

Pengaruh Inokulasi Jamur Mikoriza Vesikular Arbuskular and Rhizobium terhadap Daya Kompetisi *Acacia mangium* (Willd.) dengan Alang-alang [*Imperata cylindrica* (L.) Beauv.]

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INTISARI

Penelitian ini bertujuan untuk mengetahui pengaruh inokulasi jamur mikoriza vesikular arbuskular dan Rhizobium terhadap pertumbuhan *A. mangium* yang tumbuh bersama dengan alang-alang (*I. cylindrica*).

Pada percobaan kultur murni, (metoda *additive series*) menggunakan Rancangan Acak Lengkap (RAL) dengan lima ulangan. Perlakuan untuk masing-masing spesies *A. mangium* (M) and *I. cylindrica* (C). Perlakuan pada *A. mangium* terdiri atas ; M₁ : 1 *A. mangium*/pot, M₂ : 2 *A. mangium*/pot, M₃ : 3 *A. mangium*/pot, M₄ : 4 *A. mangium*/pot. Sama dengan *A. mangium* perlakuan pada *I. cylindrica*, terdiri atas ; C₁ : 1 *I. cylindrica*/pot, C₂ : 2 *I. cylindrica*/pot, C₃ : 3 *I. cylindrica*/pot, C₄ : 4 *I. cylindrica*/pot.

Pada percobaan kultur campur, (metoda *replacement series*) menggunakan Rancangan Acak Lengkap (RAL) pola faktorial, dengan 5 ulangan. Faktor pertama, inokulasi mikrobial yaitu MVA dan Rhizobium, faktor kedua rasio *A. mangium* dengan *I. cylindrica* (Ac/Im), yaitu A₁ : tanpa inokulasi (kontrol), A₂ : inokulasi dengan Rhizobium, A₃ : inokulasi dengan MVA, A₄ : inokulasi dengan Rhizobium and MVA. Faktor kedua, rasio *A. mangium* / *I. cylindrica* (Ac/Im), yaitu B₁ : 0/4 rasio Ac/Im, B₂ : 1/3 rasio Ac/Im, B₃ : 2/2 rasio Ac/Im, B₄ : 3/1 rasio Ac/Im, B₅ : 4/0 rasio Ac/Im.

Parameter pertumbuhan yang diamati antara lain: tinggi tanaman, jumlah daun, berat basah dan berat kering tajuk dan akar, berat kering total, rasio akar dan tajuk, persentase akar yang terinfeksi mikoriza dan jumlah total bintil dan bintil akar efektif, kadar N dan P total tajuk dan tanah. Analisis data menggunakan sidik ragam (Anova) dan uji lanjut dengan *Duncan's Multiple Range Test* (DMRT) pada taraf uji 5%.

Hasil penelitian menunjukkan bahwa semakin tinggi kerapatan *A. mangium* maupun *I. cylindrica* pada percobaan monokultur, pertumbuhan tanaman semakin menurun. Sementara tanpa adanya kompetisi pertumbuhan tanaman semakin baik. Pada percobaan kultur campur inokulasi MVA dengan mikoriza secara nyata meningkatkan pertumbuhan tanaman (tinggi tanaman, jumlah daun, berat segar dan berat kering tajuk dan akar, total berat kering, serta rasio akar/tajuk), jumlah total bintil dan bintil akar efektif dan persentase infeksi MVA, serta, kadar P total tajuk. Pertumbuhan terbaik dijumpai pada rasio Ac/Im 2/2, sedangkan interaksi keduanya dijumpai pada perlakuan A₄B₃ dengan rata-rata total berat kering 1,97 g.

Kata kunci: *pertumbuhan, kompetisi, A. mangium, I. cylindrica, MVA, Rhizobium*

The Inoculation of Vesicular Arbuscular Mycorrhizal Fungi and Rhizobium on The Competitiveness of *Acacia mangium* (Willd.) to Alang-alang [*Imperata cylindrica* (L.) Beauv].

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ABSTRACT

The aims of this study were to study the effect of Vesicular Arbuscular Mycorrhizae and Rhizobium inoculations to enable *Acacia mangium* to compete with alang-alang (*Imperata cylindrica*).

The monoculture experiment was using an Addition Method. Completely Randomized Design (CRD), with five replicates, for each *A. mangium* (M) and *I. cylindrica* (C) was selected. The treatments were: 1, 2, 3, and 4 plants per pot respectively.

The polyculture experiment was using Replacement Series Method. Factorial Completely Randomized Design (CRD), with two factors and five replicates was chosen. The first factor was four levels of microbial inoculation, i.e.; A₁ : without inoculation, A₂ : inoculation with Rhizobium, A₃ : inoculation with mycorrhizae, A₄ : inoculation with Rhizobium and mycorrhizae. The second factor consisted of five levels ratio of *A. mangium* / *I. cylindrica* (Ac/Im), i.e: 0/4 (B₁), 1/3 (B₂), 2/2 (B₃), 3/1 (B₄) and with 4/0 (B₅) ratio of Ac/Im,

The growth parameters were: plant height, number of leaves, fresh and dry weight of shoot and root, total plant dry weight, root/shoot ratio, percentage of mycorrhizae infection, total nodules and effective nodules of Rhizobium, total N and P contents in shoots, total N and P contents in soils. Data were analyzed using Analysis of variance (Anova), followed by Duncan's Multiple Range Test (DMRT) at 5 % level of significancy.

The results of the monoculture experiment showed that plant density significantly affected the growth of *A. mangium* or *I. cylindrica*. The growth of one *A. mangium*/pot were higher than four *A. mangium*/pot. The result of polyculture experiment showed that VAM inoculation and dual inoculations of VAM and Rhizobium significantly increased plant growth (height, number of leaves, fresh and dry weight of shoot and root, and total plant dry weight), and also percentage of mycorrhizal infection, total nodules and effective nodules of Rhizobium, and total P content of shoot. The best growth of *A. mangium* in plant ratio Ac/Im is in the ratio 2/2 while interaction between inoculation and ratio Ac/Im is A₄B₂ treatment with average total plant dry weight of 1,97 g.

Key word: *growth, competition, A. mangium, I. cylindrica, Vesicular Arbuscular Mycorrhizae (VAM), Rhizobium*