

INTISARI

Bacillus aerophilus, *Rhizobium milounense*, dan *Simplicispira* sp. merupakan bakteri endofit yang diisolasi dari Pisang Klutuk dan Pisang Ambon. Bakteri tersebut mampu meningkatkan pertumbuhan tanaman pisang tetapi hingga saat ini belum terdapat laporan terkait pengaplikasian bakteri ini pada *duckweed*. Penelitian ini bertujuan untuk mengetahui kemampuan bakteri dalam meningkatkan pertumbuhan dan biomassa *Landoltia punctata* dan *Lemna aequinoctialis* serta mengetahui apakah bakteri tersebut termasuk dalam bakteri endofit pada *duckweed* atau tidak. Penelitian diawali dengan konfirmasi karakterisasi morfologi sel dan koloni bakteri, kemampuan fiksasi nitrogen, produksi *Indole Acetic Acid* (IAA), dan kemampuan infeksi bakteri pada tanaman tembakau. Tahap selanjutnya yaitu pengujian kemampuan bakteri dalam mendukung pertumbuhan dan biomassa *duckweed* dengan menghitung jumlah *frond*, panjang akar, berat basah, dan berat kering. Tahap terakhir yaitu deteksi sel bakteri pada jaringan *duckweed* dengan *repetitive element sequence-based PCR* (rep-PCR). Hasil penelitian ini yaitu ketiga bakteri memiliki kemampuan fiksasi nitrogen dan produksi IAA serta bersifat non-patogen. *Rhizobium milounense* menunjukkan peningkatan jumlah *frond* tertinggi sebesar 37% pada *Landoltia punctata* secara signifikan dan *Bacillus aerophilus* menunjukkan peningkatan jumlah *frond* tertinggi pada *Lemna aequinoctialis* secara signifikan sebesar 61% serta berat kering tertinggi pada *Lemna aequinoctialis* sebesar 101,25% dengan rerata 4.03 ± 0.42 mg. Berdasarkan hasil visualisasi rep-PCR dan analisis pohon filogenetik, tidak ada sel bakteri uji yang masuk ke dalam jaringan *Landoltia punctata* maupun *Lemna aequinoctialis*. Kesimpulan penelitian ini yaitu ketiga bakteri mampu meningkatkan laju pertumbuhan dan biomassa *Lemna aequinoctialis* serta mampu meningkatkan jumlah *frond* dan berat basah *Landoltia punctata* tetapi ketiga bakteri tidak terdeteksi sebagai bakteri endofit pada kedua *duckweed*.

Kata kunci: bakteri endofit, biomassa, *duckweed*, laju pertumbuhan.

ABSTRACT

Bacillus aerophilus, *Rhizobium milounense*, and *Simplicispira* sp. are endophytic bacteria isolated from Klutuk banana and Ambon banana. These bacteria have been reported to enhance the growth of banana plants, however, there has been no study on their application in duckweed. This study aimed to evaluate the ability of these bacteria to promote growth and biomass production in *Landoltia punctata* and *Lemna aequinoctialis*, and to determine whether these bacteria can act as endophytes in duckweed. The research began with confirmation of bacterial morphological characteristics, including cell and colony morphology, nitrogen fixation ability, Indole Acetic Acid (IAA) production, and pathogenicity testing through infection assays on tobacco plants. The next stage involved assessing the ability of the bacteria to support duckweed growth and biomass by measuring frond number, root length, fresh weight, and dry weight. The final stage was the detection of bacterial cells within duckweed tissues using repetitive element sequence-based PCR (rep-PCR). The results showed that all three bacteria possessed nitrogen fixation ability, produced IAA, and were non-pathogenic. *Rhizobium milounense* significantly increased the frond number of *Landoltia punctata* by 37%, while *Bacillus aerophilus* significantly increased the frond number of *Lemna aequinoctialis* by 61% and produced the highest dry weight in *Lemna aequinoctialis* (101.25%) with an average of 4.03 ± 0.42 mg. Based on rep-PCR visualization and phylogenetic tree analysis, none of the tested bacteria were detected within the tissues of *Landoltia punctata* or *Lemna aequinoctialis*. In conclusion, all three bacteria were able to enhance the growth rate and biomass of *Lemna aequinoctialis*, as well as increase the frond number and fresh weight of *Landoltia punctata*. However, they were not detected as endophytic bacteria in either duckweed species.

Keywords: biomass, duckweed, endophytic bacteria, growth rate