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تدوین: رضا علیایی حستویی
Effect of some biotic and abiotic characteristics on biological control of Dacus citellus with entomopathogenic nematodes

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The Cucurbit fruit fly, Dacus citellus Loew, is one of the most important pest of cucurbit plants. D. citellus spend part of its life cycle inside the soil, where several biocontrol agents like entomopathogenic nematodes are active. Those agents have different host finding behavior and are compatible for use against the pest. The aim of this study is to evaluating the pathogenicity of entomopathogenic nematodes against several stages of the cucurbit fly under laboratory and greenhouse condition. For this means, native strains of EPN along with commercial strains were tested against growing stages of cucurbit fly. Among 50 soil samples, 5 samples were positive. Both Steinernema Travassos and Heterorhabditis Fournier genera were isolated. According to morphological and morphometric characters and also phylogenetic analysis based on sequence data of 16S rRNA, four isolates, namely Boy1, Boyj, Boyk and Boy1 were from "famae" species group of Steinernema. Another isolate, HBoj was a member of "bacteriophora" species group of Heterorhabditis. Results of pathogenicity assay of EPNs against the cucurbit fly showed that S. carpocapsae Weiser was more effective compared to H. bacteriophora in plate and soil assay, respectively. Dissection of cadavers demonstrated that reproduction of S. carpocapsae within last instars larva. Both nematode species H. bacteriophora and S. carpocapsae induced low mortality on pupal stage with 300 Dl/ cm² concentration. In pathogenicity experiment of both nematode species against adult flies, effects of isolate and concentration of nematodes were significant on D. citellus mortality. In the pathogenicity experiment within fruit, S. carpocapsae isolate was able to find and infect last instars larve in fruit. In greenhouse experiment, H. bacteriophora and S. carpocapsae had equal effect against larvae. Effect of abiotic factors on the pathogenicity of EPNs against last instars larve was examined too. In experiment of related to soil type effect, loamy-sandy and sandy soil provided optimal condition for pathogenicity of both nematode species. In this research, the effectiveness of H. bacteriophora and S. carpocapsae under laboratory as well as the effect of abiotic factors confirmed that the utility of both species as biocontrol agents for management of this pest.

Keywords: Dacus citellus, insect pathology, Heterorhabditis bacteriophora, Steinernema carpocapsae, laboratory, greenhouse