High on the Desert Cochise County Master Gardener Newsletter

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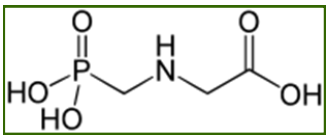
The University of Arizona and U.S. Department of Agriculture Cooperating

The Virtual Gardener — Is Glyphosate Safe to Use?

Lately, I've been reading and hearing a lot about glyphosate, the key ingredient in Monsanto's herbicide RoundUp. Personal injury lawyers have been advertising their assistance in recovering damages if you think you have developed cancer from using glyphosate, and the state of California, controversially, has added glyphosate to the list of chemicals "known to the state to cause cancer." Since we gardeners are big users of RoundUp and other products containing glyphosate, I thought this might be a good topic to take a look at this month.



Glyphosate (aka N-(phosphonomethyl) glycine)) is an organophosphorus herbicide discovered by a chemist working for Monsanto in 1970 and first marketed by that company in 1974 as the active ingredient in the herbicide RoundUp. Since that time it has become the most widely used herbicide in agriculture in the United States and the second most used herbicide in US home yards and gardens—2,4-D is number one. It is also widely used commercially and by home gardeners world-wide.

Over the years there have been several studies suggesting that glyphosate is carcinogenic, but it wasn't until 2015 when the International Agency for Research on Cancer (IARC) released its findings placing glyphosate in their Group 2A hazard category, classifying it as "probably carcinogenic to humans," that the claim began to be taken seriously, and a spate of lawsuits were launched against Monsanto. According to IARC's definition, Category 2A means that there is limited evidence of carcinogenicity in humans but sufficient evidence of carcinogenicity in experimental animals.

The IARC, formed in 1965 to promote international collaboration in cancer research, is a sub-agency of the United Nations World Health Organization (WHO). One of its key activities has been to convene international working groups to evaluate the carcinogenicity of

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substances or activities. Over the years many of IARC's findings have been controversial, and it has occasionally come under severe criticism for both its findings and *modus operandi*, sometimes even by its own parent agency, the World Health Organization.

IARC carcinogenicity evaluations are meta studies that synthesize the results of other research. Typically a working group of experts is formed to review ***published*** scientific reports on the agents under consideration. They are given a year to review the reports individually and then convene for a one-week period to discuss what they have read and come to a consensus. The findings are then published in a monograph. Over the years, the agency has conducted 989 **studies** and pronounced 988 of the agents it examined to be carcinogenetic.

Glyphosate has been extensively studied for harmful effects on humans for many years. The IARC rating has been **disputed** by studies done by the health and safety protection agencies of at least seven countries, including Australia, Canada, Germany, Japan, Korea, New Zealand, and the USA as well as the European Union and jointly by the Food and Agriculture Organization and World Health Organization of the United Nations itself.

Of all the studies bearing on the carcinogenicity of glyphosate, the most comprehensive and definitive by far is the **Agricultural Health Study** of the U.S. National Cancer Institute (NIC) and the U.S. National Institute of Environmental Health Sciences. This study, involving nearly 90 thousand farmers and their families, has followed their exposure to agricultural chemicals—including glyphosate—and health status since 1993. Extensive data generated by this study has found no link between glyphosate and cancer.

The IARC group that studied glyphosate (and four other organophosphate insecticides and herbicides) was comprised of 17 recognized experts that met in March 2015 under the chairmanship of Aaron Blair, an epidemiologist who formerly worked for the U.S. National Cancer Institute (NCI). Blair had also been a key researcher in the AHS and was well aware of the lack of evidence for a link between glyphosate and cancer. He did not reveal this information to the IARC working group because it had not yet been published, and IARC rules require that the study panels consider only ***published*** reports in their deliberations. In **sworn testimony** during a California court case against Monsanto, Blair revealed that the AHS data concerning glyphosate had been available for two years before the IARC study and that had the data been available to the IARC panel its conclusions would have been different.

So back to the original question: Is glyphosate safe for gardeners to use?

Two terms widely used by epidemiologists for describing the dangers posed to people or the environment by something are *hazard* and *risk*. Describing something as posing a **hazard** means that it has a potential for causing harm but says nothing about the conditions required for the harm to materialize. Assessing its **risk** means quantifying the danger posed by a hazard as to the conditions under which it will be harmful and the severity of the harm. The difference between hazard and risk is summed up in a fundamental principle of toxicology: "the dose makes the poison."

IARC does not rate risks—only hazards. Its findings say nothing about the risk of using glyphosate. Is the tiniest exposure dangerous? Or, does it take a massive exposure over a long period of time to pose a danger? The AHS indicates that even heavy exposure over decades does not increase the incidence of cancer in agricultural workers.

As for the risk to home gardeners, here is the answer given by IARC staffer Kate Guyton as quoted in a **Huffington Post article**:

> ***"I don't think home use is the issue. It's agricultural use that will have the biggest impact. For the moment, it's just something for people to be conscious of."***

As for me, I will continue to use glyphosate for weed control in my yard.

Until next time, happy surfing!

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Cochise County Master Gardener Newsletter Editor
Carolyn Gruenhagen

Two-Day Workshop Given for Area Teachers

School gardens are being developed all over the United States where our youth can 1) learn the science of soil and growing plants, 2) learn the nutritional value of eating fresh fruits and vegetables, and 3) benefit from the physical activity of working a garden outdoors in the fresh air.

The concepts learned in a school garden make up one of the few topics which can be common throughout all the educational years of elementary, middle and high school. Additionally, a school garden can be used to teach cross-categorical lessons in the subjects of science, math, language arts, social studies, and even art.

The Cooperative Extension at University of Arizona Sierra Vista receives numerous calls from teachers throughout Sierra Vista and Cochise County, seeking help and knowledge with development and maintenance of a vegetable garden for their school.

In response to the many requests for help, the Cooperative Extension offered a two-day workshop for area teachers on the development of school gardens. The class covered multiple topics to include garden planning & design, soil health & composting, fertilizers, vegetable varieties, planting techniques, irrigation and rainwater harvesting, seed starting, common garden pests, harvesting, examples of cross-categorical lesson plans, and cooking what is grown.

The Cooperative Extension staff put together the comprehensive curriculum taught by Wendy West, 4H Coordinator, Rebecca Dailous, Water Wise Youth, Mary Ann Capehart, Water Wise Coordinator, Monica Pastor, Cooperative Extension Staff, Mary Jackson & Deborah Hargrove, Master Gardener Seed Library, and Jan Groth, Master Gardener Program Coordinator. The participating teachers were provided numerous resources and a beautiful, comprehensive reference book. Sixteen enthusiastic and engaged educators participated in the workshop for which they received 12 CEU credits.

And did I mention food? It was wonderful. Wendy West and her Americorps students prepared lunch both days, offering menus representing healthy meals from the garden. We had gourmet sandwiches the first day with all the yummy "fixins," and side dishes that a garden can provide, and a killer salad bar the second day that would rival any five-star restaurant.

With the excellent feedback we received, we hope to offer a youth garden workshop on a yearly basis to our dedicated teachers in order to build knowledge, competence, enthusiasm and confidence for their school garden programs.

Jan Groth, Master Gardener Program Coordinator

Master Gardener

Agastache … a Pollinator Favorite

Agastache, pronounced AH-GAH-STAH-CHEE, accent on the "STAH," has become a personal favorite in my pollinator gardens at home and in the Discovery Gardens at UA Sierra Vista. (*Salvia greggii* is still my #1!) It's bright, long-blooming flowers draw migrating hummingbirds of all kinds to include the Rufous, the Black-chinned, and the Broad-tailed hummers. Sphinx moths are also active feeders and pollinators. In the fall, *Agastache*'s ripened seeds are a feast for Lesser Goldfinches.

There are several species of *Agastache* boasting various flower colors and shapes, and different shaped leaves. Being from the *Lamiaceae* family (the Mint or Deadnettle family), they all have a square stem and a fairly intense minty scent, making them unattractive to deer and rabbits. Some folks will crush the leaves and stems and rub them on the skin as an effective mosquito repellent.

Agastache can be just a bit tricky to grow at first, in that they do not want to get thirsty while getting established, but also do not want wet feet. I actually lost an *Agastache* in June, giving it copious amounts of daily water, thinking I was helping it get through the heat, and ended up loving it to death. They like a light, lean, well draining soil, and once established, a deep soaking once a month during the growing season, and once a week in the summer when no soaking rain has fallen. Bottom line on watering . . . our usual general desert

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plant watering rule . . . water deeply and thoroughly when the top couple of inches of soil have dried, and water less frequently.

As with most of your flowering plants, deadheading or pinching off spent flowers will keep this workhorse bloomer in beautiful color. Propagation is fairly simple by rooting stem cuttings in moist sand or vermiculite. Seeds which have been cold stratified for a month will easily produce a new plant for you and will usually bloom the first year if you sow in early spring. *Agastache* can handle full sun, but I have found that a little bit of shade during the hottest part of the day allows it to be even more of a show-off.

The many species of *Agastache* are quite versatile. I find this perennial plant to be beautiful in a desert garden, featured alone or in a grouping, by a bird bath or water feature, and also lovely in a container.

Agastache cana, known as Bubblegum Mint, Mosquito Plant, or Giant Hyssop, displays its showy orange and pink flowers June through October. It can grow 2-3' high by 1-2' wide, and is root hardy to -20° F. It is found in the southern Rocky Mountains, down through west Texas, and into New Mexico.

Agastache pallida, also called Pale Giant Hyssop or Giant Hummingbird Mint, only occurs naturally in southern Arizona. Yaaay! We can claim this one as our own! It's rose-purple flowers just happen to be in their height of bloom during the peak hummingbird migration in the Southwest. How convenient! This species also serves as a nectar feast for other pollinators such as butterflies and bees. *Agastache pallida* is root hardy to 0° F.

Agastache rupestris, commonly called Threadleaf Giant Hyssop, Sunset Hyssop, or Licorice Mint, can grow a little larger than the previous two species, reaching 2-4' high by 2' wide. This orange and purple bloomer is root hardy to -20° F. Its flower color offers a different hue to most pollinator gardens for a little variety away from the common reds and pinks. It can be found growing naturally in southern Arizona, southwestern New Mexico, and northern Mexico.

Agastache pallidiflora, known as Bill Williams Mountain Giant Hyssop, is unique in that it is one of the only species of *Agastache* that can truly tolerate wet feet and heavy, slower draining soils.

High Country Gardens Nursery in Santa Fe was instrumental in propagating and developing an extensive selection of garden-tested *Agastache* varieties. In fact, they claim they have built their reputation on that. It used to be one of few places I could find *Agastache* for purchase, but several species have now become more available in our nurseries. Look for them. They're a fun surprise when you find them. Try the different species in different parts of your garden. You'll enjoy them over a long season, and so will all those flying beauties that use them as a nectar source!

Jan Groth, Master Gardener
Program Coordinator

Cuttings 'N' Clippings

❄ The next CCMGA meeting will be on Thursday, **August 10 at 2:00 PM** in Room 503 UA Sierra Vista. Deborah Hargrave and Mary Jackson, 2016 Master Gardener graduates, will be doing a seed-saving workshop at the meeting on how to plant, grow, pollinate, harvest, and save seeds. They will discuss the procedures on how gardeners can interact with the Community Seed Library (see informational article in **July 2017** Master Gardener Newsletter).

❄ Water Wise will be holding the next free workshop on **Saturday, August 12** from **9:00—11:00 AM** at the UA Sierra Vista**.** Join Karen LeMay, Founder, Pollinator Corridors SW and Francesca Claverie, Borderlands Restoration to learn about the many advantages of using our local native plants in your garden! Contact the Cooperative Extension at 458-8278, Ext. 2141 for more information. Check out the Water Wise web site for their 2017 schedule at:
http://waterwise.arizona.edu/

❄ The Cochise Chapter of the Arizona Native Plant Society will resume meetings in September. For more information, follow AZ Native Plant Society on their web site:
http://www.aznps.com/chapters/cochise/cochise.htm

❄ The 26th Southwest Wings Festival is **August 2-5** on the Sierra Vista Cochise College campus. There will be numerous talented speakers addressing many fascinating and educational topics. For schedule and registering:
http://www.swwings.org/

At a Glance Box

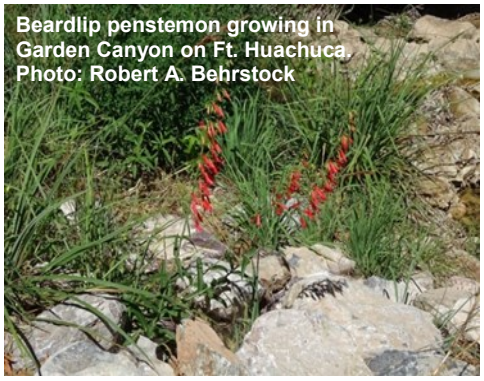
It's a Bloomin' Cochise County Native Plant of the Month

Plant: Beardlip penstemon (*Penstemon barbatus*)
Description: Perennial plant
Blooms: Red tubular flowers, spring and autumn
Use: Excellent wildlife habitat, xeriscape and rock garden plant
Learn more: Cochise County Herbarium, www.cochisecountyherbarium.org
For an in-depth article, see below.

Karen LeMay, Guest Author, Founder of Pollinator Corridors Southwest (a new non-profit supporting native plant habitats and their pollinators)
www.PoCoSouthwest.org

BEARDLIP PENSTEMON (*Penstemon barbatus*)

Walking through any canyon in the Huachuca mountains during spring, your eyes may be drawn to a scarlet red color among grasses and shrubs. From oak-juniper woodlands to the highest peaks where aspens and conifers grow, Beardlip penstemon is one of the common red tubular flowering plants. A native to southwestern U.S., it may be found at elevations of 4,000 to 10,000 feet.


Beardlip penstemon growing in Garden Canyon on Ft. Huachuca. Photo: Robert A. Behrstock


Close-up of the "beard" and "lip" Photo: Robert A. Behrstock

If you look closely at the lower petals on one of its many beautiful flowers, the common name of this penstemon becomes clear. It refers to the "beard," the tiny white hairs in the middle of the lower "lip" of the asymmetrical blossom. At a distance, the easiest way to tell this 1-4' tall penstemon apart from other red penstemons is the reflexed lower lip—two petals that curve back toward the plant.

According to Marcy Scott's wonderful book, *Hummingbird Plants of the Southwest*, Beardlip penstemon is considered a short-lived perennial, living about five years. Fortunately, this plant reseeds in coarse well-drained soil, and is able to tolerate heavier soils if the ground is sloped and provides drainage. This penstemon is one of the best for cold winter and/or humid summer climates. If the flower stalks are deadheaded right after the spring blooms dry up, the plant will bloom again in early fall. Cold stratification improves the germination rate of its seeds, so allowing some of the fall blooming seed heads to drop their ripened seeds to the ground is a good way to encourage more plants the following spring.

The group of flower characteristics that attract a particular type of pollinator are called pollinator syndromes. Based on the characteristics of penstemon flowers, red or orange, funnel-like in shape, and having ample nectar deeply hidden in the flower petals, these plants are pollinated primarily by hummingbirds and some small bees. The longer and narrower the flower tube, the more dependent the plant is on a hummingbird taking nectar deep inside the throat of the flower. While sipping nectar, pollen is deposited on its face and bill. As the hummingbird continues feeding on other flowers, pollen is then dropped off on another blossom to begin the pollination process.

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The hummingbird has no idea it is performing this valuable service.

Beardlip penstemon is a great choice for high elevation wildlife habitat gardens. Its natural sprawling form looks great as an understory plant or within a rock garden in full or partial sun at lower elevations. Desert Survivors nursery (in Tucson), Borderlands Restoration (in Patagonia), and possibly other native plant nurseries propagate and sell this plant.

In Cochise County, we are so fortunate to have as many as 15 species of hummingbirds migrating through this area in the spring and fall. Hummingbirds have excellent memories. During their migration, they will go back to the same patch of flowering plants or hummingbird feeders they visited the previous year. These tiny birds favor the native plants they evolved with, that provide a variety of nutrients not present in feeder sugar water.

By growing Beardlip penstemon and other locally native plants, wildlife habitat gardeners may not only use less water and soil amendments, but they are providing migrating hummingbirds with a reliable nectar source on their annual spring and fall stopovers.

Karen LeMay, Guest Author, Founder of Pollinator Corridors Southwest
www.PoCoSouthwest.org

Female White-eared hummingbird
Photo: Charles W. Melton

Cactus Video

Again this year the *Trichocereus sp*. blossoms have been spectacular! Last year, Mrs. Virtual Gardener put together a short video featuring the Jewels of the Desert in our garden. You may view it **here**. Enjoy!

"Gardening requires lots of water—most of it in the form of perspiration."

- Lou Erickson

Upcoming events:

⇒ Annual Master Gardener Fall Plant sale, Saturday September 16. For information:
http://cals.arizona.edu/cochise/mg/

⇒ The 93rd Cochise County Fair will be held at the fairgrounds in Douglas, AZ on September 21 - 24. For information go to:
https://cochisecountyfair.org/

⇒ 20th Annual Xeriscape Grand Garden Tour Celebration on Saturday, October 14. For information:
http://cals.arizona.edu/cochise/mg/

August Reminders

- Keep pulling the weeds
- Prolong annuals by deadheading spent flowers
- Plan your spring wildflower garden
- Watch for nutrient deficiencies, sunburn, salt burn, overwatering, & insects
- Fertilize