

RINGKASAN

Jagung (*Zea mays* L.) merupakan komoditas penting di Indonesia, namun produktivitasnya sering terancam oleh serangan ulat grayak (*Spodoptera frugiperda*), hama invasif yang dapat menurunkan hasil secara signifikan. Petani umumnya mengandalkan pestisida kimia untuk pengendalian, tetapi penggunaannya berisiko menimbulkan resistensi, pencemaran lingkungan, dan dampak kesehatan. Nematoda entomopatogen (NEP) berpotensi sebagai agens pengendali hayati karena bersifat spesifik terhadap inang sasaran dan ramah lingkungan. Penelitian ini bertujuan mengeksplorasi, mengidentifikasi, dan menguji efektivitas isolat lokal NEP terhadap *S. frugiperda* pada tanaman jagung.

Penelitian dilaksanakan di Laboratorium Perlindungan Tanaman, Universitas Jenderal Soedirman, pada November 2024 sampai dengan Juli 2025. Sampel tanah diambil dari lima lahan jagung di Kecamatan Sumbang, Banyumas, kemudian dilakukan isolasi NEP dengan metode *baiting* menggunakan larva *Tenebrio molitor*. Identifikasi morfologi juvenil infektif (JI) mengacu pada Nemaplex (UC Davis, 2024). Uji efektivitas NEP terhadap larva *S. frugiperda* instar III disusun menggunakan Rancangan Acak Lengkap (RAL) faktorial dengan dua faktor yaitu asal isolat dan kerapatan JI, masing-masing dengan lima, ulangan.

Hasil penelitian menunjukkan bahwa NEP berhasil ditemukan di lahan jagung Kecamatan Sumbang. Isolat NEP yang diperoleh kemudian diidentifikasi secara morfologi dan morfometri. NEP dari Desa Banjarsari Kulon yang terdiri atas *Steinernema* sp., sedangkan dari Desa Datar yang terdiri atas *Steinernema* sp. dan *Heterorhabditis* sp. Uji efektivitas terhadap larva *S. frugiperda* menunjukkan bahwa isolat asal Datar memiliki tingkat mortalitas lebih tinggi, yaitu sebesar 75,2%, dibandingkan isolat Banjarsari Kulon yang menghasilkan mortalitas sebesar 63,3%. Selain itu, kerapatan JI sebanyak 500 JI telah menunjukkan efektivitas yang cukup dalam menimbulkan kematian larva. Temuan ini menunjukkan bahwa isolat lokal NEP berpotensi dikembangkan sebagai agens pengendali hayati yang efektif dan ramah lingkungan untuk pengendalian *S. frugiperda* di lapangan.

SUMMARY

Maize (*Zea mays* L.) is a major crop in Indonesia, but its productivity is threatened by the fall armyworm (*Spodoptera frugiperda*), an invasive pest capable of causing significant yield losses. Chemical pesticides are widely used for control, yet their long-term application risks resistance, environmental damage, and health issues. Entomopathogenic nematodes are potential biological control agents due to their specificity and eco-friendly nature. This study aimed to explore, identify, and evaluate the effectiveness of local EPN isolates against *S. frugiperda* on maize plants.

The research was conducted at the Plant Protection Laboratory, Universitas Jenderal Soedirman, from November 2024 to July 2025. Soil samples were collected from five maize fields in Sumbang District, Banyumas Regency, and EPNs were isolated using the baiting method with *Tenebrio molitor* larvae. Morphological identification of infective juveniles was carried out based on Nemaplex (UC Davis, 2024). The effectiveness test of EPNs against third-instar *S. frugiperda* larvae was arranged in a factorial Completely Randomized Design (CRD) with two factors, namely isolate origin and infective juvenile (IJ) density, each with five replications.

The results of the study showed that NEP was successfully found in corn fields in Sumbang District. The NEP isolates obtained were then identified morphologically and morphometrically. NEP from Banjarsari Kulon Village consisted of *Steinernema* sp., while from Datar Village consisted of *Steinernema* sp. and *Heterorhabditis* sp. Effectiveness tests against *S. frugiperda* larvae showed that the isolate from Datar had a higher mortality rate, namely 75.2%, compared to the Banjarsari Kulon isolate which resulted in a mortality of 63.3%. In addition, a JI density of 500 JI has shown sufficient effectiveness in causing larval mortality. These findings indicate that local NEP isolates have the potential to be developed as effective and environmentally friendly biological control agents for controlling *S. frugiperda* in the field..