Black Soldier Fly Larvae rearing advantages

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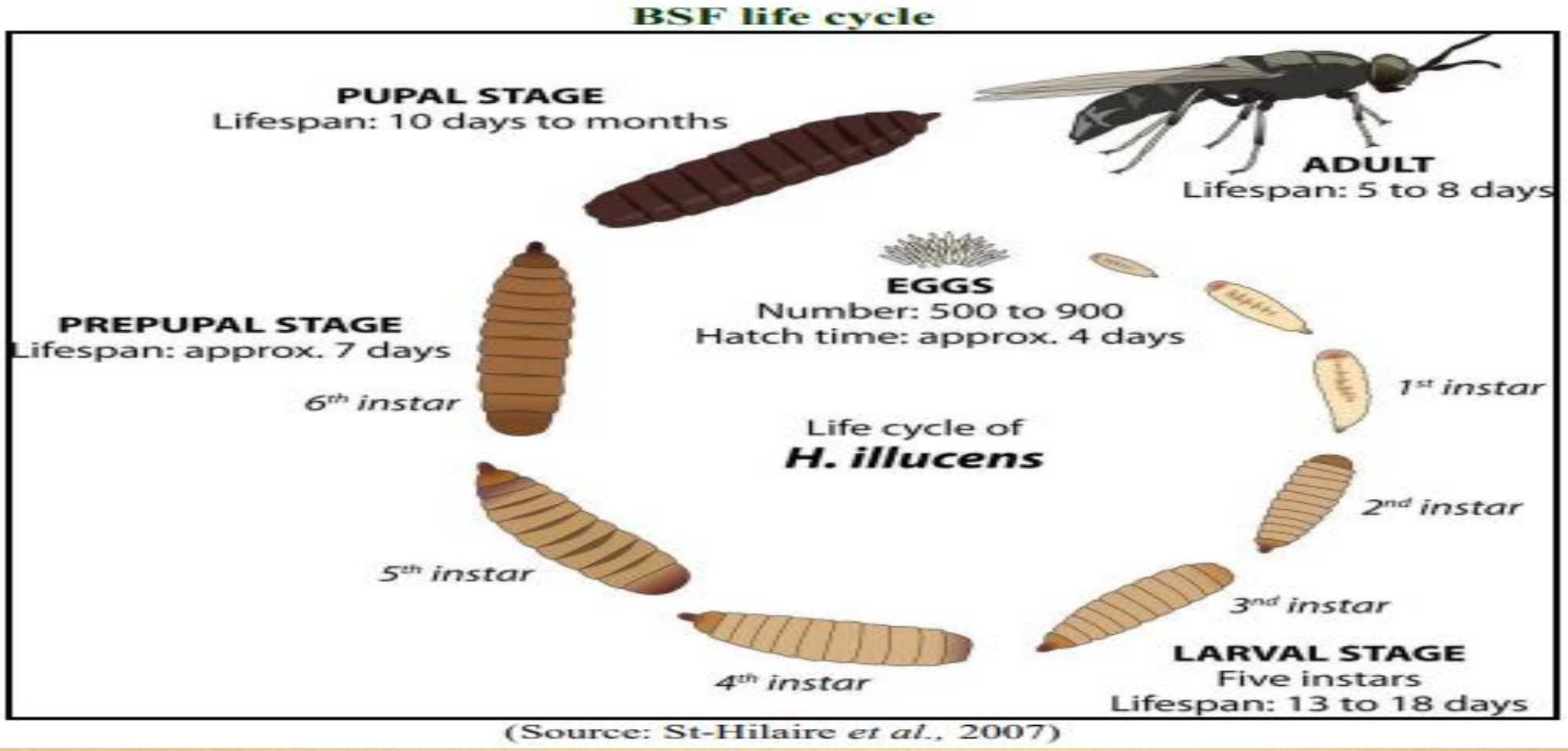
Introduction

- General knowledge about black soldier fly (BSF)

- (*Hermetia illucens*)
- a wasp-like appearance
- Non-pest fly, harmless, manageable the entire time and nether biting nor stinging
- warm temperature(tropical and warm-temperate region) insect
- Saprophytic in nature

Figure 2: Distribution area of the black soldier fly, *Hermetia illucens*

Black Soldier Fly lifecycle



(Source: St-Hilaire *et al.*, 2007)

ADULT

- Live for 5 to 21 days
- Survive on preserved nutrients
- Water source needed(may contain some nutrients)
- Lekking behaviour: males occupy certain

  area and mate females which come to its home area.
- Mating (2 days after the emergence)
- Oviposition (2 days later)

EGGS

- Tiny

  (1 mm in length and 0.025 mg weight)
- Beige to beige/yellow colour
- Female lay 600 to 800 eggs
- Hatch with in 2 to 4 days mainly

  [may reach 14 days]

LARVAE

- Main stage of life cycle
- Live for 13 to 18 days
- Rich in nutrients
- Only larvae consume feed
- Voracious eater
- Full size 2.5 cm length and 0.5 cm width

Optimal conditions for BSFL

- Temperature
  - the larvae survive between 0°C and 45°C
  - The optimal temperature is 35°C
  - Inactive at temperatures less than 10°CBSFL do not survive well in direct light or
- In extreme dry or wet conditions
- They prefer to be 8-9 inches deep into the food source

PUPAE

- Do not eat
- Mouth part convert into hook
- Brown to black in colour
- Abandons digestive organs
- Hides in dark places to pupate
- Pupa to adult 7 -15 days

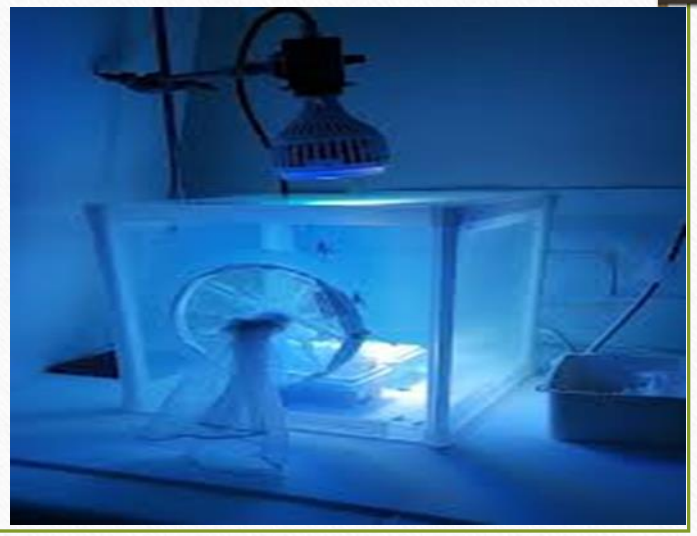
BLACK SOLDIER FLY BREEDING

METHODS OF BLACK SOLDIER FLY BREEDING

- **A) Natural oviposition**
  - Developing a technique to attract adults and egg trapping
- **B)Semi artificial method**
  - Developing a technique to rear the adult in a cage without modification the surrounding environment

- **C) Artificial method**
  - Building up a colony (rearing the adults and providing the suitable environment)
- The target of all methods is
  - Collect the fertile eggs
  - Hatching eggs and
  - Close the life cycle

  (artificial and semi-artificial methods)



How to build an indoor BSF breeding operation[Breeding colony]

- Preparing suitable room
- **Tools needed in artificial breeding**
  - Ant proof stands or tables
  - Love cage
  - Dark box
  - Light source
  - containers
  - Eggies

ACTIONS INSIDE THE REARING ROOM

- Pupation
  - Collect suitable quantity of prepupae
  - Put them in containers having a moist soil-like substrate /compost/ saw dust into which the pre-pupae can bury themselvies
  - The pupation containers are placed inside a pupation cage (dark box)
  - Emergence of the adults starts 7-10 days later

- Mating and Oviposition

  - Collect the adults to the love cage
  - The love cages are equipped with
    - wet cloth
    - LED or halogen lamps
    - Eggies
    - Smelly attractant

MOST IMPORTANT FACTORS AFFECTING ARTIFICIAL BREEDING

- Suitable place with enough space
- Light
- Temperature
- Humidity

EGG HATCHING AND LARVAE FEEDING

- Eggies or pure eggs are placed over an open hatching container (hatching shower)or fine wire mesh (1 mm) ,respectively where newly hatched larvae fall into the hatching container
- Hatching container is filled with available meal like chicken feed 70% moisture content
- The eggs hatch within 2-4 days

- 100gm larvae for 5kg waste

  for 7 days

- Add 5kg waste repeated

  2 weeks for optimum growth

- Optimal temperature required 27–30 °C and optimal humidity required 70% RH.

- 2.5% of the produced larvae will be used as a seed for future propagation Environmental conditions (mainly temperature) can affect the sex ratio of the adults.

Black Soldier Fly Larvae rearing advantages

- 1- Converting the biowastes into larvae and soil.
  - The larvae contain proximately 40% crude protein and 30% crude fat
  - The soil contains nutrients and organic matter which can be used in agriculture helping in reducing soil depletion.
- 2- Establishing processing unit using BSFL is very simple and does not need this high technology to operate it,
  - BSFL have the highest potential for large-scale production

- 3- Create new job opportunities for low-income and unskilled labours.
- 4- BSF convert low-grade organic side streams into high-quality protein and provide an innovative strategy for waste valorization,
  - The produced larvae have suitable for fish, poultry and pigs feeding.

- 5- Feeding biowastes to BSFL inactivate the diseases transmitting bacteria like
  - *salmonella enterica* and
  - *Escherichia coli* and also
  - neutralise aflatoxins and
  - degrade tetracycline.
- 6- BSFL have been reported to consume and degrade biowastes up to 70 % which reduce the space needed and the cost of wastes transport to landfills.

- 7- High conversion efficiency of feed with wide range of feed materials with relatively very short life cycle.
- 8- Utilization of biowastes with minimum water consumption, minimum land utilization per unit production of feed ingredient.
- 9- Saving of the foreign currency needed for importation of feed ingredients.

THANK YOU