Research Paper

Characteristics, management and production performance of 'Nagal' pig in tribal production system of North Eastern Hill region of India

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ABSTRACT

Nagal pigs are favored by tribal farmers due to their rapid growth rate, large litter size, black colour, and unique pork taste. This study, carried out in six districts of Nagaland, involved observations and interviews with pig owners, employing a pre-structured questionnaire to detail the morphology of 'Nagal' pigs, along with their management practices and production performance. Nagals are long, deep-bodied and black pigs. They have a short snout gently curved upward. Their top line is slightly concave. They have large, wide and drooping ears, partially obscuring their vision. Nagal pigs breed around the year. For males, the age at first mating is 6-7 months, while in females it is 7-8 months. The age at first farrowing is about 12 months with a farrowing interval of 5-6 months.The average litter size is sizeable, ranging from 7 to 20 piglets, although some sows may produce litters as large as 26.The gestation period is around 114 days. They are raised under intensive backyard management and fed on rice, corn, wheat bran, rice polish, plant leaves and leftover kitchen scraps. Short snout, black colour, low hair density and large ears are the preferred traits. The results of this study will aid in the development of breeding and conservation strategies for this significant swine genetic resource of Nagaland.

Keywords: Charactization, Nagaland, Pig

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INTRODUCTION

The climate of the North Eastern Hill (NEH) region ranges from sub-tropical to temperate. This area is home to a significant tribal population, predominantly non-vegetarian, which results in a high demand for pork (Singh *et al.*, 2019; Singh *et al.*, 2021). The predominant pig production system in this region is characterized by backyard farming, which operates on low input and low output. Tribal farmers typically raise between 2 to 5 native pigs in their backyards, primarily for fattening purposes (Huyen *et al.*, 2017). The pig germplasm in this region exhibits considerable phenotypic and genetic diversity, encompassing a variety of native pig germplasm that includes small, medium, and large breeds.The genetic characteristics, differentiation, and production parameters of indigenous pigs in the NEH region remain undocumented. Nevertheless, the rich socio-cultural diversity of tribal communities residing in geographically isolated hilly areas, who have longstanding and deep-rooted connections with native pigs, suggests that these pigs may possess unique genetic diversity. However, the preference of farmers for rapidly growing European and American pig breeds often results in the neglect or crossbreeding of valuable native genetic resources (Singh *et al*., 2023; Yan *et al.*, 2023). Furthermore, much of this genetic material has yet to be characterized and is currently threatened by indiscriminate breeding practices.

The 20th Livestock Census showed that India has a total pig population of 9.06 million. About 47% of these pigs come from the North-Eastern Hill (NEH) region (Table1), and are mostly reared in backyard production system, with only a small number being part of an intensive production system. In Nagaland, the total livestock population is recorded at 0.76 million, with pigs constituting the largest segment, representing 52.7% of the total livestock. Among these, exotic and crossbred pigs hold the largest share at 51%, while non-descript pigs account for 48%, and indigenous pigs make up a mere 1% (BAHS, 2019). The proportion of Nagaland's pig population within the NEH region is 9.5%.

About half of the pig population in Nagaland is non-descript. The ICAR-NBAGR is actively engaged in characterizing these non-descript animal genetic resources in order to identify new, uniform populations. One such new pig population of Nagalandwas identified, characterized, and namedas 'Nagal'(Yadav *et al.*, 2024). Nagal pigs are favored by tribal farmers due to their rapid growth rate, large litter size, black colour, and uniquepork taste. This study details the morphology of 'Nagal' pigs, as well as their management practices and production performance. The results will aid in the

development of breeding and conservation strategies for this significant swine genetic resource of Nagaland.

MATERIALS AND METHODS

Using purposive sampling a survey was conducted in six districtsviz. Chumukedima, Dimapur, Peren, Niuland, Kohima and Wokha. Over 200 Nagal pigs were studiedon 11 biometric traits viz. total body length, height at withers, height at loin, chest girth, abdominal girth, neck girth, face length, snout length, ear length, ear width and tail length. Information on morphology, management practices, and production-reproductive traits was collectedthrough observations and interviews conducted with pig owners, utilizing a pre-structured questionnaire.

RESULTS AND DISCUSSION

Morphology

The Nagal pigs are large-sized, primarily characterized by their black coat. Some have pink or white coloration or spots on their legs below the hock, on their muzzle, and on the end of their tail.They have a long, deepbody and short legs, with a slightly concavetop-line.They possess a facial structure reminiscent of a bulldog, featuring a short snout that curves gently upward, along with a sunken forehead and deep-set eyes.Most have black hooves, but a few have pink or white ones, and the hoof placement is full.They feature large, wide and drooping ears, partially obscuring their vision.Their tail is long, thin and curled, while the bristles are short.The stout-bodied Nagals stand 53-90 cm at the shoulder, and have a total body length ranging from 99-155 cm.

Table 1: Pig population of North Eastern Hill States of India (2019)

S. No.	State	Population
1.	Arunachal Pradesh	271463
2.	Assam	2099000
3.	Manipur	235255
4.	Meghalaya	706364
5.	Mizoram	292465
6.	Nagaland	404695
7.	Sikkim	27320
8.	Tripura	206035
Total		4242597

Source: 20th Livestock Census, 2019

Productive-reproductive traits

The weight at birth of Nagal pigs ranged from 1 to 1.4 kg, while weight at 3 months, 6 months, 9 months and 12 months varied from 12 to 18 kg, 40 to 60 kg, 80 to 100 kg and 100 to 140 kg respectively. The weight at more than a year varied from 100 to 220 kg.For males, the age at first mating was 6-7 months, while in females it was 7-8 months. The age at first oestrous was 7-8 months with an oestrous cycle of 18-22 days and oestrous duration of 2-3 days. The age at first farrowing was around 12 months with a farrowing internal of 5-6 months. The Nagal sows gave birth to large litter ranging from 7 to 20, but some had litters up to 26. In the eleventh farrowing, a sow was witnessed giving birth to 20 piglets. The lifetime farrowing ranged from 5 to 8. The sows were good at mothering ability and had 6 to 8 pairs of teats. The gestation period was around 114-days. The boars had a two-year breeding life span, whereas sows had a three- to five-year lifespan, thereafter they were usually slaughtered. The Nagal pigs bred round the year. The identifiable physical traits viz. short snout, black colour, large ears, and low hair density, are used in the selection process. The farmersutilize distinct physical characteristics such as a short snout, black colour, large ears, and low hair density in the selection process of Nagal pigs.

Utility and Management

The Nagal pigs are raised for their pork and manure, and the pork is the preferred product. They are raised under intensive backyard management and fed on rice, rice polish,corn, wheat bran, plant leaves and leftover kitchen scraps., The herd size generallyvaries from 2-5 but herd size of 8-15 were also observed. The herd was composed of 50% piglets, 10% boars, and 40% sows.

Houses constructed from locally sourced bamboo poles and wooden planks, featuring primarily earthen or wooden flooring, were provided for small herds ranging from 2 to 5 animals. In some cases, structures with elevated slatted floors made of bamboo poles and wooden planks were also noted. Conversely, for larger herd sizes, the housing was designed with concrete floors and walls, ensuring adequate ventilation and cleanliness. No major disease patterns have been reported, and vaccinations for foot and mouth disease (FMD) and classical swine fever (CSF) are given regularly. The mortality rate among adult pigs is below 0.5%, whereas it is approximately 5% in piglets.

Typically, both male and female animals are reared for the purpose of fattening. Breeding boars are not usually maintained individually; rather, a limited number of farmers maintain breeding boars for the benefit of the community. A breeding boar provides mating services to sows within a village or a cluster of villages. The owner charges ₹1500-2000 for every service. If the pregnancy fails, free re-service is provided. A boar is utilised four to five times per month.

The Nagal pig farming is highly remunerative in Nagaland, as the Naga community has a strong preference for black pigs during their social and cultural

celebrations. The sale of live pigs is priced between ₹250 and ₹270 per kg of live weight, while pork is sold at a rate ranging from ₹300 to ₹350 per kg. Nagal pig farrows two times in a year, with average litter size 8 to 12 piglets in each farrowing. Thus, it is possible to harvest approximately 20 piglets from a single sow over the course of two farrowings. The price of a single piglet ranges from ₹5000 to ₹7000, allowing a farmer to generate an income of ₹80000 to ₹100000 solely from the sale of piglets in a year. The farmers indicated that they incurred approximately ₹10,000 per year in maintenance expenses for a sow.The piglets are typically sold when they are two months old, usually in pairs (one male and one female). The sale price of breeding boars varies from ₹30000 to ₹35000. Giving pigs, mostly, black pigs, as gifts in marriages and to the local church (10% of the piglets) is a customary social practice. At weddings and festivals, black male pigs are often chosen for the feasts.The benefit-cost ratio (BCR) of Nagal pig rearing varies from 2.2 to 2.7 (Singh *et al.*, 2020).The average body weight of Nagal pigs is around 101 kg in females and 117 kg in males (Yadav *et al*., 2024). When comparing the average body weight of registered pig breeds in India (Table 2) with that of Nagal pigs, it is evident that they represent the largest and heaviest pig population in the country.

Table 2: Average body weight and breeding tract of registered pig breeds of India

S. No.	Breed	Breeding Tract	Body Weight (kg)	
			Male	Female
1.	Agonda Goan	Goa	41	43
2.	Andamani	Andaman Islands	78	78
3.	Banda	Jharkhand	28	27
4.	Doom	Assam	42	45
5.	Ghoongroo	West Bengal	62	59
6.	Ghurrah	Bareilly and Lucknow Divisions of UP	52	53
7.	Mali	Tripura	68	71
8.	Manipur Black	Manipur	96	93
9.	Niang Megha	Meghalaya	63	68
10.	Nicobari	Nicobar Islands	64	67
11.	Purnea	Bihar and Jharkhand	44	48
12.	Tenyi Vo	Nagaland	40	40
13.	Wak Chambil	Meghalaya	35	35
14.	Zovawk	Mizoram	54	59

Source: https://nbagr.icar.gov.in/en/databases/

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