

## RINGKASAN

Jagung merupakan komoditas pangan yang penting dan berperan strategis dalam pemenuhan kebutuhan bahan baku pakan ternak, pangan, dan industri. Selama masa pertumbuhannya, jagung mengalami beberapa kendala budidaya baik dari hama maupun penyakit yang dapat menurunkan produksi, salah satunya yaitu adanya penyakit hawar pelepah yang disebabkan oleh patogen *Rhizoctonia solani*. Upaya pengendalian penyakit ini seringkali menggunakan pestisida kimia yang dapat membahayakan lingkungan. Oleh karena itu diperlukan pengendalian alternatif yaitu dengan penggunaan agensia hayati. Penggunaan agensia hayati memiliki beberapa kelebihan diantaranya dapat mengurangi pencemaran lingkungan bahan kimia, lebih efisien, dan berkelanjutan. Bakteri endofit yang dapat dijadikan sebagai agensia hayati diantaranya adalah *P. fluorescens* dan *Bacillus* sp. Penelitian ini bertujuan untuk: 1) mengetahui kemampuan bakteri endofit *P. fluorescens* dan *Bacillus* sp. dalam menghambat pertumbuhan jamur patogen *R. solani* secara *in vitro*, 2) mengetahui efektivitas bakteri endofit *P. fluorescens* dan *Bacillus* sp. dalam mengendalikan penyakit hawar pelepah pada tanaman jagung secara *in vivo*, dan 3) mengetahui pengaruh aplikasi bakteri endofit *P. fluorescens* dan *Bacillus* sp. terhadap pertumbuhan tanaman jagung.

Penelitian dilaksanakan mulai bulan Oktober 2020 sampai April 2021, bertempat di Laboratorium Perlindungan Tanaman dan *screen house* Fakultas Pertanian Universitas Jenderal Soedirman, Purwokerto. Rancangan percobaan yang digunakan yaitu Rancangan Acak Kelompok (RAK) dengan perlakuan bakteri endofit *Bacillus* sp. Kembaran B1, *Bacillus* sp. Baturraden B4, *P. fluorescens* Padamara B5. Variabel yang diamati yaitu pengujian *in vitro* meliputi penghambatan pertumbuhan jamur *R. solani* dan bobot kering miselium; pada pengujian *in vivo* meliputi masa inkubasi penyakit, intensitas penyakit, kejadian penyakit, *Area Under Disease Progress Curve* (AUDPC), serta komponen pertumbuhan tanaman. Data dianalisis menggunakan *Analysis of variance* (Anova) dan apabila terdapat perbedaan nyata antar perlakuan yang diujikan, maka dilanjutkan dengan uji Beda Nyata Jujur (BNJ) taraf kesalahan 5%.

Hasil penelitian menunjukkan bahwa pada perlakuan *Bacillus* sp. Kembaran B1 memberikan pengaruh terbaik dalam menghambat jamur *R. solani* secara *in vitro* sebesar 74,6% dan bobot kering miselium dengan nilai terkecil 0,04 g. *Bacillus* sp. Kembaran B1 memberikan pengaruh terbaik dalam pengujian *in vivo* dengan penekanan kejadian penyakit sebesar 55%, penekanan intensitas penyakit sebesar 42,11%, penekanan AUDPC sebesar 61,90%. Aplikasi bakteri endofit *Bacillus* sp. Kembaran B1 memiliki pengaruh terbaik terhadap pertumbuhan tanaman jagung dalam meningkatkan tinggi tanaman sebesar 150,35 cm dan bobot tanaman segar sebesar 139,65 g.

**Kata kunci** : bakteri endofit, *Bacillus* sp., *P. fluorescens*, *R. solani*, jagung

## SUMMARY

Maize is an important food commodity and have a strategic role in the needs of raw materials for animal feed, food, and industry. During its growth period, maize plant experienced several cultivation constraints from both from pests and diseases that could reduce production. One of which was the presence of sheath blight caused by the pathogen *Rhizoctonia solani*. Efforts to control this disease often use chemical pesticides that can harm the environment. Therefore, alternative control is needed, namely the use of biological agents. The use of biological agents have several advantages including reducing chemical environmental pollution, being more efficient, and sustainable. Endophytic bacteria that can be used as biological agents include *Pseudomonas fluorescens* and *Bacillus sp.* This research aims to: 1) determine the ability of endophytic bacteria *P. fluorescens* and *Bacillus sp.* in inhibiting the growth of the pathogenic fungus *R. solani* in vitro, 2) identify the effectiveness of the endophytic bacteria *P. fluorescens* and *Bacillus sp.* in controlling sheath blight on maize in vivo, and 3) observe the effect of application of endophytic bacteria *P. fluorescens* and *Bacillus sp.* on maize growth.

The research was carried out from October 2020 to April 2021, at the Plant Protection Laboratory and screen house Faculty of Agriculture, Jenderal Sudirman University, Purwokerto. The research design used was a Randomized Block Design with 1 factor, the treatment of endophytic bacteria. The variables observed were in vitro testing including inhibition of the growth of the fungus *R. solani* and dry weight of mycelium; In vivo testing includes disease incubation period, disease intensity, disease incidence, Area Under Disease Progress Curve AUDPC, and plant growth components. The data were analyzed using analysis of variance (Anova) and if there was a significant difference between the treatments being tested, it was continued with the BNJ test with an error rate of 5%.

The results showed that in vitro testing, the treatment of *Bacillus sp. Kembaran B1* gave the best effect in inhibiting the fungus *R. solani* 74.6% and dry weight of mycelium with the smallest value 0.04 g. *Bacillus sp. Kembaran B1* gave the best effect in vivo testing with suppression of disease incidence by 55%, suppression of disease intensity by 42.11%, suppression of AUDPC by 61.90%. Application of endophytic bacteria *Bacillus sp. Kembaran B1* gave the best effect on the growth of maize plants in increasing plant height by 150.35 cm and fresh plant weight by 139.65 g.

**Keywords:** endophytic bacteria, *Bacillus sp.*, *P. fluorescens*, *R. solani*, maize