

IDENTIFIKASI KERAGAMAN GEN LEPTIN SERTA HUBUNGANNYA DENGAN BERAT LAHIR DAN UKURAN TUBUH SAPI POTONG

INTISARI

Laksa Ersya Anugratama
16/394473/PT/07146

Leptin adalah gen yang mempengaruhi berat hewan. Leptin memiliki kontrol terhadap berat lahir, asupan pakan, pengeluaran energi, fungsi kekebalan tubuh dan reproduksi. Penelitian ini bertujuan untuk mengidentifikasi keragaman genetik pada sapi persilangan Belgian Blue dan Wagyu berdasarkan *marker single nucleotide polymorphism* pada gen leptin, mengetahui pengaruh hubungan keragaman genetik berdasarkan *marker single nucleotide polymorphism* gen leptin terhadap berat dan ukuran tubuh saat lahir, serta mengetahui pengaruh perbedaan bangsa sapi terhadap berat dan ukuran tubuh saat lahir. Penelitian dilakukan di PT. Widodo Makmur Perkasa, Klaten, Jawa Tengah. Materi yang digunakan ialah 52 ekor sapi hasil persilangan dengan penyebutan bangsa di awal sebagai pejantan dan bangsa di belakang sebagai betina yaitu Belgian Blue x Brahman Cross G1 (BB x BX, n = 11), Wagyu x Brahman Cross G1 (Wagyu x BX, n = 11), Belgian Blue Cross x Brahman Cross G2 (BBX x BX, n = 5), Belgian Blue Cross x Wagyu Cross G2 (BBX x WagyuX, n = 2), Wagyu Cross x Belgian Blue Cross G2 (WagyuX x BBX, n = 3), Wagyu Cross x Brahman Cross G2 (WagyuX x BX, n = 14), dan Brahman Cross (BX, n=6). Materi lain yang digunakan ialah data *recording* ternak berupa data berat dan ukuran tubuh saat lahir. Penelitian dilakukan dalam dua tahap, tahap pertama adalah pengambilan sampel darah dan data serta yang kedua analisis DNA dan data di Laboratorium Genetika dan Pemuliaan Ternak Fakultas Peternakan UGM. Metode analisa yang dilakukan adalah penentuan genotip yang berasal dari sampel DNA menggunakan metode *sequencing*. Hasil *genotyping* kemudian dilakukan perhitungan frekuensi genotip dan alel, keseimbangan *Hardy-Weinberg*, serta dilakukan analisa hubungan genotip dengan fenotip menggunakan uji *Independent Sample t-test*. Data *recording* juga digunakan untuk analisis pengaruh perbedaan bangsa sapi terhadap fenotip menggunakan uji *One Way Anova* kemudian dilakukan uji lanjut *Duncan Multiple Range Test*. Hasil *sequencing* menunjukkan adanya polimorfisme ditandai dengan satu *single nucleotide polymorphism* (SNP) pada 1180 C>T. Terdapat dua genotip yaitu CC dan CT. Distribusi alel pada populasi Belgian Blue x Brahman Cross (G1), Wagyu x Brahman Cross (G1), dan Wagyu Cross x Brahman Cross (G2) memenuhi keseimbangan *Hardy-Weinberg*. Perbedaan bangsa sapi berpengaruh signifikan terhadap berat dan ukuran tubuh saat lahir. Hubungan polimorfisme gen Leptin dengan berat dan ukuran tubuh saat lahir tidak menunjukkan hasil yang berbeda nyata. Berdasarkan penelitian yang dilakukan dapat disimpulkan bahwa

polimorfisme gen Leptin (SNP 1180 C>T) hanya dapat digunakan untuk membedakan genotip ternak tetapi tidak dapat digunakan sebagai alat pendukung seleksi untuk berat dan ukuran tubuh saat lahir.

Kata kunci: Belgian blue, Leptin, Marker gen, Single Nucleotide Polymorphism, Wagyu.

IDENTIFICATION OF LEPTIN GENE DIVERSITY AND ITS RELATIONSHIP WITH BIRTH WEIGHT AND BODY SIZE OF BEEF CATTLE

Laksa Ersya Anugratama
16/394473/PT/07146

ABSTRACT

Leptin is a gene that affects animal weight. Leptin gene has control of birth weight, feed intake, energy expenditure, immune function and reproduction. This study aims to identify the diversity in Belgian Blue cross and Wagyu based on single nucleotide polymorphism marker in leptin gene, to know the relationship between diversity based on single nucleotide polymorphism marker in leptin gene with birth weight and body size at birth, also to know effect of differences in cattle breeds with body weight and body size at birth. This researched was conducted at PT. Widodo Makmur Perkasa, Klaten, Central Java. The material used in this study included 52 cows from crossing with the mention of the breed at the beginning as a male and the breed behind as a female namely of G1 Belgian Blue x Brahman Cross (BB x BX, n = 11), G1 Wagyu x Brahman Cross (Wagyu x BX, n = 11), G2 Belgian Blue Cross x Brahman Cross (BBX x BX, n = 5), G2 Belgian Blue Cross x Wagyu Cross (BBX x WagyuX, n = 2), G2 Wagyu Cross x Belgian Blue Cross (WagyuX x BBX, n = 3), G2 Wagyu Cross x Brahman Cross (WagyuX x BX, n = 14), and Brahman Cross (BX, n = 6). Other material used was the record of birth weight and body size at birth data. This research was run into two steps. The first step was blood sampling and data collected and the second step was DNA and data analyses at the Laboratory of Genetics and Animal Breeding, Faculty of Animal Sciences UGM. The analysis method used is the determination of genotypes derived from DNA samples using the sequencing method. The genotyping results are then calculated genotype and allele frequencies, Hardy-Weinberg balance, and analysis of the relationship of genotypes with phenotypes using the Independent Sample t-test. Recording data also used for analysis effect of differences in cattle breeds with phenotype using One Way Anova and further test using Duncan Multiple Range Test. The sequencing results showed the presence of polymorphisms characterized by one single nucleotide polymorphism (SNP) at 1180 C> T. There were two genotypes namely CC and CT. Distribution of alleles in the population of Belgian Blue x Brahman Cross (G1), Wagyu x Brahman Cross (G1), and Wagyu Cross x Brahman Cross (G2) met Hardy-Weinberg balance. Effect of differences in breed cattle has significant effect with birth weight and body size at birth. There was no significant relationship between Leptin gene polymorphism with body weight and size at birth. Based on research results, it can be concluded that the Leptin gene polymorphism (SNP 1180 C>T) can only be

used to distinguish livestock genotypes but cannot be used as a selection tool for body weight and size birth.

Keywords : Belgium Blue, Leptin, Marker gene, Single nucleotide polymorphism, Wagyu.