

**EFFECT OF FOUR KINDS OF FERTILIZER ON NEMATODE
ABUNDANCE IN TSURUOKA DRYLAND, JAPAN**

Fadila Rahma Yunita¹, Daryono Prehaten², Satoru Sato³

ABSTRACT

Drylands are characterised by low water and organic matter content, which results in low soil productivity. One approach to improving soil quality is through fertilizer application, which can affect the dynamics of soil microorganism communities, including nematodes. Nematodes play an important role as bioindicators of soil fertility and microecosystem health. This study aimed to compare the abundance of nematodes after five different fertilizer treatments and determine the significant differences between the treatments.

The study was conducted on dryland of Yamagata University, Tsuruoka, Japan, using a latin square with five treatments: control (no fertilizer), compost, BSF (Black Soldier Fly) frass fertilizer, swine manure, and NPK chemical fertilizer. Data were collected through soil sampling before and after treatment, followed by nematode extraction using the Baermann method. Nematode abundance was calculated per 100-gram of soil, then analysed using ANOVA test and Tukey HSD follow-up test using R Studio software.

The results showed that BSF fertilizer produced the highest abundance of nematodes, with an average of 167 individuals/100-gram of soil, followed by swine (129), compost (99), control (86), and the lowest was NPK with an average of 57 individuals. ANOVA tests showed significant differences ($p < 0.05$) between treatments. Bacterivorous nematodes were the most dominant group in the organic fertilizer treatment. In conclusion, fertilizer type has a significant effect on nematode abundance and composition, and organic fertilizer has been proven to better support the sustainability of soil biological function.

Keywords: soil nematodes, organic fertilizer, BSF, microbial activity, biological indicators

¹ Student of Faculty of Forestry UGM

² Lecturer of Faculty of Forestry UGM

³ Lecturer of Faculty of Agriculture Yamagata University

PENGARUH EMPAT JENIS PUPUK TERHADAP KELIMPAHAN NEMATODA DI LAHAN KERING TSURUOKA, JEPANG

Fadila Rahma Yunita¹, Daryono Prehaten², Satoru Sato³

INTISARI

Lahan kering memiliki karakteristik rendahnya kandungan air dan bahan organik yang berdampak pada rendahnya produktivitas tanah. Salah satu pendekatan untuk meningkatkan kualitas tanah adalah melalui aplikasi pupuk, yang dapat memengaruhi dinamika komunitas mikroorganisme tanah, termasuk nematoda. Nematoda berperan penting sebagai bioindikator kesuburan tanah dan kesehatan mikroekosistem. Penelitian ini bertujuan untuk membandingkan kelimpahan nematoda setelah diberi lima perlakuan pupuk berbeda serta mengetahui perbedaan signifikan antar perlakuan tersebut.

Penelitian dilakukan di lahan kering milik Yamagata University, Tsuruoka, Jepang, menggunakan Rancangan Bujur Sangkar Latin (RBSL) dengan lima perlakuan: kontrol (tanpa pupuk), pupuk kompos, pupuk frass BSF (Black Soldier Fly), pupuk kotoran babi (swine), dan pupuk kimia NPK. Pengumpulan data dilakukan melalui pengambilan sampel tanah sebelum dan sesudah perlakuan, diikuti dengan proses ekstraksi nematoda menggunakan metode Baermann. Kelimpahan nematoda dihitung per 100 gram tanah, lalu dianalisis menggunakan uji ANOVA dan uji lanjut Tukey HSD melalui perangkat lunak R Studio.

Hasil penelitian menunjukkan bahwa pupuk BSF menghasilkan kelimpahan nematoda tertinggi dengan rata-rata 167 individu/100 gram tanah, diikuti oleh pupuk kotoran babi (swine manure) (129), kompos (99), kontrol (86), dan terendah adalah NPK dengan rata-rata 57 individu. Uji ANOVA menunjukkan terdapat perbedaan yang signifikan ($p < 0.05$) antar perlakuan. Nematoda bakterivora merupakan kelompok yang paling dominan pada perlakuan pupuk organik. Kesimpulannya, jenis pupuk berpengaruh nyata terhadap kelimpahan dan komposisi nematoda, dan pupuk organik terbukti lebih mendukung keberlanjutan fungsi biologis tanah.

Kata kunci: nematoda tanah, pupuk organik, BSF, aktivitas mikroba, indikator biologis

¹ Mahasiswa Fakultas Kehutanan UGM

² Staff Pengajar Fakultas Kehutanan UGM

³ Staff Pengajar Fakultas Pertanian Universitas Yamagata



UNIVERSITAS
GADJAH MADA

**EFFECT OF FOUR KINDS OF FERTILIZER ON NEMATODE ABUNDANCE IN TSURUOKA DRYLAND,
JAPAN**

Fadila Rahma Yunita, Dr. Ir. Daryono Prehaten, S.Hut., M.Sc., IPM. ; Associate Prof. Dr. Satoru Sato

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>