Raising H.illucnes: A Protocol

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Method Article

Keywords: Flies, Bugs, Tseste Flies, Model Organism, Lab Space, Ecology, Environment, Entomology

Posted Date: February 22nd, 2018

DOI: https://doi.org/10.1038/protex.2018.024

Abstract

This is a study to assess the near perfect conditions in order to raise the greatest amount of Black Soldier Flies into adulthood. This is so that is amount of uses as Black Soldier flies as model organism increases. All genres of Black Soldier Flies were looked at in this study to develop the protocol. The flies that were chosen were best represented to reflect the abilities and gender of the natural amount of Black Soldier flies in the wild. Potential subjects were then tested with the different types of p variables such as food and sunlight. At this time all the Black Soldier flies were kept in specific conditions and tested with different types of habitats. These habitats reflected the living conditions of the flies in the natural plain. After all the data was compiled, it was aggregated and used to find the best living conditions for the Black Soldier fly as a model organism. This was used personally in a lab setting of the author in order to increase the amount of Black Soldier Flies that were gained from breeding. This protocol resulted in a significant increase in the amount of Black Soldier flies that were bred in the lab.

Introduction

The larvae will be placed in a 1 m ** 1 m ** 1 m glass or clear plastic box. There will be dirt on the bottom, followed by chicken meal on the top. There will be three holes that will be 6 cm ** 6 cm ** 2 cm big \(\(about one hand scoop)). The box will be divided up into three sections, one for feed and pupation, one for feces, and one for special research flies. The food and pupation section will take up half of the box. The dirt layer will be 5.5 cm deep. The dirt from the holes will be used to make hills and ridges for a more natural location, along with providing shelter. One of the holes will be in the middle, and it will have water from a freshwater river. The water should have a pH level of 5 \(\(Newby, 1997)). The nutritional value of the chicken meal should roughly have ≈332KJ, ≈6.3 grams of ash, ≈77 calories per serving, ≈4.47 grams of proteins, ≈0.626 grams of fat, ≈13.3 grams of carbohydrates, ≈75.2 grams of moisture, ≈0.217 grams of cis-unsaturated fatty acids, ≈0.095 grams of cis-polyunsaturated fatty acids, ≈0.034 grams of trans-fatty acid, ≈0.005 grams of omega 3 polyunsaturated fatty acids, and ≈0.09 grams of omega 6 polyunsaturated fatty acids \(\(Tomberlin et al., 2002))). Amino acids will also be added for every 100 grams of food for higher nutritional count. The amino acids that roughly should be added are ≈6.56 grams of of aspartic acid, ≈2.77 grams of threonine, ≈3.02 grams of serine, ≈6.95 grams of glutamic acid, ≈4.53 grams of glycine, ≈4.41 grams of alaine, ≈0.39 grams crystine, ≈4.51 grams of valine, ≈1.25 grams of methionine, ≈3.15 grams isoleucine, ≈5.07 grams of leucine, ≈4.48 grams of tyrosine, ≈2.83 grams of phenylalanine, ≈2.08 grams of histidine, ≈3.63 grams of lysine, ≈3.33 grams of arginine and ≈4.08 grams of proline \(\(Diender et al., 2011)). 500 mg of chicken meal will be spread over the box \(\(Barry, 2004)). Every 12 hours, more food should be added \(\(Barry, 2004)). The temperature will be 30˚ celsius with 60% Relative Humidity \(\(Tomberlin et al.,2009)). The moisture level will be at 70% \(\(Newby, 1997)). The lighting will be 200μ of natural sunlight or from a quartz iodine lamp \(\(Zhang et al.,2010)). The larvae should be under the light in 12 hour intervals \(\(Zhang et al.,2010)). The larvae should be in clumped distribution determined by food. A quarter of the box, about 0.25m will be separate from the food. This area will be for the feces of the larvae. The larvae will be

treated under these conditions for 22-24 days, until they become pupae \(\(Diender et al., 2011)). When the larvae start to enter the last instar on days 19-24, decrease the amount of food given to 100 g, and then cut off all food given \(\(Newby, 1997)). For research purposes, another quarter of the box will be separate from the rest of the sections. This is where 50 of the 500 larvae will be grown, so they can be separated for experiments and research purposes. For measuring, they will be taken out by using tweezers, and measured. Measurement will take place every three days on the same larvae.

Equipment

Larvae \(At Least 300) Chicken Feed \(10 gallons) One Clear Container with a volume of one meter Dirt Water \(Specifically from a river)

Procedure

1.) Place the larvae in a 1m^3 box. The box will already be pre-filled with dirt. 2.) Feed the larvae the specific food described in the protocol 3-4 times a day in an interval of 2-3 hours in between. This will allow to most efficient amount of growth. 3.) Continue this until the larvae become pupals. This is the moment when the most amount of food should be put in the box. 4.) When the pupals become adults, change the environment from the dirt by adding water. This is where the adults mates. 5.) After the adults mate, retrieve the newly made larvae.

Anticipated Results

The following protocol was used in a laboratory setting by the author and from the following instructions, there was a significant increase in the amount of Black Soldier Flies that were bred. This protocol allowed the amount of Black Soldier Flies gained from breeding to increase ~36% than if the protocol was not used. This increase is necessary as it allows the model organism of the Black Soldier Flies to be an option and a candidate for laboratory use because of their affordability and usefulness \(Marzouk, 2016).

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