**Short Communication**

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**Summary**

Surveillance plans were carried out in Italy from 1995 to 2003, with the main aim of controlling the possible circulation of low-virulence classical swine fever viral strains. The repetition of a serological monitoring programme over several years, with constantly negative results, can prove the absence of the infection while increasing the degree of confidence. In our case, in 2003, after eight repetitions of the surveillance plan, the probability that there was at least one infected farm reached 0.006%. Therefore, on the basis of the results of the sampling carried out from 1995 to 2003, we may state that there is no endemic infection, even because of a low virulence virus, in continental Italy.

**Introduction**

Classical swine fever (CSF) is one of the most economically important viral infectious diseases that affects wild and domestic pigs. As a matter of fact, it is included in the OIEs ‘A’ list (OIE International Animal Health Code, Appendix 3.8.1. General principles for recognising a country or zone free from a given disease/infection) and is object of particularly strict sanitary police laws at an international level. Since the 1980s, in the European Union, the eradication strategy has substituted immunizing prophylaxis for CSF control and the absence of outbreaks allowed to consider certain territories non-endemic area (Terpstra, 1991).

Nonetheless, during the last few years, foci of CSF have occurred in Europe, thus giving origin to extensive epidemics with great economic loss. The most important one occurred during the 1997 and the Netherlands, Germany, Italy and Spain suffered the major consequences (Stegeman et al., 2000). In Italy two outbreaks occurred during the above mentioned epidemic and CSF virus was also found in Lombardia (1997), in Piemonte (1999) and in Emilia Romagna (1998–1999); these outbreaks are not the expression of an endemic status of the disease because the epidemiological and clinical differences were registered (Biagetti et al., 2001; Floegel-Niesmann et al., 2003). None of these outbreaks had consequences outside a restricted area; the absence of the disease in continental Italy was demonstrated by surveillance plans on domestic pigs that have taken place since 1995.

**Materials and Methods**

The serological surveillance plans (Ordinanza Ministeriale 16 February 1995 and subsequent) of the national swine population, were implemented on a regional basis in parallel with the swine vesicular disease (SVD) national eradication plan for economical reasons. Farms were sampled on the basis of the results of the sampling carried out from 1995 to 2003, we may state that there is no endemic infection, even because of a low virulence virus, in continental Italy.

**Fig. 1.** Classification of regions by percentage of seropositive farms and pigs during the year 1995.
with the technical attachments to the implementation of the community regulations. The positive sera were then sent to the National Reference Centre for Swine Fevers (CEREP) to perform a differential diagnosis with ruminant pestiviruses (bovine virus diarrhoea and border disease) by seroneutralization test.

The number of samples examined during each year of the plan’s implementation and the number of true positives because of infection found, were used to calculate the maximum prevalence the infection could have in Italy, on the basis of Bayes theorem and considering the results obtained, as well as the distribution of the probability of prevalence itself. For each year of the plan, the distribution of probability obtained the previous year (uniform distribution for the first year of the plan – 1995) was considered as the a priori distribution of the prevalence of infection while the a posteriori distribution of the probability of infection was calculated considering the data obtained during the year (Siegel and Castellan, 1988; Hosmer and Lemeshow, 1989).

### Results

During 1995, 122 278 animals, reared in 6245 breeding farms, were tested. A total of 761 of these animals were found serologically positive for CSF, but it was shown that these sera were obtained from old animals immunized before the vaccination ban. The CSF virus was never isolated in the farms where seropositive animals were found.

Table 1 shows the number of farms and animals sampled during the period 1997–2003. All animals tested negative. On the basis of these results, we calculated the distribution of the probability that there were no positive farms in the Italian regions, probability that increases progressively and has reached the value of 99.99% in the year 2000.

A serological surveillance plan, if based on sampling, only allows to verify if the disease is endemic in the population above a certain threshold value.

In theory, the proof of the absence of the infection could only be given if every single member of the population was examined simultaneously using a perfect test (i.e. with 100% sensitivity and specificity). Therefore, in practice, the demonstration of the absence of a disease from a population is given by providing sufficient evidence that the infection, if present at an endemic level, is so in a proportion of the population itself that is below a certain threshold (i.e. prevalence threshold) and howing, at the same time, using an early alarm system, that the disease or the infection is not present with epidemic characteristics (e.g. as a result of a recent introduction from the outside).

The degree of belief of the absence of an endemic infection (mainly caused by low-virulence strains) from the Italian swine population given by only 1 year of the plan (e.g. 1995) only allows to say that the probability of the infection being present in at least one farm is about 6%. Values of this kind are often not considered acceptable at an international trade level. Furthermore the sampling performed cannot assure the infection is not endemic in small-circumscribed niches.

Nonetheless, the repetition of the plan for a certain number of years, with constantly negative results, determines an increase of the degree of belief, and in our case, after eight repetitions, in 2003, the probability of there being at least one positive farm reached $6 \times 10^{-5}$ (0.006%).

Therefore, considering the results obtained from 1995 up to now, we may say that in the continental Italian territory there is no endemic infection, not even sustained by low-virulence strains (assuming a confidence level of 99.99% is considered acceptable).

This does not mean surveillance plans may be forgotten, because infection by low-virulence strains is present in other countries, both inside and outside the European Union, from which we import both live pigs and their products.

The implementation of the surveillance plans each year is necessary, because an interruption or a further reduction of the number of samples collected would reduce the reliability of the data.

### References


