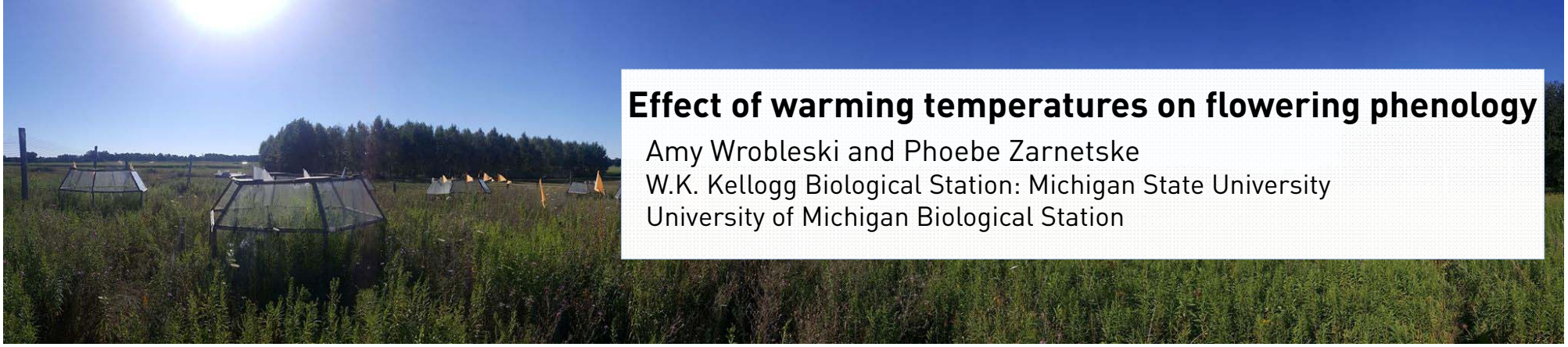

Effect of warming temperatures on flowering phenology

Amy Wrobleski and Phoebe Zarnetske
W.K. Kellogg Biological Station: Michigan State University
University of Michigan Biological Station

Introduction

- Warming shifts flowering times earlier into the season (Fitter 2002).
- The upper Midwest is expected to see increased temperatures, however there are different impacts across the state of Michigan. Two study sites were established to better reflect this

Question

Do warmer temperatures impact the average date of first flower?

Results

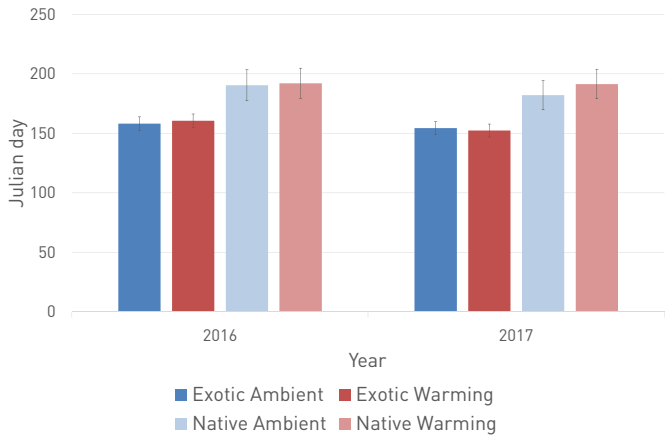

Figure 1: At KBS, timing was affected by year, temperature, and status (p=.0723). In both years exotics flowered earlier than natives. In 2017 treatment did not impact exotics, but natives in ambient temperatures flowered earlier than natives in warm temperatures.

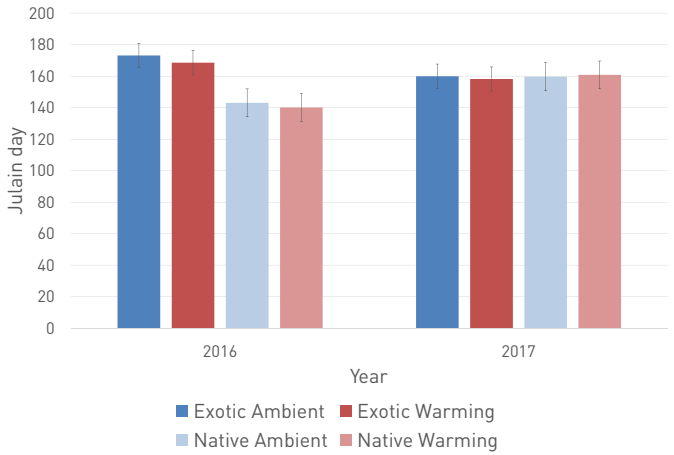

Figure 2: At UMBS, timing was not affected by year, temperature, and status (p=.85). In 2016 exotics flowered later than natives, and ambient plants flowered later than warmed plants, but this trend did not continue in 2017.

Methods

- OTCs: open topped chambers that warm the plot
- Flowering phenology: taken every 2-3 days
- A MANOVA model compared temperature treatment, status (Native or Exotic), and year.

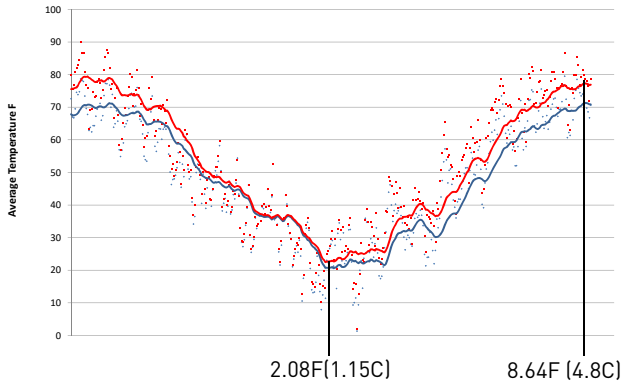

Figure 3: Temperature in OTCs and ambient plots at UMBS from July 2015-July 2016

Conclusions

At KBS there was a trend towards changing flowering patterns from 2016 to 2017. In 2016, exotics flowered earlier than natives, temperature did not have a large effect. In 2017, exotics again flowered earlier than natives, but warmed natives flowered later than ambient natives. This is opposite of the expected trend. However, this trend was not seen at UMBS. In 2016 at UMBS exotics flowered later than natives. Warmed exotic and native plants flowered slightly earlier than plants at ambient temperatures, which follows the expected shift. This trend did not continue in 2017. All species, native or exotic, warmed or ambient, flowered at the same time at UMBS in 2017.

Acknowledgements

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References

Fitter, A. H., and R. S. R. Fitter. "Rapid changes in flowering time in British plants." *Science* 296.5573 (2002): 1689-1691.

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