

Bawang merah merupakan tanaman hortikultura yang penting, dengan berbagai pusat produksi di Indonesia, salah satunya terletak di Kabupaten Bantul, Daerah Istimewa Yogyakarta. *Fusarium* spp. adalah jamur patogen yang menyebabkan penyakit moler pada bawang merah, sementara komunitas mikroba memainkan peran penting dalam kesehatan tanaman. Pola tanam, kondisi iklim, dan insiden penyakit adalah faktor-faktor yang dapat mempengaruhi kerentanan tanaman, namun hubungan antara faktor-faktor ini belum diteliti secara mendalam. Penelitian ini bertujuan untuk mengidentifikasi dinamika perkembangan penyakit dan dampaknya terhadap keragaman mikroba selama tiga musim tanam. Penelitian dilakukan di salah satu daerah berpasir di Kabupaten Bantul, dengan pengamatan kejadian penyakit selama tiga musim dan perhitungan AUDPC. Pengambilan sampel tanah untuk metagenomik dilakukan di area rhizosfer secara diagonal, dianalisis menggunakan platform MGI DNBSEQ-G400, dan divisualisasikan menggunakan Rstudio (R versi 4.2.3). Hasil penelitian menunjukkan bahwa kejadian penyakit lebih tinggi pada musim hujan (Desember-Februari) dengan nilai 12,67% dibandingkan musim peralihan (Februari-April) dan musim kemarau (Juni-Agustus). Analisis menunjukkan faktor agroklimatik yang paling berpengaruh adalah curah hujan, intensitas cahaya, kecepatan angin, kelembapan, dan suhu. Komunitas *Fusarium* spp. patogen ditemukan pada ketiga musim, dengan komunitas terendah pada musim tanam kedua. Perbedaan dalam komunitas *Fusarium* spp. dipengaruhi oleh keragaman komunitas bakteri, terutama bakteri antagonis; keragaman bakteri yang lebih tinggi diduga dapat mengurangi komunitas jamur patogen. Beberapa bakteri yang mampu menghambat infeksi patogen termasuk *Paenibacillus* sp., *Streptomyces* sp., dan *Corynebacterium* sp.

**Kata kunci:** Agroklimat, keragaman, metagenomik, musim tanam, moler

## ABSTRACT

Shallots is one of the important horticultural with several production centers in Indonesia, one of which is in Bantul District, Special Region of Yogyakarta. *Fusarium* spp. are the pathogenic fungi causing twisted disease in shallot, and microbial communities are an integral part of plant health conditions. Planting patterns, climatic conditions, and disease incidence, can also be determining factors in plant vulnerability, yet research on the relationship between these factors has not been conducted. This study aimed to determine the dynamics of disease development and its influence on microbial diversity over 3 (three) planting seasons. The research was conducted in one of the sandy area in Bantul Regency. The research included observing three seasons of disease incidence and calculating AUDPC, in which soil sampling for metagenomics was conducted in the rhizosphere area diagonally, analyzed using the MGI DNBSEQ-G400 platform, and visualized using Rstudio (R version 4.2.3). The results of this study showed that the incidence rate of disease in the rainy season (December-February) tended to be higher with a value of 12.67% compared to the transitional season (February-April) and the dry season (June-August). The analysis results related to agroclimatic factors that had the highest influence were rainfall, light intensity, wind speed, humidity, and temperature. The community of pathogenic *Fusarium* spp. was confirmed in all three seasons, with the lowest community found in planting season 2. Differences in *Fusarium* spp. communities was influenced by the diversity of bacterial communities, especially those acting as antagonistic agents; higher diversity of bacterial was suspected to reduce the community of pathogenic fungi. Some confirmed and suspected bacteria that were able to inhibit the levels of pathogenic infection included *Paenibacillus* sp, *Streptomyces* sp, and *Corynebacterium* sp.

**Keywords:** Agro-climate, diversity, metagenomics, planting season, twisted