

Technique for Maggot Production - The Songhai Experience

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Maggot is the larvae of the domestic fly (*Musca domestica*). The Songhai Centre in Porto-Novo has facilities for and engages in the mass production of maggots as a solution to the high cost of feed in fish and livestock production.

A brief review of a maggot production enterprise in Songhai is outlined below.

1) Role of maggot in development

i) Provides a source of nutrient for fish, quail, turkeys and guinea fowls.

ii) Provides fertilizer for crop production.

iii) Protection of the environment as wastes are concentrated and decomposed.

iv) The technology for maggot production is simple and cost effective for farmers.

2) Choice of site for Maggotry

Maggottries should preferably be located away from human residence - in

places where there are trees. The leaves of the surroundings vegetation serve to absorb offensive odor from the maggotry and reduces the ambient temperature.

3) Housing

The building should preferably be oriented in an East-West direction to reduce the effect of direct sunlight on the substrate.

Specifications : The garble roof type of building with openings at the top and sides for ventilation is recommended. The roof can be made of corrugated iron sheets or thatch. At songhai, the following dimensions are in use :

Height of building:

Floor to eaves = 2 meters

Floor to ridge = 3.2 meters

Wall of building:

Open sided building with very short walls to allow for optimum free flow of air. The dwarf wall should be 0.4 meters higher than the maximum water level in the surrounding canal.

Floor : The floor of the building is flat concrete and plastered. The rectangular building has a central passage (0.8m wide) in the middle with substrate tanks arranged on either sides of the passage.

Substrate tanks : Maggot substrate tanks are open shallow concrete tanks where the fly larvae are cultured. Each tank is 1 meter square and 0.1

meter deep. Each side has railings of 0.12m.

Collecting tanks : These are narrow tanks 0.3m wide and 1 meter length running parallel to the substrate tanks where escaping maggots are trapped and harvested maggots are cleaned. At Songhai, we have 180 substrate tanks located on 307.1 sq meters of floor space

Surrounding Canals (or gutters) : The entire building housing the maggotry is surrounded by a canal (or gutter) containing water to prevent the invasion of ants and other crawling predators. This canal which is 1meter wide is used in raising tilapia and catfish which feeds exclusively on stray maggots and phytoplanktons in water.

4) Maggot Culture

To produce maggots, the following prerequisites must be satisfied :

- * House fly (*Musca domestica*)
- * Suitable substrate
- * Fly attractants

In Songhai Center, the substrate used is fermented grain residue namely brewery spent grain. The fly attractants include animal manure like pig and poultry wastes ; animal offal from the abattoir, dead lizards, birds, rats and other animals - we also use decaying fruits like mangoes. Mango is a good attractant.

Production Procedure :

Maggot production is an aerobic fermentation process.

To produce maggots, proceed as follows :

*** In a clean substrate tank (1m x 1m) place 4 shovel full of fresh animal manure and 6 shovel full of fresh brewery spent grain. Mix them together.**

*** Cut the animal offal into small pieces (10cm length) and spread them in the middle on top of the substrate.**

*** The flies are attracted immediately to lay eggs.**

*** During dry weather, water the prepared tanks, using a watering can.**

*** Small maggots are observed about 6 hours later (after first contact of flies with substrate)**

*** Water the substrate daily. The drier the weather, the more frequent the watering. Avoid water logging of substrate.**

*** The maggots attain optimal size in 3 - 4 days and are then ready to be harvested. Minimal temperature of 30 C or more is required for maggot production.**

Other points to note :

During unfavorable weather, decomposition is slow and the substrates should be turned daily, before the first harvesting. At about 6 days old, maggots become slow and relatively insensitive and are ready to be transformed into adult flies.

5) Harvesting of maggots

Harvesting of maggots begins on the 4th day after 1st contact of fly with substrate. The maggots are of the right size at this stage.

To harvest, proceed as follows :

* i) Water the substrate (few seconds later, the maggots migrate to the surface of the substrate).

* ii) Place fresh brewery waste and some fresh pig or chicken manure at the corner nearest the migration terminus.

* iii) About 30 min later, the maggots are attracted to the substrate. Scoop the maggots with a hand spade into the collecting tank where the remaining brewery waste is removed with a broom. Harvest the clean maggots into a rubber or plastic bucket.

* iv) Wood ash is sprayed on maggots in the bucket to prevent them from escaping.

* v) Harvesting is done twice daily (morning and afternoon).The morning field constitutes 73.7% of the daily total.

At Songhai, a 1m x 1m substrate tank yields 2.5-3.3.5Kg of maggot per day.

6) Factors affecting yield of Maggots

Season of the year

a) Production is low during harmattan and dry weather

b) Temperature $\geq 30^{\circ}\text{C}$

c) Humidity - Production is better in humid conditions

d) Quantity of fly attractants / baits - More the quantity of attractants, the more number of flies and the greater the number of maggots produced.

e) Predators - Rats at night ; lizards and birds in the day ; ants if not prevented cover the field of maggots.

f) Operators skill can affect the quantity of maggot produced

7) Utilisation in Songhai

Aquaculture : Feeding of fresh maggots to tilapia and catfishes is done twice daily. (late in the morning and later afternoon). An average of 100 Kg/day of fresh maggot is used for 87 concrete ponds of about 50 m² and 0.5 m depth each.

Poultry: Fresh maggots are used as basic component of feed for quail, chicks. Fresh maggots are included in the ration of poultry and guinea fowls.

Fertiliser : The spent substrates are used to fertilize directly plants in the field (ring application in mango, banana, papaw plantation) In farm yard manure, the spent substrates are incorporated into the compost production.

8) Preservation of Maggots

By sundrying of steamed maggots and placing in airtight containers.

9) Chemical Composition of maggots

Dry Matter 24,7%

Crude protein 47,5-50,1%

Lipid	19,3%
Cellulose	23,2%
Minerals	9,1%
Ca	1,5%
P	1,2%
Mg	0,3%
K	1,3%
Na	4528 ppm
Mn	196,5 ppm
Fe	425,7 ppm
Cu	19,7 ppm
Zn	235,8 ppm

10) Constraints of Production

Problem..... Solution

Waterlogging of substrates during rains..... Since the orientation of the building is impossible after construction, increase the eave or height of the dwarf wall. Wind breaks are also useful around the building.

Harmattan or dry air which dries the substrate faster..... Water substrates frequently. Turn substrates after every harvesting.

Direct Sunlight on substrates..... Cover the open sided walls with bamboo mats or dark colored plastic sheets well arranged for ventilation.

Ants (Soldier ants)..... Maintain water regularly in the canal.

Inspect and repair cracks inside the building

Birds..... Line traps are used for birds outside. Trap nets are also

placed in the open walls.

Lizards..... Place trap nets in the open walls.

Rats..... Place trap nets in the open walls

Human vigilanceThe operator should also be vigilant enough to harvest the maggots earlier before they could pass to the next stage.