

IDENTIFIKASI KARAKTERISTIK SIFAT KUANTITATIF DAN *GENE* *MARKER MELANOCORTIN 4 RECEPTOR (MC4R)* PADA INDUK KAMBING PERANAKAN ETTAWA

Jalu Dwi Anggara Pamungkas
18/424569/PT/07621

INTISARI

Kambing Peranakan Ettawa (PE) merupakan kambing persilangan antara kambing Ettawa (Jamnapari) dengan kambing Kacang. Kambing PE banyak dipelihara oleh masyarakat karena memiliki produktifitas daging dan susu yang baik. Induk dengan kemampuan produktifitas yang baik akan memiliki sifat pertumbuhan yang baik pula. Sifat pertumbuhan induk dapat dilihat melalui sifat kuantitatif ternak. Produktifitas kambing PE dengan potensinya perlu dijaga dan ditingkatkan agar dapat menghasilkan nilai ekonomis yang lebih tinggi. Salah satu upaya yang dapat dilakukan adalah dengan seleksi kambing PE. Seleksi kambing dapat menggunakan pendekatan genetik kuantitatif atau menggunakan *gene marker*. Seleksi menggunakan *gene marker* yang sering digunakan adalah *single nucleotide polymorphism* (SNP). Polimorfisme gen telah ditemukan pada berbagai kandidat gen salah satunya adalah gen *melanocortin 4 receptor* (MC4R). Gen *melanocortin 4 receptor* (MC4R) adalah gen utama yang bertugas mengatur asupan makanan dan keseimbangan energi. Penelitian ini bertujuan untuk mengidentifikasi karakteristik sifat kuantitatif induk kambing PE dan mengidentifikasi *Single Nucleotide Polymorphism* (SNP) gen MC4R pada induk kambing PE. Penelitian ini dilakukan di Bhumi Merapi dan 78 Farm, Sleman, Yogyakarta. Materi penelitian yang digunakan yaitu data karakteristik sifat kuantitatif dan sampel darah 14 ekor induk kambing PE. Metode penelitian yang dilakukan antara lain pengambilan data sifat kuantitatif, persiapan sampel DNA, amplifikasi DNA, sekuensing DNA, identifikasi SNP, analisis dan penentuan enzim restriksi, identifikasi genotip dan alel, analisis perubahan asam amino, serta analisa data. Analisa data yang dilakukan yaitu menghitung keragaman genetik dengan rumus Hardy-Weinberg dan menghitung derajat heterozigositas. Hasil penelitian menunjukkan bahwa karakteristik sifat kuantitatif berupa berat badan, panjang badan, lingkaran dada, lebar pinggul, dan tinggi pinggul induk kambing PE adalah $39,68 \pm 7$, $74,14 \pm 5,01$, $80,21 \pm 5$, $80,21 \pm 5$, $16,5 \pm 1,22$, dan $82,29 \pm 3,85$. Selain itu, terdapat dua SNP yakni g.999 A>G dan g.1070 C>T dengan tingkat polimorfisme yang rendah ($\leq 5\%$). Kesimpulan dari penelitian ini adalah SNP g. 999 A>G dan g.1070 C>T belum bisa dimanfaatkan sebagai *gene marker* karena tingkat informasi polimorfisme yang masih sangat rendah, sehingga perlu dilakukan penelitian lebih lanjut dengan menambah jumlah sampel dari daerah yang berbeda.

Kata kunci: kambing peranakan ettawa, induk, sifat kuantitatif, MC4R, *gene marker*, *single nucleotide polymorphism*

IDENTIFICATION OF QUANTITATIVE CHARACTERISTICS AND MARKER GENE MELANOCORTIN 4 RECEPTOR (MC4R) IN ETTAWA CROSSBREED DOES

Jalu Dwi Anggara Pamungkas
18/424569/PT/07621

ABSTRACT

Ettawa Crossbreed goats are crossbred goats between Ettawa goats (Jamnapari) and local goats, called Kacang goats (Bean goats). Ettawa Crossbreed goats are widely raised by the community because they have good meat and milk productivity. Does with good productivity would have good growth traits as well. Good growth traits could be seen through the quantitative characteristics. The productivity of Ettawa Crossbreed does with their potential needs to be maintained and increased in order to produce higher economic value. One of efforts that can be done is by selection of Ettawa Crossbreed does. Does selection could use a quantitative genetic approach or genetic markers. Selection used a genetic marker that is often used is single nucleotide polymorphism (SNP). Gene polymorphism has been found in various gene candidates, one of which was the melanocortin 4 receptor (MC4R) gene. The melanocortin 4 receptor (MC4R) gene is the main gene in charge of regulating food intake and energy balance. This research aimed to identify the quantitative traits characteristics of Ettawa Crossbreed goat does and identify the Single Nucleotide Polymorphism (SNP) of the MC4R gene in Ettawa Crossbreed does. This research was conducted at Bhumi Merapi and 78 Farm, Sleman, Yogyakarta. The research material used is data on quantitative nature characteristics and blood samples of 14 Ettawa Crossbreed does. The research methods carried out include quantitative nature data collection, DNA sample preparation, DNA amplification, DNA sequencing, SNP identification, restriction enzyme analysis and determination, genotype and allele identification, amino acid change analysis, and data analysis. The data analysis carried out was to calculate genetic diversity with the Hardy-Weinberg formula and calculate the degree of heterozygosity. The results showed that the quantitative characteristics of the characteristics in the form of weight, body length, chest circumference, hip width, and hip height of PE goat does were 39.68 ± 7 , 74.14 ± 5.01 , 80.21 ± 5 , 80.21 ± 5 , 16.5 ± 1.22 , and 82.29 ± 3.85 . In addition, there were two SNPs, namely g.999 A>G and g.1070 C>T with low levels of polymorphism ($\leq 5\%$). The conclusion of this research is SNP g. 999 A>G and g.1070 C>T cannot be used as gene markers because the level of polymorphism information is still very low, so further research needs to be carried out by increasing the number of samples from different regions.

Keywords: Ettawa Crossbreed, doe, quantitative characteristics, MC4R, gene marker, *single nucleotide polymorphism*