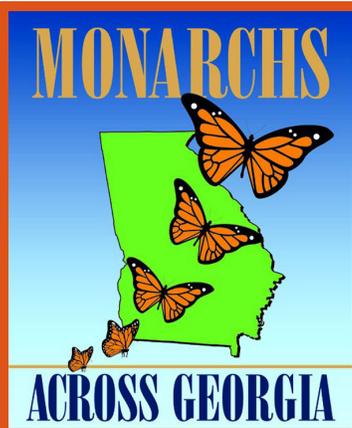


The Chrysalis



Emerging News from Monarchs Across Georgia

A Committee of the Environmental Education Alliance of Georgia



Upcoming Events

Grow Your Garden Beautifully - With Native Plants

April 10 • 9:00am - 3:00pm
Kistner Center, Snellville, GA
www.gplt.org

Cobb County Master Gardeners Plant Sale

May 15
10:00am - 5:00pm
675 Holt Road, Marietta, GA

Monarchs Across Georgia Educator Workshop

June 15 & 16
9:00 a.m. - 2:30 p.m.
Trinity School, Atlanta, GA

National Pollinator Week 2010

June 21-27
www.pollinator.org

Monarchs Across Georgia Educator Workshop

August 27, 5:00-8:00 p.m. &
August 28, 9:00 a.m.- 4:00 p.m.
Watson-Brown Foundation,
Thompson, GA

Autumn Tagging Event in St. Marks, Florida

Watch for more details
in the fall newsletter!

For more information about these
events or to register, please visit
www.monarchsacrossga.org

Milkweed for Monarchs: Keeping Things Native in Georgia Gardens

by Sonia Altizer, Odum School of Ecology, University of Georgia

Planting non-native tropical milkweed can lead to problems for monarchs by interfering with their natural migration cycle and increasing infections by OE parasites.

Monarch lovers know that planting milkweed in their gardens is a sure way to attract these familiar black and orange butterflies to their yards. Female monarchs are amazingly skilled at finding milkweed plants, and if monarchs are in the area, their black and yellow caterpillars will soon adorn a tasty milkweed plant. Growing interest in butterfly gardening has prompted increased planting of host plants and nectar plants to provide food for larval and adult butterflies of many species, including monarchs. But not all milkweeds are created equal, and the wrong plants in the wrong places might lead to problems for these insects in the long run.

One milkweed species that has some scientists concerned is the tropical milkweed (*Asclepias curassavica*). Monarch larvae feed exclusively on host plants in the milkweed family, Asclepiadaceae. Over 100 species of *Asclepias* are native to North America. Yet the species that has become the most popular among gardeners and nurseries is *A. curassavica*, also known as blood flower, Mexican milkweed, or tropical milkweed. These plants produce attractive red and orange flowers, and smooth leaves that are rich in cardenolides, the toxins that monarchs sequester from milkweed to make them distasteful to predators.

The problem with tropical milkweed is that this species is not native to the U.S., but instead historically occurs throughout the New World tropics, including much of Central America. In northern parts of the US, tropical milkweeds can survive well during the summer, but behave as annual plants, dying back during cold winters. In areas where temperatures remain mild, such as parts of California, Texas and Florida, the plants can persist year-round. Thus, unlike native milkweed species in the eastern US that naturally die back each fall and winter, the tropical milkweeds can continue to flower and produce new leaves until they are killed by a heavy frost.



A monarch caterpillar feeds on *A. curassavica*

Continued on page 4



Butterflies Use Antennae GPS to Guide Migration

by Hadley Leggett

Scientists have finally located the 24-hour clock that guides the migration of monarch butterflies. Instead of being in the brain where most people expected, it turns out the circadian clock is located in the butterflies' antennae.

Every fall, monarchs make an impressive 2,000-mile trek south, using the sun to guide them to the exact same wintering spot in central Mexico. But because the sun is a moving target, changing position throughout the day, biologists have long speculated that in addition to having a "sun compass" in their brains, butterflies must use some kind of 24-hour clock to guide their migration. Now, researchers have located this special GPS system, but it's not what everyone expected.

"The assumption was that we knew where in the brain the molecular clock for this process was," said biologist Steven Reppert of the University of Massachusetts, who co-authored the paper published Thursday in *Science*. "Almost everyone you would ask prior to this work would say, 'Well, of course the clock has to be in the brain. Where else would it be?'"

Reppert and his team had been studying the ability of butterfly antenna to sense odors when they uncovered something surprising: When they clipped off the insects' antennae and tethered them in a flight simulator, the butterflies no longer flew in a uniform direction.

"It was remarkable, the difference," Reppert said. "The

ones without antennae still flew straight, but as a population they were flying in all different directions, compared to the population of migrants with intact antennae that was all going in a southwesterly direction." Without their feelers, the butterflies lost the ability to navigate using the sun, as if they could no longer adjust their direction based on the time of day.

But when the researchers looked for molecular changes in the brains of the antennae-less butterflies, they found that circadian rhythms in the brain were unaffected by clipping the antennae. "This raised the heretical prospect that the timing mechanism may actually be in the antennae," Reppert said.

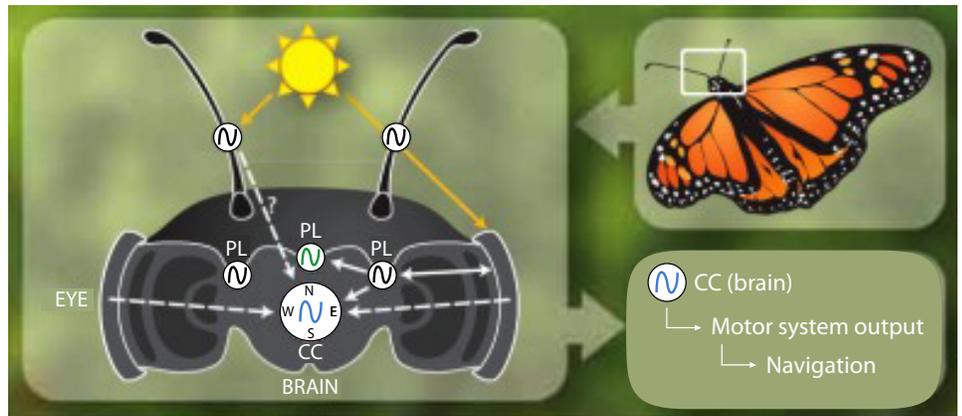
The researchers tested their hypothesis by painting the antennae of half their butterflies with black enamel, which blocked all input from the sun, and the other half with clear paint that allowed the sun's rays through. While the monarchs covered with clear paint kept flying south, the butterflies with blacked-out antennae started to drift consistently north, suggesting that their molecular clock was running about an hour off schedule.

The antennal clock is therefore rather like a standalone global positioning system that one might use while driving, which now eclipses the paper map (brain clock)," biologist Charalambos Kyriacou of the University of Leicester wrote in a commentary about the research, also published Thursday in *Science*. "This result is surprising, given that several studies have set the stage for a brain clock to mediate navigation."

Reppert says the new finding not only changes how scientists think about butterfly antennae, but may also suggest a similar role for an antennal clock in other types of insects, such as bees and ants, that also operate elaborate navigation systems. Like butterflies, honeybees use a sun compass to find flowers and communicate their specific position to the rest of the hive, and they could be using a circadian clock in their antenna to adjust the sun's position to the time of day.

"I think it's a really interesting and elegant paper," said butterfly researcher Karen Oberhauser of the University of Minnesota, who was not involved in the research. But given the incredible sensory powers of insect antennae, she said she's not too surprised that the feelers can also keep time.

"Our sensory systems are really localized to our heads, but insects can taste with their feet and smell with their antennae, and probably their abdomens have pretty complex sensory systems, too," Oberhauser said. "Because insect sensory systems are so different than our sensory systems, it's sometimes difficult for us to even ask the right questions. That's what's so interesting about the work that's being done in the Reppert lab— they're really delving into these detailed questions."



This article was reprinted with permission from www.wired.com

Attracting Pollinators:

Would you like to create a lovely garden that will give you year-round viewing pleasure and satisfy the needs of the pollinators in your area? A simple container garden will encourage pollinators to fly in and stick around. Here are some guidelines for planting your "pollinator pot":

Choose plants that flower at different times of the year to provide nectar and pollen throughout the growing season.

Plant clumps instead of single plants, to better attract pollinators.

Provide a variety of flower colors and shapes to attract different pollinators.

Whenever possible, choose native plants. They will attract more native pollinators and serve as larval host plants.

Pollinator friendly plants for your area can be found at www.pollinator.org/guides.htm.

Top Ten Nectar Plants: aster, black-eyed Susan, butterfly bush, coreopsis, yarrow, butterfly weed, lantana, liatris, purple coneflower, joe-pye weed

Sample Host Plants: cabbage, canna, carrots, celery, clover, coneflower, daisy, dill, ginger, lupine, milkweed, mountain mint, parsley, snapdragon, stonecrop, strawberry, sunflowers

A Potted Garden Guide

Pollinator Habitat Certification

Do you enjoy watching and studying caterpillars on their host plants; searching for chrysalides hidden from predators; observing butterflies and hummingbirds flitting from flower to flower? Does your schoolyard, workplace or backyard have bushes, trees and flowers that provide host plants, nectar and protection for butterflies, bees, hummingbirds and other pollinators? Is there a source of water/puddling areas for thirsty butterflies? Are there places for them to roost at night? Then you might want to look into registering your backyard/schoolyard/workplace habitat with Monarchs Across Georgia's Pollinator Habitat Program. For more details and to download the form visit www.monarchsacrossga.org. No garden is too big or too small!

Congratulations to the latest gardens to be certified:

Donna McDermott., Norcross, GA

**Lilburn Woman's Club,
Conservation Department, Lilburn, GA**

Jo Adang, Atlanta, GA

Continued from page 1

Monarchs that encounter these plants during the fall and winter months could be tricked into laying eggs outside of their regular breeding season, thus interfering with their natural cycle of migration and overwintering.

Importantly, the presence of these plants in the southern U.S. is probably responsible for a growing number of winter sightings of adult and larval monarchs along the southern Atlantic and Gulf Coasts, as reported by volunteers of the popular Journey North citizen science program. The most likely explanation for these winter monarch sightings is that some eastern migrants, instead of traveling on to Mexico in the fall, stop migrating when they encounter tropical milkweeds and instead establish isolated winter breeding colonies.

Having monarchs in our gardens year-round might seem like a good thing, but previous research has shown that spores of the debilitating monarch parasite, *Ophryocystis elektroscirrha* (OE), can build up on milkweed plants over time. These parasites are transmitted from adult monarchs to larvae, especially when infected females scatter spores onto milkweed leaves during egg-laying. OE spores have a thick coating that makes them resistant to heat, cold and sunlight, and a caterpillar can develop a heavy infection by eating even a single spore. As a result, parasite transmission can increase in areas where milkweeds don't die back, if monarchs continue to use the same plants over many generations.

A real-world example of increased parasite infection in continuously-breeding monarchs occurs near Miami, Florida, where tropical milkweeds are now common. Monarchs in this area suffer from extremely high infection rates (80-100%) based on OE monitoring efforts during the past decade. By comparison, average infection rates in the eastern

migratory population have historically been low (less than 8% infection). Thus, monarchs breeding in habitats where plants don't die back each year appear to be less healthy than monarchs that migrate annually to Mexico. A related concern is that otherwise healthy monarchs returning to the U.S. from Mexico in the spring could encounter pockets of infected butterflies from winter-breeding colonies in the southern states, giving the parasite a head-start in infecting a higher percentage of this migratory population during the summer months. To lower OE transmission, some gardeners who plant tropical milkweeds can cut the stalks back to the ground during fall and winter, thus discouraging monarchs from breeding off-season and limiting the build-up of OE spores on milkweed leaves.

What can you do?

Become familiar with the native milkweeds of Georgia

Encourage local nurseries to grow and sell native wildflowers

Grow a butterfly garden that includes native milkweeds

Contribute your sightings of monarchs to monitoring programs, including Journey North, Monarch Health, and the Monarch Larva Monitoring Program. Participation is free, and your observations will help scientists track monarch migration, reproduction and infection rates.

What alternatives do enthusiastic butterfly gardeners have to planting tropical milkweed here in Georgia? Many milkweed species are native to Georgia and are attractive to people and monarchs alike. Some examples of native Georgia milkweeds that are easy to grow and are often available at native plant nurseries include butterfly weed (*A. tuberosa*), swamp milkweed (*A. incarnata*), and whorled milkweed (*A. verticillata*). Native milkweeds can be harder to find in commercial garden centers, but seeds of these species can be ordered from growers specializing in native wildflowers. An advantage of native milkweed is that because they are perennials, they naturally die back in the fall but will re-sprout each spring just before the monarchs return

from Mexico. Native milkweeds also capture an incredible diversity of sizes, shapes and floral displays, ranging from brilliant orange to shades of soft pink and white. Providing ecologically sensible host plants and nectar resources for monarchs doesn't mean sacrificing beauty in the garden, and doing so will help to promote the health and amazing migrations of this iconic insect in North America.

To learn more:

A guide to milkweed species native to Georgia: www.monarchsacrossga.org/MAGmilkweed_in_ga.htm.

To learn more about parasites of monarchs: www.monarchparasites.org.

Detailed information on monarch ecology, reproduction and migration: www.monarchlab.umn.edu/Lab/.

For more information on winter monarch sightings in the U.S.: www.learner.org/jnorth.

SPOTLIGHT... Plants For Your Pollinator Garden

Passion flower, Passion vine, Maypop, Apricot vine
(*Passiflora incarnata*)

USDA Native Status: Native to U.S. • USDA Plant Hardiness Zones 5 to 10

Purple Passionflowers bring back such good memories of my grandparent's home in rural Alabama. These vines grew profusely along the pasture fences and we had great fun popping the vine's fruit, which we referred to as 'maypops', for the sound the fruits make when stepped on. Many years later, I value this native vine for it's one-of-a-kind beauty. It is on my top ten list of favorite plants and as a bonus it is very easy to grow, but also easy to control.

The native passionflower is an herbaceous perennial vine, growing to 6-15 feet in height. Its exotic flowers are white and purple and bloom through summer to mid fall. The fruits are about the size of a hen's egg. This vine is a fast grower, dying down in the winter and growing back quickly in the spring. It requires direct sunlight for at least half of the day and prefers fertile, well-drained soil, but will grow in heavier clay. It has average water needs. Pick a spot in the garden where the plants may either climb or spread freely. They may be propagated from seed or by cuttings.

Passionflowers are the exclusive hosts to over seventy species of butterflies known collectively as the Heliconids. Gulf and variegated fritillaries and zebra longwing butterflies are passionate about the passion flower. Fritillary caterpillars can ravage its leaves when feeding. The fruit is a favorite of deer and rabbit.

It's easy to believe that the plant was named for its exceptional flower, but records show that Spanish missionaries in the 15th and 16th centuries named the flower after it reminded them of certain aspects of the Passion of Christ.

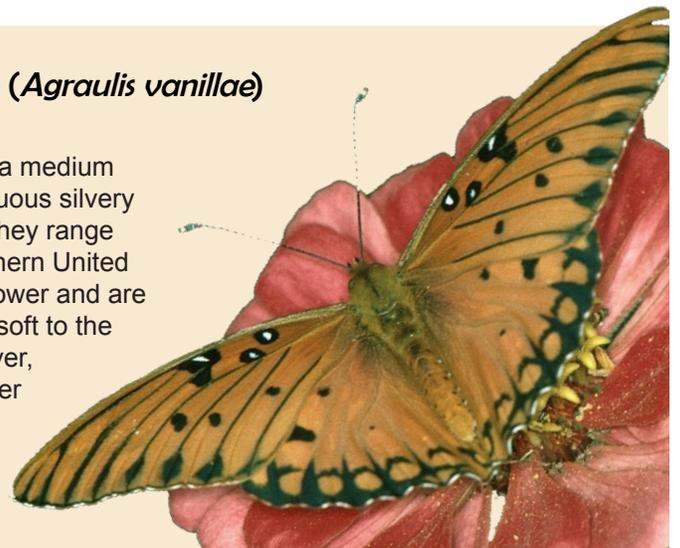
Virginia Brewer

Lavender Mountain
HARDWARE
and garden



Gulf Fritillary (*Agraulis vanillae*)

The Gulf Fritillary or Passion Butterfly (*Agraulis vanillae*) is a medium sized, bright orange butterfly. Its underwings have conspicuous silvery spots. It prefers open fields, pastures, and city gardens. They range from South America through Central America, into the southern United States. The larva feed exclusively on species of passion flower and are bright orange with rows of black spines. These spines are soft to the touch, but the caterpillar itself is poisonous if eaten. However, some predators are specialized to eat them, and some larger caterpillars have been observed eating smaller ones. The chrysalis is dark brown and resembles a curled, dry leaf.



Interested in Becoming a MAG Facilitator?

In the spring of 2008, Monarchs Across Georgia recognized the need for recruiting and training additional workshop facilitators to assist with our educator workshops. Faced with the problem of recruiting a sufficient number of workshop participants in a troubled economy, the steering committee decided to develop a mentor program to orient and prepare new Monarchs Across Georgia facilitators. Under the guidance of a veteran MAG Facilitator (Mentor), a MAG Educator (Candidate) learns by direct experience what is required to organize and deliver a MAG Educator Workshop and be recognized as a MAG Facilitator.

During the summer of 2009, MAG recruited two educators to pilot the program. Over the next year, they assisted their mentor in presenting a workshop then organized and implemented a workshop under their mentor's supervision. Upon completion of the documentation required for the workshop and demonstration of mastery of the material and process, the mentor submitted a recommendation to the Steering Committee and the certification was completed.

Vicki Culbreth, Environmental Programs Specialist from Cobb County Water System, was the first person to complete the MAG Facilitator Mentor Program. Based on her recommendations and experiences piloting the new program, the MAG Steering Committee has revised the draft protocol and has officially launched the MAG Facilitator Mentor Program.

To qualify for the mentor program the Candidate must have completed the training for and be an experienced facilitator in at least one EE Curriculum AND have completed either the 5- or 10- hour MAG Educator workshop. The Candidate must complete the Candidate Application Form providing a copy of their EE Curriculum Facilitator certification AND their MAG Educator Training Certificate (or the date, location, and name of their Educator Workshop Facilitator). These documents are to be mailed along with a check made out to EEA for \$10.00 to the MAG Steering Committee Chair.

MAG is looking for new facilitators. If you are passionate about butterflies, take a look at our Mentor Facilitator Program Guidelines and MAG's Facilitator Job Description at www.monarchsacrossga.org.

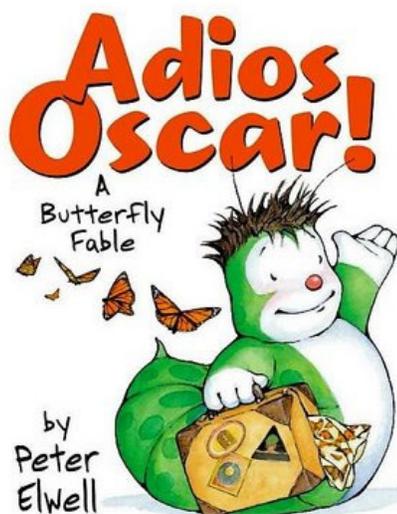
Congratulations to our 2010 Monarchs in Mexico Scholarship Winners!



Betsy Razza
Druid Hills High School
DeKalb County Schools

**Anna Allen &
Suzanne Edwards**
(sharing one scholarship)
Trinity School

For more information
about scholarships, go to
www.monarchsacrossga.org



Recommended Reading

When Oscar the caterpillar discovers that he will one day become a butterfly, he's overjoyed. And his friend Edna the bookworm encourages his hopes of flying to Mexico with the other Monarch butterflies. To prepare, Oscar learns Spanish and dreams of flying through the purple Sierra Madre Mountains. But when Oscar emerges from his cocoon with stubby little wings, a craving for the taste of designer sweaters -- and the urge to take a spin around the bathroom lightbulb -- his dreams are dashed. There will be no trip to Mexico for Oscar -- or will there?

Yes there will! How Oscar ignores the limitations of being a moth and learns how to dream like a butterfly is both inspirational, liberating -- and hilariously funny.

~ From barnesandnoble.com