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Relationship between Gestation Length, Birth Weight and Weight at Service in Brown Swiss X Red Sindhi.

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Abstract: *This study was conducted to determine the relationship between gestation length, birth weight, and weight at service of brown Swiss red Sindhi crosses. The data were collected from the record sheets of 85 cows maintained in Department of Animal Genetic and breeding, Sunderasan School of Animal Husbandry and Dairying, Sam Higginbottom Institute of Agriculture, Technology and Sciences Allahabad, UP, India. Completely randomised designed and correlation statistical method was used in the analysis of data using SPSS software. The mean gestation length for male calves were divided into four groups as; 268.28, 284.42, 290.15 and 283.25. The group one with (268.28) was regarded as the best group with shorter gestation length according to weight at service, while the mean gestation length of female calves were also divided into four groups as; 278.5, 278.44, 277.6, and 281.72. Group three was regarded as best group with shorter gestation (277.6). The mean birth weight for both sexes were; 14.83, 23.15, 22.011and 18.898 for males calves, while 15.78, 12.78, 11.67 and 14.87 for female calves. Group G2 and G1 are considered best group according to weight of the calves. The ANOVA tables reveals that, there is no significant differences (P>0.05) in gestation length and birth weight for both sexes. It was also observed that increase in weight at service has no impact in heavier birth weight of calf and gestation length. There is no significant difference (P>0.05) between gestation length and birth weight of calves, gestation length was positively correlated with birth weight 0.052 at 5% probability level.*

Keywords*: Gestation Length, Birth Weight, Weight at Service, Brown Swiss and Red Sindhi crosses.*

I. Introduction

Livestock sector plays a significant role in the rural economy of India. it contribute about 5 percent of the total gross domestic product GDP and one of the fourth of the agricultural GDP. The sector is unique in terms of employment opportunities as to third of females in rural India is engaged in livestock rearing, livestock is an integral part of mixed farming system that characterised Indian agriculture. Livestock manure is the major source of nutrient for crop production and for sustaining soil fertility. Livestock economy is more equitably distributed than that of land and the important of livestock for poorer household is even more. Besides contributing food and input for crop production, livestock are important as saving or investment for poor household and provide security or insurances through varieties aspect in different production system (kitalyi *et al.*, 2005). However crossbreeding of indigenous stock with exotic animals is well known strategy for improving the productivity of indigenous stock mainly of cattle, sheep, pig, and poultry. The strategy was mooted in India in the early of the twentieth century but could not be successful implemented due to fear of non adaptability of crossbreed animal to tropical India condition(Rajapurohit,1979p).later on to come up with the growing challenges of meeting the rising demand for livestock products, crossbreeding research and development effort were re introduces during 1950s and concerted effort, especially after 1970s have been made to promotes crossbreed strains of cow, sheep and pig are now available, as per livestock census carried out in 2003, India had 185 million cattle,98 million buffaloes,124 million goats,61 million sheep,14 million pigs and 489 million poultry. Cattle always dominated the livestock production systems in India. The priority of maintaining a sufficient number of draught animals for used in crop production and transportation led to dual purpose breeds of cattle that could produces milk and quality draught males. Other species like buffaloes, sheep, goats, pigs and poultry have traditionally maintained for food production (Birthal and Taneja, 2006).

II. Materials And Method

Study Area

This study was carried out in an experimental area ($25^{o}45^{o}$N, $81^{o}51^{o}$E, 98m) of the Sam Higginbottom Institute of Agriculture, Technology and Science (SHIATS) Allahabad (UP), India. This location receives the mean annual rainfall ranged from 500mm to 1000mm. More than 70 percent of rains are received during S-W monsoon i.e. Remaining 5 to 10 percent rains is received in winter, 10-15 per cent in summer and 5-10 per cent during post monsoon season. Normal rainy days exceed 40 per cent per annum. Summer monsoonal rainfall comes in down pours while winter rainfall comes in light drizzles and is easily absorbed in soils. Temperature

varies in this region. May and June are the hottest and December and January are coldest. Monthly mean temperature more than 25^{o}C prevails during 8-10 months of the year. During May and June maximum temperature rises above 40^{o}C and hot dry winds are common feature. In January, normal mean minimum temperature remains around 8-10^{o}C. Frost for one or two days may also occur during winter months.

Data Collection

The data used in this study was collected from 47 sheets record maintained in the Sunderasan School of Animal Husbandry and Dairy Technology, Animal Genetic and Breeding Unit from the period of (1990 to 2014), on Brown Swiss Red Sindhi crosses. The data recorded includes birth weight, gestation length, and weight at service, however the birth weight recorded in kilogram (Kg) within twenty four hours of parturition, gestation length was calculated as the number of days between the last service and the date of calving or parturition. The animals were divided in to four groups i.e. G1, G2, G3, and G4.

- (410 to 495 lbs) G1
- (496 to 580 lbs) G2
- (581 to 665 lbs) G3
- (666 to 750 lbs) G4

STATISTICAL METHOD

Complete Randomized Design (CRD) and correlation using IBM SPSS Statistics software Version 20 was used in the analysing the data.

III. Results

The ANOVA table for gestation length of males and females calves reveals that, the calculated F value due to groups of weight at service was less than the F table value on degree of freedom of 3 and 46 at 5% probability level as in table 1. The ANOVA table for female's calves' gestation length was found to be 3 and 76 at 5% probability level as in table 2. The F value as in table 3 for male birth weight is less than F table. The F value as in table 4 for female birth weight is less than F table. The correlation value between gestation length and birth weight was positively correlated (0.52).

Table 1: ANOVA TABLE FOR GESTATION LENGTH MALE

SOURCE OF VARIATION	DF	SS	MSS	FCAL	FTAB	RESULT
BETWEEN TREATMENT	3	2492.424	830.8081	1.930457	2.000	NS
WITHIN TREATMENT	46	19796.96	430.3686			
TOTAL	47					

Table 2: ANOVA TABLE GESTATION LENGTH FOR FEMALE

SOURCE OF VARIATION	DF	SS	MSS	FCAL	FTAB	RESULT
BETWEEN TREATMENT	3	358.1528	119.38428	0.9333333	2.00	NS
WITHIN TREATMENT	76	28466.85	374.56378			
TOTAL	79					

Table 3: ANOVA TABLE BIRTH WEIGHT FOR MALE

SOURCE OF VARIATION	DF	SS	MSS	FCAL	FTAB	RESULT
BETWEEN TREATMENT	3	272.1769	90.72565	1.969442	2.00	NS
WITHIN TREATMENT	42	1934.8	46.06667			
TOTAL	45					

Table 4: ANOVA TABLE BIRTH WEIGHT FOR FEMALE

SOURCE OF VARIATION	DF	SS	MSS	FCAL	FTAB	RESULT
BETWEEN TREATMENT	3	270.1767	90.0567	0.5359679	2.00	NS
WITHIN TREATMENT	40	1930.7	48.2675			
TOTAL	43					

Table 1: CORRELATIONS BETWEEN BIRTH WEIGHT AND GESTATION LENGTH.

		Gestation length,1	Birth weight
Gestation length,1	Pearson Correlation	1	-.178
	Sig. (1-tailed)		.052
	N	85	85
Birth weight,2	Pearson Correlation	-.178	1
	Sig. (1-tailed)	.052	
	N	85	85

IV. Discussion

Weight at service of the cows in this study shows that, there was no significant difference on the gestation length and on the birth weight of the calves, while the result of Defries et al., (1999) on brown Swiss gestation length and birth weight, observed that, there is significant differences among breeds with exception of difference between jersey and Holstein. Foote et al., (2001) observed significant differences in gestation length due to sex, males calves were carried an average of 1.44 days longer than female calves. Touchberry and Bereskin (2006) studied the effect of cross breeding on gestation length and birth weight observed no significant effect on gestation length and birth weight. This is in line with my findings, that was observed that, the cows which weighted 496- 580lbs at service gave birth to heavier calves with regards to male calves and the cows which weighted 581-665lbs at service gave birth to the heavier calves in case of female calves in relation to birth weight according to weight at service. There is no significant difference in birth weight due to sex. It was concluded that, There is no significant difference between gestation length and birth weight of the calves and the gestation length was positively correlated with the birth weight 0.52^{**} at 0.05 probability level. Touchberry and Bereskin (2006) reported almost the same value of correlation 0.54.

V. Conclusion

It was concluded that, weight at service of the cow has no significant difference on the gestation length and on birth weight of the calves, though it was observed that the cows which weighted 496- 580lbs at service gave birth to heavier calves in case of male calves and the cows which weighted 581-665lbs at service gave birth to the heavier calves with regard to female calves in case of birth weight according to weight at service. Significant difference in birth weight due sex was observed. There is no significant difference between gestation length and birth weight of the calves. The gestation length was positively correlated with the birth weight 0.526^{**} at 0.05 probability level. Cows with longer gestation length gave birth to relatively heavier calves than those with shorter gestation length.

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