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CURRENT AND RETROSPECTIVE SEROLOGY STUDY OF INFLUENZA A VIRUSES ANTIBODIES IN BRAZILIAN PIG POPULATIONS

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Introduction

Influenza A virus (IAV) infections are endemic diseases in pork producing countries around the world. Although Brazilian swine production is expressive (4th pork producer and exporter), few reports investigated the occurrence of swine influenza virus (SIV) antibodies or isolates in Brazil. Initial studies analyzed swine sera collected from 1996-1999. Antibodies against subtype H1N1/ Texas1/77 (2.2%) and H3N2/ New Jersey/76 (16.7%) were detected by hemagglutination inhibition (HI) assay (1). The emergence of the pandemic 2009 human H1N1 influenza A virus (pH1N1) (2) raised questions about the occurrence of this virus in Brazilian swine. The objective of this work was to determine the presence of antibodies to IAV in pigs' populations before and after 2009.

Materials and methods

A serologic study on 10 pig herds using current and retrospective samples was carried out. Samples consisted of 09 commercial farms and 01 feral swine herd (176/09/2009) from Pantanal wetland in Brazil. Swine serum samples examined (359 total) were received at the Embrapa Swine and Poultry Research Center in Concordia, Brazil between 2006 and 2010. Retrospective samples were chosen from different years (before and after the occurrence of the pandemic H1N1 influenza virus), regions, and biosecurity or management levels. The selection of commercial herd's samples (not feral swine's) was based on the presence of clinical signs and influenza-like lung lesions typical of acute respiratory disease. Serologic assays included the HI (3) and the Avian Influenza MultiS-Screen Idexx ELISA (4). HI assays were used to evaluate serum samples against classic H1N1-A/sw/IA/31(AAF6/19/92) or H1N1, H3N2-A/sw/IA/8548-2 or H3N2, both purchased from NVSL-ARS-USDA and pH1N1/107b/10-3A (H1N1) or pH1N1 isolated from Embrapa's swine herds (5).

Fig. 1 – Elisa

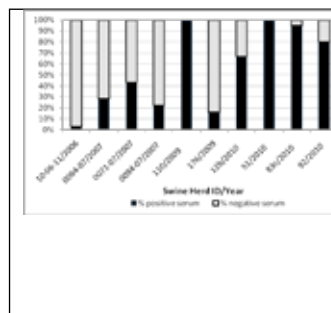


Fig. 2 HI

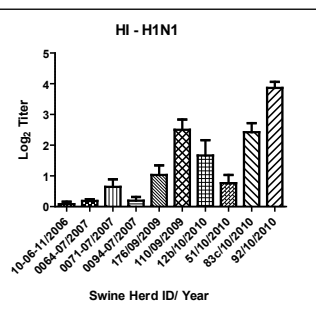


Fig. 3.

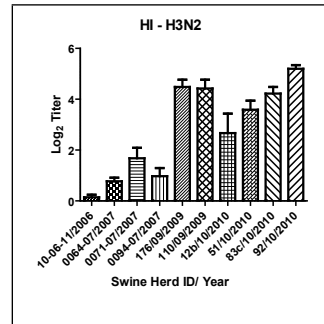
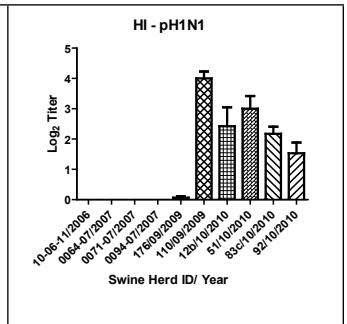


Fig. 4



Results

In this study, a commercial ELISA developed for the detection of IAV nucleoprotein antibodies in avian species was used. The cutoff as S/N ≤ 0.673 (positive) was used as described previously (4). Figure 1 shows Elisa results (%) and Figures 2-4 presents HI titers for IAV used in this work. Reciprocal HI titers were log₂ transformed for analysis. Clearly, an increase in frequency and antibody titers from 2006 – 2010 is observed in both tests. The results show a shift in 2009, probably due to the infection of swine with pH1N1. This demonstrates a lack of specific antibodies to the pH1N1, which suggests Brazilian pigs were not fully protected against the pH1N1 from previous exposure. Besides commercial swine herds, feral swine population (176/09/2009) resulted positive to IAV antibodies by Elisa (5/31) and HI.

Discussion

This is the first detection of the pH1N1 IAV antibodies in Brazilian pigs. Although previous serologic studies have indicated the circulation of SIV in Brazilian pigs (1,6,7), no evidence of a robust immune response to IAV was observed previously. No influenza vaccines are registered to use in Brazilian pigs herds. Based on the diversity and continuous evolution of IAV of swine, the findings of this study warn for the constant monitoring of these viruses in populations not previously diagnosed. Not only are these findings important for swine health, but they have implications for human health as well.

Acknowledgements

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