Full Length Research Article

GENETIC STUDY ON PERFORMANCE OF MURRAH BUFFALO BULLS

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ABSTRACT

In the present study, breeding information spread over a period of 14 years from 1995 to 2008, was collected from the history-cum-pedigree sheets and milk yield registers of Murrah buffaloes maintained at four centres of Network Project on Murrah Buffalo Improvement (National Dairy Research Institute, Karnal; Central Institute for Research on Buffalo, Hisar and Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana and Choudhary Charan Singh Haryana Agricultural University, Hisar). Data on first lactation traits of 832 Murrah buffaloes sired by 95 bulls were used for the study. Farm had significant effect on FL305MY, while season and year of calving did not affect significantly in the present study. Breeding value for first lactation 305 days milk yield was estimated using simple regressed least-squares (SRLS) method. The breeding value of different bulls varied from 1469.09 kg to 2061.76 kg in fifth set.

INTRODUCTION

Identification of the best sires with maximum accuracy is of immense importance for any breed improvement programme, as sires are easily and rapidly disseminated in various herds under progeny testing programme. Robertson and Randle (1954) reported that as much as 61% of genetic gain in dairy cattle resulted from selection of sires through two paths, i.e. bulls to breed cows and bulls to breed bulls. Hence, accurate selection of bulls used in artificial insemination (AI) programme is of prime importance for long-term genetic progress in the population. The prediction of breeding values constitutes an integral part of most breeding programmes for genetic improvement of the sire for different economic traits. The accuracy of estimating the breeding value of an animal is the major factor that affects the genetic progress due to selection. The sire evaluation based on milk yield was most widely used criteria. To make rapid genetic progress in performances through selection for traits of economic importance, the animals must be chosen accurately for their superior breeding values. Over the times various methods have been used for sire evaluation, Harvey (1979) described the computational procedure for simple regressed least- squares (SRLS) analysis for sire evaluation under mixed model.

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He reported SRLS estimates of the sire effects are obtained by first imposing appropriate restrictions on the least-squares set of equations and then regressing the least-squares estimates of sire effects. Several workers in India have utilized this SRLS model for estimating sire merit. Tajane and Rai (1990); Gandhi and Gurnani (1991) and Singh *et al*., (1992) estimated breeding value of Holstein-Friesian and Sahiwal; Sahiwal and Hariana Sires, respectively, based on SRLS method. Raheja (1992) estimated breeding value of Sahiwal sires based on SRLS method. Parekh *et al*., (1994) utilized SRLS for estimation of sire merit and found that this method was most accurate with the highest correlation (0.49 - 0.71) between estimated effect and rank of the sires. Banik (2004) and Mukherjee *et al*. (2007) also used SRLS along with other methods (BLUP, LSM, REML) for estimation of breeding values in Sahiwal and Frieswal bulls, respectively.

MATERIALS AND METHODS

The Murrah bulls in 7 sets (11, 12, 15, 14, 15, 16 and 12 bulls) were inducted for progeny testing at Central Institute for Research on Buffalo (CIRB), Hisar, National Dairy Research Institute (NDRI), Karnal Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana, Choudhary Charan Singh Haryana Agricultural University (CCSHAU), Hisar. The daughters of first 7 sets have

completed their first lactation records. The first lactation 305 days milk yield (FL305MY) records of 832 daughters of 95 bulls calved during 14 years from 1995 to 2008, were used for this study. The period of 14 years was divided into 14 years. Each year of calving was further classified into 2 seasons, viz. most calving season (January to June) and least calving season (July to December) based on calving pattern. All information was classified in four farms viz. NDRI, CIRB, GADVASU and CCSHAU. The breeding value of sires was estimated by Simple regressed least-squares (SRLS) method (Harvey, 1979). The formula given as below

$$Si \ = \frac{Vs}{[Vs + AiiVe]}si$$

where,

Si: is simplified regressed least-squares estimate of ith sire
V_s: is least-squares variance component for sire
V_e: is least-squares variance component for error
Aii: is diagonal element of inverse of coefficient matrix of ith sire
Si: is least-squares constant of ith sire

After adjusting data for significant fixed effects, EBVs of Murrah buffalo bulls were estimated for FL305DMY. Analysis was done in the method using the General Linear Model (GLM) procedure of SAS (2009).

Breeding value of ith sire was estimated by the following formula:

$$sire^{i}_{BV} = \mu + Si$$

RESULTS AND DISCUSSION

The overall least squares mean of total first lactation milk yield was, however, lower than that reported by Patil (2011) and Geetha (2005) in Murrah buffalo. Higher than this was reported by Katneni (2007). Farm had significant effect on FL305MY in the present study. Overall least-squares means for 305MY was found to be 1846.86 ± 35.94. Season and year of calving did not affect significantly the FL305MY of Murrah buffaloes in the present study. The information on bulls along with their breeding values is given in Table 1 to Table 7. The breeding value of different bulls varied 1646.73 to 2039.39 kg in first set, 1719.84 to 1997.04 kg in second set, 1666.99 to 2013.40 kg in third set, 1721.34 to 1886.86 kg in fourth set, 1469.09 to 2061.76 kg in fifth set, 1667.26 to 1996.02 kg in sixth set and 1675.39 to 2011.05 kg in seventh set.

Table 1. Breeding values of Murrah buffalo bulls in set 1

Sire	No. of Daughters	Breeding Value	Rank
1	5	1994.32	9
2	6	1995.46	8
3	8	2039.39	2
4	18	1974.46	11
5	19	1840.09	45
6	18	1646.73	92
7	10	1663.41	91
8	4	1912.45	26
9	5	1785.00	60
10	2	1678.40	88
11	11	1750.08	69

Table 2. Breeding values of Murrah buffalo in set 2

Sire	No. of Daughters	Breeding Value	Rank
12	9	1825.94	48
13	8	1920.71	22
14	11	1930.15	20
15	7	1997.04	6
16	2	1917.21	25
17	8	1920.13	24
18	11	1743.29	73
19	15	1951.57	17
20	10	1846.31	43
21	9	1741.54	74
22	9	1719.84	81
23	13	1755.60	67

Table 3. Breeding values of Murrah buffalo bulls in set 3

Sire	No. of Daughters	Breeding Value	Rank
24	9	1803.12	57
25	4	1972.18	12
26	8	1964.84	14
27	11	1736.44	75
28	3	1962.90	16
29	6	2013.40	3
30	4	1812.86	53
31	3	1748.27	70
32	2	1901.37	27
33	3	1964.32	15
34	5	1712.98	84
35	21	1760.66	65
36	11	1835.48	47
37	7	1699.99	86
38	9	1897.65	28

Table 4. Breeding values of Murrah buffalo bulls in set 4

Sire	No. of Daughters	Breeding Value	Rank
39	18	1844.72	44
40	9	1790.64	58
41	5	1812.26	55
42	9	1768.75	62
43	6	1788.43	59
44	5	1822.44	50
45	6	1721.34	80
46	11	1839.74	46
47	7	1850.13	41
48	9	1735.02	76
49	11	1847.66	42
50	5	1808.62	56
51	11	1886.86	33
52	8	1823.21	49

Table 5. Breeding values of Murrah buffalo bulls in set 5

Sire	No. of Daughters	Breeding Value	Rank
53	16	1639.82	93
54	3	1812.67	54
55	12	1488.84	94
56	7	1700.60	85
57	6	1745.61	72
58	6	1725.42	79
59	6	1870.00	35
60	8	1822.41	51
61	3	1469.09	95
62	6	1813.08	52
63	11	1931.93	19
64	9	1775.22	61
65	22	2005.23	5
66	12	2061.76	1
67	12	1920.57	23

Table 6. Breeding values of Murrah buffalo bulls in set 6

Sire	No. of Daughters	Breeding Value	Rank
68	10	1745.96	71
69	20	1996.02	7
70	7	1761.51	64
71	2	1688.37	87
72	3	1718.75	82
73	4	1887.29	32
74	8	1861.35	37
75	15	1850.37	40
76	14	1944.37	18
77	5	1754.63	68
78	7	1756.19	66
79	10	1971.47	13
80	10	1893.18	31
81	5	1983.81	10
82	4	1730.21	78
83	7	1667.26	90

Table 7. Breeding values of Murrah buffalo bulls in set 7

Sire	No. of Daughters	Breeding Value	Rank
84	18	1854.43	38
85	8	1730.96	77
86	13	1764.96	63
87	8	1876.36	34
88	6	2011.05	4
89	4	1718.64	83
90	3	1675.39	89
91	13	1895.25	29
92	6	1893.43	30
93	13	1868.46	36
94	9	1853.27	39
95	17	1921.27	21

The highest breeding value was observed for sire 66 (set 5) followed by 3 (set 1) and 29 (set 3). Singh and Singh (1999) estimated sire index of Murrah buffalo for 300-days milk yield and its value was ranging from 1192.70 kg to 1338.80 kg.

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