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Short Communication

Occurrence of Black Soldier Fly *Hermetia illucens* (Diptera: Stratiomyidae) in Biocompost

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Abstract

The macro-organisms in the compost feed upon the semi converted organic matter, enhance the composting and convert humus into cured compost. These include several arthropods particularly insects. Among these insects soldier fly Hermetia illucens *(Diptera: Stratiomyidae) was observed during the study. This is the first time known record of this fly in compost in India. This paper studies the occurrence and description of the fly.*

Keywords: Compost, black soldier fly.

Introduction

The compost fauna is well studied across India as well globally. While the references on micro fauna are abundant, the ones regarding macro-fauna in compost are scanty. In India the diversity and role of these various macro-organisms has been studied[1], in which the occurrence of Black soldier fly in the compost was first noted.

The black soldier fly, *Hermetia illucens* (Linnaeus), was first seen in 1930 in Hilo Sugar Company in Hawaiian Islands[2]. Black soldier fly is a tropical fly indigenous to the whole of the Americas, from the southern tip of Argentina to Boston and Seattle. But during World War II, the black soldier flies spread into Europe, India, Asia and even Australia. It is a sleek looking fly that's often confused with a wasp. However, like most flies, the black soldier flies only have two wings (wasps have four) and does not possess a stinger[3].

According to Newton *et. al.*[4], the black soldier fly is often associated with the outdoors and livestock, usually around decaying organic matter such as animal waste or plant material. Since the black soldier fly larvae or BSFL as it is commonly called, consume decaying matter, they have been used to reduce animal manure in commercial swine and poultry facilities in western countries, but in India the practice is not much common. In fact according to Diener *et.al*[5] valorization of municipal organic waste through larval feeding activity of black soldier fly constitutes a potential benefit, especially low and middle income countries. In India, BSF larvae were found in poultry house in Punjab in 2007[6]

Black soldier flies though look very bulky, are not known as a disease vector, and possess no danger. Adult soldier flies are a potential mechanical vector of various pathogens. A more likely negative interaction would be accidental ingestion of black soldier fly larvae by animals or humans[7].

In natural breeding, black soldier flies lay their eggs in moist organic material while in urbanized areas the black soldier fly lays eggs in dumpsters or compost, which provide similar odors and nutritional needs to naturally occurring organic matter[8].

Members of the family Stratiomyidae usually range in color from yellow, green, black or blue, with some having a metallic appearance. Many are mimics of other flying insects, such as bees and wasps.

Black soldier fly adults are bristle less flies having a wasp-like appearance and are black or blue in color. They also have two translucent "windows" located on the first abdominal segment and their scutellum is often conspicuously developed. The wing veins of fly are crowded near costa and more strongly pigmented than those behind while vein C does not entirely surround the wing. Adults range from 15 to 20 mm in length[9] while BSF observed during study was 1 inch (25mm) in length (figure 1). The adult's antennae are elongated with three segments, and legs have white coloration near the end of each leg (figure 2).

Mating usually occurs two days after adult emergence from the pupal case. The male black soldier fly intercepts a passing female in mid-air and they descend in copula[10]. Male soldier flies utilize lekking (gathering of male for competitive mating display) sites, where they await female soldier flies. These sites are defended against other male soldier flies. When a male intrudes upon the territory of a resting male, the resting male seizes the intruder. After a brief descent, the invading male retreats from it[8].

Figure-1

Figure-2

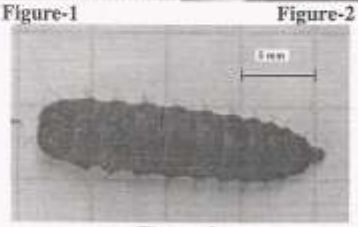

Figure-3

Methodology

During present study, the Black soldier fly, *Hermetia illucens* was observed hovering on the compost bin after addition of fresh feedstock. The compost contained vegetable kitchen waste including stalks and peels of vegetables, eggshells, raw and processed leftover vegetarian as well as non vegetarian food which was added daily in random quantity as per the generation of waste. Black soldier flies were observed on the upper strata of the bin and their larva (figure 3) was found buried in the middle layers of the compost. BSF larvae were kept in the compost itself instead of isolation, in order to get them regular food supply and to observe life cycle of soldier fly.

Result and Discussion

During the study, the BSF larvae were voraciously eating the debris, while the adult fly hovered upon the upper strata of the compost for egg laying. The blackish gray larvae consumed almost every bit of green feedstock within hours of adding and helped to keep the compost bin clean.

Conclusion

According to Sheppard *et. al*[8] and Diener *et. al*[3] due to this capability of BSF Larvae they are commonly used in household and manure composting in western countries since long time. But at the same time it should be noticed that the rearing of BSF is easier in India as larvae flourish more in tropical environment than in colder one[9], hence composting using BSFL should be recommended in India as well.

Acknowledgement

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