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Influence of different altitudes on productive and reproductive performance of pigs

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ABSTRACT

Upgraded (Hampshire × Indigenous, 270) pigs were distributed to 9 families each in 10 villages situated at different altitudes in Nagaland with 1 male and 2 female pigs/family. Significant higher body weight was recorded at high altitudes, i.e. Porba, Chare and Kohima villages as compared to foothills villages like Murise. Average litter size and weight at birth and weaning were 7.65, 5.17, 5.99 and 10.13 kg, respectively, with furrowing of 60%. Minimum and maximum age at sexual maturity and age at first conception ranged between 7.51 to 7.89 and 8.65 to 9.00 months, respectively. The age at first furrowing and gestation period ranged from 12.48 to 12.77 months and 114 to 117 days, respectively. It can be concluded that body weight gain, litter size and weight at birth and weaning, age at sexual maturity, first conception and gestation period were within the normal range at various altitudes but higher than the indigenous pigs.

Key words: Altitudes**,** Conception, Furrowing, Gestation, Hampshire, Litter Size, Weaning

Pork becomes an obvious choice for the people of Nagaland because of its low price. The pork deficiency in Nagaland is around 643 metric tonnes/annum inspite of the annual slaughter rate of 55,000 to 63,000 pigs. Even with this slaughter rate, per capita deficiency of meat is 47.25 kg annually. Pigs (16,000 – 22,000) are brought from outside the state to meet the pork deficiency and an amount of around ₹ 15 crore are annually drained out from the state exchequer to meet the requirement of pork alone in the region. This is mainly due to rearing of non-descript pigs (around 60%) whose productivity is very low (Kalita *et al.* 2001). Meanwhile, various Government establishments in the region have developed upgraded pigs (Hampshire and Indigenous) having exotic inheritance level from 50 – 87%. These varieties are also supported by production and health packages. Some of these varieties and the production packages developed are to be tested at farmers' fields. Considering the importance of pigs in the socio–economic development of the tribal people in the region, the present research work was carried out at farmers' field.

MATERIALS AND METHODS

Villages (10) from 4 different districts, i. e. Dimapur, Kohima, Phek and Tuensang were selected to have different altitudes ranging between 194 to 3048 metres. In each village, 9 farm families having pig farming experiences were selected with a total of 90 farm families. A unit of male (1) and female (2) at the age of 2 months per farmer, i.e. 3 pigs × 9 farmers × 10 villages = 270 numbers of F_1 upgraded piglets (Hampshire × indigenous) was distributed. The weaners (2 – 4 months), growers (4 – 6 months) and gilts/boars were provided 0.750, 1.5 and 2.0 kg feed/day, respectively. The share of feed for the above 3 categories of pigs from the institution was 28.00, 14.25 and 12.00% and the remaining was borne by farmers. Body weight of the individual pig was recorded at the onset of experiment till 6 months of age at monthly interval. Age at sexual maturity, first conception, first furrowing, gestation period, other reproductive performances, viz. litter size and weight at birth and weaning etc. were precisely recorded considering the date of birth of individual piglet. The data so collected were subjected to standard statistical analysis (Snedecor and Cochran 1994).

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RESULTS AND DISCUSSION

Growth performance of piglets: Initial body weight of piglets was recorded at the time of their placement with the farmers at the age of about 2 months. Initial body weight of male piglets (Table 1) was more than the female ones; however, difference in body weight was not significant. Further, body weight of the piglets increased with the advancement of the age from 1–6 months irrespective of the villages which were situated at various altitudes. The results corroborated well with the observations of others (Kalita *et al*. 2001, Pankaj *et al.* 2013a, 2013b). The body weight of the piglets due to villages at various altitudes did not differ significantly up to 4 months of age; however, the body weight

was significantly ($P < 0.05$) higher at Porba, Chare and Kohima villages situated at high altitudes and which were marked by semi-temperate climatic conditions and was lowest at Murise village located at the foothill at lowest altitude.

Gain in body weight (Table 2) was significantly ($P < 0.05$) higher only during second and third months which could be attributed to the influence of housing and other environmental factors like disease and parasitic attack due to poor management etc. Similar findings on differences in body weight gain due to months/seasons were also reported by other workers (Palve *et al*. 2000, Pourouchottamane *et al.* 2013). Considering the overall highest (6.37 kg) and lowest (4.55 kg) body weight gain in Kohima and Murise villages, the daily weight gain was calculated to be 211 g and 150 g, respectively, irrespective of months.

Table 1. Effect of different altitudes on the body weight (kg) of pigs

Name of village	Months						
	At onset	1st	2nd	3rd	4th	5th	6th
Sahoi	10.37±0.30	15.43±0.49	21.56±0.71	27.00±0.88	31.04±0.93	36.18^{a}±1.11	40.68^{a}±1.24
Soucunoma	10.23±0.40	14.59±0.43	20.50±0.68	26.20±1.16	32.45±1.53	36.75^{ab}±1.86	41.60^{ab}±2.16
Chare	10.07±0.35	14.55±0.51	20.69±0.59	28.34±0.72	32.90±0.69	37.59^{ab}±1.12	43.09^{ab}±1.49
Bade	10.85±0.32	15.19±0.60	20.18±0.52	26.61±0.47	31.95±0.50	36.50^{ab}±0.90	41.20^{ab}±1.11
Murise	10.26±0.31	15.85±0.49	21.22±0.49	27.14±0.67	30.85±0.87	34.05^{a}±0.87	38.66^{a}±1.06
Gaili	10.26±0.35	14.38±0.63	20.70±0.58	27.50±0.58	32.58±0.80	37.04^{ab}±1.25	42.04^{ab}±1.52
Nsunyu	10.38±0.31	14.47±0.45	20.30±0.60	28.00±0.72	31.52±0.94	37.27^{ab}±1.49	42.11^{ab}±1.73
Kohima	10.39±0.38	15.30±0.65	21.21±0.68	27.95±0.66	34.00±0.64	39.95^{b}±0.95	46.19^{b}±1.25
Cheipobozuo	10.64±0.27	15.79±0.50	21.50±0.60	28.20±0.50	33.08±0.97	38.63^{ab}±1.46	43.34^{ab}±1.81
Porba	10.70±0.29	15.84±0.53	21.90±0.56	29.28±0.69	35.89±0.87	41.55^{b}±1.37	47.65^{b}±1.71
Average	10.41±0.02	15.14±0.02	20.97±0.02	27.62±0.06	32.63±0.08	37.55±0.09	42.66±0.11

a, b, means bearing different superscripts in a column differ significantly ($P < 0.05$).

Table 2. Effect of different altitudes on gain in body weight (kg) of pigs

Name of village	Months between				
	1–2	2–3	3–4	4–5	5–6
Sahoi	6.25±0.07	5.43±0.03	4.04±0.24	4.68±0.21	5.13±0.31
Soucunoma	5.97±0.03	6.20±0.01	6.25±0.04	4.20±0.29	4.85±0.20
Chare	6.26±0.08	7.65±0.10	4.40±0.20	4.68±0.09	5.81±0.32
Bade	4.89±0.10	6.43±0.05	5.50±0.09	4.50±0.08	4.65±0.54
Murise	5.37±0.07	5.91±0.08	3.71±0.14	3.38±0.28	4.42±0.24
Gaili	6.52±0.02	6.79±0.19	5.08±0.31	4.45±0.59	5.00±0.05
Nsunyu	5.72±0.08	7.73±0.10	3.88±0.14	5.27±0.38	4.83±0.28
Kohima	6.13±0.11	6.59±0.30	6.61±0.02	6.42±0.42	6.14±0.02
Cheipobozuo	5.70±0.03	6.56±0.13	4.91±0.25	5.55±0.08	5.08±0.24
Porba	6.34±0.10	7.09±0.09	6.50±0.03	5.30±0.27	6.21±0.29
Average	5.96±0.15	6.54±0.23	5.10±0.30	4.74±0.26	5.18±0.19

Table 3. Effect of different altitudes on reproductive performances of gilts

Name of village	No of gilts delivered	Litter size at birth	Litter weight at birth (kg)	Litter size at weaning	Litter weight at weaning (kg)
Sahoi	10	7.20±0.57	5.73±0.50	5.40^{ab}±0.30	9.86±0.27
Soucunoma	12	7.58±0.31	6.25±0.28	4.83^{ab}±0.47	10.19±0.20
Chare	12	7.00±0.66	5.41±0.55	4.25^{a}±0.37	9.91±0.23
Bade	11	7.33±0.52	5.69±0.37	5.33^{ab}±0.41	9.92±0.39
Murise	12	8.00±0.24	6.33±0.24	5.41$^{ab\pm}$0.52	10.62±0.20
Gaili	12	7.75±0.39	6.21±0.35	6.08^{b}±0.45	10.46±0.27
Nsunyu	12	8.45±0.47	6.66±0.36	6.00^{b}±0.68	10.19±0.20
Kohima	11	8.16±0.57	6.21±0.45	5.25^{ab}±0.27	10.28±0.28
Cheipobozuo	11	8.18±0.42	6.08±0.30	5.27^{ab}±0.42	10.09±0.21
Porba	11	6.90±0.47	5.37±0.37	3.90^{a}±0.39	9.84±0.28
Average	11	7.65±0.04	5.99±0.03	5.17±0.03	10.13±0.01

a, b, means bearing different superscripts in a column differ significantly ($P < 0.05$).

Table 4. Effect of different altitudes on age at sexual maturity, first conception, first furrowing and gestation period of pigs

Name of villages	Age at sexual maturity (months)	Age at first conception (months)	Age at first furrowing (months)	Gestation period (days)
Sahoi	7.51±0.16	8.90±0.13	12.70±0.15	115.00±0.65
Soucunoma	7.66±0.12	8.80±0.11	12.60±0.12	115.41±0.41
Chare	7.55±0.12	8.87±0.11	12.70±0.11	115.75±0.76
Bade	7.87±0.07	9.00±0.11	12.77±0.14	116.27±0.64
Murise	7.89±0.03	8.65±0.08	12.48±0.08	115.91±0.73
Gaili	7.85±0.04	8.70±0.06	12.52±0.06	115.50±0.52
Nsunyu	7.85±0.05	8.85±0.13	12.71±0.13	117.23±0.59
Kohima	7.52±0.13	8.81±0.08	12.71±0.09	117.27±0.54
Cheipobozuo	7.44±0.13	8.76±0.10	12.70±0.11	114.50±0.64
Porba	7.66±0.10	8.70±0.10	12.51±0.10	115.20±0.68
Average	7.68±0.01	8.80±0.01	12.64±0.01	115.80±0.03

Reproductive performance of piglets: Litter size at weaning varied significantly ($P<0.05$) among villages (Table 3). The findings of the present study corroborated well with the observations of Ramesh *et al.* (2001) who had reported the litter size at birth and weaning, litter weight at birth and individual weaning weight to be 7.485, 5.10, 6.049 and 9.51 kg, respectively. Further, the performance in terms of litter size at birth and weaning of the improved pigs at farmers' field were higher than the indigenous pigs where the litter size at birth and litter weight at birth and individual weaning weight were 5.61, 4.89 and 7.13 kg, respectively (Pankaj *et al.* 2013a, 2013b).

Other reproductive performance of piglets: The reproductive parameters (Table 4) in terms of age at sexual maturity, age at first conception, age at first furrowing and gestation period did not differ irrespective of villages and were in normal range. The findings were in close agreement with the observations of Ray *et al.* (2001) who had reported the age at first furrowing for indigenous pigs to be 380±17 days.

It can be concluded from the results that performance of piglets in terms of body weight gain and other reproductive parameters like litter size at birth and weaning, litter weight at birth and weaning, age at sexual maturity, age at first conception and gestation period were within the normal range under field conditions irrespective of various altitudes and the values were higher than the indigenous pigs**.**

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