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Enhancing Pig Productivity in North Eastern India using Artificial Insemination

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Abstract

Pig farming is essential to rural communities, livelihood, and food security in North Eastern India, where pork constitutes a single of the most widely consumed animal proteins. However, poor genetic quality, unregulated breeding and restricted access to better boars frequently limit productivity of standard pigs in the area. Pig's genetics potential, efficiency of reproduction, and total production can all be greatly increased by artificial insemination (AI), a promising reproductive technology. Adoption of AI makes it possible to employ superior boar semen, lessens the requirement for farm-level breeding boar maintenance, and improves disease control. This illustrates the importance of AI technology, its advantages, and its potential to transform pig production systems in North Eastern India, boosting farmer income and strengthening the regional pork supply chain.

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INTRODUCTION

Pig farming is one of the largest animal enterprises in northeastern India. This area contributes significantly to both the population of pigs and the consumption of pork in India. Pig breeding is a major source of income for rural people and smallholder farmers in states like Assam, Meghalaya, Nagaland, and Mizoram. Despite its significance, the region's pig productivity is still comparatively low because of subpar breeding methods and a shortage of superior breeding boars. Modern reproductive technology called artificial insemination (AI) provides a scientific way to increase the effectiveness of pig breeding. AI can quickly increase the region's pig farming system's profitability and productivity by employing the sperm from genetically superior boars.

IMPORTANCE OF PIG FARMING IN NORTH EASTERN INDIA

The socioeconomic and cultural circumstances of northeastern India make pig raising especially appropriate. Pigs can efficiently turn feed into meat, grow quickly, and have high rates of reproduction (Ghosh et al., 2024). Throughout the region, there is a high demand for and consumption of pork. Typically, smallholder farmers keep two to ten pigs, which support employment, household income, and nutritional security (Das et al., 2025). However, unregulated mating with local boars is a common practice in traditional breeding systems, which leads to variable performance and sluggish genetic progress.

CONCEPT OF ARTIFICIAL INSEMINATION IN PIGS

In pigs, artificial insemination (AI) involves utilizing specialized equipment to transfer processed semen from a chosen boar into the reproductive tract of a sow or gilt in place of natural mating. This technique enhances the production and reproductive efficiency of pig herds while enabling the effective use of genetically superior boars. Liquid semen is most frequently utilized for artificial insemination in pig breeding (Paul et al., 2024). Sperm motility, concentration, morphology, and

viability are just a few of the critical quality criteria that are meticulously assessed while collecting semen from healthy and genetically superior boars. Following evaluation, the semen is diluted with appropriate semen extenders, which supply vital nutrients, preserve pH equilibrium and shield sperm cells from harm while being stored. Additionally, using better semen extenders increases the lifetime and reproductive potential of sperm. In order to preserve sperm viability and metabolic stability for a brief period of time, the diluted liquid semen is kept at a regulated temperature of 15–18°C (Paul et al., 2022). Liquid boar semen can typically be kept for three to five days while maintaining a suitable fertilizing potential under hygienic handling and storage circumstances. During this time, farms or facilities for artificial insemination may get the semen from boar stations or semen manufacturing labs. By inseminating sows at the appropriate time of estrus, this technique helps farmers and breeding facilities increase conception rates and litter size. AI-generated high-quality liquid semen not only speeds up genetic advancement but also eliminates the need for farm-level breeding boar maintenance, increasing the productivity and cost-effectiveness of pig production.

ADVANTAGES OF ARTIFICIAL INSEMINATION IN PIG PRODUCTION

The adoption of AI technology offers several advantages to pig farmers:

- **Genetic Improvement**: AI makes it possible to employ semen from exceptional boars with desirable characteristics including greater carcass quality, increased growth rate, and enhanced feed efficiency. In pig populations, this speeds up genetic advancement.
- **Decreased boar maintenance costs**: Keeping breeding boars demands more housing, feeding, and management, all of which are costly. AI lowers production costs by removing their desire for farmers to sustain boars.
- **Disease control**: AI lowers the possibility of reproductive illnesses spreading during spontaneous mating. Biosecurity is enhanced by regulated insemination and hygienic semen processing.
- **Effective use of outstanding boars**: One boar can produce enough semen to inseminate numerous sows, expanding the spread of superior genetics throughout several farms.
- **Improved reproductive management**: Planned programs for breeding and better control over reproduction schedules are made possible by AI (Fig. 1), which contributes to higher litter sizes (Fig. 2) and farrowing rates.

APPLICATION OF AI IN NORTH EASTERN INDIA

In North Eastern India, the use of artificial insemination in pigs is progressively growing thanks to programs run by government organizations, research centers, and extension services.

Fig.1 Artificial Insemination in Pig

Fig. 2 New born Piglets after farrowing

The method is being promoted through the creation of semen production labs and training courses for field technicians and farmers. AI adoption among small-scale farmers can be strengthened by mobile AI services and village-level semen distribution systems. To encourage farmers to use this scientific breeding process, capacity building and awareness campaigns are crucial.

FUTURE PROSPECTS

Pig farming in the area could be significantly transformed by artificial insemination. AI has the potential to greatly improve pig productivity and reproductive performance with better infrastructure, enhanced semen storage methods, and farmer training. Sustainable pig production methods will benefit from the integration of AI with better feeding, medical care, and management techniques. Through AI service centers and village-level semen banks, the technology can also facilitate entrepreneurial prospects.

CONCLUSION

In North Eastern India, artificial insemination is a potent method for increasing pig productivity. By reducing production costs, boosting reproductive efficiency, and facilitating the application of superior genetics, AI can greatly enhance this area's pig farming systems. Increased use of this technique will boost farmer income and guarantee a steady supply of high-quality pork for customers, thanks to government incentives, research and extension.

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