

IDENTIFIKASI MARKER GEN *GROWTH DIFFERENTIATION FACTOR 9* (GDF9) PENGKODE SIFAT PROLIFIK PADA KAMBING BLIGON

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INTISARI

Gen *Growth Differentiation Factor-9* (GDF9) adalah molekul polipeptida famili dari TGF- β *Growth Factor* yang berperan dalam pendewasaan dan pematangan oosit. Penelitian ini bertujuan untuk mengidentifikasi marker gen GDF9 pada kambing Bligon. Penelitian ini dilakukan di Laboratorium Genetika dan Pemuliaan Ternak Fakultas Peternakan Universitas Gadjah Mada. Materi penelitian yang digunakan yaitu data *recording* ternak tipe kelahiran dan 30 isolasi sampel DNA dari kambing Bligon Kelompok Ternak Ngudi Lestari. Metode penelitian yang dilakukan yaitu pemilihan sampel dengan bobot kelahiran tertinggi pada setiap kelompok tipe kelahiran, amplifikasi DNA dari tiga posisi target gen GDF9 (posisi urutan dari depan adalah GDF9-3, GDF9-2, dan GDF9-1), sekuensing DNA dan identifikasi SNP dan genotip. Analisis yang dilakukan yaitu menghitung frekuensi alel dan genotip, heterozigositas serta identifikasi peta enzim restriksi. Hasil analisis SNP (*Single Nucleotide Polymorphism*) pada penelitian ini ditemukan 6 SNP yaitu g.1956A>C, g.2248G>T, g.2996C>T, g.3615T>C, g.3760T>C, dan g.3855A>C. Hasil analisis frekuensi genotip tipe kelahiran tunggal SNP g.1956A>C genotip AA sebanyak 0,4 genotip CC sebanyak 0,6. SNP g.3855A>C genotip AA sebanyak 0,8 dan genotip AC sebanyak 0,2. Pada tipe kelahiran tunggal dan kembar SNP g.3760T>C genotip TT sebanyak 1. Selain pada posisi tersebut menunjukkan hasil frekuensi genotip 1 pada genotip perubahannya. Hasil analisis frekuensi alel tipe kelahiran tunggal pada SNP g.1956A>C alel A sebanyak 0,2 dan alel C sebanyak 0,8. SNP g.3855A>C alel A sebanyak 0,9 dan alel C sebanyak 0,1. Pada tipe kelahiran tunggal dan kembar SNP g.3760T>C alel T sebanyak 1. Selain pada posisi tersebut menunjukkan hasil frekuensi alel 1 pada alel perubahannya. Enzim restriksi HpaII dan MspI teridentifikasi pada SNP posisi g.1956A>C. Enzim restriksi BsaI, BcoDI dan BsmAI teridentifikasi pada SNP posisi g.3855A>C. Prediksi genotip heterosigot dapat dilihat dari enzim restriksi pada SNP g.1956A>C (GDF9-3) dengan ukuran pemotongan 768 bp, 305 bp, dan 463 bp, serta pada SNP g.3855A>C (GDF9-1) dengan ukuran pemotongan 456 bp, 306 bp dan 149 bp. Enzim restriksi yang disarankan pada penelitian selanjutnya adalah BsaI untuk target gen GDF9-3 dan MspI untuk target gen GDF9-1.

(Kata kunci: kambing Bligon, GDF9, marker gen, *Single Nucleotide Polymorphism*)

IDENTIFICATION OF MARKER GEN GROWTH DIFFERENTIATION FACTOR 9 (GDF9) CODING PROLIFIC NATURE IN BLIGON GOATS

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ABSTRACT

The Growth Differentiation Factor-9 (GDF9) gene is a polypeptide molecule of the TGF- β Growth Factor family that plays a role in oocyte maturation. This study aims to identify the GDF9 gene marker in Bligon goats. This research was conducted at the Laboratory of Animal Breeding and Genetics, Faculty of Animal Science, Universitas Gadjah Mada. The research material used were recording from birth type and 30 isolated DNA samples taken from the Bligon goat of the Ngudi Lestari Livestock Group. Research Methods that carried out sample selection with the highest birth weight in each group birth type, DNA amplification of the three GDF9 gene targets (sequence from the front is GDF9-3, GDF9-2, and GDF9-1) sequencing and SNP identification and genotype. The analysis carried out was to calculate allele and genotype frequencies, heterozygosity and identification of the restriction enzyme map. The results of the SNP (Single Nucleotide Polymorphism) analysis in this study found 6 SNPs, namely g.1956A>C, g.2248G>T, g.2996C>T, g.3615T>C, g.3760T>C, and g.3855A>C. The results of the analysis of the genotype frequency of single birth type SNP g.1956A>C genotype AA as much as 0.4 genotype CC as much as 0.6. SNP g.3855A>C genotype AA as much as 0.8 and AC genotype as much as 0.2. In the type of single birth and twins SNP g.3760T>C TT genotype as much as 1. Apart from that position, the genotype frequency of 1 changes in the genotype. The results of the analysis of the allele frequency for singleton birth type in SNP g.1956A>C the A allele was 0.2 and the C allele was 0.8. SNP g.3855A>C allele A as much as 0.9 and allele C as much as 0.1. In the type of single birth and twins, the SNP of g.3760T>C is the T allele as much as 1. Apart from this position, the allele frequency results in the change in allele. Restriction enzymes HpaII and MspI were identified at the SNP positions g.1956A>C. Restriction enzymes BsaI, BcoDI and BsmAI were identified at the SNP position g.3855A>C. Prediction of heterozygous genotype can be seen from the restriction enzyme at SNP g.1956A>C (GDF9-3) 768 bp, 305 bp, and 463 bp, and at SNP g.3855A>C (GDF9-1) with size of the cut is 456 bp, 306 bp and 149 bp. The restriction enzymes suggested in future studies are BsaI for the target gene for GDF9-3 and MspI for the target gene for GDF9-1.

(Keyword: Bligon goat, GDF9, Marker gene, *Single Nucleotide Polymorphism*).