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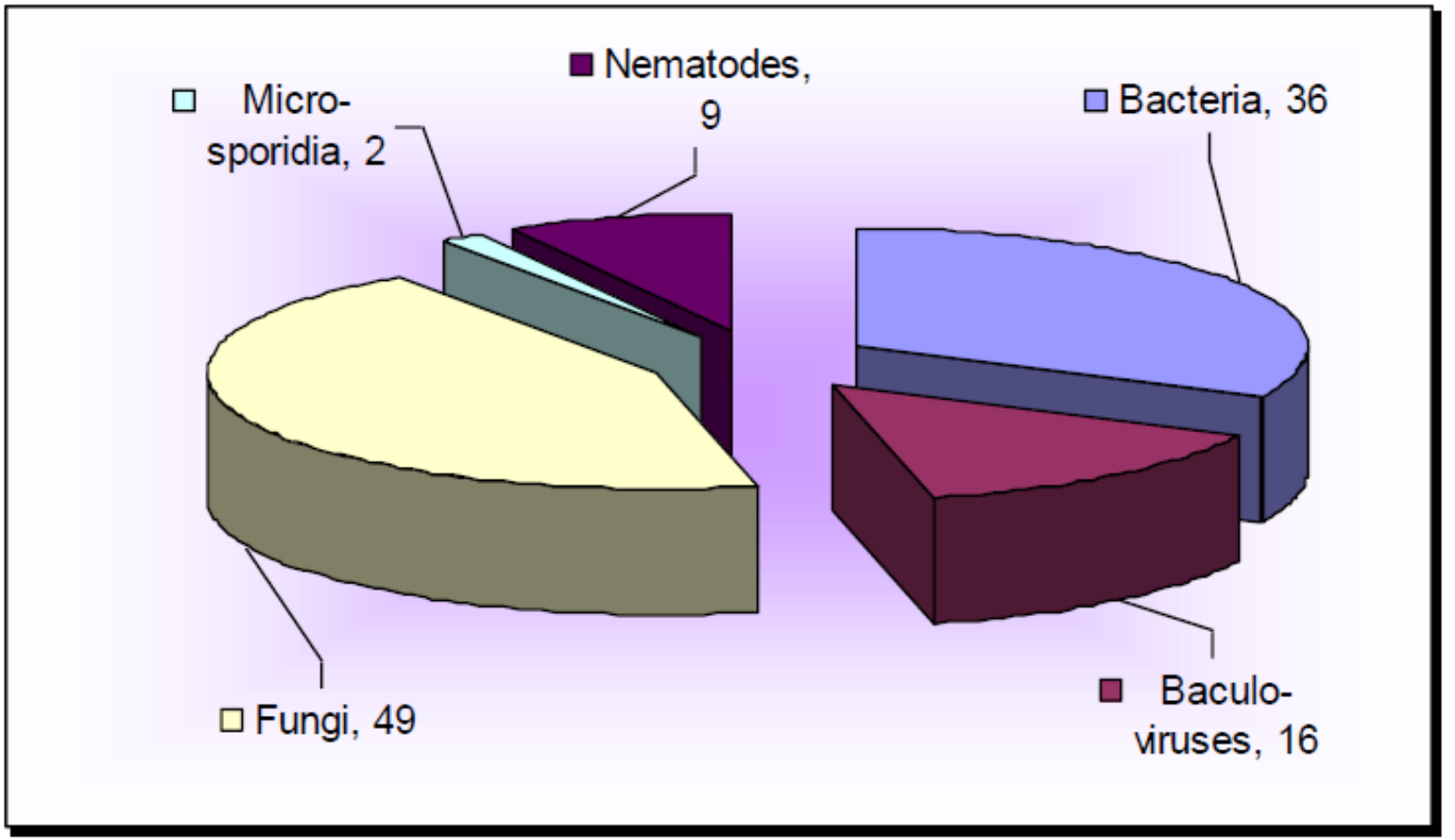
Virulence, Pathogenicity and symptoms of entomopathogenic pathogens and nematodes.

Micro-organisms use in biocontrol



INTRODUCTION

- Nematodes are simple roundworms.
- These are colorless, unsegmented and lacking appendages.
- Nematodes may be free-living, predaceous, or parasitic.

- Nematodes pathogenic to insects are referred to as Entomopathogenic nematodes.
- Possess an optimal balance of biological control attributes.

✓ Entomopathogenic nematodes are extraordinarily lethal to many important insect pests, yet are safe for plants and animals

PATHOGENICITY

- EPNs enter through the insect's natural body openings, the mouth, anus or respiratory inlets (spiracles) Poinar, 1990.
- Heterorhabditis species penetrate through the intersegmental membranes by scratching away at these with a special tooth.
- In the insect's blood, infective juvenile releases a highly specialised symbiotic bacterium.
- These symbiotic bacteria multiply rapidly produce toxins that cause septicemia.
- Kills the insect within **24-48 hours**

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- Nematodes complete **2-3 generations** inside the host
- Over 100,000 nematodes exit the insect
- The cycle of entry of infective juveniles in to the insect host to emerge of new batch of infective juveniles it takes **10-14 days.**

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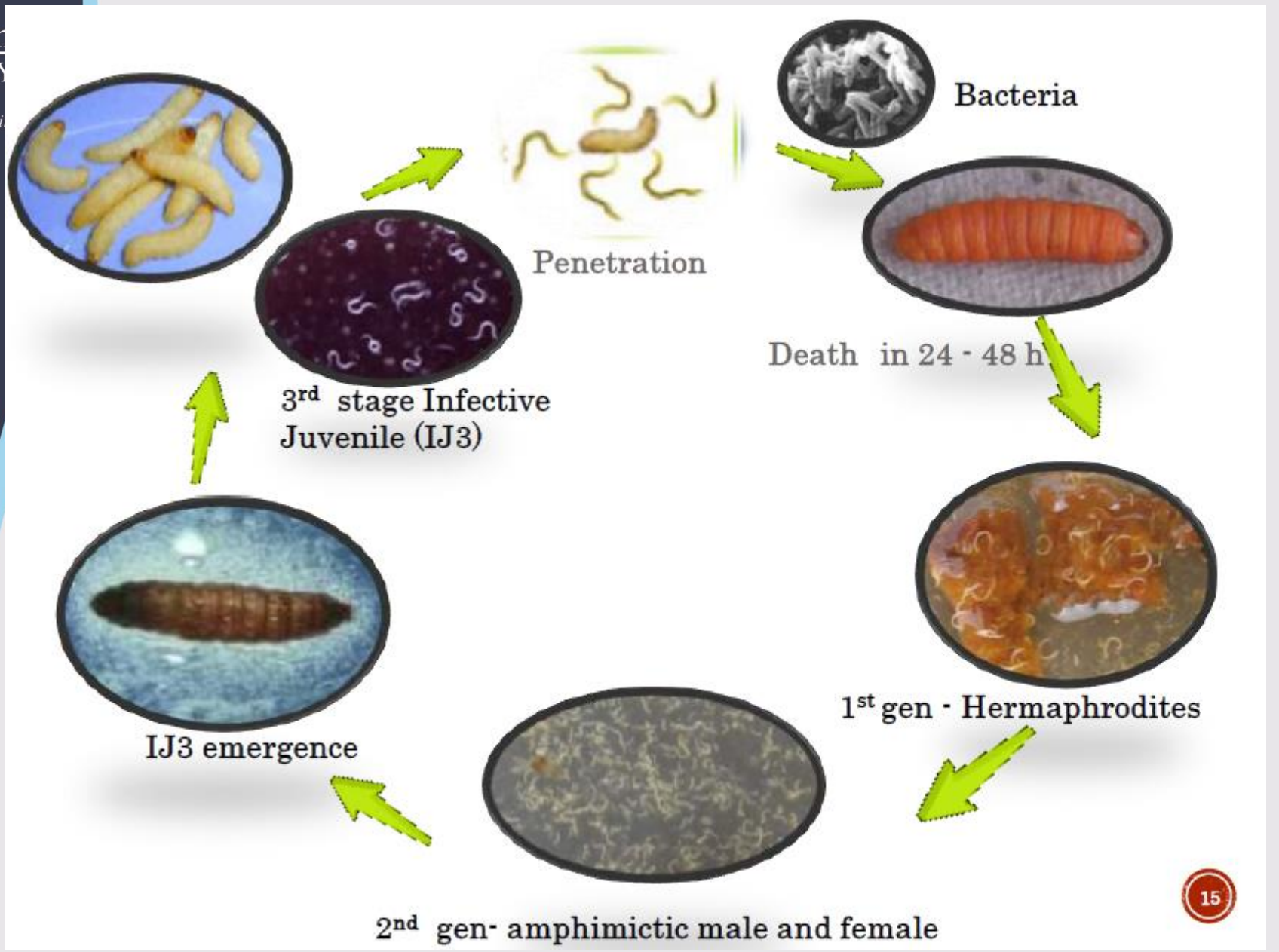
LIFE CYCLE



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Mode of Action

- The juvenile stage release cells of their symbiotic bacteria from their intestines into the hemocoel of insect pest.
- The bacteria multiply in the insect hemolymph and the infected host usually dies within 24 to 48 hours.
- Once released, nematodes actively seek out thei insect hosts. When a host has been located, the nematodes penetrate into the insect through body openings and release symbiotic bacteria that multiply and rapidly kill the insect.
- Subsequently ,nematodes feed upon the host, and mature into adults, which mate and produce the next generation.
- The life cycle is completed within a few weeks, and hundreds of thousands of nematodes emerge in search of new hosts.

SYMBIOTIC BACTERIA OF EPN

- Both *Xenorhabdus* and *Photorhabdus* are with peritrichous flagella.
- It have primary and secondary phases
- Primary phase – optimizes nematode development
- Secondary phase –supplies nutrition and antibiotics to the developing nematodes.
- Nematode protect bacteria in their gut and acts as vector.
- Bacteria convert the insect into suitable food for the nematodes survival , reproduction and produces toxins for killing insect.