



The Virtual Gardener—The Mittleider Gardening Method

In [October 2013](#) I wrote an article about gardening videos on YouTube. One of the [video series](#) I discussed was about the Mittleider gardening method. This month I want to take a closer look at this method of gardening.

Dr. Jacob Mittleider (1919-2006), the originator of this gardening method, was the owner of Mitts Nursery, a very successful Loma Linda, California company that produced bedding plants for the wholesale nursery trade. During his 20 years in that business, Mittleider developed techniques for growing plants in a soilless medium under precisely controlled feeding and watering conditions. Realizing that these techniques would work for growing vegetables as well as flowers, Mittleider retired from his business and traveled the world teaching people how to create high yield vegetable gardens in any soil. To answer a challenge, Mittleider once even created a highly productive community vegetable garden on a concrete parking lot!

Let's take a closer look at his methods. Although Mittleider's method is quite flexible and adaptable to many situations, I will describe a classic implementation that

begins with the construction of a wooden-sided "grow box" built with pressure-treated 1" X 8" planks. The requirements for a Mittleider garden are the same as for any vegetable garden. It must be located in a sunny area that is well drained and have access to water. If possible, the long axis of the grow box should be north-south.

The grow box becomes the form for a raised bed. Typically the box is 30 feet long, either 18 inches (for one row of plants) or 4 feet (for two rows of plants) wide and 8 inches high, but the length and width can be varied to accommodate the size of the space available. The box is just a frame with no bottom, sitting directly on cleared bare ground. To permit even watering, it must be carefully levelled.

Although the grow box may be filled with amended soil as the growing medium, Mittleider recommends a soilless medium comprising a mixture of organic and inorganic components so that plant nutrition and watering can be more precisely controlled. The classic mix is roughly 1/3 sand and 2/3 sawdust by volume, although other organic materials can be substituted for the sawdust as long

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as they absorb water but are not toxic to plants, don't decompose in less than a growing season and do not settle into hardened layers. The medium must be uniformly blended and levelled to permit even distribution of water.

The key to success with the Mittleider method is the precision watering and feeding schedule. Since the soilless growing medium contains no natural nutrients for plants, the nutrients must be supplied by the gardener. Unlike traditional gardening methods where the garden is fertilized once or just a few times during the gardening season, the Mittleider method feeds the plants on a weekly basis with a dilute solution of a specially blended fertilizer.

There are 16 elements essential to plant growth. Carbon, hydrogen, oxygen are derived from the air and water. The rest are derived from the soil and fertilizers. Nitrogen, phosphorus, and potassium are the primary elements; calcium, magnesium, and sulfur are the secondary nutrients; and boron, chlorine, copper, iron, manganese, molybdenum, and zinc are the micronutrients. The Mittleider fertilizer formulation is designed to furnish all of the essential soil minerals. You can mix your own following the instructions listed [here](#), or if that's too complicated, you can combine 3 lbs of Epsom salt (MgSO₄) and 20 lbs of 16-8-16, 20-10-20, or 16-16-16 NKP fertilizer with a package of pre-formulated micronutrients available from the [Mittleider website](#). A well-known, and expensive, all-purpose plant food also offers about the same components as the Mittleider fertilizer formulation and can be found in most garden shops. Mix the above with water and apply to your plants every week at a rate of half an ounce of fertilizer per linear foot of row using a sprinkler can.

Although the Mittleider garden is watered daily, the method is

described as a low-water system. Only enough water is delivered to wet the growing medium and satisfy the daily requirements of the plants. Sprinklers or drip irrigation are not used. Instead, water is delivered to the grow medium using a hose with a rag tied on the end to reduce the force of the water as described [here](#). Alternatively an "automatic" watering system can be constructed by drilling tiny holes along the length of a PVC pipe. This YouTube [video](#) shows the details of how to construct an automatic watering system.

Another feature of the Mittleider system is vertical gardening. By growing vining plants such as tomatoes upward instead of sprawling along the ground, plants can be placed much closer together, reducing space requirements for the garden. A detailed description of growing tomatoes the Mittleider way can be found [here](#).

This has been a quick and dirty overview of the Mittleider system. Although the system has a large and enthusiastic following from locations around the world, and Mittleider earned two honorary doctorates for developing it, it is not without its detractors. Mittleider claims the system is "organic" but many gardeners in the organic community are critical of it because of its reliance on "synthetic chemicals." For a critical review of the method check out this "Growing Your Greens YouTube [video](#)."

If you would like to learn more about the Mittleider system, check out the [playlist](#) of Mittleider videos on YouTube. Take a look at the [blog](#) on the Mittleider method by Arizona gardener Stephanie Shumway. Visit the Mittleider websites at the Food for Everyone Foundation [website](#). Or check out the [Mittleider Gardening Group](#) on Facebook. As always, you can also find much more information by googling "Mittleider gardening."

Until next time, happy surfing!

Gary Gruenhagen, Master Gardener
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June Reminders

- ◆ Check tree ties
- ◆ Remove stakes if tree can stand alone
- ◆ Mulch trees and shrubs
- ◆ Remove faded flowers & fertilize roses
- ◆ Stake tomato plants and watch for curly top—remove
- ◆ Prevent blossom end rot by even watering
- ◆ Water! Water! Water!



Cuttings 'N' Clippings

✿ CCMGA will hold its next meeting on **Thursday, June 5**. This will be the Annual Business Meeting.

✿ Water Wise presents on **Saturday, June 7, 8:30 - 10:30 a.m.: Success with Succulents**. Come learn about the variety of succulents you can plant in your yard and how to care for them. Plants will be for sale after the talk. Presenter is Mark Sitter, B & B Cactus, Tucson. Location is University of Arizona Sierra Vista, 1140 N. Colombo Ave, Sierra Vista, AZ, Public Meeting Room, in Groth Hall.

For information call (520) 458-8278, Ext 2141, or contact Joyce at:

jwilliam@ag.arizona.edu

You can visit Water Wise at:

waterwise.arizona.edu

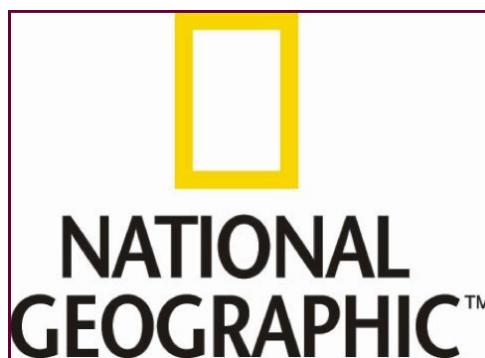
Cochise County Master
Gardener Newsletter Editor
Carolyn Gruenhagen

The Future of Agriculture . . . and Eating

Starting with the May 2014 issue, *National Geographic Magazine* is running an eight part series entitled *The New Food Revolution* that should be of interest to many readers of this newsletter. The opening page of the article echoes comments in the April 2014 issue of this newsletter by asking the question “Where will we find enough food for 9 billion?”. The second page of the article states that the answer “...doesn't have to be industrial farms versus small, organic ones. There's another way.”

Doing things “another way” is indeed the point. Maintaining that only organic, or only industrial, techniques can solve the difficulties we face is to choose to ignore entire areas of potential solutions. According to the writers of the article, humanity now farms an area roughly the size of South America (yes, the entire continent), and we run livestock on an area about the size of Africa! This is equivalent to 40% of the earth's ice-free land, just for feeding humans. Imagine the impact if the amount of land necessary to feed two billion more people is directly proportional to the population increase. This would translate to an almost 30% increase in land area being farmed, resulting in agriculture occupying over 50% of ice-free lands. On top of that, we'll need to find the space to house two billion more people as well. That is a lot of land.

The article claims that, by some measures, agriculture contributes more to increasing atmospheric carbon dioxide content than do cars, trucks, and trains. There are a number of reasons for this, but the most significant one is deforestation. Simply put, a field devoted to agriculture cannot sequester nearly as much carbon as can a forest. The upshot is that we really must develop ways of growing, and efficiently distributing, food without using



more land to do so. This means technology—technology of all kinds: organic, industrial, genetics, and more.

The article in the May issue proposes four broad steps to take to begin to help provide adequate food for a growing population while respecting and minimizing the impact of agriculture on our environment. These steps are:

Freeze agriculture's footprint. Grow more on existing farms. Increase yields per unit of land being farmed by continuing the Green Revolution in places where the techniques are still inefficient.

Use resources more efficiently. This is where high tech can really help by doing things like reducing water use and applying specifically tailored fertilizer applications. In other words, continue to improve the yields while addressing the negative aspects of current practices, such as fertilizer run-off.

Shift diets. A plant based diet is definitely more efficient in terms of land area used versus calories consumed (I'm not real fond of this idea—I like meat!). The article also addresses the idea that using food crops for biofuel may not be wise.

Reduce waste. Some current estimates of food waste show that we may already produce enough food to feed nine billion if we were more efficient in poor countries and less wasteful in rich countries. This element alone may offer the most effective way to increase food availability.

It is not my intent to be an alarmist here, nor does alarmism appear to be

the goal of *National Geographic*. The situation is not dire and we will no doubt find ways to feed the world. The articles are intended to educate, not frighten. The *National Geographic* series will run through the December issue of the magazine. The June issue, which addresses aquaculture (which they have dubbed the “Blue Revolution”) should be available on newsstands by the time this newsletter is published. Your local municipal library certainly subscribes to the magazine and the articles are also available online at the *National Geographic* website: <http://www.nationalgeographic.com/>

National Geographic is a respected publication and their series on agriculture should be most interesting and informative. By December, we can all be a bit more aware about how agriculture affects our lives and the world around us.

Bill Schulze, Master Gardener
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On Your Mind . . .

Sierra Vista Herald May 13, 2014—“I love gardening in Sierra Vista. Don't you know it's a good day when you turn your spring compost into your garden bed and it's full of worms? Ahh! Happy gardening, people.”

Ask a Master Gardener

Cochise County Master Gardeners are available to answer your gardening questions either by telephone call to the Cooperative Extension Office or on-line on our web site at:

<http://ag.arizona.edu/cochise/mg/question.htm>

In a Desert Garden

The Fairy Dusters: *Calliandra eriophylla* and *C. californica*

I love the fairy dusters and grow two varieties in my little garden. As my garden in front of the house is left completely natural and I let the plants naturalize, I almost have a groundcover formed by *Calliandra eriophylla*. This is the pink variety that is native to California, Arizona, New Mexico, Texas and Mexico. I planted one plant about 17 years ago and it has overtaken my front yard. The pink Fairy Duster is a small shrub-like plant with fernlike leaves, sturdy thin woody branches and lovely pink dainty flowers. The clumps are 8 x 20 inches, and the flowers are pale pink with stamens that look lovely when backlit by the sun in the afternoon. Unfortunately it is also a difficult plant to photograph, and I tried many times, but was never able to get a nice photo of the whole show. It was quite a show this spring—like a sea of pale pink in between the bright yellow of my chocolate flower, *Berlandiera lyrata* that has taken over most of my front yard, too.

The pink fairy duster is an easy plant to grow, drought tolerant, but looks better with occasional irrigation, mainly during very dry and hot times, and it can be invasive. It took my plant 17 years to really spread, but maybe in a very clean and well arranged garden it might be a problem. I think because my mostly native plants in my front yard have taken over, I do not have any of the really nasty weeds. Where would they grow? The pink fairy duster is visited by bees and butterflies and the occasional hummingbird. In very cold winters the plant might get injured around the tips and to make it tidy needs to be trimmed back to the living stems. The plant blooms in spring, and sometimes in the cooler season again, but looks nice and green most of the seasons.

In my backyard, I grow the Baja fairy duster, *Calliandra californica*. About 15 years ago I saw this plant at my visit to Tohona Chul Park in Tucson, and I knew

then that I needed to have one. This plant is only borderline hardy in our high desert climate, and it is not fond of our cold winters and gets freeze damaged. It is best not planted in an open space or close to the river. My yard is very sheltered, and that is why this plant has endured for so long. There are now more cold tolerant varieties available. In full bloom this



Calliandra californica

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Raised Bed Gardening In a Small Space Part 2: Results & Conclusions

Precipitation—I live in a trailer park where I could only water every other day. In the Master Gardener Class I learned that the months of May and June would be the windiest and driest. I used a bucket with an elongated head that enabled me to water near the stems and the soil. One day when my tomato plants were withered and the beans and corn bending their heads to the soil crying, “Help!” I realized they needed a drink every day! I used water from my patio fountain on my non-scheduled days and all my plants were happy and waving at me in the wind. I was stunned by how fast they recovered!

Progress—Since I used young starts in my garden instead of seeds, I saw results right away. I could see the plant stalks getting thick and within four weeks, my tomatoes had grown into their cages and the squash was growing big green leaves. The corn was just standing still and I was disappointed until I re-read my *Master Gardener’s Manual* and was reminded they build a strong root system. The herbs were rounded plants all about the same size, and when I began to water every day, the basil grew very fast. I almost gave up on the squash until one morning I saw a little yellow-orange flower that gave me joy! I did something really different which was suggested to me. I saw the corn budding in the

silk so I took old pantyhose toes and pulled them down over the ears. As the ear grew, the pantyhose expanded and protected it from pests. It looked funny, but it worked! Fortunately, the corn was close to the tomatoes and I used one side of two cages to support its voluminous branches.

Production—7 zucchini, 10 crook-necks, 25 bean pods, 23 Romas, 3 Early Girls, 17 ears of corn, plenty of basil and rosemary for pizza and mint to go with iced tea! After seven weeks I never saw my Ace55, although the label was still sticking up out of the soil. Hmmm...

Projection—is for a raised bed garden every year planted with things I like to eat and to try some new things, too! Never be afraid to ask questions.

I have seen many carrots in the store and from people’s gardens but could not figure out how they reproduce. I finally asked my question at our monthly Master Gardener’s meeting and found out! The second year the carrot produces a stem with a poppy-like flower. All the seeds are on stamen in the flower! Wow! So if you have a question, please call your Cochise County Master Gardener or take the class!

Chrissa Link, Master Gardener and winner of a 2014 High Desert Gardening & Landscaping Conference scholarship.

At a Glance Box

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

Plant: Catclaw acacia, *Acacia greggii*

Description: Small tree

Blooms: Creamy yellow flowers in spring

Use: Excellent Xeriscape plant

Culture: Well-draining soil, full sun.

Learn more: Cochise County Herbarium,

www.cochisecountyherbarium.org

For an in-depth article, see below.

Cado Daily

Water Resources Coordinator, Water Wise Program

University of Arizona Cochise County Cooperative

Extension

Is That a Mesquite?

It has been a spectacular spring for flowers. Prolific blooms on the desert willows (*Chilopsis linearis*) and ocotillos (*Fouquieria splendens*) have been a bonanza for hummingbirds. The whitethorn acacia and viscid acacia (*Acacia constricta* and *vernica*) bushes have just started blooming with their brilliant, strongly perfumed yellow ball flowers.

However, I decided not to write about the obvious and have you discover a wonderful native tree that is inconspicuous except when it blooms in the spring.

This small to medium sized tree growing on the side of the road may catch your eye this spring as you drive on Highway 90, 80 or I-10. From a distance, it looks like a mass of dull-creamy white flowers among dense stands of trees. At first glance it looks like a mesquite, but with a closer look quite a few differences can be seen.

Before we get to the differences, let's look at the similarities to a mesquite that are the tricksters. This tree is similar, yet it is a little smaller and denser. Some books list this plant as a shrub growing to about 10 feet high, but I have seen plants that have thick trunks like mesquites growing to 15 or so feet high. Like a mesquite it can be multi-trunked and similarly dense with twigs. It is also deciduous.

It has small leaflets like a mesquite (remember that the leaf on a mesquite is the leaf stem contain-

Acacia greggii



ing multiple leaflets). It also has fuzzy yellow flowers, and pods. Now look again.

It is easy to assume every plant with small leaflets is a mesquite, but it is fun to take a minute and examine the leaves. They are actually quite variable. Without getting into what kind of leaflets many of these plants have (pinnate, or pinnately and bipinnately compound), just look at the number of leaflets, size, and position on the leaf stem. Our mystery plant has more and smaller leaflets than the mesquite, but not quite as small as some other similar plants like the acacia mentioned earlier in this article.

The mystery plant's flower is another clue. The mesquite "flower" (it is really a spike of flowers) is about two or three inches long and yellow. This plant's "flower" (also a spike of flowers) is lighter yellow, fuzzier and only about one or two inches long. Unlike the mesquite flower, it is scented.

How about the pod? At this time of year, there may not be

any pods on the tree, but could be scattered on the ground. Mesquite pods are dense (thus a great source for making flour), light colored and skinny. This plant's pods are hard, dark and flat. Not very palatable.

This last clue is a dead giveaway. Yes, this plant has thorns. But what do mesquite thorns look like? Besides being sharp, they are straight and long. This plant's thorns are short and curved, like a cat's claw.

And there is your answer. This mystery plant is a Catclaw Acacia, *Acacia greggii*. Here is one native plant where the common name actually makes sense!

The Catclaw acacia is a great landscape plant. As a dryland native, it is cold hardy (to 0° F) and water thrifty. It can be planted in full sun and naturally grows in hot locations.

Being a dense and thorny plant, it makes great bird habitat. Put this wonderful native in the natural zone of your landscape among some evergreen plants. Plant it in the fall, tuck it in with some passive water harvesting berms and swales, give it some water to get it established, then sit back and enjoy watching your Catclaw acacia grow into a magnificent no-care addition to your landscape.

Cado Daily, M.A.

Water Resources Coordinator

MESQUITE

New Agricultural Traditions for an Ancient Food

ALL-DAY WORKSHOP

Come join us for a day of presentations, vendors and demonstrations on today's use of mesquite beans as an alternative food source for humans and animals. Topics covered will include food and handling safety, nutrition, management, cultivation, sorting, drying, cooking, harvesting and milling.

WHEN: Friday, June 13, 2014
8:30 am - 3:00 pm

WHERE: Cochise College Benson Center
1025 State Highway 90
Benson, Arizona 85602

REGISTRATION: \$30 per person (\$25 for BASA members, \$20 for students). Lunch will be provided to all who have registered and paid by June 9. If space permits, late registration will be available at the door, but lunch may not be provided.

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To register online, go to <http://bajaaz.org/calendar/mesquite-workshop/>
Or clip, fill out the information below and with a check made out to Baja Arizona Sustainable Agriculture, mail to: BASA Mesquite Workshop, P.O. Box 40935, Tucson, AZ 85717
Questions, call: 520-331-9821

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plant is stunning as the flower stamens are bright red and visited by hummingbirds. This plant in its natural environment starts to flower in mid-winter to late spring. Unfortunately, in a regular winter it might freeze, and as it has to recover—no flowers. Luckily, it will flower again in fall, but winter is just around the corner, and sometimes the flowers will freeze. The year we had the deep freeze, my plant froze to the ground, and it took that whole year for it to come back to its normal size of 3 feet in my yard—5 feet at Tohono Chul. I don't mind if there is a year it doesn't flower as it is still a nice plant with its dainty dark green foliage, and as I mentioned before, there are varieties that are more cold hardy.

*Angel Rutherford, Master Gardener
Photographer*