



MICROBIOLOGICAL IMAGE

**Nematicidal effect of an Argentine strain of
Photorhabdus laumondi laumondi
(Enterobacteriaceae) on the free-living nematode
Panagrellus redivivus (Rhabditidae: Panagrolaimidae)**

Efecto nematocida de una cepa argentina de *Photorhabdus laumondi laumondi* (Enterobacteriaceae) sobre el nematodo de vida libre *Panagrellus redivivus* (Rhabditidae: Panagrolaimidae)

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Bacteria with nematicidal effects have attracted interest as biocontrol agents of pests and diseases due to their relatively low environmental impact compared to chemical management strategies¹. The damage they cause to target nematodes is diverse and imperfectly understood⁴.

Photorhabdus spp. (Enterobacteriaceae) lives symbiotically within the nematode *Heterorhabditis* spp. (Rhabditida: Heterorhabditidae). It is known that secondary metabolites of this gram-negative bacterium exhibit insecticidal activity, mainly in Lepidopteran and Coleopteran insects². Studies have also shown that cell-free culture filtrates of *Photorhabdus* spp. have nematicidal activity on free-living nematodes

and pest phytonematodes; however, the causes of death in these targets are still being studied³.

This work provides information on the effect caused by the intake of *Photorhabdus laumondi laumondi* (strain LP1900, isolated from *Heterorhabditis bacteriophora* strain SUP2), in the digestive tract of the bacteriophagous nematode *Panagrellus redivivus* (Rhabditidae: Panagrolaimidae).

LP1900 strain was cultured on nutrient agar (Difco) plates for 7 days at 29 °C (5 repetitions); then 2×10^3 nematodes were inoculated on each plate, and freely dispersed through the culture. Untreated controls consisted of agar nutrient plates with the 2×10^3 nematode inoculum alone. Alterations in the posterior esophagus (behind the basal bulb), and in the anterior, middle and posterior intestinal regions of treated nematodes were recorded 24 h after treatment under a light microscope (10×) (Eclipse E200; Nikon), and compared with untreated nematodes (Fig. 1).

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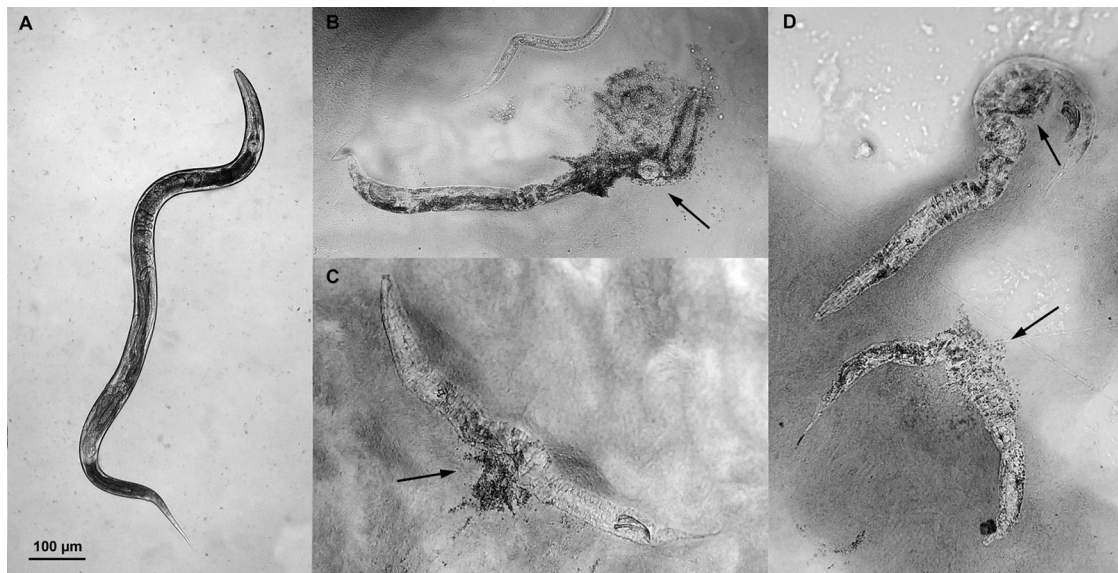


Figure 1 Nematicidal effect of *P. laumondi laumondi* LP1900 on the digestive tract of *P. redivivus*. (A) Both the intestine and the cuticle were intact in untreated nematodes. (B) A rupture in the cuticle near the basal bulb region can be observed on nematodes exposed to a 7-day-old culture of LP1900, spilling the internal contents of the organism. The musculature, from the stoma to the beginning of the basal bulb, showed signs of disintegration. (C, D) A similar effect was observed in the middle and posterior intestinal regions of other treated nematodes.

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References

1. Bojanich M, Basualdo J, Giusiano G. In vitro effect of *Chrysosporium indicum* and *Chrysosporium keratinophilum* on *Toxocara canis* eggs. *Rev Argent Microbiol.* 2018;50:249–54.
2. Eliceche D, Tesis Estudio de las características bio-ecológicas de un aislamiento autóctono del entomonemátodo *Heterorhabditis bacteriophora* (Nematoda: Heterorhabditidae) y su potencialidad como agente bio regulador de insectos. Buenos Aires, Argentina: Facultad de Ciencias Naturales y Museo, UNLP; 2019.
3. Hu K, Li J, Webster J. Nematicidal metabolites produced by *Photorhabdus luminescens* (Enterobacteriaceae), bacterial symbiont of entomopathogenic nematodes. *Nematology.* 1999;1:457–69.
4. Maestro M, Sauka D. Progression of the predatory activity of an Argentine strain of *Arthrobotrys oligospora* (Helotiales: Orbiliaceae) on *Panagrellus redivivus* (Rhabditidae: Panagrolaimidae). *Rev Argent Microbiol.* 2019, <http://dx.doi.org/10.1016/j.ram.2019.03.008>.