Culturing Painted Lady Caterpillars

Live Material Care Guide

Background

The painted lady butterfly (*Vanessa cardui*) is found throughout North America and across much of the world. With a wingspan of less than three inches, this small orange, brown, white, and black butterfly is the final stage in the maturation from caterpillar to pupa to butterfly.

Butterflies undergo complete metamorphosis, arriving as small caterpillars that progress through several instars before becoming pupae within chrysalides. This transition typically takes 2 to 3 weeks. The final instar molt happens after the caterpillar climbs to the lid of the container. The caterpillar attaches itself to the lid and moves into a "J" shape. The last molting occurs and the chrysalis forms. The pupa inside the chrysalis requires about ten days to completely change into the mature butterfly. If properly cared for, the adult butterflies may live one or more weeks in captivity and a second generation may start to grow if host plants are provided.

Caterpillar Housing and Food Requirements

The painted lady's housing and nutritional requirements change dramatically as the insects grow. They will arrive in vented containers with all the food they need to grow and pupate. Keep these cups at room temperature and out of direct sunlight to prevent overheating.

The package of five caterpillars (LM1248) arrives in a single container. The paste-like food has been pressed into the bottom and up the sides of the container. It may be necessary to remove the lid to observe the caterpillars at this stage. These small larvae will eat the food from the sides of the cup so visibility will increase as the caterpillars grow.

The package of 33 caterpillars (LM1249) arrives with all of the caterpillars in one container plus small cups with lids, a plastic spoon, and extra containers of food. Within a couple of days of receipt, the caterpillars need to be moved to the small cups. Place one teaspoon of food into each of the small cups. Use a spoon or gloved hands to push the food up along the sides of the cup. Transfer a single caterpillar to each cup and cap it so the caterpillar doesn't escape.

Keep the lid closed as much as possible and only handle the caterpillars with clean spoons or brushes. The larvae are susceptible to bacteria and dehydration. If possible, observations should be conducted while the caterpillar remains in the cup.

The caterpillars will weave thin, white threads throughout the container. In the wild they weave a silken "nest" for camouflage. Although these threads may look like mold, they are not. If possible, do not disturb the threads. The slope of the food inside the cup allows for the frass (waste) to accumulate on the bottom of the cup, out of the path of the feasting caterpillars.

The caterpillars can also be transferred into an enclosure with a few of their favorite host plants such as thistle, mallow, hollyhock, and legumes such as soybeans. The larvae will eat the leaves of the host plant as they mature. They will not eat the food paste once they have eaten a favorite variety of leaf.

After a week or two each larva will climb to the lid of its container and spin a small thread bundle. The larva attaches a small hook into the bundle and moves into a "J" shape. At this point the caterpillar transforms into a pupa within a chrysalis. Allow each chrysalis to harden a day or two before transferring it to the adult enclosure.

Butterfly Housing and Food Requirements

The chrysalides must be hung in the net enclosure that will be used to house the adult butterflies. If the pupae are not hung, they will die within their chrysalides. Place twigs inside the enclosure, carefully remove each lid, and prop the lid between the twigs. Use tape to affix the lid with the pupae attached to the top of the enclosure or gently place the small lids on a clean test tube rack with the pupa hanging through the holes in the rack. The chrysalides may move around when touched. This is a defense mechanism and they probably won't fall. If any fall, see the tip in the *Problems* section.

When the adult butterflies emerge they will need a net or screen enclosure. The newly emerged butterflies will climb away

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from their chrysalides and unfurl their wings. If the wings are unable to fully extend within the first few minutes, the butterfly will always have a damaged wing. The newly emerged adults excrete a bright red meconium that can be mistaken for blood. The meconium looks messy but removing it is not necessary. If desired, use water or a small amount of organic cleaner on a cotton swab to remove the spots.

Male painted ladies are territorial and will defend their areas by chasing off rivals. Provide a large area or several smaller enclosures for the adults. Enclosures can be purchased (Catalog No. FB2092) or built by cutting large "windows" out of the sides of a cardboard box and securing nylon window screen over the openings with tape or staples. Be sure to make a door so the adults can be fed.

The butterflies can be fed sugar water (1 tsp. sugar per cup of water), a sugary sports drink, or orange slices. If using the sugar water or sports drink, place cotton balls in the bottom of a several Petri dish bottoms and tops and then wet the cotton balls with the liquid. Do not flood the Petri dishes since the butterflies will drown. Add more sugar water as necessary. Replace the cotton balls and clean or replace the Petri dishes at least once a week. Replace the orange slices every other day.

Nectar from flowers provides nutrients that are necessary for the long-term health of the adults. Place goldenrod, thistle, aster, milkweed or cosmos that haven't been treated with pesticides in small-necked containers within the enclosure. Like all butterflies, Painted Ladies feed through a proboscis so they have evolved the ability to draw the nectar out of a specific set of plants.

Butterflies reproduce sexually and it is possible to rear another generation of butterflies. Soybean plants are a preferred host for egg laying. Simply begin growing soybean seeds when the caterpillars arrive. Each larva will need a plant so sow numerous seeds. Transfer a few of the pots of soybeans into the adult habitat and wait. After a week or two the newly hatched larva will begin to devour the leaves of the soybeans. If necessary, carefully transfer the larvae to another host plant so that each larva has enough food. The adult butterflies will need access to their food as well so don't overcrowd the enclosure. The eggs are small, green and barrel-shaped. After four days they hatch into tiny larvae. These tiny larvae are about the size of a small ant and they move quickly.

Potential Issues

Avoid touching the food with unclean hands because bacteria and fungi will grow on the paste-like food.

All stages of development must not be allowed to dry out. In particularly dry areas or classrooms, keep the caterpillar containers and the adult enclosure in a larger enclosed space into which water can be misted. A classroom greenhouse kept out of direct sunlight and with the plastic sides closed works well.

If a pupa falls off of its thread bundle, gently try to reattach it. If that fails, try to hook the chrysalis to a cotton ball or gauze then hang the cotton ball or gauze inside the enclosure. If the chrysalis isn't hanging the butterfly will not emerge.

Safety Precautions

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

Tips

- The life cycle of the butterfly can easily be documented with student-made diagrams or photographs.
- Both the caterpillar and butterfly life stages can be used in animal behavior experiments. Allow your students to test the same stimulant (light, temperature or humidity preference) for both life stages and see if there is a difference.

Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures, and review all federal, state and local regulations that may apply, before proceeding. Organisms raised in the classroom should not be released into the wild. Deceased animals may be disposed of according to Flinn suggested Biological Waste Disposal Method Type IV.

Materials for *Culturing Painted Lady Caterpillars* are available from Flinn Scientific, Inc.

Catalog No.	Description
LM1248	Painted Lady Caterpillars, pkg. of 5
LM1249	Painted Lady Caterpillars, pkg. of 33
FB2092	Butterfly Habitat

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