

{CONSERVATION CAROUSEL}

SPEAKING OF BUGS!

{BY CALE NORDMEYER, BUTTERFLY CONSERVATION SPECIALIST}



Giant insects have invaded the Zoo and the new Conservation Carousel is also in on the action. Insects representing biological hotspots adorn its exterior: Central America's bright green malachite butterfly (*Siproeta stelenes*) and southeast Africa's gold-banded forester butterfly (*Euphaedra neophron*) to name just a few.

One of the Conservation Carousel's chariots depicts the world's largest butterfly: the Queen Alexandra's birdwing, *Ornithoptera alexandrae*. Not only are they impressive in size (females have a foot-long wingspan!) they are also one of the most endangered species of butterfly. Queen Alexandra's birdwings are restricted to one small forested area on the island of New Guinea, an area threatened by habitat loss to unsustainable palm oil plantations. Though international trade of this species is illegal, another threat to these butterflies is poaching for personal collections.

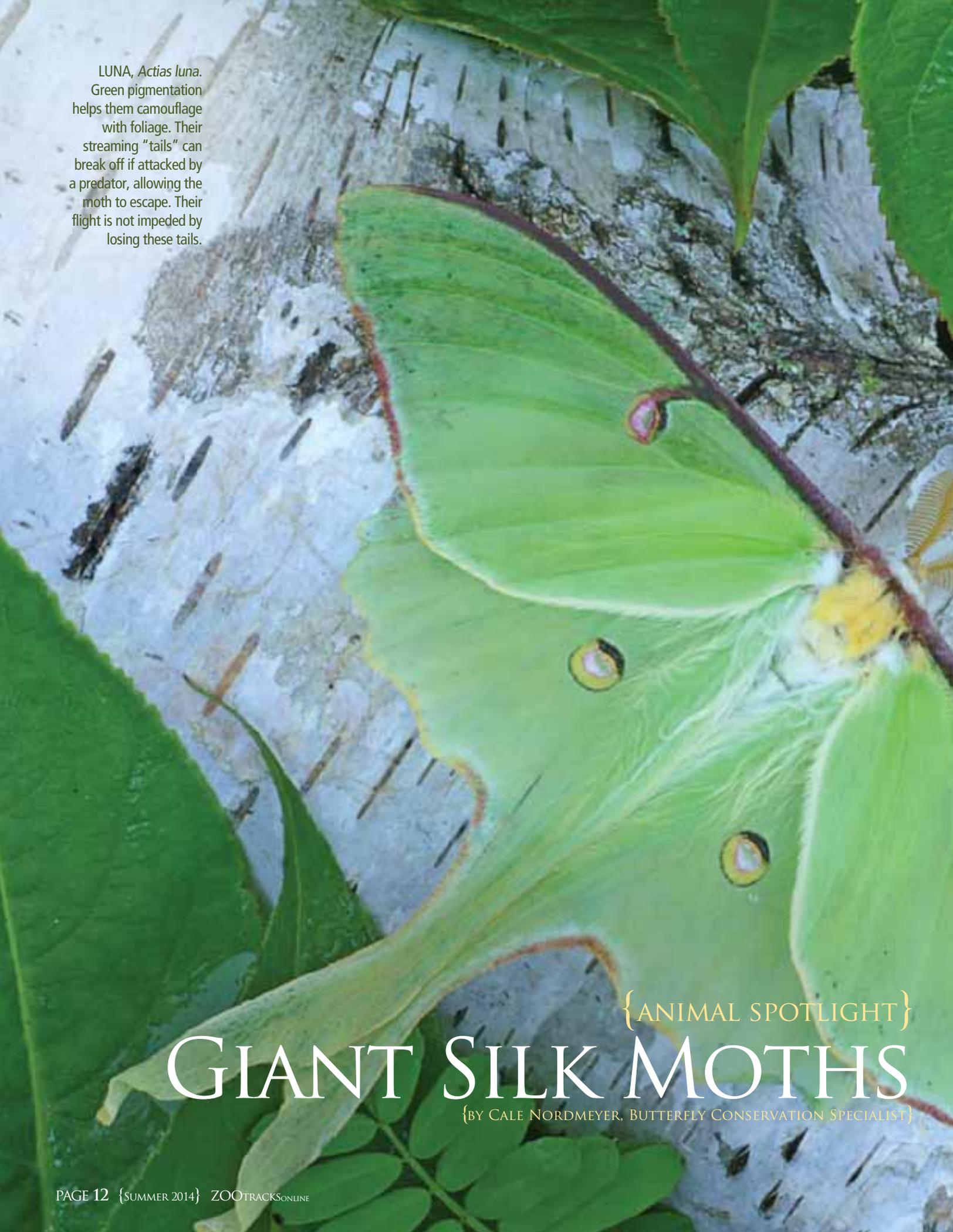
You can help Queen Alexandra's birdwing, and other endangered species, by ensuring that the household products you purchase do not contain unsustainably-harvested palm oil. Learn more about which companies and products are committed to using sustainable palm oil by visiting the Zoo's Do One Thing webpage.

Come take a ride on the new Conservation Carousel (separate fee) opening June 14th!



Queen Alexandra's birdwing

LUNA, *Actias luna*.
Green pigmentation
helps them camouflage
with foliage. Their
streaming "tails" can
break off if attacked by
a predator, allowing the
moth to escape. Their
flight is not impeded by
losing these tails.



{ANIMAL SPOTLIGHT}
GIANT SILK MOTHS
{BY CALE NORDMEYER, BUTTERFLY CONSERVATION SPECIALIST}



As you stroll through the Aveda Butterfly Garden on sunny days this summer, you will be immersed in the amazing aerial displays of dozens of different North American native butterflies. But the Aveda Butterfly Garden is home to nocturnal residents as well. Giant silk moths sleep throughout the garden while excited guests watch the goings-on.

Giant silk moths are named for their great size and silk cocoons they spin. Moths in this family comprise some of the largest insects in the world and include North America's largest moth: the cecropia, with a six to eight inch wingspan. Most silk moths spin a cocoon before pupating. Cocoons are made from silk produced from glands in the caterpillar's mouth. Their cocoons are formed from a single, long strand of silk. The cocoon of a cecropia moth may only be three inches long, but the stand of silk comprising its cocoon may be over 2.5 miles long.

The Aveda Butterfly Garden, opening June 14, is home to four species of giant silk moths. All of these impressive species are found in Minnesota and have similar life histories. They typically have a single generation here in the North. Caterpillars feed on trees such as birch and wild cherry and take most of the summer to grow. Rather than migrating like monarch butterflies, these hardy Minnesotans hunker down for the long winter in their pupa stage. They won't emerge from their protective cocoon until late spring. Every day, new moths will be emerging from their cocoons in the Aveda Butterfly Garden making each visit a unique experience.

Sporting dramatic eye spots, bold patterns and adorably fuzzy bodies, giant silk moths are creatures to behold. But, like a firework, this radiance does not last long. Their primary duties are to mate, lay eggs and start the cycle anew. Moths of this family have reduced mouth parts and cannot eat as adults. Adults only live about one week.

Considering their short adult lifespan, giant silk moths have adapted some great hardware to find each other quickly. Most insects use their antennae for chemoreception (smell) but giant silk moth olfaction verges on the supernatural. Their antennae are large and feathery with as many as 60,000 hair-like smell detectors. This increased surface area helps males locate females from miles away. Males, whose antennae are larger than females, may be able to detect a single scent molecule per cubic yard. When there are many females at one time in the Aveda Butterfly Garden, wild male moths from miles away will congregate outside the mesh hoping to find the females within.

None of Minnesota's giant silk moth species are listed as threatened or endangered. However, they are subject to habitat loss, the effects of light pollution and are susceptible to pesticide use.

{THE SILK IN SILK MOTHS}

The silk that most species of giant silk moths spin is coarse, scratchy and of little commercial use. Nearly all silk produced for textiles and clothing around the world comes from the cocoons of their domesticated relative: the mulberry silk moth, *Bombyx mori*. Our relationship with *B. mori* began as far back as 5,000 years ago in what would later become China. The silk of this species' cocoon is prized for its softness and shimmering optical quality. Selective breeding of this species for its silk over thousands of generations has fine-tuned the traits of the silk we use today. Having been captive-reared for so long, this species can no longer survive in the wild on its own. It is considered the only truly domesticated insect. Feeding, waste removal and even mating must be facilitated by humans.



{ GREEN INITIATIVES }

NEONICOTINOIDS

{ BY KIM THOMAS, HORTICULTURE SUPERVISOR }

As the Zoo focuses on this summer's Big Bugs! exhibit and the important role of pollinators, it is hard to avoid the topic of "neonicotinoids" and their use in the garden industry.

Neonicotinoids (aka "neonics") were developed over the last 30 years to replace older, more toxic insecticides. Worldwide, they have been used on many economically-important crops until recent evidence has pointed to their contribution to the decline in bee populations and their effect on many insect pollinators.

Minnesota Zoo members and guests will be glad to hear that the Zoo has never used neonics in our landscapes and has only practiced insect control in the Tropics Building with beneficial insects. We would rather remove or replace a plant than risk the safety of our guests or our animal collection. By planting locally-grown material and as many native species as possible, and by questioning all vendors who supply our plants, we hope to continue to be a 'pollinator friendly' landscape.

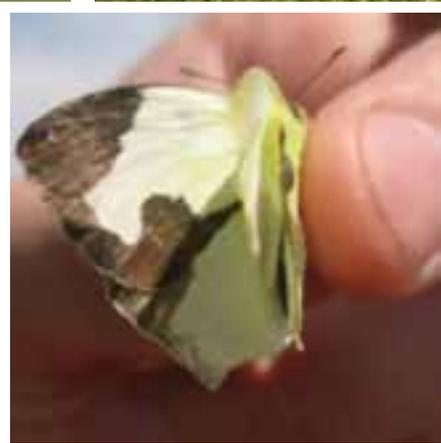


{FIELDNOTES}

TRACKING MINNESOTA'S RAREST BUTTERFLIES

{BY DR. ERIK RUNQUIST, CONSERVATION BIOLOGIST}

It was one of those May days where you could almost hear the grass growing. A warm breeze was waking Minnesota's prairie from winter, and dozens of monarchs, red admirals, and painted lady butterflies rode the wind north over my head. Atop the highest ridge in Glacial Lakes State Park, I was searching for one of the most endangered butterflies on Earth, the Poweshiek skipperling, as part of the Minnesota Zoo's Prairie Butterfly Conservation Program.



During lunch, a creamy yellow butterfly caught my eye. I knew that it was not a Poweshiek skipperling, but I also knew that it was out of place. I grabbed my butterfly net and stumbled down the hill after it. It was a Mexican yellow—a sulphur butterfly rarely found north of Texas. I photographed him to document the record, and then released him back into the wind to continue his unlikely journey through central Minnesota.

He was only the 26th Mexican yellow ever found in Minnesota and the first since 1988. I was thrilled by this very rare find, but what is Minnesota's rarest butterfly? This is a hard question, and one I've had a lot of time to think about searching for Minnesota's rare and endangered prairie butterflies.

About 157 butterfly species are known from Minnesota. Seven of these, including the Mexican yellow, are only rare strays. They do not breed here and are not part of our regular butterfly fauna. Several others, like the monarch (our State Insect), may do most of their breeding

in Minnesota, but they are snowbirds and flee our winters. Monarch populations fell to record lows in 2013 due to the loss of milkweed in the Upper Midwest, forest clearing around their Mexican overwintering grounds, diseases, and bad weather luck. The quick decline of icons like monarchs certainly grabs attention, but they do not (yet) count as the rarest Minnesota butterfly.

Minnesota's rarest butterflies must be the Poweshiek skipperling and others that spend their entire lives in Minnesota but that have now largely vanished. Eight butterflies are listed in Minnesota as Endangered but only two of them, the Dakota and Ottoe skippers, have been confirmed in a few places recently. The Poweshiek skipperling may be completely gone from Minnesota even though it was locally common just 20 years ago. Like a common crow, it was so expected that its presence was often not written down during some butterfly surveys. Sadly, Poweshiek skipperling

disappeared from at least 90 percent of its remaining range in the early 2000s, and it has not been confirmed in Minnesota since 2007. Only one percent of its original prairie habitat remains, and fewer than 500 Poweshiek may now survive in the world. Six more of our resident butterflies may have gone extinct in Minnesota in recent decades, including the vibrant Karner blue pictured in the Maritz Family Lodge at the head of the *Medtronic Minnesota Trail*. Scientists still look for them because there may be isolated populations somewhere in Minnesota needing protection.

Field surveys across the state by Minnesota Zoo staff, the Minnesota Department of Natural Resources and others provide data on the status of rare species. Our work also provides valuable data on other common species that may be following a troubling downward spiral like Poweshiek skipperlings.



The Minnesota Zoo works to save prairie butterflies like the Poweshiek skipperling and Dakota skipper from extinction through conservation breeding and research. Due to their apparent absence in Minnesota, I had to go a few miles north of the border into southern Manitoba to see my first (and only) wild Poweshiek skipperlings in 2012. Their bouncing flight from one black-eyed susan flower to the next was thrilling. Unfortunately, it was also fleeting, and it took a full day for us to spot just a dozen. Luckily, Minnesota's rarest butterflies do still exist just beyond our borders. The Poweshiek skipperling and other rarities can return with help from conservationists and concerned Minnesotans.

You can help our butterflies and other pollinators in your backyard by planting native wildflowers and avoiding pesticides. Learn more on our website. You can also help by donating to the Prairie Butterfly Conservation Program this summer at Zoo admissions.



Take a cue from the Zoo and start making a list of the animals that make their homes near yours! Maybe start with the butterflies that fly through your yard, or the birds that visit the birdfeeder outside your apartment. We're positive you'll be surprised at what you find! You can even help scientists monitor our wildlife by submitting your notes to a citizen science project!

{CONSERVATION CORNER}
**WHAT'S
IN YOUR
BACK
YARD?**

{BY KATIE TALBOTT, BIODISCOVERY PROJECT COORDINATOR}



RED FOX
(*Vulpes vulpes*)

Enjoying nature doesn't have to mean a long ride in the car—there's plenty of wildlife living right in your neighborhood! The Zoo has a pretty fantastic 'back yard'; over half of our 485-acre property is undeveloped, which leaves plenty of room for some wonderful wildlife. This natural area is mainly covered in woodlands, wetlands, and some shrublands. To find out what animals are making their homes at the Zoo—off exhibit!—the BioDiscovery Project started surveying this natural area in June of 2013. We focused on looking for mammals, birds, amphibians, reptiles, dragonflies, and butterflies. So far, we've recorded over 150 species, including the photogenic creatures featured in our slideshow!