Age at First Calving in Nili Ravi Buffalo

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Abstract
Age at first calving was studied in 630 buffaloes maintained at six dairy farms in Pakistan. The mean age at first calving in overall data was 1291.31 ± 8.68 days. It was 1376.17 ± 54.12, 1290.7 ± 26.17, 1304.97 ± 21.32, 1266.19 ± 12.71, 1301.77 ± 16.26 and 1268.31 ± 33.73 days at MDF Peshawar, MDF Nowshera, MDF Rawalpindi, MDF Khyber Okara, MDF Punjab and LRS, NARC, Islamabad, respectively. There was no significant difference between age at first calving at various farms. Age at first calving was studied in early and late maturing groups of buffalo and it was found 1282.75 ± 10.14 days in early maturing group (age at maturity: 957.93 ± 10.68 days) and 1308.78 ± 16.44 days in late maturing group (age at maturity: 1015.26 ± 17.39 days). Correlation between age at first calving and first lactation performance traits was studied. Non-significant negative relationship was observed between age at first calving and birth weight of male and female calves, lactation length, dry period and service period. Age at maturity showed significant positive correlation with age at first calving.

Introduction
The age at first calving is an important parameter of reproductive efficiency. The shorter the age at first calving the longer will be the productive life. The losses due to late age at first calving in Pakistani buffaloes is estimated as 24.27 billion rupees (Usmani, et al., 1987). The age at first calving as reported in the literature are presented in Table 1.

The economics of buffalo milk production was studied by Pradeep, et al. (1992) in house hold landless labourers, small, lower medium, upper medium and large farmers in Muzzafarnagar district, India. The age at first calving ranged from 39 months in landless labourer to 36 months in upper medium farmers.

The heritability (h²) for age at first calving for Egyptian buffalo 0.61 ± 0.12 and for Indian buffaloes is reported in the literature as -0.91 ± 0.94 (Dahiya, et al., 1990), 0.23 ± 0.06 (Singh and Yadav, 1989), 0.43 ± 0.14 (Singh and Basu, 1988).

Several restricted selection indices, using combinations of nine dairy performance traits, were calculated from the first lactation records of Murrah buffaloes maintained at the National Dairy Research Institute, Karnal, India by Gajbhiye and Tripathi (1991). The reduction in genetic gain was seen when restriction was imposed on highly heritable and economically important traits such as age at first calving. A restriction selection index combining age at first calving, first lactation length, first dry period, first service period and milk yield per day of the first lactation was recommended for the Murrah herd at Karnal.

Selection indices constructed for the improvement in genetic merit of buffaloes include age at first calving as an important parameter (Chakravarty and Rathi, 1990 and Chakravarty, et al., 1990).

The present study was planned to investigate the age at first calving and its effect on other traits of economic importance in Nili Ravi buffalo maintained at various farms in Pakistan.

Materials and Methods
The study was based on 630 buffaloes maintained at following farms during the period 1978 to 1994.

<table>
<thead>
<tr>
<th>Farm Type</th>
<th>Number of Buffaloes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military Dairy Farm</td>
<td>28 buffaloes</td>
</tr>
<tr>
<td>Military Dairy Farm</td>
<td>84 buffaloes</td>
</tr>
<tr>
<td>Military Dairy Farm</td>
<td>95 buffaloes</td>
</tr>
<tr>
<td>Military Dairy Farm</td>
<td>174 buffaloes</td>
</tr>
<tr>
<td>Military Dairy Farm</td>
<td>206 buffaloes</td>
</tr>
<tr>
<td>Livestock Research</td>
<td>43 buffaloes</td>
</tr>
<tr>
<td>Total</td>
<td>630 buffaloes</td>
</tr>
</tbody>
</table>

Green fodder was available throughout the year in the canal irrigated area of interior Punjab and LRS, NARC, Islamabad during the period under study. At MDFs Peshawar, Nowshera and Rawalpindi there was shortage of green fodder in the months of November, December, May and June. During these months the animals were generally fed on some silage and wheat straw. At all the farms animals were fed concentrate ration according to their body requirements based on their production status along with green fodder and roughages. Usually six kilograms/day of concentrate ration was offered to milking buffaloes, two kilograms/day to pregnant and one kilogram/day to dry animals. The concentrate ration offered to the animals maintained at MDFs, Peshawar, Nowshera and Rawalpindi were conventional concentrates like oilseed cake + wheat or rice bran mixed with straw. Whereas, balanced feed containing 16 to 18 per cent protein, 70 to 72 per cent total digestible nutrients and 2.5 percent minerals were offered at LRS, NARC, Islamabad and MDFs Khyber Okara and Punjab. The ingredients of the feed and their
Naqvi and Shami: Nili Ravi Buffalo, calving, age, correlation maturity

placements according to availability and economics are as
owing:

Cotton seed cake and Rapsseed
cake or Maize oil cake 10-25%
Rice polish and Rice bran or
wheat bran 25-60%
Corn gluten feed 20%
Molasses 15-20%
Di-calcium phosphate or bone meal
Sodium chloride and Lime stone 2.5%

Calves were kept in loose housing system with adequate
supply of water at all the farms. In summer and autumn, in
morning times the buffaloes were taken out for grazing
the pastures for 2 to 3 hours.

These farms mean age at maturity was earlier at MDF
Per Okara, MDF Punjnad and LRS, NARC compared to
Peshawar, Nowshera and Rawalpindi. The farms thus, divided into two groups. Group I, early maturing
and Group II, late maturing (LM). Age at first calving
studied in both early and late maturing groups.
Statistical analysis of the data involved the application of
test of significance, t-test, F-test and correlation and
analysis following Sokal and Rohlf (1969).

Results

Age at first calving in buffaloes maintained at various
farms is given in Table 1. The mean age at first calving in
all data was 1291.31 ± 8.68 days. It is
1276.17 ± 54.12, 1290.7 ± 26.71, 2017.77 ± 16.26,
1268.31 ± 33.73 days at MDF Peshawar, MDF, Nowshera, MDF Rawalpindi,
Khyber Okara, MDF Punjnad and LRS, NARC,
abad, respectively. The difference in mean age at first
calving in the farms was non-significant.

Table 1: Age at first calving in Nili-Ravi Buffaloes at
various farms

<table>
<thead>
<tr>
<th>Farm</th>
<th>N</th>
<th>Age at first calving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peshawar</td>
<td>28</td>
<td>1276.17 ± 54.12</td>
</tr>
<tr>
<td>Nowshera</td>
<td>84</td>
<td>1290.7 ± 26.71</td>
</tr>
<tr>
<td>Rawalpindi</td>
<td>95</td>
<td>1304.7 ± 26.71</td>
</tr>
<tr>
<td>Okara and Khyber</td>
<td>174</td>
<td>1266.19 ± 12.71</td>
</tr>
<tr>
<td>Punjab</td>
<td>206</td>
<td>1301.77 ± 16.26</td>
</tr>
<tr>
<td>NARC Islamabad</td>
<td>33</td>
<td>1268.31 ± 33.73</td>
</tr>
<tr>
<td>Total</td>
<td>630</td>
<td>1291.31 ± 8.68</td>
</tr>
</tbody>
</table>

Mean age at first calving in Group I (early maturing)
was 1282.75 ± 10.14 days and in Group II (late maturing)
was 1308.78 ± 16.44 days (Table 2). The difference
between the two Groups was, however, non-significant
(t_{226} = 1.34; P > 0.10).

Table 3 shows correlations between age at first calving
and first lactation performance traits in buffaloes from six
buffalo dairy farms.

Table 2: Age at first calving in early (I) and late (II)
maturity groups in Nili-Ravi Buffaloes

<table>
<thead>
<tr>
<th>Group</th>
<th>Age at maturity (days)</th>
<th>Age at lst calving (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>1276.17 ± 54.12</td>
<td>1282.75 ± 10.14</td>
</tr>
<tr>
<td>Group II</td>
<td>1308.78 ± 16.44</td>
<td>1308.78 ± 16.44</td>
</tr>
</tbody>
</table>

Non-significant negative relationship was observed between
age at first calving and various traits except in a few cases.
The only significant correlations were seen for dry period
and service period at MDF Peshawar. Age at maturity at all
the buffalo farms showed significant positive correlations
with age at first calving (Table 3).

Discussion

The mean age at first calving of buffaloes in this study
ranges from 1266.19 ± 12.71 (MDF Khyber Okara) to
1308.78 ± 16.44 (MDF Peshawar). The age at first calving
reported from other authors is on the higher side. The age
at first calving reported in India is 51.5 ± 1.1 months for
Kujang buffaloes (Dash and Mishra, 1990); 62.17 ± 0.77
months for swamp buffaloes of Assam (Gogi et al., 1986);
1575.64 ± 21.69 days for Mehsana and Surti buffaloes
(Tailor and Jain, 1988); 52.5 ± 1.2 months for daughters
of Surti bulls (Govindaiah and Rai, 1987). Swamp buffaloes
of Thailand take 4 to 8 years for first calving (Konanta, 1992).
Bangladeshi buffaloes take 1735.4 ± 42.33 days (Alam et
al., 1993); Philippine Carabao take 5.3 ± 1.2 years,
Carabao X Murrah crossbred in Philippine take 4.3 ± 0.9
years for first calving (Momongan et al., 1991). Shrestha
and Yazzman (1990) reported the age at first calving in Murrah
and Murrah X Nepalese crossbreeds in Brazil as 52.3 and
48.3 months, respectively. This is higher than that
investigated in the present study.

The age at first calving less than that observed in the
present study has also been reported. In Italian buffalo, Pilla
and Moloi (1992) reported age at first calving as 20 to 26
months. Buffaloes at Parana State, Brazil calve at the age
of 1000 to 1200 days (Silva and Schorr, 1990). The age at
first calving at MDF Khyber Okara (1266.19 ± 12.71) and
LRS, NARC, Islamabad (1268.31 ± 33.73 days) in the
present study is comparable to age at first calving in Indian
Nili-Ravi buffalo, 1259.72 ± 12.66 days (Eswara Reddy and
Tanaja, 1970). 41.6 months (Ambles et al., 1970); and 40.8
months (Singh and Singh, 1977).

The age at first calving at MDF Peshawar (1308.78 ± 16.44
days) is comparable to Nepalese buffalo, 44.5 months
(Shrestha and Yazzman, 1990).

Chaudhry et al. (1983) reported the effect of feeding on
growth rate, age and weight at maturity and age at first

calving in Sahiwal, Friesian X Sahiwal crossbred cattle and Nili-Ravi buffaloes. Each type of animals was divided into two groups. The one which was offered concentrate mixture (1 percent of live weight bases) along with green fodder ad libitum and the other group was offered green fodder alone. The information reveals that the animals which were offered concentrate mixture + green fodder had a higher daily growth rate, lower age at maturity and lower age at first calving compared to the other group.

Chaudhry et al. (1991) reported that green fodder + concentrate and mineral supplement reduce the age at first calving (1045 days) in Nili-Ravi buffaloes as compared to green fodder + concentrate (1053 days) and green fodder (1472 days).

The influence of feed has been observed in this study as well. In MDFs Peshawar, Nowshera and Rawalpindi the animals were fed on oil seed cake wheat or rice bran mixed with straw. In these three farms the age at first calving ranges from 1290.7 ± 26.71 to 1376.18 ± 54.12 days. In MDF Khyber Okara, MDF Punjab and LRS, NARC, Islamabad a balanced feed is offered containing 16-18 percent protein, 70 to 72 percent total digestible nutrients and 2.5 percent of minerals. Moreover, green fodder was available ad libitum. In these farms the age at first calving ranges from 1266.19 ± 12.71 to 1301.77 ± 16.26 days.

Correlations between age at first calving and first lactation performance traits were studied in all the six farms. Age at first calving is positively correlated with age at maturity. All other traits show negative trends in terms of first lactation performance in relation to age at first calving except in a few cases where negligible positive trends were seen (Table 3). This shows, as the age of the buffaloes advances, there is negative trend in birth weight (male and female calves), lactation length, dry period and service period. Correlations of age at first calving and these traits can be readily located in the literature for instance Dahania et al. (1991), Type and Nagarcenkar (1992), Tien and Tripathi (1991), Dahama et al. (1990), Khan et al. (1990), Datt and Yadav (1988) and Mohammad et al. (1991).

Eswara Reddy and Taneja (1982) reported the age at first calving as 42 months in Nili-Ravi buffalo maintained at Ferozepur Military Dairy Farm, India. They reported significant (P<0.05) effect of age at first calving for weight at first calving, first lactation yield, average first lactation yield per day of first lactation length and average first lactation yield per day of first lactation interval. The regression co-efficients were 0.049, 0.287, 0.008 and 0.006 kg, respectively, suggesting that these traits would increase with increase in age at first calving.

However, it is worth mentioning that correlation/regression of age at first calving and these traits only explain the linear part of the relationship.

### References


Naqvi and Shami: Nili Ravi Buffalo, calving, age, correlation maturity


