**Corresponding Author contact details.**

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**Title of your paper AND running title of not more than 75 characters including spaces.**

Intraspecific variation in responses to extreme and moderate temperature stress in the wild species, *Solanum carolinense*

Intraspecific variation of temperature tolerance in *Solanum carolinense*

**Abstract of up to 300 words.**

Adaptation or acclimation to local temperature regimes has often been used as a proxy for predicting how plant populations will respond to impending novel conditions driven by human-caused climate change. We explored how Solanum carolinense populations from Texas and Minnesota differ in temperature tolerance traits in a two-part study. We first examined how development in moderate heat affected reproductive structures and success. We then compared how plants from the two regions respond to extreme heat and cold in both vegetative and reproductive traits. We found that moderate heat was generally detrimental to the development of reproductive structures and seed production. Plants in heat produced 16 fewer seeds on average than plants in the control. Reproductive structures that developed in heat were also reduced in size and to a greater extent in the northern populations relative to populations from the south. In the second experiment, we found that temperature sensitivity differed between populations of the south that face extreme heat regularly and northern populations that do not. However, the results were not completely consistent with our expectations, including results that directly countered our expectation. Our results provide evidence for the adaptation of a potential avoidance mechanism to mitigate extreme heat in pollen germination. Overall, our finding suggest that rising temperatures have the potential to incur substantial consequences to the reproductive success of individuals in this species, but on a more positive note, there is evidence that populations could mitigate stressful temperature conditions through evolutionary processes.

**Name(s) of associate editors who would be best suited to handle your submission.**

Heidrun Huber- Evolutionary biology and ecology; plant responses to environmental stresses; clonal plants; phenotypic plasticity

Silvia Matesanz Garcia - Phenotypic plasticity; climate change; local adaptation; quantitative genetics; common gardens; populations; drought

Kristine Crous - Plant physiological ecology; photosynthesis; respiration and metabolism; climate change

**Contact details of six potential referees and any scientists you would prefer not to serve as referees for your paper.**

People we recommended in the past – Oecologia (we received feedback from 1 reviewer)

1. Susan Mazer
   1. Professor, University of California Santa Barbara
   2. sjmazer@ucsb.edu
   3. Interests in plant adaptation and ecological risks limiting adaptation
2. Vincent Eckhart
   1. Professor, Chair in Biology, Grinnell College
   2. eckhart@grinnell.edu
   3. Interests in natural selection in plants and geographic patterns of species' ranges
3. Oscar Rocha
   1. Associate Professor, Kent State University
   2. orocha@kent.edu
   3. Interests in reproductive ecology
4. Laura Galloway
   1. Professor, Associate Dean for the Sciences, University of Virginia College and
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   4. Interests in plant adaptation and patterns of evolution

**Funding information.**

North Dakota EPSCoR