

Genetic Screening of Sahiwal Bulls for Higher Fertility

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Abstract : The selection of Sahiwal bulls on the basis of dams best lactation milk yield under breeding programme in herd of the country neglecting fertility traits leads to deterioration in their performances and economy. The goal of this study was to explore polymorphism of CRISP2 gene and their association with semen traits (Post Thaw Motility, Hypo-osmotic Swelling Test, Acrosome Integrity, DNA Fragmentation and capacitation status), scrotal circumference, expected predicted difference (EPD) for milk yield and fertility. Sahiwal bulls included in present study were 60 bulls used in breeding programme as well as 50 young bulls yet to be included in breeding programme. All the Sahiwal bulls were found to be polymorphic for CRISP2 gene (AA, AG and GG) present within exon 7 to the position 589 of CRISP2 mRNA by using PCR-SSCP and Sequencing. Semen analysis were done on 60 breeding bulls frozen semen doses pertaining to four season (winter, summer, rainy and autumn). The scrotal circumference was measured from existing Sahiwal breeding bulls in the herd (n=47). The effect of non-genetic factors on reproduction traits were studied by least-squares technique and the significant difference of means between subclasses of season, period, parity and age group were tested. The data were adjusted for the significant non-genetic factors to remove the differential environmental effects. The adjusted data were used to generate traits like Waiting Period (WP), Pregnancy Rate (PR), Expected Predicted Difference (EPD) of fertility, respectively. Genetic and phenotypic parameters of reproduction traits were estimated. The overall least-squares means of Age at First Calving (AFC), Service Period (SP) and WP were estimated as 36.69 ± 0.18 months, 120.47 ± 8.98 days and 79.78 ± 3.09 days respectively. Season and period of birth had significant effect ($p < 0.01$) on AFC. AFC was highest during autumn season of birth followed by summer, winter and rainy. Season and period of calving had significant effect ($p < 0.01$) on SP and WP of sahiwal cows. The WP for Sahiwal cows was standardized based on four developed predicted model for pregnancy rate 42, 63, 84 and 105 days using all lactation records. The WP for Sahiwal cows were standardized as 42 days. A selection criterion was developed for Sahiwal breeding bulls and young Sahiwal bulls on the basis of EPD of fertility. The genotype has significant effect on expected predicted difference of fertility and some semen parameters like post thaw motility and HOST. AA Genotype of CRISP2 gene revealed better EPD for fertility than EPD of milk yield. AA genotype of CRISP2 gene has higher scrotal circumference than other genotype. For young Sahiwal bulls only AA genotypes were present with similar patterns. So on the basis of association of genotype with seminal traits, EPD of milk yield and EPD for fertility status, AA and AG genotype of CRISP2 gene was better for higher fertility in Sahiwal bulls.

Keywords : expected predicted difference, fertility, sahiwal, waiting period

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