

Utah State University

DigitalCommons@USU

Research on Capitol Hill

Browse Undergraduate Research Events

3-5-2019

Inducing Reversions Between Asexual and Sexual Reproductive Strategies in Daphnia

Alex Braeger
Utah State University

Follow this and additional works at: <https://digitalcommons.usu.edu/roch>



Part of the [Plant Sciences Commons](#)

Recommended Citation

Braeger, Alex, "Inducing Reversions Between Asexual and Sexual Reproductive Strategies in Daphnia" (2019). *Research on Capitol Hill*. Paper 102.
<https://digitalcommons.usu.edu/roch/102>

This Poster is brought to you for free and open access by the Browse Undergraduate Research Events at DigitalCommons@USU. It has been accepted for inclusion in Research on Capitol Hill by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.



Inducing Reversions Between Asexual and Sexual Reproductive Strategies in Daphnia

Alex Braeger, *Utah State University* | Dr. John Carman, *Utah State University*

I. Our Study

We are testing the effects of numerous treatments (both chemical and non-chemical) on crustaceans, with the goal of controlling the male to female ratio and the method of reproduction they use (sexual or asexual).



Understanding how this process works and how to control it would be invaluable not only to the scientific community, but also to farmers (as asexual organisms reproduce much faster!).

We believe that the different modes of reproduction evolved together early on in eukaryotic evolution; thus the capacity for asexual and sexual reproduction is retained in the genetics of all eukaryotes.

So far, we have found that the control for reproductive strategy is largely dependent on population size and the amount of available food.

Alex Braeger
Utah State University
Department of Plants, Soils & Climate
alex.braeger@gmail.com

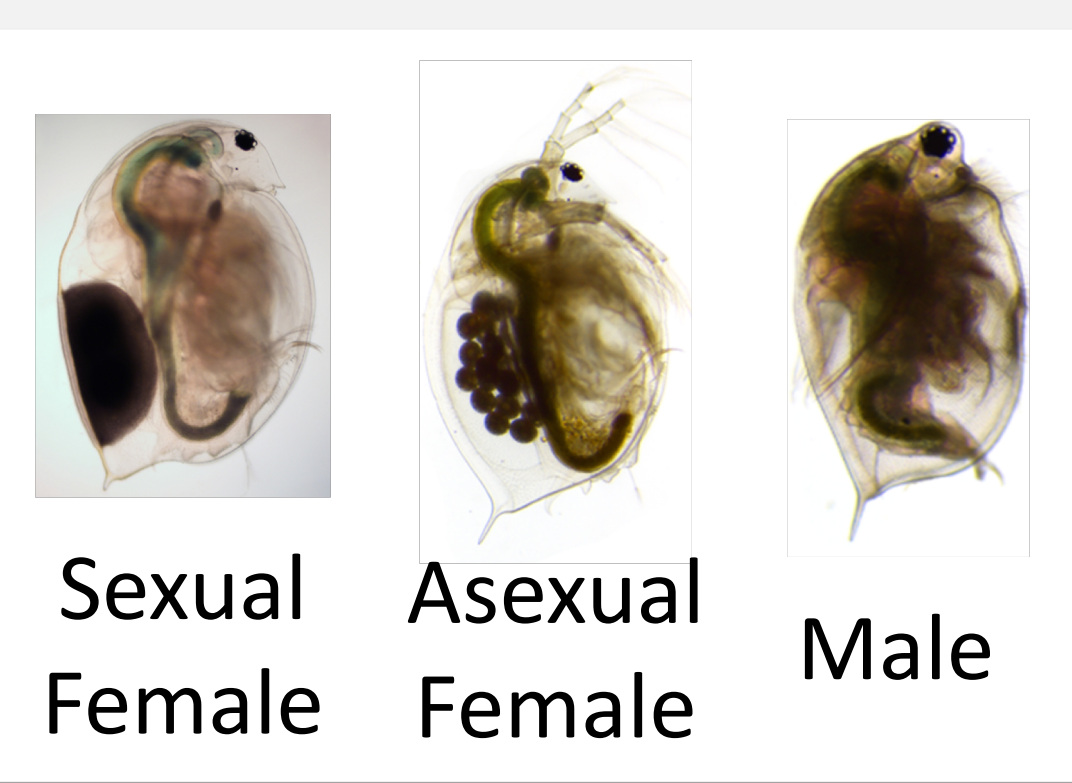
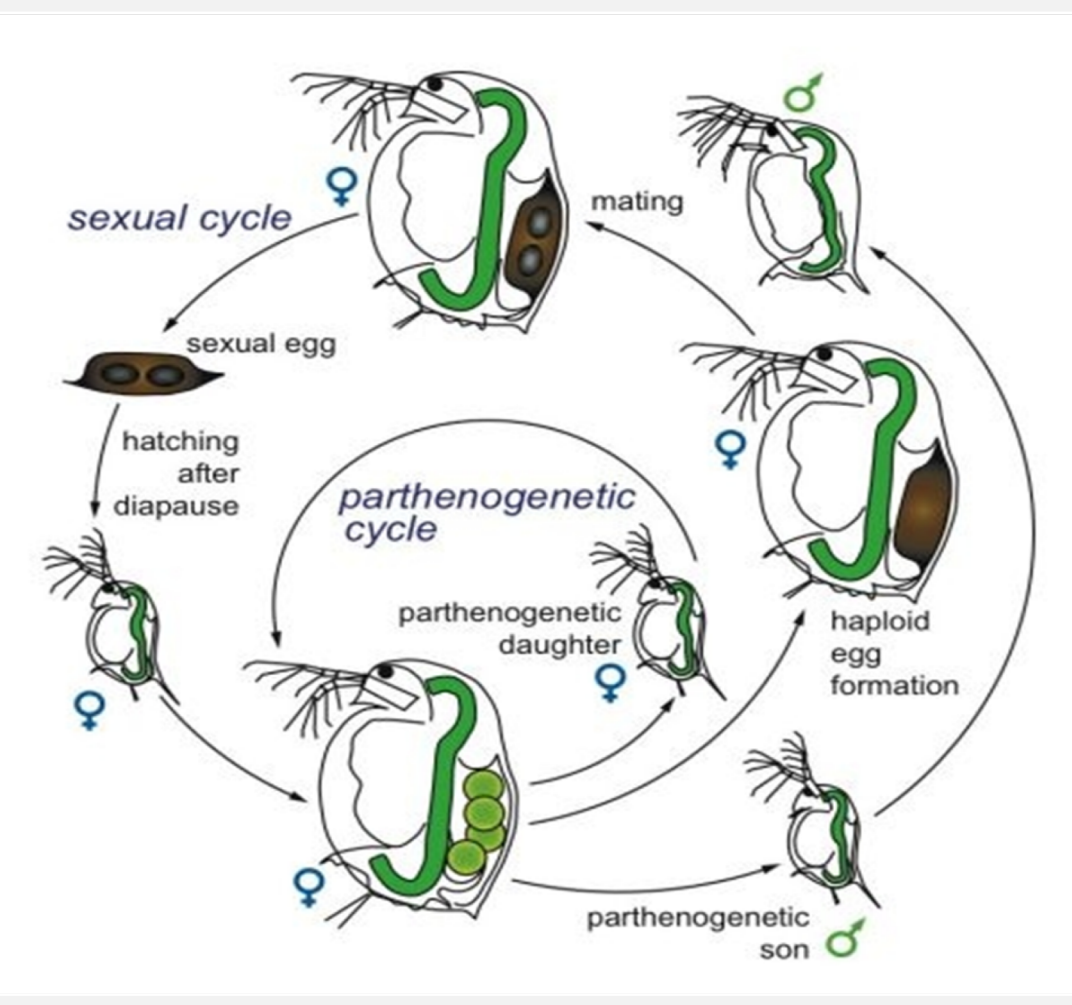


UtahState
University

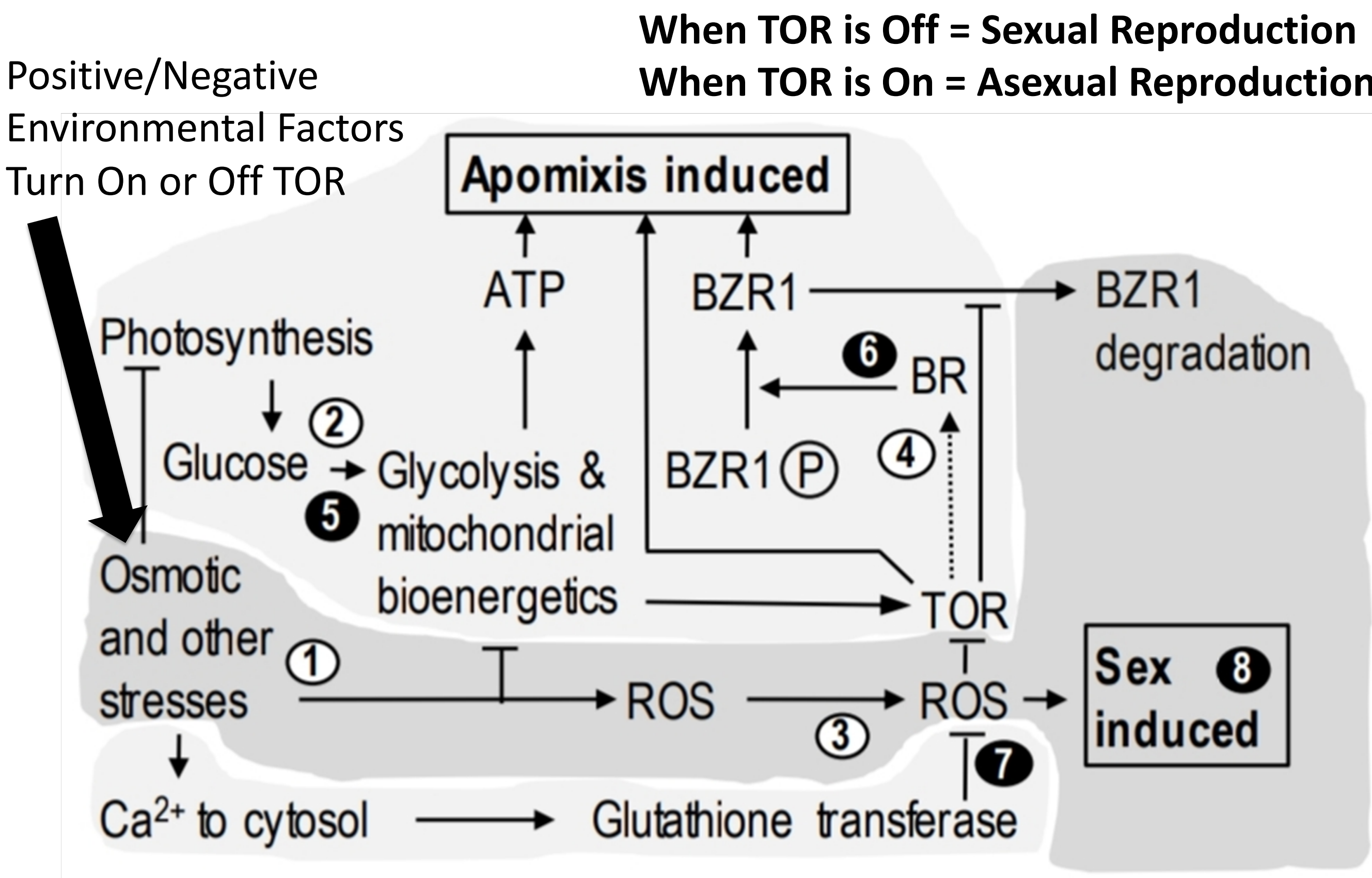
II. What Are Daphnia?

Daphnia (water fleas) are a genus of small crustaceans that are present in almost all major freshwater environments. They are used in studies because they reproduce quickly and are very sensitive to environmental changes.

Daphnia are facultatively parthenogenic, meaning that they can adjust their reproductive pathway to best fit the environment.



The TOR Pathway in Plants

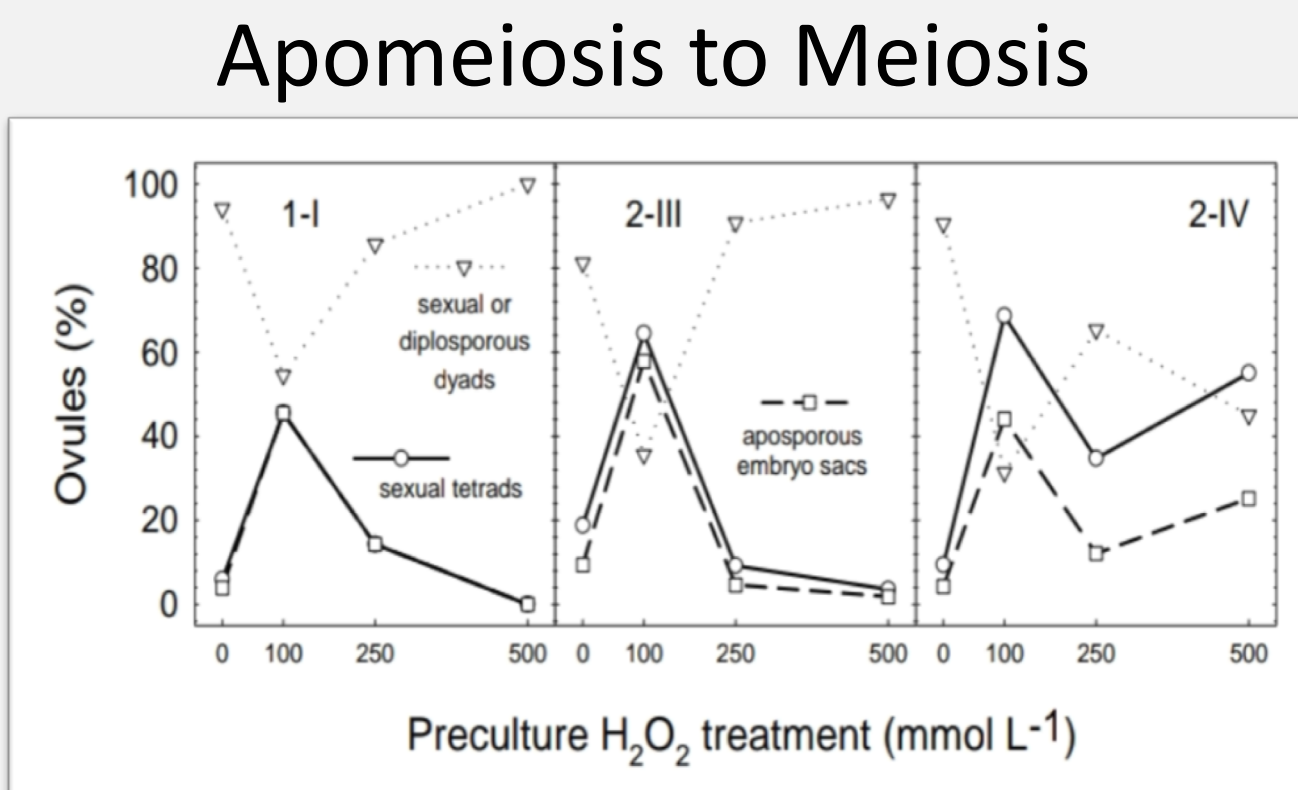
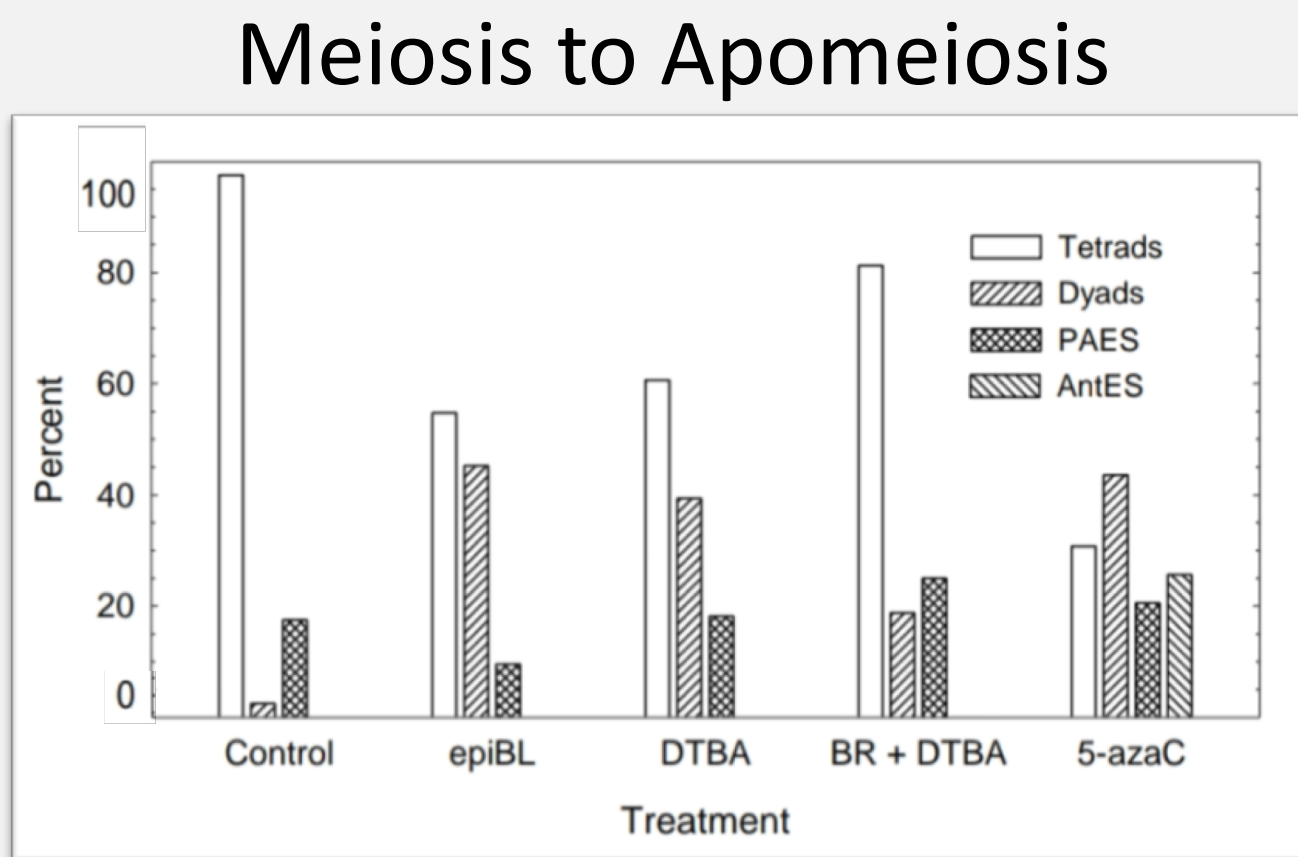


III. Supporting Research

Past studies from Dr. Carman and Dr. Gao of USU have shown sexual pathways can be changed with chemicals found in the TOR pathway.

In these studies, sexually reproducing plants were induced to reproduce asexually and visa versa.

Upon treatment, there is a dramatic change in the reproductive strategy.



IV. Importance of Study

Apomictic plants and parthenogenic animals reproduce much faster and in much greater numbers than sexually reproducing ones.

If there is a desired trait a plant or animal has, apomixis locks it in place.

The majority of crop plants reproduce sexually, meaning that we can't use hybrid varieties' seed. If apomixis was permanently fixed, so would hybrid vigor.

Study conducted with funding from a USU Undergraduate Research and Creative Opportunity Grant and lab assistance from the USU Department of Plants, Soils & Climate.