Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2020; 8(2): 290-293

Received: 07-01-2020
Accepted: 09-02-2020

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# Productive and reproductive performances of Murrah buffalo cows: A review

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**Abstract**
Murrah buffalo is one of the finest dairy buffalo breed in India. The success of any dairy farm depends upon efficient productive and reproductive performances of a dairy animal. Different genetic and non-genetic factors influence its performance potential. All the productive and reproductive traits of murrah buffalo under the present study will serve as standard and hence can be used as a reference or standard at a glance to compare the performances of Murrah Buffalo reared under different agro-climatic zones of India. Therefore, performance traits like 305- days, peak milk yield, lactation length, average daily milk yield, dry period, birth weight, calf mortality rate, age at first calving, service period, calving interval, number of services per conception and conception rate of Murrah buffalo are reviewed here.

**Keywords:** Productive, reproductive, performances, Murrah buffalo and mortality

## Introduction
Dairy Buffalo rearing is one of the most important occupations. It contributes more than 50% of the total milk production in India. Murrah buffalo cow is the finest breed of milk producing buffalo. Introduction of high yielding breed like Murrah buffalo in milk deficient state can bridge the gap of milk requirement in India. There is a huge gap in their rearing or managemental practices, production and reproduction performances and efficient/economical output of their produce in different parts of India. Agro-climatic condition of the regions affects the production and reproduction performances of dairy animals such as the finest breed, Murrah Buffalo. Performance traits like 305- days, peak milk yield, lactation length, dry period, birth weight, calf mortality rate, age at first calving, service period, calving interval, number of services per conception and conception rate of Murrah buffalo were reported as 2147.6 ± 87.06 kg [29], 8.87 ± 0.05 kg [39], 297.8 ± 1.9 days [39], 110.66±6.62 [11], 34.76 ± 0.54 Kg [31], 29.1% to 39.8% [1], 43.69±0.46 months [21], 139.91±2.96 [16], 15.5±4.51 months [10], 1.17 ± 0.03 [13] and 33.19% [33], respectively. Review of literature pertaining to production and reproduction performances of murrah buffalo in a holistic manner is rather scanty. Hence, considering these points, we reviewed the productive and reproductive performances of Murrah Buffalo so that the literature can acts as source of information for scientific rearing and management of Murrah buffaloes in different agro-climatic conditions of India.

## Age at First Calving (AFC)
Early AFC is very important factor because more number of productive life can be obtained. Short generation interval increases genetic gain. AFC in Murrah buffaloes ranged from 1216.64±17 days [11] to 1656.87±31.26 days [15]. It was also reported that age at first calving as 48.2 ± 0.30 months [6], 43.69±0.46 months [21] and 1578.7 ± 20.3 days or 51.9 months [40] which is higher than 47.1 ± 0.6 months [28, 18, 22]. It is influenced by period of calving or season of birth and herd size.

## Service Period (SP)
Service period has a key role in calving interval. Longer the SP, longer will be the Calving interval. It is affected by season, parity and herd. The average service period of 139.91±2.96 [16] days was reported in Murrah buffalo at NDRI farm, 225.0 ± 5.5 [39] in Tamil Nadu, 253.7 ± 17.3 [40], 259.93 ± 11.31 days [17] and 283.8 ± 14.2 days [28]. The average first service period in Murrah buffaloes ranged from 143.41 ± 3.97 days [25] to 281.50 ± 8.65 days [41]. It was also reported that FSP (First Service Period) as 161.65 ± 4.61 in Murrah buffaloes [27]. It was also observed that service period as 148.00±8.9, 144.80±8.8, 167.40±3.9 and 134.10±3.40 days for

first, second, third and fourth parity, respectively [38]. It was also reported that service period for first, second and third parity as 232.09±10.37, 185.90±10.83 and 179.38±12.91 days, respectively in Murrah buffaloes [13].

**Number of Service per conception** (NS/C)
It accounts for effective use of time, germplasm and productive life of the animal. It is affected by season of birth. Average number of services per conception in buffaloes ranges from 1.5 to 2.0 in India. Number of services per conception in Murrah buffaloes ranged from 1.73±0.00 [8] to 3.74±0.26 days [41]. It was also reported that number of services per conception (NS/C) was 1.31±0.23 in Nagpuri buffaloes [17] and in Murrah buffaloes as 3.1-4.5 [1], 3.74±0.26 [41], 2 [20] and 1.81±0.24 [9]. However, in Murrah buffaloes, it was reported that average NS/C was 1.49 ± 0.06, 1.17 ± 0.03 and 1.32±0.06 for first, second and third parity, respectively [13]. Higher rate of service per conception may be the implications of post-partum complication, failure in estrus detection, poor postpartum management, etc.

**Conception rate (CR)**
Season has a significant impact on conception rate. Conception rate (CR) in Murrah buffaloes was estimated as 33.19% [33] and in Nili-Ravi buffaloes as 47.07, 41.51, 39.81 and 51.96% in winter, spring, summer and autumn, respectively [26].

**Gestation period**
It ranges from 307-310 days. Gestation period of Graded Murrah buffaloes maintained under field conditions in India was reported as 308.68 ± 0.16 days [4].

**Calving interval (CI)**
Period of calving has a significant impact on calving interval in Murrah buffaloes [37, 41]. Calving interval of 532.8 ± 5.5 [39], 559.6±17.3 days [40, 18, 28], 15.5±4.51 months [10] and 470 ± 4.87 days [6] in Murrah buffaloes were reported. Lot of variations were observed in the FCI (First Calving Interval) in Murrah buffaloes. Minimum FCI of 437 days [30] whereas the highest average of the same trait was 632 days [34] was reported. Average calving interval (CI) were reported for first, second and third parity as 464.6, 435.1 and 432.6 days, respectively [36].

**Birth weight of calf**
Mean body weight at birth irrespective of sex, male and female Murrah calves were observed as 34.76 ± 0.54 Kg, 32.83 ± 0.63 Kg and 37.06 ± 0.73 Kg, respectively [31]. The birth weights for suckling and weaned calves were 30.87±1.09 and 30.92±1.17 kg, respectively [19]. It was also reported as 27.7 ± 0.13 kg, respectively [6]. It was observed that Bull calves were heavier at birth than were heifer calves. Calf birth weight increased quadratically with body weight of the dam at calving. Heavier dams produced heavier calves, and body weight of the dam at calving increased with age of the dam at calving [32].

**Lactation length (LL)**
Lactation length was mainly influenced by the parity of lactation. Murrah buffalo lactation length was reported to be 299.91±5.01 [37], 312.8 ± 5.7 [40], 268 ± 2.55 days [6] and 297.8 ± 1.9 days [39].

**Milk yield (Peak yield, 305 days & total lactation milk yield)**
It was reported that 305-day milk yield in Murrah Buffalo was 2147.6 ± 87.06 kg [29]. Peak yield, days to attain peak yield, 305-day milk yield, lactation length and lactation milk yield were reported as 8.87 ± 0.05 kg, 1804.9 ± 14.7 kg, 297.8 ± 1.9 days and 1855.6 ± 16.1 kg, respectively [39]. The overall peak milk yield of Buffalo was recorded as 13.97±1.13 [37]. The averages for 305-day and total lactation milk yields were 1616.3 ± 39.6 and 1686.2 ± 44.4 kg, respectively [40]. Total milk yield and lactation length were 1185 ± 21.4 kg and 268 ± 2.55 days, respectively [6].

**Dry Period**
Dry period is essential to give rest to the milch animal and also providing nourishment to the growing foetus. It is also affected by season of birth. The average Dry Period (DP) was observed as 226±13 day [24], 230.2 ± 4.9 days [39], 250.5 ± 15.9 [40] and 179 ± 4.43 days [6]. Lower dry period in the Murrah buffaloes was in its home tract [41]. DP as 207.56±7.63, 174.34±8.02 and 171.91±9.77 days for first, second and third parity, respectively [14] in Murrah buffaloes. On the other hand, estimated DP was reported as 158.20±5.01, 143.03± 52.2, 135.85±6.34 and 110.66±6.62 days for first, second, third and fourth parity, respectively [11] in Murrah buffaloes. DP was estimated as 189.15±8.39, 193.36±9.24, 189.37±10.35 and 190.77±12.46 days for first, second, third and fourth parity, respectively in Murrah buffaloes [37].

**Mortality of calves**
Economy of the farm not only rest on milk produce but also depends upon survival of the calves since they will the future replacement milch herd of the farm. The cause of mortality in Murrah buffalo calves may be respiratory problems, general debility, digestive problems, liver and urinary problems, etc. Mortality in cattle and buffalo calves ranged from 29.1% to 39.8% [1] and 20% [23]. Mortality in 0-1m, 1-2m, 2-3m, 3-6m, 6-18m, 18m-3 yr and >3-year age groups were 17.49, 5.99, 3.34, 5.42, 6.35, 2.59 and 3.93,% respectively [35]. Herd management system and selection of sire with high productive life evaluations was associated with lower mortality [7].

**Table 1:** Means of different production traits of Murrah Buffalo cows

| Particulars | 305-day milk yield (kg) | Peak yield | Lactation length (days) | Lactation milk yield (kg) | Dry period (days) | Mortality of Calves | Birth weight of calves | Reseacher |
|---|---|---|---|---|---|---|---|---|
| Mean(μ) | 1616.3 ± 39.6 | - | 312.8 ± 5.7 | 1686.2 ± 44.4 | 250.5 ± 15.9 | - | - | Thiruvenkadan *et al*., 2010 [40] |
| | - | - | - | - | - | - | 34.76 ± 0.54 Kg, | Pramod *et al*., 2018 [31] |
| | 2147.6 ± 87.06 kg. | - | - | - | - | - | - | Pawar *et al*., 2012 [29] |
| | - | 13.97±1.13. | - | - | - | - | - | Suresh, 2013 [37] |
| | - | - | - | - | 226±13 day | - | - | Meena, *et al*., 2016 [24] |
| | - | - | - | - | - | 5-17% | - | Shivahre *et al*., 2014 [35] |

**Table 2:** Means of different reproduction traits of Murrah Buffalo cows

| Particulars | Age at First calving | Service period (days) | Service per conception | Conception rate | Gestation period | Calving interval (days) | Reseacher |
|---|---|---|---|---|---|---|---|
| Mean (μ) | 51.9 months | 253.7 ± 17.3 | - | - | - | 559.6 ± 17.3 days | Thiruvenkadan *et al*., 2010 [40] |
| | | 225.0 ± 5.5 | - | - | - | - | Thiruvenkadan *et al*., 2014 [39] |
| | 1216.64±17 days | - | - | - | - | - | Gogoi *et al*., 1985 [11] |
| | - | - | - | 33.19% | - | - | Sarkar *et al*., 2005 [33] |
| | | | | | | | |
| | - | - | - | - | 308.68±16 days | - | Bhave *et al*., 2018 [4] |
| | - | - | - | - | - | 437 days | Prakash *et al*. 1989 [30] |
| | | | 2 | - | - | - | Khan *et al*. 2009 [20] |
| | - | - | 1.81±0.24 | - | - | | Dutt *et al*.,1988 [9] |
| | | | 1.17± 0.03 | | | | Gupta *et al*., 1994 [14] |

## Conclusion

The performance of murrah buffalo cows in different agro-climatic zones depends upon managemental practices adopted, sires used for breeding, environmental conditions and variations in feed and fodder availability. So, genetic and non-genetic factors have major impact on the productive and reproductive performances of Murrah Buffalo. It is therefore, necessary to give emphasis on improvement in the husbandry practices and incorporation and evaluation of high merit genetic gerplasm.

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