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Factors affecting body weight in landrace, desi and their half bred pigs

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Introduction

Piggery has been accepted by rural people as a principal remuneration enterprise. Economic viability and productive performance of pigs industry depends on reduced loss due to piglet mortality with higher growth rate. Growth is an important trait in any meat producing animal like pigs. Body weight is one of the good indicator to know the growth rate of pigs .Various genetic and non-genetic factors that's effect the body weight are genetic groups, sex, period, season and parity of birth. Hence, present study has been planned to study the effect of various genetic and non-genetic factors affecting body weight at different ages.

Materials and Methods

The present study was carried out on 1301 pigs spread over a period of 20 years from 1982 to 2001 belonging to three genetic groups viz. Landrace(378), Desi (288) and their half breeds (625) maintained at pig breeding farm Ranchi veterinary college (Jharkhand). The pre-weaning and post-weaning body weight were recorded at 4weekly interval from birth to 24th.week of age .The weaning was done at the age of 8weeks. The whole data were grouped in to 4 periods comprising of 5years in each period viz., P1(1982 to1986)P2 (1987 to1991), P3(1992 to1996) and P4(1997 to2001). Least squires – analysis was done to see the effect of genetic and non-genetic factors on weight at different ages. The differences was tested by Duncan Multiple Range Test(1957).year as divided in to 4 season on the basis of climatological data viz., winter(December to February-cold),summer (March to May- dry-hot),Rainy (Jun to August-hot humid)and autumn(September to November-moderate)

Results and Discussion

Least-squares analysis of variance have been presented in Table1.

Genetic groups: Genetic group had significant effect on body weight at all the ages under study. The difference in body weights at different ages in various genetic groups seems to be genetic in origin. Mukhopadhyay et al. (1991) in Landrace, Tamworth, Desi and their cross breds and Sukhdeo et al. (1992) and Chhabra et al.(1994) in Desi and Landrace halfbreds also reported significant effect of genetic group on body weight at different ages . In general significantly lowest body weight during pre-weaning period in Desi followed by LR X D and Landrace is comparable with the finding of some other workers (Kumar et al.,1990; Mukhopadhyay et al.,1991 and Sharma et al.,1992). The difference of birth reflects the inherent growth rate in uterine environment while at latter ages show more clearly the influence of inherent growth rate and external environments. The trend of growth was different during post-weaning periods in comparison to pre- weaning periods. During post-weaning periods almost similar body weight were observed in Landrace and Landrace half breds (LR X D) and they did not differ significantly from each other but both the genetic groups had significantly higher body weight than Desi pigs. The results suggested that maternal effect was important during pre-weaning period resulted in to growth rate in Landrace pigs due to more availability of milk from Landrace sows in comparison to Desi sow. The higher body weight in Landrace and Landrace half-bred than Desi observed during post-weaning period is indicative of better combining ability between genes of Landrace and desi.

Period of birth: The list-sqaures analysis variance (Table.1) revealed that period of birth had significant effect at body weight at all the ages during pre-weaning and post-weaning periods. There was no definite trend with respect to body weights at different ages in various periods. However, higher body weight at different ages observed during P1 (1982-1986) or during P2(1997-2002)in majority in cases.

Season of birth: Season of birth was found to exert significant effect on body weights at almost all the ages from birth to 24th.weeks of ages at four weekly intervals. The significant effect of

season of birth on body weights during pre-weaning period was also reported by Sukhdeo et al.(1981), Siagian et al.(1986), Mukhopadhyay et al.(1991) Badoloi et al.(1993),Kalita et al (2001) and Khalkho(2004) in different breeds and breed combinations . Significantly lower birth weight in the piglets born during winter and rainy then those Summer and autumn might be due to influence of climatic condition of different season on the physiology during pregnancy period of sows .The result indicate that extreme weather during the pregnancy period of sows had unfavorable influence on birth weight of piglets. Significantly lowest weaning weight was observed in piglets born during rainy season. It may be due to hot and humid stress conditions. Incidence of diseases was more during rainy season and most of the piglets suffered from different type of diseases viz., bacterial diarrhea ,fever ,wound etc. resulting in poor growth .Least-squares means (Table 1) further indicated significantly higher body weight at latter ages in piglets born during winter season. The results suggest that winter season had favorable effect on growth of piglets.

Parity: Parity showed significant effect on body weight at all the ages under study (Table1) . The present results are in good agreement with those of Sharma et al (1990), Mukhopadhyay et al(1991) Chhabra et al.(1996), Kalita et al (2001) and Khalkho (2004) who also observed significant effect of parity of dam on the weight at different ages in exotic desi and their crossbred pigs. Lower birth weight in piglets born during the early parities than those of late parities (Table1) indicate under development of piglets born during early parities might be due to lack of proper maturation and small body size of sows up to 1-1.5 year of ages. Whereas, higher body weight at the 4th. and 8th.week of age in the piglets born during latter parities might be due to the effect of higher birth weight and comparatively better milk ability of sow belonging to the latter parities.

Sex: The effect of sex had non-significant on body weight at all the ages except at birth. Similar finding were also reported by Kumar et al (1990) in Landrace desi and LR X D. The finding are in close agreement with those of Bardoloi and Raina (1984), Mukhopadhyay et al.(1991) Sukhdeo et al (1992), Chhabra et al (1994,1996), Pandey et al (1997), Kalita et al (2001) and Khalkho(2004) in different exotic, Desi and their cross-breds.

Birth weight: Least-squares analysis of variance revealed significant effect of birth weight on subsequent body weight at all the ages from 4th.weeks to 24th.week at 4 weekly intervals. Least-squares means present in (Table. 1) indicated significantly positive increase in body weight at different ages with the increase of birth weight of individual. Kumar (1999) also reported significant effect of birth weight on pre-weaning body weight but non-significant at most of ages during pos- weaning periods

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Table1- Least - square means for various factor affecting body weight at different ages along with Duncan Multiple Range Test in pigs data pooled over all genetic groups.

	Birth wk.wt.	4th.wk wt	8th. wk.wt	12th. wk wt.	16th. wk wt.	20th. wk wt.	24th. wk wt.
μ	1.09±0.01 (1301)	4.45±0.09 (1072)	7.56±0.16 (1007)	12.58±0.47 (298)	18.50±1.06 (183)	24.01±1.49 (153)	32.15±1.89 (137)
Genetic group:-							
Desi	0.84[a] ± 0.02 (288)	3.93 [a] ±0.12 (245)	679 [a] ±0.22 (229)	9.43[a] ±0.64 (51)	12.94[a] ±1.43 (34)	17.95[a] ±2.06 (30)	22.85[a] ±2.65 (29)
Landrace	1.36[b] ±0.02 (378)	4.90[b] ±0.18 (283)	8.93[b] ±0.31 (275)	13.54[b] ±0.73 (120)	18.12[b] ±1.45 (86)	24.05[b] ±2.11 (68)	32.63[b] ±2.81 (64)
LR X D	1.04[c] ±0.01 (635)	4.54[b] ±0.01 (544)	7.76[c] ±0.18 (503)	12.76[b] ±0.52 (127)	19.45[b] ±1.20 (63)	24.73[b] ±1.69 (55)	30.16[b] ±2.15 (54)
Sex:-							
M	1.12[a] ±0.02 (654)	4.50 ±0.10 (540)	7.55 ±0.17 (5.03)	12.75 ±0.51 (121)	18.61 ±1.15 (86)	24.22 ±1.64 (75)	30.16[b] ±2.08 (70)
F	1.06[b] ±0.01 (647)	4.41 ±0.09 (524)	7.57 ±0.17 (501)	12.40 ±0.49 (157)	18.39 ±1.08 (97)	23.81 ±1.51 (78)	32.09 ±1.94 (67)
Period of birth:-							
1982-1986	1.32[a] ±0.01 (398)	4.78[a] ±0.14 (299)	7.79[ab] ±0.24 (290)	9.69[bc] ±0.52 (121)	15.14[b] ±1.12 (87)	20.80[c] ±1.66 (67)	26.15[b] ±2.11 (53)
1987-1991	0.98[b] ±0.01 (625)	4.19[b] ±0.08 (532)	7.10[ab] ±0.14 (493)	10.60[b] ±0.37 (136)	16.16[b] ±0.95 (61)	20.29[b] ±1.36 (55)	25.88[b] ±1.72 (53)
1992-1996	0.99[b] ±0.01 ((264)	3.97[b] ±0.10 (230)	6.74[b] ±0.18 (214)	12.14[c] ±0.03 (38)	16.63[b] ±0.08 (33)	20.04[b] ±0.04 (29)	27.29[b] ±0.02 (28)
1997-2002	1.01[b] ±0.04 (14)	4.88[a] ±0.34 (11)	8.62 [a] ±0.60 (10)	17.86 [a] ±1.64 (3)	26.07 [a] ±3.42 (2)	34.92 [a] ±4.81 (2)	49.26 [a] ±6.07 (2)
Parity:-							
P1	0.99[a] ±0.01 (338)	4.59[b] ±0.11 (285)	7.02[ce] ±0.53 (267)	12.90[ac] ±0.19 (74)	18.37[a] ±1.16 (38)	24.49[ab] ±1.67 (34)	34.98[a] ±2.21 (30)
P2	1.08[b] ±0.02 (251)	4.75[b] ±0.12 (209)	7.66[cd] ±0.02 (196)	11.18[b] ±0.05 (70)	15.71[c] ±1.11 (43)	20.05[b] ±1.60 (36)	27.25[b] ±2.07 (32)
P3	1.16[c] ±0.02 (168)	4.09[a] ±0.12 (140)	7.81[bc] ±0.22 (142)	12.57[a] ±0.72 (24)	17.14[a] ±1.62 (14)	20.64[ab] ±2.33 (13)	27.02[ab] ±2.07 (13)
P4	1.20[c] ±0.02 (91)	4.24[a] ±0.16 (74)	7.19[bcd] ±0.24 (107)	11.68[bcd] ±0.60 (24)	17.60[a] ±1.25 (14)	27.32[a] ±1.92 (13)	34.33[ab] ±2.46 (140)
P5	1.08[b] ±0.02 (72)	4.06[a] ±0.16 (74)	6.71[ce] ±0.28 (67)	11.79[bcd] ±0.79 (18)	18.24[a] ±1.62 (14)	23.09[ab] ±2.75 (8)	36.14[ab] ±4.20 (5)
P6	1.08[b] ±0.02	4.06[a] ±0.16	6.71[ce] ±0.28	11.79[bcd] ±0.79	18.24[a] ±1.62	23.09[ab] ±2.75	36.14[ab] ±4.20

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	(91)	(74)	(67)	(18)	(14)	(8)	(5)
P7	1.14^{bc} ±0.09 (69)	4.85^{ab} ±0.18 (58)	8.48^{a} ±0.30 (50)	14.42 ±0.75 (2)	19.13^{ab} ±1.50 (16)	24.12^{ab} ±2.27 (15)	31.56^{ab} ±2.88 (15)
P8	1.19^{c} ±0.04 (60)	4.45^{b} ±0.18 (51)	7.60^{b} ±0.31 (51)	10.02^{a} ±1.07 (8)	19.34^{ab} ±4.45 (1)	23.83^{ab} ±6.34 (1)	31.72^{ab} ±7.96 (1)
P9	1.04^{ab} ±0.02 (114)	4.87^{b} ±0.14 (88)	8.25^{ab} ±0.25 (82)	13.20^{c} ±0.65 (30)	19.59^{ab} ±1.45 (23)	26.58^{a} ±2.03 (23)	34.11^{ab} ±2.56 (23)
Season of farrowing:--							
Winter	1.04^{a} ±0.02 (353)	4.58 ±0.11 (306)	7.95^{a} ±0.20 (392)	13.64^{a} ±0.64 (78)	19.88 ±1.34 (48)	25.99 ±1.92 (47)	35.14^{a} ±2.43 (43)
Summer	1.12^{b} ±0.02 (321)	4.46 ±0.12 (267)	7.44^{b} ±0.20 (249)	12.77^{ab} ±0.56 (100)	17.56 ±1.27 (63)	23.35 ±1.83 (45)	34.24^{a} ±2.38 (34)
Rainy	1.06^{a} ±0.02 (433)	4.32 ±0.11 (343)	7.13^{c} ±0.19 (320)	12.42^{ab} ±0.58 (86)	18.30 ±1.25 (49)	24.07 ±1.81 (43)	31.29^{ab} ±2.31 (43)
Autumn	1.19^{c} ±0.02 (194)	4.46 ±0.12 (156)	7.42 ±0.21 (146)	11.49^{b} ±0.57 (34)	18.26 ±1.34 (23)	22.65 ±2.02 (18)	27.91^{b} ±2.64 (17)

Figure in Parentheses indicate degree of freedom.