

Pathogenicity of native isolates of entomopathogenic nematodes (*Heterorhabditis* and *Steinernema*) against *Spodoptera frugiperda* under arid coastal conditions

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ABSTRACT

Given the increasing resistance of *Spodoptera frugiperda* to chemical insecticides, entomopathogenic nematodes (EPNs) offer a sustainable alternative. This study aimed to isolate and identify native EPNs from agricultural soils in Lambayeque, Peru, evaluate their spatial distribution, and determine their pathogenicity against *S. frugiperda* under arid coastal conditions. Out of 267 soil samples collected from various agroecosystems, 7.5% tested positive for EPNs, revealing a global distribution (R-index = 0.453) in perennial crops. Molecular analysis (ITS) confirmed identities with over 99.4% similarity to *Heterorhabditis indica* and *Steinernema diaprepesi*, representing the first genetic report of the latter in Peru. *In vitro* bioassays against *S. frugiperda* showed that Heterorhabditidae strains caused mortality rates > 85% (at 80 IJs/larva); specifically, strain UNPRG.SV 01 exhibited the lowest median lethal concentration ($LC_{50} = 4.63$ IJs/larva), followed by UNPRG.SV 10 ($LC_{50} = 8.02$). Conversely, while UNPRG.SV 19 (Steinernematidae) showed less than 15% lethality *in vitro*, *in vivo* trials demonstrated 70.0% efficacy over 96 h, which was statistically comparable to chemical insecticide performance (72.5%). These results indicate promising biocontrol potential of these native isolates and their potential integration into integrated pest management programs.

KEYWORDS:

Spodoptera frugiperda

entomopathogenic nematodes

Heterorhabditis indica

Steinernema diaprepesi

biological control

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data supporting the findings of this study are available in the institutional repository of the National University Pedro Ruiz Gallo from Lambayeque (UNPRG, Peru) and can be provided upon reasonable request from the corresponding author.

Supplemental Material

Supplemental data for this article can be accessed online at

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