Silkworms (*Bombyx mori*)

Introduction

Silkworms are the larval, or caterpillar stage of the domesticated silk moth (*Bombyx mori*). A widely and economically important species in the silk production industry (known as sericulture), they also serve as important model organisms in genetic engineering and research, and many other aspects of arthropod biology. As they have since long been domesticated through selective breeding and propagation, domestic silkworms have lost their ability to fly as adult moths, and have become closely dependent on humans in their feeding, reproduction, and other aspects of husbandry, and differ substantially from wild types/species of silk moths in terms of their commercial viability of silk, as well as nutritional quality as feeders. As such, silkworms have also become an important, and nutritionally viable source of feeders for a variety of other arthropods, amphibians, reptiles, and other animals due to their lower levels of fat, and higher levels of calcium, phosphorus, and protein.

Silkworms undergo five (5) stages of growth known as instars, and can develop and grow rapidly depending on whether favorable temperatures, humidity, and other conditions are met. They begin their life cycle as eggs, followed by two larval stages, pupation, and finally, adult moths, which do not eat or drink, and have short longevity (where they serve mostly to mate and reproduce before dying).

Taxonomy:

Life: All living, physical, and animate entities
Domain: Eukaryota
Kingdom: Animalia
Phylum: Euarthropoda
Class: Insecta
Order: Lepidoptera
Family: Bombycidae
Genus: Bombyx
Species: *Bombyx mori**
**Taxonomy subject to change and revision.*

Experience Level Required

Novice/Beginner to Intermediate/Moderate.

Size

Silkworm larvae, or caterpillars typically range from 1 to 3 inches in size. When they first hatch, they are 1/8 of an inch or smaller in size.

Housing and Enclosure

Housing, or enclosures for silkworms can be relatively simple and inexpensive to purchase and maintain. Many commercially available tubs (including those made by Rubbermaid, Sterilite, and Iris), aquariums/terrariums, Kritter Keepers, or other containers of sufficient height as to prevent escape often work well. The container or enclosure should be large enough for each larvae housed within it to be accommodated and not be in constant contact with any wastes inside the container. To prevent any possible escape or them climbing the sides of the container, a layer of Vaseline, plastic boxing tape, or other slippery surface can be used around the top 2 to 3 inches to one third of the container. A tight, securely fitting lid or top with adequate ventilation and smooth sided containers can also be used as well. If using a plastic container, the lid that comes with the container can be used and modified by punching or carving out a section and covering it with a secure wire mesh. Cleaning wise, containers should be spot cleaned and cleaned regularly every 1 to 2 weeks to remove and discard any soiled food, debris, dead or decaying worms, frass (shed exoskeletons), pupae, or adult moths/insects. These larvae are can be sensitive to fumes and chemicals, and dead worms and other wastes in the container can produce toxins that can kill the living ones and create an overall fowl and unkempt environment. Silkworms do not require a substrate other than any leftover, or uneaten mulberry leaves. They may also even create a matting of silk they can rest or move upon. Do not allow excess moisture or humidity to buildup, as this causes molding and other unfavorable conditions. In addition, suitable hides, shelters, and other furnishings that can be provided can include egg crates/cartons, cork bark, rock slabs, corrugated cardboard, and other similar materials. This can help with further stages of silkworm pupation, spinning, and egg laying by adult moths. Providing adequate space, hides, and food is a must, as some species of larvae can be territorial and cannibalistic, and will kill and consume one another without adequate resources.

Temperature, Lighting, and Humidity

For temperatures, silkworms can be maintained from 78 to 88 degrees F for optimal temperatures and metabolic activity. They can be maintained at slightly lower room temperatures as well, but may become less active and develop some husbandry related issues Do not maintain larvae at temperatures substantially above or below the above range, as this will kill them as well. If additional heating is needed, a low wattage ceramic heat emitter, incandescent bulb, or a UTH (or under tank heating pad) can be used. More specific lighting, heating, and humidity product suggestions and recommendations that can best suit one's needs, as well as those of any feeder species can be given as well. If an UTH is used, create at least a ¼ of an inch gap to create adequate airflow. Also be sure to use a quality dimmer or thermostat as well. Additional lighting typically is not required for larvae. Also be sure to keep any of these feeders out of direct sunlight as well. Maintaining the correct temperatures and humidity are the most important aspects to keeping silkworms.

Feeding, Diet, and Nutrition

Silkworms are monophagous, meaning they are specialist feeders, and prefer feeding on a narrow range of foods, namely leaves of the various mulberry plants (*Morus sp*.), or white mulberry (*Morus alba*). However, as these plants are deciduous, seasonal availability may be an issue in some areas. However, some commercially available mulberry based diets for silkworms can also serve as a suitable substitute diet in such cases. Silkworms should be offered food daily, and it should be kept somewhat moist as well. Excess uneaten, dried, or soiled/fouled food should be cleaned and removed. Silkworms do not require any additional water or hydration, as they derive most, if not all of their moisture requirements from what should be quality diets consisting of 75% or more moisture. More specific dietary and supplementary product suggestions and recommendations that can best suit one's needs, as well as those of one's

animals can be given as well.

Handling

Silkworms are relatively soft bodied and delicate, and can be subject to bruising. Thus, they should be handled or moved carefully. Most feeder larvae and other feeder insects can be handled, moved, or transferred from one container or enclosure to another if needed by gently shaking or tapping the egg carton, tube, or other hide that they are on or within, or scooping them up. It is recommended that they be dusted or supplemented with calcium and other vitamins prior to feeding to other animals as well. Individuals can also be gently grasped and offered using forceps or tweezers as well.

It is possible for some people to develop allergies to feeder insects and/or their frass (droppings and waste products) as a result of too frequent of handling or constant exposure to thereof. Handling your feeder insects in a well ventilated room or other area, and using gloves are some ways to prevent any potential human health related issues. Also remember to be sure to practice basic cleanliness and hygiene associated with proper husbandry after touching or handling any animals or animal enclosures to prevent the possibility of contracting salmonellosis or any other zoonotic pathogens

Contact

Authored by Eric Roscoe. For any additional questions, comments, and/or concerns regarding this animal, group of animals, or this care sheet, please email and contact the Madison Area Herpetological Society at info@madisonherps.org

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