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Effects of horizontal distance and moisture content on the infectious ability of indigenous entomopathogenic nematodes, *Steinernema hermaphroditum* EPNKU60 and *Heterorhabditis indica* EPNKU82 collected from thailand

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Abstract

Entomopathogenic nematodes (EPNs) in the genera *Steinernema* and *Heterorhabditis*, and their symbiotic bacteria (*Xenorhabdus* spp. and *Photorhabdus* spp., respectively) are lethal endoparasites of soil-borne insects. They have been used to control a wide variety of insect pests throughout the world. However, nematode ecology typically affects the ability of nematode infection. The purpose of this study is to determine the effect of horizontal distance and moisture content on the infectious potential of two indigenous EPNs from Thailand, *Steinernema hermaphroditum* EPNKU60 and *Heterorhabditis indica* EPNKU82. We evaluated the horizontal movement of the two EPNs at a rate of 25 infective juveniles (IJs)/cm^2 at distances of 0, 5, 10, and 15 cm from the insect host. The results showed that S. hermaphroditum EPNKU60 and H. indica EPNKU82 killed more than 80 % of fifth instar larvae of *Galleria mellonella* L. three days after exposure and increased to 100 % five days after exposure. In one to two days, the two EPNs move horizontally up to 15 cm. The numbers of S. hermaphroditum EPNKU60 and H. indica EPNKU82 were found in the insect cadaver in populations of 24–35 and 18–34 individuals, respectively. In addition, the efficacy of the two EPNs were evaluated at different moisture contents of 0, 10, 20 and 30 % when the two EPNs were applied at 15 cm away from the insect host. Seven days after exposure, the two EPNs were still moving and successfully infecting the insect host at rates of 40–60 % and 86.66–100 % for moisture contents of 20 and 30 %, respectively. The two EPNs were found in the insect cadaver in populations of 2–4 individuals. Infectivity was not detected in treatments with moisture contents of 0 and 10 %. This study presents the information ecology for the potential use of the two EPNs as bio-agents against larvae of soil-borne insects.

Keywords: Insect pathogen, nematode ecology, soil-borne insect, wax moth

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