IDENTIFIKASI *SINGLE NUCLEOTIDE POLYMORPHISM* (SNP) *GROWTH DIFFERENTIATION FACTOR* 9 (GDF9) PADA KAMBING BLIGON

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INTISARI

Growth differentiation factor 9 (GDF9) adalah molekul polipeptida famili dari *transforming growth factor*-β (TGF-β) *Growth Factor* yang berperan dalam pendewasaan dan pematangan oosit. Gen yang termasuk dalam family TGF-*β Growth Factor* seperti *bone morphogenic protein* 15 (BMP15), *growth differentiation factor* 9 (GDF9), dan *Bone Morphogenic Protein* IB berperan dalam pertumbuhan folikel dan tingkat ovulasi. Penelitian ini bertujuan untuk mengidentifikasi *single nucleotide polymorphism* (SNP) pada kambing Bligon dengan tipe kelahiran tunggal. Penelitian ini dilakukan di Laboratorium Genetika dan Pemuliaan Ternak Fakultas Peternakan Universitas Gadjah Mada, dengan menggunakan data 21 ekor kambing Bligon tipe kelahiran tunggal. Sekuensing dilakukan di Laboratorium Penelitian dan Pengujian Terpadu (LPPT) UGM, Yogyakarta. Materi penelitian yang digunakan yaitu data *recording* ternak berupa data tipe kelahiran dan hasil isolasi DNA. Metode penelitian yang dilakukan antara lain studi referensi sekuen target Gen GDF9, pemilihan sampel dengan tipe kelahiran tunggal, isolasi DNA, amplifikasi DNA dengan primer *forward* dan *reverse* dari GDF9 (GDF9-3 dan GDF9-6). dan identifikasi SNP dan genotipying menggunakan PCR-RFLP. Analisis yang dilakukan yaitu menghitung keragaman genetik dengan rumus Hardy-Weinberg. Analisis kekerabatan menggunakan pohon filogenetik. Hasil analisis SNP pada penelitian ini ditemukan 9 SNP yaitu g.3615T>C, g.3760T>C, g.3855A>C, g.3879A>G, g.3924A>G, g.3943G>T, g.3969G>A, g.3981G>A, dan g.4314C>T. Hasil pemetaan pada penelitian ini ditemukan enzim yang memotong SNP g.3855A>C (MspI/HpaII), g.3924A>G (Hpy188I), dan g.3981G>A (MseI). Enzim yang digunakan untuk PCR-RFLP yaitu MspI. Hasil PCR-RFLP menunjukan genotip homozigot AA. Hasil pohon filogenetik menunjukan sampel kambing Bligon memiliki kedekatan kerabatan dengan 3 sampel kambing Kacang hasil sekuensing dan 2 *genbank Capra hircus*.

Kata kunci : Enzim restriksi, kambing Bligon, keragaman genetik, PCR-RFLP, pohon filogenetik, dan *single nucleotide polymorphism*.

IDENTIFICATION OF SINGLE NUCLEOTIDE POLYMORPHISM (SNP) GROWTH DIFFERENTIATION FACTOR 9 (GDF9) IN BLIGON GOATS

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ABSTRACT

Growth differentiation factor 9 (GDF9) is a polypeptide molecule of the transforming growth factor-β (TGF-β) family that plays a role in oocyte maturation. Genes belonging to the TGF-β Growth Factor family such as Bone Morphogenic Protein 15 (BMP15), growth differentiation factor 9 (GDF9), and Bone Morphogenic Protein IB play a role in follicle growth and ovulation rates. This study was to identify single nucleotide polymorphism (SNP) in Bligon goats with single birth type. This research was conducted at the Laboratory of Genetics and Animal Breeding, Faculty of Animal Husbandry, Gadjah Mada University, using data from 21 heads single-born Bligon goats. Sequencing was conducted at the Laboratorium Penelitian dan Pengujian Terpadu (LPPT) UGM, Yogyakarta. The research material used is livestock recording data in the form of birth type data and the results of DNA isolation. The research methods used include reference studies of the GDF9 gene target sequence, selection of samples with single birth type, DNA isolation, DNA amplification with forward and reverse primers of GDF9 (GDF9-3 and GDF9-6). and SNP identification and genotyping using PCR-RFLP. The analysis carried out to calculate genetic diversity using the Hardy-Weinberg formula. Kinship analysis using phylogenetic trees. The results of the SNP analysis in this study was found 9 SNPs, namely g.3615T>C, g.3760T>C, g.3855A>C, g.3879A>G, g.3924A>G, g.3943G>T, g.3969G>A, g.3981G>A, and g.4314C>T. Mapping results in this study found enzymes that cut SNPs g.3855A>C (MspI/HpaII), g.3924A>G (Hpy188I), and g.3981G>A (MseI). The enzyme was used for PCR-RFLP are MspI. The results of PCR-RFLP showed a homozygous genotype of AA. The Hardy-Weinberg equilibrium test could be calculated. The results of the phylogenetic tree show that the Bligon goat sample is related to 3 samples of the kacang goat from sequencing and the 2 *Capra hircus* genbank.

Keyword: Restriction enzymes, Bligon goat, genetic diversity, PCR-RFLP, phylogenetic trees, and single nucleotide polymorphism.