Indian Journal of Animal Sciences **90** (6): 934–936, June 2020/Article
https://doi.org/10.56093/ijans.v90i6.105008

Reproductive attributes of Hampshire, Gunghroo, Large Black and Tenyi Vo (local Naga Pig) under intensive management system in subtropical condition of Nagaland

MAHAK SINGH*, R TALLIMOA MOLLIER, and ROMEN SHARMA

ICAR Research Complex for NEH Region, Nagaland Centre, Medziphema, Nagaland 797 106 India

Received: 10 August 2019; Accepted: 1 October 2019

ABSTRACT

Different reproductive attributes, viz. age at puberty, age at first mating, age at farrowing, litter size at farrowing, litter size at weaning, gestation period, weaning to estrus interval (WEI) and pre-weaning mortality were comparatively analysed in different breeds under intensive management system. Age at puberty, age at first mating and age at farrowing was significantly lower in Tenyi Vo pig compared to others breeds. Mean age of puberty varied from 185 days to 284 days. Age at first mating was recorded from 226 days in local Naga pig to 323 days in Hampshire. Age at first mating and age at first farrowing was significantly higher in Hampshire and Gunghroo breed as compared to Large Black and Tenyi Vo. Mean litter size at farrowing and weaning varied from 5 to 12 and 5 to 10, respectively. Litter size at farrowing and weaning was significantly higher in Large Black pig as compared to other breeds. Mean gestation period varied from 112 days in Gunghroo to 116 days in Tenyi Vo breed which differ significantly ($P<0.05$). WEI was significantly higher in Large Black compared to other breeds. Pre-weaning mortality was highest in Tenyi Vo breed (32%) and lowest in Hampshire breed (13%). In the present study, reproductive performance of Large Black, Gunghroo and Hampshire breed was recorded to be superior to Tenyi Vo pig. Also, reproductive performance of Large Black was better than other breeds.

Keywords: Gunghroo, Hampshire, Intensive management, Large Black, Reproductive performance, Tenyi Vo

Among the meat-producing animals, pig occupies a unique position in the Nagaland, as pig rearing is socio-culturally intermingled with the livelihood of tribal people of the region (Das and Bujarbaruah 2005). Among different species of livestock reared by tribals of Nagaland, pig alone accounts for 55.38% of total livestock population. Pig is most important livestock which plays an integral role in improving the economic status of the tribal and weaker section of the Nagaland (Patra *et al*. 2014, Singh and Mollier 2016). Per capita consumption of pork is highest in Nagaland as compared to other states in India. This region is inhabited by tribal population who are mostly non-vegetarian and hence, the demand for animal protein is very high (Kumaresan *et al*. 2006). Out of the total pig population, 75.59% are crossbreed while 24.41% are indigenous breeds. Almost every rural household has a small piggery unit, but still a wide gap exists between the demand and availability of pork. However, due to indiscriminate breeding the genetic potential of the swine population has become unpredictable and warrents an urgent need to introduce and supply improved germplasm in the state (Singh *et al*. 2018). The major reason for low productivity of pig production system in Nagaland are indiscriminate breeding, inbreeding, non-availability of good germplasm and lack of balance feeding which leads to poor growth rate and hence their production is hardly adequate for the fast growing population. Hence, the need for promoting fast growing pig breeds like Hampshire, Large Black and Gunghroo and their crossbreed became inevitable. There is no information available on the reproductive performance of these exotic pigs breed under Nagaland conditions. The present investigation was envisaged to study the reproductive performance of Hampshire, Gunghroo and Large Black in comparison with that of Tenyi Vo (local Naga/Votho) pigs under intensive management conditions in Nagaland.

MATERIALS AND METHODS

The present investigation was conducted at pig research farm, ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapanui, Medziphema at latitude of 25°45′ N, longitude of 93°50′ E and altitude of 281 meters at mean sea level. Reproductive performance of 71 sows of four different breeds (Hampshire, Gunghroo, Large Black and Tenyi Vo) were collected between 2016 to 2018 and analysed for the present study. Reproductive performance of sows were recorded in terms of following parameters, i.e. age at puberty, age at first mating, age at farrowing,

*Corresponding author e-mail: mahaksinghivri@gmail.com

litter size at farrowing, litter size at weaning, gestation period, weaning to estrus interval (WEI) and pre-weaning mortality. Artificial insemination was done in Hampshire, Gunghroo and Large Black whereas in Tenyi Vo natural mating was done. Weaning was done at age of 45 days. Data were analysed by one way ANOVA using SPSS 19.0 packages for comparing the mean. All data were presented as mean±S E. The difference of mean values for all data analysed with $P < 0.05$ was considered as significant.

RESULTS AND DISCUSSION

The reproductive performance of different breeds is presented in Table 1. In the present study, reproductive performance of Large Black, Gunghroo and Hampshire breed was recorded to be superior to Tenyi Vo pig in terms of litter size. Age at puberty, age at first mating and age at farrowing was significantly (P<0.05) lower in Tenyi Vo pig compared to others breeds of pig. Age at puberty was significantly (P<0.05) higher in Hampshire breed. Mean age of puberty varied from 185 days to 284 days. Age at first heat was recorded 190.38±4.38 days and 210.5±2.42 days in Ghungroo and Niang-Megha pigs, respectively (Sahoo *et al*. 2012). Present finding of early sexual maturity in indigenous breeds is in accordance with the earlier study that indigenous pigs attained puberty and sexual maturity earlier than exotic breeds mainly due to their adaptation to the native climatic condition (Kumaresan *et al*. 2007; Gokuldas *et al*. 2015).

Age at first mating was recorded from 226 days in Tenyi Vo to 323 days in Hampshire. Age at first mating was significantly (P<0.05) higher in Hampshire and Gunghroo breed as compared to Large Black and Tenyi Vo. Mean age at farrowing was recorded from 342 to 437 days. Age at first farrowing were significantly (P<0.05) higher in Hampshire and Gunghroo breed as compared to Large Black and Tenyi Vo. Age at first mating and age at first farrowing was recorded to be significantly (P<0.05) higher in Large Black as compared to Tenyi Vo. Local Naga pig is shy in nature and mating mostly takes place at night. Also, the male piglets attain early sexual maturity and are able to do mating at the age of four months approximately. Genetic factors have been considered to responsible for early gonadal development, puberty and sexual maturity in indigenous breed. Gokuldas *et al*. (2015) reported similar findings in Gunghroo and Hampshire breed. Chusi *et al.* (2016) reported 182 days of age at first fertile service and 298 days of age at first service in local Naga Pig in the field condition which is lower as compared to finding in present study. The difference may be due to different location and poor record keeping by farmers. Borkotoky *et al*. (2014) reported age of sexual maturity in male and female Naga local pigs 92.33±11.2 days and 248.12±34.2 days, respectively. Kumaresan *et al*. (2008) reported that the non-descript local male pigs of Mizoram could mate and impregnate the females as early as 108.8±8.0 days of age.

Mean litter size at farrowing and weaning varied from 5 to 12 and 5 to 10, respectively, in the present study. Litter size at farrowing and weaning was significantly (P<0.05) higher in Large Black pig as compared to other breeds. Significantly (P<0.05) lower litter size were recorded in Tenyi Vo and Hampshire breed compared to other two breeds. Also, in Tenyi Vo pig, litter size at farrowing and at weaning was significantly (P<0.05) lower than other breeds. Chusi *et al*. (2016) reported higher litter size at birth as well as weaning in Naga Pig compared to finding in present study. This may be due to type of pigs, age of pigs, management practices, mortality rate and prevalent of climatic condition. Indigenous or local breed of pigs are known to have small litter size due to genetic factors coupled with body size and nutrition level offered to them in farmers field (Gokuldas *et al*. 2015; Singh *et al*. 2018). Similar results were reported by other researcher in exotic or crossbreed pig (Kumari *et al*. 2008; Saiprasanna *et al*. 2009).

Mean gestation period varied from 112 days in Gunghroo to 116 days in Tenyi Vo breed which differ significantly (P<0.05). Longer gestation period in Tenyi Vo breed compared to other breeds could be due to small litter size and coupled with genetic factors. Chusi *et al*. (2016) observed similar findings in local Naga pig. Dandapat *et al*. (2010) reported gestation period of 115.0±0.9 days in Mali pig of Tripura. Gokuldas *et al*. (2015) reported 113 to 116 days of gestation length in indigenous and crossbreed pigs.

Weaning to estrus interval was found to be significantly (P<0.05) shorter in Tenyi Vo breed compared to other

Table 1. Reproductive performance of Hampshire, Gunghroo, Large Black and Tenyi Vo female pigs (Mean±SE) under intensive management system in Nagaland

Parameter	Hampshire (n=20)	Gunghroo (n=20)	Large Black (n=20)	Tenyi Vo (n=11)
Age at puberty (days)	284.05±1.56^{a}	276.60±1.56^{b}	235.45±1.56^{c}	185.81±2.10^{d}
Age at first mating (days)	323.05±1.98^{a}	318.50±1.98^{a}	272.85±1.98^{b}	226.36±2.67^{c}
Age at farrowing (days)	437.15±2.0^{a}	431.10±2.0^{a}	388.40±2.0^{b}	342.81±2.70^{c}
Litter size at farrowing	5.85±0.26^{c}	9.75±0.26^{b}	12.85±0.26^{a}	4.54±0.35^{d}
Litter size at weaning	5.05±0.20^{c}	8.35±0.20^{b}	10.95±0.20^{a}	3.09±0.27^{d}
Gestation period (days)	114.10±1.94^{c}	112.60±1.94^{d}	115.55±1.94^{b}	116.45±0.26^{a}
Weaning to estrus interval (WEI) (days)	11.90±0.71^{a}	13.00±0.71^{a}	22.55±0.71^{b}	07.45±0.95^{c}
Pre weaning mortality (%)	13.67^{b} (16/117)	14.35^{b} (28/195)	14.78^{b} (38/257)	32.00^{a} (16/50)

Means bearing different superscript in a row differ significantly (P<0.05).

breeds. Result from present study revealed that WEI was significantly (P<0.05) higher in Large Black compared to other breeds. Longer WEI in Large Black pig may be due to large body size and large litter size at farrowing. Large litter size generally leads to higher milk secretion which has a negative impact on resumption of ovarian cyclicity. Weaning to estrus interval (WEI) is an important reproductive trait in pig production because longer WEI period increases maintenance costs and decreases overall reproductive efficiency. Reduced daily feed intake during lactation, inadequate estrus detection and sows farrowed in the summer often has an extended weaning-to-estrus interval (Gokuldas *et al*. 2015). Nutritional deficit and loss of back fat thickness during lactation has negative bearing on weaning to estrus interval, especially in primiparous sows (Skorjanc *et al*. 2008). Pre-weaning mortality was highest in Tenyi Vo breed (32%) and lowest in Hampshire breed (13%). Higher pre-weaning mortality in Tenyi Vo pig is mainly due to poor mothering ability and aggressive behavior of indigenous female pig particularly at the time of farrowing. Reproductive performance of the breeding herd is one of the key components in controlling the efficiency of swine production in most competitive and sustainable way. Higher reproductive efficiency is must for making pig production system profitable. Sub-optimal reproductive efficiency and poor genetic make up of the herd can result in low productivity and profitability.

Significant influences of different genetic groups on reproductive variables were observed. From the present study, conclusion may be drawn that reproductive performance of Hampshire, Large black and Gunghroo pig is better than Tenyi Vo breed of pig under intensive management system in sub-tropical condition of Nagaland. Large Black pig out-performed in terms of litter size at birth and litter size at farrowing compared to all other breeds. Naga local pig can be utilized in breeding programme for its hardiness and adaptability to harsh management conditions. Also, in term of reproductive performance, poor performance of Tenyi Vo breed as compared to other breeds warrants adoption and popularization of improved breed of pigs and their crosses in Nagaland for bridging the huge demand and supply gap of pork.

ACKNOWLEDGEMENTS

Financial support by ICAR, New Delhi through Mega Seed Project on Pig (PIMS Project code # 0XX01916) is duly acknowledged for carrying out this study.

REFERENCES

Borkotoky D, Perumal P and Singh R K. 2014. Morphometric attributes of Naga local pigs. *Veterinary Research International* **2**: 08–11.

Chusi Z, Savino N, Dhali A and Perumal P. 2015. Phenotypic morphometric parameters of indigenous pig of Nagaland. *Indian Journal of Animal Sciences* **85**(12): 1334–37.

Chusi Z, Savino N, Dhali A and Perumal P. 2016. Reproductive attributes of local pig (Votho) of Nagaland, India. *Indian Journal of Animal Research* **50**(6) : 862–66.

Das A and Bujarbaruah K M. 2005. Pig for meat production. *Indian Journal of Animal Sciences* **75**(12): 1448–52.

Gokuldas P P, Tamuli M K, Mohan N H, Barman K and Sahoo N R. 2015. A comparative analysis of reproductive performance of different pig breeds under intensive management systems in sub-tropical climate. *Indian Journal of Animal Sciences* **85** (9): 1042–45.

Kumaresan A, Bujarbaruah K M, Pathak K A, Chhetri B, Das S K, Das A and Ahmed S K. 2007. Performance of pigs reared under traditional tribal low input production system and chemical composition of non-conventional tropical plants used as pig feed. *Livestock Science* **107**: 294–98.

Kumaresan A, Hussain J, Ahmed S K, Pathak K A, Das A and Bujarbaruah K M. 2006. Growth performance of hampshire, large white yorkshire and mizo local pigs under mizoram field conditions. *Indian Journal of Animal Sciences* **76**(2): 148–50.

Kumari B P, Rao D S and Ravi A. 2008. Genetic and non-genetic factors affecting the litter traits in desi and crossbred pigs. *Indian Veterinary Journal* **85**: 170–72.

Murugan M, Mathew J, Sivakumar T and Gnanaraj P T. 2009. Effect of different feeding system on the performance of crossbred pigs. *Indian Journal of Animal Sciences* **79**(10): 1058–60.

Patra M K, Begum S and Deka B C. 2014. Problems and Prospects of Traditional Pig Farming for Tribal Livelihood in Nagaland. *Indian Research Journal of Extension Education* **14**(4): 6–11.

Saiprasanna J, Gnanaprakash M, Gupta B R and Mahender M. 2009. Genetic study on reproductive traits in crossbred pigs. *Livestock Research for Rural Development* **21**: 142–47.

Singh M and Mollier R T. 2016. *Pig Production Scenario in Nagaland: Current status and future prospective*, pp. 86–95. Stakeholder meets on Agriculture development and Agromet Advisory Services in Nagaland, ICAR Research Complex for NEH Region, Nagaland Centre.

Singh M, Mollier R T and Rajkhowa D J. 2018. Mega Seed Project on Pig and Poultry Seed. Project in the service of tribal farmer's of Nagaland for livelihood and income enhancement. *Souvenir for North Eastern Zone Regional Agri-Fair,* pp. 36–39.

Singh M, Sharma P R, Mollier R T, Ngullie E, Baisyha S K and Rajkhowa D J. 2019. Tribal farmers' traditional knowledge and practices of pig farming in Nagaland. *Indian Journal of Animal Sciences* **89**(3): 329–33.