

ABSTRAK

RISIKO RESISTENSI FUNGISIDA PROKLORAZ MANGAN KLORIDA PADA JAMUR *Xylaria* sp. PENYEBAB PENYAKIT BUSUK AKAR DAN PANGKAL BATANG TEBU

Oleh

ZAHRA EKA YOLANDA

Penyakit busuk akar dan pangkal batang (BAPB) pada tanaman tebu disebabkan oleh jamur *Xylaria* sp. Penyakit ini berpotensi menurunkan produktivitas dan rendemen tanaman tebu secara signifikan. Salah satu alternatif pengendalian untuk menekan perkembangan penyakit BAPB adalah menggunakan fungisida. Penelitian ini bertujuan untuk mengetahui risiko resistensi jamur *Xylaria* sp. terhadap fungisida prokloraz-Mn, salah satu fungisida golongan DMI (*Demethylation Inhibitor*). Kegiatan penelitian meliputi: generasi mutan resisten fungisida prokloraz-Mn, penentuan nilai EC_{50} , uji stabilitas resistensi, uji pertumbuhan koloni pada berbagai suhu, serta uji resistensi silang menggunakan fungisida flutriafol sesama golongan DMI. Hasil penelitian berhasil didapatkan mutan *Xylaria* sp. yang mampu tumbuh pada media mengandung prokloraz-Mn hingga konsentrasi 16,0 $\mu\text{g/mL}$. Uji EC_{50} didapatkan bahwa parental jamur *Xylaria* sp. memiliki EC_{50} 0,000002919 $\mu\text{g/mL}$, sedangkan mutan *Xylaria* sp. tahan terhadap fungisida prokloraz-Mn memiliki EC_{50} 0,000794469 $\mu\text{g/mL}$. Uji tingkat resistensi didapatkan nilai RF (*resistance factor*) sebesar 272,17, yang mengindikasikan bahwa fungisida prokloraz-Mn memiliki risiko tinggi untuk menimbulkan resistensi pada jamur *Xylaria* sp. Uji stabilitas resistensi jamur *Xylaria* sp. mutan tahan fungisida prokloraz-Mn didapatkan nilai FSC (*factor sensitivity change*) sebesar 0,0000279, yang menunjukkan bahwa stabilitas resistensinya tidak stabil. Uji pertumbuhan pada beberapa suhu menunjukkan bahwa jamur *Xylaria* sp. parental dan mutan tahan fungisida prokloraz-Mn tumbuh optimal pada suhu 25–30°C. Uji resistensi silang menunjukkan bahwa mutan jamur *Xylaria* sp. resisten terhadap prokloraz-Mn tidak menunjukkan adanya resisten silang terhadap fungisida flutriafol. Hasil penelitian ini menunjukkan bahwa *Xylaria* sp. memiliki potensi membentuk resistensi terhadap prokloraz-Mn, namun penggunaannya masih efektif jika dikelola secara bijak dengan rotasi atau kombinasi fungisida lainnya.

Kata kunci: BAPB, prokloraz-Mn, resistensi, tebu, *Xylaria* sp.

ABSTRAK

RISK OF PROCHLORAZ MANGANESE CHLORIDE FUNGICIDE RESISTANCE IN *Xylaria* sp., THE CAUSE OF ROOT AND BASE ROT DISEASE IN SUGAR CANE

By

ZAHRA EKA YOLANDA

Root and basal stem rot (BAPB) in sugarcane is caused by the fungus *Xylaria* sp. This disease has the potential to significantly reduce sugarcane productivity and yield. One alternative control method to suppress BAPB disease development is the use of fungicides. This study aimed to determine the risk of resistance of *Xylaria* sp. to the fungicide prochloraz-Mn, a member of the DMI (Demethylation Inhibitor) group. Research activities included: generating mutants resistant to prochloraz-Mn, determining EC₅₀ values, resistance stability testing, colony growth testing at various temperatures, and cross-resistance testing using the DMI fungicide flutriafol. The study successfully obtained mutants of *Xylaria* sp. which is able to grow on media containing prochloraz-Mn up to a concentration of 16.0 µg/mL. The EC₅₀ test found that the parental fungus *Xylaria* sp. has an EC₅₀ of 0.000002919 µg/mL, while the mutant *Xylaria* sp. resistant to the fungicide prochloraz-Mn has an EC₅₀ of 0.000794469 µg/mL. The resistance level test obtained an RF (resistance factor) value of 272.17, which indicates that the fungicide prochloraz-Mn has a high risk of causing resistance in the fungus *Xylaria* sp. The resistance stability test of the fungus *Xylaria* sp. mutant resistant to the fungicide prochloraz-Mn obtained an FSC (sensitivity change factor) value of 0.0000279, which indicates that the stability of its resistance is unstable. Growth tests at several temperatures showed that the fungus *Xylaria* sp. The parental strains and mutants resistant to the fungicide prochloraz-Mn grew optimally at 25–30°C. Cross-resistance tests showed that the mutants of the fungus *Xylaria* sp. resistant to prochloraz-Mn did not exhibit cross-resistance to the fungicide flutriafol. The results of this study indicate that *Xylaria* sp. has the potential to develop resistance to prochloraz-Mn, but its use is still effective if managed wisely with rotation or combination with other fungicides.

Keywords: BAPB, prochloraz-Mn, resistance, sugarcane, *Xylaria* sp