

PENGEMBANGAN METODE PENENTUAN KELAMIN SECARA DINI BERBASIS MOLEKULER PADA TANAMAN SALAK *DIOECIOUS*

Abstrak

Salak merupakan tanaman buah tropik yang memiliki nilai ekonomi dengan tipe pembungaan *dioecious*, *monoecious*, dan hermiprodit. Salak *dioecious* yang dibudidayakan membutuhkan tanaman betina dan jantan dengan rasio 4:1. Penentuan kelamin salak *dioecious* secara dini menjamin rasio kelamin betina dan jantan, karena pada stadia bibit sulit untuk membedakan kelamin tanaman baik secara morfologi, isozim, dan kromosom. Penentuan kelamin berbasis molekuler dengan teknik PCR-RAPD lebih akurat. Seleksi dari 305 primer dengan metode *Bulked Segregant Analysis* (BSA) terdapat 35 primer kandidat sebagai pembeda kelamin tanaman salak *dioecious*. Uji lebih lanjut secara individu dari primer kandidat ada 3 primer yang konsisten menghasilkan fragmen spesifik, yakni primer OPAP-20, OPO-17, dan UBC-454. Primer OPAP-20 menghasilkan fragmen terkait kelamin jantan dengan ukuran 570 bp, OPO-17 dengan fragmen berukuran 290 bp terkait kelamin betina, dan UBC-454 menghasilkan 2 fragmen spesifik, fragmen berukuran 940 bp terkait kelamin betina dan 950 bp terkait kelamin jantan. Kloning fragmen spesifik terkait kelamin tersebut menghasilkan efisiensi transformasi sekitar 95,00%. Hasil sekuensing fragmen spesifik dihasilkan 8 pasang primer spesifik, 2 primer diantaranya dapat digunakan untuk membedakan jenis kelamin pada tanaman salak *dioecious*. Primer tersebut adalah J-3(1)_{OPO-17} mengamplifikasi fragmen 229 bp dengan tingkat akurasi 93,33% untuk kelamin jantan, sedangkan primer B5.3 (3)_{UBC454} menghasilkan fragmen berukuran 356 bp dengan tingkat akurasi 95,00% untuk tanaman salak betina.

Kata kunci : diagnosis dini, kelamin, RAPD, *dioecious*, salak

DEVELOPMENT OF MOLECULAR BASED METHOD FOR EARLY SEXUAL DETERMINATION IN DIOECIOUS SALACCA

Abstract

Salacca is a tropical fruit crop that has various inflorescence types from monoecious, dioecious, up to hermaphrodite. Cultivation of dioecious salacca fruit requires ratio female and male plant about 4:1. Early sexual determination of dioecious salacca would guarantee the accuracy of female and male ratio because it is difficult to be distinguished at seedling stage both using its morphology, isozyme, and chromosome. Molecular based sexual determination through PCR-RAPD could detect the sexual of certain crop more accurately. From 305 primers tested using bulk segregant analysis method, 35 selected primers were considered as sex marker candidates for dioecious salacca. Each primer were further analyzed individually resulting three primers with reproducible specific fragments, namely OPAP-20, OPO-17, and UBC-454. OPAP-20 resulted 570 bp fragment related to male sex marker, while OPO-17 showed 290 bp fragment related to the female. In contrast, UBC-454 displayed two specific fragments (940 and 950 bp) that related to both sexes. Cloning of all specific fragments resulted 95% efficiency. According to the result of DNA sequencing, eight pairs of specific primers were obtained and two of them (J-3(1)_{OPO-17} and B5.3 (3)_{UBC454}) could be used as sex marker for dioecious salacca. Both J-3(1)_{OPO-17} and B5.3 (3)_{UBC454} were able to amplify 229 bp (male) and 356 bp fragments (female) with accuracy level around 93,33% and 95%, respectively.

Keyword: Early determination, sex, RAPD, dioecious, salacca.

