

Newsletter of The Gopher Tortoise Council

## Message From a Co-Chair

Dick Franz

### Reflections on Walter Auffenberg and the Founding of the Gopher Tortoise Council

The Gopher Tortoise Council is a very special organization that has its heart in conserving gopher tortoises and their specialized xeric habitats in the Southeast. This organization has its roots with Walter Auffenberg, who was my mentor, colleague, and friend. It was through Walt's efforts that the GTC was founded. He first got the idea after presenting a talk at the Desert Tortoise Council in 1977. He knew the tortoise was in trouble, based on a range-wide study of gopher tortoises that he and I conducted in the early 1970s...this study on status and distribution was later published. Arriving home from California, Walt gathered his tortoise-minded students and friends together and suddenly we were off and running. Did I mention Walt's strong-will? You did not say NO to him. Nearly 40 years later, the GTC still exists and continues to be a force for gopher tortoise conservation.

Walt Auffenberg was a unique character who was brilliant and well versed in all manner of the natural and physical sciences. He knew his herps and was completely conversant in paleontology, geology, soils, plants, and environmental processes. He also learned electronics when the need arose and built his own transmitters, antennas, and receivers.

Walt, a student of herpetologist Arnold Grobman, received his Ph.D in the Zoology Department at the University of Florida in 1956. He described the fossil snake fauna of Florida in his dissertation which was later published in the journal *Tulane Studies*. Following completion of his degree he worked for Biological Science Curriculum Studies (BSCS), developing high school biology texts with his former graduate chair, Dr. Grobman, at the University of Colorado in Boulder. After a short stint there he returned to his Florida roots and took a curatorship position at the Florida State Museum (University of Florida). There he studied monitor lizards, West Indian iguanas, and fossil tortoises, and wrote books, including his famous Komodo Dragon tome. He remained at the Florida museum until his retirement but continued his studies as an emeritus curator, until he passed away on June 17, 2004.

We honor Walt as an early hero and advocate for gopher tortoise conservation as we look to the future. In October, we celebrate the 39<sup>th</sup> Annual Meeting of the Council! Co-chair Will Dillman with the South Carolina Dept. of Natural Resources is diligently putting together this year's program to be held near Edgefield, South Carolina. We hope you'll join us there!

Dick



#### In This Issue:

##### Message from a Co-Chair

##### Announcements

##### 2017 Annual GTC Meeting

- Call for Papers
- Silent Auction
- Student Awards

##### Proposal Solicitations

- J. Larry Landers Student Research Award
- Donna J. Heinrich Environmental Education Grant

##### Feature Article-In Search of Fossil Gopher Tortoises

##### Public Information and Education

- Zoo Miami's Conservation Teen Scientist Program
- GT Burrow Exhibit

##### Gopher Tortoise Commensals

- Feature Article-Obligate Invertebrate Commensals
- *Idia gopheri* in Georgia and Florida

##### Call for Nominations-GTC 2017 Awards

##### Kids' Corner

- Gopher Tortoise Invertebrate Commensals

## ANNOUNCEMENTS

### 2017 Annual Meeting



Please join us in South Carolina for the  
**39th Annual Gopher Tortoise Council Meeting**  
Edgefield, SC  
October 13-15, 2017  
Registration is now open!

See details on our website at [www.gophertortoisecouncil.org](http://www.gophertortoisecouncil.org)

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### The J. Larry Landers Student Research Award

The **J. Larry Landers Student Research Award** is a Gopher Tortoise Council competitive grant program for undergraduate and graduate college students. Proposals can address research concerning gopher tortoise biology or any other relevant aspect of upland habitat conservation and management. The amount of the award is variable but has averaged \$1,000 over the last few years.

The proposal should be limited to four pages in length and should include a description of the project, a concise budget, and a brief resume of the student.

This is an excellent opportunity for undergraduate and graduate students to access funding for their projects.

**The deadline for grant proposals each year is the 15th of September.** For questions please contact Jeff Goessling at [goessling@auburn.edu](mailto:goessling@auburn.edu). Proposals should also be submitted electronically in Word to Jeff ...please check website for details at [www.gophertortoisecouncil.org](http://www.gophertortoisecouncil.org).

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### Silent Auction-39th Annual GTC Meeting

We greatly appreciate any donations to fund our GTC Environmental Education Grants! Please consider bringing silent auction items with you to the meeting! Can't attend the meeting? Contact us for shipping information! Please contact Connie Henderson at [lpgcsh@aol.com](mailto:lpgcsh@aol.com) for more information.

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Keep track of Gopher Tortoise news and Council updates!  
Find us on-

The Facebook logo, consisting of the word "facebook" in white lowercase letters on a blue rectangular background.

## ANNOUNCEMENTS

### Gopher Tortoise Council's 2017 Donna J. Heinrich Environmental Education Grant

The GTC Environmental Education Grant was established to support educators and organizations committed to developing educational projects about the gopher tortoise and the fascinating world in which it lives. The grant also honors Donna June Heinrich, an environmental educator, whose life was dedicated to conserving wildlife and their associated habitats.

**Deadline for submission of this year's proposals is August 31st, 2017.** Applications may be downloaded from our website ([www.gophertortoisecouncil.org](http://www.gophertortoisecouncil.org)). Click on "Menu" in the upper right hand corner. Go to "Who We Are" and click on the "Grant Programs" tab and scroll down. Applications which contain the following will be given preference:

- Projects that reach diverse and new audiences.
- Projects that focus on the importance of the conservation of intact upland ecosystems.
- Projects that encourage community involvement.
- Projects that have matching funds.

Please follow the instructions on the grants program page noting the requirements. For questions contact Cyndi Gates at [cyndi@fgates.com](mailto:cyndi@fgates.com). Proposals should be submitted to the same email address.

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**Call for Papers!**  
The 39th Annual Meeting of the Gopher Tortoise Council  
will be held October 13-15, 2017  
**Deadline for abstracts is**  
**September 8th, 2017!**

Go to [www.gophertortoisecouncil.org](http://www.gophertortoisecouncil.org) for abstract and submittal details!

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#### GTC Student Awards

**Student Presentation Awards** are given for the top three student oral presentations at the annual meeting. Please indicate clearly in your abstract if you are an undergraduate or graduate student so that you can be considered for this award. Contact Lora Smith at [lsmith@jonesctr.org](mailto:lsmith@jonesctr.org) if you have any questions.

**Bob Herrington Student Travel Grants** will be available and two awards (at \$100/each) will be made to randomly selected students who travel more than 60 miles to attend the meeting. Students must be presenting an oral or poster presentation. If interested, please email Betsie Rothermel at [brothermel@archbold-station.org](mailto:brothermel@archbold-station.org) and include your current university affiliation.

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## FEATURE ARTICLE

## IN SEARCH OF FOSSIL GOPHER TORTOISES...A CONTINUING COMMENTARY by Dick Franz

Years ago, Walter Auffenberg introduced me to the world of fossil tortoises. Walt, another student named Dave Frailey, and I spent many days during the summer of 1973 traveling to the Thomas Farm fossil locality near Bell in Gilchrist County, Florida, in search of early Miocene vertebrate fossils. It was hot, humid, and buggy...heat and sweat pouring from our skins. After an intense day of fossil collecting, we would retire to a spring on the Suwannee River to wash our treasures and to cool off.

Thomas Farm was so rich that we always came back to the Florida Museum of Natural History with buckets of bones...amphibians, reptiles, birds, small rodents, bats, rhinoceroses, three-toed horses (see photo below), camels, peccaries, dogs, bears, and bear dogs. But the most prized specimens, from my point of view, were tortoise shell pieces. One particular tortoise had been named *Testudo tedwhitei* by Ernest Williams of Harvard University in 1953. Later Walt placed this species in the genus *Geochelone*, and later in *Hesperotestudo*.

*Hesperotestudo tedwhitei* was thought to be the only tortoise species present at this 18-million year old sinkhole site. But years later, when I had a chance to systematically go through the Thomas Farm material at the Florida Museum, I began finding pieces of a second tortoise...one with a thin-walled shell and a wide cervical scale. But what was it? That night in my dreams I suddenly realized it had to be the remains of an ancient gopher tortoise...a species millions of years older than any gopher yet known from Florida. Another project...name that tortoise...is in progress.

Field crews from the museum continue to work at Thomas Farm. Now they concentrate on screening for micro-fossils...bats, birds, snakes, lizards, frogs and salamanders. Dave Steadman, bird curator at the museum, is still intent on collecting here the earliest known fossil hummingbird from Florida (see photo below).

Paleo-people are an odd sort. I know. I am one of them.



Student with bird curator Dave Steadman



Three-toed horse jaw

## PUBLIC INFORMATION AND EDUCATION

## Zoo Miami's Conservation Teen Scientist Program

by Dr. Steve Whitfield

Zoo Miami's conservation and education teams recently launched an environmental education project focused on Gopher Tortoises funded by the Gopher Tortoise Council's Donna J. Heinrich Environmental Education Grant.

Surrounding Zoo Miami is one of the world's largest remaining patches of critically endangered pine rocklands habitat - a subtropical pine savannah unique to South Florida and a few islands in the Caribbean. This rare upland habitat is rich in biodiversity - much of which is threatened either by urbanization or fire suppression. These pine rocklands are home to one of the southernmost populations of gopher tortoises and the tortoises have been one focus of Zoo Miami's conservation research programs.

With funding from the Gopher Tortoise Council, Dr. Steven Whitfield (a conservation biologist at Zoo Miami) teamed up with the Zoo Miami Foundation's Conservation Teen Scientist (CTS) program - a conservation training program for high school students in the greater Miami area. Through classroom sessions with CTS students, Dr. Whitfield provided information to small groups of high school students about the biology of gopher tortoises, threats to the tortoises, the ecology of gopher tortoise habitats, and the role of gopher tortoises in the pine rocklands ecosystem.

After the classroom training sessions, the CTS students then went with Dr. Whitfield into the pine rocklands to learn first-hand what it's like to conduct field research with gopher tortoises (Figure 1). Dr. Whitfield showed students how to distinguish tortoise burrows from other types of burrows and how to tell if a tortoise burrow is active or abandoned. Dr. Whitfield demonstrated several field techniques in tortoise conservation including- how to use camera traps to monitor tortoise activity, how to use radio telemetry to track tortoises, how to safely handle gopher tortoises and distinguish males from females, and how to use burrow scopes to check burrows for tortoise occupants.



Figure 1. Zoo Miami staff and Teen Conservation Scientists

Newly equipped with knowledge of and enthusiasm for gopher tortoises, CTS students then attended a "Gopher Tortoise Education and Engagement" program on weekends at Zoo Miami to reach out to Zoo Miami's public audience of nearly one million visitors per year (Figure 2). Zoo Miami's Graphics Department prepared some posters with facts about gopher tortoises and their conservation and CTS students distributed fact sheets from the Florida Fish and Wildlife Conservation Commission (FWC) on topics ranging from urban gopher tortoises to waif tortoises to interested guests. Using videos compiled from camera traps on a tablet at the tortoise education station, students were able to show guests a range of tortoise behaviors (courtship, mating, aggressive

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## Zoo Miami's Conservation Teen Scientist Program...continued

interactions), and a range of tortoise burrow inquilines (Black Racers, Eastern Cottontails, Hispid Cotton Rats). Perhaps best of all, Zoo Miami's Children's Zoo provided one of their ambassador gopher tortoises - a waif tortoise given to the zoo by FWC for education and outreach - to be part of the environmental education program (Figure 3).

Urban audiences are increasingly disconnected from nature and zoos provide one of the best opportunities to connect urban residents to nature. By leveraging our visitors' interest in animals, Zoo Miami's ongoing research with gopher tortoises, and the enthusiasm of our CTS students, Zoo Miami has been able to train a new generation of conservationists to protect tortoises - and to communicate conservation messages to the public.



Figure 2. CTS students discuss gopher tortoise biology with Zoo Miami visitors



Figure 3. Children and other visitors learn more about gopher tortoises with this waif tortoise "ambassador"

**"Student Spotlight"** GTC wishes to highlight students who are actively involved in upland conservation projects within the gopher tortoise's range in the GTC newsletter. The purpose of this feature is to encourage greater student participation in the organization and bring recognition to students and their projects. Projects pertaining to research, management, or policy will be considered. Please submit a brief description of the project and any findings to date. Submissions should be 500 words or less and may be accompanied by photographs. Please send to: [cyndi@fgates.com](mailto:cyndi@fgates.com)

Check it out...Gopher Tortoise Burrow Exhibit

## Did you ever want to crawl through a burrow?

Well, at least kids can do so at the Brooker Creek Preserve Environmental Education Center located in Tarpon Springs, Florida. The award-winning Education Center opened its doors on June 19, 2004. The Center is staffed by Pinellas County Extension employees and assisted by volunteers. Interpretive programs, guided nature tours and educational exhibits are offered to the public.

The crawl-through Gopher Tortoise Burrow Educational Experience was the concept of educator Dr. Carlos de la Rosa. As the story goes, he initially sketched the design out on a napkin. Numerous educational staff (then in the County's Environmental Lands Division) assisted in the evolution of the exhibit. Details include images of a Gopher Frog and Burrowing Owls and the rattling sound of a Diamondback. And, of course, a Gopher Tortoise!

For details including location and hours of operation see - [www.brookercreekpreserve.org/aboutus.htm](http://www.brookercreekpreserve.org/aboutus.htm).



Contributed by Don Stillwaugh

## In the news...

Check out this blog on an unusual gopher tortoise burrow buddy...found during a BioBlitz on the Chassahowitzka Wildlife Management Area in west-central Florida last April...

<https://guyharveyoutpost.com/blog/wildlife-blitz-in-west-central-florida-yields-rare-surprise/>

## FEATURE ARTICLE

## SURVEYING FOR GOPHER TORTOISE OBLIGATE INVERTEBRATE COMMENSALS by Dave Almquist

More than 300 invertebrates have been documented in gopher tortoise burrows and they likely derive some benefit from the burrows (Florida Fish and Wildlife Conservation Commission 2012). Some insects, termed obligate commensals, are known only from gopher tortoise burrows, relying on a miniature ecosystem based on the tortoise's dung. Some subsist directly on the dung, while others subsist on dung and/or possibly other organic matter in the burrows. Other species prey upon these species. The caterpillars of one moth appear to subsist solely on the keratin from shells of dead gopher tortoises.

None of these species can persist in areas with no gopher tortoises and they may require dense and/or large tortoise populations. It seems likely that there is a mutualistic relationship between the burrow insects and the tortoise with the insects providing waste removal and pest control services. I'm calling these 14 species gopher tortoise obligate invertebrate commensals (OIC) for the purpose of this article, although technically the one scavenger moth is not a burrow commensal (Table 1).

Common Name	Scientific Name
Little Gopher Tortoise Scarab Beetle	<i>Alloblackburneus (=Aphodius) troglodytes</i>
Gopher Tortoise Hister Beetle	<i>Chelyoxenus xerobatis</i>
Gopher Tortoise Copris Beetle	<i>Copris gopheri</i>
Equal-clawed Gopher Tortoise Hister Beetle	<i>Geomysaprinus floridae</i>
Punctate Gopher Tortoise Onthophagus Beetle	<i>Onthophagus polyphemi polyphemi</i>
Smooth Gopher Tortoise Onthophagus Beetle	<i>Onthophagus polyphemi sparsisetosus</i>
Gopher Tortoise Rove Beetle	<i>Philonthus gopheri</i>
Western Gopher Tortoise Rove Beetle	<i>Philonthus testudo</i>
Gopher Tortoise Acrolophus Moth	<i>Acrolophus pholeter</i>
Gopher Tortoise Shell Moth	<i>Ceratophaga vicinella</i>
Gopher Tortoise Noctuid Moth	<i>Idia gopheri</i>
Tortoise Burrow Dance Fly	<i>Drapetis</i> sp. 1
Gopher Tortoise Burrow Fly	<i>Eutrichota gopheri</i>
Gopher Tortoise Robber Fly	<i>Machimus polyphemi</i>

Table 1. Invertebrate taxa that are dependent upon gopher tortoises and occur in Florida.

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Obligate Invertebrate Commensals...continued

I have been studying these species on and off since about 2000 and find them fascinating. I was lucky enough to be able to survey for them while working at the Florida Natural Areas Inventory (FNAI) during a Florida Fish and Wildlife Conservation Commission (FWC)-funded project (Filling in the Data Gaps for Obligate Invertebrate Commensals of the Gopher Tortoise). I surveyed in two sites each in five regions of Florida during a two-year period, with three week-long trips to each region during that time.

I examined 934 burrows and used a variety of traps and techniques. Examining burrows involved scooping sand from directly inside the burrow mouth and inspecting it, and especially any dung (Figure 1). This was productive for some species, but very labor intensive.



Figure 1. Punctate Gopher Tortoise Onthophagus Beetle in fresh tortoise dung (© Deborah Burr)



Figure 2. Close-up of a gopher tortoise burrow facade trap that mimics a burrow entrance

One of the most productive sampling techniques was a burrow facade trap (BFT) that I devised with help from Dr. Paul Skelley (Florida State Collection of Arthropods) and have refined over the years (Figure 2). It does not impact the tortoises or their burrows at all and catches very few non-target invertebrates. It appears to look like a burrow to some of the GTOIC which come in to the “burrow mouth” and fall into a container of preservative through slit-like openings below (Figure 3). When set at sites with dense tortoise populations, it is effective at capturing several species. It sounds silly but the idea came from Looney Tunes cartoons; the idea of a fake hole on a vertical surface!



Figure 3. Opened burrow facade trap showing slits that specimens fall through and container beneath

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I also used black lights to survey for some species. This was productive for Little Gopher Tortoise Scarab Beetle but not for any of the other species that have been found using this sampling technique (Figure 4). I did not find the Gopher Tortoise Noctuid Moth, for which there are records from black lights, but there is some good evidence that this species may have declined (Deyrup 2011, Stillwaugh 2006, Schweitzer et al. 2011). The Gopher Tortoise Copris Beetle has been collected at light but it may be declining also. Hubbard (1894) stated that this species was found in every burrow he examined and they were frequently abundant. One burrow produced 84 specimens. However, Mark Deyrup, entomologist at Archbold Biological Station in Venus, FL, did not find this species when surveying on the Lake Wales Ridge in 2009 (pers. comm.). I found only one probable/partial specimen during this project and one specimen years before during another survey.



Figure 4. Black light sheet

I documented ten of the OIC with three of the more common and widespread species being found in four of the five regions surveyed. Four were documented from pine plantation, abandoned field, sandhill, upland mixed woodland, and upland pine habitats. For taxa that were found at enough sites to draw any conclusions, it appears that most OIC do not require pristine habitats, but rather xeric areas with robust tortoise populations. Some taxa appear to either be geographically restricted, have more exacting requirements, or be very cryptic and difficult to survey. FNAI staff produced habitat models for all OIC based upon results from this project as well as other definitive records as shown in the summary figure (Figure 5).

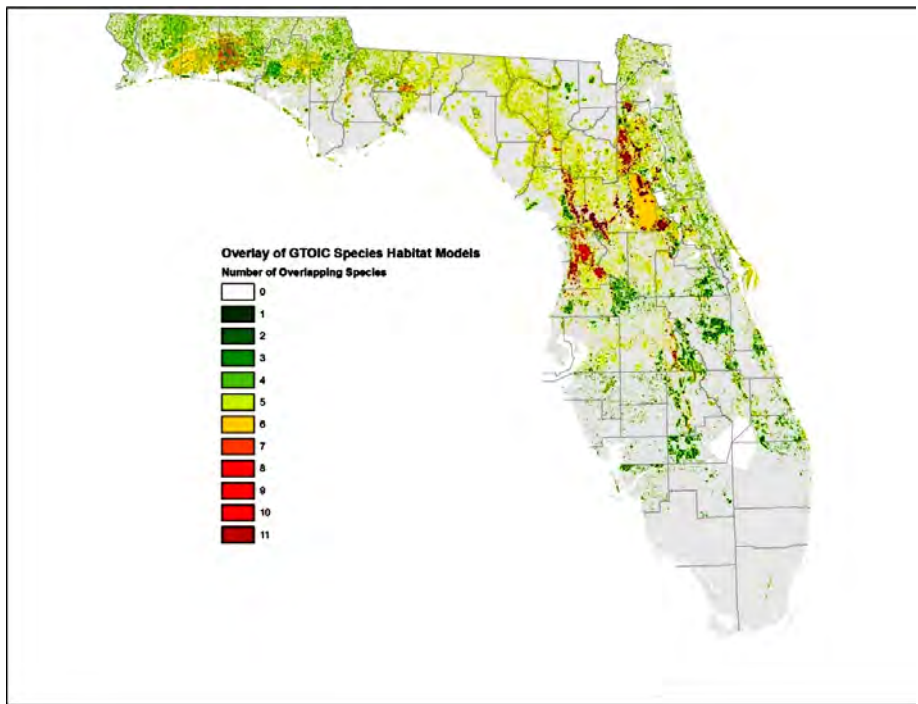


Figure 5. OIC predicted species richness based upon land cover and known distributions (Florida Natural Areas Inventory)

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Many people who are familiar with gopher tortoise burrow fauna notice camel crickets but may not realize how small most of the obligate commensals are. The Little Gopher Tortoise Scarab Beetle (Figure 6), which is one of the most ubiquitous and widespread OIC, is only about 3.5 mm long, or shorter than a grain of rice. It subsists upon tortoise dung in the burrows, usually being found within or slightly below its food source. As with the other dung-feeding commensals, they have never been found in tortoise dung away from burrows.



Figure 6. Little Gopher Tortoise Scarab Beetle

The two subspecies of Gopher Tortoise Onthophagus Beetle, the punctate shown in Figure 1 and the smooth shown in Figures 7 and 8 below, are also relatively common burrow fauna. They are medium sized at approximately 6 mm in length, or about as long as medium to long grain rice, but much wider. They are also dung feeders.



Figure 7. Male Smooth Gopher Tortoise Onthophagus Beetle



Figure 8. Smooth Gopher Tortoise Onthophagus Beetle on penny to demonstrate size

The Gopher Tortoise Burrow Fly, another widespread and common dung-feeder, is about 7 mm long (Figure 9). This species feeds on dung but is most commonly found flying around burrow mouths and can be extremely common in some areas.

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Figure 9. Gopher Tortoise Burrow Fly

Four species of predatory beetles live in the burrows and I documented all of them. The Gopher Tortoise Rove Beetle and Western Gopher Tortoise Rove Beetle (not pictured) are both nearly identical in appearance, being very elongated and skinny, yellowish to reddish-yellow, and about 5 mm in length. Two hister or clown beetle (family Histeridae) predators live in burrows. I have documented both of them including the Gopher Tortoise Hister Beetle (Figure 10) and Equal-clawed Gopher Tortoise Hister Beetle (Figure 11). These small, 3 mm long beetles most likely prey upon eggs and larvae of other insect burrow inhabitants. They may be found by examining burrow entrances and by using BFTs, although the Equal-clawed species is less commonly encountered.



Figure 10. Gopher Tortoise Hister Beetle



Figure 11. Equal-clawed Gopher Tortoise Hister Beetle



Figure 12. Gopher tortoise shell showing evidence of the Gopher Tortoise Shell Moth

The picture at left shows an upturned tortoise shell with evidence of Gopher Tortoise Shell Moth larvae (caterpillars). The larvae eat the keratin from the outside of dead tortoise shells, making a silken tube to live in (Deyrup et al., 2005). In Figure 12 these tubes look like fingerlike projections as shown to the right of the depression made by the shell. Mark Deyrup stated that they may need relatively large tortoise populations in which at least one tortoise dies per year. This species has been designated as a species of conservation concern on the Lake Wales Ridge (Deyrup 2011).

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I did not find any Gopher Tortoise Robber Flies (Figure 13) during any of my surveys although most sites were within its known range in Florida including one study site very near where it had been found before. It is large (15 mm long!) and obvious for an OIC. These predators hang out on the roofs of burrows, probably feeding upon Gopher Tortoise Burrow Flies, and occasionally zipping in and out of the burrow mouth (Bullington and Beck 1991). In Florida, it is only known from two localities in Putnam and Santa Rosa counties. It is also known from one locality in Georgia and approximately five localities in southeastern Mississippi (Bullington and Beck 1991).



Figure 13. This is most likely a Gopher Tortoise Robber Fly, found flying out of a burrow at the Alapaha River WMA, Irwin Co., GA by Noah McCoard and Matthew Stoddard (© Noah McCoard)

It would be very useful to get more records and information for all of these species. For most taxa, a specimen would be necessary for positive identification, although good macro photos would suffice for some. It may sound counterintuitive to collect specimens of a relatively rare species, but hundreds of individuals of some species have been documented in a single burrow, so removing a few individuals will not hurt the population and will further our knowledge of these interesting insect taxa that may benefit gopher tortoises.

All photographs in this article by Dave Almquist except Figures 1 and 13

## References

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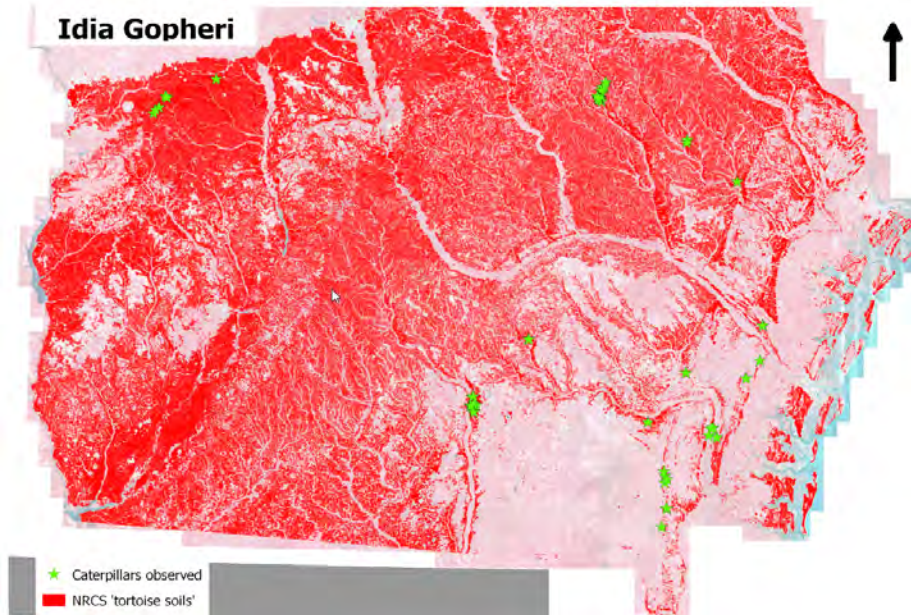
Dave Almquist is an invertebrate zoologist with the Florida Natural Areas Inventory (FNAI) in Tallahassee. He is responsible for compiling, entering and updating information about the invertebrates tracked by FNAI, evaluating additional species for inclusion in the database and surveying for the presence of rare invertebrates. Dave has a Bachelor's degree in entomology from the University of Florida and is a Research Associate with the Florida State Collection of Arthropods. While at UF he discovered two new species of beetles, invented a non-invasive method to survey for insects associated with gopher tortoise burrows and produced stunning insect photographs using advanced computerized technology.

### *Idia gopheri* in Georgia and Florida

Matt Stoddard and colleagues at the Georgia Dept. of Natural Resources note that they have observed caterpillars of the *Gopher Tortoise Noctuid* or *Burrow Moth* (*Idia gopheri*) at around 15 sites in the Coastal Plain of Georgia (see map). Matt was able to photograph an adult and caterpillars using a burrow camera (see below).



Photos by Matt Stoddard



*Idia gopheri* sightings (green stars) throughout areas with suitable GT soils in the Coastal Plain (Georgia DNR)



Copyright © 2009 [David Almquist](#)

*Idia gopheri* caterpillar from Pasco County, FL-Photo by Dave Almquist



Copyright © 2014 [Janice Jones](#)

*Idia gopheri* adult moth from Hernando County, FL-Photo by Janice Jones

## NOMINATIONS FOR 2017 GTC AWARDS

Every year, the GTC board recognizes significant contributions of those within the Council and larger community for contributions to our mission of education and conservation of gopher tortoises and their upland habitat through special awards (described below) presented at our annual meeting. Please send nominations for 2017 awards to Lora Smith at [lsmith@jonesctr.org](mailto:lsmith@jonesctr.org). We ask that you provide a little background as to why you think this individual is deserving of a particular award along with your nomination. Thank you for your help!

### Gopher Tortoise Council Awards

**Distinguished Service Award**- presented to those who have consistently offered years of service to the Council.

**Lifetime Service Award**- presented to individuals whose have devoted a career to service of the Council.

**Special Project(s) Award**- presented to individuals who have taken the lead or played a major role in special GTC projects.

**Conservation Education Award**- given to individuals who have contributed to significant education and outreach activities relevant to conservation of tortoises and upland habitats. Candidates may be outside the realm of GTC.

**Auffenberg and Franz Conservation Award**- presented to individuals with lifetime accomplishments and organizations with long-term efforts in conserving gopher tortoises and upland ecosystems. The first recipients for this award were Walter Auffenberg and Dick Franz, presented at the 2003 Annual meeting (our 25<sup>th</sup> meeting).

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## Kids' Corner...Creepy, Crawly Critters-including Cool Commensals!

Do you know what a **commensal** is? In the case of gopher tortoises, a commensal is an animal that obtains food, shelter, or other benefits from the tortoise's burrow...commensals can be **vertebrates**, or **animals with back bones** like reptiles, amphibians, mammals or birds, or **invertebrates**, or **animals with no back bone**. This includes spiders, ticks and insects like beetles, moths, and flies (see article on pages 8-13 in this issue). Along with commensals there are lots of other critters that occasionally use tortoise burrows.

**Did you know???** See if you can answer questions A through E on the next two pages (answers on page 16)

**Question A.** Some beetles that live in gopher tortoise burrows eat **poop!** Yuck! How many kinds of **beetles** can you find in this edition of The Tortoise Burrow that eat poop? (Hint: also called "dung"...check out the article on pages 8-13).

**Question B.** Can you find the tiny sand particle stuck to the equal-clawed hister beetle in the article on Obligate Invertebrate Commensals? What part of its body is it on? (hint-see page 12)

**Question C.** Do you know what this scary looking guy is? His picture was taken at the mouth of a tortoise burrow using a special camera. Turn to the next page to find out what he is.

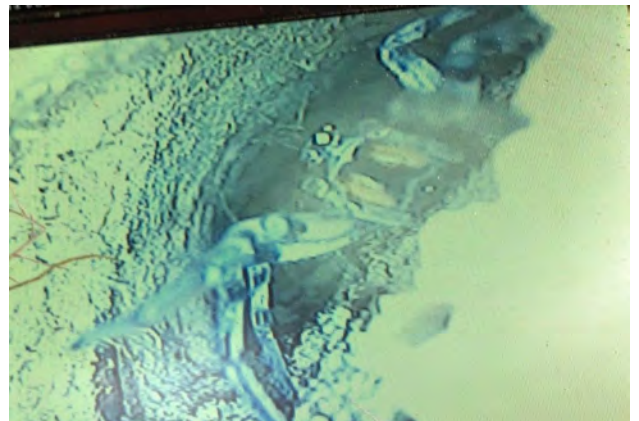


Photo by Matt Stoddard (GADNR)

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### Kids' Corner continued...

An **Obligate** Gopher Tortoise Commensal is one that can only live in tortoise burrows. The table on page 12 shows several **obligate invertebrate commensals (OIC)** known for Florida. The **table below** indicates what other states in the gopher tortoise range are also known to have the same kind or species of invertebrate GT commensal. If there is a “Y” in the box for a certain species that means it has definitely been found in that state. If there is a “P” it means it “probably” lives in that state.

**Question D.** How many OIC are known to live in Alabama? (e.g. how many boxes are marked with a “Y” for yes?)

**Question E.** Which state, besides Florida, is known to have the most OIC species? (“Y” for yes)

Common Name	Alabama	Georgia	Mississippi	South Carolina
Gopher Tortoise Acrolophus Moth				
Little Gopher Tortoise Scarab Beetle	P	Y	Y	Y
Gopher Tortoise Shell Moth	P	P	Y	
Gopher Tortoise Hister Beetle	P	Y	Y	
Gopher Tortoise Copris Beetle				
Tortoise Burrow Dance Fly				
Gopher Tortoise Burrow Fly	Y	Y	Y	
Equal-clawed Gopher Tortoise Hister Beetle		P		
Gopher Tortoise Noctuid Moth		Y	Y	
Gopher Tortoise Robber Fly	P	Y	Y	
Punctate Gopher Tortoise Onthophagus Beetle		Y		Y
Smooth Gopher Tortoise Onthophagus Beetle	Y		Y	
Gopher Tortoise Rove Beetle		P		
Western Gopher Tortoise Rove Beetle	P	Y	Y	

Table by Dave Almquist-invertebrate zoologist for FNAI



From Question C on p. 15-It's a wolf spider! Most wolf spiders are not commensals but frequently like to hide out in holes and burrows of other animals. (Photo courtesy of Dave Almquist)



Can you find the wolf spider in the photo above? (Photo courtesy of Dave Almquist)

Kids' Corner Answers: A-3 dung feeding beetles were discussed in the article: the Punctate GT Onthophagus Beetle, the Smooth GT Onthophagus Beetle and the Little GT Scarab Beetle. B-the sand particle is stuck on the Hister Beetle's left side, behind and just above its left middle leg. C-the Wolf Spider! See above! D-2 OIC are known to occur in Alabama-the GT Burrow Fly and the Smooth GT Onthophagus Beetle. E-Mississippi has the most known GT OIC after Florida when you consider the information in the tables provided. MS has 8 known species-maybe you can become an invertebrate zoologist and help find more gopher tortoise commensals!



## *Newsletter of The Gopher Tortoise Council*

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