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SEROPREVALNCE OF INFECTIOUS CAUSES OF ABORTION IN SOWS*

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SUMMARY: The objective of the present study was to investigate the sero-prevalence of potential agents among aborted sows in a commercial swine farm in Serbia. Infectious agents may be specific and non-specific pathogens. Specific viruses, bacteria and protozoa, which come to the fetus through the blood or through the vaginal opening. Non-specific pathogenic, mainly bacteria, causing the systemic infection and they can cause a miscarriage and the death of the fetus of action in the uterus (endometritis) or direct cytolytic effect on the fetus. Almost all the fertility parameters in sows (reproductive and productive) may be affected by different infectious diseases. Changes in reproductive parameters may also occur without the appearance of appreciable pathological findings or with clinical signs often overlapping or similar to different diseases or pathogens. Since the reproductive efficiency is one of the main factors in the pig production, the activity should be focused on reducing the abortion, particularly in farm with intensive way of keeping the pigs where the occurence of abortion should be reduced to sporadic cases. All the clinical aspects and the pathological findings should be taken into account to address a tentative diagnosis with the support of laboratory findings. Regular serological monitoring is the basis of health care of pigs, and therefore the control and prevention of reproductive disorders.

Key words: *abortion, infection, reproductive parameters, sows.*

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INTRODUCTION

There is a constant need in pig production in order to increase reproductive efficiency measured by the number of piglets produced. This value depends on a number of genetic and paragenetic factors and directly is affected to total production of pigs, both, in nudity and in economic terms (Stančić et al., 2012). Modern pig breeds with high genetic potential of the individual parameters of reproductive performance, which can result in the production of more than 30 weaned piglets per sow per year. However, different disorders of reproductive functions are one of the main reasons why this value is very difficult to achieve in practical terms (Gagrcin et al., 2001). The main objective of the ventures is to obtain a greater number of piglets per sow, reducing their mortality and achieving better production results. There are numerous factors that lead to a reduction in reproductive efficiency, which leads to the continuity, scope and increased cost of production (Gagrčin et al., 2007). One of the leading factors of reproductive efficiency are abortions in sows (Stojanac et al., 2011).

Infectious agents that cause abortions may be specific and non-specific pathogens. Specific are viruses, bacteria and protozoa, which come to the fetus through the blood or through the vaginal opening. Non-specific pathogens are mainly bacteria which cause systemic infection and connected to the miscarriage and death of the fetus with affecting the uterus (endometritis) or having direct cytolytic effect on fetus (Martinez et al., 2008).

The aim of this study was to investigate the serological status of sows that had a miscarriage. Serum was checked for the presence of antibodies to Brucella spp., Leptospira spp., Listeria Monocytigenes, Salmonella spp., Porcine reproductive and respiratory ryndrome virus, Classical swine fever, Porcine circovirus diseases, Aujeszky's disease and Porcine parvovirus.

MATERIALS AND METHODS

Farms

The test was performed on the pig farm with of 2000 sows from January 2011 to December 2012 year. The farm is of closed type with the intensive way of keeping pigs. Lactation lasts for 28 days. After weaning, sows are placed in insemination room in group boxes (10 sow per a box) until entering into estrus, when they are moved to incarceration where they are inseminated and remain until 28^{th} day of pregnancy. Following a positive ultrasound control sows are placed in the waiting area in group boxess (10 sows) and remain there until 110 day of pregnancy. Sows are fed installment, twice a day, and water intake is at their will. Microbiological and mycological control of raw materials for feed preparation and prepared food is conducted regularly.

Immunoprophylaxis

Seven days before weaning sows are vaccinated against classical swine fever and Aujeszky's disease. Vaccination and revaccination of sows against colibacillosis and necrotic enteritis was done on 80^{th} and 100^{th} day of pregnancy. Vaccination of pigs against Mycoplasma infection and circovirus infections was conducted on the studied farm.

Sample collection and laboratory analysis

There were 164 abortions in the experimental period. Within 24 hours of miscarriage, blood was taken from sows by the puncture in brachiocephalic plexus. Testing was conducted at reference laboratory. The blood serum of sows who had abortions was examined on the presence of antibodies specific for: Brucella spp. using rapid agglutination method, Leptospira spp. using the microscopic agglutination test, Listeria monocytigenes using agglutination method, and Salmonella spp. by indirect ELISA. The presence of antibodies against the viruses was also determined for: respiratory and reproductive syndrome swine (PRRS) by ELISA test, classical swine fever (CSF) by ELISA test, and circovirus infections (PCV-2) using indirect ELISA (Nawagitgul et al., 2002). The titer of antibodies specific for the Aujeszky's disease (AD) was determined by serum neutralization and to swine parvovirus (PPV) using hemagglutination inhibition.

Data analysis

Data were entered into an Excel spreadsheet (Microsoft Excel 2007) 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 2007).

RESULTS AND DISCUSSION

On the test farm in a period of two years (2011-2012) there were 10789 farrowing, which makes 98.48% of all pregnant sows in this period. The rest of the pregnant sows, 164 (1.52%) had early partus or abortion (Table 1). The incidence of abortion was 1.52%, which is above the level (0.8-1%), which many researchers consider to be the limit for good, quality reproduction (Alborali and Pozzi, 2012).

Table 1. Number of abortions in the studied farm (2011-2012)
Tabela 1. Broj pobačaja na ispitivanoj farmi (2011-2012)

	Farrowing	Abortion	TOTAL
Number	10789	164	12122
%	98,48	1,52	100

Infectious factors, as main causes of reduced reproductive efficiency can lead to miscarriage and death of the fetus where the fetus by inflammation of the endometrium, or the direct influence on the fetus or sows. Table 2 shows the results of serological tests in aborted sows on the presence of specific antibodies for potential causes of miscarriage.

On the tested farm a infectious agents of brucellosis, leptospirosis and listeriosis are not identified. Salmonella seroprevalence of 72% is similar to what was found by other researchers (Funk, 2008; Baptista et al., 2009; Shishak et al., 2011; Hernandez et al., 2013).

Out of 164 aborted sows, 92 were positive for PRRS. This result is slightly lower than the result reached by the Tummaruk et al., 2009.

Seven tested sows were seronegative on CSF. Bearing in mind that the farm implements regular vaccination against CSF, the reason why seroconversion did not take place in these cases should be found in the failure of vaccine application.

The presence of antibodies specific for PCV-2 in 147 sows, tells about the fact that circovirus infection of pigs is widespread throughout the world and are a potential threat to cause abortion (Perreul et al., 2010).

Table 2. The presence of antibodies in the blood serum of sows
Tabela 2. Prisustvo antitela u krvnom serumu krmača

	Positive	Negativ	TOTAL
Brucella spp.	0	164	164
Leptospira spp.	0	164	164
Listeria monocytigenes	0	164	164
Salmonella spp.	118	46	164
PRRS	92	72	164
KKS	157	7	164
PCV-2	147	17	164

Parvovirus infection is widespread in clinically healthy pigs worldwide and has enzootic character. It is the constant presence of parvoviral infection on the farm, that caused all sows to be seropositive, established a high titer of antibodies, which protect the piglets from intrauterine infection (Stojanac et al., 2012).

Regular vaccination of sows against Aujeszky's disease can explain why none of the aborted sows was seronegative (Table 3).

Table 3. The titer of antibodies to PPV and AD
Tabela 3. Titar antitela za PPV i AD

	Mean	Interval of variation
PPV	3786	1024-16364
AD	12,7	2-32

CONCLUSION

Based on the analyzed and processed data it could be concluded that abortions have an important impact on the reproductive efficiency of pigs. For the improvement of inter-reproductive efficiency and reduction of the prevalence of abortion it is necessary to conduct regular serological monitoring of the entire herd. In this way we would have an insight into the health status of the herd, which will serve for the proper implementation imunoprophylactic measures, or, therefore, this reduce the number of abortions.

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SEROPREVALENCA INFEKTIVNIH UZROČNIKA POBAČAJA KOD KRMAČA

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Izvod

Cilj ovog ispitivanja je bio da se ispita seroprevalenca potencijalnih uzročnika pobačaja kod krmača na komercijalnim farmama u Srbiji. Infektivni uzročnici mogu biti specifični i nespecifični patogeni. Specifični su virusi, bakterije i protozoe, koji dolaze do ploda putem krvi ili kroz vaginalni otvor. Nespecifični patogeni su uglavnom bakterije koje su uzročnici sisitemske infekcije i oni mogu izazvati pobačaj i uginuće plodova dejstvom na matericu (endometritis) ili direktinim citolitičkim dejstvom na plod. Skoro na sve parametre plodnosti krmača mogu da utiču različite infektivne bolesti. Do promena u reproduktivnim parametrima može doći i bez spoljašnjih promena ili se klinički znaci bolesti često preklapaju ili su isti kod različitih uzročnika. Imajući u vidu da je reproduktivna efikasnost jedan od vodećih faktora u proizvodnji svinja, treba da se radi na smanjenju broja pobačaja, naročito u farmama sa intezivnim načinom držanja svinja, gde bi se prevalenca pobačaja trebala svesti na sporadične pojave. Sve kliničke simptome i patološke nalaze treba uzeti u obzir kod postavljanja dijagnoze sa posebnom potporom laboratoriskih nalaza plotkinja koje su pobacile. Redovan serološki monitoring predstavlja osnov zdravstvene zaštite svinja, a samim tim kontrolu i preventivu reproduktivnih poremećaja.

Ključne reči: pobačaj, infekcija, reproduktivni parametri, krmače.

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