

## ESTIMASI PARAMETER GENETIK SIFAT PERTUMBUHAN DAN ASOSIASI GEN LEPTIN TERHADAP SIFAT PERTUMBUHAN SAPI BALI DI BPTU HPT DENPASAR BALI

### INTISARI

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Penelitian ini bertujuan untuk mengestimasi parameter genetik sapi Bali, mengidentifikasi polimorfisme gen Leptin sapi Bali dan asosiasi gen Leptin dengan sifat pertumbuhan. Penelitian dilaksanakan pada bulan Juli sampai dengan November 2021 di BPTU-HPT Denpasar Bali dan Laboratorium Pemuliaan Ternak Fakultas Peternakan UGM dengan tahapan yaitu pengumpulan data, perhitungan estimasi parameter genetik, dan analisis molekuler. Materi yang digunakan yaitu data recording berupa identitas ternak dan sifat pertumbuhan sapi Bali dari tahun 2017 sampai 2020, serta sampel darah sapi Bali sebanyak 60 sampel. Estimasi parameter genetik yang dihitung yaitu heritabilitas menggunakan metode saudara tiri seapak, rinitabilitas menggunakan metode korelasi antar kelas, dan korelasi genetik menggunakan analisis kovariansi. Heritabilitas digunakan untuk menghitung nilai pemuliaan (NP), dan rinitabilitas digunakan menghitung MPPA. Hasil penelitian menunjukkan bahwa nilai heritabilitas termasuk kategori tinggi yaitu bobot sapih (BS), tinggi pundak sapih (TPS), panjang badan sapih (PBS), dan lingkaran dada sapih (LDS) dengan kisaran 0,39 – 0,44, kategori sedang yaitu bobot setahun (BST), tinggi pundak setahun (TPST), panjang badan setahun (PBST), dan lingkaran dada setahun (LDST) dengan kisaran 0,15 – 0,26. Nilai rinitabilitas termasuk kategori sedang yaitu BS, TPS, PBS, LDS, BST, TPST, PBST, dan LDST dengan kisaran 0,14 – 0,26. Korelasi genetik sifat pertumbuhan sapi Bali berkorelasi positif dan tinggi yaitu BS-BST, TPS-BS, PBS-BS, LDS-BS, TPST-BST, PBST-BST, dan LDST-BST dengan kisaran 0,64 – 0,94. Nilai pemuliaan pejantan tertinggi berdasar bobot sapih dan bobot setahun anaknya yaitu pejantan Penebel dan 0155.14. Nilai MPPA induk tertinggi berdasar bobot sapih dan bobot setahun anak yaitu induk 0991.09 dan 0609.09. Hasil analisis gen Leptin menunjukkan terdapat SNP yaitu g.2913C>T, g.3260T>C, dan g.3549G>A. SNP g.2913C>T berpengaruh nyata terhadap TPS, PBS, LDS, TPST, PBST, dan LDST. SNP g.3260T>C berpengaruh nyata terhadap BS, TPS, PBS, LDS, BST, TPST, PBST, LDST; sedangkan SNP g.3549G>A tidak berasosiasi dengan bobot dan ukuran tubuh. Berdasarkan dari tiga *Single Nucleotide Polymorphisms* diperoleh tujuh tipe genotip yang diasosiasi dengan sifat pertumbuhan sapi Bali menghasilkan hubungan nyata pada TPS, TPST dan PBST dengan urutan ranking tertinggi yaitu tipe 1, 3, 4 dan 2.

Kata kunci: Sapi Bali, parameter genetik, molekuler, gen Leptin, *single nucleotide polymorphism*

## ESTIMATION OF GENETIC PARAMETERS AND ASSOCIATION LEPTIN GENE ON THE GROWTH TRAITS OF BALI CATTLE AT BPTU HPT DENPASAR BALI

### ABSTRACT

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This study aims to estimate the genetic parameters of Bali cattle, identify Bali cattle Leptin gene polymorphisms and associations of Leptin genes with growth traits. The research was carried out from July to November 2021 at BPTU-HPT Denpasar Bali and the Breeding Laboratory of the Faculty of Animal Science UGM with stages, namely data collection, calculation of genetic parameter estimates, and molecular analysis. The material used is data recording in the form of cattle identity and growth characteristics of Bali cattle from 2017 to 2020, as well as 60 samples of Bali cattle for blood samples. The estimated genetic parameters that were calculated were heritability using the half-sibling method, repeatability using the inter-class correlation method, and genetic correlation using covariance analysis. Heritability was used to calculate the breeding value (NP), and repeatability was used to calculate MPPA. The results showed that heritability values were in the high category, namely weaning weight (WW), weaning shoulder height (WSH), weaning body length (WBL), and weaning chest circumference (WCC) with a range of 0.39 – 0.44, the medium category was yearling weight (YW), yearling shoulder height (YSH), yearling body length (YBL), and yearling chest circumference (YCC) with a range of 0.15 – 0.26. The repeatability values included in the medium category, namely WW, WSH, WBL, WCC, YW, YSH, YBL, and YCC with a range of 0.14 – 0.26. The genetic correlation of growth traits of Bali cattle has a positive and high correlation, namely WW-YW, WSH-WW, WBL-WW, WCC-WW, YSH-YW, YBL-YW, and YCC-YW with a range of 0.64 – 0.94. The highest male breeding values based on weaning weight and yearly weight of their offspring were Penebel and 0155.14 males. The highest parent MPPA values based on weaning weight and one year weight of the offspring were 0991.09 and 0609.09. The results of the Leptin gene analysis showed that there were SNPs, namely g.2913C>T, g.3260T>C, and g.3549G>A. SNP g.2913C>T significantly affected WSH, WBL, WCC, YSH, YBL, and YCC. SNP g.3260T>C significantly affected WW, WSH, WBL, WCC, YW, YSH, YBL, and YCC; while SNP g.3549G>A was not associated with body weight and size. Based on three Single Nucleotide Polymorphisms, seven types of genotypes were obtained which were associated with the growth characteristics of Bali cattle, which resulted in a significant relationship between TPS, TPST and PBST with the highest ranking sequentially, namely types 1, 3, 4 and 2.

Keywords: Bali cattle, genetic parameters, molecular, Leptin gene, single nucleotide polymorphism