Growth Rates and Growth Curve in Sahiwal Cattle

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The profitability of dairy enterprise depends on the overall productivity of animals maintained in a herd, which can be enhanced by selecting the animals as early as possible. Selection of animals on the basis of first lactation 305 days or less milk yield under progeny testing increases the generation interval. Thus growth parameters at an early age can be used as one of the selection criteria, besides selecting the animals on the basis of their performance during first lactation. Fitting of growth curves can be used effectively for selecting the animals at early ages. Hence, the present investigation was undertaken to plot growth curves in Sahiwal cattle.

Keywords: Body weights, Sahiwal cattle, heifers, growth rate, growth curves

INTRODUCTION

The present investigation was carried out on Sahiwal breed of cattle maintained at National Dairy Research Institute (NDRI), Karnal. Body weights of 780 animals at different ages at six months intervals from birth to 36 months of age and weight at first calving were collected for a period of 47 years (1961-2007). The records of the animals with known pedigree were only considered for this study. The birth weight of calves born of abortion and still birth were not included. Subsequent body weights, in case of sick calves were also not included. Body weights of females Sahiwal animals from birth to first calving were used for evolving selection criteria by preparing growth curves. Growth curve was prepared by plotting age (in months) against average body weights (in kg). Average daily weight gains at different periods were also estimated.

The growth curve indicates graphical representation of the average body weights at different ages. The linear growth function was considered for construction of growth curves.

\[ Y = a^0 + b^0 X \]

Where, \( Y \) was the body weight (kg), \( X \) was age (in months), \( a^0 \) was intercept value and \( b^0 \) was estimated regression coefficient.

The average birth weight of Sahiwal calves was observed to be 20.80 ± 0.07 kg. Average body weights of Sahiwal cattle at six, twelve, eighteen, twenty four, thirty and thirty six months of ages were 83.40 ± 0.63 kg, 137.81 ± 0.95 kg, 202.27 ± 1.13 kg, 252.83 ± 1.30 kg, 300.77 ± 1.62 kg and 323.45 ± 1.75 kg, respectively. Average weight at first calving was observed to be 348.04 ± 1.82 kg with an average AFC of 36.3 ± 0.32 months. Khan et al. (1999) also reported that the body weights of Sahiwal cattle at birth, twelve months, twenty four months and at first calving were 21.4 ± 2.5 kg, 130.0 ± 30.0 kg, 222.0 ± 43.0 kg and 319.0 ± 38.0 kg, respectively. Similarly, Hiremath et al. (2007) observed that the body weights at birth, six months, twelve months and at first calving were 26.0 ± 0.38 kg, 74.1 ± 2.81 kg, 151.0 ± 7.74 kg and 284.9 ± 7.71 kg, respectively in crossbred cattle. However, Madhuri et al. (2007) reported relatively higher birth weight and subsequent body weights in three-breed crosses involving Holstein Friesian, Brown Swiss and Hariana cattle.

Growth rates in Sahiwal calves and heifers were estimated at different ages. Daily weight gains from birth to age at first calving were estimated for Sahiwal female cattle and average daily weight gain was observed to be 298.35 g/day. Maximum growth rate was observed between twelve and eighteen months of age (363.32 g/day) and minimum growth was observed between thirty months to age at first calving (238.74 g/day). Similar growth rate (309.6 g/day) was reported...
by Mudgal and Ray (1965) up to 2.5 months of age whereas, an increased growth rate of 476.7 g/day was observed from 2.5 months to 6 months of age in Sahiwal cattle. However, Kumar (1969) and More et al. (1974) reported very lower growth rates of 185.5 ± 4.7 and 197.0 ± 3.2 g/day, respectively. The daily weight gains in Sahiwal cattle from birth - 6 m, 6-12 m, 12-18 m, 18-24 m, 24-30 m, 30 m - AFC and overall growth rates were obtained as 341.98, 297.51, 363.32, 274.02, 274.54, 238.74 and 298.35 g, respectively.

It is clear that the growth rate was comparatively higher during first 6 months and then it declined from 6 to 12 months and again increased. The better managemental practices and feeding schedule followed in the calf section may have attributed to higher growth rates up to an age of 6 months. The sudden withdrawal of skim milk and beginning of rumen development may be the reason of decreased growth rate from 6 to 12 months. Completely developed fore stomach may be attributing to the further increased growth rate thereafter. A steady growth rate was observed for a period one and a half year i.e. from 18 to 30 months of age. Minimum growth rate was observed during the period of 30 months to AFC may be due to attainment of adult body weight around the age of 30 months in most of the Sahiwal cows.

The growth curve was observed to be linear in nature in Sahiwal heifers (Figure 1) with an accuracy of prediction of 99.00%. Singh (1978) also reported more or less linear nature growth curves from birth to sixty months of age at three months interval in Sahiwal and other crossbreds.

CONCLUSIONS
It was concluded that by fitting the growth curves Sahiwal cattle can be selected at an early age, besides selecting the animals on the basis of their performance during first lactation.

REFERENCES


