

Pengaruh Inokulasi *Funneliformis mosseae* (Nicol. & Gerd.) Walker & Schuessler Terhadap Pertumbuhan Tanaman Cabai (*Capsicum frutescens* L.) pada Berbagai Dosis Pupuk Urea dan Fosfat di Tanah Marginal = Influence of *Funneliformis mosseae* (Nicol. & Gerd.) Walker & Schuessler Inoculation to Chili (*Capsicum frutescens* L.) Plant Growth on Various Dosages of Urea and Phosphate Fertilizers in Marginal Soils

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Abstrak

Penurunan produktivitas tanah akibat penggunaan pupuk kimia berlebih menjadi permasalahan umum yang terjadi pada tanah marginal. Pertanian cabai rawit (*Capsicum frutescens* L.) menjadi salah satu sektor pertanian yang sangat berpengaruh terhadap roda perekonomian di Indonesia. Penelitian dilakukan dengan tujuan untuk mengoptimalkan penggunaan pupuk kimia dalam mendukung pertumbuhan cabai rawit yang diinokulasikan fungi mikoriza arbuskular *Funneliformis mosseae*. Parameter pengujian meliputi kimia edafik tanah, agronomi tanaman, kejadian penyakit tanaman, kolonisasi mikoriza, biokimia tanah, sporulasi fungi mikoriza, hingga kelimpahan bakteri pelarut fosfat dan penambat nitrogen di tanah. Hasil menunjukkan adanya beda nyata dalam peningkatan biomassa tanaman cabai rawit yang diinokulasi dengan *F. mosseae* di berbagai dosis pupuk fosfat dan urea. Hasil analisis statistik DMRT menunjukkan kolonisasi fungi mikoriza *F. mosseae* berpengaruh dalam mendukung pertumbuhan tanaman cabai pada tanah defisiensi unsur hara nitrogen. Fungi *Funneliformis mosseae* mampu mereduksi kejadian penyakit cabai rawit di berbagai dosis pupuk fosfat dan urea. Aktivitas enzim fosfatase dan mikroba total di tanah meningkat pada tanaman cabai rawit yang diinokulasi *F. mosseae*. Asosiasi *F. mosseae* dengan tanaman cabai rawit memberikan pengaruh positif terhadap populasi mikroba penambat nitrogen dan pelarut fosfat di tanah. Pemberian fungi *F. mosseae* dapat menekan penggunaan pupuk fosfat sebesar 75% serta memberikan hasil terbaik pada dosis normal pupuk urea. Fungi *F. mosseae* dapat menekan penggunaan pupuk kimia dan mendukung pertanian cabai rawit yang berkelanjutan.

.....Excessive use of chemical fertilizers results in a decrease in soil fertility, a common problem in marginal soils. Chili (*Capsicum frutescens* L.) farming is one of Indonesia's most important agricultural industries. The research aimed to optimize the use of chemical fertilizers to support the growth of chili inoculated with arbuscular mycorrhizal fungi *Funneliformis mosseae*. Soil edaphic chemistry, plant agronomy, plant disease incidence, mycorrhizal colonization, soil biochemistry, mycorrhizal fungi sporulation, and the colony of phosphate solubilizing and nitrogen-fixing bacteria in the soil also were included in the test parameters. The results revealed that the increase in plant biomass of chili inoculated with *F. mosseae* was significantly different regardless of the amount of phosphate and urea fertilizer applied. The mycorrhizal fungi colonization of *F. mosseae* was successful in supporting the growth of chili plants in nitrogen-deficient soils, according to the results of DMRT statistical analysis. At various phosphate and urea fertilizer dosages, the *F. mosseae* fungi reduced the incidence of chili disease. When chili plants were inoculated with *F. mosseae*, phosphatase enzyme activity and total microorganisms in the soil increased. The presence of *F. mosseae* in the soil increases the population of nitrogen-fixing and phosphate-solubilizing bacteria. *Funneliformis*

mosseae fungi can reduce the use of phosphate fertilizers by up to 75% while producing the highest performance with standard urea fertilizer dosages. The *F. mosseae* fungi can help the farmers cultivate chilis more sustainably by reducing the consumption of chemical fertilizers.