

INTISARI

Sistem monokultur intensif khususnya padi (*Oryza sativa* L.) dinilai memberikan dampak negatif tidak hanya terhadap penurunan mutu tanah (sifat fisika, kimia dan biologi tanah) namun diduga dapat menurunkan hasil padi. Pola pergiliran tanaman yang tepat dapat dilakukan sebagai salah satu alternatif pertanian berkelanjutan. Keragaan suatu tanaman dipengaruhi oleh faktor lingkungan dan faktor genetik. Dalam penelitian ini dilakukan pengamatan dampak tiga pola pergiliran tanaman yaitu padi-padi-padi (P-P-P), jagung-jagung-padi (J-J-P), kacang panjang-pare-terong-padi (S-S-P) terhadap karakteristik tanah, pertumbuhan dan hasil padi. Tujuan penelitian untuk mempelajari pengaruh tiga pola pergiliran tanaman terhadap komponen kesuburan tanah, pertumbuhan dan hasil 10 padi harapan milik Universitas Gadjah Mada. Selain itu, dapat diketahui genotipa yang adaptif dan stabil pada masing-masing pola pergiliran tanaman. Rancangan percobaan menggunakan *oversites design* dengan dua faktor yaitu pola pergiliran tanaman dan genotipa diulang sebanyak 3 kali.

Hasil menunjukkan bahwa pola pergiliran tanaman berbeda memberikan sifat fisika, kimia dan biologi tanah berbeda. Pola pergiliran monokultur padi (P-P-P) menyebabkan kandungan bahan organik, jumlah karbon, jumlah bakteri dan jamur lebih rendah, dibandingkan dengan pola pergiliran J-J-P dan S-S-P, namun menyebabkan kandungan K tersedia lebih tinggi dalam tanah. Kandungan N tersedia dan KPK tertinggi didapatkan pada pola pergiliran S-S-P. Pola pergiliran tanaman J-J-P memiliki nilai pH, karbon organik, bahan organik P tersedia, lebih tinggi dibandingkan pola pergiliran P-P-P dan S-S-P. Pola pergiliran J-J-P menyebabkan kandungan N, P, K jaringan, laju pertumbuhan tanaman, rerata tinggi tanaman, jumlah anakan, luas permukaan daun, bobot kering akar, jumlah anakan produktif, panjang malai, jumlah gabah per malai bobot gabah per rumpun dan bobot kering total tertinggi. Produktivitas tertinggi didapatkan pada pola pergiliran tanaman J-J-P, dan terendah pada pola pergiliran tanaman P-P-P. Genotipa dengan produktivitas tinggi dan adaptif adalah GM 8 yaitu 8,18 ton/ha. Genotipa yang memberikan hasil tinggi pada pola pergiliran tanaman S-S-P dan J-J-P adalah genotipa Mutan Lampung Kuning, dan pada pola pergiliran tanaman P-P-P adalah genotipa GM 28, GM 8 dan Mutan Rojolele 30 Pendek.

ABSTRACT

Monoculture cropping system especially of rice (*Oryza sativa* L.), is considered to contribute negative effects not only on degradation of soil properties but also on long-term grain yield. Appropriate crop rotation is often practiced as an alternative strategy to overcome the negative side effects of intensive cropping. The experiment was conducted in Agrotechnology Innovation Center (PIAT), Universitas Gadjah Mada, Kalitirto, Berbah, Sleman Regency, Yogyakarta from December 2020 to June 2021. In this study, it was investigated the impact of three crop rotation patterns, rice-rice-rice (P-P-P), maize-maize-maize (J-J-P), crop rotation pattern involving many types of vegetables such as eggplant, long bean, and bitter melon (S-S-P) on growth and yield of ten new rice genotypes. The results showed that different crop rotation patterns gave different responses to the physical, chemical and biological properties of the soil. The rotational pattern of rice monoculture (P-P-P) has lower organic matter content, the amount of carbon, the number of bacteria and fungi, compared to J-J-P and S-S-P, but has a higher content of available K in the soil. The content of available N and the highest CEC was found in the S-S-P rotation pattern. The crop rotation pattern J-J-P has a higher pH value, organic carbon, available organic matter, available P than the P-P-P and S-S-P. The J-J-P rotation pattern had the highest values for N, P, K content at plant tissue, CGR, average plant height, number of tillers, leaf surface area, root dry weight, number of productive tillers, panicle length, number of grains per panicle, grain weight per clump and total dry weight. The highest yield was obtained in rice with a crop rotation pattern of J-J-P, and the lowest in an intensive rice monoculture crop rotation pattern (P-P-P). The genotypes with the highest productivity was GM 8, which was 8.18 tons/ha. The genotype that was performed better in the S-S-P and J-J-P crop rotation pattern was the Mutan Lampung Kuning, and the P-P-P crop rotation pattern was the GM 28, GM 8 and the Mutan Rojolele 30 Pendek.