

**ASOSIASI POLIMORFISME GEN *MYOSTATIN* TERHADAP
PERTUMBUHAN AYAM HIBRIDA (*Gallus gallus domesticus* Linn. 1758)
HASIL PERSILANGAN ♀F₁ KAMPER DENGAN ♂BC₁ BROILER**

Oleh:

TANJUNG ARDO

(16 / 401978 / PBI / 01427)

Fakultas Biologi, Universitas Gadjah Mada, Yogyakarta

INTISARI

Jumlah produksi ayam lokal pedaging nasional yang masih rendah menyebabkan diperlukannya alternatif galur ayam lokal pedaging baru. Fakultas Biologi UGM berinovasi membentuk galur ayam lokal pedaging baru yang disebut GAMA Ayam dengan menggabungkan sifat-sifat ayam Pelung, *Broiler*, dan *Layer* secara *selective breeding*. Polimorfisme gen *myostatin* diketahui dapat dijadikan penanda genetik berat badan ayam dalam pemilihan individu ayam unggul untuk dijadikan induk galur baru. Oleh karena itu, diperlukan penelitian untuk mendeteksi polimorfisme gen *myostatin* pada ayam yang akan digunakan dalam pembentukan galur GAMA Ayam. Metode yang digunakan dalam penelitian ini antara lain pemeliharaan ayam, pengambilan sampel darah, isolasi DNA, amplifikasi gen *myostatin*, dan sekuensing. Data dianalisis dengan membandingkan rerata bobot ayam hibrida dan kontrol, *alignment* data hasil sekuensing gen *myostatin* kemudian dianalisis letak *Single Nucleotide Polymorphism* (SNP), dan uji korelasi antara SNP terhadap bobot ayam. Hasil menunjukkan karakter morfologis dominan pada populasi ayam hibrida adalah jengger berbentuk tunggal/*single* (100%), warna jengger merah dan merah muda (50%), warna paruh putih (33,3%), warna kaki putih (83,3%), dan warna bulu hitam blirik (58,3%). Bobot ayam hibrida secara signifikan lebih tinggi dari ayam Pelung tetapi lebih rendah dari ayam *Broiler*. Terdapat 7 titik polimorfisme pada gen *myostatin* menghasilkan 9 macam haplotipe. Tiga haplotipe memiliki sekuens asam amino identik dengan protein Myostatin. Sedangkan enam haplotipe lainnya memiliki sekuens asam amino yang berbeda dengan protein Myostatin yang diakibatkan karena mutasi. Terdapat korelasi positif yang kuat ($r = 0,736$) antara protein myostatin normal dan mutan terhadap bobot ayam hari ke-49. Mutasi insersi *Adenine* pada nukleotida nomor 2099-2100 memiliki korelasi positif sangat kuat ($r = 0,800$) terhadap bobot ayam hari ke-49. Sedangkan mutasi substitusi T4842G memiliki korelasi negatif kuat ($r = -0,773$) terhadap bobot ayam hari ke-49 sehingga kedua polimorfisme ini berpotensi menjadi penanda genetik berat badan ayam hibrida.

Kata kunci : gen *myostatin*, insersi *adenine*, penanda genetik, berat badan, polimorfisme

**POLYMORPHISM OF THE *MYOSTATIN* GENE AND ITS
ASSOCIATION WITH GROWTH TRAITS IN HYBRID OF
♀F₁ *KAMPER* AND ♂BC₁ BROILER CHICKEN
(*Gallus gallus domesticus* Linn. 1758)**

By:
TANJUNG ARDO
(16 / 401978 / PBI / 01427)
Faculty of Biology, Universitas Gadjah Mada, Yogyakarta

ABSTRACT

The low production of local chicken meat production needs an alternative local chicken line. Faculty of Biology UGM innovates to produce a new breed of local chicken line called GAMA *Ayam* by combining the phenotype of *Pelung*, Broiler, and Layer chicken with selective breeding method. *Myostatin* gene polymorphisms were known to be used as genetic markers of chicken body weight in individual selection for the formation of new strains. Therefore, a study was needed to detect *myostatin* gene polymorphisms to be a genetic marker in the formation of GAMA *Ayam* strains. Methods used in this study were chicken breeding and maintenance, chicken blood sampling, DNA isolation, *myostatin* gene amplification, and sequencing. Data was analyzed by comparing body weight means of hybrid and its control, alignment of *myostatin* gene then analyzed the Single Nucleotide Polymorphisms (SNPs) site and Pearson correlation test between SNPs and chicken body weight. The results showed that hybrid chicken dominant morphological appearances are single comb (100%), red or light red comb color (50%), white beak (83,3%), and barred feather (58,3%). Hybrid chicken body weight was higher than *Pelung* chicken but lower than Broiler. There were 7 SNPs in *myostatin* gene exons that produced 9 haplotypes. Three haplotypes were identical to Myostatin protein, while six haplotypes has different amino acid sequences with Myostatin protein. The Pearson correlation analysis showed strong positive correlation ($r = 0,736$) between normal Myostatin protein and mutant to chicken body weight at 49-days-old. Adenine insertion to nucleotide 2099-2100 of *myostatin* gene has very strong positive correlation ($r = 0,800$) to 49-days-old chicken weight, despite T4842G substitution has strong negative correlation ($r = -0,773$) to 49-days-old chicken weight so this both polymorphisms have potent to becomes a genetic marker of hybrid chicken body weight traits.

Key words: Adenine insertion, chicken body weight traits, genetic marker, *myostatin* gene, polymorphism