1. **Title:**
   1. A study of digestive efficiency across two strains of European corn borer *(Ostrinia nubilalis)*
2. **Abstract:** 
   1. Since the early 20th century, European corn borer (ECB) has remained a primary pest of agricultural corn. ECB is responsible for approximately $1 billion in costs related to yield loss and managing this pest. Understanding the digestive efficiency of these larvae could provide comprehensive information to better manage the impact of ECB. To understand the relationship between digestive efficiency and diapause, we will use two sympatric strains of ECB with different diapause lengths. The effect of diapause on digestive efficiency will be tested by comparing the consumption rate of each strain during the fifth instar when feeding on an artificial diet. The results of this experiment will be applicable for more efficient pest management systems for farmers who are economically impacted by these larvae.
3. **Introduction and Literature Review**
   1. History of ECB
   2. Strain differences of ECB
   3. Artificial diet
   4. Methodology/Techniques
4. **Research Hypothesis**
   1. We predict that the shorter diapausing strain of ECB will have a higher rate of digestive efficiency compared to the strain with a longer diapause because this strain must utilize the same natural resources as the other strain in a shorter period of time to reach its next life stage.
5. **Materials and Methods**
   1. Insect rearing
      1. We obtained colonies of European corn borer from Dr. Erik Dopman’s lab at Tufts University. The insects were then reared in our lab using two incubation chambers: one chamber set to long-daylight hours (16:8) and one chamber set to short-daylight hours (12:12).
   2. Insect husbandry
      1. The insects remain in plastic rearing trays in their respective incubation chambers. Each larva receives artificial diet that is prepared in the lab using [I forgot what the company was called]. The larvae are checked daily for sufficient diet, mold growth, and fifth instar conditions. At the fifth instar, the larvae are removed from the rearing trays for data collection.
   3. Data collection
      1. Once the larvae reach the fifth instar, they are starved for 30 minutes to clear their digestive tract. The larvae are then moved to microtubes to undergo a Folch extraction procedure that will allow for us to measure their lipid mass. The diet and frass left over in the rearing trays will also be weighed. The larvae, after going through the extraction process, will then be freeze dried on a lyophilizer.
   4. Data analysis/Instrumentation
      1. We will be using a Liquid Chromatography-Evaporative Light Scattering Detection (LC-ELSD) instrument to analyze our data.
6. **Conclusion and Justification**
   1. Implications of results
7. **Bilbiography**