Diverse responses to temperature at the leaf level

Sites don’t appear to have different responses to temperature, which may be attributed to highly diverse responses to temperature within leaves.

As populations evolve in response to strong selective pressures, emergent traits may strain interactions with other species. These evolution-mediated indirect effects on interspecific interactions are likely a common side effect of rapid anthropogenic climate change, but few empirical studies have sought to investigate them. I aim to observe changes in the competitive ability of the Bdelloid rotifer *Habrotrocha rosa* as it evolves in response to a higher temperature. *Habrotrocha rosa* is an ecologically important resident of the water filled leaves of the carnivorous purple pitcher plant (*Sarracenia purpurea*) and competes for resources primarily with other bacterivores, including ciliates in the genus *Tetrahymena*. To reproduce, *H. rosa* lay eggs that develop without fertilization via apomixis, a form of obligate parthenogenesis. With a lack of recombination, all offspring are full clones of their mother. The trait diversity of natural populations of *H. rosa* living in pitcher plant leaves is unknown. To investigate the potential for rapid evolution, I performed a temperature response experiment. Clones of *H. rosa* isolated from field samples of leaf water were grown in microcosms at 25C and 30C for 42 days. Population growth rate and dry mass, both key traits in competition and temperature response, were estimated for each clone. Here we present data that indicate rotifer clones have different growth rates in response to temperature, supporting the potential for rapid evolution in natural populations. A separate, ongoing evolution experiment will aim to investigate evolution-mediated indirect effects of temperature on competition between *H. rosa* and a natural competitor, *Tetrahymena* sp*.*

Evolution plays a key role in directly altering ecology in natural communities. As the environment changes rapidly, populations that are unable to acclimatize or move must evolve to avoid extinction. Here, I report on a high diversity in temperature response among clones of the Bdelloid rotifer *Habrotrocha rosa*, indicating the potential for rapid evolution in natural communities. *Habrotrocha rosa* are ecologically important residents of the water filled leaves of the carnivorous purple pitcher plant (*Sarracenia purpurea*) and compete for resources primarily with other bacterivores, including ciliates in the genus *Tetrahymena*. To reproduce, *H. rosa* lay eggs that develop without fertilization via apomixis, a form of obligate parthenogenesis. Since this process lacks recombination, all offspring are full clones of their mother. The trait diversity of natural populations of *H. rosa* is unknown. To investigate the potential for rapid evolution, I performed a temperature response experiment: Clones of *H. rosa* isolated from field samples of leaf water were grown in microcosms at 25C and 30C for 42 days. Population growth rate and dry mass, both key traits in temperature response, were estimated for each clone. Data indicate rotifer clones have different growth rates in response to temperature, supporting the potential for rapid evolution in natural populations. A separate, ongoing evolution experiment will aim to investigate evolution-mediated indirect effects of temperature on competition between *H. rosa* and a natural competitor, genus *Tetrahymena.*

Rapid evolution relies on an existing diversity of trait phenotypes that are relevant for withstanding the changing environment.

Diverse response to temperature

Naturally occurring variation in temperature response, indicating cryptic genetic mechanisms, or multiple introduction events to new leaves.

Evolution plays a key role in directly altering ecology in natural communities. As populations evolve in response to higher temperatures, the indirect effects of these trait changes on interspecific interactions are not well understood. I aim to observe these indirect effects on the competitive ability of pitcher plant rotifers (*Habrotrocha rosa)*. The water-filled leaves of the carnivorous pitcher plant *Sarracenia purpurea* harbor a diverse community well-suited for studying microevolution in the context of ecology. *Habrotrocha rosa* is a bacterivorous bdelloid rotifer that likely experiences interspecific competition with other bacterivorous members of the pitcher plant leaf water community, like the ciliate *Tetrahymena*. Additionally, *H.* rosa exhibits apomixic parthenogenetic reproduction, meaning individuals reproduce asexually and without meiosis, resulting in clonal offspring. Clones of *H. rosa* isolated from field samples of leaf water were grown in microcosms at 25C and 30C for 42 days. Population growth rate and dry mass, both key traits in competition and temperature response, were estimated for each clone. Here we present data that indicate rotifer clones have different growth rates in response to temperature, supporting the potential for rapid evolution in natural populations. A separate, ongoing evolution experiment will aim to investigate evolution-mediated indirect effects of temperature on competition between *H. rosa* and a natural competitor, *Tetrahymena* sp*.*