

PENGARUH POLA TANAM BAWANG MERAH DI LAHAN SAWAH DAN PASIR TERHADAP KERAGAMAN KOMUNITAS MIKROB, NUTRISI TANAH, DAN KEJADIAN PENYAKIT MOLER

INTISARI

Pertanaman bawang merah di pesisir Bantul, Yogyakarta dilakukan pada dua tipe tanah dengan rotasi tanam berbeda, yaitu sawah (padi–bawang–bawang) dan pasir (cabai–bawang–bawang). Perbedaan agroekosistem ini memengaruhi kandungan nutrisi, komunitas mikroba, serta kejadian penyakit moler yang disebabkan *Fusarium* spp. Penelitian ini bertujuan membandingkan insidensi moler, komunitas mikroba, nutrisi tanah, dan hubungan keduanya pada kedua agroekosistem. Pengamatan dilakukan melalui survei kejadian moler dan pengambilan sampel tanah untuk analisis DNA serta uji nutrisi. Komunitas bakteri dianalisis menggunakan primer 16S V4 (515F–806R), sedangkan komunitas jamur menggunakan primer ITS2 (2024F–2409R). Uji nutrisi mencakup pH, C-organik, N, P, K, S, kapasitas tukar kation (KTK), kandungan anion–kation utama, serta tekstur tanah. Hasil penelitian menunjukkan insidensi moler tidak berbeda signifikan antar tanah, namun di tanah pasir gejala muncul satu minggu lebih cepat. Tanah sawah memiliki KTK, NO_3^- , dan NH_4^+ lebih tinggi, sedangkan tanah pasir lebih kaya Fe, Ca, Mn, Cu, Mg, S, dan Zn. *Marmoricola* menjadi biomarker sekaligus core microbe di sawah, sedangkan *Lysinibacillus* di pasir. Pada jamur, *Fusarium* merupakan core microbe di kedua tanah. *Pyrenochaetopsis* menjadi biomarker di sawah, sementara *Sordariales* di pasir. Jaringan mikroba di tanah pasir lebih kompleks. Secara umum, komunitas mikroba berhubungan erat dengan kondisi nutrisi, terutama pH.

Kata kunci: Rotasi tanam, tanah sawah, tanah pasir, *amplicon metagenomic sequencing*, penyakit moler.

EFFECTS OF SHALLOT CROPPING PATTERNS ON SOIL MICROBES, SOIL NUTRIENTS, AND TWISTED DISEASE INCIDENCE IN PADDY AND SANDY SOILS

ABSTRACT

Shallot cultivation in the coastal area of Bantul, Yogyakarta, is carried out on two soil types with different crop rotations, namely paddy soils (rice–shallot–shallot) and sandy soils (chili–shallot–shallot). These agroecosystem differences influence soil nutrient content, microbial communities, and the incidence of shallot basal rot disease caused by *Fusarium* spp. This study aimed to compare basal rot incidence, microbial communities, soil nutrients, and their relationships across the two agroecosystems. Field observations were conducted by monitoring basal rot incidence and collecting soil samples for DNA analysis and nutrient testing. Bacterial communities were analyzed using the 16S V4 region (primers 515F–806R), while fungal communities were analyzed using ITS2 (primers 2024F–2409R). Soil nutrient analyses included pH, organic C, N, P, K, S, Cation Exchange Capacity (CEC), major anions and cations, and soil texture. The results showed no significant differences in basal rot incidence between the two soil types, although symptoms appeared one week earlier in sandy soils. Paddy soils exhibited higher CEC, NO_3^- , and NH_4^+ , while sandy soils were richer in Fe, Ca, Mn, Cu, Mg, S, and Zn. *Marmoricola* was identified as both a biomarker and core microbe in paddy soils, while *Lysinibacillus* was dominant in sandy soils. In fungal communities, *Fusarium* was a core microbe in both soil types. *Pyrenochaetopsis* was identified as a biomarker in paddy soils, whereas *Sordariales* was dominant in sandy soils. Microbial networks were more complex in sandy soils. Overall, microbial communities were strongly associated with soil nutrient conditions, particularly pH.

Keywords: crop rotation, paddy soil, sandy soil, amplicon metagenomic sequencing, twisted disease