Is there a North American latitudinal cline in *Nasonia* diapause?

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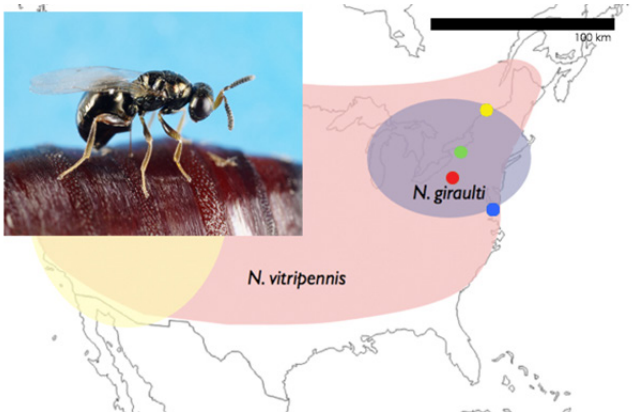

Biological rhythms are processes that are regulated by an internal "clock", the most obvious being the circadian (24h) rhythm. They modulate the biology of most species and their importance has been recognized by e.g. the 2017 Nobel Prize. In insects, rhythms influence numerous traits, including diapause. Diapause is a winter survival strategy in which larvae temporarily stop development and resume in the spring. How the circadian clock regulates diapause, and how it varies for closely related species is not well understood.

Nasonia wasps are parasitoids of blowfly pupae and are highly suited for rhythmicity studies. *Nasonia vitripennis* is a cosmopolitan species covering a wide range of latitudes and photoperiods, but *Nasonia girault* is found only in North America. *Nasonia* larval diapause is maternally controlled. Females have a "switchpoint" in which they will stop producing normal larvae and start producing diapause larvae in response to shortened photoperiod (24h light-dark cycles). It is hypothesized that circadian biology controls this switchpoint, as there is a latitudinal cline in diapause efficiency in European *N. vitripennis.* Northern populations from areas with colder winters and more extreme seasonal changes in day length will more easily go to diapause than Southern populations, even if they are kept in the same lab conditions. However, this clinal distribution of diapause has not been looked for in any other *Nasonia* species or at any other continent. We would like to find out whether selection on photoperiodism has led to similar genetic architecture of diapause at different continents and different species.

The student will spend 2-3 months in North America doing fieldwork collecting *N. vitripennis*, *N. girault*, and their blowfly hosts along a latitudinal cline stretching from Canada to Virginia, followed by switchpoint phenotyping of collected lines in Groningen. He or she **must have** a **driver's license** and **passport**, and **be comfortable working outdoors** and **driving long distances**. Funding for all fieldwork-related travel, living, and research expenses will be provided, including Netherlands-USA flights.

Starting date: 2-3 month between March-August 2019, exact time depends on weather condition