IDENTIFICATION OF BGN GENE POLYMORPHISM AND ITS ASSOCIATION WITH GASTROINTESTINAL PARASITE RESISTANCE IN SHEEP

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Bogor, August 2026

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ABSTRAK

MUHAMMAD NAUFAL FADHILAH. Identifikasi Polimorfisme Gen BGN dan Asosiasinya dengan Resistensi terhadap Parasit Gastrointestinal pada Domba. Dibimbing oleh ASEP GUNAWAN dan FADJAR SATRIJA.

Infeksi nematoda masih menjadi kendala utama dalam produksi domba karena menurunkan kesehatan dan produktivitas ternak serta meningkatkan ketergantungan pada obat antelmintik. Gen Biglycan (BGN) diprediksi berperan dalam resistensi terhadap nematoda melalui regulasi respons imun dan inflamasi. Penelitian ini bertujuan untuk mengidentifikasi polimorfisme gen BGN pada SNP g.77807325 (G > C) serta mengevaluasi asosiasinya dengan sifat resistensi terhadap nematoda pada domba. Sebanyak 75 ekor induk domba betina dianalisis genotipenya menggunakan metode PCR-RFLP dengan enzim restriksi *HinfI*. Fenotipe yang diamati meliputi jumlah telur cacing dan ookista dalam feses (FEC), skor FAMACHA, bobot badan, dan *body condition score* (BCS), yang dianalisis menggunakan uji t dan uji Mann-Whitney. Hasil menunjukkan bahwa gen BGN bersifat polimorfik dengan dua genotipe, yaitu GG dan GC, masing-masing berfrekuensi 0,95 dan 0,05, sedangkan genotipe CC tidak ditemukan. Populasi berada dalam keseimbangan Hardy–Weinberg. Genotipe BGN berasosiasi signifikan ($P < 0,05$) dengan *Strongyle* FEC dan BCS, di mana individu bergenotipe GC memiliki jumlah telur cacing lebih rendah dan nilai BCS lebih tinggi dibandingkan GG. Tidak ditemukan asosiasi yang signifikan ($P > 0,05$) terhadap skor FAMACHA, bobot badan, maupun jumlah ookista. Hasil ini menunjukkan bahwa polimorfisme gen BGN berpotensi menjadi penanda molekuler untuk meningkatkan resistensi terhadap nematoda gastrointestinal dalam program pemuliaan domba.

Kata kunci: asosiasi, domba, gen biglycan, nematoda gastrointestinal, resistensi nematoda

ABSTRACT

MUHAMMAD NAUFAL FADHILAH. Identification of BGN Gene Polymorphism and Its Association with Gastrointestinal Parasite Resistance in Sheep. Supervised by ASEP GUNAWAN and FADJAR SATRIJA.

Nematode infection remains a problem in sheep production, compromising animal health and productivity while increasing reliance on anthelmintic treatments. Biglycan (BGN) is predicted to contribute to nematode resistance through by regulating immune and inflammatory responses. This study aimed to identify polymorphisms in the BGN gene at SNP g.77807325 (G > C) and evaluate its association with nematode resistance traits in sheep. A total of 75 ewes were genotyped using PCR-RFLP with the *HinfI* restriction enzyme. Resistance traits, including fecal egg count (FEC), FAMACHA score, body weight, and body condition score (BCS) were analyzed using the t-test and Mann-Whitney test. The analysis revealed that the BGN gene was polymorphic, with two genotypes (GG

and GC) identified at frequencies of 0,95 and 0,05, while the CC genotype was absent. The population was in Hardy–Weinberg equilibrium. The BGN genotype was significantly associated ($P < 0.05$) with *Strongyle* FEC and BCS, with GC sheep showing lower egg counts and higher BCS than GG sheep. No significant associations were observed for FAMACHA score, body weight, or oocyst count. These findings suggest that BGN polymorphism may serve as a molecular marker to improve resistance to gastrointestinal nematodes in sheep breeding programs.

Keywords: association, biglycan gene, gastrointestinal nematode, nematode resistance, sheep

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PREFACE

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The author realizes that this scientific work is still far from perfect. Therefore, constructive criticism and suggestions are highly appreciated for future improvement. It is sincerely hoped that this scientific work will contribute to the development of animal genetics research, particularly in the field of genetic resistance to gastrointestinal parasites in sheep, and provide useful information for researchers, breeders, and all parties interested in livestock breeding and genetics.

Bogor, August 2026

Muhammad Naufal Fadhilah

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