Silkworm

A CAROLINA™ CareSheet

Immediate Care and Handling

When your silkworm eggs arrive, immediately open the shipping container and inspect your shipment. Place the eggs in a clean, sterile 9-cm petri dish and maintain them at 29° C (84° F). Hatching will begin in about 2 or 3 weeks. The eggs turn dark just before they hatch. Check the dish frequently for hatchlings. Silkworm larvae feed on mulberry leaves and will not eat any other natural food. Remove the larvae as they hatch and transfer them to mulberry leaves immediately. See the “Collecting and Preparing Mulberry Leaves” section below for details.

Collecting and Preparing Mulberry Leaves

Mulberry trees (*Morus* sp.) grow in wide areas of the US, and the young, tender leaves needed for larvae are available in early spring. Older leaves are too tough for 1st through 3rd instar larvae to eat, but 4th and 5th instars can eat them. (An **instar** is the stage between molts. Silkworms have 5 larval instars.) If you cannot provide mulberry leaves, our Silkworm Artificial Dry Diet (item #143966) is a great alternative.

After collecting a large supply of branches with young leaves, remove the leaves and soak them for 3 minutes in a disinfecting solution made by adding 3 tablespoons of laundry detergent (sodium hypochlorite) and a drop of dishwashing detergent to a gallon of water. After soaking, carefully rinse the leaves under running tap water. Remove all traces of soap from the leaves because it can kill the larvae. Shake off the excess water and refrigerate the leaves in plastic bags. If you are using Silkworm Artificial Dry Diet, follow the instructions provided with it.

Larvae Care

The optimal temperature for larvae in the first 3 instars is 29° C (84° F). Do not expose them to temperatures below 20° C (68° F). The 4th and 5th instars are more temperature tolerant and can be raised at room temperature. Check often to ensure all larvae have food and that the leaves are moist and fresh. Petri dishes (9 cm) are recommended as culture containers. Disinfect glass petri dishes with boiling water before use or use sterile, disposable petri dishes.

Note: *The following instructions assume the larvae are being fed mulberry leaves. If they are being fed Silkworm Artificial Dry Diet, refer to the instructions provided with it*. Place a piece of filter paper in the bottom of the petri dish and moisten it (use a spray mister if possible) so that it is damp but not soggy. Wrap the petiole (end of the stem) of a young, tender mulberry leaf with a piece of moist paper towel and place in the petri dish. Use a small brush to transfer the larvae onto the leaf. During the first week, remove the leaf each day and replace it with a fresh one. After the first week, add several leaves bunched together to keep up with the larvae’s expanding appetites.

The larvae undergo their first molt about 4 days after hatching. They become somewhat brighter in color and stop eating. After the larvae have molted, remove everything from the dish and disinfect it with boiling water or use a new, sterile petri dish. Place a clean, moistened filter paper on the bottom of the dish and add new leaves. Repeat for the second molt. As the larvae grow larger, they consume more food and need more room. The 3rd instar larvae should be placed into 2 petri dishes.

Maintain the 4th and 5th instar larvae at 25 to 27° C (77 to 81° F). Set up more petri dishes as needed to prevent overcrowding. Check often to ensure all larvae have food and that the leaves are moist and fresh. During days 6 to 8 of the 5th instar, the larvae shrink slightly and become somewhat transparent. This indicates they are ready to spin their cocoons.

Pupae Care

Construct cocoon nests from paper towels or newspaper—or cellophane if you want to watch cocoon formation. Roll the paper into a tube large enough to accommodate 2 larvae, twist one end, put the larvae in it, and twist the other end closed. Store the rolls in a dark room at 25° C (77° F). A mature larva needs about 3 days to spin its cocoon. Once the cocoon is completed, it takes another 2 or 3 days for the larva to pupate. When you are sure pupation is complete, you can remove some pupae from their cocoons for observation. To do this, cut open the end of the cocoon with a razor blade and gently extract the pupa. The females are larger than the males and their next-to-last abdominal segment has a ventral interruption. Return the pupae to their cocoons. If they have been carefully handled, they should emerge as adults.

Silk Collection

Note: *Silk collection kills the pupae*. The single strand of silk that makes up a silkworm's cocoon may be 300 to 900 meters long. Since the adult's emergence cuts the strand into pieces, silk is collected from intact cocoons with the pupae still inside. Boil some intact cocoons in water for 5 minutes while repeatedly turning them over with a dissecting needle or similar instrument. The cocoons will begin to loosen, and you will see some tangled strands around each. Remove the cocoons from the heat. Use the dissecting needle to pick up strands until you find a single strand of silk that pulls away easily. Tie the end of the strand to a pencil and turn the pencil to wind the silk on to it.

Adult Care

Adult moths begin emerging about 2 weeks after cocoon formation and tend to emerge in the early morning. The females are larger and less active than the males. The males flutter their wings (neither sex can fly) and crawl about in search of females. Pairs can be kept in clear plastic or glass containers where their mating behavior can be observed for several hours. The females will lay eggs on paraffin paper within 24 hours of successful mating. Adults do not feed and live only a few days. Any eggs produced will be in **diapause** (a resting stage) and will require lengthy storage for hatching.

FAQ's

I received my silkworm eggs, but I am not ready to use them. Can I refrigerate them?
Yes, you can prevent the eggs from hatching by refrigerating them at 10° C (50° F). Be careful not to expose them to temperatures lower than that or they may not hatch.

My silkworms have stopped eating. What is wrong?
They may be preparing to molt. Before molting, larvae become somewhat brighter in color and stop eating. If they are not preparing to molt and you are raising them on mulberry leaves, replace the leaves with fresh ones. If you are raising them on artificial diet, it may have become too dry. Replace it with fresh diet.

The larvae grew large, but now seem smaller. What is happening?
During days 6 to 8 of the 5th instar, the larvae shrink slightly and become somewhat transparent. This indicates they are ready to spin their cocoons. See the "Pupae Care" section for instructions on constructing cocoon nests.

My silkworm eggs have not hatched.
Allow enough time. It takes 2 to 3 weeks for the eggs to hatch. Cooler temperatures may extend that time. Mist the eggs lightly to keep them from drying. The eggs turn dark just before hatching. Check them frequently for hatchlings.

My silkworms hatched, but they do not seem to be eating.
If you are growing them on mulberry leaves, the leaves may be too old, or you may not have mulberry leaves. Make sure you are feeding them fresh, young mulberry leaves. If you are growing them on artificial diet, the diet may have become too dry. Replace it with fresh diet.

The silkworms were growing, but now they have stopped and are turning black and dying. What is wrong?
The silkworms are overcrowded. As they grow larger, they need more space, and you will need to prepare more habitats for them. See the “larvae care” section for details.

The moths have emerged, but they cannot fly. What is wrong?
Nothing. Silk growers do not want their moths flying away, so they have selected and bred moths that cannot fly.

What should I feed the moths?
Nothing. The moths do not feed. In fact, they do not have mouthparts. Their job is to reproduce.

Problems? We hope not, but if so contact us. We want you to have a good experience.
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