



Highland Lakes Steward

January 2014

Volume 5, Issue 1

MISSION

The Texas Master Naturalist program is a natural resource-based volunteer training and development program sponsored statewide by Texas A&M 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

OFFICERS

President
 Pat Campbell
 pat.campbell@dishmail.net
 (512) 715-0176

Vice-President
 Chris Faught
 Crisfaught1@hotmail.com
 (512) 261-6583

Secretary
 Barbara Booth
 boothbarbara@hotmail.com
 (512) 470-5534

Treasurer
 Blair Feller
 blair.feller@gmail.com
 (830) 385-2782

A NEW YEAR

By Pat Campbell

Happy new year! I am so looking forward to this year and working with everyone to make this another successful year. Last year saw us volunteering over 14,000 hours for the benefit of the area. 2014 will be another exciting year as we look forward to undertaking new projects as well as the ongoing ones. We look forward to completion of the Inks Lake State Park Bird Blind for one.

I hope that everyone will continue to find areas of interest in which to volunteer and make this another banner year. We certainly have a buffet of projects from which to choose, so pick one and join the fun. Working along side other members is a great way to get to know people and the rewards are many.

The trip committee is already working on some amazing adventures for us. So save your pennies and get ready to join us. More to come on this!

There are still some positions open for this year. The watershed committee needs a chairman and people are needed for continuing the pest of the month program and for reviewing the operating manual. So please respond positively if asked. Get and keep involved!

Congrats to Sue Kersey on achieving her 2500 hours pin. That makes two of us!

Way to go Sue!

The board is facing new challenges that we hope will be met and solved to the benefit of all our members, our organization and the community within which we work.

We appreciate all of your input and concerns. While it is not always possible to please everyone we will work within the given guidelines to solve whatever issues we face.

I have been amazed as I have hiked on my ranch at the surprises that I find. There nestled in the dead grass will be a brilliant patch of green peeking through. Or I will see some green on a rock along the creek. I guess the algae, and bryophytes (I learned this word at the conference) have enjoyed our winter weather.



INSIDE THIS ISSUE:

A New Year	1
Pat Campbell	
February Program	2
Chris Fraught	
January Program	2
Mike Childers	
2500 Hours!	3
Balcones Canyonlands News	4
Joan Mukherjee	
Amphibian Watch	4
Joan Mukherjee	
Doris Mager—the Eagle Lady	5
Phil Wyde	
The Pleated Woodpecker	7
Joanne Fischer	
HLNPSOT Program - Floral Fauna	8
Baarbara Booth	
Bug Basics	9
Phil Wyde	
Gallery	14
Cathy Hill, Sue Kersey	

Please submit pictures, articles, reports, stories, announcements, 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.

FEBRUARY PROGRAM by Chris Fraught

Mike Ross is a Biologist with an interest in native and exotic amphibians and reptiles we see in the Texas Hill Country. His presentation will include live and preserved specimens for us to see and experience. We will be introduced to the tools available to identify and classify specimens and be informed in ways research is done in this interesting field.

Mike and his wife Olivia have many years experience in working with Master Naturalists, so this will be an interactive and informational class.

Next month's Meeting will be February 5th and will begin at 12:30 at the Methodist Church.

LAST MONTH'S PROGRAM

At our January meeting, Charlie Neuenschwander provided an overview of how to deal with your basic disasters by staying home and having a good plan and ample supplies for the duration of the event.

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

2500 HOURS - CONGRATULATIONS SUE!



Sue Kersey receives her 2500 Hour Pin from Past Chapter President Linda O'nan and current President Pat Campbell.

Photo by Phil Wyde

BALCONES CANYONLANDS NEWS

by Joan Mukhergee

The mission of the Friends of the Refuge is to support, complete and enhance the Balcones Canyonlands National Wildlife Refuge and its diverse ecology and to promote its use for recreational, educational and scientific purposes. During the summer the refuge hosts students who work on a variety of scientific projects. The Friends group plans and hosts SparrowFest, Songbird Fest and Refuge Week and several other small group outings during the year. They also partner with Jonestown to do SwiftFest in September. The refuge organizes school educational outings we call Going Buggy and Bridges to Birding, which are staffed by volunteers who teach about insects and birds. Many of the volunteers are from HLMN. The refuge also hosts a youth deer hunt in the fall.

Upcoming events include SparrowFest on February 8th which features both field and classroom sessions led by sparrow experts. If you have been frustrated by those LBJ's (little brown jobs) this is a good opportunity. We see 20+ species on the refuge. See friendsofbalcones.org for more information.

On February 9th there is bird walk to look for wintering birds.

April 25th to 28th is Balcones Songbird Festival. Registration begins Feb. 15th and the schedule of events is already on the website, friendsofbalcones.org. There are many birding and other nature events with experienced leaders. Sunday is family day with children's activities, entertainment, and food. Every year the attendance has increased for this event.

The only part of the Refuge that is open to the public at all times is Doeskin Ranch where there are now two hiking trails. With nearly 30,000 acres of prime Hill Country land, the refuge is an uncut jewel. We are getting more and more HLMN members in the area who could support additional activities. I am hoping we can develop more opportunities for the public to enjoy the Refuge. Please let me hear your ideas.



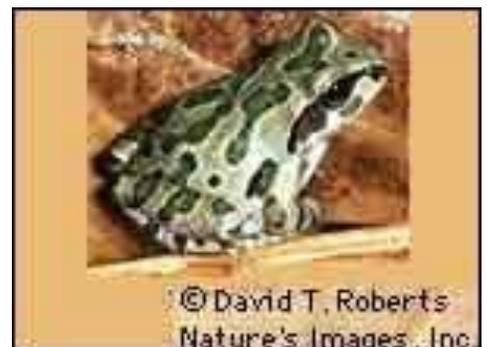
Photo courtesy of Rob Iski USFWS

AMPHIBIAN WATCH

by Joan Mukhergee

Are you listening? Now is the time that Strecker's Chorus Frogs mate. Yes, January to March. On a nice sunny afternoon or warm evening you are likely to hear them if you are near water. You may also see other frogs along the water at this time of year who are not singing. Below is a photo of Strecker's Chorus Frog. He is only 1-1 5/8 inches long. Go to www.tpwd.gov/tracker to play his song. You may be able to play it from the picture below with CTRL+click.

Two years ago we had training for amphibian watch, which raised awareness of our local amphibians. But I have failed to get any of you to keep a record and report. Reporting is important because amphibians are very sensitive to their environment and thus are an excellent way to monitor the health of our environment. Despite the drought I haven't given up. Starting in March I will regularly monitor at two or three public sites where anyone who is interested can join me. One will be at Balcones Canyonlands Refuge headquarters and the others farther west. Please send me your suggestions for convenient monitoring sites since I am not familiar with that territory. I propose to start at sunset, on the second and fourth Wednesdays of the month. More specifics to follow.



© David T. Roberts
Nature's Images, Inc.

DORIS MAGER, “THE EAGLE LADY,” INKS DAM NATIONAL FISH HATCHERY

by Phil Wyde

As many of you know, Doris Mager, the Eagle Lady, gave a series of presentations in our area on December 28th. During these performances she exhibited her live birds, ET a great horned owl, Tex a cute, but fierce looking, screech owl and EV Yaah a beautiful American kestrel. She also displayed, showed and talked about different bird items, bird pictures and articles of clothing covered with dynamic avian images. Best of all she told funny, thoughtful (sometimes somber) and poignant stories of her years of experience with hurt raptors. I only took part in the presentation that took place in the large "Shop (or Maintenance) Building" located at the Inks Dam National Fish Hatchery, and it is this particular event that I would like to tell you about.

Doris's presentation at the Hatchery took place at 10 a.m. in the morning. It was a beautiful, cool and clear morning. I think that contributed to the good turnout that we got: 150 children and adults (many of them families). Of course the publicity blitz carried out by Sue Kersey for several weeks prior to the 28th probably helped out also. Regardless, starting at 9:30 a.m. cars came rolling onto the Hatchery grounds. Ray Buchanan greeted them at the Park Road 4 Hatchery entrance, Hollis Neir greeted them ½ way up the entrance road and when they got to the parking area, Richard Nichols, Billy Hutson and Marvin Bloomquist welcomed them still again and helped them to park. But that was not enough. For the last 200 feet from the parking area to the presentation site we had "shepherds" greeting and shepherding the visitors to their seats. And what seats they were: premier hay bales in the front for children and some older folks, and first rate folding chairs for many of the other adults. (Andrea Roach drove almost to Lampassas to get the hay bales and deliver them to the presentation site.) Because of the overflow crowd a significant number of people had to stand throughout the presentation. But despite this and the large number of visitors, things went very well. Indeed, with only one exception, I heard only enthusiastic approval and effusive accolades about Doris's and our efforts. (The one disappointing note that I heard was from one person who was disenchanted because there was no live bald eagle in the show.) I think that the HLMN and FOIDNFH volunteers that helped make the building presentable and safe, and that set up the hay bales, chairs and tables



Happy and Proud Young Lady Holding ET



Doris Mager, Debora Moroney and Tex
Photo by Jeff McSpadden

the day before this event deserve many thanks – as do the volunteers that greeted, directed, helped with the parking and shepherded the guests.

Doris and her birds were in top form. Virtually everyone at the presentation was inspired and awed. As I have already stated, we heard and received—with the exception noted above--nothing but the most laudatory comments about her, the birds and the entire

presentation. I think that the event can be judged as very successful by a number of measurements: 1) Doris and her organization, Save Our American Raptors (S.O.A.R.), got a record amount of donations; 2) she had excellent sales of her shirts, hats and other items [the profits of which are used to help fund S.O.A.R. and Doris's traveling expenses]; 3) the



Another Convert to Nature

attendees gained much respect for, and learned much about, raptors, nature and conservation; and 4) the Inks Dam National Hatchery, the HLMN and FOIDNFH got a lot of good exposure and public relations. There truly was a lot of laughter, oos and aaaahs and learning along with a number of memorable moments, during the event. The last mostly involved either the birds (e.g., E.T. flying) or the interaction of the birds with the children. I think most, if not all, of the children were mightily impressed. In fact, I would say that most of the adults were, too. Thus, I think that it is not an overstatement (or a cliché) to summarize Doris's Inks Dam National Fish Hatchery presentation as truly "awesome." I think that with this event we (HLMN, FOIDNFH, IDNFH and the U.S. FWS) truly fulfilled our mission to educate and stimulate enthusiasm for nature, conservation and the outdoors.

I only mentioned by name a few of the volunteers that helped prepare for this event, helped during the presentation, and cleaned up after everything was over. However, each of you that participated should feel proud; you were a remarkable team and did a really great job. Special thanks also have to go to Paul Dorman, Hatchery Manager, and the rest of the Hatchery personnel (Greg, Julie and Larry). They were extremely cooperative, helpful and made everything possible.



EV Yaah (American Kestrel) Up Close



Tex the Screech Owl



ET Flying to Her Perch



ET Ruffling

THE PILEATED WOODPECKER (AKA WOODY WOODPECKER)

by Joanne Fischer

The Pileated Woodpecker is one of the largest, most striking forest birds in North America. The name "pileated" refers to the crest covering the "pileum" or top of the head. It is in the family Picidae and is a year round resident in Texas in the eastern third of the state. Although the Hill Country is not officially part of its territory, Pileated Woodpeckers have been spotted on properties of several of our Highland Lakes Master Naturalists. The species is common west to Bastrop, north to Denton and south to Victoria and Goliad. If you have never seen this species – a short drive to find one would be well worth the effort.

Woodpeckers, in general, are fascinating birds because of some unique physical characteristics. As an example, the bones of the skull in woodpeckers are thick and heavily ossified so they are able to withstand the vigorous poundings that they take. Their bills are thick and chisel shaped so they can excavate for nests and forage for food. They have short legs and strong claws that enable them to climb and cling to the sides of trees. They even have a different toe configuration than most other species of birds. Instead of the normal arrangement of three toes pointing forward and one back, they have a reversible toe that is usually directed backward to facilitate vertical climbing. Woodpeckers also have unusually stiff tail feathers supported by large muscles which allow the tail to act as a prop as they move up and down trees and act as a brace when they are excavating or foraging. Their tongues are similar to that of a hummingbird in that the woodpecker is able to thrust it several inches beyond the tip of the beak so it can find insects deep within tree cavities. And finally, several woodpecker species, including the Pileated, have tufts of feathers over their nasal cavities to protect them from flying wood chips.

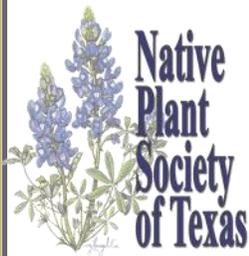
The Pileated Woodpecker is approximately the size of a crow. It is mostly black with bold white stripes on its face and down its neck and a flaming red crest. The male has a red whisker (malar) stripe on its face while the female has a gray forehead and mustache stripes. As with all woodpeckers, the Pileated has a distinct undulating flight pattern.



Pileated Woodpeckers live in mature deciduous or mixed deciduous-coniferous woodlands. They require large, standing dead trees and downed wood. The bird's primary diet is carpenter ants (now I know why we had a pair living in our yard in Minnesota - we had a carpenter ant infestation that included our house!) The diet is supplemented by other ants, beetle larvae, termites and other wood boring insects. They are also known to eat fruits and nuts when ants and insect supplies are insufficient.

Pileated Woodpeckers are non-migratory and typically monogamous. They are cavity nesters and prefer large trees for nesting sites. The male performs most of the nest excavation and the entrance hole is oblong rather than the circular shape of most woodpecker holes. Pileated Woodpeckers don't line their nests with any material except for leftover wood chips and the nest construction can take between 4 to 6 weeks. The cavity depth can range from 10 to 24 inches. They raise one brood per year. The eggs are white (seemingly because there is no need for camouflaging them) and are more rounded than other bird eggs (no need for oval shapes with pointed ends to prevent the egg from rolling from the nest). Both parents incubate the eggs and feed the young.

(Continued on page 8)



Highland Lakes Native Plant Society of Texas

Presents on

January 18, 2014

Marble Falls Library

1:00 pm

"Floral Fauna"

There is more going on in your garden than you might ever imagine. While it is well known that flowers lure such showy visitors as hummingbirds and butterflies, there is a lot more that occurs within this unique habitat. This talk will cover the wide range of arthropods that utilize blossoms as a place to find food and mates, as well as the relationships and interactions that occur between species.



Presenter: Valerie Bugh is a local naturalist specializing in the arthropods of the Austin area, with interests in taxonomy and photography. She runs the Fauna Project at the Lady Bird Johnson Wildflower Center, leads insect discovery walks, teaches entomology courses, provides insect/spider identifications, gives talks to local organizations, and has published a pocket guide to "The Butterflies of Central Texas." Website: www.austinbug.com

The Native Plant Society of Texas promotes the conservation, research, and utilization of the native plants and plant habitats of Texas. Meetings are free and the public is encouraged to attend. Approved for Master Gardener and Naturalist AT.

Woodpecker (Continued from page 7)

The Pileated Woodpecker uses its beak and "jackhammers" for three distinct purposes: to excavate, to forage and to communicate. The woodpecker's communication technique (called drumming) takes the place of song and is used for territorial and courtship purposes.

And now to Woody Woodpecker. This cartoon character was created in 1940 by Walter Lantz, a storyboard artist for Universal Pictures. According to

reports at the time, the idea for Woody came during Lantz's honeymoon in Sherwood Lake, California. A noisy Acorn Woodpecker had kept the honeymoon couple awake all one night boring holes not only in surrounding trees but also in the cabin they were occupying. The next morning Lantz wanted to shoot the thing, but his wife suggested that instead, her husband make a cartoon about the bird and thus Woody was born. Although allegedly based on an Acorn Woodpecker, Woody evolved over time (artistic license) to share more characteristics with that of the Pileated Woodpecker.

BUG BASICS

by Phil Wyde



Photo by Phil Wyde

Lately I have been thinking a lot about insects and other bugs. The reason for this is of course, BILLY! (My life would be so much simpler without him!) He asked me to help develop a curriculum for a “Bug Station” at the Upper Highland Lakes Nature Center (UHLNC) where Girl Scouts could get their “Bug Merit Badge” and others could learn basic information about bug and insect. I said “yes” thinking that it would be easy. HA!

I started changing my mind about how easy it would be to develop a program for a Bug Station a few days after Billy made his request. I was sitting on a small seat weeding a part of my yard and thinking about a myriad of different things (weeding and aimless thinking are two things that are incessant, cathartic activities of mine). As I was doing this, I became absorbed with several of the tiny creatures scuttling about me and somewhere in this reverie I asked myself, “What is a bug, what is an insect and is there a difference?” I thought that I knew the answers to

these questions, but decided that I would check on them. (Do you know without looking?) Hours later when I had done all of the weeding that I could stand that day, I very slowly stood up and walked hunched over and aching into the house, turned on my computer and asked Google what it thought a bug and an insect were. Needless to say, I got more than I bargained for! I found out that a bug can be:

- A harmful microorganism (e.g., a bacterium or virus)
- An illness (e.g., “a stomach bug”)
- An enthusiastic, almost obsessive interest in something (“they caught the sailing bug”);
- A miniature microphone;
- An error in a computer program or system; or
- A small insect or mite; informally a “creepy-crawly, beastie.”

The last definition was close to what I had in mind for the word, “bug;” that is that insects were a group of animals within a larger (non-scientific) category of “bugs.” For example, I thought, and still think, that spiders, centipedes and millipedes are bugs, but not insects. Thus to me the term “bug” incorporates a number of little creatures, including insects. I was less happy with the informal definition of bug that was given; what did “creepy-crawly, beastie” mean? Does creepy here mean “scary” or just that the beastie creeps along the ground? I think the reason I was most nonplussed with this definition is that to me most bugs are not “creepy-crawly” or “beastie.” I find most bugs fascinating and captivating.

Despite this “rocky” beginning, I have continued working on a potential Bug Station Program that could be used at the UHLNC and during this effort I have come across a number of different facts about insects and other bugs that I would like to share with you. Some of you may know most of what I will be telling you, some of you may have known most of these things, but have long since forgotten them, and some of you may never have known these things. No matter what category you are in, I hope that you all read on and realize again, or for the first time, that bugs are really interesting. Actually I have a selfish reason for getting you excited about bugs; I want to get HLMN volunteers to work with me at the UHLNC Bug Station.

All of the information below was excerpted from references 1 – 4. Keep in mind that the facts that I am listing refer to ADULT insects and bugs.

Interesting Facts About Insects

- Insects and bugs are ANIMALS.
- Indeed, nearly $\frac{3}{4}$ of all animals are insects!
- Indeed again. There are more known species of insects than all other animals and plants species combined!
- What is more, there are probably 100s of thousands of species of insects that have not yet been discovered!
- According to fossil records, insects have been

around for more than 350 million years.

- Some of these ancient insects were very large (e.g., dragonflies with wingspans in excess of 2 feet and an estimated weight of over 1 pound [about the size of a crow]).
- In present times, the largest known insect is a walking stick (*Phobaeticus cani*). One example of this species (it is in the Natural History Museum in London) is 14.1 inches long.
- Other examples of large insects are praying mantises (the largest known being a female African mantis that measured 12 inches) and several species of beetles (the largest known example being a Hercules beetle [*Dynastes Hercules*] that measured 9 inches from the tip of its horn to its back end).
- However, as most of you know, presently most insects are quite small (e.g., mosquitoes and flies) suggesting that their small size is a biologic advantage.
- Of course the very high reproductive rates and very diverse feeding habits of insects have probably contributed as much, and maybe more than size, to their great success.

By any measure, insects are a biologic success! They are ubiquitous and live – indeed thrive – in almost every known habitat!

Other Interesting Facts About Insects

- Beetles make up the largest group of insects (i.e., more than 1/3 of all named species of insects. Translated this means that there are more than 300,000 species of beetles.)
- The next most common types of insect are butterflies and moths (Lepidoptera).
- There are 125,000 species of wasps and bees (Hymenoptera).
- There are about 20,000 species of flies (Diptera).
- These 4 groups of insects make up >80% of the named species of insects.

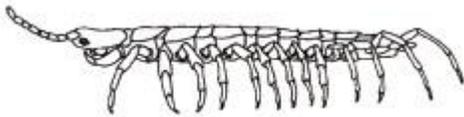
- There are approximately 92,000 named species of insects that live in the United States and Canada.
- It is thought that the number of insects that live in California, Arizona, Texas and Florida greatly exceeds the number of insects found in the Midwest and northern parts of the U.S.
- People that study insects are called entomologists.
- The particular branch of study of insects is called entomology.
- All insects have 6 legs
- Other bugs may have 8 (e.g., spiders), 10 (e.g., a pill bug) or many more legs (e.g., centipedes and millipedes).
- All insects have 3 distinct body parts (head, thorax and abdomen). Some bugs that are not insects may have their head and thorax combined. If so, this combined body part would be called a cephalothorax.
- Most insects usually have a pair of compound eyes and two antennae. However, some insects and other bugs have more than two eyes, e.g., spiders, or two sets of antennae.
- Insects may or may not have wings and some have 1 and some 2 pair.
- The mouth parts of an insect vary in appearance depending on the diet of the insect. Thus they can be designed to bite and chew (e.g., the mouth of a grasshopper), pierce and suck (e.g., the mouth of mosquitoes), sponge (e.g., the mouth of a house fly) or siphon (e.g., the mouth of a butterfly).
- The head of an insect contains the antennae, eyes and mouthparts, the thorax is the middle part of the body to which the legs and wings are attached, and the abdomen contains the digestive, respiratory and reproductive organs.
- The exoskeleton of insects is made up of chitin (a hard material similar to that of human fingernails). The exoskeleton holds the insect together and in addition protects the insect from physical injury and desiccation (drying out).
- The legs of insects can differ depending on whether they are designed for jumping, digging, swimming, grasping or running. Insect legs are almost always segmented.
- The wings of insects are made of a thin membrane containing veins. Different insect orders may have differences in their wings (e.g., the wings of flies and butterflies).
- Because insects have hard, rigid exoskeletons which are on the outside of their body, to become larger an insect must periodically shed the old exoskeleton, expand in size, and then grow a slightly bigger exoskeleton than the one it just shed. This process is called shedding or molting. The intermediary insect forms resulting from each molting are known as instars.
- After each molting, the new flexible skin is expanded by pumping it up with air or water. After expansion, the new exoskeleton hardens and takes on color. This process of molting may occur several times during the growth of an insect, depending upon what species it is.
- Once insects and many bugs become an adult, growth ceases.
- The sides of the thorax and abdomen of insects are lined with tiny spiracles (pores) through which they obtain oxygen. (The oxygen enters through these spiracles and then diffuses throughout their bodies.)
- Here is a fascinating fact; you can drown an insect such as a grasshopper by keeping its abdomen, but not its head, under water.
- The larval forms of aquatic insects have gills as do some bugs (roly polies for example).
- Many insects can taste with their feet, smell with their antennae and hear with special structures in their feet, abdomens and sometimes antennae. As noted above they can often see through many eyes.

- With only a few exceptions insects begin life as an egg. In general, the insect that comes out of the egg is a miniature version of the fully grown insect. The change in form from egg to adult in insects is termed metamorphosis.

Spiders.

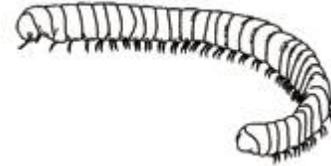
- Spiders have 4 PAIR OF LEGS (i.e., 8 legs)
- Spiders do not have antennae
- Daddy-long-legs are not true spiders (they do not have a segmented body)

Centipedes (Chilopoda (chili=thousand, poda=legs) (Cent indicates 100 legs and chili 1000 legs. That is science for you. If you actually count legs you will very likely get neither.)



- Centipedes have long and somewhat flattened and many-segmented bodies.
- Centipedes have one pair of legs attached to each body segment.
- Centipedes have long antennae.
- Centipedes have fangs which they use to catch, hold and eat their prey.
- The fangs of centipedes secrete a poison which immobilizes the prey after they are caught.
- Centipedes differ from millipedes.

Diplopoda (di=two, poda=legs) millipedes (milli=1000; pedes=legs) (Here we are getting a name indicating 2 legs/segment or 1000 legs total.) If you actually count you will get 2 legs/body segment, but almost certainly not get 1000 legs total.)



- Millipedes have more than one pair of legs/segment of body.
- Millipedes have rounded bodies.
- Millipedes are slower than centipedes.
- Millipedes normally feed on dead or decaying matter.
- Millipedes do not have fangs or poisons to kill their food.

Crustacea (crust=shell-like) sowbugs, pillbugs, shrimp, lobsters, crabs



sowbug



Figure 5. Pill (roly poly) bug

- Pillbugs and sowbugs have hard exoskeletons.
- They have at least five pairs of legs and a cepha-

lothorax.

- They also have one or two pair of antennae.
- They live on land but have GILLS. Thus to survive they must live in moist habitats (e.g., mulch, decaying leaves or in wooded areas with much debris).

A list of all the insect orders (the total will vary depending on the source that you use.)

Collembola, Thysanura, Ephemeroptera, Odonata, Dictyoptera, Orthoptera, Dermaptera, Isoptera, Plecoptera, Psocoptera, Mallophaga, Anoplura, Thysanoptera, Hemiptera, Homoptera, Neuroptera, Megalo-
optera, Coleoptera, Mecoptera, Trichoptera, Lepidoptera, Diptera, Siphonaptera, Hymenoptera

Are Insects Good or Bad?

- They are a major cause of damage to agricultural plants, ornamental plants, and native plants;

- They can be extremely destructive to food during production and storage;
- They destroy buildings;
- They can be carriers of a number of different harmful and lethal human and animal diseases (e.g., flies and mosquitos).
- They are major pollinators of plants (e.g., bees)
- They are important of limiting bad bugs (e.g., ladybugs)
- They can be things of great beauty (e.g., butterflies)
- They can be things of great beauty and be destructive (e.g., All butterflies come from caterpillars. Also, isn't the grasshopper in Figure 1 beautiful?)

Suggested Reference Books (from ref. 4)

- Arnett, Ross H. and Richard L. Jacques, Jr.. 1981. *Guide to Insects*, 511 pp. New York, Simon and Schuster.
- Borror, D.J. and R.E. White. 1970. *A Field Guide to the Insects of America North of Mexico*, 404 pp. Boston, Houghton Mifflin Co.
- Borror, D.J., C.A. Triplehorn, and N. F. Johnson. 1989. *An Introduction to the Study of Insects*, 875 pp. Philadelphia, Sanders College Publishing.
- Fichter, G.S. and H.S. Zim. 1966. *Insect Pests*, 160 pp. New York, Golden Press.
- Gibb, T. J. and C. Y. Oseto. 2006. *Arthropod Collection and Identification—Laboratory and Field* 311 pages. New York, Elsevier/Academic Press.

References

- http://extension.entm.purdue.edu/401Book/default.php?page=field_identification; How to Make an Awesome Insect Collection, A Beginner's Guide to Finding, Collecting, Mounting, Identifying, and Displaying Insects, Authors: Timothy J. Gibb and Christian Y. Oseto
 - <http://www.mnn.com/earth-matters/animals/photos/10-of-the-largest-insects-in-the-world/big-bugs>
1. http://en.wikipedia.org/wiki/List_of_largest_insects).
- http://extension.entm.purdue.edu/401Book/default.php?page=field_identification

GALLERY



Hummingbird nest I discovered in one of our shrubby peach trees after it lost its leaves. It was only about 3-4 feet off the ground. Sure wish I had know it was there when it was in use as I could see right into it Cathy Hill



I figured if the squirrels are going to eat my bird seed, I might as well make the pictures fun. Wonder if anyone else remembers having a child tractor like this. This one was my brother's back in the 1950's. Cathy Hill



Here is the wonderful rare duck at the hatchery, a female long-tailed duck. Sue Kersey