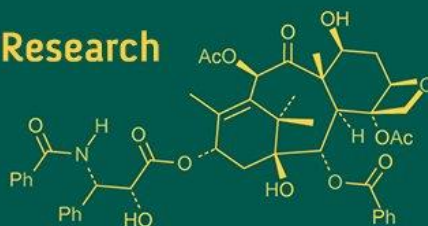


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2026): 5.29
IJABR 2026; 10(7): 400-403
www.biochemjournal.com
Received: 09-04-2026
Accepted: 12-05-2026

Dr. Binod Kr. Dutta Borah
ICAR-RC for NEH Region,
A.P. Centre, Basar, Arunachal
Pradesh, India

Dr. Joken Bam
ICAR-RC for NEH Region,
A.P. Centre, Basar
Basar, Arunachal Pradesh,
India

Dr. Sourabh Deori
ICAR-RC for NEH Region,
Umiam, Meghalaya, India

Dr. Doni Jini
ICAR-RC for NEH Region,
A.P. Centre, Basar, Arunachal
Pradesh, India

Dr. Utpal Barua
ICAR-KVK, Namsai
Namsai, Arunachal Pradesh,
India

Dr. Sanjay Kumar Pandey
ICAR-RC for NEH Region,
A.P. Centre, Basar, Arunachal
Pradesh, India

Dr. Sandeep Ghatak
ICAR-RC for NEH Region,
Umiam, Meghalaya, India

Corresponding Author:
Dr. Binod Kr. Dutta Borah
ICAR-RC for NEH Region,
A.P. Centre, Basar, Arunachal
Pradesh, India

Comparative evaluation of productive and reproductive performance of cross-bred Hampshire under traditional systems

Binod Kr. Dutta Borah, Joken Bam, Sourabh Deori, Doni Jini, Utpal Barua, Sanjay Kumar Pandey and Sandeep Ghatak

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i7f.9034>

Abstract

Pig farming plays a crucial role in the livelihood and nutritional security of rural and tribal communities in the North-Eastern region of India. However, the productivity of indigenous pigs remains low under traditional rearing systems. The present study was conducted as an On-Farm Trial (OFT) in Namsai district of Arunachal Pradesh to evaluate the productive and reproductive performance of two Hampshire crossbred pigs (HD-K75 and Lumsniang) in comparison with indigenous pigs under traditional management conditions. A total of 15 piglets including cross-bred and indigenous piglets were evaluated under farmers' field conditions. Parameters studied included age at first service, age at first farrowing, litter size at birth and weaning, birth weight, and weaning weight. The results revealed that crossbred pigs significantly ($p < 0.05$) outperformed indigenous pigs across all parameters. HD-K75 recorded the lowest age at first service (273.50 ± 1.31 days) and age at first farrowing (395.30 ± 1.54 days), followed by Lumsniang, while indigenous pigs showed significantly higher values. Litter size at birth and weaning was also higher in crossbred pigs (9.33 ± 1.43 and 8.91 ± 1.20 in HD-K75; 9.13 ± 1.01 and 8.93 ± 1.20 in Lumsniang) compared to indigenous pigs (7.10 ± 0.99 and 6.24 ± 1.04 , respectively). Similarly, birth weight and weaning weight were significantly higher in crossbreds, with HD-K75 showing the best performance (1.12 ± 0.25 kg and 12.45 ± 1.11 kg, respectively). The findings indicate that Hampshire crossbred pigs, particularly HD-K75, exhibit superior reproductive efficiency and growth performance under traditional rearing systems. Therefore, the adoption of such improved genetic groups can significantly enhance pig productivity and livelihood security in the region.

Keywords: Crossbred pigs, HD-K75, indigenous pigs, Lumsniang, on-farm trial, performance

Introduction

Pig farming plays an important role in the livelihood and nutritional sustenance among rural and tribal populations of the North-Eastern (NE) region of India, where pork is the most preferred source of animal protein (Mehta and Bhattacharjee, 2024) [12]. Pigs are particularly valued for their high feed conversion efficiency, early sexual maturity, prolific reproductive performance, and relatively shorter generation interval, making them well-suited for low-input production systems. The NE region alone accounts for nearly 46.8% of the country's total pig population (Basic Animal Husbandry Statistics, 2019), reflecting both cultural acceptance and economic importance of piggy in the region. Despite this significant share of the population, the productivity of indigenous pigs remains low, primarily due to their slow growth rates and reproductive efficiency under traditional management systems (Kadirvel *et al.*, 2021) [8].

Genetic improvement through the introduction of suitable cross-bred varieties has been widely promoted as a strategy to enhance productivity while retaining adaptability to local agro-climatic conditions. Among the improved genetic groups, HD-K75 (75% Hampshire $\times$ 25% Assam local) developed by College of Veterinary Science, AAU, Khanapara and Lumsniang (75% Hampshire $\times$ 25% Niang Megha) developed by ICAR-RC for NEH Region, Umiam, Meghalaya have gained prominence in the hill ecosystems of the NE region due to their enhanced growth performance, better feed utilization, and improved reproductive traits.

These crossbreds are also reported to possess adequate adaptability to low-input, traditional backyard systems, which predominate in states such as Arunachal Pradesh. However, systematic comparative evaluations of these cross-bred pigs with indigenous non-descript pigs under farmers' field conditions remain limited, particularly in eastern Arunachal Pradesh.

A comparative assessment of productive and reproductive performance under uniform traditional management conditions is therefore essential to identify the most suitable genetic group for sustainable pig production in the region. Such evidence is critical for guiding breed selection strategies, improving farm profitability, and supporting policy interventions for piggery development. In view of the above, the present study was conducted as an On-Farm Trial (OFT) to evaluate and compare the productive and reproductive performances of HD-K75, Lumsniang, and Indigenous pigs under traditional rearing systems in Namsai district of Arunachal Pradesh.

Materials and Methods

Study area

The present study was conducted in Namsai district of Arunachal Pradesh, India, to evaluate the productive and reproductive performance of HD-K75 and Lumsniang crossbred pigs in comparison with indigenous pigs, which served as the control group. The district is located in the northeastern part of the country, lying between 95.45° to 96.20° E longitude and 27.30° to 27.55° N latitude, with a geographical area of approximately 1,587 km².

Animals

The study was carried out under farmers' field conditions. A total of 15 piglets i.e. 5 piglets each in each group (HD-K75, Lumsniang and indigenous pigs) were selected and reared under the existing management practices of the farmers. The average age of the selected piglets ranged from 45 to 60 days. All piglets were vaccinated against prevalent diseases,

including Foot-and-Mouth Disease (FMD) and Classical Swine Fever (CSF), following standard vaccination protocols. All piglets were maintained under similar feeding and management conditions. Prior to the commencement of the study, participating farmers were trained on scientific pig management practices and advised to maintain uniform feeding across all experimental animals.

The animals were fed twice daily with locally available feed resources, including colocasia leaves, papaya fruits, banana stems, rice bran, rice polish, and kitchen waste. Housing structures were constructed using locally available materials, with cemented concrete flooring provided to ensure basic hygiene.

Parameters studied

The productive and reproductive performance parameters evaluated included age at first service, age at first farrowing, litter size at birth, birth weight, litter size at weaning, and weaning weight. Litter size was calculated as the total number of piglets born divided by the total number of sows farrowed. Body weights of piglets were recorded at birth and at weaning (56 days of age) using an electronic weighing balance.

Statistical analysis

The collected data were subjected to statistical analysis, and results were expressed as mean $\pm$ standard error. Percentage differences between groups were also calculated. The significance of differences between means was tested using the Student's t-test as described by Snedecor and Cochran (1989).

Results and Discussion

The productive and reproductive performance of crossbred Hampshire pigs (Lumsniang and HD-K75) and indigenous pigs of Arunachal Pradesh were evaluated under traditional rearing systems, and the results are presented in Table 1.

Table 1: Productive and Reproductive performance of cross-bred and Indigenous pigs in Arunachal Pradesh

Parameters	HD-K75	Lumsniang	Indigenous breed
Age at first service (days)	273.50 $\pm$ 1.31 ^a	289.80 $\pm$ 0.94 ^a	340.50 $\pm$ 1.00 ^b
Age at first farrowing (days)	395.30 $\pm$ 1.54 ^a	412.11 $\pm$ 1.23 ^a	465.20 $\pm$ 0.98 ^b
Litter size at birth (Nos.)	9.33 $\pm$ 1.43 ^a	9.13 $\pm$ 1.01 ^a	7.10 $\pm$ 0.99 ^b
Litter size at weaning (Nos.)	8.91 $\pm$ 1.20 ^a	8.93 $\pm$ 1.20 ^a	6.24 $\pm$ 1.04 ^b
Birth weight (Kg)	1.12 $\pm$ 0.25 ^a	0.95 $\pm$ 0.19 ^a	0.75 $\pm$ 0.15 ^b
Weaning weight (kg)	12.45 $\pm$ 1.11 ^b	10.24 $\pm$ 1.04 ^a	6.69 $\pm$ 1.02 ^c

Row-wise figures bearing common superscript do not differ significantly ($p < 0.05$).

Reproductive traits

The age at first service (AFS) and age at first farrowing (AFF) were significantly ($p < 0.05$) lower in crossbred pigs compared to indigenous pigs. HD-K75 recorded the lowest AFS (273.50 $\pm$ 1.31 days) and AFF (395.30 $\pm$ 1.54 days), followed by Lumsniang (289.80 $\pm$ 0.94 and 412.11 $\pm$ 1.23 days, respectively), whereas indigenous pigs showed significantly higher values (340.50 $\pm$ 1.00 and 465.20 $\pm$ 0.98 days, respectively). The lower AFS and AFF observed in crossbred pigs indicate earlier attainment of sexual maturity and superior reproductive efficiency. These findings are consistent with Kumar *et al.* (2020) [11], who reported lower age at maturity (259 $\pm$ 23 days) and age at first farrowing (373 $\pm$ 35 days) in crossbred pigs compared to indigenous pigs. Similar trends have also been reported by Gokuldas *et*

al. (2015) [5] and Kaushik *et al.* (2019) [10] for AFS, and by Kadirvel *et al.* (2020) [9] and Bey *et al.* (2025) [3] for AFF in Hampshire-based crossbreds. However, Singh *et al.* (2020) [15] noted that these traits may vary depending on genotype and management conditions.

Earlier AFS and AFF are economically advantageous traits, as they reduce generation interval and enhance lifetime productivity. The superior performance of HD-K75 and Lumsniang may be attributed to their improved genetic background, faster growth rate, and better adaptability to local agro-climatic conditions. In contrast, the delayed maturity observed in indigenous pigs could be due to slower growth, smaller body size, and suboptimal nutritional and management practices under traditional systems

Litter traits

The litter size at birth (LSB) and litter size at weaning (LSW) were significantly higher ($p < 0.05$) in crossbred pigs compared to indigenous pigs. HD-K75 recorded LSB and LSW of 9.33 ± 1.43 and 8.91 ± 1.20 , respectively, while Lumsniang recorded 9.13 ± 1.01 and 8.93 ± 1.20 . In contrast, indigenous pigs showed lower values (7.10 ± 0.99 and 6.24 ± 1.04 , respectively). The higher litter size in crossbred pigs indicates better prolificacy and reproductive efficiency, along with improved maternal ability. Comparable findings were reported by Nath and Deka (2003) [13], who observed a litter size at weaning of 8.40 ± 0.32 in Large Black pigs, which aligns with the present results. Rabha *et al.* (2026) [14] reported a litter size at weaning of 6.13 ± 0.35 , which is comparable to the indigenous pigs in the present study. However, Kalita *et al.* (2018a) [6] reported lower litter sizes in Thaokhri pigs of Assam, possibly due to differences in genetic potential and management conditions. The relatively lower litter size in indigenous pigs may be attributed to smaller body size, lower ovulation rate, and inadequate nutrition under backyard systems. These findings are in agreement with Behl *et al.* (2020) [2], who reported generally lower reproductive performance in indigenous pigs compared to crossbred and exotic pigs.

Growth traits

Birth weight and weaning weight differed significantly ($p < 0.05$) among the genetic groups. HD-K75 recorded the highest birth weight (1.12 ± 0.25 kg) and weaning weight (12.45 ± 1.11 kg), followed by Lumsniang (0.95 ± 0.19 kg and 10.24 ± 1.04 kg), while indigenous pigs recorded the lowest values (0.75 ± 0.15 kg and 6.69 ± 1.02 kg). The superior growth performance of crossbred pigs reflects better prenatal development, higher genetic potential, and improved maternal traits. These results are consistent with Kumar *et al.* (2020) [11], who reported better growth performance in crossbred piglets under similar farming conditions in Namsai district. Behl *et al.* (2020) [2] reported that the birth weight of indigenous pigs in India typically ranges from 0.44 to 0.83 kg, and the present findings for indigenous pigs fall within this range, whereas crossbred pigs exceed it. Das *et al.* (2023) [4] reported a weaning weight of 9.845 ± 0.009 kg, and Bayan *et al.* (2024) [1] reported 9.666 ± 0.013 kg for HD-K75 pigs under Assam conditions, both of which are slightly lower than the present findings. The higher weaning weights observed in this study may be attributed to better litter management, improved maternal milk production, and relatively favourable feeding conditions. These findings are further supported by Kalita *et al.* (2018b) [7], who emphasised that scientific weaning practices and improved nutritional management significantly enhance piglet growth and farm profitability.

Conclusion

The present On-Farm Trial demonstrated that Hampshire crossbred pigs, particularly HD-K75, exhibited significantly superior productive and reproductive performance compared to indigenous pigs under traditional rearing systems in Arunachal Pradesh. Crossbred pigs attained earlier sexual maturity, recorded higher litter size at birth and weaning, and achieved better growth performance in terms of birth and weaning weight. Among the evaluated genetic groups, HD-K75 showed the best overall performance, indicating its

suitability for low-input backyard production systems prevalent in the region. The adoption of improved Hampshire crossbreds can therefore play an important role in enhancing pig productivity, improving farmers' income, and strengthening livelihood and nutritional security among rural and tribal communities of Arunachal Pradesh and the North-Eastern region of India.

Acknowledgements

The authors are grateful to the Indian Council of Agricultural Research (ICAR) for providing the financial support necessary for the execution of this research work. The authors also sincerely acknowledge the Director, ICAR Research Complex for NEH Region, Umiam, Meghalaya, for providing the facilities and institutional support required for the successful completion of this study under the On-Farm Testing (OFT) project entitled "Productive and Reproductive Performance of Crossbred Pigs."

Conflict of Interest

The authors declare no competing interests.

References

1. Bayan J, Zaman GU, Kalita D, Goswami RN, Phookan A, Akhtar F, *et al.* Least-square analysis of non-genetic factors on the growth performance traits of HD-K75 pigs. *Uttar Pradesh Journal of Zoology*. 2024;45(14):131-143.
2. Behl R, Vij PK, Niranjana SK, Behl J, Viji RK. Indigenous pig genetic resources of India: Distribution, types and their characteristics. *The Indian Journal of Animal Sciences*. 2020;90(2):127-133.
3. Bey B, Laskar S, Zaman UZG. Reproductive performance of HD-K75 pigs under field conditions. *International Journal of Veterinary Sciences and Animal Husbandry*. 2025;10(5):294-297.
4. Das E, Kalita D, Goswami RN, Phookan A, Khanikar D, Deka N. Growth performance of HD-K75 pigs in the original nucleus herd. *International Journal of Veterinary Science and Animal Husbandry*. 2023;8(6):24-28.
5. Gokuldas PP, Tamuli MK, Mohan NH, Barman K, Sahoo NR. A comparative analysis of reproductive performance of different pig breeds under intensive management systems in sub-tropical climate. *The Indian Journal of Animal Sciences*. 2015;85(9):1000-1005.
6. Kalita D, Deka N, Das N, Sarma O, Phookan A. Morphometric and performance evaluation of Thaokhri pigs of Assam, India. *Journal of Advances in Biology & Biotechnology*. 2018;28(4):889-897.
7. Kalita G, Roychoudhury R, Kalita D, Saikia BN, Saharia J, Bora M. Effect of weaning management on economics of piglet production under farm condition of Assam. *International Journal of Livestock Research*. 2018;8(10):165-171.
8. Kadirvel G, Rajkhowa S, Barman D, Deka BC, Laha G. Pig production systems and opportunities for improvements in North East Hill Region of India. *The Indian Journal of Animal Sciences*. 2021;91(6):453-458.
9. Kadirvel G, Singh NM, Rahman M, Singh LA, Khargharia G, Kumar RA. Comparative evaluation on productive and reproductive traits of Tamworth $\times$ Desi

- and Hampshire × Niang Megha pigs under subtropical hill ecosystem in eastern Himalayas region of India. *Indian Journal of Animal Research*. 2020;54(11):1332-1337.
10. Kaushik P, Handique PJ, Rahman H, Banik S, Das A. Effect of genetic groups on productive and reproductive traits of exotic and crossbred pigs in organized farm of Assam. *International Journal of Agricultural Sciences*. 2019;11(17):8976-8978.
 11. Kumar S, Borah BKD, Sasmal D, Kanwat M, Kalita H. Performance of crossbred and local pig in Namsai District of Arunachal Pradesh. *International Journal of Livestock Research*. 2020;10(12):184-188.
 12. Mehta P, Bhattacharjee S. Sustainable pork production and processing: A step toward empowering tribal women in Northeast India. *Frontiers in Nutrition*. 2024;11:1425020.
 13. Nath DR, Deka D. Litter trait and preweaning growth performance of Large Black pig in Assam. *Indian Veterinary Journal*. 2003;80(3):287-289.
 14. Rabha S, Sarma NK, Deka RJ, Medhi T. A study on swine management practices adopted by the Rabha community of Assam, India. *Journal of Scientific Research and Reports*. 2026;32(1):89-95.
 15. Singh NM, Medhi K, Gogoi SH, Pathak B. Reproductive, growth performance and carcass traits of pigs raised under existing low input tribal backyard pig production system in Dima Hasao, Assam of North East India. *Journal of Entomology and Zoology Studies*. 2020;8(SI4):480-484.