

APLIKASI BAHASA PEMROGRAMAN R
UNTUK ANALISIS QUANTITATIVE TRAIT LOCI (QTL)
TERKAIT KETAHANAN PENYAKIT LAYU PHYTOPHTHORA CAPSICI
PADA TANAMAN CABAI (*Capsicum annuum*)

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INTISARI

Tanaman cabai (*Capsicum annuum*) merupakan salah satu komoditas pangan strategis di Indonesia. Tingkat konsumsi yang tinggi membuat permintaan cabai selalu meningkat tiap tahunnya. Salah satu penyakit tanaman cabai berasal dari jamur *Phytophthora capsici* yang mengakibatkan tanaman menjadi busuk. Sifat resistensi terhadap *Phytophthora capsici* diatur oleh beberapa gen. Gen mayor dilaporkan terdapat pada kromosom ke-5. Penelitian ini bermaksud memodelkan pengaruh marka terhadap ketahanan *Phytophthora capsici* pada tanaman cabai dengan menggunakan analisis *Quantitative Trait Loci* (QTL). Data yang digunakan adalah marka *Single Nucleotide Polymorphism* (SNPs) hasil persilangan populasi cabai *Criollo Del Morello* (CM) 334 dan cabai jenis lokal *Jak-5673*. Hasil analisis QTL terhadap 27 marka dengan metode *Multiple Imputation* diperoleh model $y \sim Q1 + Q2 + Q3 + Q1:Q2$. Model ini mampu menjelaskan 46.3% variansi ketahanan tanaman cabai terhadap *Phytophthora capsici*. Marka signifikan yang terkait ketahanan terhadap *Phytophthora capsici* adalah PMMCB81 di posisi 121 cM (Q1), PMMCB34 posisi 159.31 cM (Q2), dan MCA32 di posisi 256.48 cM (Q3).

Kata Kunci: Tanaman Cabai, *Phytophthora capsici*, SNPs, QTLs, R software.

R LANGUAGE PROGRAMMING APPLICATION
for QUANTITATIVE TRAIT LOCI (QTL) ANALYSIS
ASSOCIATED RESISTANCE TRAIT AGAINST PHYTOPHTHORA CAPSICI
in HOT PEPPER (*Capsicum annuum*)

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ABSTRACT

*Hot peppers (*Capsicum annuum*) is one of the strategic food commodities in Indonesia. High levels of consumption make the demand is always increasing every year. One of the major disease on hot peppers is *Phytophthora capsici* that cause plants to become rotten.. Resistance againts *Phytophthora capsici* is controlled by several genes. Major genes were reported to be found on chromosome 5. This research aims to model the influence of markers against *Phytophthora capsici* resistance in plants of hot peppers by using Quantitative Trait Loci (QTL) analysis. This research used data Single Nucleotide Polymorphism (SNPs) markers based on the results of crossing populations Criollo Del Morello (CM) 334 and local types of chilli Jak-5673. The result of QTL analysis againts 27 markers used Multiple Imputation method obtained the significant model $y \sim Q1 + Q2 + Q3 + Q1:Q2$. QTLs model was able to explain 46.3% variance resistance on hot peppers against *Phytophthora capsici*. The significant markers are PMMCB81 at position 121 cM, PMMCB34 at 159.31 cM, and MCA32 at 256.48 cM, respectively.*

Key Words: *Hot Peppers, *Phytophthora capsici*, SNPs, QTLs, R sofware.*