Estimates of heritability (h^2) along with standard error of growth traits and reproductive traits in Landrace desi their cross-brads and data pooled over all genetic group pigs

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Abstract- Present study revealed the heritability of growth traits and reproductive traits for bringing improvement in livestock productivity. The success of bringing improvement can only be predicted if we know the degree of correspondence between phenotypic value and the breeding value of an animal. Heritability is the fraction of the observed phenotypic variance with result from difference in hereditary among the gene and gene combination of the individual. The broad concept of heritability in which the hereditary variance is consider as the sum of the additive genetic variance, dominant deviation and epistasis. Heritability estimate of growth traits body weight at different ages had low to moderate and some where higher at different ages. The heritability estimate of reproductive traits like age at first farrowing was greater than unity in all of the genetic group. Litter size at birth and at weaning had low to medium heritability in majority of the cases. The estimate of heritability for litter weight at birth and at weaning was low for LR X D, desi and medium for Landrace and data pooled over all genetic group. In general heritability of farrowing interval was moderate in nature.

Materials and Methods

The present study was carried out on data 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 4 weekly interval from birth to 24^{th}week of age. The weaning was done at the age of 8 week.

During the study of heritability of reproductive traits like Litter size at birth, litter size at weaning, litter weight at birth, litter weight at weaning, farrowing interval, age at first farrowing considered .In productive traits heritability of the pre-weaning and post-weaning body weight were recorded at 4 weekly interval from birth to 24th week of age.The year was divided in to 4 season on the basis of climatological data viz., winter(December to February-cold),summer (March to May-hot dry),Rainy(Jun to August-hot humid) and autumn(September to November-moderate). The whole data were grouped in to 4 periods comprising of 5 years in each period viz., P1(1982 to1986)P2 (1987 to1991), P3(1992 to1996) and P4(1997 to2001).The suckling piglets were provided with creep feed in creep box after 2 weeks of ages. Least-squares analysis was done to see the effect of genetic and non-genetic factors on weight at different ages. Duncan Multiple Range Test (DMRT) as modified by Kramer(1957) was used for pair wise compression of different effects.

Result and Discussion

Heritability provides a measure additive genetic variance available and to predict the response to selection .Trait having high heritability show stronger response to selection and when low showed that the character is influence by environmental factors to a large extent. So better management and environment should be provided to get high return.

Growth Trait:The heritability estimates for body weight at various ages have been presented in table1.

Body weight at various ages: There was no definite trend of heritability of body weight at various ages. The highest estimates of heritability indicate possibility of improvement in traits through selection. The result are in conformity with the finding of Sukhdeo *et al.* (1981), Kumar (1989), Mukhopadhyay *et al.* (1991),Chauhan *et al.* (1993), Shally and Bardoloi (1993),Pandey *et al.*(1997), Kumar (1999),Singh *et al.*

(2000) and Khalkho (2004) In different exotic ,desi and crossbreds. However, Chauhan *et al.*(1994) recorded comparatively low heritability in indigenous pigs.

Reproductive traits: The heritability estimates of reproductive traits have been presented in table 2.

Age at first farrowing:The heritability of age at first farrowing was greater than unity in each genetic group separately while the value being 0.35±0.22 on data pooled over all genetic groups. Kumar(1999),reported higher heritability in T X D whereas Khalkho(2004) reported moderate value in same genetic group. Litter size at birth:-The heritability of litter size at birth in desi, Landrace, LR X D and pooled was low to moderate. The low estimates may be due to maternal and other environmental factors.Low to moderate estimates indicated good scope for increasing better management practices along with selection. The present finding in good agreement with that of Kumar (1999), Mukhopadhyay *et al.*(1991) and Khalkho (2004).

Litter size at weaning:The heritability of litter size at weaning in generally low. Low estimates of heritability of the trait were also reported by Milojic and Petroic (1983) in Landrace. Khalkho (2004) recorded low to medium value of liter size at weaning in Tamworth, desi and their cross brads.

Litter size at birth:The heritability of litter size at birth was estimated to be 0.23±0.33, 0.10 ± 0.22, 0.07 ± 0.17, and 0.27±0.16 in LR, LR X D ,Desi and pooled respectively. Mukhopadhyay (1991) reported low to high heritability in Landrace Tamworth and pooled data whereas Khalkho(2004)reported low and negative in exotic desi and crossbreds.

Farrowing interval: The estimates of heritability for farrowing interval was low to moderate in data pooled over all genetic group except in desi where as the value was high (0.65±0.54). This is similar to Irgang and Robinson (1984) in Landrace and LWY, Mukhopadhyay *et al.*(1989),Kumar(1999) and Khalkho(2004) in different exotic desi

and their crossbreds, who also obtained low to moderate heritability.

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Table 1-Estimates of heritability (h^2) along with standard error of growth traits in Landrace, desi and their cross breeds and data pooled over all genetic group in pigs.

Factors	LR	LR X D	Desi	Pooled
Birth wt.wk.	0.46±0.24 (378)	0.39±0.16 (633)	0.35±0.21 (237)	> 1 (1300)
4th weeks	0.02±0.07 (282)	0.63±0.23 (542)	> 1 (195)	0.23±0.08 (1071)
8th weeks	0.03±0.08 (274)	0.98±0.30 (501)	> 1 (181)	0.64±0.15 (968)
12th weeks	0.23±0.26 (191)	> 1 (121)	> 1 (36)	0.67±0.24 (290)
16th weeks	0.46±0.41 (85)	> 1 (58)	0.64±0.25 (21)	> 1 (172)
20th weeks	0.68±0.52 (67)	> 1 (50)	0.01±0.70 (20)	0.91±0.36 (145)
24th weeks	0.97±0.66 (53)	> 1 (49)	0.64±1.00 (19)	> 1 (129)

Figure in parentheses indicates no. of observation.

Table 2- Estimates of heritability (h^2) along with standard error of reproductive traits in Landrace desi and their cross breeds and data pooled over all genetic group in pigs

Factors	LR	LR X D	Desi	Pooled
Age at 1st.	>1	> 1	> 1	0.35±0.22
farrowing	-75	-130	-98	-305
Litter size	0.09±0.13	0.32±0.30	0.90±0.27	0.32±0.17
At birth	-75	-110	-86	-310
Litter size	0.10±0.14	0.08±0.21	0.08±0.26	0.01±0.09
at weaning	-75	-111	-86	-311
Litter weight	0.23±0.33	0.10±0.22	0.07±0.17	0.27±0.16
at birth	-75	-111	-86	-311
Litter weight	0.33±0.38	0.20±0.26	0.10±0.16	0.51±0.21
at weaning	-75	-110	-85	-310
Farrowing	0.09±0.26	0.17±0.28	0.65±0.54	0.34±0.19
interval	-75	-90	-70	-274

Figure in parentheses indicates no. of observation