

ABSTRAK

Analisis Filogenetik Kambing Peranakan Etawah Berkepala Hitam dan Cokelat asal Kulon Progo berdasarkan Sekuen Gen Penyandi *Cytochrome Oxidase-1*

Grace Febiani Citrowiharyo
22/498484/KH/11303

Kambing Peranakan Etawah (PE) merupakan salah satu sumber daya genetik ternak yang banyak dikembangkan di Indonesia. Di Kabupaten Kulon Progo, kambing PE memiliki variasi fenotipe warna kepala, yaitu kepala hitam (jeliteng) dan kepala cokelat (mbranang), yang memiliki perbedaan nilai jual di tingkat peternak, namun hubungan kekerabatan genetik antara keduanya belum diketahui. Gen *cytochrome oxidase subunit 1* (CO-1) pada DNA mitokondria digunakan sebagai penanda molekuler karena memiliki daerah konservatif dan variasi sekuens yang dapat digunakan dalam analisis hubungan kekerabatan genetik. Penelitian ini bertujuan untuk menganalisis hubungan kekerabatan genetik kambing PE berkepala hitam dan cokelat asal Kulon Progo, Daerah Istimewa Yogyakarta, berdasarkan sekuens gen CO-1 DNA mitokondria. Sampel penelitian berupa darah dari enam ekor kambing PE yang terdiri atas tiga sampel berkepala hitam dan tiga sampel berkepala cokelat. DNA hasil isolasi diamplifikasi menggunakan metode PCR, kemudian dilakukan sekuensing DNA dan analisis filogenetik menggunakan *software* MEGA12. Hasil *alignment* menunjukkan panjang sekuens gen CO-1 sebesar 1519 bp dengan adanya deleksi satu nukleotida yang menyebabkan perubahan kerangka baca (*frameshift mutation*). Analisis jarak genetik menunjukkan nilai 0,0000 antar sampel kambing PE serta kedekatan dengan kambing lokal Indonesia. Analisis filogenetik menunjukkan seluruh sampel kambing PE berkepala hitam dan cokelat termasuk dalam haplogroup B bersama beberapa kambing lokal Indonesia dan kambing Karachay dari Rusia. Hasil penelitian ini menunjukkan bahwa variasi fenotipe warna kepala pada kambing PE tidak menunjukkan perbedaan kekerabatan genetik berdasarkan gen CO-1 serta dapat mendukung informasi pengelolaan sumber daya genetik dan pelestarian plasma nutfah kambing PE.

Kata kunci: gen CO-1, haplogroup B, kambing Peranakan Etawah, kekerabatan genetik, mtDNA

ABSTRACT

Phylogenetic Analysis of Black- and Brown-Headed Etawah Grade Goats from Kulon Progo based on Cytochrome Oxidase-1 Gene Sequences

Grace Febiani Citrowiharyo
22/498484/KH/11303

Etawah Grade (EG) goat is one of the livestock genetic resources widely developed in Indonesia. In Kulon Progo Regency, PE goats exhibit variations in head color phenotype, namely black-headed (jeliteng) and brown-headed (mbranang) goats, which have differences in economic value among farmers; however, their genetic relationship remains unknown. The cytochrome c oxidase subunit 1 (CO-1) gene in mitochondrial DNA (mtDNA) was used as a molecular marker because it contains conserved regions and sequence variations that can be utilized for genetic relationship analysis. This study aimed to analyze the genetic relationship between black-headed and brown-headed PE goats from Kulon Progo, Special Region of Yogyakarta, based on CO-1 gene sequences of mitochondrial DNA. Blood samples from six PE goats were used, consisting of three black-headed and three brown-headed samples. Isolated DNA was amplified using PCR, followed by DNA sequencing and phylogenetic analysis using MEGA12 software. Sequence alignment showed a CO-1 gene sequence length of 1519 bp with a one-nucleotide deletion causing a frameshift mutation. Genetic distance analysis showed a value of 0.0000 among PE goat samples and indicated close relationships with Indonesian local goats. Phylogenetic analysis showed that all black-headed and brown-headed PE goat samples were included in haplogroup B together with several Indonesian local goats and Karachayev goats from Russia. This study indicates that head color phenotype variation in PE goats does not reflect differences in genetic relationships based on the CO-1 gene and provides information for genetic resource management and conservation of PE goat germplasm.

Key words: CO-1 gene, Etawah Grade goat, genetic relationship, haplogroup B, mtDNA