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Research Application Summary

African swine fever dynamics: a major challenge to food and economic security to pig farmers in Uganda

Ogweng, P.,[1] Mayega, J., [1,2]Muwanika, V. B.,[2]Aliro, T.,[1] Stahl, K. [3] & Masembe, C.[1*]

[1]Makerere University, College of Natural Sciences, School of Biological Sciences, Department of Zoology, Entomology and Fisheries Sciences, P.O. Box 7062, Kampala, Uganda
[2]College of Agriculture and Environmental Sciences, Department of Environmental Management, Makerere University, P.O. Box 7062, Kampala, Uganda
[3]National Veterinary Institute (SVA), Uppsala, Sweden
Corresponding Author: cmasembe@cns.mak.ac.ug

Abstract

African swine fever (ASF) is a devastating hemorrhagic fever of pigs, caused by the African swine fever virus (ASFV). The frequent outbreaks of ASF affect the food and economic security of farmers yet the dynamics of the disease, its risk factors and its effect on farmers are not fully known. In our study in Uganda, African swine fever virus was present in 42% of blood samples collected while 61 % of the farmers practiced free-range management system which increased disease spread in addition to other risk factors. The outbreak of the disease in many cases caused total loss of pigs in farms although it was difficult to estimate the actual economic losses because of poor or no record keeping by the farmers. However the failure of the farmers to meet their financial targets is a clear indication of economic loss due to the disease. There is therefore need to sensitise the farmers and the entire community on the risk factors so us to control the spread of the disease.

Key word: African swine fever, risk factors, Uganda

Résumé

La peste porcine africaine (PPA) est une fièvre hémorragique dévastatrice des porcs, causée par le virus de la peste porcine africaine (VPPA). Les fréquentes flambées de PPA affectent la sécurité alimentaire et économique des agriculteurs, mais la dynamique de la maladie, ses facteurs de risque et ses effets sur les agriculteurs ne sont pas entièrement connus. En Ouganda, le virus de PPA était présent dans 42% des échantillons de sang prélevés tandis que 61% des agriculteurs pratiquaient un système de gestion en plein air qui augmentait la propagation de la maladie en plus d'autres facteurs de risque. Dans de nombreux cas, le déclenchement de la maladie a entraîné la perte totale de porcs dans les exploitations, bien qu'il ait été difficile d'estimer les pertes économiques réelles en raison de la mauvaise tenue ou de l'absence de tenue des registres par les agriculteurs. Cependant, l'incapacité des agriculteurs à atteindre leurs objectifs financiers est une indication claire de la perte économique due à la maladie. Il est donc nécessaire de sensibiliser les agriculteurs et l'ensemble de la communauté sur les facteurs de risque afin que nous puissions contrôler la propagation de la maladie.

Mot clé: Peste porcine africaine, facteurs de risque, Ouganda

Introduction

In Uganda, 85% of the population live in rural areas with majority of the people depending on agriculture (UBOS, 2010). The country has the second largest and most rapidly growing pig production in Africa (Phiri *et al*., 2003), with a population of over 3.2 million pigs (UBOS, 2010). Pig keeping in Uganda is steadily increasing due to the high demand for livestock products and as a tool for poverty reduction (Doble, 2007).

However, the pig sector in Uganda continues to be affected by the threat of a fatal, haemorrhagic African swine fever virus (ASFv) that is endemic in Uganda's domestic pig population (Muhangi *et al*., 2012) and the disease has no vaccine or cure (Penrith *et al*., 2004). ASF is a devastating haemorrhagic fever of pigs that causes up to 100% mortality (Costard *et al*., 2013). This disease is caused by a double stranded DNA (ds-DNA) virus, the African swine fever virus (ASFV), that is classified within the Asfarviridae family; with genus Asfivirus, as the only member (Takamatsu *et al*., 2011).

In Uganda, control of the disease has been and is still a big challenge for most farmers although the farmers are aware to a large extent of the signs and symptoms of the disease in addition to some control measures (Chenais *et al*., 2015) but their knowledge of risk factors seem to be lacking.

Significance of the study. Pigs have a rapid rate of growth and reproduction with a gestation period of about four months. Sows produce 4-12 piglets, which makes them have a high multiplication rate and hence provide high economic returns to farmers. However, 75% of Uganda's pigs are kept in smallholder rural farms with very minimal biosecurity levels if any making the control ASF very difficult. In recent years and currently ASF outbreaks have been reported every year in Uganda and this is gossly affecting food and economic security of the farmers. This study therefore sought to investigate the ASF dynamics, risk factors and effects on food and economic security of households in Uganda.

Methodology

The study was conducted in the districts of Gulu and the greater Murchison National Park area in northern Uganda.

Study design. The study employed questionnaire survey to selected pig farmers and sampling whole blood from domestic pigs in farms with ASF outbreaks for data collection. A total of 219 pig farmers and 45 pig and pork business people from ASF outbreak villages were interviewed. Subsquently 298 blood samples collected for the two study areas (Gulu and Murchison falls) were tested for ASF virus.

Genomic DNA extraction. Genomic DNA was extracted from 100µl of whole blood using a nucleic acid extraction kit (QIAGEN/DNeasy Blood and Tissue kit) following the manufacturer's procedures. The extracted DNA products were analysed by electrophoresis through 2% agarose gel visualised under ultra violet light.

ASFV DNA detection. All pig samples collected were analysed for the presence of ASFv using a highly sensitive gel-based PCR assay that targets the highly conserved VP72 coding region for the ASFv genome for the detection of all the ASFv genotypes as described in Agüero *et al*. (2003).

Results

ASF dynamics. African swine fever virus was present in 42% (125/298) of blood samples collected, in the 43 villages studied in Gulu district. The confirmed ASF outbreaks were distributed in 14 out of 16 sub-counties affecting 219 pig farmers from September 2010 to November 2010. Typical links between ASF outbreaks in villages were tracked from September 2010 to November 2010, which indicated that in only three months ASF outbreak covered a total of 85km.

Risk factors associated with ASF outbreaks. The responses of the farmers and people involved in pig and pig product business revealed several risk factors, which included; the distribution of unscreened piglets by some NGOs, vehicles used to transport pigs from one farm to the other were not disinfected, multiple on farm biosecurity breach, free range management system (61%) increasing disease spread, un fenced park boundaries which led to virus transmission from the wild, unprofessional practices by some Veterinary officials during on farm visits, improper disposal of waste materials, borrowing of boars for mating/ taking sows for mating and lack of slaughter slabs for pigs.

Effects of ASF outbreaks on farmers. The outbreak of the disease in many cases caused total loss of pigs in farms, forcing farmers to sell their pigs cheaply thus failing to meet their financial targets. In most cases, the dead and very sick pigs were sold on credit without any guarantee that the money would be paid by the buyer. However, it was difficult to estimate the actual economic losses because of poor or no record keeping by the farmers.

Discussion

African swine fever outbreaks were highest especially during festive seasons and dry seasons since these periods corresponded to the times when pork business was prominent and most pigs were left on free range. Such uncontrolled movement of live pigs and pig products is probably the leading cause of ASF transmission (Chenais *et al*., 2015). The risk factors were also very prominent in disease transmission, for example the sale of dead pigs by 74% of the farmers indicates that a high proportion of farmers unknowingly engage in disease transmission during outbreaks.

Most farmers had very poor or completely no records of their pigs, thus making the estimation of economic losses very difficult in addition to selling their pigs on credit during outbreaks. However the failure of the farmers to meet their financial targets is a clear indication of economic loss due to the disease.

Based on the findings of this study, the presence of multiple risk factors facilitates the rapid spread of ASF in between farms and villages thus causing enormous food and economic loss to the farmers. There is therefore need to sensitise the farmers and the entire community on the risk factors so us to control the spread of the disease.

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