

Warming with temperature oscillation impacts on the host-parasitoid interaction

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Background

- The pea aphid is a pestiferous insect.
- Parasitoid, *Aphidius ervi*, a key bio-control agent of pea aphids.



Pea aphid



Aphidius ervi

- They do not experience mean conditions in nature.
- Environmental temperatures undergo daily cycles.
- They are exposed to daily fluctuation of habitat temperature.
- Global warming is continuing.
- Minimal research on warming with temperature fluctuation.

Objective

- To assess the effects of warming with temperature fluctuation on host-parasitoids interaction.

Hypothesis

- Fluctuating temperature have a positive impact on host parasitoids interaction, mummy production is higher in fluctuating than constant temperature. Whereas warming have negative impacts on host-parasitoids interaction.

Research Questions

1. How do parasitoids respond to the different heat exposure treatments in host-parasitoid interaction?
2. Does the response vary with a series of increasing fluctuating and constant temperature?

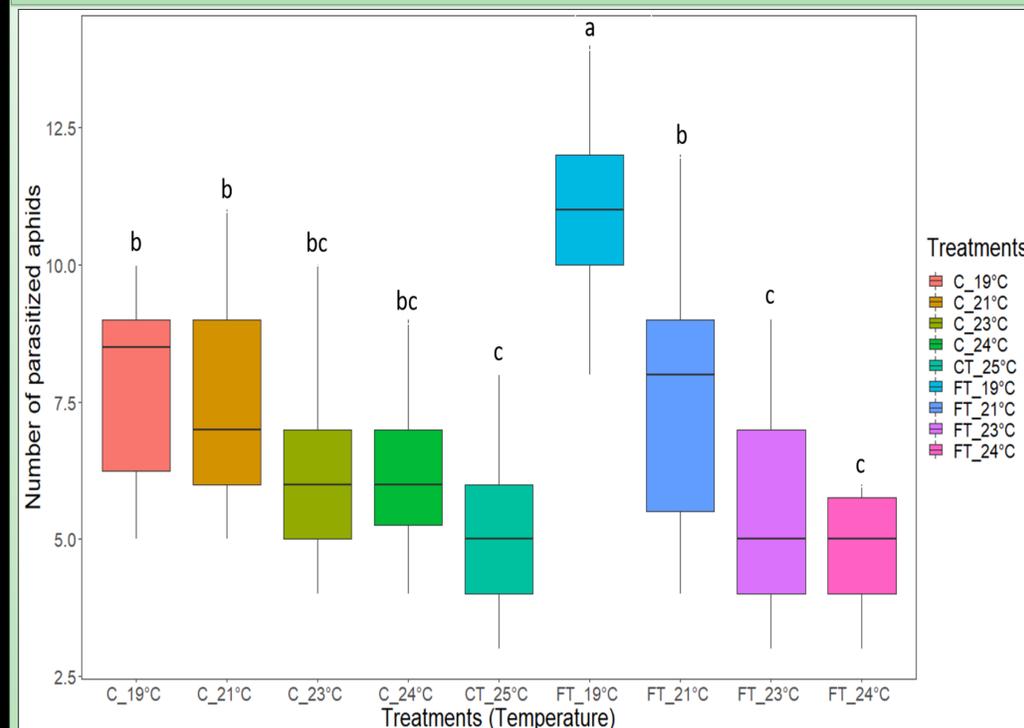
Findings

- The highest number of mummy (12) were produced at fluctuating temperature (FT_19°C).
- Warming decrease number of mummy production.
- Pea aphids and *A.ervi* can continue their interaction a range of temperatures.
- They are distributed across different geographical locations with diverse climates.



Mummy

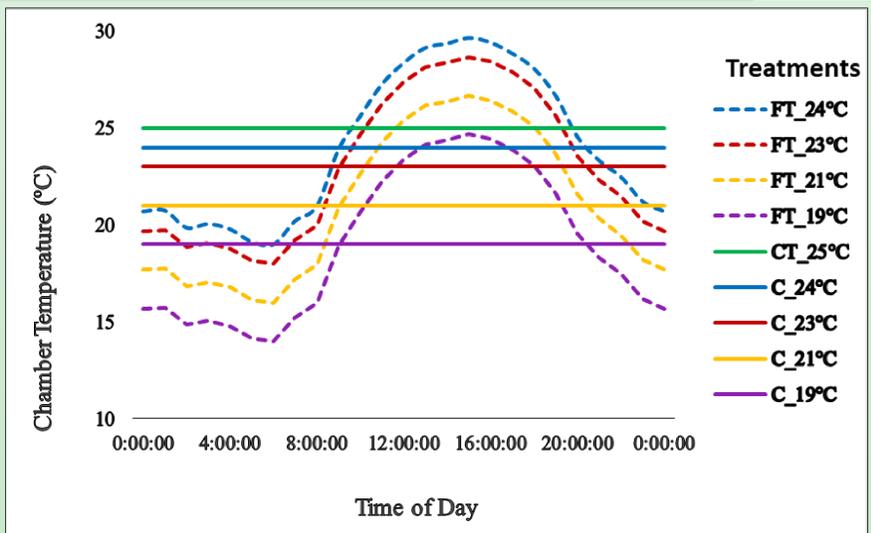
Parasitoids mummy production at constant and fluctuating temperature



- Bars with different letters are significantly different $p < 0.05$ (Tukey's honestly significant difference test).

Materials and Methods

- Aphids reared on 2 weeks old broad bean plant.
- *Aphidius ervi* reared on pea aphids.
- Rearing condition: $25 \pm 1^\circ\text{C}$, 70% RH and L16:D8.
- 9 treatments: 4 fluctuating (FT_19, FT_21, FT_23 and FT_24°C), 4 constant (C_19, C_21, C_23 and C_24°C) and a control (CT_25°C) temperatures.
- Replicate: 20 temperature control chambers.
- 20 one day old aphids/ chambers.
- 1 parasitoid/ chamber (1 pm to 4 pm).
- No. of mummy was recorded after 10 days.



9 Treatments and 24 hours cycle



Temperature control chambers