RINGKASAN

Pisang (*Musa* sp.) merupakan komoditas hortikultura yang berpotensi dikembangkan untuk menunjang ketahanan pangan karena produksinya cenderung mengalami peningkatan dari tahun ke tahun. Namun, tanaman pisang sangat rentan terinfeksi penyakit layu fusarium yang disebabkan oleh jamur *Fusarium oxysporum* f.sp *cubense*. Penyakit tersebut dapat menyebabkan penurunan produktivitas pisang sebesar 35% atau bahkan kematian tanaman dalam infeksi berat. Pengendalian alternatif yang digunakan adalah penggunaan jamur yang bersifat antagonis untuk meningkatkan ketahanan tanaman terhadap patogen. Beberapa jamur yang berasosiasi dengan tanaman terutama yang hidup di dalam jaringan tanaman (jamur endofit) diketahui dapat mengendalikan patogen tanaman dan meningkatkan pertumbuhan tanaman. Jamur dengan karakter tersebut disebut *Plant Growth Promoting Fungi* (PGPF).

Penelitian ini dilaksanakan pada bulan Oktober 2023 sampai Februari 2024. Sampel akar dan batang pisang diambil dari berbagai varietas, yaitu varietas Raja; Kepok, Tanduk, dan Ambon. Sampel dibawa ke Laboratorium Perlindungan Tanaman, Universitas Jenderal Soedirman. Penelitian terdiri atas eksplorasi jamur endofit, seleksi jamur endofit non patogen, karakterisasi morfologi jamur jamur endofit, pengujian antagonis jamur endofit terhadap pertumbuhan Foc secara *in vitro*, serta pengujian jamur endofit sebagai pemacu pertumbuhan tanaman. Rancangan percobaan pengujian daya hambat antagonis secara *in vitro* dan pemacu pertumbuhan tanaman *in planta* menggunakan Rancangan Acak Lengkap dengan 10 perlakuan dan 3 ulangan. Data hasil pengamatan dianalisis menggunakan analisis sidik ragam. Apabila respon dari perlakuan berpengaruh nyata, maka dilanjutkan dengan uji Duncan's Multiple Range Test (DMRT) pada taraf kesalahan 5%.

Hasil isolasi jamur endofit tanaman pisang diperoleh 10 jamur bersifat non patogen. Isolat jamur yang teridentifikasi secara morfologi berasal dari 3 genus yaitu *Penicillium* sp., *Aspergillus* sp., dan *Gliocladium* sp. Jenis jamur antagonis pada endofit tanaman pisang yang memiliki daya hambat paling tinggi dalam menekan pertumbuhan jamur patogen Foc secara *in-vitro* (63%) berasal dari perlakuan *Aspergillus* sp. isolat RA1. Pada analisis produksi IAA diketahui bahwa perubahan supernatan menjadi warna merah muda paling pekat ditunjukkan oleh perlakuan *Aspergillus* sp. isolat KB1. Hasil percobaan secara *in planta* menunjukkan bahwa perendaman benih mentimun menggunakan jamur endofit menunjukkan hasil lebih baik dibandingkan kontrol (tanpa perendaman jamur endofit) pada seluruh variabel. Perlakuan terbaik banyak ditunjukkan oleh *Aspergillus* sp. isolat KB1, sedangkan pada variabel panjang akar ditunjukkan oleh perlakuan *Aspergillus* sp. isolat KB2.

SUMMARY

Banana (Musa sp.) is a horticultural commodity that has the potential to be developed to support food security because its production tends to increase yearly. However, banana plants are highly susceptible to fusarium wilt disease caused by the fungus Fusarium oxysporum f.sp cubense. The disease can cause a 35% reduction in banana productivity or even cause plant death in severe infections. An alternative control that can be used is the use of antagonistic fungi to increase plant resistance to pathogens. Some plant-associated fungi that live in plant tissues (endophytic fungi) are known to control plant pathogens and increase plant growth. Fungi with these characters are called Plant Growth-Promoting Fungi (PGPF).

This research was conducted from October 2023 to February 2024. Samples of banana roots and stems were taken from various varieties, including varieties of Raja; Kepok, Tanduk, and Ambon. The samples were brought to the Plant Protection Laboratory, Universitas Jenderal Soedirman. This research is a descriptive and experimental research. The research consisted of exploration of endophytic fungi, selection of non-pathogenic endophytic fungi, morphological characterization of endophytic fungal fungi, antagonistic testing of endophytic fungi against Foc growth in vitro, and testing endophytic fungi as plant growth promoters. The experimental design for testing antagonistic inhibition in vitro and plant growth promotion in planta used a completely randomized design with 10 treatments and 3 replicates. Observation data were analyzed using analysis of variance. If the response of the treatment has a significant effect, it is continued with the Duncan's Multiple Range Test (DMRT) test at the 5% error level.

The results of isolation of banana plant endophytic fungi obtained 10 fungi are non-pathogenic. Fungal isolates identified morphologically come from 3 genus namely Penicillium sp., Aspergillus sp., and Gliocladium sp. Antagonistic fungal species in banana plant endophytes that have the highest inhibition in suppressing the growth of pathogenic fungi Foc in-vitro (63%) comes from the treatment of Aspergillus sp. isolate RA1. In the analysis of IAA production, it is known that the supernatant changes to the most intense pink color shown by the treatment of Aspergillus sp. isolate KB1. The results of in planta experiments showed that soaking cucumber seeds using endophytic fungi showed better results than the control (without soaking endophytic fungi) on all variables. The best treatment was shown by Aspergillus sp. isolate KB1, while the root length variable was shown by Aspergillus sp. isolate KB2.