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Genetical and Molecular studies on Egyptian Buffalo

BY

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List of Abbreviations

Word or phrase	Abbreviation
MAS	Marker Assistant Selection
SNP	Single nucleotide polymorphism
GEBV	Genomic estimated breeding value
QTL	Quantitative trait loci
BLAST	Basic Local Alignment Search Tool
Nj tree	Neighbor joining tree
INDEL	Insertion / Deletion
NCBI	National center for Biotechnology Information
D	Day
LF	Lactoferrin
PCR	Polymerase chain reaction
Kb	Kilo base
MTAM	Multi-trait animal model
MME	Mixed model equations
LP	Lactation period
DP	Dry period
CI	Calving interval
MD	Milk per day
TMY	Total milk yield
DO	Days open
h^2	Heritability
σ_a^2	Direct additive genetic variance
σ_m^2	Maternal variance
APRI	Animal Production Research Institute
BLUE	Best Linear Unbiased Estimation
BLUP	Best Linear Unbiased Prediction

Abstract

The present study was carried out on the Egyptian buffaloes kept in Mehallet Mousa Animal Production Research Station, belonging to Animal Production Research Institute (APRI), Agricultural Research Center, Ministry of Agriculture, Egypt. Data of 721 buffaloes having 2644 normal lactation records (1-12 lactations) over a period of 18 years from 1998 to 2015 were used in this study. Numbers of sires and dams were 156 and 416 respectively. All Previous data were under investigation to study different factors affecting milk production traits, variance component for productive and reproductive traits, estimate some of genetic parameters and identification of single nucleotide polymorphisms (SNP) at lactoferrin gene and it's associated with studied traits in Egyptian Buffaloes.

The result showed that mean of total milk yield (TMY), milk per day (MD), lactation period (LP), dry period (DP), calving interval (CI) and days open (DO) were 1629.5 kg, 8.15 kg, 198.7 d, 249.70 d, 427.52 d, and 116.47 d, respectively. The heritability (h^2) for aforementioned traits were 0.30, 0.20, 0.15, 0.19, 0.15, and 0.14, respectively. The genetic correlations among TMY and studied traits were positive, except for the correlation between TMY and each of CI and DO, being negative. The corresponding phenotypic correlations among all traits were negative (-0.23), except for the correlation between TMY and each of DP and DO, being positive (0.06 and 0.07), respectively. Phenotypic correlation between MD and DP was positive (0.14). The accuracy of female buffalo cows breeding value ranged from 0.65 to 0.93 respectively. Sequence analysis for intron 6 of Lactoferrin gene (LTF) using Basic Local Alignment Search Tool (BLAST) showed the selected highly production individual was closely related to *Bubalus bubalis*. The simliraties were 99.62, 99.24, and 98.86% with sequences in Database of buffalo, with accession No. KX228134.1, KX228137.1 and KX228136.1 respectively, also the comparison of selected individual nucleotide substitution were found at four positions 39, 46, 150 and 231 with two INDEL in positions 46 and 231 and singleton variable sites (two variants) in position 39 and 150 which change C to T and A to G, respectively, in low milk production (L3) which indicate low milk production. These results suggested that this SNP may be avital genetic marker in selection programs for Egyptian buffalo through marker assisted selection. More studies are needed to confirm these results and to better understanding the important role of LTF gene.