

RINGKASAN

Kedelai (*Glycine max* L.) merupakan tanaman kacang-kacangan dengan kandungan protein dan minyak nabati yang tinggi. Produktivitas kedelai dalam negeri masih rendah sehingga diperlukan upaya untuk meningkatkannya. Tanah Inceptisol memiliki sebaran yang luas di Indonesia, namun tanah ini dianggap kurang subur. Pemupukan merupakan salah satu upaya yang dapat digunakan untuk meningkatkan produktivitas tanaman dan kesuburan tanah, karena pupuk ini mengandung mikroba yang mampu mengikat unsur hara menjadi tersedia bagi tanaman serta mampu memecah partikel tanah sehingga struktur tanah menjadi lebih remah. Penelitian ini bertujuan untuk mengetahui pengaruh kombinasi pupuk hayati dan pupuk NPK terhadap sifat fisika Inceptisol, pertumbuhan serta hasil tanaman kedelai. Selain itu untuk mengetahui pengaruh penggunaan pupuk hayati terhadap pengurangan dosis pupuk NPK.

Penelitian berlangsung pada Bulan Juli - Desember 2024, di lahan percobaan Desa Kebanggan, Kecamatan Sumbang, Kabupaten Banyumas pada tanah Inceptisol. Penelitian menggunakan metode Rancangan Acak Kelompok (RAK) non faktorial dengan 10 rancangan percobaan yang diulang 3 kali sehingga terdapat 30 unit percobaan. Adapun dosis perlakuan kombinasi pupuk hayati dan pupuk NPK yang digunakan dalam penelitian ini, yaitu: P0 = Kontrol; P1 = 1 NPK; P2 = 1,5 NPK + 1 Pupuk Hayati; P3 = 1,5 NPK + 2 Pupuk Hayati; P4 = 1 NPK + 1 Pupuk Hayati; P5 = 1 NPK + 2 Pupuk Hayati; P6 = 0,75 NPK + 1 Pupuk Hayati; P7 = 0,75 NPK + 2 Pupuk Hayati; P8 = 0,5 NPK + 1 Pupuk hayati; P9 = 0,5 NPK + 2 Pupuk Hayati. Variabel yang diamati meliputi kadar air tanah, berat jenis isi (BJI), berat jenis partikel (BJP), porositas tanah, batas-batas Atterberg, serta pertumbuhan dan hasil tanaman kedelai.

Hasil analisis menunjukkan bahwa kombinasi 0,75 pupuk NPK + 2 pupuk hayati merupakan perlakuan terbaik yang dapat meningkatkan 22,5% berat jenis isi tanah, 8,4% batas lekat dan 8,3% jangka olah tanah. Kombinasi pupuk NPK dan pupuk hayati berpengaruh nyata terhadap beberapa variabel pertumbuhan dan hasil tanaman, hal ini dikarenakan faktor lingkungan dan kebutuhan air yang kurang mendukung sehingga pertumbuhan tanaman tidak optimal di setiap minggunya. Kombinasi 1 NPK + 1 pupuk hayati dapat meningkatkan 16,1% tinggi tanaman minggu keempat, 3,7% tinggi tanaman saat panen, 2,1% jumlah daun minggu kedelapan, 14,4% jumlah daun saat panen, 44,4% jumlah biji dan 72,4% berat biji. Sifat fisika tanah dan pertumbuhan tanaman menunjukkan adanya korelasi nyata pada variabel kadar air tanah, batas cair, batas lekat dan batas gulung tanah terhadap tinggi dan jumlah daun tanaman. Korelasi ini menunjukkan pentingnya pengelolaan tanah yang tepat dan penggunaan pupuk hayati untuk meningkatkan hasil panen. Dengan mengoptimalkan faktor-faktor ini, petani dapat mencapai tanaman yang lebih sehat dengan karakteristik pertumbuhan yang lebih baik sekaligus meminimalkan penggunaan pupuk anorganik.

SUMMARY

Soybeans (Glycine max L.) are legumes with a high content of protein and vegetable oils. Domestic soybean productivity is still low, so efforts are needed to increase it. Inceptisol soil has a wide distribution in Indonesia, but this soil is considered less fertile. Fertilization is one of the efforts that can be used to increase plant productivity and soil fertility, because this fertilizer contains microbes that are able to bind nutrients to be available to plants and are able to break down soil particles so that the soil structure becomes more crumbly. This study aims to determine the effect of the combination of biological fertilizer and NPK fertilizer on the physical properties of Inceptisol and the growth and yield of soybean plants. In addition, to determine the effect of the use of biofertilizers on reducing the dose of NPK fertilizers.

This research took place from July - December 2024 on the experimental land of Kebanggan, Sumbang, Banyumas Regency, with the type of Inceptisol soil. The study used a non-factorial Group Random Design (RAK) method with 10 experimental designs that were repeated 3 times so that there were 30 experimental units. The dosages of the combination of biofertilizer and NPK fertilizer used in this study were P0 = control; P1 = 1 NPK; P2 = 1.5 NPK + 1 biofertilizer; P3 = 1.5 NPK + 2 biological fertilizers; P4 = 1 NPK + 1 biological fertilizer; P5 = 1 NPK + 2 biological fertilizers; P6 = 0.75 NPK + 1 biofertilizer; P7 = 0.75 NPK + 2 biofertilizers; P8 = 0.5 NPK + 1 biofertilizer; and P9 = 0.5 NPK + 2 biofertilizers. The variables observed included soil moisture content, content specific gravity (BJI), particle specific gravity (BJP), soil porosity, Atterberg boundaries, and soybean crop growth and yield.

The results of the analysis showed that the combination of 0.75 NPK fertilizer + 2 biological fertilizers was the best treatment that could increase the specific gravity of the soil content by 22.5%, the density limit by 8.4% and the tillage period by 8.3%. The combination of NPK fertilizers and biofertilizers has a real effect on several plant growth and yield variables, this is due to environmental factors and water needs that are not supportive so that plant growth is not optimal every week. The combination of 1 NPK + 1 biofertilizer can increase 16.1% of the height of the fourth week of plants, 3.7% of the height of the plants at harvest, 2.1% of the number of leaves at the eighth week, 14.4% of the number of leaves at harvest, 44.4% of the number of seeds and 72.4% of the weight of the seeds. The physical properties of soil and plant growth show a clear correlation between soil moisture content, melt limit, adhesion limit and soil roll limit to plant height and leaf count. This correlation shows the importance of proper soil management and the use of biofertilizers to increase crop yields. By optimizing these factors, farmers can achieve healthier crops with better growth characteristics while minimizing the use of inorganic fertilizers.