TEXAS MASTER GARDENER
TEXAS A&M AGRILIFE EXTENSION
Bastrop County

What's Growing On?

BASTROP COUNTY MASTER GARDENER ASSOCIATION

July 2024

Fireflies

By Wizzie Brown

What do you call those flashing beetles that light up in the summertime? Is it a firefly or a lighting bug? Different areas of the U.S. call these beetles one or the other or, sometimes, use these terms interchangeably. Fireflies and lightning bugs refer to beetles in family Lampyridae.

I recently visited my family in Ohio and got to return somewhat to my childhood, being giddy over the number of fireflies I discovered emerging with their gentle flashing patterns at dusk. Yes, I ran around like an idiot catching them, but releasing them after taking photos.

Larvae are nocturnal and feed on small animals, including snails. Larvae prefer moist environments, with some being subterranean or semi-aquatic. Some larvae can emit short glows which are used to warn predators that they are distasteful.

Adult beetles are around ½-inch long, slender, and soft-bodied. They have a shield-like structure, the pronotum, which covers their head from above. The last few abdominal segments may be modified to emit light, but not all Lampyridae do this.

Some fireflies are ***bioluminescent*** which means they have a chemical reaction that occurs within their body causing them to light up. When fireflies combine oxygen with calcium, adenosine triphosphate (ATP) and the chemical luciferin in the presence of luciferase, a bioluminescent enzyme, light is produced. Light from a firefly does not give off heat which is important to ensure survival of the beetle. Fireflies control light flashing by controlling the oxygen that reacts with other chemicals needed to produce light.

Adults use flash patterns to identify those of the same species as well as determine location of the opposite sex. Female fireflies choose their mates based upon flash pattern characters: males with higher flash rates and increased flash intensity are preferred.

Adults feed on nectar, pollen, other fireflies, or many do not feed. One group of females in the genus *Photuris* lure in males from the genus *Photinus* by mimicking the flash pattern of female *Photinus*.

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When the male comes in to mate, instead of mating he gets eaten.

It is thought that disappearing habitat along with light pollution are playing a part in the decline of fireflies. How can you help fireflies? Turn off lights at night to help reduce light pollution (you'll get the added benefit of less insects being drawn to areas where they can possibly get into your house). Create water features in your landscape to provide areas of moisture required for larvae. Target pesticide usage and make wise pesticide choices to reduce the possibility of effecting non-target organisms.

For more information or help with identification, contact Wizzie Brown, Texas A&M AgriLife Extension Service Program Specialist at ebrown@ag.tamu.edu.

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Join Our Upcoming Bastrop County Master Gardener Intern Class

by Debbie Michel, Education Chair

Enrollment in the 2024 Bastrop County Master Gardener Intern Training Class opens June 1st. Classes will be August 17th through November 9th with most of the classes on Saturday from 9am – 1pm.

What are former students saying about their class experience? Ernie McCloud from the 2023 Intern Class says:

"I have always liked growing plants and the class taught me so much. We learned about bugs, pesticides, fertilizers, soil, water, parts of a plant, and propagation. One of the best things I learned was all the things I was doing wrong. A soil test is where to start. What a great group of people. I have made friends and the more experienced gardeners are so willing to share what they have learned. I enjoy sharing what I have learned with others and I think sharing information and educating others is what

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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. https://txmg.org/bastropcounty/

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being a Master Gardener is all about."

Dale Weiss of the 2023 Intern Class says:

"The curriculum was top-notch and the lessons were great, but the real draw was getting to mix and mingle with all the fellow green thumbs in the neighborhood. Those classes were like a secret society of gardening geeks, and I was more than happy to be a card-carrying member. Where else could I find my people, the ones who understood the pure joy of watching your efforts grow and mature? Those classes weren't just educational, they were a gardening-fueled social hour, and I wouldn't have had it any other way. I'd walk out of those classes feeling like I could master my humble backyard plot. KUDOs to the BCMGA program!"

Bastrop County Master Gardener Association mission statement:

Assist the Texas A&M AgriLife Extension Services in providing unbiased, high quality, relevant horticultural education, and service to the people of Bastrop County and the state of Texas through outreach, teaching, and demonstration projects. Protect and conserve the natural resources of the state by teaching safe, effective, and sustainable horticultural practices that promote the development of healthy gardens, landscapes, and communities. Develop a strong Master Gardener organization in Bastrop County through education and volunteer commitments.

If you want to be a volunteer educator, love gardening, and want to protect our environment by sharing what you learn with our community, this class is for you! See the website for schedule and application. For more information contact us at class@bcmga78602.org

TEXAS MASTER GARDENER TEXAS A&M AGRILIFE EXTENSION Bastrop County

TEXAS A&M AGRILIFE EXTENSION

Bastrop County Master Gardener Class

August 17, 2024 – November 9, 2024

application can be found on our website

https://txmg.org/bastropcounty/master-gardener-training/become-a-master-gardener/

The Bastrop County Master Gardener Association, a 501 (c)3 nonprofit organization, is a program of Texas A&M AgriLife Extension providing equal opportunities in its program and employment to all persons, regardless of race, color, sex, religion, national origin, disability, age, genetic information, veteran status, sexual orientation, or gender identity.

For more information contact:

Class@bcmga78602.org

TEXAS MASTER GARDENER TEXAS A&M AGRILIFE EXTENSION Bastrop County

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.

What the New USDA Cold Hardiness Map Means for Your Garden

by Howard Nemerov

The news is out, declaring that most of the U.S. is experiencing warmer winters. Last March, National Public Radio said:

> *"A newly updated government map has many of the nation's gardeners rushing online, Googling what new plants they can grow in their mostly warming regions."*[1]

The updated USDA cold hardiness map moved Bastrop County into a warmer winter zone. Does this mean you can plant more tropical landscaping? The following science paints a different, more complex picture you should know about before planting your prized lemon tree in the ground.

Cold hardiness zones defined

According to The Royal Horticultural Society, "Hardiness ratings are determined by the lowest temperature a plant is likely to withstand."[2] This key point is worth remembering as we explore the science below: What's the lowest temperature a plant can withstand and remain alive?

Most perennials have cold hardiness zone ratings: If you live in the right zone, those plants should come back reliably each spring. Plants considered "tropical" usually cannot survive our winters, and some begin showing damage at temperatures below 50°F. "In-between" plants like many citrus fruit trees can survive in South Texas but need protection to survive our winter weather.

It's true that if your area's winter lows are warming, you could plant less cold tolerant landscaping and see it return each spring. For example, many people like Meyer's lemons, which are cold hardy in Zone 9.[3] The USDA moved most of Bastrop County from Zone 8b to Zone 9a, meaning our winter low temperatures moved from a 15°F minimum to 20°F (see maps below). Allegedly, you can now grow a Meyer's lemon tree outside like a landscape plant.

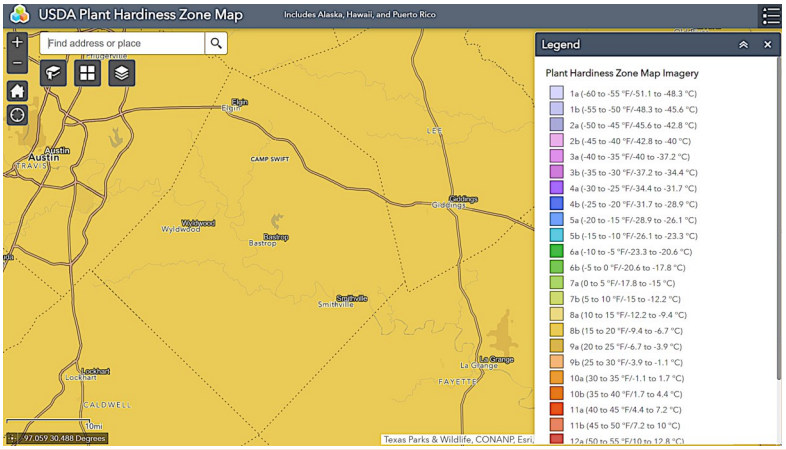

Figure 1 – Old USDA Map showing Bastrop in Zone 8b.[4]

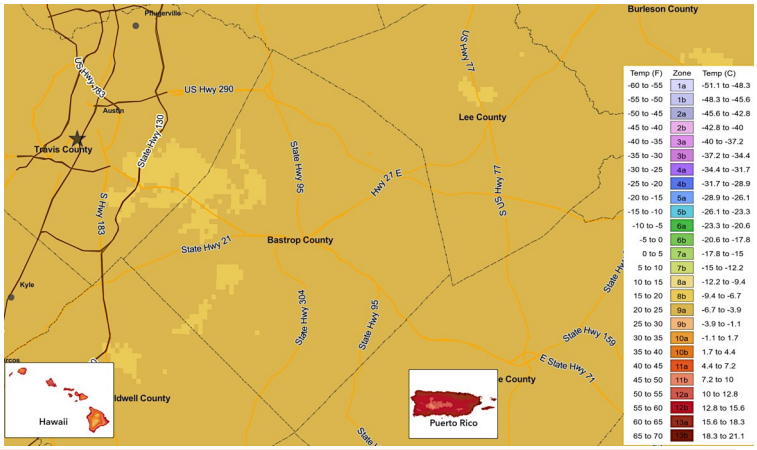

Figure 2 – New map showing most of Bastrop in Zone 9a.[5]

But does recent temperature data support this?

This article is not a commentary on climate change

First, a caveat: Some may think that talking about temperature trends means this article weights in on

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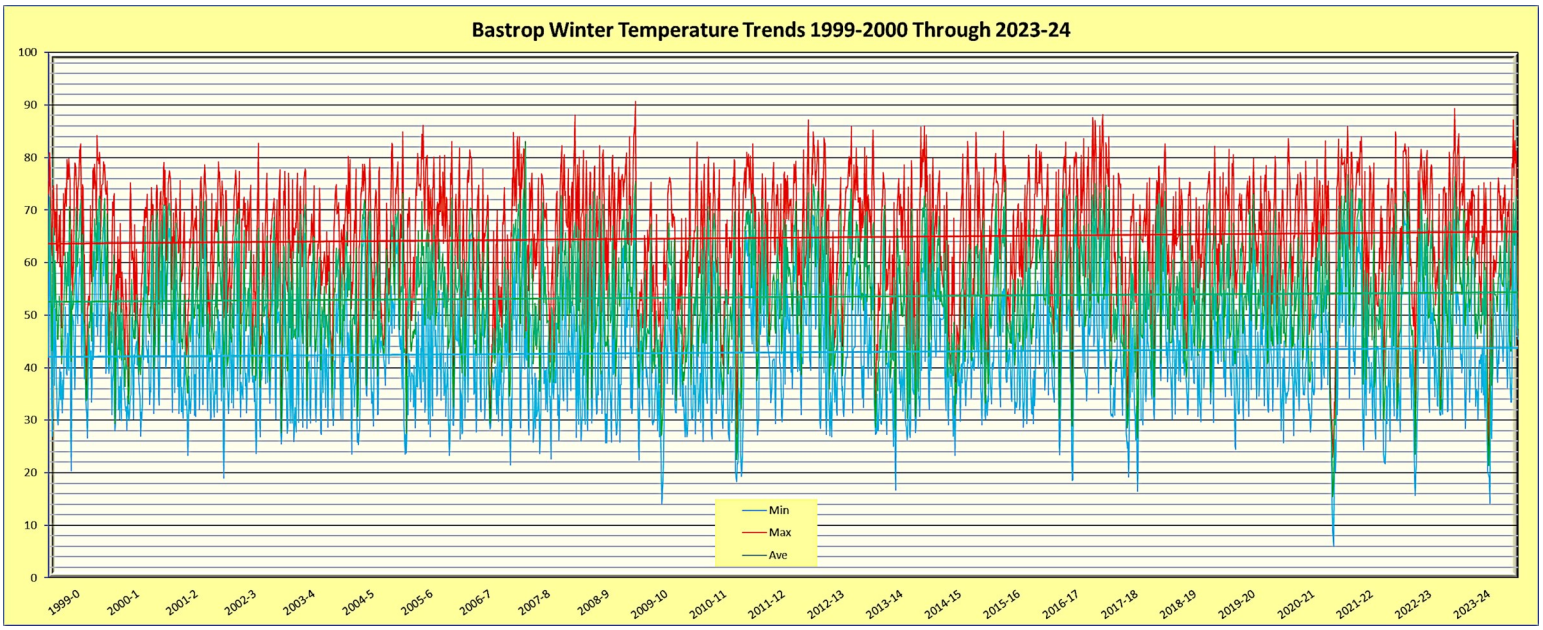
climate change in either direction: No. For example, the 25-year historic trend recorded by the Lower Colorado River Authority (LCRA) Bastrop station show an upward trend in December through February lows (+4.0%), highs (+3.6%), and average (+3.3%) temperatures (see below). At the same time, notice the lowest lows in the last three winters. It appears that Bastrop winters can average warmer overall while extreme lows get colder. That's why this article addresses one question only: **Can you change permanent landscaping to include less cold-hardy plants?**

Difference between local weather data and large-scale modeling



USDA cold hardiness maps are retrospective, meaning they look back at temperatures over a certain time period using available weather station data. Then they interpolate what temperatures areas between weather stations experienced using a complex model that includes elevation changes.[6] This model is called PRISM, which stands for "Parameter-elevation Regressions on Independent Slopes Model."[7]

> *The original algorithm was written to mimic the decisions an expert climatologist makes while developing a map showing long-term averages of temperature and precipitation.*[8]

The PRISM dataset includes weather stations across the U.S., while the dataset used in this article covers Bastrop County and a few surrounding LCRA weather stations located on or near the Colorado River. This underscores the need to focus on how local data informs gardeners on what plant materials to install based upon their cold hardiness. In the Bastrop winter temperature graph above, you can also see that extreme lows have been colder lately. This opens the possibility that we're experiencing warmer overall winter temperatures—as the PRISM model infers—while also experiencing some colder nights.

The USDA defines certain criteria followed in this article, addressing extreme temperature data which is important to understand when choosing permanent landscape plants.

> *The 2023 map is based on **30-year averages** of the lowest annual winter temperatures at spe-*

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cific locations, is divided into 10-degree Fahrenheit zones and further divided into 5-degree Fahrenheit half-zones.

*Plant hardiness zone designations represent what's known as the "**average annual extreme minimum temperature**" at a given location during a particular time period (30 years, in this instance). Put another way, the designations do not reflect the coldest it has ever been or ever will be at a specific location, but simply the **average lowest winter temperature for the location over a specified time**. Low temperature during the winter is a crucial factor in the survival of plants at specific locations.*[9] *[emphasis added]*

LCRA Data cited in this article

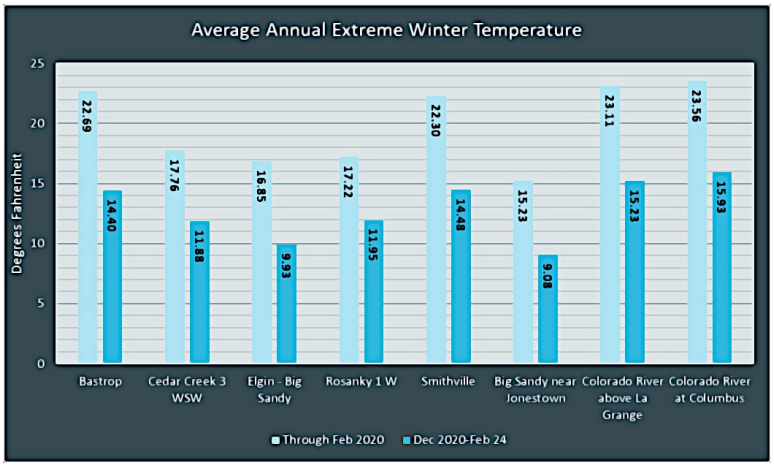
I'm tracking five LCRA stations from around Bastrop County:

- Colorado River at Bastrop
- Cedar Creek 3 WSW
- Big Sandy Creek near Elgin
- Rosanky 1W
- Colorado River at Smithville.

I also included one station in neighboring Travis County (Big Sandy Creek near Jonestown) and Fayette County (Colorado River above La Grange). All these stations reside in areas that used to be in USDA Zone 8b and have moved to Zone 9a. To check for larger trends, I included one LCRA station in Colorado County (Colorado River at Columbus) which also moved from Zone 8b to 9a. I excluded numerous stations because their data went back only 13 years or less.[10]

What the data shows

Since this discussion is about planting to survive coldest temperatures, the following graph contains the average coldest winter temperatures for reported by the LCRA. Through February 2020, extreme lows were warmer; from December 2020 through February 2024, every LCRA station recorded lower temperatures.



In case you're wondering if the February 2021 freeze was the only reason why the extreme winter temperature average dropped since 2020, the follow graph shows the percentage of extreme lows below 20°, which is the cut-off between USDA Cold Hardiness Zones 9a (lowest winter temperature 20°) and 8b (lowest winter temperature 15°). As with the graph above, the percent of extreme lows below 20° increased for all stations. Half experienced lows below 20° every winter since 2020; the other half went from around 25% to 75%. The graph on page 7 shows that winter lows have declined since 2020.

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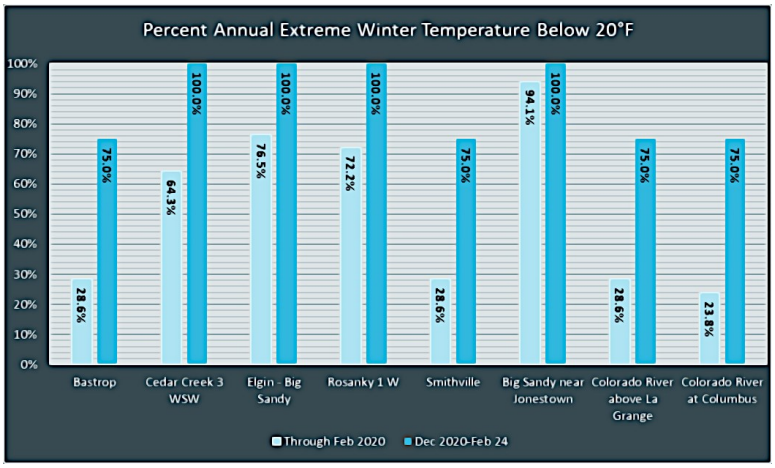
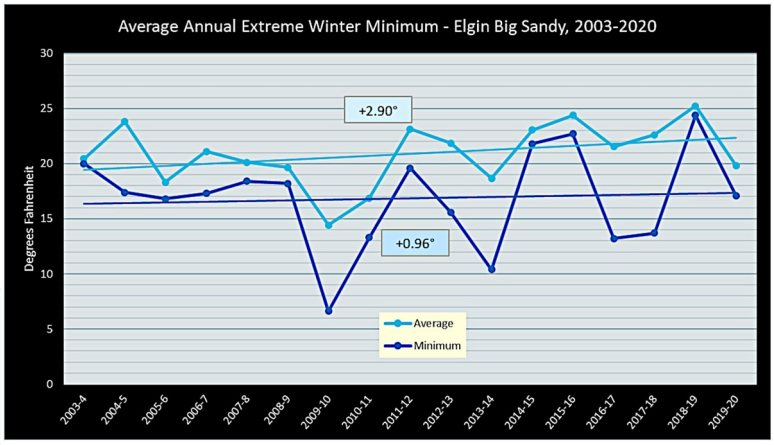
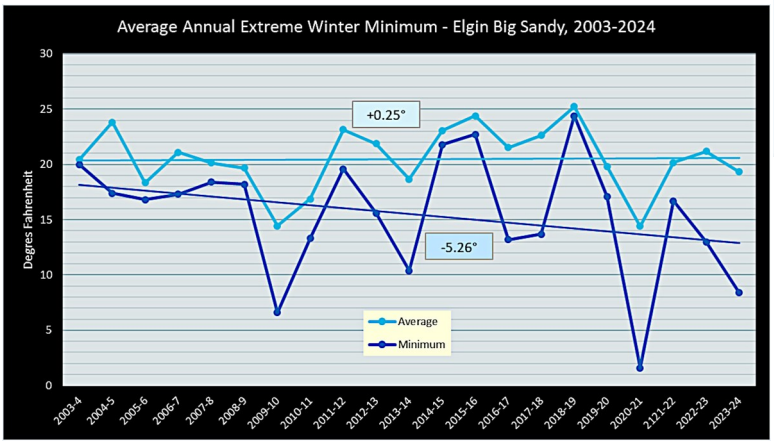


Each year, the coldest temperature of the year has been in December, January, or February. Collating the coldest night from these three months creates the average extreme temperature for each winter. As an example, the graph below shows extreme cold trends for the Big Sandy at Elgin LCRA station through winter of 2020. Elgin's average extreme temperatures increased 2.90°, supporting the USDA's claim that winters warmed enough to move Elgin into a warmer cold hardiness zone. Even each winter's extreme minimum (coldest night each winter) trended warmer (+0.96°).



However, adding the last four winters flattened Elgin's average minimum temperature trend (+0.25°), while extreme lows trended lower (-5.26°). Extreme cold temperatures over the last four winters heavily impacted these trends. Remember, the new USDA cold hardiness map represents what happened between 1991 and 2020, not what's happened since.



What happened in Elgin is similar to what happened throughout Bastrop County and neighboring counties: warmer extreme lows through 2020, trending colder afterwards. The table below compares December through February average monthly lows plus the extreme low for each winter. All LCRA stations but one showed that the average extreme lows increased through 2020, supporting the USDA's moving these locations into Zone 9a. Adding the four winters through 2024 shows that average extreme lows increased less or declined: Extreme winter lows consistently decreased across all LCRA stations about 5–7°F, countering any benefit derived from moving to a warmer cold hardiness zone. (Increasing trends shaded red; decreases shaded blue.)

This LCRA data has become retrospective just like the USDA data, but it's the latest and most accurate data we have to work with today. The next four winters may or may not be different.

Conclusion

What's really important as a gardener—the question you need to answer—is: "Is it reasonable to change plant selection criteria?" Considering recent LCRA temperature data, the answer is no.

Extreme Winter Low Temperature Trends by LCRA Station

Station	*Through 2020*		*Through 2024*	
	Average	Lowest	Average	Lowest
Colorado River at Bastrop	+1.01	+0.43	-0.81	-5.95
Cedar Creek 3 WSW	+4.30	+3.01	+0.43	-3.70
Elgin Big Sandy Creek	+2.90	+0.96	+0.25	-5.26
Rosanky 1W	+1.73	+0.74	+0.82	-4.23
Colorado River at Smithville	+0.15	-0.92	-1.27	-6.60
Big Sandy Near Jonestown	+2.91	+0.90	+0.75	-4.48
Colorado River Above La Grange	-0.74	-1.67	-2.44	-7.46
Colorado River at Columbus	+0.59	-1.01	-0.44	-6.69

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Endnotes

[1] Simon, Julia. "'It feels like I'm not crazy.' Gardeners aren't surprised as USDA updates key map." KUT News, November 17, 2023. Accessed May 23, 2024. https://www.npr.org/2023/11/17/1213600629/-it-feels-like-im-not-crazy-gardeners-arent-surprised-as-usda-updates-key-map

[2] "RHS hardiness rating." Royal Horticultural Society. Accessed May 22, 2024. https://www.rhs.org.uk/advice/rhs-hardiness-rating

[3] "Citrus x limon 'Meyer' (Meyer's Lemon)." Gardenia.net. Accessed June 12, 2024. https://www.gardenia.net/plant/citrus-limon

[4] "USDA Plant Hardiness Zone Map." USDA Agricultural Research Service. Accessed June 12, 2024. https://www.plantmaps.com/interactive-texas-usda-plant-zone-hardiness-map.php

[5] "2023 USDA Plant Hardiness Zone Map." USDA Agricultural Research Service. Accessed June 12, 2024. https://planthardiness.ars.usda.gov/

[6] Daly, Christopher et al. "Physiographically sensitive mapping of climatological temperature and precipitation across the conterminous United States." *International Journal of Climatology*, 2008. Accessed November 16, 2023. https://www.prism.oregonstate.edu/documents/pubs/2008intjclim_physiographicMapping_daly.pdf

[7] "FAQ." PRISM Climate Group. Accessed November 16, 2023. https://www.prism.oregonstate.edu/FAQ/

[8] "PRISM High-Resolution Spatial Climate Data for the United States: Max/min temp, dewpoint, precipitation." National Center for Atmospheric Research, University Corporation for Atmospheric Research. Accessed November 16, 2023. https://climatedataguide.ucar.edu/climate-data/prism-high-resolution-spatial-climate-data-united-states-maxmin-temp-dewpoint

[9] "USDA Unveils Updated Plant Hardiness Zone Map." Agricultural Research Service, USDA. Accessed November 16, 2023. https://www.ars.usda.gov/news-events/news/research-news/2023/usda-unveils-updated-plant-hardiness-zone-map/

[10] "Temperature – Current." Lower Colorado River Authority. Accessed November 16, 2023. https://hydromet.lcra.org/

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Tarantula–hawk Wasps Pollinating Milkweeds

by Howard Nemerov

I'm finding that wasps are great milkweed pollinators. There's science behind this: milkweed flowers are uniquely structured, making it harder for insects to pollinate them. Larger, stronger insects like many wasp species are better suited to handle this challenge. For more information on milkweed flowers, read Chris Helzer's article "Milkweed Pollination: A Series of Fortunate Events."

On the left is a male *Pepsis thisbe* (Thisbe's Tarantula-hawk Wasp) on *Asclepias oenotheroides* (Zizotes Milkweed). On the right is a female *Pepsis menechma* (Elegant Tarantula-hawk Wasp) on *Asclepias angustifolia* (Arizona Milkweed.)