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Investigating the effect of temperature on parasitic success of nematodes and their associated bacteria in a Lepidopteran host

Nell Foucher, Chloé Roux, Jean Claude Ogier, Stéphanie Bedhomme, Julien Brillard

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Investigating the effect of temperature on parasitic success of nematodes and their associated bacteria in a Lepidopteran host

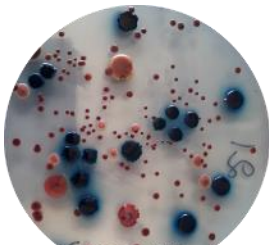
Nell Foucher¹, Chloé Roux¹, Jean-Claude Ogier¹, Stéphanie Bedhomme², Julien Brillard¹
¹DGIMI, INRAE, Univ. Montpellier, Montpellier, France. ; ²Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier, France

Introduction

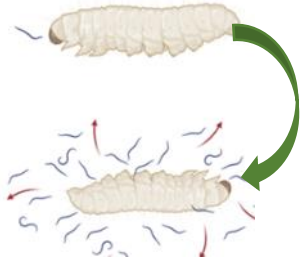
Context: Entomopathogenic Nematodes (EPN) have a great potential to control various insect crop pests, but their killing efficiency greatly depends on environmental conditions [Guyer et al., 2021]. The **insect killing** ability of the endosymbiotic bacterial species (*Xenorhabdus*) located in the EPN's gut (*Steinernema*) has been known for years. Recently, the whole bacterial microbiota associated to these EPNs has been characterized by molecular approaches in the laboratory [Ogier et al., 2020]. Several additional bacterial species were found and may also contribute to the parasitic success of the EPN [Ogier et al., 2023]. In a context of **global warming**, the killing efficiency of these EPN could be impaired.



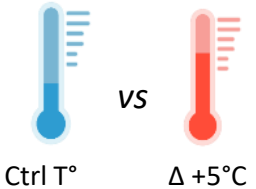
EPN: Gfp-labelled *Xenorhabdus* in *Steinernema*'s gut



Microbiota isolated from EPN

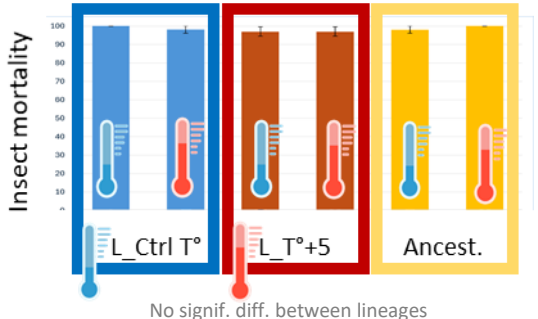


Method: *S. carpocapsae* EPN lineages were obtained after serial passages in vivo in the lepidopteran species *Galleria mellonella*, at 2 temperatures. The phenotypes of the evolved lineages were compared to those of the ancestral strain.

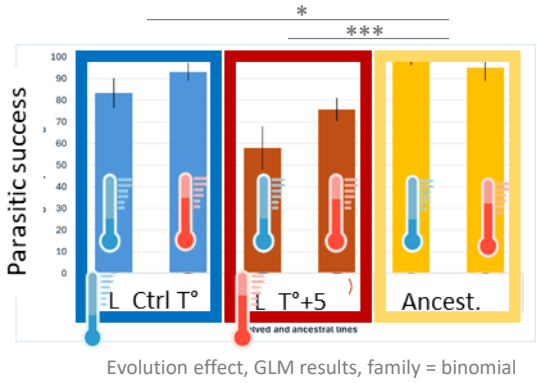


Results

EPN Phenotypes:

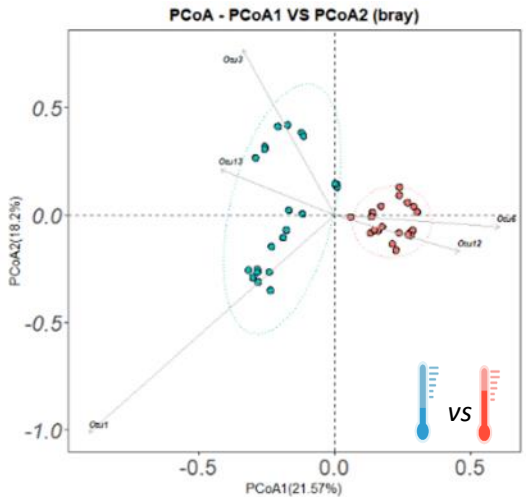


→ Insect killing ability is not modified by the serial passages



→ parasitic success is modified by the serial passages, particularly at high temperature

Composition of the associated microbiota:



→ **Beta-diversity** of the EPN microbiota is modified by the serial passages and **depends on the temperature**

Conclusion

→ Is there a link between the impaired parasitic success and the microbiota composition changes?

Future direction: A better understanding of the various factors involved in the parasitic success of these EPN should help improve the biocontrol efficiency in a context of global warming

