Maintaining Insect Colonies

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The main colonies reared in Lab 420 include the soybean looper, cabbage looper, and mint looper. Although these larvae are difficult to differentiate on the basis of their external appearance, one characteristic they share is that they can all be found in soybeans (Beach & Todd 1986). The colonies are maintained year round for scientists to run various tests and also for easy access during the off season.

The rearing room

Every Monday, Wednesday, and Friday we feed moths of these colonies with 20 percent sugar water, and we also change their egg sheets with cheese cloth. The egg sheets are then placed in Ziploc bags in an incubator to induce hatching at 29.9 degrees Celsius. Once the eggs have hatched, the larvae are placed on diet, a specifically formulated substance which includes linseed oil and a mixture of propionic and phosphoric acid. The larvae remain on this diet as they progress through each instar stage until they become pupae. This process takes about two weeks. The pupae are then transferred to buckets where they emerge as moths. Once they reach adulthood they begin to reproduce. The cycle is then repeated and the generations continue.

The maintaining of these colonies is extremely important because entomologists use them to run many different kinds of tests throughout the year. A study in Auburn, Alabama once said that the coloration of thoracic legs has been used to determine different looper species, such as soybean or cabbage loopers (Canerday & Arant 1967). Specifically that soybean loopers possess black thoracic legs. Although, we noticed in our soybean looper colonies that many of the larvae havegreen thoracic legs. One test we performed this summer examined the environmental influences on these thoracic legs of the soybean loopers. We did this by placing soybean leaves in 100 petri dishes with agar and a range of 1-15 loopers on each leaf. The test terminated after about two weeks when the larvae reached pupation. Their legs began to turn black after the first week. By running this test we learned that densities are a factor in the coloration of thoracic legs. The more the soybean loopers reared together, the greater the percentage of loopers with black legs.

We also performed a bioassay to examine the response of the various looper species to Cry1Ac, which is an insecticidal toxin found in some Bt plants, such as Bt cotton. We filled cells of trays containing 128 wells with 1.5ml of the artificial diet we use in rearing the colonies. We then pipetted 50µl of various concentrations of Cry1Ac diluted in water in the wells after the diet had dried. Once the buffer had penetrated the diet, a single larva from a particular colony was placed in each well. The wells were then covered with a plastic sheet. The larvae were held for seven days on the trays, and mortality was recorded. We found that mint loopers were more susceptible to Cry1Ac compared to cabbage or soybean loopers. The survival of soybean and cabbage loopers was similar.

Photos from an assay to look at thoracic leg color.

References:
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