

## ABSTRAK

Masuknya *Spodoptera frugiperda* menjadi masalah baru dalam upaya peningkatan produksi jagung. Serangan *S. frugiperda* yang terjadi pada seluruh fase pertumbuhan tanaman mengakibatkan menurunnya produktivitas tanaman jagung. Peningkatan populasi yang terjadi dengan cepat juga menjadi faktor penyebab kerusakan yang tinggi pada tanaman. Peningkatan populasi *S. frugiperda* di wilayah baru terjadi karena berbagai faktor diantaranya belum beradaptasinya musuh alami asli (parasitoid dan jamur entomopatogen) dalam menyerang *S. frugiperda*, iklim yang mendukung, dan ketersediaan tanaman inang. Penelitian ini dilakukan untuk mengetahui tingkat serangan *S. frugiperda* pada tanaman jagung pasca invasi di Provinsi Lampung, menemukan parasitoid yang menyerang *S. frugiperda*, menemukan jamur entomopatogen *S. frugiperda*, dan mengetahui potensi metabolit sekunder jamur entomopatogen dalam mematikan *S. frugiperda*. Data tingkat serangan *S. frugiperda* pada tanaman jagung diperoleh dari Balai Proteksi Tanaman Pangan dan Hortikultura Provinsi Lampung. Survei intensitas kerusakan tanaman dilakukan di Lampung Tengah, Lampung Selatan, Lampung Timur, dan Pringsewu dari tahun 2019-2023. Eksplorasi parasitoid larva dan jamur entomopatogen dilakukan di Kabupaten Pesawaran, Pringsewu, Lampung Selatan, dan Lampung Timur pada tahun 2021-2022. Pengamatan tingkat parasitasi larva, dan isolasi, karakterisasi, identifikasi jamur, uji patogenesis jamur entomopatogen, ekstraksi metabolit sekunder, serta pengujian kemampuan metabolit sekunder dalam mematikan *S. frugiperda* dilakukan di Laboratorium Bioteknologi Fakultas Pertanian Universitas Lampung. Setiap pengujian dilakukan dengan menggunakan rancangan acak kelompok lengkap (RAKL) dengan 5 ulangan. Data yang diperoleh dianalisis ragam kemudian dilanjutkan dengan uji DMRT 5%. Hasil penelitian menunjukkan bahwa tingkat serangan *S. frugiperda* di Provinsi Lampung berkorelasi positif dengan curah hujan ( $r = 0,45$ ;  $\alpha = 0,05$ ). Ditemukan empat parasitoid larva *S. frugiperda* yaitu *Senometopia illota*, Genus nr. *Eriborus* sp., *Drino (Pallexorista)* sp., dan *Chelonus formosanus*. Dua diantara parasitoid tersebut yaitu *S. illota* dan Genus nr. *Eriborus* sp. belum pernah dilaporkan memarasit *S. frugiperda*. Sembilan jamur entomopatogen juga berhasil diisolasi dari larva *S. frugiperda* terinfeksi yaitu *Metarhizium rileyi*, *Geosmithia pallida*, *Penicillium citrinum*, *Aspergillus flavus*, *Cladosporium tenuissimum*, *Penicillium expansum*, *Beauveria bassiana*, *Sarocladium zeae* 1, dan *Sarocladium zeae* 2. Sporulasi jamur *B. bassiana* lebih tinggi dibanding dengan jamur lain. Viabilitas spora jamur *Cladosporium tenuissimum* menunjukkan nilai tertinggi. Mortalitas larva *S. frugiperda* pasca aplikasi jamur entomopatogen berkisar antara 1-8% dengan mortalitas larva tertinggi pada perlakuan *Sarocladium zeae* 1. *Penicillium citrinum* mengakibatkan kegagalan berpupa sebesar 63,33%. Metabolit sekunder jamur entomopatogen mengakibatkan mortalitas *S. frugiperda* sebesar 22,22 – 71,11%. Metabolit sekunder *S. zeae* 1 mengakibatkan mortalitas tertinggi, metabolit sekunder *B. bassiana*, *C. tenuissimum*, dan *P. citrinum*.

**Kata kunci:** Jamur entomopatogen, metabolit sekunder, mortalitas larva, parasitoid larva, *Spodoptera frugiperda*

## ABSTRACT

The invasion of *Spodoptera frugiperda* has become a new problem in efforts to increase maize production. *S. frugiperda* attacks occur at all stages of plant growth, resulting in decreased maize productivity. The rapid population growth is also a factor causing significant damage to plants. The population increase in new areas is due to several factors, including the lack of adaptation by native natural enemies (parasitoids and entomopathogenic fungi) to attacking *S. frugiperda*, a supportive climate, and the availability of host plants. This research was conducted to determine the level of *S. frugiperda* attacks on corn plants post-invasion in Lampung Province, to find parasitoids attacking *S. frugiperda*, to discover entomopathogenic fungi of *S. frugiperda*, and to determine the potential of secondary metabolites of entomopathogenic fungi in killing *S. frugiperda*. The Plant Protection and Horticulture Agency of Lampung Province provided data on the attack levels of *S. frugiperda* on maize. Surveys of plant damage intensity were conducted in Central Lampung, South Lampung, East Lampung, and Pringsewu from 2019–2023. Larval parasitoids and entomopathogenic fungi were explored in Pesawaran, Pringsewu, South Lampung, and East Lampung in 2021–2022. Observations on larval parasitism rate, isolation, characterization, entomopathogenic identification, entomopathogenic pathogenicity tests, secondary metabolite extraction, and secondary metabolite tests to cause mortality of *S. frugiperda* were conducted at the Biotechnology Laboratory, Faculty of Agriculture, University of Lampung. Each test was conducted using a completely randomized block design (CRBD) with five replications. The obtained data were analyzed using variance analysis followed by a 5% DMRT test. The findings revealed that the level of *S. frugiperda* attacks in Lampung Province was positively correlated with rainfall ( $r = 0.45$ ;  $\alpha = 0.05$ ). Four larval parasitoids of *S. frugiperda* were found: *Senometopia illota*, Genus nr. *Eriborus* sp., *Drino (Palexorista)* sp., and *Chelonus formosanus*. Two of these parasitoids, *S. illota* and Genus nr. *Eriborus* sp., have not been previously reported to parasitize *S. frugiperda*. Nine entomopathogenic fungi were also successfully isolated from infected *S. frugiperda* larvae, namely *Metarhizium rileyi*, *Geosmithia pallida*, *Penicillium citrinum*, *Aspergillus flavus*, *Cladosporium tenuissimum*, *Penicillium expansum*, *Beauveria bassiana*, *Sarocladium zeae* 1, and *Sarocladium zeae* 2. The sporulation of *B. bassiana* was higher compared to other fungi. The spore viability of *C. tenuissimum* showed the highest value. Larval mortality of *S. frugiperda* post-application of entomopathogenic fungi ranged from 1–8%, with the highest larval mortality in the treatment with *Sarocladium zeae* 1. *Penicillium citrinum* caused a pupation failure of 63.33%. The secondary metabolites of entomopathogenic fungi resulted in *S. frugiperda* mortality ranging from 22.22% to 71.11%. The secondary metabolites of *S. zeae* 1 caused the highest mortality, followed by the secondary metabolites of *B. bassiana*, *C. tenuissimum*, and *P. citrinum*.

**Keywords:** entomopathogenic fungi, secondary metabolite, larval mortality, larval parasitoid, *Spodoptera frugiperda*