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# IDENTIFICATION OF THE CAPN1 (316) C>G POLYMORPHISM IN ROMANIAN SPOTTED CATTLE

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**Abstract**: Meat quality is an important trait in cattle production, with tenderness being a key characteristic influencing consumer acceptance. The calpain-calpastatin system (CAPN-CAST) plays an important role in post-mortem meat tenderization. The CAPN1 (Ala316Gly) polymorphism is a relevant molecular marker associated with meat tenderness. This study aimed to investigate the presence of the CAPN1 (316) polymorphism in Romanian Spotted cattle using PCR-RFLP with *Btg*I restriction enzyme. Electrophoretic analysis of the PCR products revealed specific restriction patterns, confirming the presence of the CAPN1 (316) polymorphism in the studied population. These preliminary results provide initial information on genetic variation at the CAPN1 (316) locus and support further investigation of genetic markers related to meat quality in Romanian Spotted (R.S.) cattle.

## • Introduction

The most important attribute of beef palatability, as perceived by consumers, is tenderness. The genetic determinants of tenderness are primarily associated with the calpain–calpastatin proteolytic system, although non-genetic factors also contribute to this trait. Two polymorphisms in calpain genes have been identified as being associated with meat tenderness and have therefore been considered in the genetic selection of cattle, including the CAPN1 (316) polymorphism. The aim of the present study was to investigate the presence of this polymorphism in the R.S. breed, a dual-purpose breed, raised for both milk and meat production.

## • Material and method

The CAPN1 (Ala316Gly) polymorphism, located in the CAPN1 gene on bovine chromosome 29 (BTA29), was investigated in 22 samples collected from Romanian Spotted (R.S.) cattle at the USAMV Cluj farm in Cojocna. The target region was amplified by polymerase chain reaction (PCR) using specific primers, generating a 709-bp fragment. The resulting amplicon was subjected to restriction fragment length polymorphism (RFLP) analysis using the restriction enzyme *Btg*I to distinguish the C and G alleles associated with the C>G substitution at nucleotide position 371 of the amplified fragment.

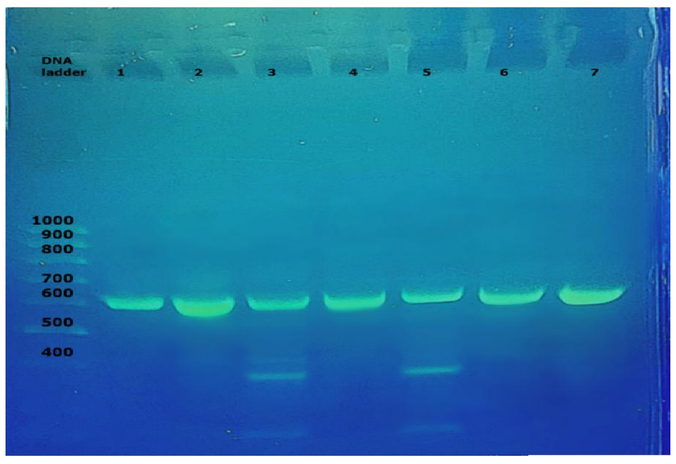



**Fig. 1** The CAPN1 (316) C>G electrophoretic profiles of R.S. cattle. Line 1:100 bp DNA step ladder (Promega, USA): Line 2-8: individual profiles with GG and CG genotypes.

## • Results and discussions

PCR-RFLP analysis revealed genetic variation at the CAPN1 (Ala316Gly) locus in the 22 Romanian Spotted cattle examined. All three genotypes (GG, CG and CC) were identified in the study population, with representative restriction patterns for the GG and CG genotypes shown in Fig. 1. The G and C allele frequencies were 43.18% and 56.82%, respectively.

## • Conclusions

The identification of the CAPN1 (Ala316Gly) polymorphism in Romanian Spotted (R.S.) cattle provides initial evidence of genetic variation at this locus. These findings establish a basis for further investigations of this polymorphism and its potential association with meat tenderness. Future studies combining the analysis of the CAPN1 (316) and CAPN1 (4756) polymorphisms could further characterize the genetic background of meat quality traits in this dual-purpose breed and explore their potential application in selection strategies.