



The glowworm



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Spring has sprung!

Have you noticed that spring seems to be here already! I began monitoring plants in my phenology garden on the coast and cannot believe the progress already. Experts report that 2006 was the warmest year in the U.S. in the past 112 years. Also, global temperature in 2006 was among the hottest since global temperatures have been recorded (<http://news.bbc.co.uk/2/hi/science/nature/6228765.stm#graph>) and temperatures in 2007 are projected to surpass those of 2006! One of the best ways to see phenomenon occur is by using plants and insects as indicators! Start keeping records of common flowering landscape plant such as star, saucer, or southern magnolia, Bradford pear, and forsythia or data on the first observed Monarch or tent caterpillar can provide data on how spring temperatures are progressing relative to other places in the state and the U.S. These data over time can document these trends in temperature in your own backyard!

For a Bug-Geek like me, it is interesting to speculate what this may mean for incidence of insect-spread diseases and global biodiversity. That sounds like an interesting school report for someone. You could use reported national or global temperature and also look at reported cases of diseases such as West Nile and Yellow fever. I know that fish-people have reported the presence of more southern species in Northern waters where they were not previously reported. This may mean that more tropical insect species may find their way north and establish. This could impact pest management for plants and human health.

Inside this edition of the *Gloworm*, I begin a three part series on "How

Insects Become Pests" and Dr. John Gieseemann has the first of a series of articles on GIS. In the future, Drs. Gieseemann and Guyton will lead you on an exploration of GPS and GIS so you can use to collect data on the location of blooming plants and insects. GIS technology is a great way to document 'movement of spring' northward in the state so join us in collecting and plotting that information.

Dr. David Held

How Insects Become Pests: Oops-Accidental Introductions

Many insect names you will recognize; imported fire ant, cycad scale, Cactus moth, mole crickets, and Formosan termites, are invaders from afar. Most of these get moved around because people on Earth are getting better connected through trade and travel. It still amazes me that you can get on a plane and fly anywhere in the world in a few days. This freedom facilitates the movement of insects particularly plant feeders like aphids, mealybugs, and scale insects. The Florida Department of Agriculture reports that at least one new species of pest is introduced there each month! I believe it, especially seeing the number of exotic insects I have seen in coastal Mississippi in the past few years.

Most, unfortunately, are brought here on commercial vessels or by people smuggling incidental items such as fruit and flowers. This is so important that people vacationing in Hawaii must sign a form stating that they have not brought any produce or plants to the islands. Furthermore, once you exit the plane you are greeted by a beagle sniffing your baggage looking for fruit and flowers that were not disclosed.

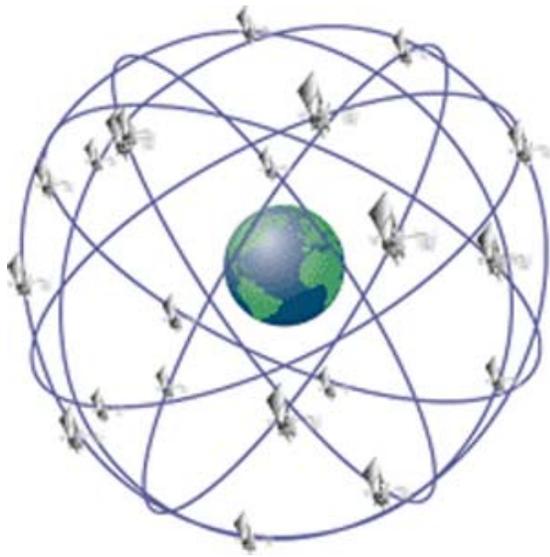


So how can these herbivorous invaders survive once they are so far from their home? This depends on the presence of suitable habitat or food and the absence of natural enemies. If someone brought a plant to Mississippi from another country and it was covered with scales, they would have introduced both the host plant and the pest together. That's how cycad scale is being spread. Japanese beetles (JB), as the name implies, were brought from Japan to New Jersey in the larval stage (grub) in soil. When the first adults emerged in summer 1917, they had to eat. Japanese beetles can eat over 300 species in 79 plant families. Herbivores like JB and gypsy moth, that have the ability to eat many different plants, are very successful at being transplanted. They can ample food and can develop in the absence of the natural enemies that keep their populations

in check in their native range. A lack of natural enemies is also important. So important that, once these introductions occur, scientists often go to the native range of these insects searching for their natural enemies. These natural enemies are grown in quarantine, tested against closely-related native insects, then they are released for biocontrol. This process, called classical biological control, takes years to complete.

What is GIS/GPS?

GPS stands for Global Positioning System. GPS is a system of 24 satellites



positioned above the earth in stationary orbits.

In other words, the satellites are always in the same position above the ground. Using this system, GPS receivers can tell exactly where you are on the earth by using signals from these satellites.

GIS stands for Geographic Information System. A GIS is a database of information that uses geographic coordinates (latitude and

longitude data) to determine where certain pieces of information are. For example, you might have a GIS of insects you have collected. Each insect in the database might have insect name, order, date, and location of its collection. But it would also have to have the latitude and longitude (geographic information) to make it a GIS.

A GIS can be used to find where things are. For example, you could find all the places a certain insect has been located in Mississippi if you had a good insect collection GIS database. Or maybe you want to find out all the places where certain plants are located because you are looking for a certain insect that feeds on those plants. A GIS database with plant information can help you find those plants. Or you could find a specific house using a GIS database that is tied to

address data. Then the fire truck can find its way to your house if it catches on fire. Or you can get directions to the nearest mall if you are in a new town.

GPS and GIS are becoming very valuable tools for a great number of things. As we learn how to use the data and get more GIS databases available, we will find more and more things to do with them.

Insect Behavior Briefs by Dr. John Guyton

Insects are amazing animals. Most of the behaviors observed in higher animals are evident in insects-with some unique to insects also. Here's a few to think about:

- Flies engage in gift giving! Nuptial gifts typically include a bit of nutritional food that may result in improved fitness and the production of healthier eggs. However, for some species gift giving has become a ritual with the male presenting an empty silken balloon that the female does not use - however she also does not eat the suitor, even when he presents her an empty balloon!
- Some species of treehoppers operate preschools. They herd their young together and collectively protect them from prey. Some treehoppers have a special "arrangement" with ants. In exchange for some treehopper honeydew, ants will raise their brood while the tree hoppers leave to start another!
- Imprinting, or learning during their early life, is common with some insects. Tobacco horn worm caterpillars will dine on many nightshade family plants including tobacco, tomato and nightshade. However they will imprint on the first they are served and demonstrate a preference for it later. Imprinting in some caterpillars is so strong that they will starve to death when given a food they can eat but won't. Sounds like a youngster at the dinner table!

**ATTENTION: YOUNG PEOPLE –TEACHERS – PARENTS
ALL WHO ARE INTERESTED IN ENTOMOLOGY!!!!**

THE MISSISSIPPI STATE ENTOMOLOGY DEPARTMENT PRESENTS ENTOMOLOGY CAMP:

Camp #1: June 17–21 – Plymouth Bluff Environmental Camp, Columbus

This camp is for **adults and youth** (over age 10) **who want to learn about insects** from experts. The camp will be taught by professors from the Entomology Department at Mississippi State, and will be educational and fun!!!!

- Learn how to collect, identify, and preserve insects!
- Learn about unique critters you've never seen, yet they live all around you!
- Make an insect collection with help from the experts!

4-H rules and guidelines apply.

Camp #2: July 15–19 –Plymouth Bluff Environmental Camp, Columbus

This camp is for **adults** (teachers, college students, youth leaders) that are looking for a unique learning experience. The camp will be also be taught by professors from the Entomology Department at Mississippi State, but will be available for college credit at Mississippi State University or CEU credits for teachers! This camp will include:

- Lecture and field collecting components that cover ecology, behavior, and taxonomy of insects
- Field identification and use of keys for family level identification of pinned specimens
- Field collecting methods

**Mississippi State University
4-H Entomology Camp Registration Form**

I will be attending CAMP Session #_____. Indicate 1 or 2, please!

Indicate t-shirt size: Small _____ Medium _____ Large _____ XL _____ Other _____

All shirt sizes are measured in adult sizes, the vendor does not handle children's sizes

Name: _____

Address: _____

City: _____

State: _____ Zip: _____ County: _____

Age: _____ Gender: _____

Telephone _____ email _____

I am interested in: CEUs or credit hours.

For adults attending Camp #2, please check the appropriate box above if you need CEU credits or wish to take the course for credit.

Please submit a **separate copy of this form for each camper** - be sure to indicate the session the camper will be attending.

Certification of health is required - so camp physicals are in order
Mail individual applications along with **\$60.00 deposit** to reserve your place to:

**Entomology Camp
MSU Entomology Department
Box 9775
Mississippi State, MS 39762**

Charges include room/board, t-shirt and miscellaneous supplies. Pins and insect boxes can be made available for an additional cost. Deposit is not refundable after May 1, 2007 for camp #1 and June 15, 2007 for camp #2, deposit is applied to camp costs.

**Enroll now for either camp!! Out of state campers are welcome!!!!
Enrollment is limited and will be on a first come basis.**