium (Ribbens et al., 2008), Chile (Pinto and Urcelay, 2003) and recently in Canada (Bottoms et al., 2012). In Sweden biosecurity measures have also been investigated on cattle and sheep farms (Nöremark et al., 2010). However, Finland differs from many other countries regarding the animal population which is sparsely distributed throughout the relatively large country. Even the areas with the highest farming densities in Finland have less than 0.5 farms/km^2 including all cattle, pig sheep and goat farms (Tike, 2009). Information about the biosecurity level on farms is important for contingency planning of emerging diseases, when combating endemic diseases in a country, or to see if and where the biosecurity needs to be improved. In addition, information on biosecurity level may benefit models for animal disease spread as well as risk assessments.

1.2. Aim

The aim of this survey was to describe the on-farm biosecurity routines used on cattle, pig and sheep farms in Finland and the possible differences in biosecurity depending on animal species, farm size and production type.

2. Material and methods

2.1. Administration of the questionnaire

A written questionnaire was designed to collect information about the level of biosecurity and hygiene practices on Finnish cattle, pig and sheep farms. The questionnaire was sent in March 2011 to each of 3000 cattle and 1000 pig farmers. Another slightly modified questionnaire was sent in June 2011 to 866 sheep farmers in Finland. An invitation letter was enclosed, in which the farmers were informed that their response will be treated confidentially and the results reported so that no individual answers could be recognized. A reminder was sent by mail to the farmers who did not respond, 4 weeks after the original questionnaire was mailed. No compensation was paid for the response.

The questionnaires were sent by mail but could also be answered online. The online link was provided in the mailed questionnaire and on the reminder card but also in the main agricultural newspapers in March 2011. A link to the pig and cattle questionnaire was published in two agricultural newspapers and the websites of the Association for Animal Disease Prevention (ETT), the National Health Classification Registry (Sikava and Naseva) and the Finnish Food Safety Authority Evira. The link to the sheep questionnaire was published in June 2011 in two agricultural newspapers, an electronic newsletter (Saparo) and the website of the Finnish Food Safety Authority Evira.

2.2. Questionnaire design

The 10-page questionnaire consisted of questions on general demography (age, sex, education and experience in animal husbandry), the farm (production type and type of buildings) and questions about several different on-farm biosecurity measures and hygienic precautions. There were 17 (14 for the sheep farmers) different biosecurity measures from which the farmers were requested to choose and mark the ones that were always in use at the farm. Biosecurity measures that were given as separate options were for example: the use of boots, or the use of protective clothing by the farmers and visitors, respectively, hand washing, use of a separate loading area, cleaning of stables and pest control. In addition, the farmers were also asked in eight separate questions about routines when purchasing animals as there are no animal markets in Finland; did they purchase animals from more than one other farm, did they enquire about the health status of the selling farm, the use of a quarantine, and the use of farm-specific transport vehicles for animals. One of the eight questions regarding trade of animals was if the farmer followed the guidelines of ETT. ETT (the Association for Animal Disease Prevention) is a farmers' association in Finland which, among other things, prepares guidelines for animal trade. Another question in the questionnaire dealt with satisfaction. The respondents were asked to mark if they were satisfied, not satisfied or did not know if they were satisfied or not with the biosecurity on their farm. In both the cattle/pig and sheep questionnaires there were additional questions, the results of which are not presented in this paper. The questionnaire was pretested by an expert group of veterinarians working with biosecurity and it was edited according to their comments.

The complete questionnaire (in Finnish or Swedish) is available upon request from the authors.

2.3. Selection of farmers

There were 16,714 cattle farms, 2343 pig farms and 2576 sheep farms in Finland in 2009 (Finnish farm registry, Tike, 2009). The sample of 3000 cattle, 1000 pig and 866 sheep farmers represented 18%, 43% and 33% of the farms in Finland in 2009, respectively. The sample size was determined based on earlier experience of response rate (approximately 20%) among Finnish farmers and the aim was to get as big and representative sample as possible. Sampling was based on farm size which is defined here as the number of animals (cows and heifers >6 months, sows and finishers > 3 months) on the farm. The selection of large farms was motivated because there is a tendency towards larger farm size whereas smaller farms tend to discontinue