

Culturing Mealworms

Live Material Care Guide

Background

Mealworms are not worms, but are in fact the larvae of the darkling beetle, *Tenebrio molitor*. During their life cycle, these beetles undergo complete metamorphosis—egg, larva, pupa, and adult. What is normally considered a mealworm is the larval stage in the life cycle of a darkling beetle. Students will be amazed at how different the beetle looks after metamorphosis.

In the wild, the life cycle typically takes 12 months to complete, although it can vary from 4 months to 24 months depending upon the climate. Each female lays between 500 and 1,000 eggs on a viable food supply. The eggs are sticky and very small. The food supply is usually a grain, such as cornmeal, oatmeal, or bran. After about a week, the eggs will hatch, but the larvae are so small that they are hardly visible. The food source often looks like it is “moving” but larvae might not be observed. The larvae will molt several times as they grow. The mealworms will remain in larval form for a few months. Eventually, the larva develop into the pupa stage which lasts for two to three weeks. The newly emerged beetles will be soft to the touch and light in color. In several days the beetles will assume the typical black color of the adult stage, and their exoskeletons will harden after a couple of weeks.

Mealworms require minimal maintenance. They are odorless, and ideal for illustrating complete metamorphosis. A continuous culture can be used as supplementary food source for other organisms. Mealworms make excellent food for fish, birds, bats, amphibians, and reptiles.

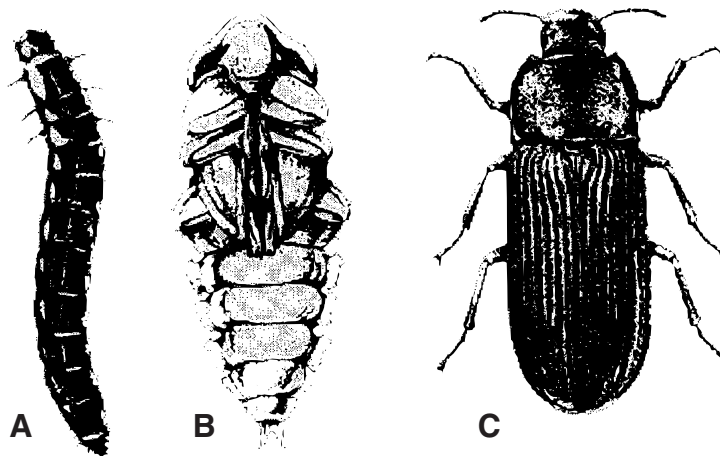


Figure 1. Mealworm Stages: A–Larva; B–Pupa; C–Darkling Beetle

Housing

Mealworms can be cultured in any clean container with a cover. A plastic storage container, baking pan, or jar with air holes in the lid works well. Place about 1" of wheat germ or oatmeal into the container. Introduce the mealworms into the culture container. Pour the entire contents of the small mealworm culture into the new larger culture container. Add all debris that has come with the supplied culture container. The debris in the bottom is likely to contain eggs and small larvae.

Keep the mealworm colony between 60–80 °F for ideal, long-term culturing. Metamorphosis will occur more rapidly between 80–90 °F. To maintain a culture in a state of dormancy, cover the container with a cloth to prevent condensation, and set it in a refrigerator or cold place at 40–50 °F. Periodically mist the culture with dechlorinated water.

Feeding

The larva will eat the slightly damp wheat germ or oatmeal. After metamorphosis, the adult beetles will also need fresh apple slices or potato.

Observe the culture periodically. When the potato or apple slice(s) dries up or becomes moldy, replace it with a fresh slice. If a new colony is subcultured, the old food may contain eggs and should be placed in a fresh culture until new larvae appear. Unless the food smells or gets moldy, leave it in the culture. Likewise, add more oatmeal or wheat germ as necessary.

Over time, a buildup of powdery residue will appear in the container. This residue, called frass, consists of mealworm waste and eggs. The frass can be sifted through a piece of window screen or a strainer. The frass can then be placed in a new culture container with a fresh media to produce a new, viable culture. Thousands of mealworms can be produced from a large culture. With care and periodic subculturing, a mealworm culture will remain viable for a very long time.

Safety Precautions

Always treat live organisms with respect and proper care. Wash hands thoroughly before leaving the lab. Follow all laboratory safety guidelines.

Problems

Never allow the food supply to get wet. When the humidity inside a closed container increases, fungi can grow and kill the worms. Temperature extremes—too hot or too cold—will also kill them.

Tips

- To observe mealworm behavior under a stereoscope, place the larva into a Petri dish. Use a spoon to scoop them up along with some of their bedding.
- After morphing into the pupa stage, the organisms will not eat again until they change into adult beetles. Adult darkling beetles feed on fruits and vegetables.

Disposal

Mealworm cultures may be disposed of according to Flinn Suggested Biological Waste Disposal Method Type IV. Never release live animals into the local ecosystem. Please consult your current *Flinn Scientific Catalog/Reference Manual* for proper disposal procedures.

Materials for *Culturing Mealworms* are available from Flinn Scientific, Inc.

Catalog No.	Description
LM1112	Mealworms, Tenebrio Larvae, 30
FB1616	Mealworm Culture Kit
FB1617	Mealworm Diet, 800 g

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.