



introduction to

COMPOSTING WITH BLACK SOLDIER FLY LARVAE

by Quoc Huy Nguyen Dinh





The photo above is not an over-fed or badly maintained worm compost bin, it is a Black Soldier Fly Larvae compost bin fed with its daily amount of food waste.

One square meter of Black Soldier Fly Larvae can process 10 kg of food waste or more per day. My current bin, made of a pontoon pole cap of 40 cm in diameter, is currently able to process 2 kg of food per day. I feed it almost anything that is not woody or rich in cellulose, this includes but not limited to: meat, fish, dairy products, pasta, rice, coffee ground, fruits, some vegetables, bread, cooked meal etc...

They are seriously voracious eaters and help me deal with all my food waste, diverting it from landfills.

The residue of their composting process is then given as food to the worms who then complete the process and produce an awesome finished rich compost for the plants.

The larvae will grow very fast and in few weeks they would have reached their final larval stage and become pre-pupae with a darker skin tone. They stop eating and self-harvest into a bucket ready to be fed to your animals for a protein and calcium treat.

Composting with BSFL, intro by thelittlewormfarm.com

WHAT IS A BLACK SOLDIER FLY?

The black soldier fly is a common and widespread fly of the family Stratiomyidae, its scientific name is *Hermetia Illucens*. They are found around the globe where the climate is warm and moist enough for them to develop.

At no stage of their life are Black Soldier Flies considered pests nor do they carry diseases. Adult flies don't eat and only live for an average of 5 days during which they only drink water and find a partner to mate with. In average, a female BSF can lay around 500 eggs. When hatched, the larvae are very small and difficult to spot. As they grow (up to 27 mm, over an inch) they eat a lot of food and very fast. This voracious appetite makes them excellent decomposers and are often use for food waste composting. The larvae are an excellent and sustainable source of protein that can be used for for aquaculture, animal feed, and pet and human nutrition.

IDENTIFYING CLUES

Adult Black Soldier Flies look like a black wasp that is about 16 mm (5/8") long. You have probably never seen any around your place even if they are there. As they don't eat, they are not attracted by our food, unless the food has started decomposing and is fermenting, emanating a scent that attracts female soldier fly that will deposit their eggs on a dry adjacent surface.

The BSF larvae, are often spotted in a worm farm as being a large (up to 27 mm) and cream or black maggot. Larvae are hatched white and their color changes to cream as the grow. When they have stocked enough nutrition to survive as adult flies, they stop eating, start migrating off the food waste, shed their skin, clean themselves off the filth, generate an anti-bacterial substance and find a dry ground to bury themselves into until they metamorphose into a fly.



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BEFORE AND AFTER PHOTO SERIES

Here is a series of before and after photos. Food are given in the evening (just because that is when I'm available) and the after photo is taken the next morning, 8 to 12 hours later) before I go to work.



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And here are the larvae in action finishing a fish (Flathead, *Platycephalus Fuscus*):



Quite gross for some, amazing for others. For me it's both but I'm getting used to it, especially when I started making money selling homemade BSFL bin, the eggs, the larvae and the pupae. When the weather is warm, the adult flies keep ovipositing (laying eggs) and each cluster contains in average 500 eggs so the population is always maintained.

STARTING WITH BLACK SOLDIER FLY COMPOSTING

I first started with Black Soldier Fly farming with a lucky deposit of eggs on Gargantua, my DIY Continuous Flow Through (CFT) worm bin. I usually spot the larvae in my worm bins but this year I noticed a large white deposit under the lid of the CFT and realised they were BSF eggs.



That has kickstarted my operation. Even with all these eggs, it took me three weeks before I started to see some BSF larvae in my bait container, it was however infested with house fly and fruit fly maggots. But that changed quickly when the BSF grubs colony established itself. Since then I noticed less and less house flies around my house. I learned that not only

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the larvae produce a pheromone that repels other flies, but the grubs themselves are so voracious that they outcompete other maggots for food.

Those who start with nothing, usually use a bait bucket with some attractants (fermenting food waste for example). The smell that comes from the bait bucket will attract adult females who then deposit their eggs in egg traps made for them. Below is a photo of a female Black Soldier Fly ovipositing in an egg trap made of corrugated cardboard.



After 4 days, the egg hatch and tiny larvae will fall onto the food and start their fast development. When a lot of larvae are visible, the content of the bait bucket can be transferred to a compost bin along with the egg trap. The bait bucket is not required from there on. The compost bin can be purchased or homemade. Just like with a worm bin, a BSFL bin can be as simple or complex as you want to.

In few weeks only the tiny larvae will grow to 19mm or more and, soon after, become pre-pupae who will climb a ramp built for them, leading to a collection bucket outside the compost bin. White larvae and black pupae can be given as food to chicken, fish, reptiles, pigs and other animals. Dried and ground pupae can be used as food supplement for pets.

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Some live pre-pupae are usually released in the garden to sustain the wild population. Then after few more weeks, they will metamorphose into flies and the cycle repeats.

Like any living beings, BSF and their larvae have some basics environmental and weather conditions requirements. The flies need a warm and humid weather to breed (over 23C and over 50% RH) the larvae generate their own heat and prefer it wetter than the worms. Obviously in winter their will be no natural deposit of eggs but you can maintain a colony of larvae with a some insulation or if brought indoors.

WHAT TO DO IF BSFL ARE FOUND IN A WORM FARM?

It is quite common to find some Black Soldier Fly Larvae in a worm farm as the female BSF are also attracted to the food we give to the worm. An overfed worm bin is tracking them even more as the excess food waste will ferment and emanates more attractive scent.

Usually, you don't need to worry too much about the presence of BSF larvae in a worm bin unless their population is going out of control. If this is the case then you will need to pick them out by hand or using a hand shovel. If you still want to get rid of them, the easiest is to leave them alone and in few weeks they will become flies and leave the system. To prevent the larvae from returning, you need to monitor your bin for eggs deposit and remove/destroy the eggs. Additionally you would want to reduce the amount of food waste available and cover with more bedding material and use some pH buffer (finely ground eggshells or garden lime) to reduce odours.

If you are interested in starting a compost bin for BSF larvae, you could collect the larvae from the worm bin and move them to the their dedicated bin. BSF larvae are secreting a pheromone that attracts female flies and will help you get more eggs to grow your bin population.

TEAMING UP WORMS AND BSF LARVAE

Worms are excellent food waste composters producing an amazing natural fertiliser. However, in a closed system like a domestic worm bin there are rules to follow and food to avoid.

BSF Larvae on the other hand can eat what worms cannot but the residue that's left is not a finished compost. That residue is an excellent worm food and the compost worms will take pleasure to complete the composting process in no time (the residue being partially processed).

What I usually do is feed the BSFL with all the food I don't give to the worms (meat, dairy, pasta, cooked meals etc...), I add the same amount in fruits and veggies waste and the rest goes to the worms. When I have enough BSFL composting residue, it goes to the worms to be completed. Since I have started using BSFL for composting, my rubbish bin is less stinky and almost never full.

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CONCLUSION

The introduction of Black Soldier Fly Larvae in my Little Worm Farm was a massive change for me. It took me about 6 months to increase my worm population to a level that can process all my fruits and veggies waste. That worm population required several regular size worm bins to host and feed them. I have now reach a level where I not only compost all my own veggies scraps but also from external sources. Now my homemade BSFL bin can process 2 kg of food waste per day! And it can process waste other than fruits and vegetables. Lucky for me I don't have to feed them every day, they can stay few days without food.



The business opportunity is a bonus, I do sell these additionally to the worm products:

- Compost bins
- Egg clusters
- Young live larvae
- Live or dried pre-pupae & pupae

But I can also see opportunities such as waste management services. I regularly see those ads for curb side composting, where you pay a subscription and the company comes on a weekly basis and pickup your kitchen waste for composting. They usually do this with worms but if you use combine the worms with Black Soldier Fly Larvae not only you would need less space for the same amount of waste but you will also dramatically reduce the vermicompost production time.

If you are in Australia and need BSF larvae, checkout my online shop:

<https://thelittlewormfarm.com/products/>

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Quoc-Huy NGUYEN DINH

The Little Worm Farmer - member of the [Worm Farming Alliance](#)

w: <https://thelittlewormfarm.com/> e: contact@thelittlewormfarm.com



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OTHER RESOURCES

If you wish to learn more about what other potentials and opportunities BSF are offering, I recommend reading "Black Soldier Fly Eco-Technology for a Sustainable Future" by Larry J. Shier.

<https://thelittlewormfarm.com/bsf-eco-technology>

I have written a little guide covering various aspects of BSF farming. It will hopefully help you start with this alternative composting method: "A guide to composting with Black Soldier Fly Larvae".

<https://thelittlewormfarm.com/bsfguide>

Join me on "Black Soldier Fly - BSFL" Facebook group where other BSF farmers from around the world will help you out.

<https://www.facebook.com/groups/547341258763061/>

Finally, if you want to follow my journey, check out my website, follow me on social media or subscribe to my newsletter.

<https://thelittlewormfarm.com/newsletter>