TEXAS MASTER GARDENER
TEXAS A&M AGRILIFE EXTENSION
Bastrop County

What's Growing On?

BASTROP COUNTY MASTER GARDENER ASSOCIATION

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The Exoskeleton—The part of an insect that goes crunch

By Wizzie Brown

Insects and other arthropods have an exoskeleton, which means their "bones" are on the outside of their body. The exoskeleton serves as a protective covering, helps prevent desiccation, allows muscles to attach to it from the inside for movement, and provides sensory information.

The exoskeleton is made up of four layers: epicuticle, procuticle, epidermis and basement membrane. The most outer layer, the epicuticle, serves as a barrier to the outside environment and helps the insect avoid desiccation. If you have ever used diatomaceous earth for insect management, you are hoping to abrade the epicuticle of the insect with the diatomaceous earth and cause enough water loss for the insect to die.

The next layer, the procuticle, is for strength. The procuticle is made of chitin, which is secreted by the underlying third layer, the epidermis. The cuticle is soft when it is first secreted, but undergoes a process called sclerotization, which allows for hardening and darkening of the exoskeleton. The procuticle is divided into two components, the exocuticle and endocuticle. The endocuticle is tough, but flexible while the exocuticle is where thickening occurs to provide a more rigid, armored structure. With soft-bodied insects, such as termites, aphids, or caterpillars, the exocuticle layer is greatly reduced.

The epidermis is a layer of living cells that secrete chitin that is used to create the layer above, the procuticle. Any sensory hairs, called setae, that an

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Hugelkultur (Hoo-gul-culture)

By Monterrey Williams

No, it's not a new yogurt…but it is like lasagna gardening! It is literally "soil on wood" or "mound bed" or "mound culture." Start by filing the bottom of your garden with wood. Use decomposing, if possible. Pack with green waste, including grass clippings, food scraps, coffee grounds, leaves and straw, cardboard and eggshells. This material will help the wood decompose faster and will prevent the soil from settling into the gaps in the wood. Top your raised bed with at least 8 inches of topsoil or potting mix. Add compost or manure to the soil for extra nutrients for your plants. After planting apply mulch to the top of the soil to retain moisture and prevent weeds.

What are the benefits of Hugelkulture gardening? Some advantages are less waste—it repurposes yard waste to create rich garden soil that drains well and can provide nutrients for vegetables and flowers for many seasons.

As a note of caution, when preparing your Hugelkultur garden, beware of using plants like black walnut, sugar maple, red oak, or elm wood because they wage chemical warfare against other plants to keep away potential neighbors that would compete for nutrients and sunlight. These are allo-

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insect has on its body originate in the epidermis and sensory information travels through the hair on the outside of the insect's body to nerves found in the epidermis.

The innermost layer is the basement membrane which is a support for the epidermis and a separation from the insect body cavity.

All these layers together make up the insect exoskeleton. The exoskeleton is comprised of hardened plates called sclerites. The composition of plate structure allows the insect to have segmented joints and bodies which allows for movement. Each segment has various thickness of sclerites related to the movement and/ or protection required in that given area of the body. Furthermore, the exoskeleton has various areas that are folded inward, called apodemes, allowing for more surface area of the exoskeleton in that particular region and creating a strengthened area where muscles can attach on the inside of the body.

For more information or help with identification, contact Wizzie Brown, Texas AgriLife Extension Service Program Specialist at 512.854.9600.

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pathic by which there are chemically mediated competition with bio beneficial bacteria and reduce nutrient availability. Black walnuts, for example, produce a chemical called juglone, which occurs naturally in all parts of the tree, especially in the buds, nut hulls and roots. Leaves and stems contain smaller quantities of juglone, which is leached into soil after they fall.[1] Sensitive plants may exhibit toxicity symptoms. Plants may show signs of decline, wilting, yellow leaves, or stunted growth.

Endnote

[1] Joy, Ann and Hudson, Brian, UW-Madison Plant Pathology, Black Walnut Toxicity, Accessed May 7, 2010. https://hort.extension.wisc.edu/article/black-walnut-toxicity

New Website Features

Check out our website, which features project slideshows, a new photo gallery section, and an events calendar to check out upcoming activities. Find news articles and our newsletters. Thanks to Dave Posh for keeping the info timely for us https://txmg.org/bastropcounty/

Late-Season Visitors to a Mistflower

By Howard Nemerov

[This is part of an ongoing Native Plants, Native Pollinators series, highlighting how native insects and plants have coevolved to help each other survive and thrive.]

Local pollinators have co-evolved over millennia to recognize certain plants as nectar and food sources, while those plants adapted to being chewed on by certain species' larva, particularly butterflies, skippers, and moths. Britannica defines "coevolution" as: "the process of reciprocal evolutionary change that occurs between pairs of species or among groups of species as they interact with one another."[1] Mutualistic interactions are an important aspect of coevolution. "Mutualism" is an "association between organisms of two different species in which each benefits."[2]

This article discusses the mutualistic relationship between native plant *Chromolaena odorata* (left) and numerous insect species.[3] The mutualism demonstrated here shows beneficial relationships in a natural balance: pollinating insects find sustenance, while the nectar plant attracts pollinators to their flowers in order to produce seed for the next generation. While none of the butterflies below use *Chromolaena odorata* for larval hosting, both parties benefit from each other: insects consume nectar and pollen, and pollinated flowers produce seed (reproduction).

Sweat Bee

This Striped Sweat Bee (right) is from genus *Agapostemon*.[4] This genus is *not* attracted to human sweat. Striped Sweat Bees nest in the ground, so leaving a patch of bare earth can encourage them to make your garden a permanent home. They can sting in self-defense, but I have not experienced any aggressive behavior when gardening around them. Adults eat pollen and drink nectar, and also carry pollen back to their nest to feed young.[5]

Queen Butterfly (*Danaus gilippus*)

A relative of the Monarch, Queens don't migrate like Monarchs. Both species lay eggs on milkweeds, but adults are generalists when it comes to sustenance. As evidence of Queen's non-migratory behavior, I took this photo (right) on December 22, 2023, after Monarchs reached their over-wintering habitat in Central Mexico.

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Volunteering

Master Gardeners volunteer in the community to teach others about horticulture. We follow the research-based recommendations of Texas A&M AgriLife Extension. Members who complete 50 hours of volunteer service in the year after training earn the designation "Texas Master Gardener." We use our title only when engaged in Texas A&M AgriLife Extension activities.

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Checkered Skipper (Genus *Burnsius*)

It's nearly impossible to tell Common and White Checkered Skippers apart without examining them in the lab, since their ranges overlap in Texas and wing coloration is similar.[6] While larvae prefer eating plants in the Mallow family, adults feed on nectar (left).[7]

Gulf Fritillary (*Agraulis incarnata*)

Larvae host on Passion Vines (*Passiflora spp.*); adults like nectar.[8] In this photo, an adult is sunning in cool December weather while also drinking nectar from a low-lying *Chromolaena odorata* flower (right).

Gray Hairstreak (*Strymon melinis*)

December 17 is late season for native butterflies, since Bastrop County usually experiences first frost by late November. This butterfly's wings are starting to look ragged, perhaps from wind or a bird trying to capture it for food. Gray Hairstreak larvae prefer mallows and legumes, while adults like nectar (below).[9]

Painted Lady (*Vanessa cardui*)

While this species (right) is documented to host its larvae on over 100 plants, *Chromolaena odorata* is not one of them.[10] It's commonly found in Bastrop County, and has been one of the most common late fall butterflies seeking nectar in my garden.[11]

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Orange Sulphur (*Colias eurytheme*)

Another common Bastrop County butterfly, I managed to photograph this shy creature hiding under cover while partaking of nectar (left).[12] Its favorite larval host plants are alfalfa, clover, and other legumes.[13]

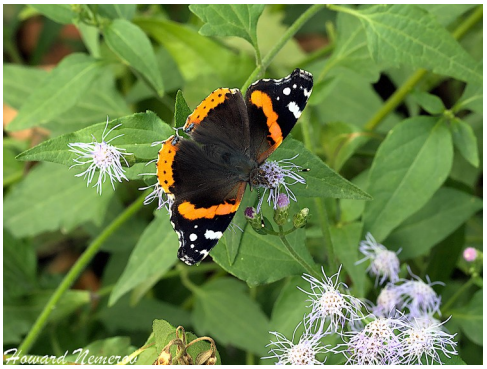
Fiery Skipper (*Hylephila phyleus*)

Skipper larvae host on grasses, but adults drink nectar from a wide variety of flowers.[14] Fiery Skippers are common in Bastrop County (right).[15]

Eastern Carpenter Bee (*Xylocopa virginica*)

In keeping with its name, as you travel west from Central Texas, this bee becomes rarer (left).[16] Females use powerful mandibles to excavate a series of tunnels in wood. They are partial to pine and cedar, but paint or stain helps prevent structural damage. If you provide alternative nesting material—like lumber blocks or tree stumps—you can still host these valuable pollinators and keep everybody happy.[17]

Red Admiral (*Vanessa atalanta*)



This is another butterfly commonly observed in Bastrop County (right).[18] Larvae prefer hosting on nettles, and adults like tree sap.[19] Obviously, they like flower nectar, too.

Oblique Streaktail (*Allograpta obliqua*)

Some late-season pollinators are worth hosting year-round, if possible. *Allograpta obliqua* is in the Hover (aka Syrphid) Fly family, and rather than buzzing you and landing on your lunch, these flies focus on protecting your garden from pests and pollinating flowers (below). Adults like nectar and their larvae love to eat aphids, mites, mealybugs, caterpillars, and whiteflies.[20] If you can draw them in with late-season nectar, they're more likely to pay you back by laying eggs that will hatch into larvae who "welcome" insects eyeing your tender spring vegetables.

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Conclusion

I photographed these pollinators on one large plant over the course of a few days. This highlights how easy it is to attract a wide variety or native pollinators by landscaping with hardy native plants. With minimal investment, you'll soon see a parade of fluttering, buzzing, happy insects that pollinate your vegetables and fruit trees, and provide protection against insects trying to prey on your prize plants. When it comes to native plants and native pollinators, everybody wins!

[All photos by Howard Nemerov]

Endnotes

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