



El Domo

Product Design Agency



DIY technical manual mealworm farm

March 29, 2023

Prepared by: Carrera Karen, Cuyago Nayely, Endara Evelyn, Lastra Johanna,
Moreta Verónica, Salazar Daniela.

STUDENTS

Reviewed and authorized by: Ing. Pedro Martinez

TEACHER

TABLE OF CONTENTS

- I. INTRODUCTION**
- II. PURPOSE OF THE MANUAL**
- III. MATERIALS**
- IV. PROCEDURE**
- V. REARING OF MEALWORMS**
- VI. SIGNS OF THREAT**

INTRODUCTION

This manual is intended for people who wish to start mealworm rearing from the construction of the farm to the production of the protein supplement for animals. There are also detailed indications of the substrates, maintenance and conditions required for the rearing of mealworms, such as temperature, humidity, feeding, etc. In addition, several suggestions are presented that can be very useful for the development of mealworms.

OBJECTIVE OF THE MANUAL

To develop a mealworm farm, using different substrates to obtain biomass and use it as a protein supplement for fish.

MATERIALS

- 4 sticks of 2 meters
- 1 large Triplex of 1m x 1m
- 3, 32cm x 37cm plastic containers
- 1 box of 1.5 inch nails
- One hammer
- One drill
- Mealworms



PROCEDURES

For the development of the farm, the procedure is detailed in three steps:

STEP 1.- Preparation of materials for the support of a 90cm high and 35cm wide base.

Before making the base, prepare the necessary materials by cutting the sticks as described below.

1.- With the help of an adult, measure and cut 4 sticks of 90 cm which will serve as the general support. (Figure 1).

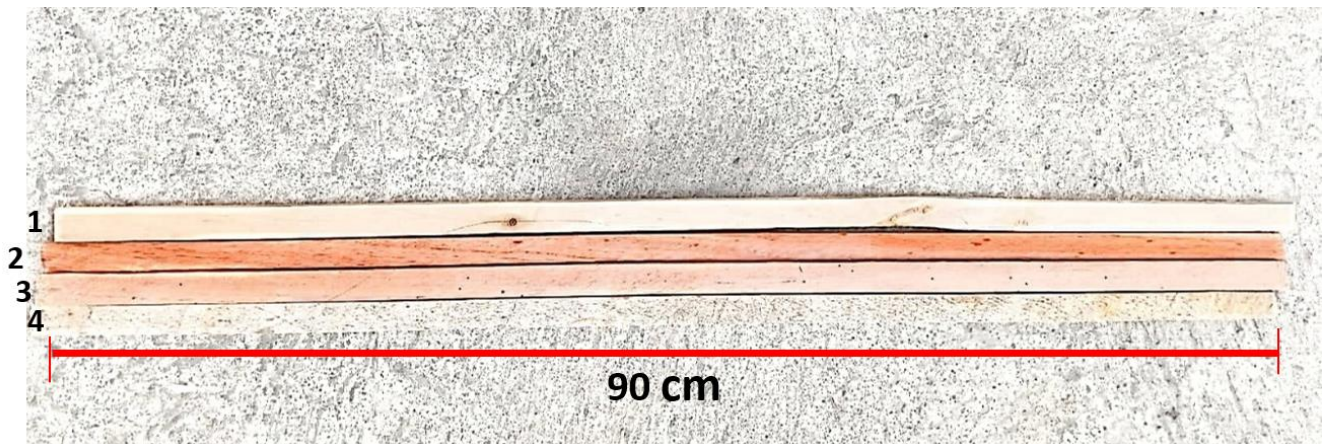


Figure 1: Wooden sticks to serve as columns

2.- Also, cut 6 sticks of 35 cm, which will keep the base firm (Figure 2).

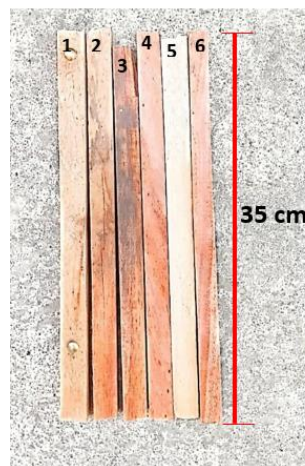


Figure 2. Wooden poles for horizontal support of the farm.

3.- For the base measure and cut 3 triplexes of 35 cm x 39 cm (Figure 3).

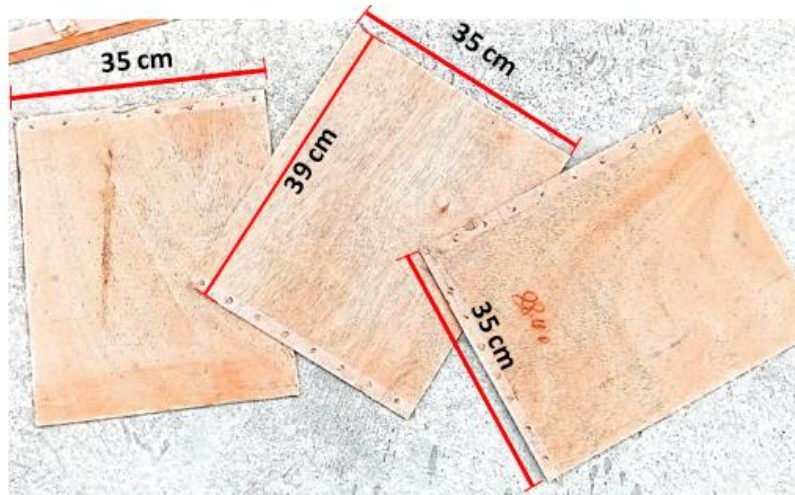


Figure 3: triplex for lower bases

4.- In addition, a 35 cm x 39 cm mesh was cut. The mesh should have tiny holes to prevent the worms from going through it (Figure 4).



Figure 4: Plastic netting

STEP 2.- Joining of each part of the materials

1.- Take 2 sticks of 35cm and separate them to a measure of 39 cm, to place the triplex on top (Figure 5). When we are ready, proceed to nail the corners obtaining the following (Figure 6), repeat the process 3 times.

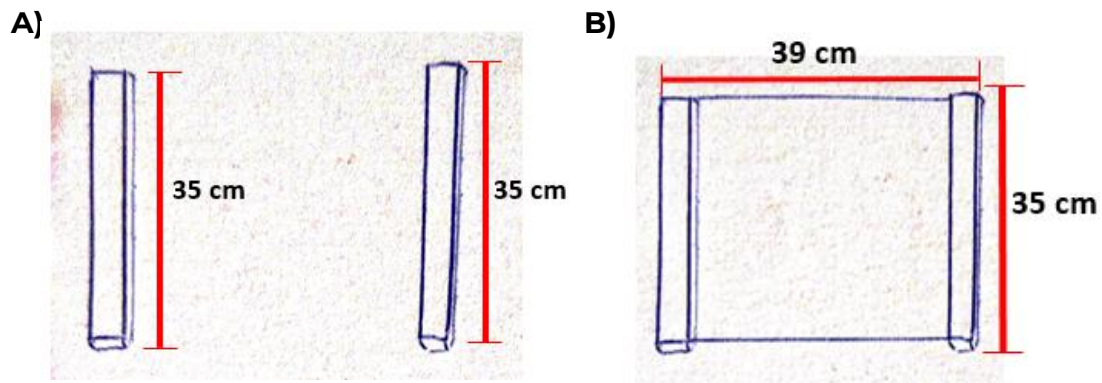


Figure 5: Plan of the lower base. A) Structure of the 35cm wooden poles and B) Union of the triplex to the poles.

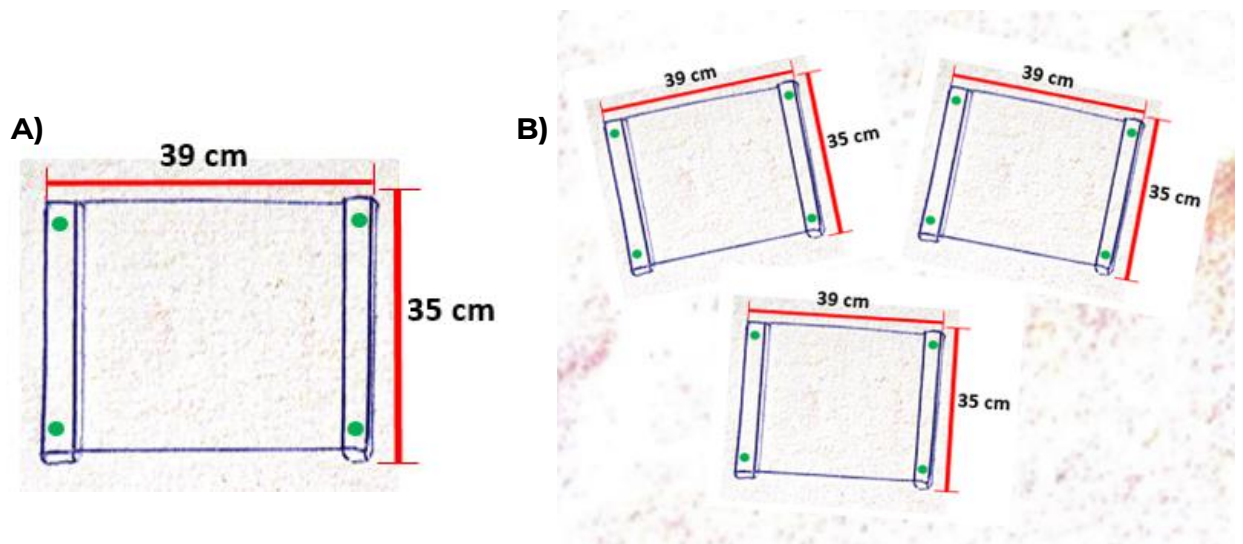


Figure 6: Plan of the lower bases. A) lower structure nailed and B) repetition of the bases 3 times.

2.- To continue the 4 sticks of 90cm, they will be pointed 30cm 3 times (Figure 7) this will be done to nail the triplex.

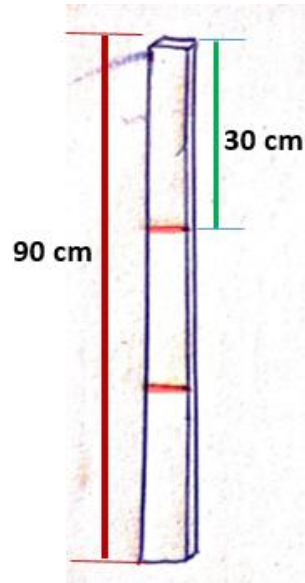


Figure 7: Measurement plan of 90 cm poles

3.- Take two 90 cm poles, and separate 35 cm to proceed to nail the triplex (Figure 8).

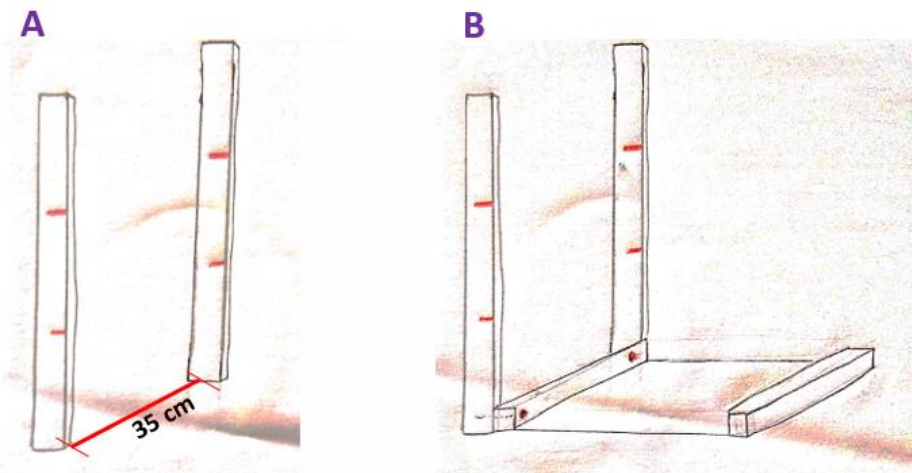


Figure 8: Drawings of the base attached to the 90 cm sticks

4.- The two 90 cm poles are then nailed to the corners of the triplex as follows (Figure 9).

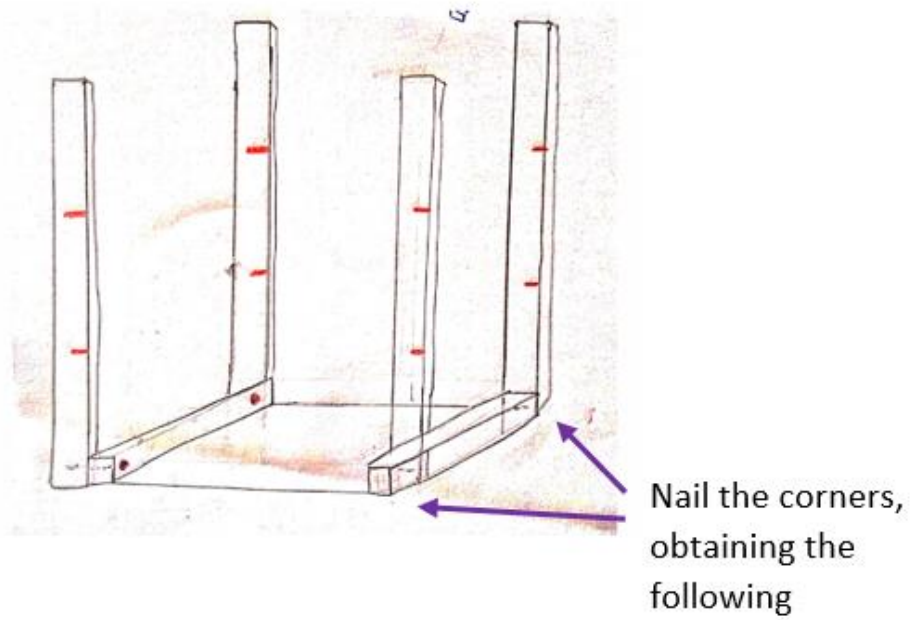


Figura 9: Plano de columnas unidas a las esquinas del triplex

5.- In this way, the two remaining triplexes will be nailed, as shown in (Figure 10).

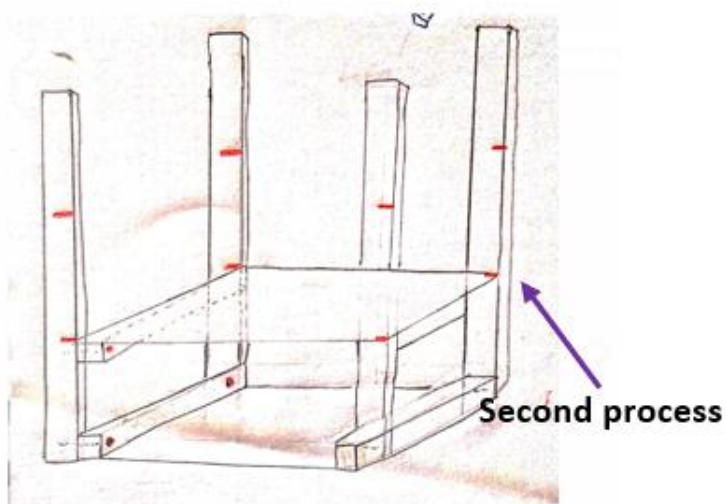


Figure 10: Attachment plan of the central triplex to the general base

6.- As a result, the following results were obtained (Figure 11)

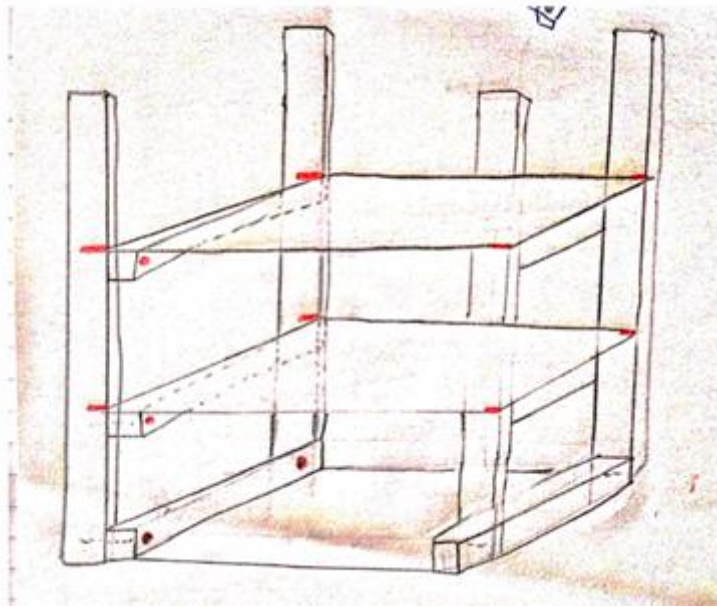


Figure 11: Attachment plane of the upper triplex on the general base

Step 3.- Preparation of containers

For the elaboration of the farm we need 3 plastic containers, where we are going to do the following:

1.- In a container with the help of a drill we are going to make holes in the bottom of the containers (*Figure 12*) and also in the lids of the containers.

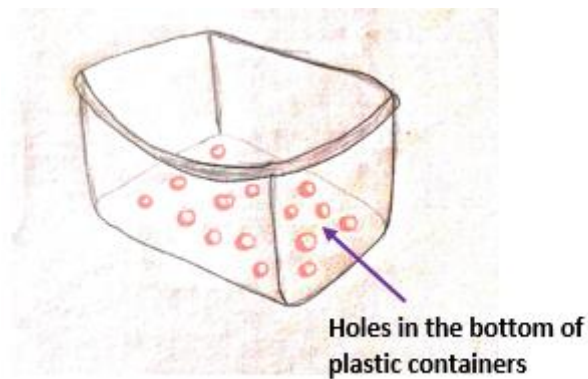


Figure 12: Plan of the holes drilled in the bottom of the plastic container

2.- Following this, with the help of a silicone we are going to glue the mesh to a height of approximately 3 cm (*Figure 13*).

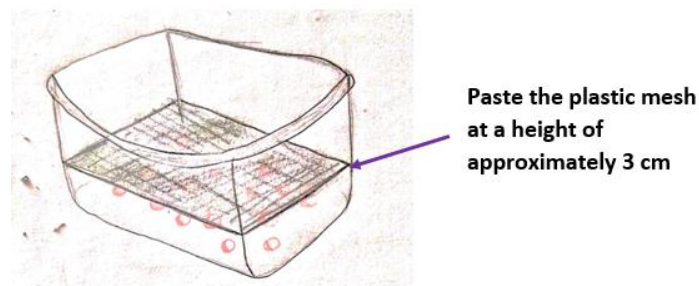


Figure 13: Drawing of plastic netting attachment to container

3.- The final result is the following (*Figure 14*)

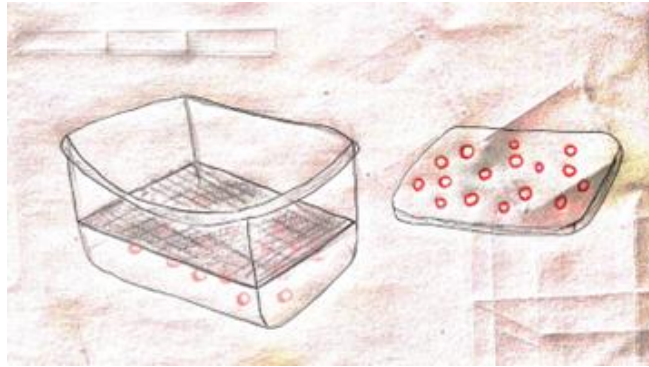


Figure 14: Drawing of the finished container with the lid with holes attached.

4.- At the end of the detailed steps we will have as a final result a home farm with inexpensive materials or materials easy to acquire at home.



Figure 15: Household farm for mealworms

WORM BREEDING

Life Cycle

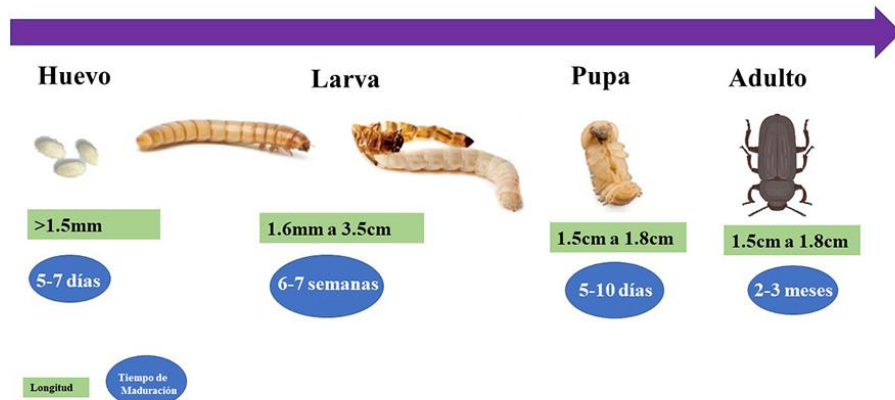


Figure 15. Life stages of *Tenebrio molitor*.

Feeding

Tenebrios feed on all types of cereals and grains and prefer those that are moist and in a state of decomposition.

The diet should be balanced to have about 20% protein on a dry basis. The supply of moist materials (fruits and vegetables) is important, as adequate moisture levels allow for better fertility performance, as well as increased productivity.

On the farm, the wet material supplied is carrots, potatoes and apples in small pieces of approximately 0.5 cm. In addition to this, oats or bran or bran and parts of the egg trays are placed so that they have a place to lay eggs.

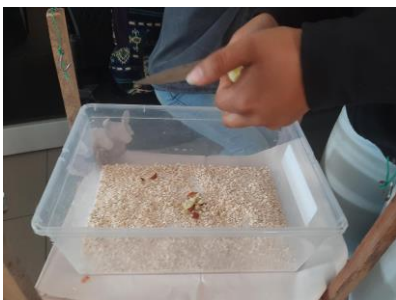


Figure 16. Placement of power supply



Figure 17. Substrate change and feeding

Temperature - humidity conditions

Mealworms develop at different temperatures, but the optimum is 30°C with

65/75% humidity, since eggs take 3 to 4 days, larvae 35 days to develop, pupae 3 to 4 days.



Figure 18. Temperature measurement



Figure 19. Temperature measurement

Farm care

The farm care is carried out in some phases such as the change of feeding and deep cleaning (based on the change of substrate and feeding).

- Phase 1: with the help of gloves, the food waste is removed in order to place new food, this is done after one day.
- Phase 2: In this phase the substrate and food is changed, for this you must remove the worms with gloves or tweezers to another tray, and discard everything accumulated in the container, then proceed to disinfect with alcohol, to put back oats or bran or also known as bran, once this is placed proceed to place pieces of apple or carrot, this cleaning is done 2 times a week.

SIGNS OF A THREAT

- Presence of flies on the farm
- Low temperature conditions