



## Reproductive attributes of local pig (Votho) of Nagaland, India

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### ABSTRACTS

The present study was conducted to measure the reproductive attributes of Naga local pigs (Votho) in Kohima, Peren and Phek district of Nagaland. The reproductive parameters were measured through field survey and reproductive records of owner. The reproductive parameters such as age at first fertile service (AFFS), age at first farrowing (AFF), gestation length, farrowing interval, litter size at birth, litter size at weaning, litter weight at birth, litter weight at weaning, mortality rate and stillbirth rate were measured. The result revealed that there was a significant difference among the different districts of Nagaland in AFFS, AFF and litter weight at birth. Parameters such as AFFS, AFF and litter weight at birth were significantly higher and gestation length, farrowing interval, litter size at weaning, litter weight at birth, litter weight at weaning were non-significantly higher in Kohima than in Peren and Phek District. Similarly, parameters such as litter size at birth, mortality rate were non-significantly higher in Peren district and stillbirth was non-significantly higher in Phek district than other districts of Nagaland. These reproductive attributes analyses may be useful in selection of breeding stock for future parents and select the place for breeding programme for indigenous local Naga pigs.

**Key words:** Districts of Nagaland, Naga local indigenous pigs, Reproductive attributes.

### INTRODUCTION

Pig production is relatively remunerative due to fast growth rate, short generation interval and high production potential, prolific fecundity, highly efficient carcass yield and high adaptability to varied environmental conditions (Holness, 1991). The pig especially indigenous one is well adapted and tolerable to various tropical environments with high temperature and relative humidity. Further, the indigenous pigs are natural scavengers, size of medium to large with poor reproductive as well as productive performance and somewhat semi-wild in their behaviour. The indigenous pigs possess good mothering ability and usually become aggressive during farrowing. Even though low in growth performance, Naga local indigenous pigs are highly preferred by rural families to supplement protein intake and family income. Swine production is particularly important in the North Eastern Region as compared to the rest part of the country. Nearly 60 per cent of the pork produced in India is consumed in Nagaland while the rest of the North Eastern States consumes about 30 percent. Only 10 per cent of the pork is consumed by the rest of the people in the country (Chandy, 1986).

In spite of high and ample scope for swine development in the state, no proper and systematic study has been reported on the productive and reproductive performances of these animals though the native types still represent a valuable component of local genetic resources (Subalini *et al.*, 2010). Stray attempts have been reported

and some endeavors have been made through the piggery development schemes to improve the animals by crossing with the exotic pigs. Nevertheless, to determine the status of the local pigs, it is essential to have certain basic information on the reproductive characters of the indigenous local pigs. Therefore, the present experiment was designed with the objective to study the reproductive attributes of indigenous local Naga pigs to enhance the selection of this indigenous pig to increase population in its native home tract.

### MATERIALS AND METHODS

The present study was conducted in the three districts *viz.* Kohima, Peren and Phek district of Nagaland. Relevant information and data regarding the reproductive performance of indigenous pigs, required for the experiment were collected through field survey and reproductive records from farmers of the three district of Nagaland. The required data were collected after thorough and proper identification and markings of the animals of the respective farmers of the different locations of different villages of the districts. Each unit consisted of 30 gilts at the age of 4-5 months were initially selected to form parental stock for the present study. Data pertaining to 630 progenies and 90 dams were utilized to study the reproductive traits of indigenous pigs in Nagaland. The informations were collected from the 720 animals. The reproductive parameters such as age at first fertile service (days), age at first farrowing (days), gestation length (days), farrowing interval (days), litter size

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at birth (nos.), litter size at weaning (nos.), litter weight at birth (kg), litter weight at weaning (kg), mortality rate (%) and stillbirth rate (%) were measured (Table 1). All the measurements were carried out by the same person in order to avoid between individual variations. The experimental animals were maintained in the backyard with no history of cross breeding were considered for the study through field survey.

The statistical analysis of the data was done as per standard procedures (Snedecor and Cochran, 1994). The data recorded in percent values were subjected to angular transformation before the analysis. Analysis of variance (ANOVA) was performed using a generalized liner model (Statistical Analysis System for Windows, SPSS (Version 10) Inc., Chicago, Illinois, USA) and treatment means were separated using Student–Newman-Kuels (SNK) multiple range test. Tables present the non-transformed data. The data was tested for normality and the percent data was transformed by arcsine transformation before proceeding to General linear model. Differences with values of  $p < 0.05$  or  $p < 0.05$  were considered to be statistically significant after arcsine transformation of percentage data.

## RESULTS AND DISCUSSION

The result revealed that there was a significant difference among the different districts of Nagaland in AFFS, AFF and litter weight at birth. Parameters such as AFFS, AFF and litter weight at birth were significantly higher and gestation length, farrowing interval, litter size at weaning, litter weight at birth, litter weight at weaning were non-significantly higher in Kohima than in Peren and Phek district. Similarly, parameters such as litter size at birth, mortality rate were non-significantly higher in Peren district and stillbirth rate was non-significantly higher in Phek district than other two district of Nagaland.

**Age at first fertile service:** The analysis of variance showed significant ( $p \leq 0.05$ ) difference for AFFS with difference in locality in different districts. The result revealed animals belonged to Kohima had significantly maximum AFFS and Peren district has minimum. The present observation was in agreement with Das and Karunakaran (2000-03). However, Bhowal (1992), Chauhan *et al.* (1994), Kalita (1995), Jogi (1995), Raju (1998) and Phookan (2002) had reported more number of days for age at first fertile service in Indigenous pigs. Babu *et al.* (2004) recorded age at first heat as 176.67 days. The difference in the age at first fertile service may be attributed to the genetic variation among the indigenous pigs in different geographical region, differences in level of nutrition, social environment, body weight, season of the year, breed, disease or parasitic infestation combine with the system of managemental practices.

**Age at first farrowing:** On statistical analysis, the differences between the localities showed significant difference ( $p \leq 0.05$ ) for age at first farrowing among three district of indigenous pig of Nagaland. The pigs of Kohima had significantly more number of days for AFF as compared to Peren and Phek districts. Das and Karunakaran (2000-03) observed similar result with the present investigation. Contrary, higher values were reported by Das and Mishra (1992), Jogi (1995), Singh and Devi (1997), Raju (1998) and Phookan (2002) for AFF days in local pigs. Chauhan *et al.* (1994) reported comparatively higher age at first farrowing for the indigenous pigs. Similarly, Bendanganger *et al.* (2008) reported comparatively lower age at first farrowing for the indigenous pigs.

**Gestation length:** The analysis of variance of gestation length of the pigs indicated no significant effect between the pigs among the different districts. The mean gestation length of indigenous pigs belong to Kohima, Peren and Phek

**Table 1:** Reproductive attributes of local pigs (Votho) of Nagaland.

Traits	Description
Age at first fertile service in gilt	The total number of actual days from the date of birth to the date of first fertile service
Age at first farrowing	The actual days from the date of birth to the date of first farrowing
Gestation Length	The sum total number of days from the date of mating to a gilt/sow till the piglets were born (pregnancy period)
Farrowing Interval	Total number of actual days between the intervals of two farrowings (from the day of one farrowing till the day of next farrowing)
Litter size at birth	Total number of piglets born for each individual female in a farrowing
Litter size at weaning	Number of piglets weaned after completion of 8 weeks (60 days) was recorded and the total number of live piglets weaned in a litter was included in the present study.
Litter weight at birth	The sum total weight of piglets in a litter at farrowing by weighing the total born piglets by placing them in pre weighed bag. The former weight was subsequently subtracted from the later weight to express the weight of animal in grams
Litter weight atweaning	Sum total body weight on the basis of alive piglets in a litter at weaning
Stillbirth	The piglets which were expelled dead at birth were designated as still birth. The percentage for still birth was calculated as the number of stillborn piglets divided by the total number of piglets born multiplied by one hundred
Mortality rate	The percent mortality was calculated as number of dead piglets till weaning divided by the total number of piglets born multiplied by one hundred

**Table 2:** Variation (Mean  $\pm$  SE) and analysis of variance for reproductive attributes in Indigenous pigs of Nagaland

Parameters	Kohima	Peren	Phek	Average	P value
AFFS (days)	184.94 $\pm$ 2.06	177.41 $\pm$ 1.98	184.55 $\pm$ 2.10	182.3 $\pm$ 2.04	*
AFF (days)	301.18 $\pm$ 2.03	293.38 $\pm$ 1.98	300.50 $\pm$ 2.08	298.35 $\pm$ 2.03	*
Gestation Length (days)	116.27 $\pm$ 0.17	115.97 $\pm$ 0.20	115.94 $\pm$ 0.22	116.06 $\pm$ 0.19	—
Farrowing Interval (days)	151.72 $\pm$ 2.24	148.88 $\pm$ 2.42	149.38 $\pm$ 2.43	149.99 $\pm$ 2.36	—
Litter size at birth (nos.)	6.20 $\pm$ 0.40	6.60 $\pm$ 0.34	6.06 $\pm$ 0.39	6.28 $\pm$ 0.37	—
Litter Size at weaning (nos.)	5.40 $\pm$ 0.38	5.20 $\pm$ 0.34	5.00 $\pm$ 0.29	5.2 $\pm$ 0.33	—
Litter weight at birth (Kg)	2.02 $\pm$ 2.12	1.97 $\pm$ 1.20	1.75 $\pm$ 2.45	1.91 $\pm$ 1.92	**
Litter weight at weaning (kg)	26.02 $\pm$ 3.06	25.98 $\pm$ 2.18	24.82 $\pm$ 2.40	25.60 $\pm$ 2.54	—
Stillbirth (No. per sow)	0.20 $\pm$ 0.10	0.46 $\pm$ 0.16	0.26 $\pm$ 0.18	0.30 $\pm$ 0.14	—
Mortality (No. per sow)	0.46 $\pm$ 0.13	0.93 $\pm$ 0.18	0.73 $\pm$ 0.15	0.70 $\pm$ 0.15	—

\* represents significant difference ( $p \leq 0.05$ ) and \*\* represents highly significant difference ( $p \leq 0.01$ )

localities were found to be  $116.27 \pm 0.17$ ,  $115.97 \pm 0.20$  and  $115.94 \pm 0.22$  days, respectively. The gestation length in the present study was in good range with Irgang and Robinson (1984). However, Das and Karunakaran (2000-03) observed higher value than the present observation. The difference may be due to disparity in the management system and the different climatic condition of the geographical location.

**Farrowing interval:** The farrowing interval in indigenous pigs of Nagaland belonging to Kohima, Peren and Phek were showed no significant difference. The observation was in agreement with Irgang and Robinson (1984) and comparable with Shostak *et al.* (1990). Nevertheless, the present observation revealed higher findings compared with Das and Karunakaran (2000-03).

**Litter size at birth:** The variation in litter size at birth of the Indigenous pigs of Nagaland among the different districts indicated no significant effect. The average litter size at birth was in good range with Singh *et al.* (1990), Bhowal (1992), Mukhopadhyay *et al.* (1992) and Singh and Devi (1997). However, the present finding observed higher value than the reports of Deka (1988), Shylla (1988), Kumar *et al.* (1990), Miachie-o (1991) and Kalita (1995). Contrary, it was found as lower than the reports of Dhingra (1987), Jogi (1989), Lakhani and Bhadouria (1991) and Chauhan *et al.* (1994). Similar value was reported in Indian indigenous pigs under unorganized farm (Bendanganger *et al.*, 2008). But Babu *et al.* (2004) reported higher average litter size at birth. Factors like type of pigs, management practices, mortality rate and prevalent of climatic condition might be the reasons for this variation.

**Litter size at weaning:** Locality did not exert significant effect on litter size at weaning in indigenous pigs of Nagaland. Litter size at weaning in present study was within the reported range of Mishra *et al.* (1985), Miachie-o (1991) and Bhowal (1992). However, comparatively higher average litter size at weaning was reported by Sharda and Singh (1982), Dhingra (1987), Jogi (1995) and Chauhan *et al.* (1994); lower values by Raina (1982-83), Deka (1988), Lakhani and Bhadouria (1991), Shylla (1988), Kumar *et al.*

(1990), Singh *et al.* (1990), Das and Mishra (1992), Mukhopadhyay *et al.* (1992), Kalita (1995) and Singh and Devi (1997).

**Litter weight at birth:** Statistical analysis of variance revealed that the locality of pig rearing had a significant ( $p \leq 0.01$ ) effect on litter weight at birth, Kohima district had significantly higher litter weight than districts of Peren and Phek. Das and Karunakaran (2000-03) reported almost similar litter weight at birth and also comparable with the finding of Singh *et al.* (1990). Nevertheless, Dhingra (1987), Shylla (1988), Das and Mishra (1992), Mukhopadhyay *et al.* (1992), Chhabra *et al.* (1996) and Singh and Devi (1997) reported relatively higher values. The difference in the litter weight at birth and weaning may be attributed to genetic differences in indigenous pig of different region and also the differences in the management system.

**Litter weight at weaning:** The locality showed no significant effect on litter weight at weaning in indigenous pigs of Nagaland. Litter weight at weaning of Indigenous pigs of Nagaland was in good agreement with the values as reported by Singh and Devi (1997). The average litter weight at weaning however, comparatively found lower than the observations made by Dhingra (1987), Jogi (1989), Mishra *et al.* (1990), Bhowal (1992), Das and Mishra (1992), Chauhan *et al.* (1994), Kalita (1995) and Chhabra *et al.* (1996) and higher values than the reports by Singh *et al.* (1990) and Mukhopadhyay *et al.* (1992).

**Still birth:** The analysis of variance of still birth showed no significant effect on localities in indigenous pigs of Nagaland. The present observation was in good agreement with the reports of Gupta *et al.* (1982). However, the present study revealed lower values as compared to the observation of Raju (1998) in pre-partum still births percent of 9.52%. Contrary, it was higher than the reports of Svendsen (1980) and Shrestha *et al.* (1984).

**Mortality rate:** Locality indicated no significant effect on mortality rate in indigenous pigs of Nagaland. Mishra *et al.* (1985), Mishra (1987) and Deka (1988) observed higher mortality percent than the present study. The disparity in the

mortality rate might be attributed to the differences in system of management and prevailing diseases.

### CONCLUSION

Naga local indigenous pig has the potential to be developed in order to contribute significantly to the indigenous pig industry based on their positive qualities

such as a valuable source of meat and secondary income to the rural household economy, the hardiness and adaptability to harsh management conditions. Reproductive attributes analyses may be useful in selection of breeding stock as the future parent stock for higher pork production.

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