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Where are all the butterflies?

WINTER HABITS OF BUTTERFLIES

As cold weather approaches, butterflies are disappearing from the landscape. But where are they? Where do butterflies go in the winter? We know that some migrate in the fall, but not all species migrate. Many will go into diapause - *a state of suspended development* - during the cool months.

BUTTERFLIES THAT DIAPAUSE AS ADULTS

Monarch Butterflies diapause as adults, flying to Mexico or southern California for the winter. **Monarch Butterflies** will roost on trees in large clusters, waiting for spring before beginning the migration back north. They are the only butterfly species known to use two-way migration, similar to migrating birds.



Monarch Butterflies Roosting

Mourning Cloak Butterflies also diapause as adults, but do not migrate. They shelter in place, finding crevices in trees, under bark, or in leaf litter to wait out the cool season. **Comma, Question Mark, and Milbert's Tortoiseshell Butterflies** also diapause in their adult form.



Mourning Cloak Butterfly



Comma Butterfly



Question Mark Butterfly



Milbert's Tortoiseshell Butterfly

BUTTERFLIES THAT DIAPAUSE AS EGGS

Some butterfly species overwinter as eggs. The **Striped Hairstreak Butterfly** has only one generation per year. Once the adult butterflies emerge from their chrysalises and pair, the female lays eggs that are in diapause and will not hatch until the following spring.



Striped Hairstreak Butterfly

BUTTERFLIES THAT DIAPAUSE AS LARVAE

As days get shorter in the fall, **Viceroy** and **Red-Spotted Purple Butterfly** caterpillars create a small hibernaculum in which they pass the cool months safely. The caterpillars crawl out in the spring once days lengthen and there is fresh growth on their host plant.



Red-Spotted Purple Butterfly with Hibernacula

Tawny Emperor and **Hackberry Emperor Butterflies** also diapause in hibernaculum. They cluster in groups inside a folded leaf. These leaves will not drop to the forest floor in the fall, they are affixed to the host plant stem by caterpillar silk.



Tawny Emperor Butterfly Caterpillars in Hibernacula

In the fall, **Great Spangled Fritillary Butterfly** caterpillars hatch out of eggs, eat their eggshell, and drop off their host plant into the leaf litter to diapause as tiny hatchlings. Once the host plants, violets, sprout new leaves in the spring, caterpillars will start eating and resume their growth.



Great Spangled Fritillary Butterfly

BUTTERFLIES THAT DIAPAUSE AS PUPAE

Many swallowtail butterfly species will diapause in the pupal stage. As a final (fifth) instar caterpillar senses shorter day lengths and longer, cooler nights, diapause is triggered. They pupate and form chrysalises, staying in diapause until the following spring.



Giant Swallowtail Butterfly Chrysalis

Many moths also diapause in the pupal stage, not emerging as adult moths until spring. Large fifth instar **Polyphemus**, **Cecropia**, and **Luna Moth** caterpillars form a protective silk cocoon around themselves before pupating safely inside. Once their host tree loses leaves for the winter, you may see cocoons affixed to branches high in the tree.



Polyphemus Moth Cocoon

DO ALL BUTTERFLIES DIAPAUSE?

Although many butterflies do diapause in various stages during the cool months, some do not. **Cloudless Sulphur**, **Common Buckeye**, and **Gulf Fritillary Butterflies** all migrate south in the fall, but they do not go into a state of suspended development. When these butterfly adults fly south, they mate, lay eggs, and die at the same rate as during the summer months. In contrast, the same **Monarch Butterfly** adult that flies south in the fall will fly north in the spring, living six months or longer during winter diapause. **Monarch Butterflies** not in diapause will only live 2-3 weeks as adult butterflies.



Cloudless Sulphur Butterfly



Common Buckeye Butterfly



Gulf Fritillary Butterfly

DO BUTTERFLIES DIAPAUSE IN LOCATIONS WITHOUT FREEZING TEMPERATURES?

Butterflies below the freeze line may still go into diapause due to host plant availability. Many butterflies and moths host on deciduous plants. Shortening day lengths in the fall trigger these deciduous shrubs and trees to drop leaves even if temperatures do not fall below freezing. The **Zebra Swallowtail Butterfly** eats Pawpaw, which loses leaves in the fall. **Zebra Swallowtail Butterfly** caterpillars go into diapause when they detect days shortening and soon afterward leaves start to fall off Pawpaw plants. Once days lengthen again in the spring, adult butterflies emerge from chrysalises, pair, and lay eggs on the new fresh growth found on Pawpaw plants.



Zebra Swallowtail Butterfly Chrysalises at Shady Oak Butterfly Farm



Spring Growth on Pawpaw

WHAT CAN WE DO TO HELP PROTECT BUTTERFLIES IN DIAPAUSE?

There are steps we can take to protect butterflies while in the vulnerable state of diapause. When possible, refrain from trimming back old growth in gardens during the fall and winter. If you do need to cut back dead/dormant branches, check them carefully for any signs of overwintering chrysalises. After raking up fallen leaves, do not bag them up and discard them in the trash. Instead, choose a location out of the way that the branches, leaves, and other items can be relocated to and left alone during the cool months. This will allow many butterflies in diapause to still emerge and continue their life cycle in the spring. Towards the end of spring you can then dispose of the discarded plant material as normal.

WANT TO LEARN MORE?

Check out these great resources to learn more about butterflies, their host plants, and how to find them in the wild.

[Butterfly Books and Field Guides](#)

