THE SCIENCE WORLD
A Monthly e Magazine
ISSN:2583-2212
Jan, 2025 Vol.5(1), 6061−6066

Popular Article

African Swine Fever: A Threat to the Pig Industry in North Eastern Region of India

Anindita Sandilya[1], Neeraj Thakur[1], Chethan G. E.[1], Nadima Khan[1], Mimi Lalmangaihzuali[1], Udipta Bhuyan[2], Arindam Bhowmik[1], Chaithra S. N.[3], Kiran J.[1], Gourav Debnath[1], Anindita Saikia[1], U. K. De[3], Kalyan Sarma[1]

[1]College of Veterinary Sciences and Animal Husbandry, Central Agricultural University, Selesih, Aizawl-796015, Mizoram

[2]College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781022, Assam

[3]ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly-243122, Uttar Pradesh

DOI:10.5281/ScienceWorld.14756119

Abstract

Pig rearing is crucial in the North Eastern region of India, where pork is a dietary staple. The international borders of the region increase its vulnerability to trans-boundary animal diseases. African Swine Fever (ASF) is a highly contagious and economically devastating disease that has significantly reduced the pig population, heightened food insecurity, and caused severe socioeconomic consequences. Traditional farming practices, inadequate biosecurity, and illegal animal movements exacerbate its spread. Since its initial detection in Assam in 2020, ASF has rapidly spread across the North Eastern states, leading to estimated economic losses between INR 17.875 billion and INR 44.625 billion (USD 242.9 million to USD 606.4 million). Effective control and prevention measures, such as stringent biosecurity protocols, enhanced surveillance, and financial support for farmers, are essential to mitigate impact of ASF and sustain the pig industry in the region.

Introduction

Pig rearing is the main source of income for many poor, marginalized farmers and backward section of the society, especially the tribal community people. The North Eastern region of India is predominantly non-vegetarian, with a significant portion of the population consuming pork. Trans-boundary animal diseases (TADs) may have important economic consequences at farm, regional and national level due to production losses and the high cost of prevention, control and eradication measures. The North Eastern region of India, due to its distinctive geographical position sharing international borders with Bangladesh, Bhutan, Myanmar, and China, facilitates the trans-boundary spread of diseases, including African Swine Fever (ASF). ASF is a contagious economically important

disease which has severely impacted the livelihoods of small-scale farmers in the North Eastern region. Pig farming is not only a source of income but also a crucial aspect of food security and cultural practices. The loss of pigs has led to significant reduction in the pig population, increased food insecurity and has affected the socio-economic repercussions on trade, business, and the costs associated with disease control in the rural communities. This inevitably results in the increase in the prices for pork and pork products.

Etiology

African Swine Fever (ASF) is caused by the African Swine Fever virus (ASFV), a large, complex, cytoplasmic and double-stranded DNA (dsDNA) virus belonging to the genus *Asfivirus* and *Asfarviridae* family. The ASFV exhibits significant genetic and antigenic variability, characterized by the presence of 24 distinct genotypes that circulate among both wild and domestic suids. ASFV predominantly infects monocytes and macrophages, which are integral components of the mononuclear phagocytic system. Furthermore, the virus exhibits a preference for lymph nodes located in proximity to the head. The clinical signs of ASF are variable and non-specific, encompassing a range of symptoms such as high fever, cyanosis of the skin, anorexia, respiratory distress, and sudden death. The most common pathological changes associated with ASFV infection include petechial haemorrhages in the kidneys, splenomegaly, and enlarged liver, and lymph nodes with haemorrhages. Microscopically, one of the striking characteristics of ASFV infection is the depletion of lymphocytes in the lymph nodes and spleen. The disease is characterized by high morbidity and mortality rates, with significant economic consequences in affected regions. ASFV is resilient in the environment and can be transmitted through direct contact with infected animals, contaminated fomites, and via soft ticks like *Ornithodoros* spp. The North Eastern region of India, comprising states such as Assam, Meghalaya, Nagaland, and others, is predominantly agrarian with pig farming being a crucial component of the rural economy. The outbreak of ASF in these regions has resulted in devastating losses for farmers, threatening food security and livelihoods.

Epidemiology

ASF remains a significant concern due to its historically substantial negative impact on both animal health and the economy. ASF was first reported by Montogomery in Kenya in 1921 and has since spread to various parts of Africa, Europe, and Asia. The global spread of ASF has been facilitated by the movement of infected pigs and pork products, as well as the persistence of ASFV in the environment. Recent outbreaks in China and Southeast Asia have underscored the potential of the virus to cause widespread devastation in regions heavily dependent on pig farming. Given the widespread presence of ASF in China and India's proximity to China, Myanmar, and Nepal, it is imperative for bordering Indian states to remain vigilant regarding the importation of live pigs and pork products.

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 25/01/2025

The first reported case of ASF in India was in January, 2020 in Assam. World Organisation for Animal Health (OIE) officially reported the outbreak on May 21, 2020. According to OIE, the infections in domestic pigs in Assam and in the village of Xiazang province of China bordering Arunachal Pradesh in North East are the first occurrences of the disease in the country. Since then, the disease has spread rapidly across the North Eastern states. The unique geography and high density of pig populations in these areas have contributed to the swift transmission of the virus. Additionally, traditional practices of free-ranging pig farming and inadequate biosecurity measures have exacerbated the situation. The spread of ASFV from endemic areas is facilitated by both legal and illegal movements of live animals, as well as the importation of animal products, by-products and animal feed.

Economic Impact

The spread of ASFV from endemic areas is facilitated by both legal and illegal movements of live animals, as well as the importation of animal products, by-products, and animal feeds. Significant factors associated with the transmission and outbreaks of ASFV include human knowledge and activities, as well as various social and economic factors. These encompass traditions, cultural identity, the relationship between farmers and administration, poverty levels, and income. Human activities, such as the improper handling of ASFV-infected carcasses by farmers in rural areas or by hunters in wild environments, can facilitate the transmission of ASFV between wild and domestic swine populations. The outbreak in the Northeast India may be attributed to the porous borders that the region shares with China, Bhutan, Bangladesh, and Myanmar. Initial ASFV outbreaks in the North Eastern states of India were reported along the banks of the Brahmaputra River, its tributaries, or in districts through which the river flows.

The direct economic losses due to ASF include the death of pigs, reduced productivity, and the cost of culling infected and at-risk animals. In the North Eastern region, where pig farming is a major livelihood, the loss of pigs has had a profound economic impact. Farmers have faced significant financial strains due to the loss of their primary source of income. Indirect losses including the impact on livelihoods and disruption of the pork supply chain, including reduced availability of pork products, increased prices are estimated at INR 5 billion to INR 10 billion (USD 67.9 million to USD 135.8 million). Additionally, the cost of vaccination, biosecurity measures, and government compensation to affected farmers amounts to approximately INR 3 billion to INR 5 billion (USD 40.8 million to USD 68 million). The closures of markets and restrictions on pig movement have further compounded the economic challenges faced by farmers and traders.

The outbreak of ASF has severely impacted the pig population in North East India. The official records of Animal Husbandry and Veterinary Department, Mizoram revealed that 33,417 pigs died from ASF in 2021, the figure was 12,795 in 2022, 1,039 in 2023 and a total of 16,158 pigs were culled

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 25/01/2025

since January 2024 to deal with the ASF outbreak as reported by the India Today North East. It has also devastated pig farming industry in Manipur, with farmers reporting that around 90% of pigs have succumbed to the disease. This catastrophic loss has inflicted severe economic hardship on the region, where pig farming is a crucial livelihood. The sudden and extensive mortality of pigs has led to significant financial losses for farmers, with estimates indicating an economic loss of around 30 crores as reported in the Deccan Herald e-paper. Assam is one of the worst-affected states, provides a poignant case study of the economic impact of ASF. The state reported the death of over 15,000 pigs within months of the outbreak, leading to an estimated loss of over INR 100 crores (approximately USD 13 million). The estimated mortality rate due to ASF ranges from 25% to 50%, affecting approximately 987,500 to 1,975,000 pigs all over the North Eastern states. The average market price per pig is between INR 10,000 to INR 15,000, leading to a direct economic loss estimated between INR 9.875 billion to INR 29.625 billion (approximately USD 134.2 million to USD 402.6 million). Overall, the total estimated economic loss due to ASF in Northeast India ranges from INR 17.875 billion to INR 44.625 billion (USD 242.9 million to USD 606.4 million). The ripple effects of this loss have been felt across the entire pork industry, affecting feed suppliers, veterinarians, and related businesses. Also, in many parts of the North Eastern region, women play a significant role in pig farming. The economic losses due to ASF have disproportionately affected women, who often rely on pig farming for their financial independence.

Control and Prevention Measures

Implementing stringent biosecurity measures is crucial to prevent the spread of ASF. These measures include restricting the movement of pigs and pork products, ensuring proper sanitation of pig farms, and educating farmers about best practices. In the North Eastern region, efforts have been made to enhance biosecurity, but challenges remain due to the traditional practices of pig farming. Effective surveillance systems are essential for early detection and rapid response to ASF outbreaks. The government and veterinary agencies in the North Eastern region have intensified surveillance efforts, including regular monitoring and testing of pig populations. However, the rugged terrain of the region and limited infrastructure pose significant challenges to these efforts. Also, the development of an effective ASF vaccine remains a top priority for researchers worldwide. While there has been progress in understanding the virus and developing potential vaccines, a commercially viable vaccine is yet to be realized. Continued investment in research is necessary to achieve this goal and provide long-term protection against ASF.

Investing in biosecurity infrastructure, including constructing quarantine facilities and providing training to farmers, is essential. Policymakers should prioritize funding and resources to enhance biosecurity measures in the North Eastern region. Improving veterinary services, including

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 25/01/2025

increasing the number of trained veterinarians and providing access to diagnostic tools, is critical for effective ASF management. Mobile veterinary units and community-based animal health workers can play a pivotal role in reaching remote areas. Financial support and compensation schemes for affected farmers can help mitigate the economic impact of ASF. Additionally, providing alternative livelihood options and promoting diversification in farming practices can enhance resilience against future outbreaks.

Conclusion

ASF is a highly fatal and contagious disease that has a profound economic impact on pig farmers, exacerbated by the current absence of an available vaccine. The sole method of disease prevention involves identifying and culling positive reactors and susceptible pigs, which significantly reduces the pig population and results in substantial financial losses for farmers. This issue is particularly acute in developing countries like India, where rural and remote farmers often lack awareness of biosecurity measures and are unable to implement effective preventive strategies. The North Eastern region of India faces a significant threat from ASF, with notable economic and socio-economic consequences that highlight the urgent need for robust control and prevention measures. Strengthening biosecurity protocols, enhancing surveillance, and investing in research and development are critical steps to mitigate the impact of ASF. Collaborative efforts among government agencies, researchers, and farmers are essential to safeguard the livelihoods of those dependent on pig farming and to ensure the sustainability of the pork industry in the region.

References

Dixon, L. K., Sun, H. and Roberts, H. (2020). African swine fever. *Antiviral Research*, 174, 104725.

Buragohain L, Barman NN, Sen S, Bharali A, Dutta B, Choudhury B, Suresh KP, Gaurav S, Kumar R, Ali S, Kumar S. Transmission of African swine fever virus to the wild boars of Northeast India. *Veterinary Quarterly*. 2023 Dec 31;43(1):1-0.

Penrith, M. L. and Vosloo, W. (2019). Review of African swine fever: Transmission, spread, and control. Journal of the South African Veterinary Association, 90(1), a982.

Food and Agriculture Organization of the United Nations. (2020). African Swine Fever in Asia and Pacific. Retrieved from http://www.fao.org/ag/againfo/programmes/en/empres/ASF/situation_update.html

Government of India, Ministry of Fisheries, Animal Husbandry and Dairying. (2020). National Action Plan for African Swine Fever Control. Retrieved from https://dahd.nic.in/

African Swine Fever kills thousands of pigs in Assam and Arunachal Pradesh (2020). https://india.mongabay.com/2020/06/african-swine-fever-kills-thousands-of-pigs-in-assam-and-arunachal-pradesh/

Total pig population data: Government of India Livestock Census 2019

Market price per pig: Regional agricultural market reports

ASF impact estimates: Reports from the Animal Husbandry Department, Northeast India

African swine fever grips Manipur, farmers claim 90% of pigs dead (2023), Deccan Herald e-paper. https://www.deccanherald.com/india/manipur/african-swine-fever-grips-manipur-farmers-claim-90-of-pigs-dead-2749214