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Population distribution and performances of Burmese black pigs in north eastern hill eco-ecosystem of India

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Abstract
The present investigation was undertaken to study the population distribution and performance evaluation of Burmese black pigs in north east region of India. A total of 900 pig farmer's across108 villages in 14 districts of four north eastern states of India were interviewed on random basis to evaluate the population structure. Data pertaining to 275 pigs and 31 sows were utilized for study of body weight and reproductive traits respectively. Eight adult pigs of 10 months of age were slaughtered for assessment of carcass traits. The population of Burmese black pigs was estimated to be 12000 which distributed in Champhai, Kolasib and Siaha districts of Mizoram; Ukhrul, Chandel, Churachandpur and Tamenglong districts of Manipur; Phek, Kiphire, Tuensang and Mon district of Nagaland and East Khasi hills, West Khasi hills and Ri-bhoi districts of Meghalaya. Among the different states, Burmese pig population were found to be highest in Nagaland (38%) followed by Mizoram (28%), Manipur (27%) and least in Meghalaya (7%). The average body weight of Burmese black pig was found to be 0.84±0.12, 14.22±1.01 and 78.45±3.49 kg at birth, weaning and adult respectively. Litters size at birth and weaning were found to be 10.20±0.67 and 8.43±0.44 respectively. Similarly dressing percentage (%) and back fat thickness (cm) were 73.23±0.76 and 2.92±0.13 respectively. The body weight and reproductive efficiency of Burmese black pigs were found to be higher than other local pig breeds of north east region with comparable carcass performance. The information of present study may be useful to adopt suitable conservation and breeding policy for the breed as the population of these breed are in declining trend.

Keywords: Burmese black pig, population distribution, performance traits, North east India

Introduction
Indigenous pigs in North Eastern (NE) region India have special significance as they are integrated with the cultural and socio economic livelihood of the tribal people. Most of the tribal farmers in this region reared 2 to 3 local pigs in low input backyard condition which contribute a reasonable amount of economic benefit in their day to day life [1]. Thus, the diversity of local pig in this region is maintained and contributing an important component indigenous animal genetic resources of the country. The north eastern region of India shares 38.5% of the country's pig population [2]. Among the eight registered pig breeds of the country, four breeds belong to this region [3]. Besides many uncharacterized pigs are available in north eastern region which describes by their local name. However, due to intensification of crossbreeding with exotic pig breed for increase productivity resulting their population in declining trend [4]. Therefore, conservation of these local pigs in their breeding habitat becomes challenges for the breeder in near future. Among the local pigs, Burmese Black Pig is an important local pig germplasm are very popular in this region. They are mostly found in Indo-Burma bordering states of India and some parts of Meghalaya. However till now there is no information on their population distribution and performances under field condition. Therefore, the present study was undertaken to study the population structure of Burmese black pigs and their productive, reproductive and carcass traits performances under field condition.

Materials and Methods
Geographical and climatic description
The survey was conducted for a period of nine months from July, 2018 to March, 2019 in different district of Mizoram, Manipur, Nagaland and Meghalaya state of India. The study area

represents typical tribal production system located between 22.02^0 to 27.11^0 N latitude and 90.08^0 to 95.12^{0}E longitudes with an altitude range from 650 to 1680meters above the mean sea level. The average annual rainfall was 2360 mm with the range varies from 1527 mm to 3160 mm. The temperature varies from 2.4 ^{0}C to 20.7 ^{0}C during winter and 14.64 ^{0}C to 34.74 ^{0}C during summer.

Location and experimental animals

In order to evaluate the population structure of Burmese black pig, 900 pig farmers cross 108 villages in 14 districts of Mizoram, Manipur, Nagaland and Meghalaya were interviewed. In each district, a two stage stratified sampling technique was done. At least five villages within each district and ten pig farmers within each village were chosen on random basis for the study. For recording of body weight total 275 pigs were utilized in different categories viz., 107 days old piglet, 131 weaned piglet and 37 adult pigs. Similarly, 31 sows selected with at least one farrowing for collection of information on reproductive traits. Total eight adult pigs of 10 months of age were slaughtered for assessment of carcass traits. The information was collected by providing structured pre tested questionnaire to the farmers and visual observation.

Statistical analysis

The analysis of the recorded data was carried out as per the standard statistical procedures [5]. The data on performance traits was represented as means ± standard error.

Results and Discussions

Breeding tract

From the survey conducted in different state of North East India it has been revealed that Burmese Black pigs are mostly distributed in Indo-Burma bordering areas viz. Champhai, Kolasib and Siaha districts of Mizoram; Ukhrul, Chandel, Churachandpur and Tamenglong districts of Manipur; and Phek, Kiphire, Tuensang and Mon district of Nagaland. Besides these Indo Burma bordering district, these pigs are also available in some parts of Meghalaya i.e. East Khasi hills, West Khasi hills and Ri-Bhoi districts. The total population of Burmese Black pig has been found speckled distribution which covers approximately 33700 km^2 area to be 12000 based on survey estimate [6]. In North East Region of India, Burmese black pig contributes 0.30% of total pigs and maximum percentage were found in Nagaland (38%) followed by Mizoram (28%), Manipur (27%) and least in Meghalaya (7%) (Fig.1).

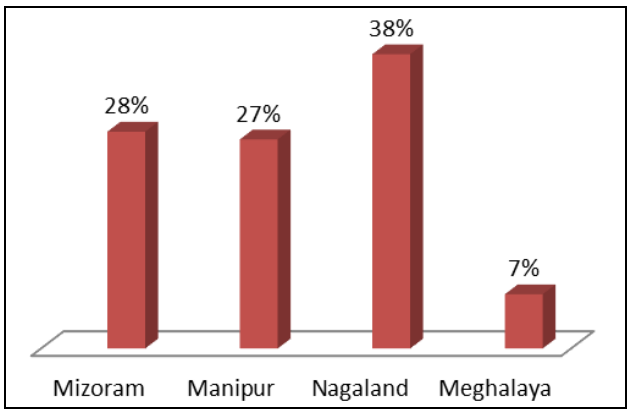

Fig 1: State-wise distribution of Burmese Black pig Population

Population structure

The Burmese black pig population has been found maximum with 4560 numbers in Nagaland state which contribute 0.91 % of total pig population of this state. Among the different districts of the state, Burmese black pigs were found maximum number in Phek, Kiphire, Tuensang and Mon district. The population intensity of Burmese black pig has been found to be highest in Kiphire district (2.84%) followed by Mon district (2.46%), Tuensang district (2.40%) and minimum population has been observed in Phek district (1.70%) (Fig. 2).

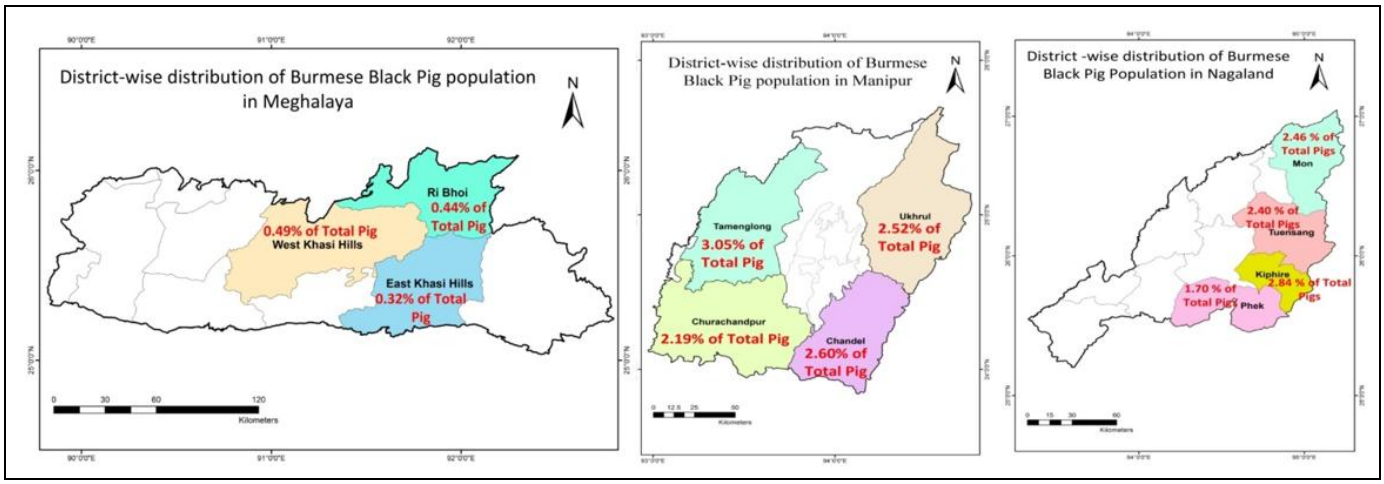

Fig 2: District-wise distribution of Burmese Black pig population in Meghalaya, Manipur and Nagaland

In Mizoram, the Burmese Black pig population has estimated as 3360 numbers which contribute 1.37 % of the total pig population. Among the different district of Mizoram, the population intensity of Burmese Black pigs were found to be maxium percentage in Kolasib district (4.96%) followed by Champhai district (4.70%), and lowest in Siaha district (2.32%) among total pig populations in this state (Fig. 3).

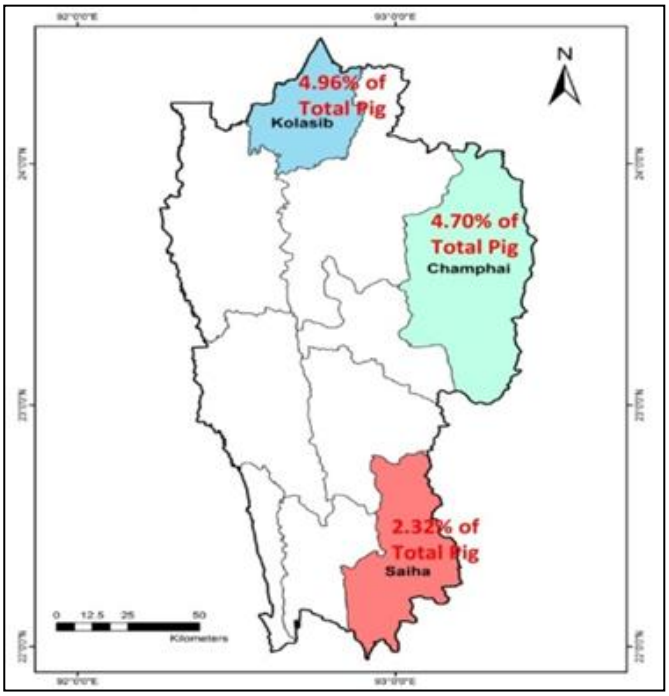

Fig 3: Distribution of Burmese Black pig population in Mizoram

The Burmese pig population of Manipur has been recorded as 3240 numbers and represents as third most Burmese black pig populated states of North east India. Tamenglong district (3.05%) of Manipur has highest population intensity of Burmese Black pigs followed by Chandel district (2.60%), Ukhrul district (2.52%) and Churachandpur district (2.19%) has lowest population intensity (Fig.2).

Among the different the four states, Meghalaya represents the lowest Burmese pig population with only 840 numbers. These pigs are found only a few villages of East Khasi Hills, West Khasi Hills and Ri-Bhoi districts of Meghalya. Among the three districts, West Khasi hills (0.49% of total pig) has highest intensity of Burmese Black pig followed by Ri-Bhoi (0.44% of total pig) and East Khasi Hills districts (0.32% of total pig) represent lowest population intensity of Burmese pig (Fig.2).

Performance traits of Burmese black pig

Productive and reproductive performance trait of swine is off great concern in economic pork production as the profitability of pig farmers largely with depends on it. The performance of different economically important traits of Burmese black pigs was presented in Table 1. The average body weight of Burmese black pigs at birth, weaning (3 months) and adult (10 months) are found to be 0.84±0.12, 14.22±1.01 and 78.45±3.49 kg respectively. The body weight at different age groups of Burmese black pigs is higher than other indigenous local pigs of North east region of India viz. Doom Pig of Assam [7], Ninag Megha pig of Meghalaya [8], Mali pig of Tripura [9], Suwo pig of Nagaland [10] and Local pig of Mizoram [11] as reported earlier. Though birth weight and weaning weight of Burmese pigs are comparable but adult weight is higher than with Ranchi local pigs [12] and Bareilly local pig [13].

Therefore, Burmese black pigs are considered as the heaviest local pig breed in Indian subcontinent. The average pre weaning and post weaning growth rate are 149.56±6.98 and 297.25±12.09 g/day in Burmese pigs in the present study which was higher than any other local pig breed of North east India. The average pre weaning and post weaning mortality of Burmese black pigs has been found to be 17.34 ± 1.10 and 8.98 ± 0.78 percent respectively. The pre weaning and post weaning mortality of Burmese black pigs are higher than other indigenous pigs of north eastern India as reported [14]. Higher mortality rate might be due to poor managemental practice in terms of feeding, housing and health care facilities and susceptibility to environmental changes.

Table 1: Productive, reproductive and carcass traits performances of Burmese Black Pig in north east India

Birth weight (kg)	0.84±0.12 (107)
Weaning weight (kg)	14.22±1.01(131)
Adult body weight (kg)	78.45±3.49 (37)
Pre weaning growth rate (g/day)	149.56±6.98(17)
Post weaning growth rate (g/day)	297.25±12.09(08)
Pre weaning piglet mortality (%)	17.34 ± 1.10
Post weaning mortality (%)	8.98 ± 0.78
Litter size at birth (number)	10.20 ± 0.67(31)
Litter size at weaning (number)	8.43 ± 0.44(31)
Age at sexual maturity (days)	234.73± 8.85(31)
Inter farrowing period (days)	204.10 ± 11.21(22)
Dressing percentage (%)	73.23 ± 0.76(08)
Back fat thickness(cm)	2.92 ± 0.13(08)
N.B. Within the parentheses are the number of observation	

The average litter size at birth and litter size at weaning of Burmese pigs in the present study are observed to be 10.20±0.67 and 8.43±0.44 numbers respectively (Table 1). The litter performance of Burmese pigs is found to be higher than other local pigs of this region viz. Doom pig, Niang Megha pigs, Suwo pig, Zovawk pig and Mali pigs [15], hence can be considered as the most prolific pig breed of North east region of India. The litter performances of these pigs are comparable with the most prolific Ghungroo pig breed of the country [16] [17]. The age at sexual maturity and inter farrowing interval of Burmese pigs are 234.73±8.85 and 204.10 ±11.21 days respectively which are inconsonance with other local pig breeds of this region [15] indicating the reproductive efficiency of Burmese pigs. However, the reproductive efficiency including litter performance further can be improved by providing optimal managemental care under the existing production system. The average dressing percentage and back fat thickness of Burmese pig in the present study are 73.23±0.76 percent and 2.92±0.13 cm respectively. Back fat thickness of and dressing percentage is comparable with other indigenous pigs indicating that this pig breeds can reared for quality pork production.

The present study revealed that Burmese black pig has scattered distribution in four northeastern states however the population density is very less as compared to other local pig breeds available in this region. The productive and reproductive performances of Burmese black pigs indicates that under north eastern agro-climate this pigs have better growth rate and litter performance with comparable carcass characteristics. However, pre weaning and post weaning mortality percentage is very higher as compared to other local pigs resulting heavy economic loss of the farmers that divert the interest of the farmers in rearing other local pigs than Burmese black pigs. Moreover, introduction of superior exotic pigs and unrestricted cross breeding for better productivity leading to decrease their population numbers becomes a potential threat for the their survival in near future. Therefore, the information on population structure and performance of Burmese pigs can be utilized as a base line data for implementation of suitable community based

conservation strategies and breeding policies for the breed in different states of North east region of India.

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Conflict of interest declaration
The authors declare that there is no conflict of interest for this study.

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