

ESTIMASI PARAMETER GENETIK SIFAT PERTUMBUHAN DAN
REPRODUKSI SERTA IDENTIFIKASI GEN GDF-9
DOMBA GARUT DI BPPTD
MARGAWATI GARUT

INTISARI

Resti Yuliana Rahmawati
16/407590/PPT/00971

Penelitian ini bertujuan untuk mengetahui potensi keragaman genetik domba Garut dengan perhitungan parameter genetik dan mengidentifikasi polimorfisme gen GDF-9 pada domba Garut. Penelitian terdiri atas dua tahap: pengambilan data *recording* dan pengambilan sampel darah serta estimasi parameter genetik dan analisis molekuler gen GDF-9. Materi penelitian yang digunakan yakni data *recording* yang terdiri atas 70 pejantan, 419 induk, dan 1487 anak, serta 60 sampel darah induk domba Garut yang memiliki data kelahiran anak (tunggal, kembar dua, dan kembar tiga). Variabel yang diamati meliputi berat lahir (BL) 1487 data, berat sapih (BS) 1103 data, berat setahun (BT) 326 data, ADG prasapih 1101 data, ADG pascasapih 311 data, *litter size* (LS) 1470 data, *lambing interval* (LI) 284 data, panjang badan 99 data, tinggi gumba 93 data, lingkaran dada 91 data, dan lebar dada 98 data. Heritabilitas diestimasi menggunakan metode saudara tiri seapak, ripitabilitas menggunakan metode antar kelas dan dalam kelas, dan korelasi genetik menggunakan metode saudara tiri seapak, sedangkan asosiasi antara polimorfisme dan *litter size* dianalisis dengan Independent sample t-test. Hasil yang didapat yakni nilai heritabilitas berdasarkan sifat pertumbuhan berkisar antara sedang hingga tinggi, sedangkan sifat reproduksi memiliki kategori rendah. Nilai ripitabilitas sifat pertumbuhan memiliki kategori sedang, sedangkan sifat reproduksi memiliki kategori rendah hingga sedang. Nilai korelasi genetik antara berat badan dan ukuran tubuh berkorelasi positif dan tinggi. Ternak yang memiliki peringkat 10 teratas pada NP dan MPPA berdasarkan berat setahun patut untuk dijadikan acuan dalam menyeleksi bibit domba Garut untuk program perkawinan. Hasil analisis gen GDF-9 didapatkan 4 SNP (SNP g.54C→T, SNP g.60G→A, SNP g.304G→A, dan SNP g.333G→A) dan 4 tipe individu dengan komposisi genotip berbeda. SNP g.333G→A menghasilkan genotip GG (n= 51) dengan rata-rata *litter size* 2,09±0,81 dan GA (n= 8) dengan rata-rata *litter size* 1,37±0,74. SNP g.333G→A menunjukkan asosiasi dengan sifat prolifik pada domba Garut (P<0,05). Kesimpulan dari penelitian ini didapatkan ternak 10 teratas pada NP dan MPPA berdasarkan berat setahun patut untuk dijadikan acuan dalam menyeleksi bibit domba Garut untuk program perkawinan. Identifikasi SNP g.333G→A pada gen GDF-9 dapat direkomendasikan sebagai penanda untuk menyeleksi ternak berdasarkan sifat prolifik.

Kata kunci: Parameter genetik, Domba Garut, Gen GDF-9, Sifat pertumbuhan, Sifat reproduksi.

ESTIMATES OF GENETIC PARAMETERS FOR GROWTH AND
REPRODUCTIVE TRAITS, AND IDENTIFICATION OF GDF-9
GENE IN GARUT SHEEP REARED AT BPPTD
MARGAWATI GARUT

ABSTRACT

Resti Yuliana Rahmawati
16/407590/PPT/00971

The aims of this study were to estimate the genetic parameters for growth and reproductive traits and to identify the polymorphism of GDF-9 gene in Garut sheep. The study was carried out into two phases: 1) collection of data for growth and reproductive traits, as well as blood samples, and 2) estimates of genetic parameters and molecular analysis of GDF-9 gene. The data used was records of 1487 lambs from 70 sires and 419 dams. Among them, a total of 60 dams having single, twin and triple birth type were collected their blood samples. Genetic parameters were estimated for birth weight (1487 data), weaning weight (1103 data), yearling weight (326 data), ADG preweaning (1101 data), ADG postweaning (311 data), litter size (1470 data), lambing interval (284 data), body length (99 data), wither height (93 data), chest circumference (91 data) and chest width (98 data). Estimates of heritability, repeatability and genetic correlation were carried out by the method of paternal half-sib correlation, inter- and intraclass correlation, and paternal half-sib correlation, respectively. Association analysis between polymorphism of GDF-9 gene and litter size was worked out by Independent sample t-test. A moderate to high heritability was found for growth traits, while a low heritability was obtained for reproductive traits. Estimate of repeatability for growth traits was moderate, while that for reproductive traits was low to moderate. A strong positive correlation was observed between body weight and body measurement. The top 10 ewes based on estimated breeding value (EBV) and most probable producing ability (MPPA) for yearling weight are recommended for future utilization as replacement stocks. Four SNPs (SNP g.54C→T, SNP g.60G→A, SNP g.304G→A and SNP g.333G→A) were found in Garut GDF-9 gene and 4 types of animal with different genotype combination were obtained. Allelic and genotypic distribution of Garut sheep at BPPTD Margawati was in accordance to *Hardy-Weinberg equilibrium*. SNP g.333G→A had a significant effect on prolificacy ($P < 0.05$). Ewes with GG genotype had higher litter size than those with GA genotype. In conclusion, the top 10 ewes based on the EBV and MPPA may be appropriate as replacement stocks for future improvement of Garut sheep. SNP g.333G→A in GDF-9 gene can be successfully used as a marker for prolificacy traits in sheep breeding.

Keywords: Genetic parameter, Garut sheep, GDF-9 gene, Growth trait, Reproductive trait.