

Butterflies may well be the best loved of all insects. For millennia, these large and showy insects have attracted the attention and admiration of people around the world. In addition to their beauty and grace, butterflies and their close relatives, moths, play important ecological roles. For example, many birds are reliant on butterfly and moth caterpillars as a food source for their young, and as fuel to maintain the high energy levels required for migration. Small mammals, reptiles, and a number of invertebrates also dine on caterpillars. Butterflies and moths are also pollinators of a number of plants, including prairie phlox (*Phlox pilosa*), a plant that relies on butterflies for pollination, and the western prairie fringed orchid (*Platanthera praeclarus*), which is pollinated by hawk moths.

Several species of blues and hairstreaks have evolved a relationship with ants; the caterpillars exude honeydew that the ants consume and in exchange protect the ants from other predators.

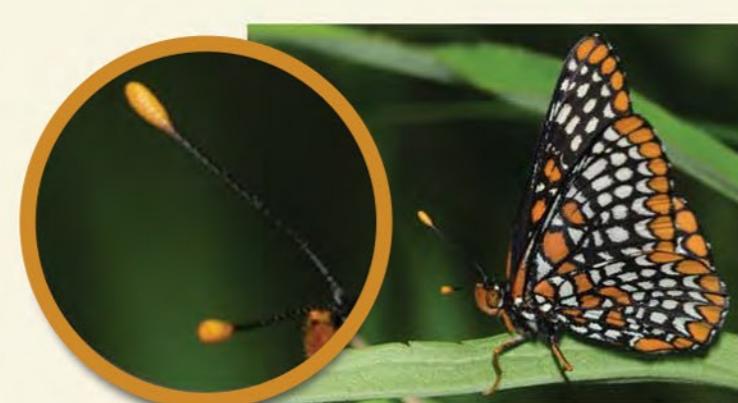


Butterfly-pollinated plants often bloom during the day and provide nectar at the bottom of a long narrow tube or spur. The flowers butterflies prefer often have a sweet odor, typically provide a large enough surface for a butterfly to land on, and have blooms in colors that butterflies can see, usually red through violet on the color spectrum and often in ultraviolet.

(Photo by Joshua Mayer, Flickr; CC BY-SA 2.0)

Butterfly or moth?

Butterflies and moths can be difficult to tell apart. It is easiest to distinguish between them when they are at rest, as illustrated by these photos.



Butterfly antennae have a clubbed bulb-like tip.

Butterflies tend to hold their wings either partially open in a V-shape or pressed together.



Male moths have feathery antennae which help them detect female sex pheromones.



Female moths have antennae that are a single filament that tapers to a point.

(Photograph by Xerces Society/Matthew Shepherd)



Orange Sulphur

Growing up in four stages

Over the course of their life cycles, butterflies and moths go through a remarkable transformation: grub-like, leaf-chewing caterpillars become winged, nectar-drinking adults. There are four distinct stages to this transformation: egg, caterpillar, chrysalis (or cocoon for moths), and adult. Butterfly or moth eggs are laid on particular plants, called host plants, which are carefully selected by the female. Caterpillars eat and eat and eat, consuming a tremendous amount of plant mass and ultimately growing to hundreds of times their original size. Along the way they shed and regrow their exoskeleton, the hard outer shell that provides body structure. The fully grown caterpillar becomes a chrysalis, a period during which it undergoes drastic changes as its body restructures itself to eventually emerge as a winged adult. Once free of the chrysalis, freshly emerged butterflies take flight in search of food and a mate.



(Life cycle photographs by Penny Stowe)



Importance of a good diet

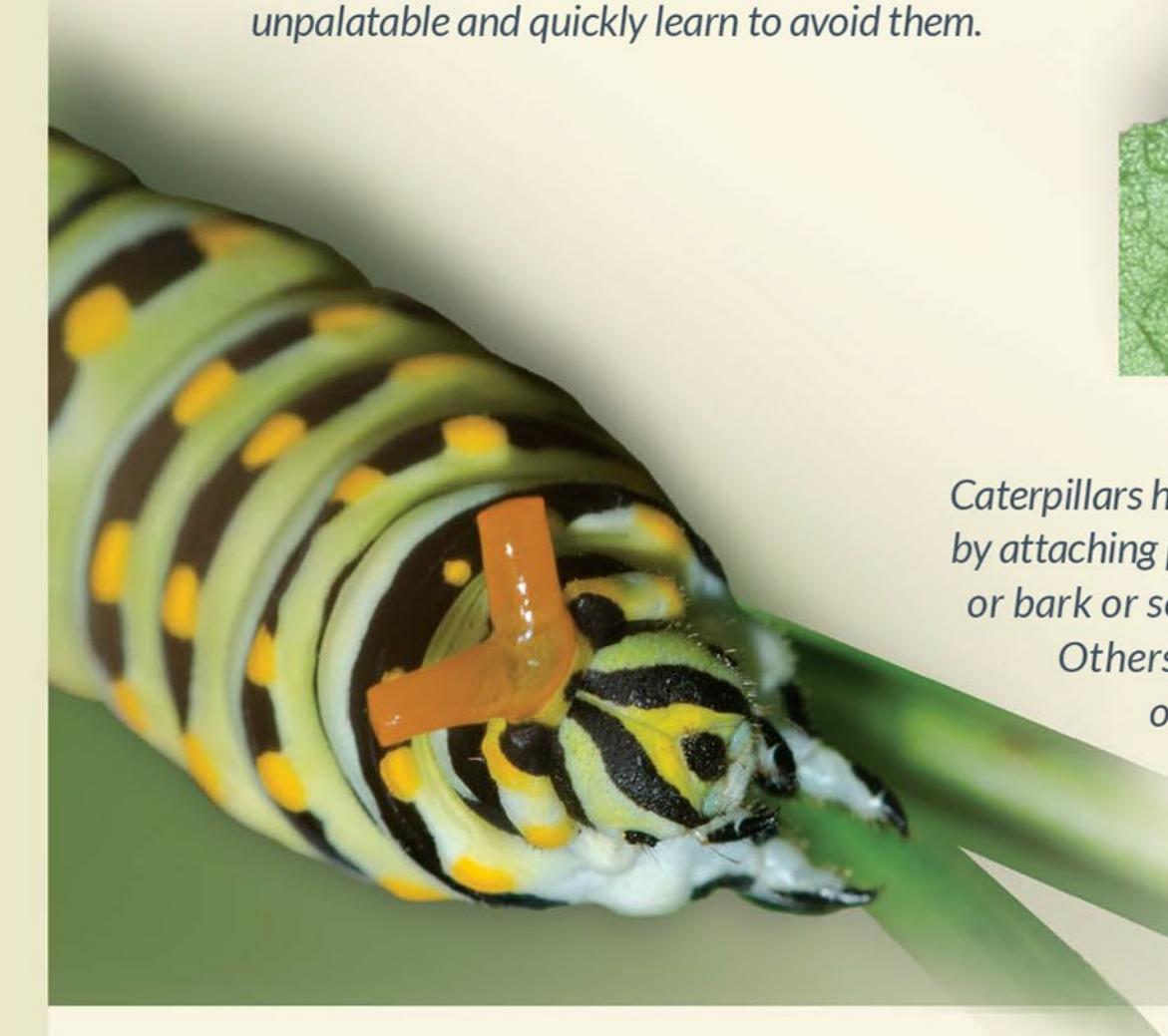
Many species of grasses, wildflowers, shrubs, and trees are host plants critical for a butterfly (or moth) to complete its life cycle. Caterpillars of some species will eat only a single species of plant or several very closely related plants, while other species will eat a wide range of plants from multiple families. For example, caterpillars of the regal fritillary (*Speyeria idalia*) feed exclusively on violets, particularly prairie violets (*Viola pedatifida*), and will not survive without their host plant. At the opposite end of the spectrum is the gray hairstreak (*Strymon melinus*), a butterfly whose caterpillars will munch on over 80 different plant species.

Butterflies often depend on toxic compounds and other protective tactics to avoid being eaten. Monarchs (*Danaus plexippus*) and pipevine swallowtails (*Battus philenor*), pictured here, concentrate poisons from their host plants within their own bodies, making them distasteful to other animals. Birds and other predators that attempt to eat them find them unpalatable and quickly learn to avoid them.

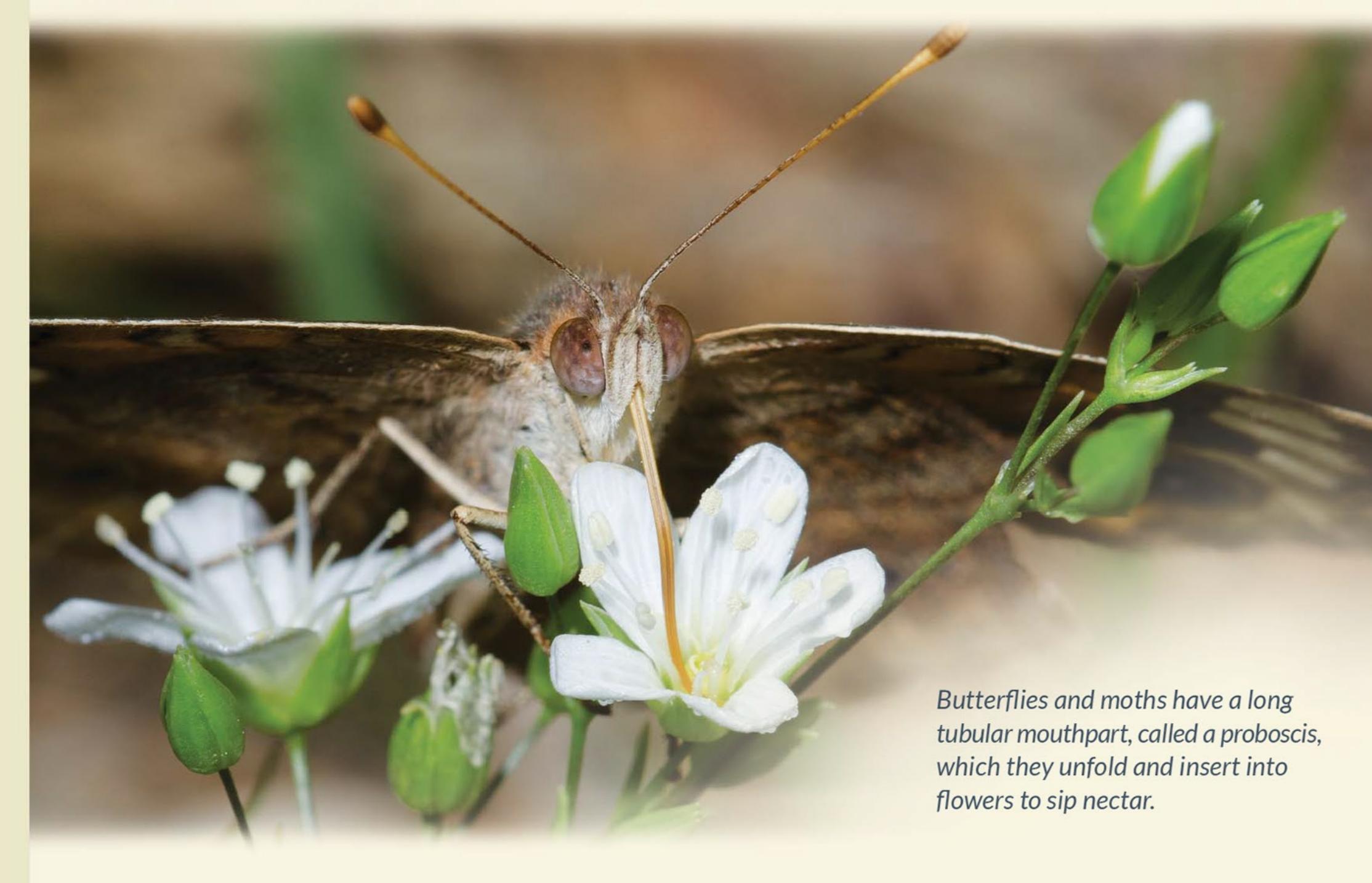


Caterpillars have many ways to protect themselves. Some caterpillars hide by attaching plant debris to themselves, while others resemble a dead leaf or bark or some other part of a tree or plant, even a bird dropping.

Others are covered in irritating hairs, employing the element of surprise to ward off harm. This black swallowtail (*Papilio polyxenes*) caterpillar inflates orange "horns," called osmeterium, to startle predators.

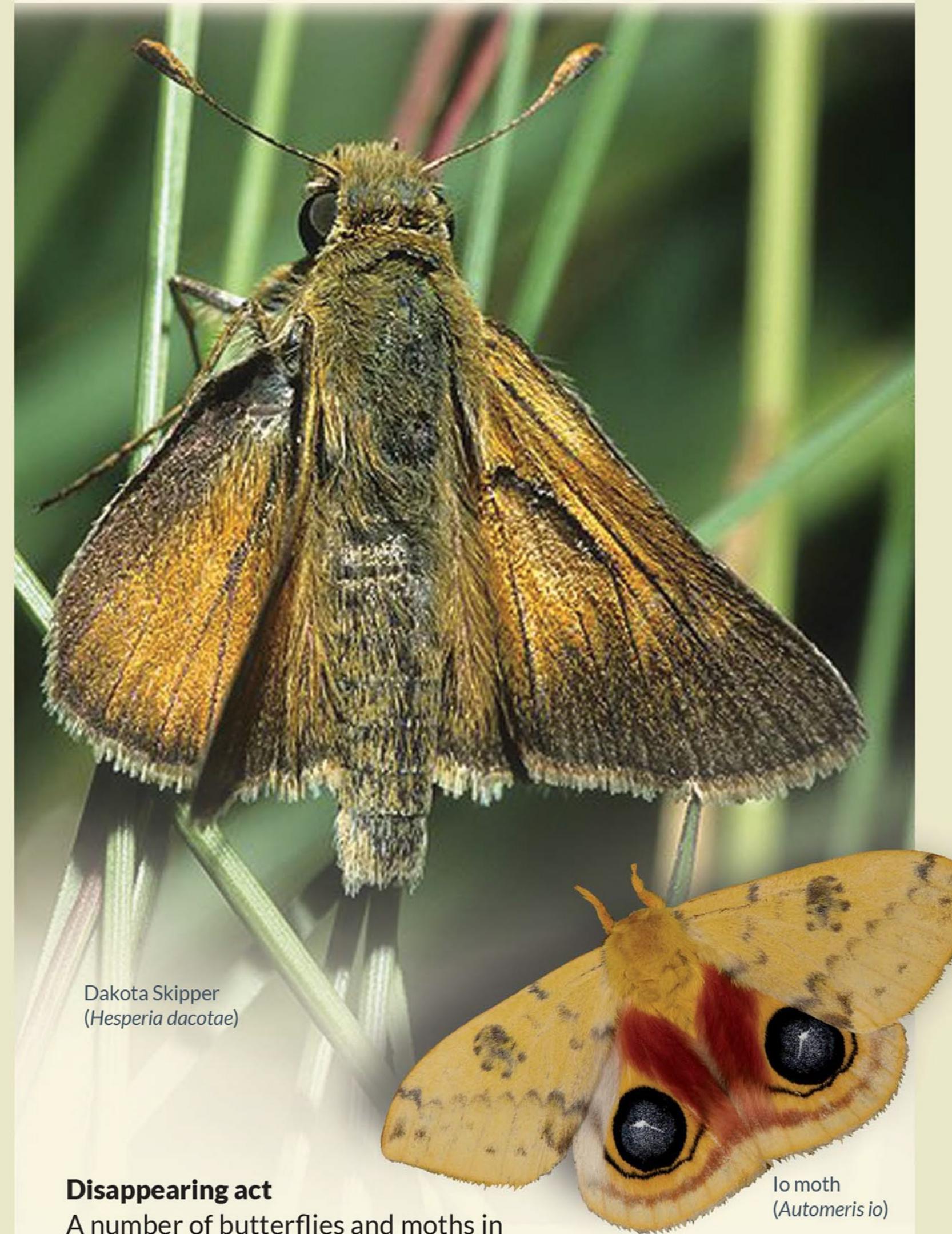


Energy-rich nectar is the primary food source for most adult butterflies. They have long, tubular mouthparts that they unfurl and insert into flowers to sip nectar. Some butterflies obtain sugar from tree sap, rotting fruit, or aphid honeydew. To acquire additional nutrients, minerals, and salts, butterflies, males in particular, sometimes seek liquid from carcasses, animal waste, puddles, and moist soil. Some adult moths also sip nectar, but there are many moths that do not consume anything as adults, living just long enough to mate and deposit their eggs.



Butterflies and moths have a long tubular mouthpart, called a proboscis, which they unfold and insert into flowers to sip nectar.

BUTTERFLIES & MOTHS IN PERIL



Dakota Skipper
(*Hesperia dacotae*)



Io moth
(*Automeris io*)

Disappearing act
A number of butterflies and moths in Iowa are in decline, with some on the verge of extinction. Many of these species are habitat specialists. For example, several butterflies that depend on prairie habitat have disappeared from Iowa in recent years, including the Poweshiek skipperling (*Oarisma poweshiek*) and the Dakota skipper (*Hesperia dacotae*). But butterflies and moths that were once broadly distributed are also struggling, including giant silkmoth moths (family Saturniidae) and the monarch butterfly (*Danaus plexippus*). Butterflies and moths face a wide range of threats, including habitat loss and fragmentation, climate change, pesticides, invasive plants, introduced predators and parasites, and diseases. Loss of both host plants for caterpillars and places with nectar-producing flowers can have a profound impact on butterfly populations and are the leading causes of decline.



While it's unlikely that Iowa's most imperiled butterflies will appear in your garden alongside common buckeyes, it's important to realize how actions at both local and regional levels can contribute to the conservation or decline of these species. Every patch of habitat makes the landscape better for butterflies, reducing the pressure on declining species.

The Value of Roadsides

Flowering plants along roadsides are important sources of nectar and host plants for butterflies, both those that spend their entire lives within the roadside and those that reproduce or overwinter elsewhere. The best roadsides for butterflies include a diversity of native plants with a succession of blooming flowers throughout the growing season.

Practices such as **Integrated Roadside Vegetation Management (IRVM)** can benefit pollinators and their habitat while meeting the functional requirements of roadside vegetation. IRVM is a management system that promotes the use of hardy and adapted native grasses and wildflowers in combination with practices such as mowing, burning, and the targeted use of herbicides to control weeds. Due to their extensive root systems, native plants help improve soil quality and water quality and provide excellent erosion control benefits.

Monarchs gather on Meadow Blazing Star (*Liatris ligulistylis*) in a roadside planting along Highway 14 north of Marshalltown, Iowa.

(Photograph by Meredith Borchardt/Trees Forever)



The Iowa Living Roadway Trust Fund (LRTF) was established by the Iowa General Assembly in 1989 and is administered by the Iowa Department of Transportation. Through grants to county, city, and state agencies, the LRTF's mission is to provide assistance to implement IRVM. The Iowa Department of Transportation, with support from the Living Roadway Trust Fund, has planted more than 100,000 acres of state and county road rights-of-way with native plants.



There are approximately 118 species of butterflies and over 2,500 species of moths found in Iowa. Regal fritillary butterflies (*Speyeria idalia*) are one of several species of conservation concern. Found only in remnant tallgrass prairie, regal fritillaries have declined as their habitat has disappeared.



A special thank you to Bryan E. Reynolds for his generous contribution of photography. All photos on this poster are attributed to Bryan unless otherwise noted.