



Black Soldier Fly Larvae

Intro to Black Soldier Fly:

Biology and life cycle

Basic Husbandry

Feeding Logistics



Native Habitats and Range

- ◆ The Black Soldier Fly (*hermetia illucens*) is a non-pest, beneficial insect native throughout the Americas. They are now found in every continent due to transfer during shipping.



If Rambo was a grub

- ◆ Black Soldier Fly Larvae (BSFL) are extremely hardy. They survive well in the presence of salt, alcohol, acids and ammonia.
- ◆ In cold temperatures or in periods of low food supply, BSFL will go into a hibernation-like state.
- ◆ BSFL eat almost anything a human can eat, plus much more. They can eat spoiled/fermented foods, vegetable matter, meat, and even some bones. They can handle animal and even human manure as a feed source.

A Nutritious Grub

- ◆ The pre-pupae larvae of the BSFL are rich in nutrients such as protein, fats and calcium. They make an excellent feedstock for all the types of poultry, fish, reptiles, pigs and other carnivores and omnivores.
- ◆ The dry weight of BSFL contain up to 50% crude protein, with an amino acid profile similar to fishmeal. The lipid (fats) composition is as much as 35%.

BSF Life Cycle



- ◆ Black Soldier Flies spend the majority of their life as larvae. In this time they feed voraciously on energy rich foods. This energy is stored for their short, reproductive adult life.

Egg

- ◆ Eggs of BSF are not laid directly on the food source
- ◆ These eggs hatch into juvenile larvae in about 4 days (100 to 106 hours)



Juvenile Larvae

- Upon hatching, the juvenile larvae fall from the egg repository and immediately seek out a suitable food source. The larvae feeding period lasts 3-4 weeks.



Pre-pupae Larvae

- ◆ Larvae stop feeding
- ◆ They change color
- ◆ Begins crawling away from their feedstock
- ◆ Best state to use as livestock feed or human food



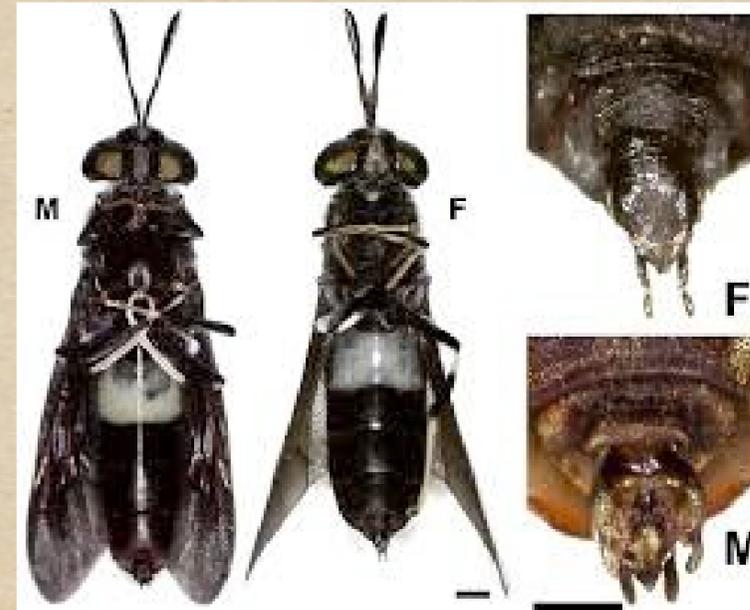
Pupae

- ◆ Lasts between 10 and 14 days
- ◆ Pupae do not eat or move during pupation.



Adult Black Soldier Fly

- ◆ An adult BSF measures about $5/8$ inches in length.
- ◆ After mating, the adult female lays between 400 and 900 eggs.
- ◆ Average life-span is 5 to 14 days.



Starting a BSFL Colony

- ◆ Temperatures between 75 and 100 degrees Fahrenheit.
- ◆ Feedstock best at 70% moisture
- ◆ Protection from predators
- ◆ A viable food source
- ◆ An accessible migration path
- ◆ An aerobic environment
- ◆ Protection from light (they are photo-phobic)
- ◆ Properly sized for your production goals

Drainage and Aeration

- ◆ A black soldier fly bin should always have adequate drainage.

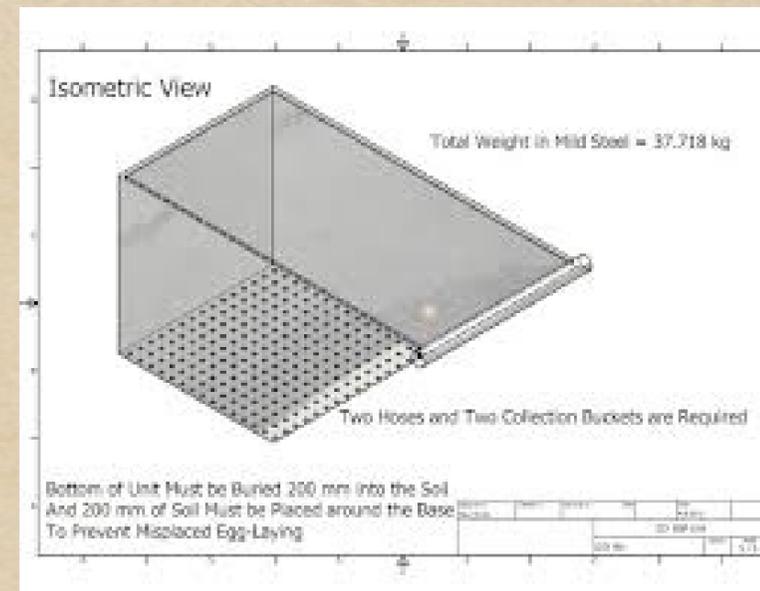
Importance of Drainage

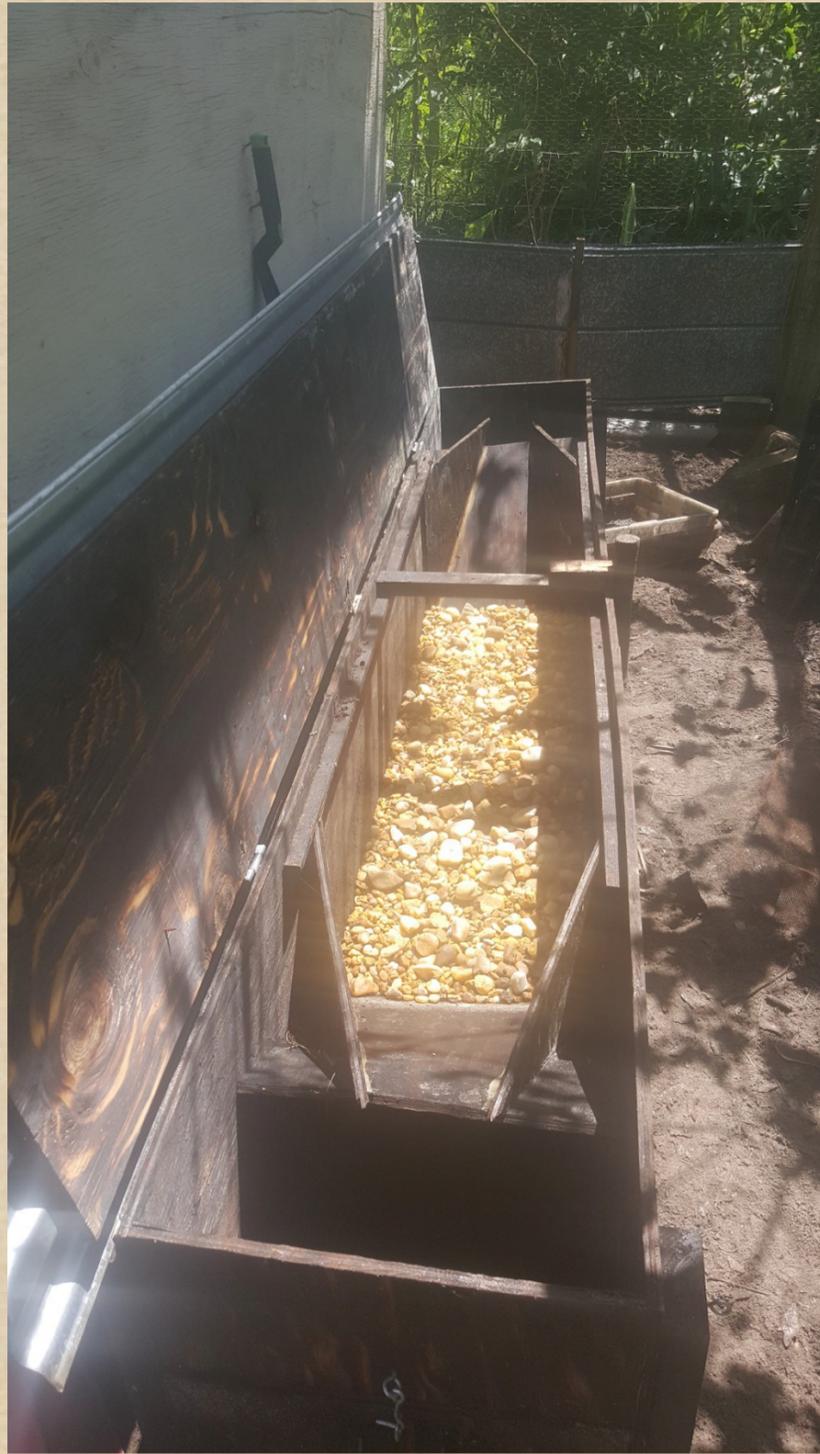
- ◆ One of the by-products of digestion produced by BSFL is a liquid leachate.
 - ◆ good for fertilizing water plants.
 - ◆ treat it as manure and not compost tea.
- ◆ Prevents the colony from going anaerobic.
- ◆ Prevents attracting pest flies like the common housefly.
- ◆ Keeps fly colony from smelling bad.



1/4 inch holes
are ideal

Holes bigger
than 1/4 inch
will allow
rodents inside.





- ◆ Place a layer of gravel, 1-2 inches deep.



- ◆ Used window screen wire
- ◆ Landscape cloth
- ◆ Old air conditioner filters
- ◆ Coconut fiber mat
- ◆ etc.



- ◆ Underneath container captures leachate for use as fertilizer

Exit Strategy

- ◆ Mature grubs (the pre-pupae larvae), will seek a path away from the active colony.
- ◆ Ends should be positioned at a 45° angle.



Rogue Escapees

- ◆ Some escape is inevitable. This will contribute in a positive way to the wild population of the BSF.



Sizing Your Bin

- ◆ Things to keep in mind:
 - ◆ BSFL will feed to a maximum depth of about 8 inches.
 - ◆ An ideal total bin depth is 18-26 inches.

- ◆ An active colony can consume about 3 pounds of feed for every square foot of surface area.

- ◆ Feed-to-weight conversion ratio is 20%.

48 ounces (3 Lbs.) of feed produces

- ◆ about 9.6 ounces of larvae.



For every 1 pound of larvae you hope to harvest on a daily basis, you would need $1 \frac{2}{3}$ square feet or 240 square inches of surface area.

Light Maintenance

- ◆ BSFL are very negatively photo-trophic.





- ◆ Breaking up clumps on anaerobic bedding helps to keep the grubs more comfortable. This ensures all of the feedstock will be consumed.

Location, Location, Location

- ◆ BSF do not do well directly under the sun or when exposed to extended rains.
- ◆ Locate bin in a shaded area out of direct sunlight.
- ◆ A sturdy lid is important.



Seeding The Colony



- ◆ When will you start seeing grubs?

It depends!

- ◆ Existing colonies can be used to “seed” new bins.
- ◆ Depends on the wild population.
- ◆ Egg traps



Feeding Your Grubs

- ◆ BSF love foods high in fats, proteins and starches.

- ◆ Kitchen scraps
- ◆ Dairy wastes
- ◆ Fruit
- ◆ Coffee grounds
- ◆ Offal (animal remains)
- ◆ Fermented foods
- ◆ Candy bars
- ◆ Onion
- ◆ Garlic
- ◆ Rabbit manure
- ◆ Water plants
- ◆ Mexican Food scraps

Don't feed...

- ◆ Diseased animals or their offal
- ◆ Seed hulls
- ◆ Cardboard
- ◆ Wood chips
- ◆ Paper shreds
- ◆ Highly fibrous vegetable matter
- ◆ Pesticide contaminated items

Keeping Your BSFL Healthy & Happy

- ◆ Bad smells
 - ◆ Don't be shy, smell your bin!
- ◆ Premature crawl-off
 - ◆ White and creamy grubs in the collection bin.
- ◆ No crawl-off
 - ◆ BSFL probably lack adequate food and moisture

Premature Crawl-off



Pre-pupae Larvae Harvest



Predators

- ◆ Birds
- ◆ Raccoons
- ◆ Possums
- ◆ Skunks
- ◆ Bears
- ◆ Rats and other rodents
- ◆ Cats and dogs
- ◆ Ants



Who can eat BSFL?

- ◆ Chickens
- ◆ Ducks
- ◆ Turkeys
- ◆ Geese
- ◆ Peafowl
- ◆ Quail
- ◆ Tilapia
- ◆ Catfish
- ◆ Trout
- ◆ Perch
- ◆ Prawn
- ◆ Piglets
- ◆ Dogs
- ◆ Cats
- ◆ Reptiles
- ◆ Bovine



Got Grubs?

