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A NEW APPROACH TO DETECT REPRODUCTIVE DISEASE OUTBREAKS USING SOW PRODUCTION RECORDS. A FOCUS ON PRRSV

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Introduction

Porcine reproductive and respiratory syndrome (PRRSV) is a viral disease with negative impact on sow reproduction, being associated to a decrease in the number of born alive piglets (NBA) and an increase in the number of lost piglets (NLP). It is of interest to quickly assess whether a farm is under a PRRSV outbreak situation. The aim of this research work is to develop a new method to distinguish between healthy and disease phases in PRRSV positive and negative farms using performance data.

Material & Methods

NBA and NLP records from a farm were used. Different discrete bivariate probability distributions were considered to model NBA and NLP using different R packages. Since a relevant negative correlation between NBA and NLP was observed, a conditional Poisson on NBA was the model showing the best goodness of fit. The expected values of NBA and NLP under a non-outbreak scenario were estimated using a maximum likelihood procedure. Then, for each farrowing, a single p-value was computed, defined as the probability of jointly observing a lower NBA and higher NLP than the expected ones. In order to assess the existence of an outbreak, a combined p-value using the last 100 p-values was computed using the Khi^2 -inverse method, procedure that was performed for each farrowing.

Results

The results showed two clear outbreak periods revealing a displacement of the mean NBA (lower) and NLP (higher) values that were confirmed with diagnostic techniques. In addition, the method was used to detect PRRSV outbreaks in two PRRSV positive and one PRRSV negative farm as control.

Discussion & Conclusion

The method was able to detect PRRSV outbreaks previously diagnosed in two farms using laboratory techniques while no suspicious case was observed in the PRRSV negative farm. Finally, this method is being routinely used for syndromic surveillance purposes.