

## THE IMPORTANCE OF LEGISLATION TO IMPROVING THE REPRODUCTIVE HEALTH OF PIGS

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*SUMMARY: The aim of this study was to investigate the boars, sows and gilts for the presence of infectious pathogens that cause deterioration of health and reproduction of pigs. This research was conducted in accordance with the Ordinance on establishing a program of measures for animal health protection and it included breeding boars, sows and gilts, which had an abortion. Tested boars and breeding sows which had an abortion were seronegative to *Brucella* spp. and *Listeria* spp., while on two farms seropositive results for *Leptospira* spp. were found. Seroprevalence of Aujeszky's disease and PRRS in boars was 29.21% and 41.57%. All boars were seronegative for tuberculosis, and no pathogens of *Brucella* spp., *Leptospira* spp., and *Listeria* spp. were found in aborted fetuses and parts of placenta of sows and gilts. The results of this study point out the importance of veterinary legislation in health care and reproduction of pigs, which is reflected in the regular monitoring of breeding animals, prevention of disease occurrence and spreading and control of infectious diseases in pigs.*

**Key words:** veterinary legislation, abortion, reproductive health, pigs.

### INTRODUCTION

Reproductive health is one of the primary factors for successful pigs breeding. Infectious factors are the leading cause that reduce reproductive efficiency and profitability of pig production (Stojanac et al., 2013). The health status of boars used for artificial insemination (AI) in the intensive pig production is the basis for successful reproduction (Britt et al., 1999; Stančić et al., 2012). In Serbia, according to the Ordinance on establishing a program of measures for animal health protection for the 2013 (Službeni glasnik, 91/13, poglavlje IX), provides for a compulsory testing of breeding boars twice

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a year on: brucellosis, tuberculosis, Aujeszky's disease (AD), leptospirosis and porcine respiratory and porcine respiratory and reproductive syndrome (PRRS).

The pregnancy is the longest period in the sows reproductive cycle (114 days), normally ending with birth. Each premature birth represents an abortion and leads to reproductive efficiency reduction. In addition, abortion of infectious etiology represents a potential source of infection for other animals and humans (Pozzi and Alborali, 2012). For this reason, the Ordinance on establishing a program of measures for animal health protection for 2013 (Službeni glasnik, 91/13, poglavlje VIII), provides for a compulsory reporting of every abortion of sows and gilts to the veterinary organization. Also, there is an obligation to investigate abortions in sows and gilts for the presence of brucellosis, leptospirosis and listeriosis, which can cause infections in humans.

The objectives of this study were to examine five pig farms in Vojvodina during the 2013, for the following: (1) breeding boars for brucellosis, tuberculosis, AD, leptospirosis and PRRS, (2) sows and gilts that have had an abortion for the presence of brucellosis, leptospirosis and listeriosis.

## MATERIALS AND METHODS

*Trial Farms:* The study was conducted on five commercial farrow-to-finish pig farms which are located in AP Vojvodina, with the capacity over 1,000 sows, with a closed production cycle. The study included 89 breeding boars, used for AI of sows on the investigated farms. In the course of research 53 abortions in sows and gilts were recorded on the studied farms. All studied farms implement a system all in/all out at all stages of production.

*Experimental design:* Blood samples were collected from breeding boars using the method of plexus brachiocephalicus puncture and were sent to the laboratory of an authorized institution. The testing was conducted for the presence of antibodies specific for *Brucella* spp., *Leptospira* spp., *Aujeszky's disease* (AD), and *porcine respiratory and reproductive syndrome* (PRRS). At the same time with taking the blood samples from boars avian and bovine tuberculin were administered intracutaneously (i.c.) in the left and right ear. Reading the results was performed on two occasions, 48 and 72 hours after administration of the tuberculin. Based on the reaction obtained, the results of tuberculin test may be: negative (point of administration of tuberculin is not swollen or the swelling is the size of a pea and is not tempered), suspicious (swelling is slightly tempered, approximately 2 cm in diameter and is not surrounded by a red zone; these pigs should have tuberculin re-administered after 60 days) and positive (swelling is pasty, tempered, somewhat more sensitive, 2-5 cm in size and surrounded by a red zone, the middle of the swelling is always tempered and often covered with crust. Pigs which reacted positively to bovine or avian tuberculin, are considered positive in tuberculosis).

*Blood samples* were taken from sows and gilts which had an abortion by puncture of plexus brachiocephalicus, and aborted fetuses and parts of the placenta were taken, in the presence of a veterinary inspector, and sent to the lab of an authorized institution. Aborted fetuses and placenta were tested for presence of *Brucella* spp., *Leptospira* spp., and *Listeria* spp., while blood samples of sows and gilts were tested for presence of antibodies specific for *Brucella* spp., *Leptospira* spp., and *Listeria* spp.

*Data analysis:* Data were entered into an Excel spreadsheet (Microsoft Excel 2010) and imported into Stata (Stata 8 Intercooled for Windows 9x) in which data were

analyzed. Descriptive analysis was done in MiniTab version 14 (MiniTabR14b) and Excel (Microsoft Excel 2010).

## RESULTS

All tested boars were in good shape with no clinical signs of diseases. A total of 89 boars was tested for the presence of antibodies specific for *Brucella* spp., *Leptospira* spp., AD and PRRS (Table 1).

Table 1. The presence of antibodies specific for *Brucella* spp., *Leptospira* spp., AD and PRRS in breeding boars

Farm	No. boars tested	<i>Brucella</i> spp.	<i>Leptospira</i> spp.	AD	PRRS
I	15	0	0	11	7
II	17	0	2	8	6
III	12	0	1	0	0
IV	22	0	0	7	14
V	23	0	0	0	10
Total	89	0	3	26	37

All the tested breeding boars after i.c. administration of tuberculin had a normal appetite, behavior and libido in the next 72 hours. All 89 breeding boars tested were negative for tuberculosis.

Aborted fetuses and parts of placenta in all 53 tested abortions of sows and gilts were negative for presence of *Brucella* spp., *Leptospira* spp., and *Listeria* spp. The presence of antibodies specific for *Brucella* spp., *Leptospira* spp., and *Listeria* spp. is shown in Table 2.

Table 2. Presence of antibodies specific for *Brucella* spp., *Leptospira* spp., and *Listeria* spp. in the blood of sows and gilts which had an abortion

Farm	No. blood samples tested from sows and gilts	<i>Brucella</i> spp.	<i>Leptospira</i> spp.	<i>Listeria</i> spp.
I	7	0	0	0
II	3	0	0	0
III	14	0	1	0
IV	12	0	1	0
V	17	0	0	0
Total	53	0	2	0

## DISCUSSION

In this study, all tested animals, breeding boars, sows and gilts which had an abortion were seronegative for the presence of *Brucella* spp. Also, *Brucella* spp. was not isolated from aborted fetuses and parts of placenta. Regular monitoring, which is prescribed by the Ordinance on establishing a program of measures for animal health protection for 2013 (Službeni glasnik, 91/13), provides a basis for preventing the disease occurrence and spreading and control of zoonotic infections, which can cause reproductive disorders in humans (Xavier et al., 2010). The results of this study are similar to the findings of other authors who report very low seroprevalence of *Brucella* spp. (Hernández et al., 2013).

World Organisation for Animal Health (OIE) in its report states that climate changes lead to the emergence of the disease in animals, and six infectious diseases are described as particularly important for Europe (Dufour et al., 2008). *Leptospira* spp. a bacteria of zoonotic potential is among these six pathogens. This research found three seropositive breeding boars on two farms (II and III) and two seropositive breeding sows that have had an abortion on two farms (III and IV). *Leptospira* spp. was not isolated from the aborted fetuses and placenta, while occurrence of leptospirosis was correlated with the appearance of high humidity, or greater precipitation (Boqvist et al., 2012).

All of the breeding sows tested were seronegative to *Listeria* spp. *Listeria* spp. was not isolated from the aborted fetuses and sows, which represents a lower value of the prevalence of *Listeria* spp. compared to the findings of other authors (Autio et al., 2004).

Twelve months before the research, vaccination of pigs against the Aujeszky's disease was not carried out. Of the 89 tested breeding boars 29.21% were seropositive, which is a higher seroprevalence compared to the findings of other authors (Tummaruk and Tantilertcharoen, 2012). High seroprevalence in our study is certainly a consequence of vaccination of breeding boars in a preceding period, but it is also undoubtedly an indication that pathogen of Aujeszky's disease is present endemically on the tested farms.

Thirty-seven (41.57%) of the tested boars were seropositive for PRRS, i.e. on 4/5 (80%) of the examined farms a presence of PRRS was found. Other researchers around the world report similar results (Kim et al., 2002; Tummaruk and Tantilertcharoen, 2012).

Tuberculosis of pigs is rare compared to other swine diseases, but its zoonotic potential still presents a risk to human health. In our study all tested breeding boars were negative.

## CONCLUSION

The results of this study point to the importance of veterinary legislation in health care and reproduction of pigs, which is reflected in the regular monitoring of breeding animals. Serological and bacteriological findings obtained suggest that abortions in sows and gilts are not of infectious etiology, while complete diagnostics of abortions requires further research.

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## ZNAČAJ ZAKONSKIH PROPISA ZA UNAPREĐENJE REPRODUKTIVNOG ZDRAVLJA SVINJA

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### Izvod

Cilj ovog rada je bio da se ispitaju priplodne svinje (nerastovi, krmače i nazimice) na prisustvo infektivnih uzročnika, koji dovode do narušavanja zdravstvenog stanja i reprodukcije svinja. Ovo istraživanje je urađeno u skladu sa Pravilniku o utvrđivanju programa mera zdravstvene zaštite životinja i ispitani su priplodni nerastovi i krmače i nazimice koje su pobacile. Ispitani nerastovi i plotkinje koje su pobacile su bili seronegativni na *Brucella* spp i *Listeria* spp., dok su na po dve farme utvrđeni seropozitivni nalazi za *Leptospira* spp. Seroprevalenca bolesti Aujeckog i PRRS kod nerastova je iznosila 29,21% i 41,57%. Svi nerastovi su bili negativni na tuberkulozu, a iz pobačenih plodova i delova placente krmača i nazimica nisu ustanovljeni uzročnici *Brucella* spp., *Leptospira* spp. i *Listeria* spp. Rezultati ovog istraživanja ukazuju na značaj veterinarskih zakonskih propisa u zdravstvenoj zaštiti i reprodukciji svinja, koji se ogleda u redovnom monitoringu priplodnih životinja, sprečavanju nastanka, širenja i kontrole infektivnih bolesti svinja.

**Ključne reči:** veterinarski zakonski propisi, pobačaj, reproduktivno zdravlje, svinje.

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