



E-ISSN: 2320-7078

P-ISSN: 2349-6800

[www.entomoljournal.com](http://www.entomoljournal.com)

JEZS 2021; 9(1): 1760-1763

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Received: 07-11-2020

Accepted: 09-12-2020

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## Comparative performance of graded Hampshire and Berkshire pig in Chandel district of Manipur

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### Abstract

**Background:** The present study was carried out at farmer's door with an objective to compare the performances of two genetic groups of pig in their agro-climatic conditions.

**Methods:** A total of 20 piglets of approximately 3 months old were distributed among 5 farmers. Pigs were maintained by farmers under intensive system with the provision of approximately 70% locally available feed and 30% supplemented ration in the form of concentrate mixture. Weaning of piglets was done at the age of 8 weeks. Body weight was recorded at monthly interval. Age at sexual maturity, age at first farrowing, litter size and weight at birth and at weaning were also recorded.

**Result:** Genetic group had significant effect on age at first farrowing (AFF) and litter weight at weaning. Significantly higher litter weight at weaning was recorded in graded Hampshire ( $82.60 \pm 2.77$  kg) than graded Berkshire ( $70.40 \pm 3.96$  kg). Similarly, significantly lower AFF was found in graded Hampshire ( $376.80 \pm 4.87$  days) than graded Berkshire ( $395.60 \pm 6.12$  days). The rest of other economic traits had non-significant influence but higher value was recorded in graded Hampshire. On the basis of above findings, it can be concluded that graded Hampshire pigs performed better than graded Berkshire under village management conditions. Hence, Hampshire boar should be preferred over Berkshire for upgrading the non-descript desi stock of the state.

**Keywords:** body weight, genetic factors, graded Berkshire, graded Hampshire, reproductive traits

### Introduction

Pig farming is one of the important components in the rural economy of Manipur state by providing additional income as well as nutritional security to families through employment of small and marginal farmers including agricultural labourers and farm women (Singh *et al.* 2019) [8]. Pork helps in solving the animal protein requirement of higher biological value at comparatively lower price because of its better feed conversion efficiency, shorter generation interval, faster growth rate, low maintenance cost, higher dressing percentage and ability to utilize unconventional feed stuff (Park *et al.* 2017) [5].

Almost every tribal house hold rears 2–3 pigs in their backyard in Manipur and other North Eastern States. In spite of considerable pig population and interest of people to rear pig, the pork production in the state is lower than the requirement. But the pig production system in the region is mainly subsistence oriented and the farmers based on the local resources. The traditional pig production system is mainly dependent on local non-descriptive pig and feeding with locally vegetation, crop residues and kitchen waste. Consumers of the region has a preference for pork from black coloured pigs. The native pigs of the region are also mostly black which are non-descript with poor growth and reproductive performances. The efficiency of feed utilized is also very poor. Insufficient availability of quality stock is great hindrance in boosting pig production of the state. Hence, ICAR Research complex of NEH region is working for the improvement of local variety of non-descript pigs by upgrading them with black coloured Hampshire and Berkshire exotic pigs to increase their productive and reproductive. Crosses of indigenous with Hampshire and Berkshire pigs are gaining acceptance in this region. In view of the above back ground, the present study was planned to develop a superior variety of pigs suitable for rearing in rural management conditions.

### Materials and methods

#### Treatment details

The present study was carried out on two genetic group of pigs with an objective to compare the performances of various economic traits with their adaptability and suitability at farmer's

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door in their agro-climatic conditions which will help in designing future breeding strategies of the state to boost up the pig production. A total of 20 piglets (10 of each genetic group) of approximately 3 months old were distributed among 5 selected farmers belonging to Teisam and Terraphai village of Chandel district. Each farmer received two pairs of which one pair (one male and one female) was graded Hampshire and another one was graded Berkshire pigs.

### Managemental Practices

All the piglets were dewormed with anthelmintic drug and vaccinated against swine fever disease just after distribution of piglets. Deworming was done at regular interval of 3 months whereas, swine fever vaccine was repeated after one year from first vaccination time. Pigs were reared on intensive system of management by providing wood houses. The managemental practices in villages were different from those of organized herd. However, pigs were maintained by farmers under intensive system with feeding of pigs in their shed itself with about 70 percent locally available pig feed of villages (Green grasses, vegetable waste, agricultural bi-products, kitchen/hotel/rice fermented wastes, coloesia, stem and leaf of banana, pumpkin etc). Apart from this, provision of supplemental ration in the form of concentrate feed (crushed maize and wheat bran) was made to the extent of about 30 percent of required quantity. Weaning of piglets was done at the age of 8 weeks.

### Measurement of traits

Body weight was recorded at monthly interval from the date of distribution of piglets to 9 months of age with the help of spring balance. Birth weight was recorded within 16 hours of farrowing. Age at sexual maturity, age at first farrowing, litter size and weight at birth and at weaning were also recorded. The following scientific measures were taken before and during the experimental period: -

- Selection of appropriate farmers interested in pig farming.
- Training of selected farmers on scientific pig farming at KVK Chandel.
- Better housing facilities for pigs were developed at farmers door.
- Scientists involved were careful in selection of quality germ plasm of graded Hampshire and Berkshire pigs when purchasing piglets from local area.
- Keeping pig sty neat and clean.
- Regular feeding of pigs with sufficient quantity of feeding materials.
- Proper care of pigs with treatment of sick animals immediately by farmers.
- Regular visit of KVK scientists to villages to solve their problems and doubts if any.
- Training of farmers in the village itself as per need in the process of learning by doing.

### Statistical Analysis

Finally recorded data were analyzed through 't' test of significance to see the effect of genetic group on various economic traits under study.

### Results and discussion

#### Weight at different ages

The genetic group had non-significant influence on weight at different ages starting from 3<sup>rd</sup> month (initial body weight) to

9 months of age at monthly interval. However, graded Hampshire pigs had marginally higher body weight at all the ages under study (Table-1). Non-significant effect of genetic group was also reported by Singh *et al.* (2000) <sup>[10]</sup> on body weight at different ages in various types of crossbred pig reared under village conditions of management. Some of the earlier workers (Sharma *et al.* 1992 and Singh *et al.* 1996) <sup>[7, 11]</sup> however, reported significant effect of genetic groups on weight at various ages in pigs reared at farmer's door. Significant effect of genetic group reported by above mentioned workers might be due to differences in genetic group of animals because they studied the performances of exotics, desi and their crossbreeds. On the other hand, the present study was based on graded exotic Hampshire and Berkshire pigs. Kumaresan *et al.* (2006) <sup>[4]</sup> and Karunakaran *et al.* (2008) <sup>[3]</sup> studied the performance of Hampshire pigs under field conditions in Mizoram and Nagaland, respectively. They found lowest body weight at 5<sup>th</sup> and 8<sup>th</sup> months of age to be 23.44±0.15 and 43.44±0.22 kg and 28.10±2.80 and 51.60±2.10 kg, respectively against present finding of 37.98±2.15 and 69.64±3.17 kg in graded Hampshire and 34.67±2.08 and 67.76±3.20 kg in graded Berkshire at same ages, respectively. On the contrary, Hazarika *et al.* (2015) <sup>[2]</sup> reported higher value of weight at approximately 8 months of age ranging from 80.80±1.10 to 83.15±1.92 kg in crossbreeds (Hampshire x Assam local) pigs maintained on different proportion of Azolla protein diets at Assam Agricultural University, Khanapara, Guwahati against the present value of 69.64±3.17 kg in graded Hampshire pigs. The higher body weight reported by them might be due to better quality of pigs.

#### Age at sexual maturity

Table-1 revealed non-significant effect of genetic group on age at sexual maturity, the value being 255.00±4.11 and 272.20±6.84 days in graded Hampshire and Berkshire, respectively. This finding was in line with Anon (2014) who noticed age at sexual maturity to be 270.00±6.15 days in crosses of Hampshire with Niag Megha. On the other hand, they observed lowest value of age at sexual maturity (201.65±6.65 days) in crosses of Hampshire with Ghungharoo pigs.

#### Age at first farrowing

Significantly lowest age at first farrowing was noticed in graded Hampshire (376.80±4.87 days) than graded Berkshire (395.60±6.12 days). Significant effect on genetic group was also reported by Kumaresan *et al.* (2006) <sup>[4]</sup> who observed age at first farrowing to be 14.88±0.26, 14.23±0.32 and 12.11±2.51 months in exotics, crossbreeds and Mizo pigs, respectively. Higher and lower age at first farrowing was also reported by Singh and Devi (1997) <sup>[9]</sup> in Landrace (476.31±10.38 days) and desi (333.45±9.01) gilts, respectively. The values range from 336.06±10.04 to 376.46±12.86 days in various types of crossbreeds. It is as per expectation because exotic pigs matured latter than local and crossbred pigs.

#### Litter size at birth

't' test of significance presented in Table-1 showed non-significant effect of genetic group on litter size at birth. Although the difference was non-significant but higher litter size at birth was recorded in graded Hampshire (9.80±0.58) than those of graded Berkshire (8.20±0.66). Exactly similar

value ( $9.86 \pm 0.25$ ) was also reported by Anonymous (2014) [1] in crosses of Hampshire with Ghungharoo pigs. The present findings were also comparable to those of Kumaresan *et al.* (2006) [4] in exotic pigs ( $9.78 \pm 0.48$ ) and crossbreds ( $10.44 \pm 0.59$ ) maintained at Mizorum. Almost similar value ranges from  $7.58 \pm 0.20$  to  $10.79 \pm 0.61$  was also reported by Singh and Devi (1997) [9] in exotics and different combinations of crossbred sows. Highest litter size at birth in exotics and crossbreds ( $9.02 \pm 0.75$  to  $10.17 \pm 0.62$ ) than desi ( $6.92 \pm 0.29$ ) was also reported by Sharma and Singh (1995) [6].

### Litter size at weaning

Table-1 showed non-significant effect of genetic group on litter size at weaning. The average litter size at weaning observed in present study in graded Hampshire ( $8.80 \pm 0.37$ ) and graded Berkshire ( $7.60 \pm 0.51$ ) is comparable to those of Kumaresan *et al.* (2006) [4] in exotics ( $8.33 \pm 0.55$ ) and crossbreds ( $8.06 \pm 0.66$ ) maintained at Mizoram. However, Singh *et al.* (1989) reported lower litter size at weaning in Hampshire ( $5.51$  to  $6.02$ ). Lower litter size at weaning was also reported by Sharma and Singh (1995) in exotics

( $6.50 \pm 0.30$  to  $7.13 \pm 0.26$ ), crossbreds ( $7.70 \pm 0.49$ ) and desi ( $5.20 \pm 0.23$ ) and Singh and Devi (1997) [9] in exotics ( $6.10 \pm 0.45$  to  $7.55 \pm 0.48$ ), crossbreds ( $6.00 \pm 0.93$  to  $7.08 \pm 0.49$ ) and desi ( $4.36 \pm 0.43$  to  $5.86 \pm 0.50$ ).

### Litter weight at birth

Litter weight at birth in graded Hampshire and Berkshire were found to be  $10.36 \pm 0.42$  and  $9.02 \pm 0.62$  kg, respectively which did not differ significantly from each other. Our finding was in conformity with those of Sharma and Singh (1995) [6] who reported litter weight at birth in Large White Yorkshire, Tamworth and crossbreds to be  $10.51 \pm 0.86$ ,  $10.28 \pm 0.52$  and  $10.09 \pm 0.70$  kg, respectively which did not differ significantly among themselves. However, they reported significantly higher and lower litter weight at birth in Landrace ( $13.05 \pm 0.37$  kg) and desi ( $6.14 \pm 0.32$  kg) sow, respectively. Significant effect of genetic group was also reported by Singh and Devi (1997) [9]. The litter weight at birth recorded by them in desi crossbreds and exotic pigs varied from  $5.06 \pm 0.56$  kg in desi to  $13.45 \pm 0.69$  kg in Landrace.

**Table 1:** Showing the effect of genetic group on various economic traits of pigs

Parameters	Genetic group		Difference (H-B)	't' Value
	Graded Hampshire (H)	Graded Berkshire (B)		
<b>Growth rate (kg)</b>				
Wt. at 3 <sup>rd</sup> month	18.32±1.66 (10)	16.65±1.62 (10)	1.67	0.72 <sup>NS</sup>
Wt. at 4 <sup>th</sup> month	27.82±1.81 (10)	24.58±1.89 (10)	3.24	1.24 <sup>NS</sup>
Wt. at 5 <sup>th</sup> month	37.98±2.15 (10)	34.67±2.08 (10)	3.31	1.11 <sup>NS</sup>
Wt. at 6 <sup>th</sup> month	49.37±2.81 (10)	46.85±2.53 (10)	2.52	0.67 <sup>NS</sup>
Wt. at 7 <sup>th</sup> month	59.85±2.94 (10)	56.52±2.99 (10)	3.33	0.79 <sup>NS</sup>
Wt. at 8 <sup>th</sup> month	69.64±3.17 (10)	67.76±3.20 (10)	1.88	0.42 <sup>NS</sup>
Wt. at 9 <sup>th</sup> month	80.87±3.79 (10)	77.52±3.95 (10)	3.35	0.61 <sup>NS</sup>
<b>Reproductive traits</b>				
ASM (Days)	255.00±4.18 (5)	272.20±6.84 (5)	17.2	2.14 <sup>NS</sup>
AFF (Days)	376.80±4.87 (5)	395.60±6.12 (5)	18.8	2.40*
Litter size at birth	9.80±0.58 (5)	8.20±0.66 (5)	1.60	1.82 <sup>NS</sup>
Litter size at weaning	8.80±0.37 (5)	7.60±0.51 (5)	1.20	1.90 <sup>NS</sup>
Litter weight at birth (kg)	10.36±0.42 (5)	9.02±0.62 (5)	1.34	1.79 <sup>NS</sup>
Litter weight at weaning (kg)	82.60±2.77 (5)	70.40±3.96 (5)	12.20	2.53*
<b>Prewaning traits</b>				
Birth weight (kg)	1.06±0.02 (51)	1.10±0.03 (41)	0.04	1.06 <sup>NS</sup>
Weaning weight (kg)	9.34±0.17 (44)	9.26±0.18 (38)	0.08	0.29 <sup>NS</sup>
Prewaning mortality (%)	9.68±2.90 (5)	6.72±2.77 (5)	2.96	0.74 <sup>NS</sup>

NS – Non-Significant,

ASM – Age at sexual maturity,

\* - P<0.05

AFF – Age at first farrowing

### Litter weight at weaning

't' test of significant presented in Table-1 indicated significantly higher litter weight at weaning in graded Hampshire ( $82.60 \pm 2.77$  kg) in comparison to graded Berkshire ( $70.40 \pm 3.96$  kg) sows. Significant effect of genetic group was also reported by Sharma and Singh (1995) [6] and Singh and Devi (1997) [9] in exotics, desi and their crossbred sows. Sharma and Singh (1995) [6] observed lower litter weight at weaning in exotics ( $56.79 \pm 2.85$  to  $69.89 \pm 4.71$  kg), crossbreds ( $56.76 \pm 3.86$  kg) and desi ( $37.91 \pm 1.78$  kg). Lowest litter weight in comparison to values observed in present study was also reported by Singh and Devi (1997) [9] in exotics ( $50.46 \pm 5.18$  to  $76.75 \pm 2.19$  kg), crossbreds ( $42.06 \pm 3.70$  to  $59.16 \pm 7.85$  kg) and desi sows ( $25.55 \pm 3.12$  to  $46.91 \pm 3.06$  kg).

### Birth weight

The average birth weight of graded Hampshire ( $1.06 \pm 0.02$  kg)

and graded Berkshire ( $1.10 \pm 0.03$  kg) observed in present study was in close agreement with the findings of Anon. (2014) in Hampshire crossbreds to be  $1.00 \pm 0.01$ ,  $1.31 \pm 0.01$  and  $1.14 \pm 0.03$  kg maintained under AICRP on pigs at Assam Agricultural University, Khanapara (Guwahati), Birsa Agricultural University, Ranchi and National Research centre on pig, Rani (Guwahati), respectively. Singh *et al.* (1989) [9] also reported almost similar birth weight of  $1.22 \pm 0.02$  kg in Hampshire pigs. Kumaresan *et al.* (2006) [4] studied the birth weight of exotics ( $1.43 \pm 0.03$  kg), crossbreds ( $1.25 \pm 0.04$  kg) and Mizo pigs ( $0.86 \pm 0.08$  kg) maintained under field conditions of Mizoram.

### Weaning weight

Genetic group had non-significant effect on weaning weight of piglets (Table-1). The weaning weight observed in graded Hampshire ( $9.34 \pm 0.17$  kg) was higher to those of Anon. (2014) who noticed weaning weight in Hampshire crossbreds

to be  $5.97 \pm 0.35$  to  $8.44 \pm 0.14$  kg at different centers of AICRP on pigs. Similarity, slightly lower weaning weight in comparison to present findings was also reported by Kumaresan *et al.* (2006) <sup>[4]</sup> in Hampshire pigs ( $8.72 \pm 0.31$  kg) maintained under field conditions. On the contrary, Karunakaran *et al.* (2008) <sup>[3]</sup> found higher value of weaning weight in pure Hampshire ( $16.10 \pm 3.20$  kg), Large White Yorkshire ( $9.70 \pm 2.70$  kg) and Bermase ( $15.70 \pm 2.40$  kg) pigs.

### Prewaning mortality

Mortality is the trait which is indicative of feeding, disease control and managerial practices of pigs done by the pig farmers. The preweaning mortality observed during the present study ( $9.68 \pm 2.90\%$  in graded Hampshire and  $6.72 \pm 2.71\%$  in graded Berkshire) was comparable to those of Anonymous (2014) <sup>[1]</sup> who observed 8.69 to 12.27 percent preweaning mortality in different genetic groups of pig. On the other hand, NRC on pig, Rani (Guwahati) recorded lowest preweaning mortality of 2.00 to 5.20 percent in different types of Hampshire crossbreds. On the contrary, Singh *et al.* (1989) <sup>[12]</sup> noticed higher preweaning mortality of 42.50 percent in Hampshire pigs maintained at Govt. Pig Breeding Farm, Kanke (Ranchi).

### Conclusion

Hampshire graded pigs perform better in the agro-climatic conditions prevailing in the state under intensive system of management. Hence, Hampshire boar is choice of breed for upgrading the non-descript stock of pigs in the rural areas of Manipur state. It was also recommended for proper training of farmers on scientific pig farming just before start of pig rearing so that farmers could procure superior germ-plasm of pig followed by proper housing management, balance feeding, appropriate health coverage etc. for better return from pig farming.

### Acknowledgements

The authors express their thanks and gratitude to ICAR for providing fund and their valuable support towards the execution and completion of this study.

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