SEROLOGIC SURVEY FOR SWINE INFLUENZA AND AFRICAN SWINE FEVER VIRUS ANTIBODIES IN NIGERIAN PIGS

K. A. MAJIYAGBE, D. PATRICK and C. I. NWOSUH,
Virology Division,
National Veterinary Research Institute, Vom, Nigeria.

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ABSTRACT

Swine sera collected from Jos abbatoir and parts of Kano and Kaduna States were serologically examined for two viral agents – African Swine Fever (ASF) and Swine Influenze (Sw.I). Out of a total of 913 sera tested, 653 (71.5%) had antibodies to Sw.I in various titers while there was none to ASF virus.

INTRODUCTION

Virus diseases pose very serious threat to profitable pig production even with good husbandry and hygiene practices. Until recently, pig farming or production has attracted little interest in Nigeria primarily for socio-economic reasons. However, this situation is fast-changing owing to better government inputs in terms of capitals and incentives to farmers to boost agriculture under the current Green Revolution schemes.

This has resulted in importation of exotic breeds of pigs into the country in large number than hitherto, with the attendant risks of disease importation especially from unproven but cheap sources. There is therefore an urgent need to gather information on the economically important pig diseases ahead of the anticipated rise in pig population.

Pigs like other animals suffer from a variety of diseases – bacterial, viral, mycotic, parasitic and even non-aetiological ones like metabolic disorders and poisoning. However, the major diseases encountered belong primarily to the first 4 categories. While parasitic, mycotic and bacterial diseases are amenable to treatment, viral diseases present the added problem of not being easily recognised by most people in addition to being untreatable. The best defence is therefore preventive management – achieved through good hygiene practices and an efficient vaccination programme to keep diseases off farms.

While there are some scattered reports on bacterial and parasitic diseases of swine in Nigeria, there is essentially nothing on viral diseases. We have therefore embarked on a survey for various viral diseases of swine beginning with African Swine Fever (ASF) and Swine Influenza (Sw.I). The results of our findings are here presented.

MATERIALS AND METHODS

Virus: The Swine Influenza virus (SIV) (Lot–001 IDV 8202) used in the study and the reference SIV antiserum (Lot 301 IDV 8201) were obtained through Dr. E.A. Cabrey, Director, National Services Laboratories, Ames, Iowa, U.S.A. The virus was propagated twice more in 10–day–old embryonated hen's egg kept at 36°C for 2 to 3 days in a humidified incubator.

Complement: Normal guinea pig serum kept at –20°C was used in the test either "frozen fresh" or lyophilis-

ed and then reconstituted before use.

Survey Material: Swine serum samples were collected from various locations as outlined below:

Jos abbatoir	– 841 samples including 5 from local black pigs (Nigerian dwarf breed),
Kano	– 4 samples, and
Kaduna	– 68 samples.

Immunoelectroosmophoresis (IEOP): Each serum sample was screened for ASFV and SIV antibodies. ASF antibodies were detected using the IEOP technique as previously described (Pan *et al.*, 1972; Majiyagbe, 1979). Reference ASF antigen, positive ASFV antiserum and negative ASF serum were obtained from the Director, Plum Island Animal Disease Center, Greenport, New York.

Single Radial Hemolysis technique: SIV antibodies were detected using the single radial hemolysis (SRH) technique as described by Ogawa *et al.*, (1978) with some modifications. Plastic petridish (90mm diameter) were used to pour the virus-agarose mixture. 10ml of the mixture was put into each petridish. Sixteen wells, 3mm in diameter, were punched into the semi-solid gel on the petridish. The wells were filled with the respective test sera and appropriate controls (positive and negative reference outserum).

RESULTS

All the serum samples (Total number 773) tested for ASFV antibody were negative. For SIV, 653 out of 773 serum samples tested (71.5%) were positive for antibodies in varying proportions. Table 1 summarises result of the screening exercise. Figure 1 illustrates the varying level of antibody to SIV as revealed by the SRH test. The highest titre was 12.00 mm diameter and the lowest was 8.3 mm diameter in which the majority of the samples (56.6%) fell.

DISCUSSION

Virus diseases exert their influence on limiting production principally in two ways (i) direct losses from deaths especially in young ones and (ii) loss in production from sick animals a result of arrested growth and waste in feed consumed prior to being sick. Pigs are good and cheap sources of animal protein, therefore safe guards against the resultant losses from infections are quite in order. The devastation that can result from various swine viral infections with its resultant economic losses had been previously reviewed (Majiyagbe, 1981). These range from the highly contagious and usually fatal ASF, the various diarhoeic diseases of the young, to the relatively mild swine pox virus infection.

The result of this survey had confirmed earlier findings (Scott and Hill, 1966; Taylor *et al.*, 1977) that Nigeria is ASF–free. The IEOP technique used in this survey is a more sensitive technique than those used by the earlier workers. However, there is need for continued monitoring of this disease in view of its insidious nature and more importantly, because of the recent outbreaks in the Cameroon in 1982 (W.R. Hess – Plum Island – personal communication) and 1984. Cameroon shares common borders with Nigerian along Borno, Gongola and Cross Rivers states and furthermore Southern Gongola and Cross Rivers have large pig populations.

With Swine Influenza, the survey revealed that infection might be more wide spread than earlier suspec-

TABLE 1

Summary of antibody survey of Swine Influenza Virus (SIV) and African Swine Fever virus (ASFV)

	Number Tested	*Number Positive (%)*	
KADUNA	68	19	(27.9%)
KANO	4	2	(50.0%)
JOS	841	632	(75.1%)
	(5)*	(5)*	(100.0%)
SIV (TOTAL)	913	653	(71.5%)
ASFV	773	0	(0%)

**Local black pigs.*

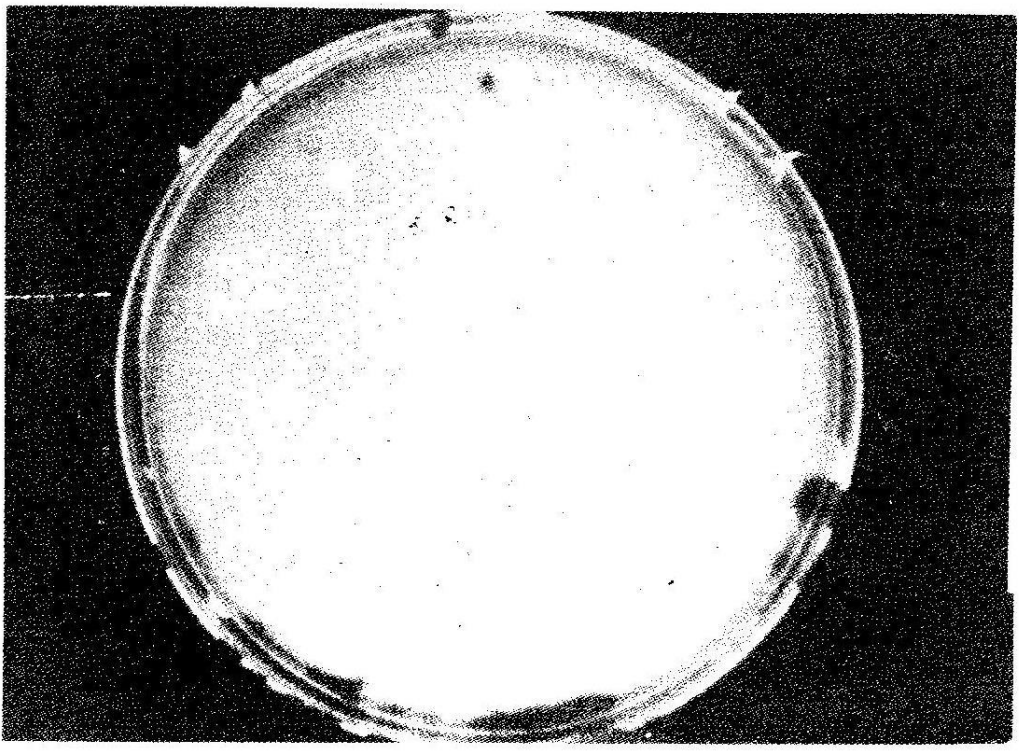

Figure 1: Distribution of Swine Influenze Virus Antibody from Survey Samples using the Single Radial Hemolysis (SRH) Technique.

ted (Majiyagbe – unpublished results) from the distribution of antibodies in various locations. This correlates with experience from other parts of the world where inapparent infections are common except when explosive outbreaks occur in association with severe cold, inclement weather or other stresses (Dunne and Leman, 1975). While the pig is the only commonly known natural host, there is serologic evidence of infection of human beings with swine influenza virus (Schnurrenberger *et. al.*, 1970). This is why the high prevalence of antibody observed is worrysome because of the public health implications. There is the possibility that new highly infectious pandemic SIV strains may arise in swine by the process of hybridization. Webster *et al. (1973)*, have shown that pigs may be infected simultaneously with H3N2 (A/Hongkong/68) and Hsw 1N1 (A/Sw/W1s./67) viruses resulting in new genetically stable hybrid viruses capable of causing mild diseases in pigs.

Human infections with swine influenza virus strain (Hsw/N1) have been recorded – an added occupational hazard amongst veterinarians, slaughter house workers and swine producers.

Our current finding suggest such a possibility in Nigeria and thus warrants further investigations in people closely associated with the swine.

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