SEROLOGIC EVIDENCE OF MULTIPLE PATHOGENS CIRCULATION AMONG HOUSEHOLD PIGS FROM IAȘI COUNTY

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Abstract
Porcine reproductive and respiratory syndrome virus (PRRSV), Aujeszky's disease virus (ADV) and Mycoplasma hyopneumoniae are among the principal agents of respiratory diseases of pigs. PRRS can manifest as lowered farrowing rates, a marked increase in abortions, stillborn, mummified and weak live born piglets and deaths. However, in some herds, infection is asymptomatic. Aujeszky's disease is a contagious viral disease caused by a herpesvirus called Pseudorabies virus and After exposure to the airborne virus, it can remain latent in the body, ready for subsequent reactivation at times of stress or immunosuppression. Mycoplasma hyopneumoniae occurs worldwide and causes a chronic infectious pneumonia of pigs that is characterized by a persistent dry cough, decreased growth rate, and sporadic respiratory distress. In this study we have made a serological investigation on 104 samples collected from households in six localities from Iasi County. The investigation was performed in order to assess the seroprevalence of specific IgG anti PRRS virus and anti Aujeszky's disease virus(ADV) glycoprotein E. The positive samples for ADV and PRRSV were tested for the detection of Mycoplasma hyopneumoniae antibodies. The overall seroprevalence was 4,8% for PRRS, respectively 15,38 % for ADV. Three samples were identified as positive for both pathogens. None of the seropositive animals for PRRS or ADV seroconverted for M. hyopneumoniae. This study demonstrated the circulation of ADV and PRRSV in backyard pigs from Iași County.
Keywords: *swine, serosurvey, porcine reproductive and respiratory syndrome, Aujeszky's disease, enzootic pneumonia*

Introduction

Porcine reproductive and respiratory syndrome virus (PRRSV) and Aujeszky's disease virus (ADV) causes severe economic loss in swine production worldwide. Reproductive failures in breeding age swine or respiratory disorders in growing pigs can lead to substantial economic damage for farming operations.

PRRSV-infected pigs usually suffer from poor growth performance and are highly susceptible to co- or secondary bacterial and other viral infections (Lunney JK et al., 2010). PRRSV complicates the ability of the host to respond to infection through several immune evasion capacities, the virus persisting in pigs for long periods of time (Diaz I et al, 2010). PRRSV infection is characterized by a delayed appearance of neutralizing antibodies (often not appearing for 3–4 months post-infection) and a slow development of virus specific interferon responses (Mateu E. et Diaz I., 2008).

ADV is a highly neurotropic virus that causes neurological disorders in pigs, which are the natural host, as well as a wide range of domestic and wild animals. Although the disease has been eradicated in commercial swine populations of many countries using gE-deleted vaccines and differentiating infected from vaccinated animals (DIVA) strategy, ADV continues to be one of the most important infection of pigs in some European countries. In regions where there is a dense population of swine, ADV is highly prevalent and intensive vaccination with such a marker vaccine has resulted in a decrease of the field virus prevalence to a sufficiently low level (Pensaert M et al., 2004).

Mycoplasmal pneumonia in pigs is a respiratory disease that is caused by *Mycoplasma hyopneumoniae*. Enzootic Pneumonia (EP) is complicated by viral pathogens, as seen overseas with swine influenza virus and PRRSV. Transmission is most common between finisher or older grower pigs to younger grower or weaner pigs. Although infected sows and gilts can transmit infection to their offspring. Lung diseases result in economic losses due to poor growth

performance, reduced feed efficiency and higher medication costs and have an adverse effect on pig welfare (Sorensen V. et al., 2006).

The purposes of the present study were to assess the seroprevalence of the selected pathogens involved in respiratory disorders in swine and to relate these results with the relationships between the three pathogens in household pigs from six localities in Iași County.

Materials and methods

Blood samples from a random sample of 104 backyard pigs from six localities in Iași County were collected by jugular vein puncture, using evacuated tubes without additive. All blood samples were collected from clinically healthy pigs that had no prior vaccination against PRRSV and ADV.

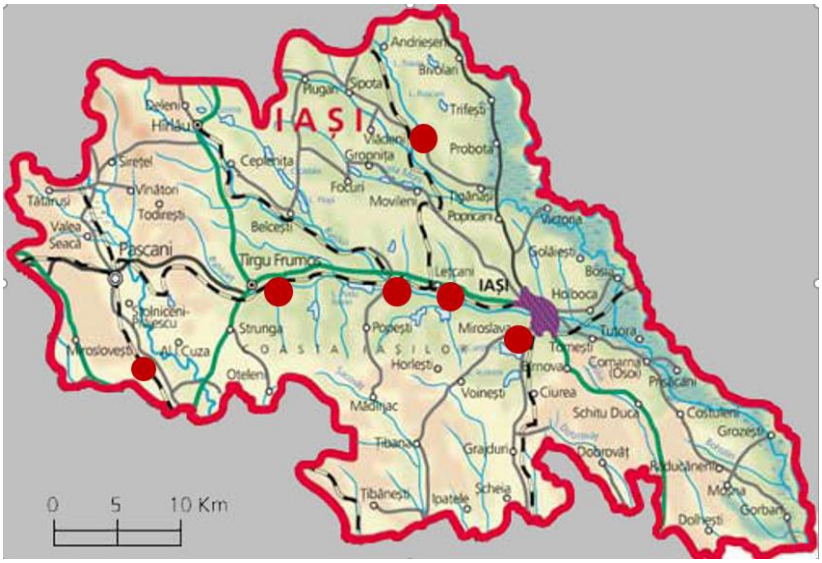

Fig. 1 Geographic distribution of collected samples in Iași County

The samples were individually identified, and serum was obtained by centrifugation for 10 min at 3500 × g and stored at −20 °C for specific serum antibody detection.

Sera from all swine were tested for PRRSV antibodies (ELISA test 3X, IDEXX Laboratory, 97.4% sensitivity (Se) and 99.6% specificity (Sp)) and ADV gE-antibodies (Svanovir®PRV-gE-Ab ELISA, 99.8% sensitivity (Se) and 99.6% specificity (Sp)). SVANOVIR® PRV gE-Ab enables the detection of Aujesky disease in vaccinated swine populations. The high specificity enables the discrimination of serological response to gE-deleted vaccinal strains from that of field virus. The seropositive samples for PRRSV and ADV were tested for enzootic pneumonia antibodies using IDEXX *Mycoplasma hyopneumoniae* Ab ELISA, according to producer's recommendations.

Table no. 1

Distribution of tested samples by location

Locality	No. of tested samples
Ion Neculce	13
Izvoarele	44
Scobălțeni	30
Lețcani	8
Vlădeni	5
Dobrovăț	4

Results and discussion

Serology can be helpful in confirming the presence (i.e., seropositivity) of PRRSV and ADV infection in pig populations.

Specific antibodies to Aujeszky's disease virus gE were detected in all localities studied. The overall seroprevalence detected for gE-ADV Ab in backyard pigs was 16,34%. The relatively high prevalence of antibodies against ADV in Iași County backyard pigs is not surprising, taking into account that a consequence of ADV replication, a latent infection in the central nervous system is established. Latently infected pigs might be detected from time to time, creating a serious problem during an ADV eradication programme (Hu D. et al, 2016).

Table no. 2

Results of the serologic testing on swine samples

Locality	No. of tested samples	gE-ADV Ab positive	PRRSV-Ab positive	gE-ADV and PRRSV-Ab positive
Ion Neculce	13	2	-	-
Izvoarele	44	3	4	2
Scobălțeni	30	6	1	1
Lețcani	8	4	-	-
Vlădeni	5	1	-	-
Dobrovăț	4	1	-	-

The seroprevalence registered for PRRSV-Ab was 4,8%, positive animals being identified in two localities: Izvoarele (4 out of 44) and Scobălțeni (1 out of 30). In the case of PRRSV infection, ELISA antibodies appear by 9–13 days post infection, rise to peak values by 30–50 days post infection, and then decline. Estimates are that ELISA antibodies exist at detectable levels for approximately 4–≥10 months (Darwich L. et al., 2011).

Antibodies against gE-ADV and PRRSV were both detected in two samples from Izvoarele and in one sample from Scobălțeni. None of the samples identifies positive for gE-ADV and PRRSV were positive for *Mycoplasma hyopneumoniae* antibodies.

Conclusions

Identification of positive pigs for gE-ADV antibodies and PRRSV-Ab demonstrates the potential circulation of these two viral pathogens in pig populations reared in household system. Identification of seropositive swine for both viral infections highlights the possibility of co-infections.

In our opinion, serology is an essential part of a PRRSV and ADV diagnostic and control

program. Serology can be a very cost-effective method of generating meaningful data on the epidemiology of PRRSV and ADV for a particular situation, as well as other infectious diseases.

References

1. Darwich L, Gimeno M, Sibila M, Diaz I, E. de la Torre, Dotti S, et al. Genetic and immunobiological diversities of porcine reproductive and respiratory syndrome genotype I strains, Vet Microbiol, 2011, 150: 49–62.
2. Diaz I., Darwich L., Mateu E.M., Certainties, doubts and hypotheses in porcine reproductive and respiratory syndrome virus immunobiology. Virus Res. 2010, http://dx.doi.org/10.1016/j.virusres.2010.07.017.
3. Hu D, Lv L, Zhang Z, Xiao Y, Liu S. Seroprevalence and associated risk factors of pseudorabies in Shandong province of China. J Vet Sci. 2016 ;17(3):361-8.
4. Lunney JK, Benfield DA, Rowland RR. Porcine reproductive and respiratory syndrome virus: an update on an emerging and re-emerging viral disease of swine. Virus Res. 2010; 154:1–6.
5. Mateu E., Diaz I., The challenge of PRRS immunology, Vet. J., 177, 2008; 345–351.
6. Mettenleiter TC, Ehlers B., Müller T., Yoon K.J., Teifke J.P. Herpesviruses. In: Diseases of Swine, edited by Zimmerman J.J., Karriker L.A., Ramirez A., Schwartz K.J., Stevenson G., Wiley-Blackwell, Ames, USA, 2012: 421–446.
7. Neumann EJ, Kliebenstein JB, Johnson CD, Mabry JW, Bush EJ, Seitzinger AH, Green AL, Zimmerman JJ. Assessment of the economic impact of porcine reproductive and respiratory syndrome on swine production in the United States. J Am Vet Med Assoc.2005; 227:385–392.
8. Pensaert M, Labarque G, Favoreel H, Nauwynck H. Aujeszky's disease vaccination and differentiation of vaccinated from infected pigs. Dev Biol (Basel), 2004; 119:243-54.
9. Sorensen V., Jorsal S.E., Mousing J., Diseases of the respiratory system. Diseases of Swine (9th ed.), Iowa State University Press, Ames, Iowa, 2006; 149–177.