CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

ACROSS-BREEDS VALIDATION STUDY USING META-ANALYSIS RESULTS AS DISCOVERY SET

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The aim with this study was to validate in Nellore, SNPs associated with sexual precocity in Brahman. We selected significant SNPs from meta-analysis of sexual precocity traits in Brahman to test their association with precocity traits in Nellore. In female Brahmans the traits were: age at the first *corpus luteum*, first postpartum anoestrus interval, ability to ovulate prior to weaning the calf. In male Brahmans, scrotal circumference was measured at 12, 18 and 24 months of age. Traits measured in Nellore were heifer early pregnancy (EP), defined as success (1) for heifers that calved before 31 months of age or failure (0) if not; and scrotal circumference (SC) measured around 18 months of age. Models were: (1) Bayes Cpi: $y = 1\mu + \sum_{i=1}^{n} g_i b_i \delta_i + e$, where y is the vector of phenotypes (EP and SC) pre-corrected for contemporary group (herd, year and season of birth, weaning and yearling management groups), 1 is a vector of ones, μ is the overall mean, g_i is the vector with the genotypes of the animals for the ith SNP effect in b_i, and δ_i is an indicator variable, which takes values 0 or 1; and (2) regression model: $y = 1\mu + X\beta + Zu + e$, where y, 1, μ and e were as previously described, β is a vector containing marker effects, u is a vector of random polygenic additive effects, X and Z are incidence matrices relating marker effects in β and random effects in u to y, respectively. Significant SNPs were those presenting P-values < 1×10^{-4} for regression and Bayes factor ≥ 3 for Bayes Cpi. A total of 28 and 34 SNPs were validated for female and male traits, respectively. Genes at ± 250 Kb from validate SNPs were grouped for Pathway analysis using WebGestalt. For females, significant pathways were: "protein processing in endoplasmic reticulum" (*ATF6B*, *HSPA1A*, *HSPA1L*, *UBE2D4*, *SELENOS*, *RNF5*) and "estrogen signalling" (*ADCY1*, ATF6B, *HSPA1A*, *HSPA1L*). Some reproductive events as oogenesis require endoplasmic reticulum to produce protein, and to promote folding maturation, furthermore main reproductive events are controlled by sex-steroids, as estrogens. For males, significant pathways were "cell adhesion" (*NFASC*, *NCAM1*, *MPZL1*) and "circadian entrainment" (*PLCB1*, *ADCY10*). Cell adhesion molecules are associated with embryogenesis and development of neuronal tissue. Circadian entrainment is related with sexual behaviour in mammals. As a result, genes located close to validated SNP and inserted in enriched pathways are good candidates associated with sexual precocity in Nellore and Brahman cattle.

Keywords: genomic association, Brahman, cross-validation, Nellore, sexual precocity

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