

# CONTROL OF PORCINE LEPTOSPIROSIS IN AN IBERIAN BREEDING FARM

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## INTRODUCTION

Porcine leptospirosis is an insidious disease that affects, among other species, pigs. Due to the economic losses that produces and the zoonosis character, it must be considered in health programs. This pathology presents an acute form, which can affect pig grow during the first months of their life causing high fever, jaundice, hemoglobinuria, convulsions and even in severe cases death of the animals. In contrast, the chronic or endemic form, give reproductive signs, causing infertility, returns to heat, vaginal discharge, abortions, weak piglets at birth, stillbirths and a modified litter scatter score.

A very important epidemiological characteristic of the pathogen is its natural hosts, which result the existence of adapted and accidental serovars. An adapted serovar is the one that have specific species as maintenance host, where is perpetuated without the intervention of other animal species; in Spain, for pigs the adapted *Leptospira* serovars are Bratislava (characterized by its persistence in the genital track of sows and boars) and Pomona. On the other hand, accidental serovars (mainly *Icterohaemorrhagiae* in our swine herd), for which pigs are accidental hosts, appears after contact with their corresponding maintenance hosts (normally wildlife species and especially rodents).

## MATERIALS AND METHODS

### Farm's description

Study farm was a 450 nucleus sow Iberian farm that for several years was a *Leptospira* like symptomatic on being PRRS negative. Farm works under weekly batches using post-cervical AI. The piglets were vaccinated before weaning with a bivalent vaccine against Porcine Circovirus type 2 and *Mycoplasma hyopneumoniae*.

### The problem

The clinical symptoms found were basically based on a very low fertility at ultrasound time, that resulted in a farrowing rate below the production objectives (TABLE 1). In addition, infertility was more evident in gilts, that were introduced to the farm for its first service. Sporadic losses were also observed at the end of the gestation period (sows that were positive to the ultrasound diagnosis arrived unpregnant to the farrowing house)

| AVERAGE FARROWING RATE |       |
|------------------------|-------|
| 2015                   | 74,9% |
| 2016                   | 73,6% |
| 2017                   | 66,8% |
| 2018                   | 74,1% |

TABLE 1

### Laboratory diagnosis

Late 2017, an exhaustive diagnosis work was made looking for the cause of these reproductive problems, discarding several viral agents (Influenza, PRRS) and bacterial (Chlamydia, Brucella). Blood samples were sent from problematic sows (affected by infertility and / or abortions) to a Spanish reference laboratory to do a leptospirosis diagnostic (MAT technique, Microagglutination). The results clearly indicated the possible involvement of *Leptospira* and more specifically the Bratislava serovar, which has been associated in several studies to infertility problems (TABLE 2).

| REFERENCE OF THE SAMPLE       | <i>Leptospira Bratislava</i> titles | <i>Leptospira Pomona</i> titles | <i>Leptospira Icterohaemorrhagiae</i> titles |
|-------------------------------|-------------------------------------|---------------------------------|--|
| Returns to estrus             | 1/200                               | Negative                        | Negative                                     |
| Aborted                       | 1/100                               | Negative                        | Negative                                     |
| Returns to estrus             | 1/200                               | Negative                        | Negative                                     |
| Returns to estrus             | 1/200                               | Negative                        | Negative                                     |
| Returns to estrus nulliparous | Negative                            | Negative                        | Negative                                     |
| Returns to estrus nulliparous | 1/100                               | Negative                        | Negative                                     |
| Aborted                       | 1/200                               | Negative                        | Negative                                     |
| Returns to estrus             | 1/200                               | Negative                        | 1/50   |
| Returns to estrus             | 1/200                               | Negative                        | 1/50   |

TABLE 2

### Measures applied

Due to the clinical and laboratory diagnosis, oral tetracycline treatment (feed) was done with the consequent slight improvement of the results, but not reaching an acceptable situation. In order to improve the results individualized injectables treatments with streptomycin (25mg / Kg PV) was done, but once again it was detected improvement without reaching the desired standard, as well as the feeling that the withdrawal of all this medication results in a resurgence of the problem.

Due to the therapeutic gap existing at that time for the control of the disease, farm decided to import a vaccine marketed outside the European Union, that included antigens for the control of *Leptospira*, Parvovirus and Porcine Erysipela. Unfortunately results were not satisfactory and the imported vaccine was discontinued.

Finally, at the end of 2018, started the commercialization of a new multivalent vaccine that includes antigens against several serovars of *Leptospira*, Parvovirus and Porcine Erysipela, and it was implemented a vaccination program of all the sows in the farm, with two shots four weeks apart.

## RESULTS AND DISCUSSION

Antibiotic was one efficient tool to control disease (TABLE 3) having a better rate at ultrasound was improved. For this study, the period has been considered in which the feed was medicated in comparison with the periods in which no antimicrobial was used. High significant differences were detected among the groups. The percentage of fertility was significantly higher in WITH Antibiotics compared with NO Antibiotics ( $p = 0.005$ ).

For the study of efficacy in the control of the disease by the new vaccine program, it was defined 3 periods: Before (referring to the twelve weeks prior to the application of the first vaccine dose), During (referring to the period between the first dose of vaccine in November of 2018 and two weeks after the second dose of vaccine, time necessary to generate immunity), and

| Period          | N° weekly batches | % of pregnant to eco |
|-----------------|-------------------|----------------------|
| W/O antibiotics | 9                 | 73,2% <sup>a</sup>   |
| W antibiotics   | 9                 | 85,6% <sup>b</sup>   |

TABLE 3

(a, b, different superscript indicates statistically significant difference)

Vaccinated (referring to the six weeks after and until this article is written). Highly significant differences between the groups ( $p = 0.007$ ) were detected. The percentage of fertility was significantly higher after the establishment of the vaccination process with respect to Before ( $p = 0.006$ ).

| Period     | N° weekly batches | % of pregnant to eco |
|------------|-------------------|----------------------|
| Before     | 12                | 77,9% <sup>c</sup>   |
| During     | 5                 | 79,4% <sup>c</sup>   |
| Vaccinated | 6                 | 91,7% <sup>d</sup>   |

**TABLE 4**

(c, d, different superscript indicates statistically significant difference)

We need to open the discussion about the disease control, first by the difficulty that often involves diagnosing the causal agent, because many of the symptoms are common to other pathogens, in addition to the difficulty of interpretation of lab tests. And, secondly, assess the use of antimicrobials as a tool to control either in isolation or in combination with the new vaccine recently appeared in the market. We must emphasize that in this case there is a temporal coincidence between vaccination and antimicrobial treatment, but that the stop in the treatment has not means a worsening of the reproductive data

## CONCLUSIONS

Results show that disease control becomes evident by two very different approaches: prevention and treatment. In this specific case, vaccination has proven to be more effective, being also a useful tool for reduce the use of antibiotic treatments.

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