

Project Meta Data

Project ID	IAPD-PPJ-010
Title	Genomic loci involved in sensing environmental cues and metabolism affect seasonal coat shedding in Bos taurus and Bos indicus cattle
User	ISHA
Grant Number	2016-68004-24827/Agriculture and Food Research Initiative Competitive
Funding Agency	USDA National Institute of Food and Agriculture
Description	Seasonal shedding of winter hair at the start of summer is well studied in wild and domesticated populations. However, the genetic influences on this trait and their interactions are poorly understood. We use data from 13,364 cattle with 36,899 repeated phenotypes to investigate the relationship between hair shedding and environmental variables, single nucleotide polymorphisms, and their interactions to understand quantitative differences in seasonal shedding. Using deregressed estimated breeding values from a repeated records model in a genome-wide association analysis (GWAA) and meta-analysis of year-specific GWAA gave remarkably similar results. These GWAA identified hundreds of variants associated with seasonal hair shedding. There were especially strong associations between chromosomes 5 and 23. Genotype-by-environment interaction GWAA identified 1,040 day length-by-genotype interaction associations and 17 apparent temperature-by-genotype interaction associations with hair shedding, highlighting the importance of day length on hair shedding. Accurate genomic predictions of hair shedding were created for the entire dataset, Angus, Hereford, Brangus, and multibreed datasets. Loci related to metabolism and light-sensing have a large influence on seasonal hair shedding. This is one of the largest genetic analyses of a phenological trait and provides insight into both agriculture production and basic science.
Data Access	Open Access
Release Date	2026-08-31
Justification	NA
Project Type	Individual
Ethical Clearance	No
Data Sharing Plan	NA
Declaration	Yes
Created At	2026-06-24 05:31

Organisms

Scientific Name	NCBI Taxon ID
Bos	9903