INTISARI

ANALISIS FILOGENETIK KAMBING BLIGON: PENGARUH VARIASI PAKAN TERHADAP SEKUENS GEN PENYANDI *CYTOCHROME* B (Cyt-B) PADA DNA MITOKONDRIA (mtDNA)

Regita Cahyani Pantoro
21/480382/KH/10959

Kambing Bligon merupakan kambing lokal hasil persilangan antara kambing Kacang betina dan kambing Peranakan Etawa jantan yang telah lama dibudidayakan di Indonesia. Penelitian ini bertujuan untuk menganalisis hubungan kekerabatan kambing Bligon dengan kambing lokal lainnya berdasarkan sekuen DNA mitokondria gen *Cytochrome B* (Cyt b) serta mengevaluasi profil asam amino dan hubungannya dengan variasi pakan. Pemilihan *Cytochrome* B karena bersifat *conserved* dan mengkode protein mitokondria. Sampel DNA diisolasi berupa 3 ml darah kambing Bligon melalui vena jugularis sebanyak sembilan sampel (K5B, K3B, K2B, 4445B, 4462B, 4448B, 4447B,4438B, dan 4433B). Primer yang digunakan yaitu (AHCB *Forward* 5'- ATTGACCTCCCAACCCCATC-3' dan AHCB *Reverse* 5'-TGTGTGGAGGAAGGGTACAA-3') yang dibuat dengan mengunduh sekuens target dari GenBank, desain primer dengan Primer3, lalu spesifisitas dicek melalui BLAST. Primer digunakan untuk amplifikasi *Polymerase Chain Reaction* (PCR), diikuti dengan elektroforesis dan sekuensing DNA. Hasil *alignment* diperoleh 531 bp yang kemudian dilakukan analisis sekuens nukleotida dan asam amino berdasarkan referensi gen dari *GenBank*. Hasil penelitian menunjukkan bahwa variasi pakan tidak berpengaruh secara langsung kepada nukleotida, namun pada asam amino menunjukkan variasi pada 38 situs yang berpengaruh terhadap adaptasi metabolik berupa modifikasi mitokondria akibat pakan dan asam amino yang dikode. Analisis filogenetik menunjukkan bahwa kambing Bligon memiliki hubungan kekerabatan yang lebih dekat dengan *Capra hircus* (Gembrong) dibandingkan dengan spesies kambing liar seperti *Capra ibex* dan *Capra falconeri.* Jarak genetik antar kambing Bligon yaitu 0,000 hingga 0,002, sedangkan dengan *Capra ibex* berkisar antara 0,056 hingga 0,058, menunjukkan perbedaan genetik yang cukup signifikan akibat proses domestikasi. Pohon filogenetik juga menunjukkan bahwa sampel kambing Bligon berada dalam haplogrup tipe B bersama dengan kambing Gembrong yang mengindikasikan adanya kesamaan asal maternal.

Kata kunci: Cytochrome B, DNA Mitokondria, Filogenetik, Jarak Genetik, Kambing Bligon.

ABSTRACT

PHYLOGENETIC ANALYSIS OF BLIGON: EFFECT OF FEED VARIATION ON CYTOCHROME B (Cyt-B) GENE SEQUENCE IN MITOCHONDRIAL DNA (mtDNA)

Regita Cahyani Pantoro
21/480382/KH/10959

Bligon goats are local goats resulting from the crossbreeding of female Kacang goats and male Peranakan Etawa goats, which have long been bred in Indonesia. This study aims to analyze the phylogenetic relationship of Bligon goats with other goat species based on the mitochondrial DNA sequence of the Cytochrome B (Cyt b) gene and to evaluate the amino acid profile and its relationship with feed variation. Cytochrome B was chosen due its high conserved region and encoded protein in mitochondria. DNA samples were isolated from the blood of nine Bligon goats (K5B, K3B, K2B, 4445B, 4462B, 4448B, 4447B, 4438B, and 4433B). The primers used in this study were AHCB Forward (5'-ATTGACCTCCCAACCCCATC-3') and AHCB Reverse (5'-TGTGTGGAGGAAGGGTACAA-3'), designed by retrieving the target sequence from GenBank, constructing the primers using Primer3, and confirming their specificity through BLAST analysis. These primers were employed for Polymerase Chain Reaction (PCR) amplification, followed by electrophoresis and DNA sequencing. The alignment results obtained a 531 bp sequence, which was then analyzed for nucleotide and amino acid sequences based on reference genes from *GenBank*. The results of the study indicated that feed variation did not directly affect nucleotide sequences; however, variations at 38 amino acid sites were observed, which are potentially associated with metabolic adaptation through mitochondrial modifications influenced by the type of feed and the encoded amino acids. Phylogenetic analysis showed that Bligon goats have a closer genetic relationship with *Capra hircus* (Gembrong) than with wild goat species such as *Capra ibex* and *Capra falconeri*. The genetic distance among Bligon goats ranged from 0.000 to 0.002, while the distance with *Capra ibex* ranged from 0.056 to 0.058, indicating a significant genetic divergence due to domestication. The phylogenetic tree also revealed that Bligon goat samples belong to haplogroup type B, along with Gembrong goats, suggesting a common maternal origin.'

Keywords: Bligon Goat, Cytochrome B, Genetic Distance, Mitochondrial DNA, Phylogenetics.