PERFORMANCE STATUS OF MURRAH BUFFALOES FOR FIRST LACTATION TRAITS - A REVIEW

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INTRODUCTION
The Murrah breed of Buffalo is pride of India in general and of Haryana in particular, because of its high milk production potential clubbed with its significant contribution towards agricultural economy and dairy industry. The Murrah was identified as a global breed of buffalo in the second world buffalo congress held at New Delhi (India) in 1988 and has production potential for milk as well as beef. The genetic worth of Murrah breed has been appreciated for its production efficiency not only in India but also throughout the world. Knowledge about the performance status of this breed and the pattern of inheritance of various economic traits related to reproduction and production is necessary for formulating breeding strategies for bringing about further improvement in their productivity.

MATERIALS AND METHODS
The review includes reports of the performance and pattern of inheritance of first lactation traits of Murrah buffaloes from 1971 through 2000. The sources of data for most of the reports are from Institutional and Governmental Farms. The performance was weighted by the number of observations.

RESULTS AND DISCUSSION
Age at first calving (AFC).

From different reports available in the literature a large variation in the AFC existed which ranged from 1293±10 (Gurnani and Nagarcenkar, 1977) to 1656±31 days (Jain and Taneja, 1982). The weighted average of AFC was found to be 1387±21.70 days (Table 1). The heritability ($h^2$) estimates for AFC varied from 0.02±0.07 (Nath, 1998) to 0.88±0.20 (Gurnani et al., 1972) table 2. This wider range of $h^2$ estimates may be attributed to the variation in number of sires and number of progeny per sire apart from differences in the genetic merit of sire used in those herds.

First lactation milk yield (FLMY).

The weighted average of FLMY was 1701±26.40 kg (Table 1) and it was ranged from 1482 (Maralidhar and Deshpande, 1995) to 2426 kg (Khosla et al., 1984). The various reports (Table 2) revealed that the $h^2$ estimates for FLMY were recorded between 0.03±0.06 (Sharma, 1996) to 0.53±0.21 (Sane et al., 1972).

First lactation length (FLL).

The average values of FLL in Murrah buffalo as reported by several workers has been reviewed and the weighted average was found to be 313±3.19 days. It varied from 283 (Gurnani et al., 1976) to 373 days (Sharma and Singh, 1988). The $h^2$ estimates of FLL ranged from 0.05±0.13 (Dass and Sadana, 2000) to 0.29±0.12 (Sethi and Khatkar,
1997). These low estimates of $h^2$ may be due to the higher component of environmental variance.

Table 1. Weighted averages for first lactation traits in Murrah buffaloes

<table>
<thead>
<tr>
<th>Traits</th>
<th>No. of studies</th>
<th>Range</th>
<th>Weighted averages</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFC (days)</td>
<td>18</td>
<td>1293 – 1656</td>
<td>1387±21.70</td>
</tr>
<tr>
<td>FLMY (days)</td>
<td>21</td>
<td>1482 – 2426</td>
<td>1701±26.40</td>
</tr>
<tr>
<td>FLL (days)</td>
<td>18</td>
<td>283 – 373</td>
<td>313±3.19</td>
</tr>
<tr>
<td>FSP (days)</td>
<td>14</td>
<td>143 – 291</td>
<td>196±7.25</td>
</tr>
<tr>
<td>FPY (kg)</td>
<td>13</td>
<td>7.10 – 11.40</td>
<td>9.47±0.19</td>
</tr>
<tr>
<td>FDP (days)</td>
<td>14</td>
<td>137 – 273</td>
<td>190±5.73</td>
</tr>
<tr>
<td>FCI days)</td>
<td>15</td>
<td>448 – 632</td>
<td>522±9.73</td>
</tr>
</tbody>
</table>

Table 2. Range of $h^2$ estimates for first lactation traits

<table>
<thead>
<tr>
<th>Traits</th>
<th>No. of studies</th>
<th>$h^2$</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFC</td>
<td>14</td>
<td>0.02±0.07</td>
<td>0.88±0.20</td>
</tr>
<tr>
<td>FLMY</td>
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<td>0.03±0.06</td>
<td>0.53±0.21</td>
</tr>
<tr>
<td>FLL</td>
<td>11</td>
<td>0.05±0.13</td>
<td>0.29±0.12</td>
</tr>
<tr>
<td>FSP</td>
<td>6</td>
<td>0.00±0.00</td>
<td>0.39±0.24</td>
</tr>
<tr>
<td>FPY</td>
<td>6</td>
<td>0.17±0.07</td>
<td>0.56±0.16</td>
</tr>
<tr>
<td>FDP</td>
<td>8</td>
<td>0.00±0.10</td>
<td>0.20±0.13</td>
</tr>
<tr>
<td>FCI</td>
<td>10</td>
<td>0.005±0.15</td>
<td>0.64±0.20</td>
</tr>
</tbody>
</table>

First service period (FSP). Table 1 indicated that this period ranged from 143 (Nath, 1998) to 291 days (Sharma, 1996) in Murrah buffaloes. The weighted averages for FSP was 196±7.25 days. The $h^2$ estimates varied from 0.00 (Jain and Sadana, 2000) to 0.39±0.24 (Gajbhiye, 1987).

First peak yield (FPY). It is one of the most important and early available traits in dairy animals. It is being used as selection criterion particularly under village conditions. The average values of FPY reviewed from literature varied from 7.1 (Sharma et al, 1992) to 11.40 kg (Khosla et al, 1985). The weighted average of FPY was 9.47±0.19. The $h^2$ estimates for FPY ranged from 0.17±0.10 (Sethi and Khatkar, 1997) to 0.56±0.16 (Tailor et al., 1998). The high $h^2$ estimate of this trait is suggestive of the presence of additive genetic variance and hence selection on individual phenotypes could be effective in improving FPY.

First dry period (FDP). Table 1 depicts that FDP ranged from 137 (Nath, 1998) to 273 days (Yadav et al., 1983). The weighted average was 190±5.73 days. FDP was found to be lowly heritable trait.
First Calving interval (FCI). The weighted average of FCI was 522±9.73 days. The average values of FCI ranged from 447 (Sahana, 1993) to 632 days (Sharma and Singh, 1988). This long calving interval is partly due to greater lactation stress in high yielding buffaloes and partly due to seasonality of breeding. Suckling of calf in buffalo may also result in failure of resumption of ovarian cyclicity following freshening, which adds to the lengthening of post-partum estrus interval and thus increasing calving interval. The $h^2$ estimates of FCI ranged from 0.005±0.15 (Dhara, 1994) to 0.64±0.20 (Gurnani et al., 1972).

CONCLUSION
Results showed that Murrah breed has a good production potential, but has late maturity, longer calving interval and low conception rate. These reproductive traits need improvement. The high estimates $h^2$ of AFC and FPY is suggestive of the fact that these traits can be improved through individual selection.

REFERENCES