

## ABSTRAK

### **DETEKSI POLIMORFISME MIKRO-INDEL PADA GEN *PRL* DAN *CRY2* SERTA ASOSIASINYA TERHADAP FENOTIPE *LITTER SIZE* DOMBA SAKUB (*Ovis aries*)**

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*Litter size* merupakan indikator vital dalam penilaian kesuburan indukan pada sektor peternakan, termasuk komoditas domba (*Ovis aries*) Sakub. Keterbatasan pada seleksi konvensional fitur *litter size* dalam program *breeding* telah mempromosikan pendekatan alternatif *molecular-assisted selection* (MAS) yang dinilai lebih efektif. Berbagai studi mendemonstrasikan kegunaan polimorfisme *insertion/deletion* (InDel) gen kandidat seperti *prolactin* (*PRL*) dan *cryptochrome circadian regulator 2* (*Cry2*) dalam seleksi *litter size* domba domestik. Penelitian terkait profil genotipik, parameter populasi, serta asosiasi InDel dengan *litter size* didasarkan pada implementasi markah InDel *PRL* dan *Cry2* terhadap domba Sakub di Desa Pandansari dan Wanareja, Brebes, Jawa Tengah. Metode yang dilakukan meliputi amplifikasi lokus *PRL*-P1-ins-23 bp dan *Cry2*-P1-del-6 bp pada isolat DNA folikel rambut melalui *touch-down polymerase chain reaction* (TD-PCR) dilanjutkan elektroforesis gel agarose 3% dan deteksi polimorfisme mikro-InDel. Analisis data populatif mengindikasikan indeks diversitas *PRL* (polimorfisme moderat) bergenotipe II, ID, dan DD yang konsisten dengan *Hardy-Weinberg equilibrium* (HWE), namun tidak dengan *Cry2* (polimorfisme rendah) bergenotipe ID dan DD. Uji statistik  $\chi^2$ , ANOVA, dan *t-test* turut mengimplikasikan insignifikansi data asosiatif ( $p>0,05$ ) antara InDel dengan partikularitas dan pluralitas *litter size*. Meski temuan ini tidak menunjukkan adanya kompetensi InDel *PRL* dan *Cry2* sebagai penanda *litter size* domba Sakub, riset lanjutan masih diperlukan untuk mengonfirmasi data terkait.

Kata kunci: Domba Sakub, *litter size*, mikro-InDel, gen *PRL*, gen *Cry2*.

## ABSTRACT

### **DETECTION OF MICRO-INDEL POLYMORPHISM IN *PRL* AND *Cry2* GENES AND THEIR ASSOCIATION TO SAKUB SHEEP'S (*Ovis aries*) LITTER SIZE PHENOTYPES**

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Litter size is a vital indicator in evaluating the profitability and fecundity of broodstock in the livestock sector, including the Sakub sheep (*Ovis aries*) commodity. Limitations on conventional selection of litter size features in breeding programs have promoted molecular-assisted selection (MAS) as alternative approaches which are considered to be more effective. Various studies demonstrated the utility of InDel polymorphisms of candidate genes such as prolactin (*PRL*) and cryptochrome circadian regulator 2 (*Cry2*) in litter size selection of domestic sheep. In this study, the investigation of genotypic profiles, population parameters, and InDel associations with litter size was based on the implementation of InDel *PRL* and *Cry2* markers on Sakub sheep in Pandansari and Wanareja Villages, Brebes, Central Java. The procedure involved amplification of the *PRL*-P1-ins-23 bp and *Cry2*-P1-del-6 bp loci in DNA isolates of hair follicle via touch-down polymerase chain reaction (TD-PCR) followed by 3% agarose gel electrophoresis and micro-InDel genotyping. Population data analysis indicated the diversity index of *PRL* (moderate polymorphism) that contains II, ID, and DD genotypes were consistent with Hardy-Weinberg equilibrium (HWE), but not with *Cry2* (low polymorphism) that contains ID and DD genotypes. The  $\chi^2$ , t-test, and ANOVA statistical tests also implied insignificance ( $p > 0.05$ ) in associative data between InDel and particularity of litter sizes. Although these findings do not demonstrate the competence of InDel *PRL* and *Cry2* as litter size markers for Sakub sheep, further research is still needed to confirm related data.

**Keywords:** Sakub sheeps, litter size, micro-InDel, *PRL* gene, *Cry2* gene