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—*Bacillus thuringiensis*

I recently received an email from a reader, and former Master Gardener, enquiring about *Bacillus thuringiensis* (*Bt*). She remembered learning about it in her Master Gardener training classes and knew it is an organic pesticide. She asked about it at a local garden center and found they had never heard of it. Then she noticed that the mosquito dunks she had been using in her rain barrels contained *Bt israelensis* (aka *Bti*). She wondered whether watering her plants with the treated rainwater would kill insects on them.

Unlike many insecticides, *Bt* is not a chemical but a living organism, a bacterium, that is widely distributed in the environment. It was first discovered and named *Bacillus sotto* in 1901 by a Japanese biologist and rediscovered by a German biologist in 1911 who gave it the name *B. thuringiensis* because it was identified in a shipment of grain from Thuringia, a state in east central Germany. The original name was subsequently declared invalid and so it is now known by the latter name.

There are a large number of varieties of *Bt* (over 1,300 at last count), each with a slightly different genetic makeup. Of these varieties, a very few have been found to produce toxins that are lethal to the larvae of certain insects, including the varieties *kurstaki (Btk)*, *aizawai* (*Bta*), *israelensis (Bti)*, and *tenebrionis (Btt)*. *Btk* is effective against caterpillars, *Bta* against wax moth larvae, *Bti* against flies and mosquito larvae, and *Btt* against potato beetle larvae.

The toxins produced by these *Bt* varieties are encapsulated in a crystalline form of protein. In order for the toxin to be effective, the *Bt* must be ingested by the targeted larvae. The high pH (alkaline) environment inside the larva gut activates the protein and releases the toxins which bind to specific receptors in the gut wall and puncture it. As a result, *Bt* spores and gut content are released into the body of the larva which then starves it to death.

Bt toxins have been extensively tested to determine their effects on humans and other animals and are found to be benign. For this reason they have been given a clean bill of health by the Environmental Protection Agency and are widely used as organic pesticides.

Bt insecticides can be applied as liquid sprays or as dusts, but their effectiveness is limited. They must be directly con-

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sumed by the target insect. This means that the *Bt* must be applied where the insects are feeding. If they feed on the undersides of leaves or are borers it may be difficult to impossible to apply the *Bt* where it will be consumed.

Bt toxins are easily washed off plant surfaces and are quickly broken down by the UV in sunlight. Studies have shown that the half-life of *Bt* toxins on plant surfaces is 1-4 days. *Bt* on the soil surface remains effective for only a few days but can last much longer beneath the soil surface.

Another limitation is *Bt* toxin specificity. The toxins only work against certain larvae and in some cases only against larvae in certain instar stages. Mature insects are not poisoned.

All these limitations of *Bt* dusts and sprays have made them too expensive for many commercial growers to use and have led to the development of alternative methods of delivery. Geneticists have been able to introduce the genes used by the *Bt* organism to produce the toxins into the plants themselves. The genetically modified plants—especially corn, potatoes, and cotton—are toxic to the targeted insects but harmless to other species. Because of widespread public prejudice against genetically modified food crops, *Bt* modified corn and potatoes have been less than totally successful in the marketplace. Consumers would apparently prefer to ingest foods sprayed with toxic artificial chemicals.

If you would like to learn more about *Bacillus thuringiensis*, check out this website from the University of California at Davis.

Until next time, happy surfing!

Gary Gruenhagen, Master Gardener
virtualgardener@cox.net

Restore The Ecosystem Around Your Home:
Passively Harvest Rainwater, Manage Erosion, and Boost Ecosystem Health

There are challenges living near mountains and in the high desert areas of Southeast Arizona. A history of land exploitation and misguided land management has resulted in a tremendous loss of topsoil. Coupled with regular periods of drought and flooding, soil erosion and land instability have become normalized in our borderland regions. Once erosion starts, it can unzip the landscape and destroy an ecosystem if left untended. Luckily, there is something to be done to not only stabilize eroding landscapes, but also kick start ecosystem recovery.

Cochise County Water Wise Program and Borderlands Restoration have teamed up to bring you 5 Hands-on Workshops designed to help landowners identify and solve soil erosion problems. With stable lands, boosting ecosystem recovery can be achieved as simply as sowing a few seeds and planting a few plants.

Attend the workshops to learn how to:

⇒ Identify types of soil erosion
⇒ Match types of erosion with stabilizing structures
⇒ Rebuild the ecosystem from the bottom up

Workshops are being held in various locations over several weeks in October. Choose the one closest to you and Pre-Register today. Registration is $15 per person and enrollment is limited. Call the Cochise County Extension Office at (520) 458-8278, Ext. 2141, or print and mail the registration form found at the end of this newsletter to 1140 N Colombo Ave, Sierra Vista, AZ 85635. Make checks payable to: **University of Arizona**.

Jody Sharp-Webb, Master Gardener

Cuttings 'N' Clippings

❁ The 2017 Master Gardener class begins January 25 and runs weekly through May. For information contact Valerie at: **valeriedavidson@email.arizona.edu** For information on the Cochise County Master Gardeners, go to the web site at:
http://cals.arizona.edu/cochise/mg/

❁ Join Water Wise on **Saturday, October 8** for their 19th annual Xeriscape tour. Contact the Cooperative Extension at 458-8278, Ext. 2141 for more information and map to locations. Check out the Water Wise web site to see what else is happening in 2016 at:
http://waterwise.arizona.edu/

❁ The Cochise Chapter of the Arizona Native Plant Society's next program will be held **Friday, October 21 at 5:00 PM.** They meet in the Cochise County Community Development Office conference room, 4001 Foothills Dr. Sierra Vista. The speaker will be Alix Rogstad. As the program manager for the State of Arizona's Urban and Community Forestry Program she will speak on *The Goals and Accomplishments of Arizona's Urban and Community Forestry Program.*
For more information, follow them on their web site:
http://www.aznps.com/chapters/cochise/cochise.htm

A Prickly Situation

Late summer in Arizona's high desert means prickly pear time to me. Prickly pear cactus plants, genus *Opuntia*, are native to the Americas from Chile to Canada. The variety most often found in our Arizona high desert and my front yard is the Engelmann's Prickly Pear (*Opuntia phaeacantha var. discata* or *Opuntia engelmannii*). Prickly pear cacti are evergreen and extremely easy to grow. Take a pad (cladode) from an existing plant, let the cut callus over, and plant the cutting one inch deep in a mixture of soil and sand. Protect from the harsh summer sun and don't water for a month while it grows roots and you will have a new plant. Blossoms will usually grow on two-year old pads and start their yearly June show with bright yellow flowers. In late summer the flowers are gone and the egg-shaped fruit will ripen to a beautiful magenta color and that's when they call to me.

Southwestern indigenous people's traditional diets have long included prickly pear cactus. Columbus took specimens of the plant back to Europe at the end of the fifteenth century, and from there it has spread all over the planet. Today, the juice of the sweet fruit, by virtue of its delicious flavor and the modern diner's quest for exotic foods, has been adopted by top chefs. The sweet, egg-shaped fruit of the prickly pear is known as 'tunas' in the Southwest. The roundish green Mickey Mouse ear pads of the cactus are known as nopales, and are a delicacy in their own right, having a very mild vegetable flavor with a lemony zip. While the nopales have been studied more than the tunas, both have shown to possibly lower blood sugar, and there is some evidence it may be useful in enlarged prostrate. However, late summer in the high desert is the time to focus on the beautiful, delicious fruit.

While harvesting the prickly pear you are mostly concerned with avoiding the larger spines on the pads and the smaller, but much more troublesome, glochids on pads and fruit. The glochids are tiny and hairy-looking, with little barbs on the end. Your harvesting equipment should include heavy leather gloves, long tongs, and fine tweezers. I always have duct tape and white all-purpose glue on hand as well. The object is not to get close enough to need anything other than the gloves and tongs. However, I have found that duct tape, lightly applied to the area you have inadvertently speared, then ripped off quickly, will often remove the offending stickers. Last choice is all-purpose white glue (children's glue is perfect) applied in a thin layer. Let it dry then pry up an edge and peel it off, hopefully removing the small remaining glochids.

When I started my mission to harvest and prepare this wonderful fruit, I researched it thoroughly, talked to many locals, and was dismayed by the level of difficulty involved. So I have devised my own harvesting method of the tunas, and I will happily share it with you in 3 steps.

Step 1: Not all prickly pears are created equal. Some are sweeter and tastier than others. Look for the 'Mickey Mouse ears' nopales that the animals and birds like. Wait until the tunas are a deep magenta-purple. Arm yourself with gloves and very long tongs. The main goal is to prevent the glochids (the little bunches of spines all over the tunas) from embedding themselves in your hands, arms, legs, and any other part of your body in the process. Load up with plastic shopping bags from the grocery store. I pick around 15 tunas per bag, often doubling the bags to protect myself even more. Then I place them in the freezer to be dealt with at a later date, August being a hot month to be laboring in the kitchen. I remove any annoying glochids I have picked up and congratulate myself on a job well done. Then, perhaps on a winter day when I feel like it, I start step 2.

Step 2: Taking 2-4 bags at a time out of the freezer (depending on my degree of enthusiasm) I thaw and wash the tunas in the kitchen sink. I thaw one bag at a time in one sink half full of room temperature water, then move to a second sink for final cleaning rinse. Using tongs, I place the tunas one at a time in my heavy duty juicing machine. The machine separates the majority of the spines and debris from the juice. This can become a messy affair, but luckily, the beautiful maroon juice wipes up without staining.

Step 3: I then strain the juice through several layers of cheesecloth to make sure all the spines are gone. Now I have my juice.

The juice can be added to flavor lemonade, champagne, or the occasional margarita. Or, you can make it into syrup and can also serve over ice cream, waffles, or pancakes. It is especially good over pancakes with Greek yogurt and assorted berries. Either the plain juice or the syrup can embellish your lemonade or other drinks, just alter the sweetness accordingly. The juice has a wild, exhilarating flavor, while the syrup is more refined and full-bodied. The pure juice should be frozen immediately, while the syrup can be stored refrigerated for up to a month before freezing. Many delicious recipes can be found in *The Prickly Pear Cookbook,* Carolyn Niethamer, Copyright 2004.

Kris Williams RPh, Master Gardener

New! Jurassic Park is Now Found in the Discovery Garden!

Exciting news! A new section of the Discovery Gardens is coming to life! While it may not be a Velociraptor or a *Tyrannosaurus rex*, a true living fossil dating back 270 million years to the Early Jurassic was recently planted in the Discovery Medicinal Garden!

Ginkgo biloba will be the centerpiece of the formal Medicinal Garden. *Ginkgo biloba* has a fascinating history. Impressions of Ginkgo leaves have been found in fossils the world over, from the Jurassic period until the end of the Pliocene, when it disappeared entirely except for a small area of Central China. There, the genetic uniformity of these Ginkgo trees suggests they may have been planted and preserved by Chinese monks over a period of about 1000 years. So that's how the modern species that we know now, survived. Just think, Ginkgo trees can trace their lineage much further back in time than we can! And, according to the fossil record they haven't changed very much in all that time. Some of today's living specimens have been claimed to be more than 2,500 years old!

Ginkgo's first use as a medicine is recorded in the late 15th century in China. It has been used in the treatment of dementia, anxiety, schizophrenia, PMS, and cerebral blood flow. Of these uses, the best documented is increasing the blood flow to the brain. Other uses have inconclusive results in various studies. That said, it is one of the most often used alternative medicines on the market. Ginkgo ingestion can interfere with anticoagulant medications, and antidepressants so always tell your doctor you are taking it. Ginkgo also has a prominent place in Chinese cuisine. The seeds are served at weddings and the Chinese New Year. 'Buddha's Delight' is a seed delicacy said to be used as an aphrodisiac consumed at special occasions.

Modern *Ginkgo biloba* grows best regularly-watered and in somewhat acidic, fine, well-drained soil but is tolerable to alkaline soil conditions. Plant only male trees that have been grafted or grown from cuttings, because female trees produce messy, ill-smelling fruit in quantity. Varieties 'Autumn Gold' & 'Fairmount' are reliably male. The trees are not bothered by insects or disease or oak root fungus. Ginkgo's will to live is seen in Hiroshima, Japan where 6 trees were among the few living things to survive the 1945 atom bomb blast 1-2 kilometers away! And they are still growing today.

Ginkgo is a large, deciduous tree, with mature specimens reaching a height of 35-50 ft. tall. It may be gawky in youth, but becomes well-proportioned with age. It usually grows slowly, but in ideal conditions, will grow up to 3' per year. Its leaves are unique, fan-shaped, veins radiating out into the leaf blade. It is also known as the 'maidenhair tree' for its resemblance to the fern of the same name. It is a lovely tree, attractive in any season, prized for its autumn foliage, a deep saffron yellow. The light green, leathery leaves of summer suddenly turn gold and linger, backlit by the autumn sun, until they drop quickly to make a magical golden carpet.

The *Ginkgo biloba* is, indeed, a wondrous tree to begin our Medicinal Garden. It can be argued that being in the presence of this living fossil today, and as it grows in the years to come, will produce a feeling of peace and well-being that is, in itself, the best medicine.

References

Sunset Western Garden 40th Edition
Ginkgoales: Fossil Record, University of California, Berkeley 1997, Wikipedia

Kris Williams, RPh, Master Gardener

October 8
10:00 AM—2:00 PM
Water Wise/Master Gardener
19th Annual Xeriscape Tour!

Don't miss this exciting tour!
Contact the UA Cooperative Extension for more information and maps.
458-8278, Ext. 2141
valeriedavidson@email.arizona.edu

October Reminders

- Be ready for the first frost
- Thin seedlings
- Over seed lawns
- Plant spring bulbs
- Divide perennials
- Don't let weeds go to seed

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

So many Cochise County native plants blooming this fall—I can't pick just one! Instead of writing about one or two, I thought picture ID's would be more useful. Some plant species are of landscape quality and value, some have wildlife value but not landscape, and some plants are just downright nasty (I get a bit obsessed with those and weed them while out hiking. Pathetic really…). Here we go!

Blackfoot daisy, *Melampoduim leucanthum*. So exciting to see popular

landscape plants in the wild. I saw this plant growing in Mule Mountain rocks. Blackfoot Daisy is a popular landscape plant and after seeing where it grows in the wild, maybe we need to reconsider not putting it on an irrigation system. Comments from the web suggest a more robust but short-lived plant if irrigated. Try tucking into a non-irrigated rock garden (but with passive water harvesting) and see how it does!

Sweet four o'clock, *Mirabilis longiflora*. This plant was found growing in the shade of an oak up a Mule Mountain canyon. Flowers open in the late afternoon. The Latin meaning of *Mirabilis* means marvelous!

Turpentine bush, *Ericameria laricifolia*. A great small/medium

evergreen, woody shrub that explodes in brilliant yellow in the fall (looks similar to the spring/fall blooming Damianita). Common on rocky hillsides, but also found in grasslands. Crush the foliage in your fingers to release the lovely turpentine scent. Excellent for landscapes but flammable (use as accent plant and best used in the natural landscape zone of your Xeriscape).

Scarlet spiderling, *Boerhavia coccinea*. Same family as the

Sweet four o'clock (*Nytaginaceae*) but really different! Sticky, sticky, sticky seeds, but not as awful as some other plants (read on...). My neighbor told me when a young girl she used to stick the delicate magenta flowers on her earlobes as play earrings! I do keep this sprawling plant out of my walking paths but leave it for the caterpillars (and fashionista teenagers).

Scarlet morningglory, *Ipomoea cristulata* and *I. coccinea*. Of all

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(Bloomin' Cochise Co. continued from page 5)

the morning glories, this one is my favorite—and the red tubular flowers are a hummingbird attractor too. Delicate, easy to manage and is one I leave when weeding the lovely but more aggressive blue and pink morning glories (I even let the scarlet one grow on the fence in my veggie garden).

Tansy aster, *Machaeranthera species*. These tall purple asters are a great fall plant. One of those "weeds" I encourage to grow!

Bigelow's beggerticks. *Bidens biglovii.* A deceptively cute plant with "such a pretty flower" but watch out. When it goes to seed, it turns into this nasty ball of thin, black seeds "beggerticks" with prongs that stick to socks and everything else. The plants are prolific. At the end of a memorable fall hike, the youngster accompanying me wearing knit jersey shorts ended up looking like a porcupine. It took us an hour to de-seed her. I am obsessive about removing these plants! I pull them wherever they are—in my yard, on the side of the road, deep in the wildest places. Pull, don't chop off the cute flower as the plant will then replace it with two flowers. Grrr!

Jewels of Opar, *Talinum paniculatum*. Fleshy leaves, delicate pink flowers and pearl-like small fruit.

On that note, I do wish you a great fall season, and remember, this is the best time to plant!

Cado Daily, Guest Author
Water Resources Coordinator, Water Wise Program – Retired!
University of Arizona Cochise County Cooperative Extension

A flower is an educated weed.
-Luther Burbank

Cochise County Master Gardener Newsletter Editor
Carolyn Gruenhagen

Cochise County Water Wise Program & Borderlands Restoration can help you...

Restore the Ecosystem Around your Home:
Passively Harvest Rainwater, Manage Erosion, and Boost Ecosystem Health

Five 4-hour, hands-on workshops are being offered to help landowners identify and solve soil erosion problems. With stable lands, boosting ecosystem recovery can be achieved as simply as sowing a few seeds and planting a few plants. You will learn how to:

- Identify types of soil erosion
- Match types of erosion with stabilizing structures
- Rebuild your ecosystem from the bottom up

WaterWise

BORDERLANDS RESTORATION

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES
Cooperative Extension
Cochise County

Funding provided by a grant from the Arizona Department of Forestry and Fire Management

If you are experiencing erosion problems on your land and would like to do something about it, register for one of these 5 Workshops today: *(see reverse for more details)*

Call (520) 458-8278 ext. 2141

Pre-Registration Required

Limited enrollment per workshop.

Cost $15/person

Make checks payable to

University of Arizona

Tombstone
October 1, 8:00—Noon

NE Sierra Vista
October 10, 8:00—Noon

Huachuca City
October 15, 9:00—1:00 PM

Hereford
October 22, 8:00—Noon

Discovery Gardens, Sierra Vista
University of Arizona
October 29, 9:00—1:00 PM

Pre-Registration instructions and form on next page.

PRE-REGISTRATION FORM

Pre-Registration is required and there is a limited number of openings available for each workshop. You can register for one or more of these workshops several ways:

- Stop by the Cochise County Extension Offices at 1140 N. Colombo Avenue in Sierra Vista
- Call the Extension Office at (520) 458-8278 ext. 2141
- Complete and mail this form to Cochise County Extension Offices ATTN: Water Wise Erosion Workshop, 1140 N Colombo Avenue, Sierra Vista, AZ 85635, along with your check payable to *University of Arizona*

Work Gloves will be provided for each participant along with water and snacks. Dress appropriately, with long pants, shoes/boots and hats.

Each Workshop costs $15 per participant. Please make checks payable to **University of Arizona**.

I would like to register for the following Workshop(s). Check one or more. If you are registering for more than one person, please complete a second Pre-Registration form.

_____**Saturday, October 1, Tombstone, from 8:00 AM to Noon**
This workshop is being hosted by Bob and Adrienne Harris, 2893 Power Ranch Road, Tombstone. Power Ranch road is two miles north of the intersection of Hwy 90 and Hwy 80. Bob and Adrian will provide lunch for Workshop participants.

_____**Monday, October 10, NE of Sierra Vista, from 8:00 AM to Noon**
Robert Luce and Madeleine Charron will be hosting this workshop at 9442 E Patti Drive. Patti Drive is located off Charleston Road. Turn onto Escapule Road, follow it to N Johnny, then left on Patti.

_____**Saturday, October 15, Huachuca City, from 9:00 AM to 1:00 PM**
This workshop is being hosted by Linda Guinter, 367 W Camino de Mesa, Huachuca City. Camino de Mesa is located 1.1 miles north of the intersection of Hwy 90 and Hwy 82.

_____**Saturday, October 22, Hereford, from 8:00 AM to Noon**
Karen LeMay and Robert Behrstock will host this workshop. 10359 S Thicket Place, Hereford. Thicket Place is located south on Hwy 92, turn right on Stone Ridge Road, turn right on East Prince Placer Road then left onto Thicket Place.

_____**Saturday, October 29, Discovery Gardens, University of Arizona, Sierra Vista, from 9:00 AM 1:00 PM**
Cochise County Master Gardeners are the hosts for this workshop. 1140 N Colombo Avenue, Sierra Vista. Turn into the North Entrance by Cochise College. Continue Straight until you reach Groth Hall at the UA.

Contact Information: (Please Print)

Name: _____

Address: _____

E-mail: _____

Phone: _____

Check Enclosed: $_____