RELATIONSHIP BETWEEN PERSISTENCY AND PRODUCTION EFFICIENCY ATTRIBUTES IN MURRAH BUFFALOES

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SUMMARY

The five hundred and thirty eight records pertaining to 173 Murrah buffaloes calved during the year 1984-1992 at Buffalo Reseach Centre, CCS Haryana Agricultural University, Hisar were considered for the estimation of phenotypic correlations between five measures of persistency and production efficiency traits. Lactation milk yield had positive phenotypic correlation (0.07 to 0.53) with all the measures of persistency. Peak yield had negative relationship with all the measures of presistency. Wet average, milk yield per day of age at second calving and milk yield per day of calving interval had positive correlations with the persistency calculated by ratio method.

Keywords : Murrah, persistency, efficiency traits.

INRODUCTION

The buffalo is the cynosure of dairying in India and contributes about 55 percent of the total milk production, not withstanding its one third population vis-a-vis cattle. Highly persistent animals have generally been found to have more milk yield, longer productive life and considered as efficient producers. Scanty information (Khan *et al.*, 1980 : Garcha and Tiwana, 1981: Khan and Johar, 1985 : Gajbhiye and Tripathi, 1988) is avialable in literature regarding the relationship of persistency with production efficiency traits in buffaloes. Keeping these points into consideration the present investigation was carried out to study the association between persistency and production efficiency attributes in Murrah buffaloes.

MATERIALS AND METHODS

The five hundred and thiry eight records on 173 Murrah buffaloes calved during year 1984 to 1992 at Buffalo Reseach Centre (BRC), CCS Haryana Agricultural University, Hisar were utilised for estimation of phenotypic correlations between various measures of persistency and production efficiency traits. The persistency was calculated using following methods :

1. Johansson and Hanson (1940) Method :

$$P_1 = \frac{\text{Milk yield after 101 to 200 days of lactation}}{\text{Milk yield after 1 to 100 days of lactation}} \times 100$$

2. Ludwick and Peterson (1943) Method :

$$P_2 = \frac{4\ X_2}{9\ X_1} + \frac{1\ X_3}{3\ X_2} + \frac{2\ X_4}{9\ X_3}$$

Where,

X_1 = Milk yield during the 3rd and 4th months
X_2 = Milk yield during the 5th and 6th months
X_3 = Milk yield during the 7th and 8th months
X_4 = Milk yield during the 9th and 10th months

3. Mahadevan (1951) Method:

$$P_3 = \frac{A-B}{B}$$

Where,

A = Milk yield in the first 26 weeks of lactation
B = Milk yield in the first 10 weeks of lactation.

4. Ratio method:

$$P_4 = \frac{\text{Lactation milk yield}}{\text{Peak yield}}$$

5. Fischer (1958) Method:

$$P_5 = \frac{\sum_{i=1}^{n} X_i Y_i - \sum_{i=1}^{n} X_i \sum_{i=1}^{n} Y_i / n}{\sum_{i=1}^{n} X_i^2 - (\sum_{i=1}^{n} X_i)^2 / n}$$

Where,

i = 1, 2 20
X_i = is the particular day of recording milk yield with a fortnight interval starting from 15th day of lactation.
Y_i = is the milk yield in kg on 15th, 30th, 45th,.....,300th day of lactation.
n = number of observations in each lactation.

The production efficiency attributes included in the study were : lactation milk yield (LMY), peak yield (PY), wet average (WA), milk yield per day of age at second calving (MSC) and milk yield per day of calving interval (MYC). Phenotypic correlations of persistency with production efficiency attributes were calculated by using standard statistical methods.

RESULTS AND DISCUSSION

Lactation Milk Yield (LMY) and Persistency. Moderate to high positive correlation (0.14 and 0.53) was observed between persistency (P_1 and P_4) and lactation milk yield. These results are in agreement with the earlier findings reported by Garcha and Tiwana (1981), Bhutia and Pandey (1989). A low positive correlation (0.07, 0.05 and 0.07) was observed between LMY and P_2, P_3 and P_5. The results of correlation of LMY with P_2 and P_3 are in congruence with those reported by Gajbhiye and Tripathi (1988). Contrarily, Khan *et al.* (1980) and Khan and Johar (1985) reported moderate positive correlation between LMY and P_2, whereas Mahadevan (1951), Rao *et al.* (1970) and Singh and Gopal (1982) found moderate positive correlation between LMY and P_3. These results indicated that LMY had higher phenotypic correlation with P_4 than with any other measures of persistency.

Peak Yield (PY) and Presistency. Peak yield was found to have negative and moderate to high correlation of -0.13, -0.12, -0.19 and -0.44 with P_1, P_3, P_4 and P_5, respectively. These results are supported by the findings of Gajbhiye and Tripathi (1988), who found negetive and significant correlation of peak yield with P_1 and P_3. While the results of Bhutia and Pandey (1989) are in corroboration with the present findings i.e. the relationship between P_4 and PY. On the other hand peak yield had very low negative correlation with P_2. These results are in consonance with the work of Singh *et al.* (1965). On the basis of these results it can be concluded that as the persistency of lactation improves the peak yield goes down.

Table 1.Phenotypic correlations of persistency measured by different methods with production efficiency attributes.

Methods	No.Obs.	LMY	PY	WA	No. Obs.	MSC	No.Obs.	MYC
P_1	538	0.14	-0.13	0.06	40	0.08	415	0.16
P_2	538	0.07	-0.02	0.06	40	-0.19	415	0.04
P_3	538	0.05	-0.12	-0.01	40	0.28	415	-0.001
P_4	538	0.53	-0.19	0.10	40	0.57	415	0.34
P_5	538	0.07	-0.44	-0.38	40	0.25	415	-0.04

Wet Average (WA) and Persistency. Perusal of Table 1 revealed that a low positive and non-significant correlation (0.06 and 0.06) existed between wet average and P_1 and P_2. A correlation of -0.01 was observed between (P_3) and wet average which did not differ significantly from zero. A low positive and significant ($P< 0.05$) association of 0.10 was obtained between P_4 and wet average. On the other hand, P_5 had highly significant ($p< 0.01$) and negative

relationship (-0.38) with wet average. It is therefore, inferred that wet average is independent of persistency measured by first four method and it will decreased with the increase in P_5.

Milk Yield per day of Age at Second Calving (MSC) and Persistency. The phenotypic correlation coefficients between MSC and various measures of persistency were alll positive except in case of P_2 where it was in negative direction and non-signifficant. Correlations of MSC with persistency (P_3 and P_4) were statistically significant. The magnitude of these correlations varied from 0.08 for P_1 to 0.57 in case of P_4. The correlation coefficients of MSC with P_2, P_3 and P_5 were - 0.19, 0.28 and 0.25, respectively. These results further indicated that MSC will increase with an increase of persistency except in case of P_2.

Milk Yield per day of Calving Interval (MYC) and Persistency. The phenotypic association of MYC with P_1 and P_4 was positive and moderate to high, being 0.16 and 0.34, respectively. Very low positive and non-significant correlation coeffcient of 0.04 was observed between MYC and P_2. Further, P_3 and P_5 had negative and non-signifcant relationship of -0.001 and -0.03, respectively with MYC. It may, therefore, be inferred that when selection pressure would be exercised to increase P_1 and P_4 then there will be corresponding increase in MYC also.

Veering round these results it may be concluded that all the measure of persistency had positive correlation with LMY indicating that persistent animals are better yielders and vice-versa. The PY had negative correlation with all measure of persistency indicating that the buffalo cows having higher PY are less persistent producers i.e. there is an abrupt fall in lactation yield as the animal gets dry soon in comparison to those having less PY. Assuming that genetic correlations between LMY and persistency is equal to the phenotypic correlations observed in the study, selection for LMY would be more accurate for the improvement of persistency as the heritability of LMY is substantially higher than the heritability of persistency.

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