Organisms deal with fluctuations in their environment to maintain homeostasis and to be competitive. Temperature is a ubiquitous stress that most all organisms actively regulate against. Temperature variance can be environmentally gradual, seasons that change from warmer to cooler as the year progresses, days that become warmer then cooler as the sun rises and falls. This type of cyclic temperature stress is predictable and organisms must synchronize their life histories to compliment theses stress cycles. can that pattern use to make life history decision.

To be competitive in one’s environment organisms must be able to utilize resources when they become available. Integrating predictable cues from the environment, organisms have evolved life history strategies that include ways to deal with these predictable cycles of resource abundance and resource scarcity. When resources are not around

Of the diapausing insects that do not feed after diapause must be able to not only survive the period of diapause but they must also be able to undergo adult pupal metamorphosis. Some insects prepare for this

The first step will pertain strictly to preliminary trial information gathering. I will use this time to flush out problems with equipment and protocols. I will look for alternative ways to complete experiments and find and use all of that to inform the experimental aspects of my project.

A more thorough definition of insect periods of activity is invaluable to not only understanding of these biological processes but to exploit these processes as a means of control.

Thus, the univoltine-Z and bivoltine-E strains of European corn borer provides an excellent case study into how facultative diapause preparation is accomplished. So far information about the energetic requirements of diapause induction in ECB is limited to (…current knowledge about the ECB diapause preparation energetics…). While less is known about the link between phenotypic variation in triglyceride and storage protein production and the genotypic variation between the 2 strains.

Further quantifying the production of these reserves between diapause destined and directly developing larvae is intended to approximate the energy storage differential between diapause destined larvae and directly developing larvae.

To evaluate this hypothesis, I intend to quantify and qualify the production of triglycerides and storage proteins at the point in the ECB life history where triglyceride and storage protein production is at its peak.

When either strain is exposed to the same photoperiodic and thermal cues in the laboratory, their specific response can be reproducibly observed but the physiological link between genotype and phenotype has not yet been described. produced by the fat body across 2 genotypically different strains of ECB.

European corn borer was chosen as the model for these experiments due to their facultative diapause life history strategy, differing genotypes and physiologies, and their different phenotypes. When either strain is exposed to the same photoperiodic and thermal cues in the laboratory, their specific response can be reproducibly observed but the physiological link between genotype and phenotype has not yet been described.

Given the understanding that UZ and BE strains of ECB are genetically different in how they regulate the length of diapause If triglyceride and storage protein levels play an important role in supporting the life history step after the larval wandering stage and given the additional metabolic demands of diapause. Could it be the case that these levels directly affect the length of diapause, such that larvae preparing to enter diapause and larvae preparing to molt into pupa will differentially express these products. Specifically, do UZ larvae preparing for their long diapause will produce more TG and SP to compensate for their longer diapause, while BE larvae preparing for their shorter diapause, produce less TG and SP.

accumulated amounts of triglyceride and storage protein during the later portion 5th instar and larvae destined for diapause or direct development.

For those individuals destined for diapause, enough energy must be reserved to survive diapause, and two bouts of metamorphosis from larva to pupa and pupa to adult. In comparison, those individuals avoiding diapause only need enough energy reserved to survive the two bouts of metamorphosis.

Alternative diapause trajectory. The change in their liporegulatory set point such that more lipids are stored. Diapause destined individuals accumulate more fat than diapause avoiding individuals.