

RINGKASAN

Jagung manis (*Zea mays saccharata* Sturt.) adalah tanaman pangan dari famili graminace atau rumput-rumputan. Budidaya tanaman jagung manis memiliki nilai ekonomi yang tinggi di pasaran dan masa produksinya relatif lebih cepat. Gangguan biotik selain hama dan penyakit tanaman adalah gangguan gulma yang menyebabkan terjadinya kompetisi baik hara, air dan ruang hidup. Herbisida memiliki banyak manfaat seperti hemat waktu pengaplikasian, ekonomis, dan memiliki tingkat efisiensi serta efektivitas yang tinggi. Penelitian ini bertujuan untuk mengetahui pengaruh herbisida berbahan aktif parakuat, glifosat, atrazin, mesotrion, dan nicosulfuron terhadap diversitas gulma pada pertanaman jagung, pengaruhnya terhadap populasi bakteri tanah dan pertumbuhan serta hasil tanaman jagung manis.

Penelitian dilaksanakan di Laboratorium Agronomi dan Hortikultura, Fakultas Pertanian, Universitas Jenderal Soedirman dan Lahan Jagung Manis Mersi, Purwokerto dari bulan Juli-Oktober 2023. Penelitian ini menggunakan Rancangan Acak Kelompok (RAK) satu faktor yaitu pengendalian gulma, terdiri atas 8 taraf dan 4 ulangan. Taraf perlakuan terdiri dari H₀ (Kontrol), H₁ (Penyiangan), H₂ (Parakuat), H₃ (Glifosat), H₄ (Parakuat, Atrazin, dan Mesotrion), H₅ (Glifosat, Atrazin dan Mesotrion), H₆ (Parakuat, Atrazin, Mesotrion dan Nikosulfuron) dan H₇ (Glifosat, Atrazin, Mesotrion dan Nicosulfuron). Variabel yang diamati meliputi identifikasi gulma pada fase sebelum tanam, 15 HST, dan 35 HST, tinggi tanaman, jumlah daun, kehijauan daun, panjang, bobot, diameter tongkol jagung berkelobot dan tanpa kelobot, kepadatan bakteri tanah total, kepadatan bakteri pelarut fosfat, kepadatan bakteri penambat Nitrogen dan kepadatan bakteri Rhizobium. Data hasil penelitian dianalisis menggunakan uji ANOVA pada taraf kepercayaan 95%, dan dilanjutkan Uji DMRT α 5% jika terdapat pengaruh perlakuan.

Hasil penelitian menunjukkan aplikasi herbisida glifosat dan parakuat mampu menurunkan diversitas gulma tanaman jagung manis dengan ditandai adanya penurunan nilai dominansi pada berbagai jenis gulma hingga 15 HST. Koefisien komunitas gulma antara sebelum tanam dan 15 HST memiliki nilai 36% yang berarti <75%. Nilai koefisien komunitas gulma <75% mendefinisikan daerah tersebut tidak terdapat kesamaan populasi. Kombinasi herbisida berbahan aktif glifosat, parakuat, atrazin, mesotrion dan nicosulfuron mampu mengendalikan gulma tanaman jagung manis. Efektivitas glifosat dan parakuat yang menurun pasca 35 HST menyebabkan dominansi berbagai jenis gulma meningkat, namun dengan diaplikasikannya herbisida atrazin, mesotrion dan nicosulfuron mampu mengendalikan gulma hingga masa panen. Aplikasi parakuat, atrazin, dan mesotrion merupakan perlakuan herbisida yang mendominasi pada hampir seluruh variabel penelitian. Aplikasi parakuat, atrazin dan mesotrion memberikan hasil terbaik pada variabel tinggi tanaman 145,72 cm; jumlah daun 10,85 helai; kehijauan daun 52,15 unit; bobot jagung per petak efektif 41,87 kg/petak; dan bobot jagung per hektar 16,75 ton/ha. Aplikasi herbisida glifosat, parakuat, atrazine, mesotrion dan nikosulfuron menyebabkan penurunan kepadatan bakteri tanah pasca aplikasi herbisida. Hasil penelitian menunjukkan penurunan kepadatan bakteri tanah saat tanaman jagung berumur 35 HST dan 55 HST dari $10,07 \times 10^8$ CFU/g menjadi $9,55 \times 10^8$ CFU/g (bakteri total), $9,53 \times 10^8$ CFU/g menjadi $9,52 \times 10^8$ CFU/g (bakteri pelarut P), $9,90 \times 10^8$ CFU/g menjadi $9,40 \times 10^8$ CFU/g (Rhizobium) dan $9,91 \times 10^8$ CFU/g menjadi $9,78 \times 10^8$ CFU/g (bakteri penambat N).

SUMMARY

Sweet corn (*Zea mays saccharata* Sturt.) is a food crop from the gramineae, or grass family. Sweet corn cultivation has a high economic value in the market, and the production period is relatively faster. Biotic disorders, apart from pests and plant diseases, are weed disturbances, which cause competition for nutrients, water, and living space. Herbicides have many benefits, such as saving application time, being economical, and having a high level of efficiency and effectiveness. This research aims to determine the effect of herbicides containing the active ingredients paraquat, glyphosate, atrazine, mesotrione, and nicosulfuron on weed diversity in corn plantations, their effect on soil bacterial populations, and the growth and yield of sweet corn plants.

The research was carried out at the Agronomy and Horticulture Laboratory, Faculty of Agriculture, Jenderal Soedirman University, and Mersi Sweet Corn Farm, Purwokerto, from July to October 2023. This research used a Randomized Block Design (RBD) with one factor, namely weed control, consisting of 8 levels and 4 replications. Treatment levels consist of H0 (control), H1 (weeding), H2 (paraquat), H3 (glyphosate), H4 (paraquat, atrazine, and mesotrione), H5 (glyphosate, atrazine, and mesotrione), H6 (paraquat, atrazine, mesotrione, and nicosulfuron), and H7 (glyphosate, atrazine, mesotrione, and nicosulfuron). Observed variables included weed identification in the pre-planting, 15 DAP and 35 DAP phases, plant height, number of leaves, greenness of leaves, length, weight, diameter of corn cobs with husks and without husks, total soil bacterial density, density of phosphate solubilizing bacteria, density of nitrogen fixing bacteria, and density of *Rhizobium* bacteria. The research data were analyzed using the ANOVA test at a confidence level of 95% and continued with the DMRT a 5% test if there was a treatment effect.

The results of the research showed that the application of glyphosate and paraquat herbicides was able to reduce weed diversity in sweet corn plants, marked by a decrease in dominance values for various types of weeds up to 15 DAP. The weed community coefficient between before planting and 15 DAP had a value of 36%, which means <75%. A weed community coefficient value of <75% defines that the area does not have similar populations. A combination of herbicides containing the active ingredients glyphosate, paraquat, atrazine, mesotrione, and nicosulfuron is able to control sweet corn weeds. The effectiveness of glyphosate and paraquat decreases after 35 DAP, causing the dominance of various types of weeds to increase; however, the application of the herbicides atrazine, mesotrione, and nicosulfuron can reduce weed diversity until harvest time. The application of paraquat, atrazine, and mesotrione was the herbicide treatment that dominated almost all research variables. Application of paraquat, atrazine, and mesotrione gave the best results at a variable plant height of 145.72 cm, a number of leaves of 10.85 pieces, green leaves of 52.15 units, an effective corn weight per plot of 41.87 kg/plot, and a corn weight per hectare of 16.75 kg/ha. Application of the herbicides glyphosate, paraquat, atrazine, mesotrione, and nicosulfuron caused a decrease in soil bacterial density after herbicide application. The results showed a decrease in soil bacterial density when corn plants were 35 DAP and 55 DAP, from 10.07×10^8 CFU/g to 9.55×10^8 CFU/g (total bacteria), 9.53×10^8 CFU/g to 9.52×10^8 CFU/g (bacteria solvent P), 9.90×10^8 CFU/g to 9.40×10^8 CFU/g (*Rhizobium*), and 9.91×10^8 CFU/g to 9.78×10^8 CFU/g (*N*-fixing bacteria).