



Productive and reproductive performances of desi pigs: A review

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ABSTRACT

The assessment of productive and reproductive performances of pig breeds have been done in different countries of the world. However, the same study for indigenous or so called desi pigs in different parts of India is limited. It is now believed that the study of some productive and reproductive traits is most essential to evaluate the potentiality of these indigenous pigs. In India, only limited studies on productive and reproductive traits have been carried out on indigenous pigs that too detailed studies have been done only in three recognised pig breeds namely Ghungroo, Niang-Megha and Agonda Goan. The desi pigs are having very sound reproductive efficiency and medium production potential. These characteristics of desi pigs are very much suitable to the small pig farmers with low input production system for livelihood and sustainable pig farming. These productive and reproductive analyses will be useful in the selection of breeding stock for future parent generation.

Key words: Desi pig, Farming, Livelihood, Productive, Reproductive, Sustainable.

INTRODUCTION

Pig rearing is one of the most important occupations of rural poor and weaker sections of the society especially among the tribal masses of India. It directly influences the socio-economic status as it acts as an insurance coverage for the down trodden and socially weaker section of the society. It also generates employment to the educated unemployed youth. The contribution of livestock sector to the national economy in terms of GDP is 4.1% at current prices in 2012-13 (BAHS 2014). Presently, livestock sector accounts for 26.02% to the Agricultural GDP. Over the last two decades, livestock sector has grown at annual rate of 5.6%, which is higher than the growth of the agricultural sector (3.3%). The scenario of piggery sector in India is not so popular. It is restricted to some pockets of area. Increased demand for pork and pork products like sausage, bacon etc. is the strength for economic upliftment of the pig growers. Pig is considered as the richest source of animal protein at a lower cost for the people who consume pork. About 7.837 million of the total pigs of the country are non-descript indigenous and the rest 2.456 million are exotic or crossbreed (BAHS, 2014).

Indigenous pigs in India show diverse and positive productive and reproductive performance which indicates their potential for improvement. There has been no thorough investigation carried out to evaluate the performance of indigenous pig in spite of the fact that they continue to thrive under poor management in a harsh climate (Subalini *et al.*,

2010; Borkotoky *et al.*, 2014). There is no planned breeding program for indigenous pigs and as a result the native pig population is decreasing gradually. But, despite decreasing trends in populations these native types still represent a valuable component of local genetic resources (Subalini *et al.*, 2010). The evaluation of reproductive parameters of such desi pigs is useful in the selection of breeding stock for future parents. Though desi pig has much genetic potential but there has been no thorough investigation carried out to study their reproductive performances in a systematic manner. The present study is therefore, an attempt to evaluate the productive and reproductive potential of these precious indigenous or desi pigs of India. Some of the related findings of research carried out in the country or elsewhere are reviewed in this section. To make it easy and clear, the review is sub-divided into several sections.

Age of puberty: It is defined by the presence of spermatozoa in ejaculate, ability to mate and impregnate females (Cheng, 1983; Wang, 1990 and Kumaresan *et al.*, 2008). Age of puberty in desi pigs is noticed quite earlier than the exotic and crossbred (Naskar *et al.*, 2006 and Kumaresan *et al.*, 2007). It varies from 2-9 months. Sahoo *et al.*, (2012) reported that age at first heat to be 190.38 ± 4.38 days and 210.5 ± 2.42 days in Ghungroo and Niang-Megha pigs, respectively. But, Gokuldas *et al.*, (2015) reported a little higher age at puberty as 7.8 ± 0.41 months, 9.85 ± 1.08 months and 7.86 ± 0.17 months for Ghungroo, Niang Megha and crossbred pigs, respectively. Meishan boars of China reach

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puberty as early as 75 days (Harayama *et al.*, 1991) whereas the European breeds reach puberty in 194–328 days (Ito *et al.*, 1944). Puberty in Taihu male pigs was reported to occur by three months of age (Cheng, 1983 and Wang, 1990). Early puberty in nondescript local pigs of Mizoram was reported as early as two months of age by Kumaresan *et al.*, (2008), Kato and Harayama, (1990) and Lunstra *et al.*, (1992). Genetic and other hormonal factors plays a crucial role in the early development of puberty.

Age of sexual maturity: It is determined by the age at first fertile service. The age of sexual maturity in indigenous male and female pigs varies from 3-4 months (Wang, 1990; Harayama *et al.*, 1991 and Kumaresan *et al.*, 2008) and 8-10 months, respectively. Borkotoky *et al.*, 2014 found age of sexual maturity in male and female Naga local pigs to be 92.33±11.2 days and 248.12±34.2 days, respectively. The early sexual maturity in indigenous male pig is due to faster testicular growth (Kumaresan *et al.*, 2008 and Rohilla *et al.*, 2000) as compared to crossbred like Landrace X desi, Hampshire and LWY pigs, *etc.* Kumaresan *et al.*, 2008 reported that the nondescript local male pigs of Mizoram could mate and impregnate the females as early as 108.8±8.0 days of age. He also explained that early sexual maturity in nondescript local male pig was because of an inherent phenomenon and mainly due to genetic factors but not due to feeding of different feeds and fodders (Kumaresan *et al.*, 2006). But on the contrary, Gokuldas *et al.*, (2015) reported that age at first fertile service were earlier in crossbred sows (8.94±0.16 months) than the des pigs like Ghungroo (9.3±0.43 months) and Niang Megha (10.96±1.09). Sahoo *et al.*, (2012) also reported age at first fertile service as 235±5.21 days and 241.3±2.25 days in Ghungroo pig and Niang Megha pigs, respectively. Hossain *et al.*, 2011 reported that the average ages at sexual maturity in Bangladeshi boar and sow were 8 and 6 months, respectively. The variation in age of sexual maturity might be due to various reasons like differences in their level of nutrition, adverse social environment, non-uniform body weight, different season of the year, breed differences, disease or parasitic infestation

and other managerial practices adopted (Borkotoky *et al.*, 2014).

Weaning to estrus interval (WEI): WEI is very crucial for the next cycle of reproductive life. Generally, delay in WEI is observed more pronounced in primiparous as compared to multiparous sows (Gokuldas *et al.*, 2015). System of breeding, weaning and knowledge of reproduction greatly affects WEI.

Age of first farrowing: The age of first farrowing (AFF) range from 9-12 months. The lowest being reported by Subalini *et al.*, 2010 on village pig in Sri Lanka as 9.50 ± 2.61 months. Ritchil, 2014 also found a moderate age at first farrowing as 10.43±0.08 months. The age of first farrowing was reported as 12.67±5.51 months in Naga local pig (NLP) and 12.11±2.51 months in nondescript local pig of Mizoram by Borkotoky *et al.*, (2014) and Kumaresan *et al.* (2007), respectively. Lemus *et al.*, (2003) conducted an experiment on Mexican Native Pigs and reported that the average age at first farrowing of pig was 547.65 days. 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. The different age at farrowing reported by other researchers are mentioned in Table 1. Rearing system and managerial conditions associated with it greatly influence age of first farrowing.

Farrowing interval (FI): The Farrowing interval or inter farrowing period range from 5-10 months in desi pigs. The average farrowing interval of native pigs in Bangladesh was found to be 6.09 ±0.02 months (Ritchil *et al.*, 2014). Borkotoky *et al.*, (2014) reported that farrowing interval in Naga local pig was 304.90±103.20 days which is little higher than the reports of other researchers. But, Dandapat *et al.* (2010) reported less farrowing interval in Mali pig of Tripura as 178.5±0.9 days In addition to these, the different findings related to farrowing interval by different researchers mentioned in Table 2. Traditional weaning of piglets affects FI.

Table 1: Age at first farrowing in desi pigs

Breed	Age at first farrowing (months /days)	References
Khasi local pig	367.47 ± 8.32 days	Bujarburuah, 2006
Non descript local pig of Mizoram	12.11±2.51 months	Kumaresan <i>et al.</i> , 2007
Mali pig	281.4±1.6 days	Dandapat <i>et al.</i> , 2010
Sri Lanka village pig	9.50±2.61 months	Subalini <i>et al.</i> , 2010
Ghungroo pig	303.33 ± 4.41 days	Sahoo <i>et al.</i> , 2012
Niang Megha pig	355.25±2.25 days	Sahoo <i>et al.</i> , 2012
Dome pig	368±1.537 days	Khargharia <i>et al.</i> ,2014
Niang-Megha pig	347.813±3.516 days	Khargharia <i>et al.</i> ,2014
Nagaland local pig (NLP)	12.67 ± 5.51 months	Borkotoky <i>et al.</i> , 2014
Bangladesh desi pig	10.43±0.08 months	Ritchil <i>et al.</i> , 2014
Ghungroo	13.1±0.65 months	Gokuldas <i>et al.</i> , 2015
Niang megha	14.76±0.32 months	Gokuldas <i>et al.</i> , 2015

Table 2: Farrowing interval in desi pigs

Breeds	Farrowing interval(months/days)	References
Puawska pigs	194-206 days.	Kamyk <i>et al.</i> , 2001
Khasi local pig	194.52 ± 9.47 days	Bujarbaruah, 2006
Non-descript local pig of Mizoram	8.23 ±0.20 months	Kumaresan <i>et al.</i> , 2007
Mali	178.5±0.9 days	Dandapat <i>et al.</i> , 2010
Sri Lanka village pig	8.91±2.49 months	Subalini <i>et al.</i> , 2010
Ghungroo	169± 4.88 days	Sahoo <i>et al.</i> , 2012
Niang Megha	207.05± 8.16 days	Sahoo <i>et al.</i> , 2012
Sikkim local pig	196.27±8.37 days	Nath <i>et al.</i> , 2013
Dome	213.533±0.396 days	Khargharia <i>et al.</i> , 2014
Niang-Megha	206.121±0.785 days	Khargharia <i>et al.</i> , 2014
NLP	304.90±103.20 days	Borkotoky <i>et al.</i> , 2014
Bangladeshi desi pig	6.09±0.02 months	Ritchil <i>et al.</i> , 2014
Ghungroo	7.2±0.19 months	Gokuldas <i>et al.</i> , 2015
Niang megha	7.18±0.3 months	Gokuldas <i>et al.</i> , 2015

Farrowing index and farrowing rate: Gokuldas *et al.*, 2015 reported that crossbreds had a higher farrowing index value of 2.01 while indigenous breeds had a relatively lower average farrowing index as 1.72 (Ghungroo) and 1.71 (Niang Megha). Besides, Gokuldas *et al.*, 2015 reported farrowing rate as 80.95% and 83.42% in Ghungroo and Niang Megha pigs, respectively.

Gestation period: The gestation period varies from 111-117 days in desi pigs. Khargharia *et al.*, (2014) reported that gestation period in Niang-Megha and Dome were 111.848±0.136 days and 112.044±0.295 days, respectively, which is relatively lesser than the other desi pigs reported by others researchers. Gokuldas *et al.*, (2015) reported gestation period of 113.8±0.16 days in Ghungroo and 14.5±0.19 days in Niang-Megha. Similarly, Ritchil *et al.*, (2014), Nath *et al.*, (2013) and Dandapat *et al.*, (2010) reported gestation period of 115.35±0.50 days in Bangladeshi desi pig, 114.83±0.22 days in Sikkim local pig and 115.0±0.9 days in Mali pig of Tripura, respectively.

Generation interval: It is time period from the birth of the animal till the age of its age at first farrowing. Gokuldas *et al.*, (2015) and Sahoo *et al.*, (2012) reported the generation interval of 13.3±0.43 months and 393.25±5.01 days in Ghungroo; 15±1.08 months and 443.12±3.05 days in Niang-megha pigs, respectively.

Individual pig weight at birth (kg): The individual pig weight at birth varies from 0.4-0.9 kg in desi pigs. Nath *et al.*, (2013) Kumaresan *et al.*, (2007), Bujarbaruah, (2006) and Sahoo *et al.*, 2012 reported that Individual pig weight at birth to be 0.49±0.31(kg) in Sikkim local pig, 0.86 ± 0.08 kg (Mizoram non-descript local pig), 0.485 ± 0.23 (Khasi Local) and 0.96±0.02 kg in Ghungroo pig and 0.64 ± 0.02 kg in Niang megha, respectively.

Individual pig weight at weaning (kg): The individual pig weight at weaning range from 4-9 kg in desi pigs. Kumaresan *et al.*, (2007), Bujarbaruah, (2006), Nath *et al.*, (2013) and

Sahoo *et al.*, (2012) reported individual pig weight at weaning to be 4.87±0.28 (Mizoram local), 4.97 ± 0.21 (Khasi Local), 4.90±0.33 (Sikkim local), and 7.08±0.25 kg in Ghungroo pig and 5.47±0.13 kg in Niang-Megha, respectively.

Litter size at birth: The litter size at birth varies from 4-10 in desi pigs. Gokuldas *et al.*, (2015) reported litter size at birth was significantly higher in Ghungroo (8.7±0.25) and crossbreds-HS × GH- 8.5±0.48 and HS × NM - 8.2±0.55 in comparison to other groups, Niang Megha (6.34±0.26). Nath *et al.*, 2013 also reported the litter sizes at birth of Sikkim local pig as 4.3±0.45. Kumaresan *et al.*, 2007 reported that the litter size at birth varied from 7.40±0.40 in nondescript local pigs to 10.44±0.59 in LWY pigs. Sahoo *et al.*, (2012) reported litter size of 10.02±0.35 and 6.5± 0.21 in Ghungroo and Niang-Megha pig of Meghalaya, respectively. Khargharia *et al.*, 2014 also reported litter size of 6.250±0.237 and 6.080±0.219 in Meghalaya Dome and Niang-Megha pig of Meghalaya, respectively. Similarly, Borkotoky *et al.*, (2014), Sahoo *et al.*, (2012), Nath *et al.*, 2013, Dandapat *et al.*, (2010), Bujarbaruah, (2006) and Bendanganger *et al.*, (2008) reported litter size of 5.80±2.30, 6.5± 0.21, 4.3±0.45, 5.50 ± 0.49 and below 6 in Nagaland local pig (NLP), Niang-Megha pig of Meghalaya, Sikkim local pig, Mali pig of Tripura, Khasi local pig and in indigenous pigs of India, respectively. Since, the desi pigs are mostly reared under scavenging system, they encounter adverse environmental conditions and this has tremendous impact on litter size.

Litter size at weaning: The litter size at weaning range from 2-12 in various desi pigs. Prakash *et al.*, (2008) reported that the average litter size of indigenous pig was 6.78±0.11. Rajiv and Pandey, (2000) conducted an experiment on economics of pig rearing in Haryana and reported that the average litter size was 8. The lowest litter size at weaning was reported by Nath *et al.*, (2013) as 2.79±0.24 in Sikkim local pig and the highest being reported by Zaman *et al.*,

Table 3: Litter size at weaning

Breeds	Litter size at weaning	Reference
Khasi local	5 ± 0.51	Bujarbaruah, 2006
Non-descript local pig of Mizoram	5.20±0.66	Kumaresan <i>et al.</i> , 2007
Sri Lankan village pig	6.44±1.19.	Subalini <i>et al.</i> , 2010
Mali pig	8.6±0.4.	Dandapat <i>et al.</i> , 2010
Desi pig	8.40±0.32	Dimitrov <i>et al.</i> , 2010
Bangladeshi desi pig	9.5±0.28.	Hossain <i>et al.</i> , 2011
Ghungroo	8.2± 0.23	Sahoo <i>et al.</i> , 2012
Niang Megha	5.63± 0.42	Sahoo <i>et al.</i> , 2012
Ghungroo	9-12	Zaman <i>et al.</i> , 2013
Sikkimese local pig	2.79±0.24	Nath <i>et al.</i> , 2013.
Niang-Megha	5.4±0.29	
Dome	5.025 ± 0.21	Khargharia <i>et al.</i> , 2014
Niang-Megha	5.202 ± 0.19	Khargharia <i>et al.</i> , 2014
NLP	4.20 ± 1.90	Borkotoky <i>et al.</i> , 2014
Ghungroo	7.4±0.24	Gokuldas <i>et al.</i> , 2015

2013 as 9-12 in WB (Ghungroo pig). The rest findings are mentioned in the Table 3. Factors like type of pigs, management practices, mortality rate and prevalent of climatic condition affects the litter size at weaning (Borkotoky *et al.*, 2014).

Litter weight at birth: The litter weight at birth varies from 3-10 kg in desi pigs. Nath *et al.*, (2013), Kumaresan *et al.*, (2007) and Sahoo *et al.*, (2012) reported that the litter weight at birth as 3.00±0.45 kg (non-descript Sikkim local pig), 6.40±1.43 kg, and 9.5± 0.23 kg in Ghungroo pig, 4.23 ± 0.29 kg in Niang-Megha, respectively. Nutritional aspect before farrowing has significant effect on litter weight at birth.

Litter weight at weaning: The litter weight at weaning under different weaning system range from 15-50 kg in desi pig. Nath *et al.*, (2013), Kumaresan *et al.*, (2007) and Sahoo *et al.*, (2012) reported that litter weight at weaning (kg) as 15.14±2.13 (nondescript Sikkim local pig), 43.20 ±5.26 (non-descript Mizoram local pig), and 49.67± 2.15kg in Ghungroo pig and 28.46± 2.25 kg in Niang-Megha, respectively. Managemental and nutrition pre, during and post farrowing plays a significant role in the growth and development of piglets as well as dam.

Weaning period: The average weaning period of indigenous piglet range from 28-60 days under different managemental conditions. But, in some village pigs no weaning period is given, it is allowed for self weaning, what is known as natural weaning. Natural weaning in desi pig may range from 4-6 months. Ritchil *et al.*, (2014), Dandapat *et al.*, (2010) and Hossain *et al.*, (2011) reported weaning period that is

followed by the pig farmers as 44.88±0.37, 58.9±0.7 and 42, days in Bangladesh desi pig, Mali pig (Tripura) and Bangladesh desi pigs, respectively.

Pre-weaning mortality: Gokuldas *et al.*, (2015) found that the average pre-weaning mortality to be significantly lower in crossbreds with Hampshire-desi crosses having the lowest rate as 2.94%, Ghungroo-14.94% and Niang Megha-14.28%. Kumaresan *et al.*, (2007) also reported pre-weaning mortality as 29.73 % in nondescript local pig of Mizoram. Mortality in piglet is due to poor management, low nutrition and the failure to address the diseases, lack of hygiene and sanitation.

CONCLUSION

Desi pigs have the immense potential to be developed in order to contribute livelihood and sustainable pig farming. Desi pigs serve as a valuable source of protein, vitamins, minerals and secondary income source to the rural masses. The important traits i.e early sexual maturity and others, disease resistant, hardiness, adaptability to harsh climatic and management conditions and requirement of low input makes these desi pigs farming a best enterprise for the weaker sections of the society and to the progressive farmers as well. In the present scenario, the desi pig breeds are on the path of extinction. So, its multiplication has to be taken care off through proper breeding strategies. In this context, the production and reproduction attributes are to given special attention. Productive and reproductive analyses will be very useful in the selection of breeding stock for future parents and as important steps towards desi pigs conservation measures.

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