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Phenotypic characterization and production systems of indigenous pigs in Madhya Pradesh

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Abstract

The present study was undertaken to assess the socio-economic status of pig farmers and the phenotypic and management characteristics of pigs reared in the Dindori and Mandla districts of Madhya Pradesh, India. A field survey was conducted among pig farmers using a structured questionnaire. Data on household socio-economic profile, herd composition, housing, feeding, and phenotypic traits of pigs were recorded. The findings revealed that pig rearing in the study area is predominantly practiced by tribal communities under low-input, semi-intensive to extensive systems. Indigenous pigs constituted the major proportion of the population, reared mainly for supplementary income and household consumption. The indigenous pigs were predominantly black coat colour, slightly concave snout profile, erect ear, white stocking and full hoof placement. The recorded phenotypic traits will provide a footprint to characterize indigenous pigs of Madhya Pradesh.

Keywords: Pig farming, socio-economic status, phenotypic characteristics, indigenous pigs, Madhya Pradesh

Introduction

Pigs are highly prolific and fast-growing livestock with efficient feed conversion, short generation interval, and early maturity (Karnuah *et al.*, 2018) ^[1]. Moreover, pig production plays an important role in improving livelihoods and serves as a resilient income-generating enterprise for socially and economically disadvantaged populations (Kumar *et al.*, 2017) ^[2]. Pig farming plays a significant role in sustaining the livelihood of socio-economically weaker and tribal communities in India (Nath *et al.*, 2013) ^[3].

In Madhya Pradesh, pig rearing is traditionally practiced under low-input management systems and plays a significant role in enhancing the socio-economic status and nutritional security of tribal farming households in the region. According to the 20th Livestock Census (2019), the total livestock population of Madhya Pradesh was approximately 40.6 million, with a pig population of about 0.46 million; with approximately 0.02 millions concentrated in Dindori and Mandla districts (DAHD, 2019). Most of the farmers in these districts rear indigenous native pigs. This indigenous pig is reared predominantly under scavenging management systems and is well adapted to local agro-climatic conditions. However, there has been no documentation available about the performance and morphological characteristics of indigenous pig of Madhya Pradesh.

Understanding the socio-economic background of farmers along with phenotypic and management characteristics of pigs is essential for planning breeding strategies. The present study was undertaken to obtain socio-economic information on pig farmers and physical characteristics of the native pig in Dindori and Mandla district of Madhya Pradesh, India.

Materials and Methods

The present study was conducted in Mandla and Dindori districts of Madhya Pradesh, India (Fig 1.). The study area lies between approximately 22.02° to 23.40° N latitude and 80.20° to 81.50° E longitude, with an altitude ranging from about 450 to 900 meters above mean sea level. The region falls under a subtropical climatic zone, characterized by hot summers,

moderate winters, and a distinct monsoon season. The annual rainfall varies from 1,200 to 1,600 mm, largely influenced by the southwest monsoon. During winter, the temperature ranges from 5 °C to 10 °C, while summer temperatures vary from 25 °C to 45 °C. The study area is predominantly tribal and forest-dominated, representing a typical rainfed farming system where pig husbandry forms an integral component of the livelihood strategy. A total of 290 farmers rearing 1175 pigs were interviewed for the evaluation of existing production system and phenotypic attributes of indigenous pigs in Madhya Pradesh.

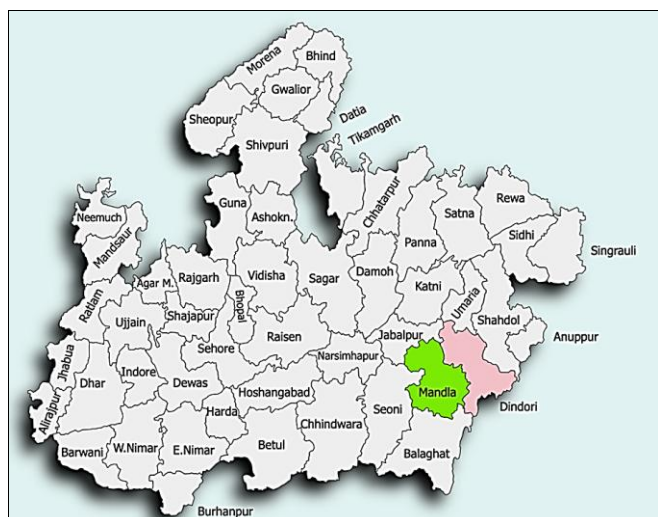


Fig 1: Mandla and Dindori districts of Madhya Pradesh

Results and Discussion

A cross-sectional survey was conducted among pig farmers in two districts of Madhya Pradesh, India: Dindori (100 farmers, 462 animals) and Mandla (190 farmers, 613 animals). The study focused on socio-economic characteristics, herd composition and phenotypic characteristics of indigenous native pigs reared under small-scale systems in tribal-dominated regions of Madhya Pradesh. Table 1 presents the descriptive statistics of socio-economic variables among the surveyed pig farmers. Farmers in Dindori exhibited an average family size of 5.29 persons; while the Mandla average family size was 4.67 persons, with roughly balanced gender composition in both districts. Literacy levels of pig farmers were notably higher in Mandla than in Dindori district. Average annual income was substantially greater among Mandla farmers (₹47,725.27) than in Dindori (₹28,869). Dindori farmers reported average land holdings of 3.73 acres and pig herd sizes of 4.66 pigs per household, whereas in Mandla the average land holding of farmers was 2.69 acres and pig herd sizes of 3.22 pigs per household. The herd composition of the pigs in Dindori and Mandla district of Madhya Pradesh is presented in Table 2. Female pig numbers were similar across districts (approximately 1.3 per household). Mandla households had a higher average number of piglets than Dindori district. Castration of male piglets was practiced by the farmers. The reason might be that the farmers kept their pigs for meat purpose only, and sale of meat of non-castrated pigs was not allowed (Rahman *et al.*, 2008) [5]. Average age (months) at first mating for male and female were around 7.5 and 6.8, respectively.

A majority of pig farmers (55% in Dindori; and 50% in Mandla) reared pigs in separate housing structures specifically constructed for pig farming. The housing is generally made of locally available materials and family

labour. However, separate housing indicates a partial interest of pig farmers to improve hygiene and reduce disease risk. The vast majority relied on kutcha (temporary/impermanent) materials such as bamboo, wood, mud, and thatch—consistent with resource constraints in tribal-dominated districts like Dindori and Mandla. In Dindori district, the floor type was predominantly earthen (54%), with a smaller proportion (43%) employing wooden flooring, and only 3% used concrete floor. Earthen floors are common in low-cost systems due to availability and minimal construction expense, though they pose challenges for cleanliness and parasite control. While, in Mandla district, about 89.47% of the farmers used earthen floor and 8.42% used concrete floor, and only 2.10% of the farmers used wooden floors for pig housing.

Household wastes and harvested plants were the major sources of animal feed. Most respondents practiced the semi-intensive management system whereby kitchen wastes along with free grazing particularly in the day time. The amount of feed given to the pigs was not quantified, but farmers indicated that it varied according to its availability, leading to the high cost of pig production during the dry season. Previous studies have reported that non-conventional feed resources contribute the majority of the feedstuffs in indigenous pig of Nagaland (Moanaro *et al.*, 2011) [6]. Kumar *et al.* (2010) [7] have reported that the supply of kitchen and rice fermented waste to pigs reduced the feeding cost.

Physical characteristic

The coat colour of indigenous pigs in Dindori and Mandla district is predominantly black with compact body, thick coarse hair (Fig 2.). Some of the animals show white markings on head and on belly region. The black colour indigenous pig is preferred by local farmers due to some of their religious belief. The predominant black colour in indigenous pigs was also reported in native pigs of Tamil Nadu (Kumar *et al.*, 2017) [2]; Mali pig of Tripura (Dandapat *et al.*, 2010) [9]; Ghunghroo pigs of West Bengal (Sahoo *et al.*, 2012) [10]; Bareilly desi pigs (Prasanta Boro *et al.*, 2016) [8]; and indigenous pigs of Jharkhand (Verma *et al.*, 2023) [11].

The shape of the head is more concave in Mandla pigs compared to Dindori district. The ears are straight with vertical orientation. The snout of indigenous pigs of Mandla is more elongated and more concave in comparison to pigs in Dindori, which have a smaller, straight snout. Verma *et al.* (2023) [11] have reported slightly concave snout with small erect ears in indigenous native pigs of Jharkhand. Dandapat *et al.* (2010) [9] have also reported narrow face with an upwardly curved snout and the ears were erect in Mali pigs in Tripura. Similarly, Kumar *et al.* (2017) [2] have also reported a straight head with erect ears with either upward or horizontal orientation in native Tamil Nadu pigs. Yaetsu *et al.* (1987) [12] conducted experiments on indigenous pigs in Bangladesh and found that native pigs had a straight face, a pointed nose, and upright ears.

The belly of pigs in both the districts of Madhya Pradesh is predominantly potbellied. Kumar *et al.* (2017) [2] have also reported the belly of indigenous pigs of Tamil Nadu was flat or potbellied. Similarly, Yaetsu *et al.* (1987) [12] and Sahoo *et al.* (2012) [10] have also reported pendulous belly in Bangladesh and Ghunghroo pigs, respectively. However, angular body type was reported in Bareilly desi pigs (Prasanta Boro *et al.*, 2016); [8] and compact body type in Mali pigs in Tripura (Dandapat *et al.*, 2010) [9].

The leg colour of the indigenous pigs was white below the hock joint referred to as white stockings with full hoof placement. White stocking has also been reported in Bareilly Desi pig Prasanta Boro *et al.* (2016) ^[8] and Nian-Megha pig (Sahoo *et al.*, 2012) ^[10]. The full hoof placement was observed in native pigs of Jharkhand (Kumar *et al.*, 2017) ^[12]. The tail of indigenous pig was straight with tuft of hair at the tip. This result was in accordance with indigenous pigs of Jharkhand (Verma *et al.*, 2023) ^[11], Mali pigs of Tripura (Dandapat *et al.*, 2010) ^[9]; and indigenous pigs of Tamil Nadu (Kumar *et al.*, 2017) ^[12].

Table 1: Socio-economic profile of pig farmers of Dindori and Mandla districts of Madhya Pradesh

S. No	Characteristics	Dindori district	Mandla district
1.	Average family size (no.)	5.29	4.67
2.	Average age of pig farmer (years)	36	38
3.	Average annual income (Rs)	38869	47725
4.	Average land holding (acre)	3.73	2.69
5.	Average pig farming experience	13	12

Table 2: Herd status and performance of indigenous pigs in Dindori and Mandla districts of Madhya Pradesh

Parameters	Dindori district	Mandla district
Herd size of pig (no.)	4.66	3.87
Average no. of adult male pig/household	0.72	0.71
No. of adult female pig/household	1.33	1.24
No. of piglets/household	2.61	1.92
Average age at first mating for male (month)	7.5	7.4
Average age at first mating for female (month)	6.8	6.7
Average weight at first mating for male (kg)	45.23	44.25
Average weight at first mating for female (kg)	40.52	41.23



Fig 2: Indigenous pigs of Dindori and Mandla district of Madhya Pradesh

Conclusion

The present study concluded that pig farming has great potential to uplift the socio-economic status of the tribal farmers of Madhya Pradesh. The farmers in have long reared native pigs with little or low input, resulting in high mortality, low productivity, and reproductive performance. Distinctly, there are two phenotypically groups were identified in the indigenous pigs of Madhya Pradesh. In addition, phenotypic and molecular characterization is therefore essential to clearly delineate these populations and provides a scientific basis for their registration and conservation of native indigenous pig of Madhya Pradesh.

Conflict of interest

Not available.

Financial support

Not available.

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