

The Capability of Black Soldier Fly, *Hermetia illucens*, to Consume Some Weeds in Vegetable Field

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Abstract. Weed in the agriculture field is needed to reduce. So It is need something environmentally tool to conserve agriculture. One promising uses Black Soldier Fly (BSF) larvae. The larvae capability to consume some weeds were presented. Descriptive research was conducted by investigating the role of BSF on some weeds i.e ki rinyuh (*Chromolaena odorata*), Babadotan (*Ageratum conyzoides*), rumput gajah (*Pennisetum purpreum*). Each was given BSF larvae with 150 g, 200 gr and 250 gr of weight on 500 gr weed, The result showed that BSF larvae at 150 g of weight convert weed between 80-100%, on 200 mg convert 75 % – 97 %, on 250 mg can convert 80 % -100 % in four day. The mortality of BSF larvae on *Chromolaena odorata* was 10 %, *Ageratum conyzoides* was 6 %, *Pennisetum purpreum* was 0 %. This showed BSF larvae can be converted weed into BSFlarvae biomass.

Keywords: *Hermetia illucens*, weeds, weight, bioconversion

1 Introduction

The waste product is a big problem in Indonesia. Various wastes have not been systematically resolved including the remnants of weeds. Weed is a plant that grows and competes with competing plants in terms of obtaining nutrients. To overcome this, farmers usually deal with it by weeding and stacking it, sometimes even burning. In large numbers, weeds will be a problem for the environment and sources of pests and diseases [1].

One solution is to use Black Soldier Fly larvae that they can transform garbage into something useful. According to Shepard et al. [2] The bio composting process of BSF larvae is quite effective so that it can be used on a large scale where the accumulation of organic waste material especially animal feed can be polluted. According to Diener [3] in this case, BSF larvae can consume organic material widely, the fund is very potential in the management of waste materials. The purpose of this study was to determine the effect of kitchen waste, harvest waste, and weed waste as BSF feed on the durability and conversion of waste into biomass. To help convert the remaining weeds, we will examine the effect of Black Soldier Fly on three types of weeds as feed.

2 Research methods

The research method used is a descriptive research method, describing the process of changing organic weeds into biomass. Research procedures, prepared ki rinyuh (*Chromolaena odorata*), Babadotan (*Ageratum conyzoides*), elephant grass (*Pennisetum purpreum*) for 500 gr. Bsf of 50 gr, 100 gr, and 150 gr are weighed, and the number of larvae is calculated for each treatment and observed for up to four days

3 Results and Discussion

The results showed that the Black Solder Fly in the three weeds i.e ki rinyuh (*Chromolaena odorata*), Babadotan (*Ageratum conyzoides*), elephant grass (*Pennisetum purpreum*) (**Figure 1**) were able to convert waste by an average of 80%.



Fig. 1. Picture of *C. odorata*, *A. conyzoides*, and *P. purpreum*).

Based on Table 1, from the observations of BSF with an initial weight of 150 gr. It is able to convert weeds into biomass almost doubled. The number of live births each was 96.67%; 97%; 100%

The same pattern occurs in Table 2, from the observations of BSF with an initial weight of 100 gr able to convert house waste, vegetable waste, and weed waste into 200 gr, 250 gr, and 200 gr respectively. It can be seen that vegetable waste as food for BSF produces the highest body weight while house waste and weed rubbish are able to change biomass weighing 200 grams for each. Based on observations of larvae with higher weight able to convert higher biomass

Table 1. Role of weeds as BSF Larvae feed with an initial weight of 150 gr.

Weeds	Initial weight (total)	Total initial/gram	End weight (total)	End Initial/gram
<i>C. odorata</i>	600	150	580	262,5
<i>A. conyzoides</i>	610	150	590	270

Weeds	Initial weight (total)	Total initial/gram	End weight (total)	End Initial/gram
<i>P. purpureum</i>	605	150	605	292,5

Table 2. The role of weeds as BSF larvae feed with an initial weight of 200 gr.

Weeds	Initial weight (total)	Total initial/gram	End weight (total)	End Initial/gram
<i>C. odorata</i>	805	200	770	200
<i>A. conyzoides</i>	800	200	780	250
<i>P. purpureum</i>	810	200	810	200

In Table 3, it can be seen that all BSF treatments for organic waste are the treatments that produce the highest weight and also survival rate of them are 87%, 91%, 100% Insects have a high feed efficiency and low feed conversion ratio, with the ability to be maintained in a bio-waste stream; they are able to grow and multiply in waste materials [3]. Insects can eat waste material and converted it into highly desirable feed for livestock. Insects that have been intensively studied and found to be the most promising for industrial feed production are black army flies (*Hermetia illucens*), common household fly larvae (*Musca domestica*), silkworms (*Bombyx mori*) and yellow worms (*Tenebrio molitor*) [4].

The buildup of organic waste, especially from restaurants, fish processors and farmers, can cause pollution. The accumulation of organic waste, especially in livestock facilities, can be a potential pollution issue. The black army fly, *Hermetia illucens* L. (Diptera: Stratiomyidae), can consume a variety of organic materials and has the potential to be used in waste management [5].

In addition, the prepupa stage of this insect can be harvested and used as a valuable nutritious feed for livestock animals [5]. Five types of waste with various organic source materials were specifically chosen to evaluate the consumption ability and reduction of black army fly larvae [6]. *H. illucens* able to reduce all types of waste Organic waste that may cause problems or recycling opportunities generally divided into four categories: 1) Food processing and factory waste, 2) Food used by consumers (restaurants and households), 3) Dirt from feeding operations limited livestock, and 4) Animal remains and innards [7]. Based on observations it appears that Black Soldier Fly can reduce organic waste by leaving no side effects

Table 3. The role of weeds as BSF larvae feed with an initial weight of 250 gr.

Weeds	Initial weight (total)	Total initial/gram	End weight (total)	End Initial/gram
<i>C. odorata</i>	1210	250	1054	450
<i>A. conyzoides</i>	1205	250	1100	475
<i>P. purpureum</i>	1207	250	1207	500

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