



July 2012

Volume 3, Issue 7

MISSION

The Texas Master Naturalist program is a natural resource-based volunteer training and development program sponsored statewide by Texas AgriLife Extension and the Texas Parks and Wildlife Department.

The mission of the program is to develop a corps of well-informed volunteers who provide education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within their communities for the state of Texas

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ONE OF MY FAVORITE SUMMER ACTIVITIES AS A CHILD WAS SLEEPING OUTSIDE

By Freddie Franki

One of my favorite summer activities as a child was sleeping outside. We had some friends who lived on a ranch close to Driftwood and Camp Ben McCullough in Travis County. In August, before school started, we were allowed to sleep out on top of their flat-roofed carport! This was usually over a weekend so we spent two or three nights doing that. It was the greatest adventure and very little sleeping occurred. The night sounds and smells are so different from daytime. There was always a good breeze up there, so no mosquitos. We had a ladder to go up and down, convenient for raiding the kitchen. Telling scary stories in the dark makes one very hungry. And it was dark out there, away from town with no street lights. We did carry flashlights but only a sissy would suggest turning on the porch light.

And that is the point of this story, the dark sky. Soon after sundown, before getting on the roof, we could catch fireflies. We thought it was so cool to take a jar of fireflies up on the roof for "extra light". There was something magical about it. Fireflies are beetles; I believe our local variety is a *Photinus* within the beetle order *Coleoptera*. Their light is used for communication with each other. There are thousands of firefly species around the world and most are bioluminescent but those that are not use pheromones to communicate. I rarely see fireflies anymore and research shows they are disappearing. The cause is the usual list - loss of habitat, pesticides, and too much mowing. Fireflies need some woodland environment that includes a canopy cover and debris of leaves and old tree limbs. They also like to hang out in tall grass during the day. And a very interesting theory is the loss of dark sky has caused a decline in firefly population. Current studies show that artificial lighting causes fireflies to act differently meaning they don't flash and therefore don't communicate. Less flashing means less mating and according to the research, fewer little fireflies.

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The rest of my story has to do with the starry sky. Besides catching fireflies and telling scary stories, we always had a contest to see who could count the most falling stars. As it happens, August is the month for the most beautiful of all meteor showers, the Persied. Meteors are pieces of rock and dust from a comet's tail, in this case the Swift-Tuttle Comet which orbits the sun. Every August the Earth passed through the tail of this comet. Some of the debris enters our atmosphere causing it to burn brightly as it falls toward Earth. The Persied meteor shower appears from the direction of the constellation Perseus, thus

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AUGUST MEETING by Linda O'nan

Our August 1 meeting at the Kingsland Library will feature Jake Abels, who will give us a report on camp with the "Brigades". This is awards month with some great numbers to share. We also will have more information on a field trip to the Texas Memorial Museum on August 14. Stay cool and join us!

Nature Center News by Billy Hutson

The summer heat and vacations usually slow down the meetings for the HLMN and HLBWS for a month or two and the same goes for the Nature center. Since the kids science program investors chose to locate in Johnson City we have had to drop back to our original plan to raise money for the first large building with grants and local donors. We can't start with those campaigns until we get our 501(C)(3) for which the IRS has not assigned an agent to yet. They are seriously behind with a large backlog I am told. My last conversation with them indicated that we should be coming up on the block in a month or two.

In the meanwhile, to keep the momentum going,

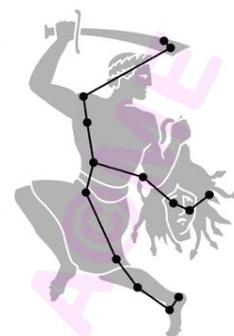
our UHLNC officers have been doing hiking programs for the members at RPR and keeping the gate plants watered. Not much else to do except for planning until fall when we can start working on a second nature trail, some kids fishing programs and maybe a bird blind.

Summer Skies (Continued from page 1)

its name. History records the Persied shower as far back as 36 A.D. There are several notable meteor showers throughout the year, each named for the constellation from whence it appears to radiate. For example, the Leonids shower in November seems to radiate from the constellation Leo.

The Constellation Perseus is in our northern sky and within the Milky Way.

The Persied shower is so numerous and bright that you don't need to find the constellation Perseus, the meteors appear throughout the sky from midnight until right before dawn. You may see 50 per hour if you have a dark sky and open horizon. This year the show starts late July/early August with the peak occurring August 11/12 and 12/13. There will be a waning crescent moon rising at midnight which should reduce the seeing only slightly. Unfortunately artificial lighting has made the stars disappear, along with the fireflies. But most of us are lucky, we live away from town or can easily drive out of town for good night sky viewing. So check it out in August, look for fireflies and falling stars.



EXCITING NEW PROJECT!

The 2012 Training Class Program was completed with surplus dollars. To put those dollars to effective use, it was suggested to the Board that we purchase an EnviroScope Wetlands Model to use as a valuable educational and public outreach tool. The Board has enthusiastically approved this new project.

Now we need to build a team to develop and present educational programs to a variety of audiences. If you are interested in participating in this project, please contact Sammye Childers at sammyen-mike@yahoo.com or 830.693.5061

To learn more about this model please access www.envirosapes.com/wetlands.html.

THE SWALLOW FAMILY AND WORLD BIRD NUMBERS

by Sherry Bixler

Swallows and martins are closely related; all belong to the *Hirundinidae* family. There are eight species in North America plus two accidental species: Common House Martins are occasionally seen in Alaska and the Bahama Swallow sometimes appears in the Florida keys.

The six hill country species include Purple Martins, Bank Swallows, Northern Rough-winged Swallows, Cave Swallows, Barn Swallows and Cliff Swallows. The Tree Swallow and Violet-green Swallow are rare migrants but have been recorded here.

Swallows are swift flyers and much easier to identify when they are perching on limbs or wires.

Purple martins love to use man-made nests which makes them easy and fun to watch. (Note that in western states the purple martin prefers to nest in tree cavities and will rarely use man-made houses). Purple martins are also the only species that can be all dark below. Barn swallows are easily identified by their long, forked tails. Cliff and Cave Swallows have orange to rust rumps and throats with mature Cliff Swallows having the darker colors. Bank and Northern Rough-winged Swallows have brown backs and pale bellies but the Bank Swallow has a band of brown across its chest.

Their slender bodies and pointed wings help them dart to catch insects and, like the swifts, they are extremely valuable for keeping insect populations under control.

All swallows except Cave Swallows lay four to six eggs and require four to seven weeks for fledging their young. Cave Swallows typically lay three to four eggs. Some swallows, especially the Cliff Swallow, will lay eggs in other swallow nests. Since Cliff Swallow nests are densely packed in large colonies, it is uncertain why this happens. Swallows also have very different nest site preferences. Tree Swallows, Violet-green Swallows and sometimes Purple Martins prefer tree cavities. Bank and Northern rough-winged Swallows like cavities in banks while Cliff, Barn and Cave Swal-



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lows build mud nests against walls, in caves and under bridges.

Birds in flight may be harder to identify but are often easier to count when bird numbers are needed. Christmas bird counts, hawk watches, shorebird counts, area counts and habitat surveys provide much needed information regarding these numbers. Count information has given Texas a claim to fame as it usually has the highest number of species in winter counts and only California and Florida join Texas in having 300 or more species in winter. Checking eBird's data reports is a good way to find more information on bird counts.

Worldwide, most bird counts show that North and Central America have about 2,000 species of birds. South America leads with 3,200 species and Asia has 2,900. Africa has 2,300, Australia and surroundings have 1,700, Europe has 1,000 and Antarctica has 65. Some species inhabit multiple continents but many are endemic to a continent or to a small area of a continent.

Each continent has its list of endangered species but recent good news about the increase in numbers for the Golden-cheeked Warbler may lead to its removal from the list. In addition to alerting scientists about low bird numbers, more and better bird counts can produce good results like this one.

SCORPIONS

By Phil Wyde

The other day I was working on my sprinkler system and had to go into a zone controller compartment. I got down on the ground, took off the lid of the compartment that I was interested in and peered down. I saw something unusual, but I was not sure what it was. As my eyes adjusted, I realized that I was looking at a scorpion, but not just any scorpion (see Fig. 1). It was covered with white lumps. Unusual or not, I was glad that I had not just reached in with my hand to adjust the valve.

I ran back to the house, got my camera and took the picture shown in Fig. 1. After studying it for a while, I realized that each of the white lumps on the scorpion had stingers and that each lump was actually a baby scorpion. This started me thinking about scorpions in general and what I knew and did not know about them. I then set out to learn more about these really unusual creatures. I would like to share some of the things that I learned with you.

First, there are about 2,000 species of scorpions in the world, nearly 80 of them are found in the United States and more than 20 in Texas (www.azscorpion.com/-Texas.html). Luckily, only 30 to 40 scorpion species have enough poison to kill a person, and apparently, none of these live in Texas. However, this said, all scorpions can deliver a very sharp, unpleasant sting that usually leaves redness around the stung area.

Scorpions belong in the animal kingdom, class *Arachnida* and order *Scorpiones*. Thus, they are closely related to spiders, mites and ticks – and like these creatures they have eight legs. Unlike spiders, mites and ticks, scorpions have a pair of grasping front claws (called pedipalps) and a narrow, segmented tail. As we all know, the last is often held in a characteristic forward curve over the back and culminates with a venomous stinger. Scorpions range in size from 9 mm (less than ½ inch) to 21 cm (~8 inches; <http://en.wikipedia.org/wiki/Scorpion>).

Figure 2 (taken from <http://en.wiki-pedia.org/wiki/Scorpion>) shows a schematic of a scorpion's body. I



Figure 1. Scorpion in sprinkler controller chamber

will not bore you with details but I would like to highlight a few things. First, the body is divided into three parts: the head or cephalothorax; (#1 in fig.), the abdomen or mesosoma (#2 in fig.) and the tail or metasoma (#3 in fig.). Note that the head is not a separate, moveable segment. Also note that scorpions have two large eyes and two to five pairs of smaller eyes (very much like spiders; there are three sets shown in Figure 2). The position of the eyes on the cephalothorax depends in part on the hardness or softness of the soil that the scorpions inhabit. The mouth parts (#6 in Figure 2) and pedipalps (claws or pincers; # 7-9 in Figure 2) are all located on the most anterior portions of the cephalothorax. The latter are used to hold prey, for defense, and for sensory purposes. The scorpion's carapace (exoskeleton) is thick and rugged. As indicated above, and as you would expect of an arachnid, there are 4 pairs of walking legs.

The mesosoma (#2 on Figure 2) or abdomen of scorpions consists of a number of segments. The first abdominal segment is important because it bears the sexual parts. Segments 3 to 7 contain the spiracles (respiratory organs).

All that I will mention about the metasoma or tail

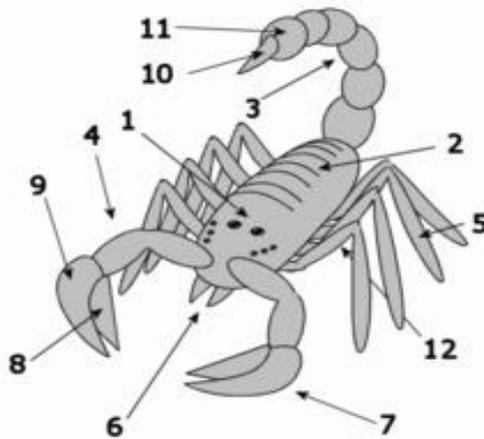
(#3 on Figure 2) is that it is quite flexible and contains the stinger of scorpions.

I know that most of us think scorpions only live in desert habitats. I was surprised to learn that they also live in Brazilian forests, areas of North Carolina and as far north as British Columbia (Canada for those of you geographically challenged) and the Himalaya Mountains (<http://animals.nationalgeographic.com/animals/bugs/-scorpion>). Although not indigenous to Great Britain, New Zealand or islands in [Oceania](#), they were accidentally introduced into these areas and now persist there (Williams, S.C. 2009. "Scorpions" In Vincent H. Resh & Ring T. Cardé. *Encyclopedia of Insects* (2nd ed.). [Academic Press](#). pp. 904–909). However, scorpions require loose soil, so they do not live in areas with per-

birds, centipedes, lizards, possums and mice; (<http://www.amonline.net.au/-factsheets/scorpions.htm>).

Scorpions eat mostly insects. However, some larger species have been known to kill small lizards and mice. Very interestingly, when food is scarce, scorpions can lower their metabolism to less than 1/3 their normal metabolic rate. This enables them to use much less oxygen than normal and survive on as little as ONE INSECT PER YEAR! Remarkably, they can quickly increase their metabolism and return to their predatory ways when a potential victim approaches (<http://animals.national-geographic.com/animals/bugs/-scorpion>).

The pedipalp claws of scorpions are lined with highly sensitive tactile hairs. When a prey touches



Key to the parts

Scorpion anatomy:

- 1 = Cephalothorax or [Prosoma](#);
- 2 = Abdomen or [Mesosoma](#);
- 3 = Tail or [Metasoma](#);
- 4 = Claws or [Pedipalps](#)
- 5 = Legs;
- 6 = Mouth parts or [Chelicerae](#);
- 7 = pincers or [Chelae](#);
- 8 = Moveable claw or [Manus](#);
- 9 = Fixed claw or [Tarsus](#);
- 10 = Sting or [Telson](#);
- 11 = [Anus](#).

Figure 2 Scorpion Schematic Parts

mafrost (cold tundra), Antarctica, high up the Himalayas or areas with very thick grass). However, don't think because of these limitations that scorpions are "pansies." If you have any doubts, just consider that they have lived on this planet for hundreds of millions of years. Also, they can survive being frozen overnight in a freezer. A few other interesting facts on scorpion habitats include: some scorpion species live in trees, some are rock-loving and some like [Vaejovis janssi](#), are not particular and live in every type of habitat found in Baja California (Ramel, G. "[The Earthlife Web: The Scorpions](#)". The Earthlife Web. <http://www.earthlife.net/-chelicerata/scorpionidae.html>).

Scorpions are generally nocturnal. Thus during the day they usually hide underground or under rocks where it is relatively cool. At night they come out to hunt and feed. One obvious advantage of this behavior is that they can evade many of their predators (e.g.,

these, the pincers mercilessly squeeze the victim. The scorpion then injects the caught quarry with neurotoxic venom from its stinger. This toxin is generally fast-acting and paralyzes or kills the trapped insect. (The toxin is also used as a defense against predators.) Using small mouth parts that protrude from its mouth the scorpion pulls off small pieces of tissue. However, it does not eat the pieces intact or directly. Instead, since scorpions can only intake food in a liquid form, they digest the pieces externally by "egesting" digestive juices from their gut onto the pieces. Any indigestible matter is separated out in a pre-oral cavity. This matter is expelled later (Polis, G.A. (1990). [The Biology of Scorpions](#). [Stanford University Press](#)).

The life spans of scorpions appear to vary according to species. The age range appears to be between 4 to 25 years (25 years being the maximum reported life span in the species [Hadirus arizonensis](#);

en.wikipedia.org/wiki/Scorpion).

Interestingly, scorpions glow when exposed to certain wavelengths of [ultraviolet](#) light such as that produced by a [black light](#). Indeed, hand-held UV lamps are often used to survey for scorpions at night (Stachel, S.J; Stockwell, S.A. and Van Vranken D.L. (1999). "[The fluorescence of scorpions and cataractogenesis](#)". *Chemistry & Biology* (Cell Press) 6 (8): 531–539). I have friends in Wimberley that have done this. They tell me that if you go out at night and look around your foundation and yard with a black light, you may never sleep calmly again – or take evening strolls. In short, in this area of Texas scorpions are much more common than you know.

Most scorpions reproduce sexually, although some species reproduce via parthenogenesis (the process by which unfertilized eggs develop into embryos). Sexual reproduction is accomplished by transferring a [spermatophore](#) from the male to the female. This is not done directly but follows a complex [courtship](#) and [mating](#) ritual. The courtship starts with the male taking hold of the female's pedipalps (little claws) with his own claws. The pair then perform a "dance" called the "*promenade à deux*." In this "dance," the male leads the female around searching for a place to deposit his [spermatophore](#). The courtship also includes a "cheliceral kiss," in which the male's [chelicerae](#) – mouth pincers – take hold of the female's. In some cases he injects a small amount of venom into her pedipalp or cephalothorax, probably to pacify her (Hickman, C. P., Roberts, L.S., Larson, A., l'Anson, H., Eisenhour, D. (2005). *Integrated Principles of Zoology* (13 ed.). McGraw-Hill Science/Engineering/Math. p. 380). As this ritual often occurs under a moon-lit sky, how could she resist him?

When the male has identified a suitable location on the ground, he deposits the spermatophore and then guides the female over it. This allows the spermatophore to enter her [genital opening, the opercula](#), which triggers release of the sperm from the spermatophore, and results in the fertilization of the eggs that the female is bearing. The mating process can take from 1 to more than 25 hours.

Unlike most [arachnid](#) species, which are [oviparous](#), scorpions are [viviparous](#). That is, the young are born after hatching [inside](#) the female. (With oviparous birth the babies are born [outside](#) the body, for example what occurs with catfish; Master Naturalists, do you know the advantages of viviparous birth compared to oviparous birth?) After this internal hatching, the young (called scorpplings) are expelled one by one from

her body. They then climb up on the back of the female and [stay there until they have undergone at least one molt](#) (this is what I stumbled onto when I took off the lid of my controller compartment). The baby scor-



Figure 3. Scorpion with Babies (from Google search for scorpions in Texas)

pions REQUIRE this maternal protection since the momma scorpion not only protects the scorpplings from predators, but also regulates their moisture level. (Doesn't the word scorppling make you think that the baby scorpions are warm and cuddly?) In some species, e.g., [Pandinus](#) spp., the scorpplings and mother stay together for extended periods of time. The size of the litter varies from a few to more than 100 depending on the species and environmental factors. The average litter however is about 8 (Lourenco, W. R. (2000). "[Reproduction in scorpions, with special reference to parthenogenesis](#)". *European Arachnology*: 71–85).

Young scorpions generally resemble their parents. Growth is accomplished by periodic shedding of the exoskeleton ([ecdysis](#)). Developmental progress is measured in [instars](#) (how many molts it has undergone) and it typically requires between five and seven molts for the scorpplings to reach maturity. Right after each molt, the [exoskeleton](#) of a scorpion is soft, making it highly vulnerable to attack.

To end this article I have included a picture taken of a scorpion mother with young obtained by asking Google for images of scorpions in Texas. It is a better picture than mine, but very similar. Indeed it looks like the same species. I included my picture because: 1) it shows the scorpion in its natural habitat; and 2) mine better shows just how camouflaged the scorpion was. I hope that knowing more about scorpions diminishes your natural hatred of this truly fascinating creature. After all, what are they guilty of: eating insects (primarily), protecting themselves and trying to survive?

GALLERY

by Jerry Stone



Purple Leatherflower (*Clematis Pitcheri*) taken at Inks Lake State Park on 6/3/12



Purple Leatherflower (*Clematis Pitcheri*) seedpod taken at Inks Lake State Park on 6/3/12



Photo of Stick-leaf (*Mentzelia oligosperma*) taken at Inks Lake State Park Valley Spring Trail on 5/26/12

Stewardship

An ethic that embodies cooperative planning and management of environmental resources with organizations, communities and others to actively engage in the prevention of loss of habitat and facilitate its recovery in the interest of long-term sustainability



Balsam-Gourd (*Ibervillea Lindheimeri*) taken at Inks Dam Fish Hatchery on 6/3/12. Note the vine attachment

GALLERY

by Jerry Stone



Yellow-Puff (*Neptunia lutea*) taken in Inks Lake State Park on 6/3/12. Yellow-Puff is similar to sensitive briar as the leaves will fold up after being touched. See the before and after shots where I touched one of the leaves.



Velvet-leaf Mallow (*Wissadula holosericea*) taken in Horseshoe Bay on 6/3/12.



Talinum (*Talinum parviflorum*) taken at Inks Lake State Park on 6/3/12

GALLERY

by Jerry Stone



Drummond Phlox (*Phlox Drummondii*) taken at Inks Lake State Park on 6/3/12. According to Joe Marcus of the Lady Bird Wildflower Center, Drummond's Phlox is amazingly variable in flower color, though the common variety that grows in the Hill country is less variable than some other varieties. The flower colors are classified as botanical forma and are not given any special distinction in the botanical sense.



Rose Mallow (*Pavonia lasiopetala*) taken in Horseshoe Bay on 6/3/12



Tasajillo blossom taken in Horseshoe Bay on 6/3/12.



Pictures of Frog-Fruit (*Phyllia incisia*) taken in Horseshoe Bay on 6/2 and 6/3/12

JULY - AUGUST EVENTS & VOLUNTEER OPPORTUNITIES

Identifying the Grasses of Central Texas - Brian Loflin Balcones Canyonlands National Wildlife Refuge	Jul 21
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FUTURE EVENTS & VOLUNTEER OPPORTUNITIES

HLMN Monthly Meeting Kingsland Library	Aug 1 1pm
Addressing Resource Concerns in the Edwards Plateau - http://tinyurl.com/kerrarcep Kerr Wildlife Management Area	8/3, 9/7, 10/5
Texas Bat Symposium https://www.batworld.org/brit-program-sign-up Bat World Sanctuary, Mineral Wells, TX	Aug 11
HLMN Field Trip Texas Natural Science Center and Bob Bullock Museum Austin	Aug 14
Texas Groundwater Summit http://www.iemshows.com/2012TGS/ Crowne Plaza Hotel, Austin, TX	Aug 28-30
Swift Fest Jonestown, Texas	Sept 8
Kids Day Out Burnet (location TBD)	Sept 15
Renewable Roundup & Green Living Fair Fredericksburg	Sep 29-30
Native Plant Society of Texas Annual Symposium Kerrville, TX	Oct 4-7
Refuge Week Balcones Canyonlands National Wildlife Refuge	Oct 13 8:30am-4pm
Texas Native Plant Week Various activities providing volunteer and advanced training opportunities	Oct 14-20
Texas Mater Naturalist Conference Camp Allen, Navasota, TX	Oct 26-28
Rainwater Revival http://rainwaterrevival.com/ Boerne, TX	Oct 27
Texas Society for Ecological Restoration Annual Conference - txser.org Rio Grande Valley & World Birding Center, Weslaco, TX	Nov 2-4
HLMN Galveston Field Trip Galveston Island	Nov 11-15

For volunteer opportunities and events scheduled at Inks Lake State Park, Blanco State Park, and Balcones Canyonlands, Balcones Canyonlands Preserve, check these websites for information:

http://beta-www.tpwd.state.tx.us/state-parks/parks/find-a-park/inks-lake-state-park/park_events/

http://beta-www.tpwd.state.tx.us/state-parks/parks/find-a-park/blanco-state-park/park_events/

<http://www.fws.gov/southwest/refuges/texas/balcones/>

<http://friendsofbalcones.org/>

<http://www.ci.austin.tx.us/water/wildland/onlineregistration/ecowebevents.cfm>

Please submit pictures, articles, reports, stories, calendar and event entries, etc. to chili865@gmail.com. Photos should have captions and appropriate credits. The deadline for submissions to each month's newsletter is the 10th of the month and publication will be by the 15th.