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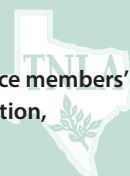


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# Genetic



# Modification and the Impact on Texas Growers

**GENETIC MODIFICATION (GM)** is the method to introduce new traits or characteristics to an organism. For example, plants may be genetically engineered to produce characteristics to enhance the growth or nutritional profile of food crops. Food and food ingredients from GM plants were introduced into our food supply in the 1990s. The FDA regulates the safety of foods and food products from plant sources including food from genetically engineered plants. Foods from GM plants must meet the same requirements, including safety requirements, as foods from traditionally bred plants. Developers genetically engineer plants for many of the same reasons that traditional breeding is used, such as resistance to insect damage, hardiness or enhanced nutrition.

The subject of producing GM crops is one fraught with controversy and is not limited to edible crops. All plants grown for resale, including trees, shrubs and ornamentals, can be grown through GM processes, and therefore are subject to the same pros and cons. There are strong opinions on both sides of the coin. On the one hand you have a technology that helps produce more plants with less vulnerabilities to pests and disease, and on the other you have product that has been scientifically altered without a clear understanding of long-term effects. We'll take a look at both sides of this coin- with a heavy focus on the food industry where most of the current research is being conducted- and let you decide!

## The Challenges

Due to the unpredictable nature of genetic experimentation, many have raised concerns that new food toxins, allergens or diseases are potential risks to eaters. Though the federal government claims GM products are safe, most research has been conducted, or funded by, the biotech industry. GM crops are patented, which gives the corporations that develop them the power to restrict independent research on the risks and benefits of GM products.

Despite the promise of higher yields, greater pest control or fewer weeds, some farmers have found mixed results dramatic rises in seed prices. The seed industry has undergone enormous consolidation, with an estimated 200 independent seed companies going out of business in the last fifteen years. Four companies – Monsanto, Syngenta, Dupont and Dow Chemical – now control over 50% of the seed market. This leaves farmers with far fewer options for seed varieties and fewer places to purchase their seeds.

*(continued on page 9)*





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It also leaves corporations with the power to control seed prices, which have risen sharply as GM crops have risen in prominence. According to the 2010 New York Times article, "Rapid Rise in Seed Prices Draws U.S. Scrutiny," farmers have seen corn seed prices rise by 135 percent, while soybean seed prices went up 108 percent.

Finally, GM crops have spawned the development of superweeds and superpests that are extraordinarily difficult to manage. For example, there are now at least 10 species of Roundup-resistant weeds in 26 states, as well as superweeds sprouting up in Australia, China and Brazil. In turn, affected farmers must revert to older and more toxic chemicals, more labor or more intense tillage to combat pests.

## The Opportunities

The findings in two reports from the journal *GM Crops*, "Global income and production effects of GM crops 1996–2012" and "Key environmental impacts of global GM crop use 1996–2012" suggest that GM crop use continues to benefit the environment and farmers. A majority of these benefits are in developing countries. "In the 17th year of widespread adoption, crops developed through genetic modification delivered more environmentally friendly farming practices while providing clear improvements to farmer productivity and income," said Graham Brookes, director of PG Economics, co-author of the report. "Half of the farm income gains and the majority of the environmental gains associated with changes in pesticide use and reductions in greenhouse gas emissions occurred in developing countries."

The two studies are extensive at more than 200 pages, (you can download the complete reports at

[www.pgeconomics.co.uk](http://www.pgeconomics.co.uk)), but here are few highlights:

- Crop GM has contributed to significantly reducing the release of greenhouse gas emissions from agricultural practices. This results from less fuel use and additional soil carbon storage from reduced tillage with GM crops. In 2012, this was equivalent to removing 27 billion kg of carbon dioxide from the atmosphere or equal to removing 11.9 million cars from the road for one year;
- The insect-resistant (IR) technology used in cotton and corn has consistently delivered yield gains from reduced pest damage. The average yield gains over the 1996–2012 period across all users of this technology has been +10.4% for insect-resistant corn and +16.1% for insect-resistant cotton;
- The herbicide-tolerant (HT) technology used in soybeans and canola has also contributed to increased production in some countries by helping farmers in Argentina grow a crop of soybeans after wheat in the same growing season[2], through higher yields and improved weed control;
- Between 1996 and 2012, crop biotechnology was responsible for an additional 122 million tons of soybeans and 231 million tons of corn. The technology has also contributed an extra 18.2 million tons of cotton lint and 6.6 million tons of canola;
- GM crops are allowing farmers to grow more without using additional land. Total area requirement is equivalent to 9% of the useable land in the U.S., or 24% of the useable land in Brazil, or 27% of the useable land in the EU (28);
- Crop biotechnology helps farmers earn reasonable incomes for their work. The net economic benefit at the farm level in 2012 was \$18.8 billion. For the 17-year period (1996–2012), the global farm income gain has been \$116.6 billion;
- Crop biotechnology continues to be a good investment for farmers around the world. The cost farmers paid for accessing crop biotechnology in 2012 (\$5.6 billion[3][4] payable to the seed supply chain) was equal to 23% of the total gains (a total of \$24.4 billion inclusive of the \$18.8 billion income gains). Globally, farmers received an average of \$3.33 for each dollar invested in GM crop seeds.

While we can see both benefits and costs around the use of GM crops and the consumption of GM foods, there are still a lot of opportunities for education. But before we can lay down a definitive Yay or Nay for the adoption of world-wide GM processes, consensus is that we need to do more independent research and continue to watch what happens in the field. 🌱



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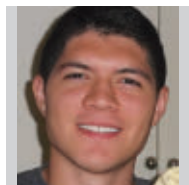
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In keeping with tradition and a commitment to promote careers in horticulture and agriculture, the Texas Nursery & Landscape Association (TNLA), in partnership with numerous local and regional industry leaders, recently announced the awarding of \$32,800 in scholarships. The scholarship program, operated by the TNLA Education and Research Foundation, provides scholarships to students who are seeking a degree in horticulture or agriculture.

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# What Loyal Customers Really Want

BY CHIP R. BELL

The landscape of customer devotion has been re-contoured! First, customers get terrific service in pockets of their life and use those experiences to judge everyone else. When the FedEx delivery person walks with a sense of urgency, we expect the mail carrier to do likewise. When USAA Insurance answers customers' phone calls on the first ring, their customers expect your nursery or landscape business to do the same. And, Amazon.com has raised the "make-it-easy" bar for every e-tailor on the planet.

Customers are also smarter than ever about the services they receive. Considering Sleepwell Hotel for your next vacation trip? You can instantly get web-based information complete with evaluations from dozens of previous guests. Everyone has become everyone's Consumers Report. It means companies must monitor all the details (now very transparent to customers) and get early warning on emerging trends or evolving glitches.

Figuring out today how to create a loyal customer is no simple task. Not only are customers different, the same customer is different at different times. Getting Starbucks coffee from a vending machine is not the same as buying Starbucks coffee at a Starbucks. The nursery customer looking for a "grab and go" plant likely has different expectations than when carefully landscaping a part



of their property. However, there are five key loyalty drivers that fit most customers most of the time about most services. Their application may be unique but their existence is not.

## Include Me Like I'm Your Partner

Customer's loyalty soars when they discover they can be active participants in the service experience. Harley-Davidson created the Harley Owners Group (HOG) as a forum to bring Harley loyalists together for education and recreation. Membership comes with the purchase of a Harley. eBay got a group of customers to help design, price and market their highly successful mobile app.

Build-A-Bear Workshop, with their interactive build-a-stuff toy experience, has grown to over 400 stores around the world in ten years. Bose sends their headphone customers a stack of courtesy cards to give out to other people who inquire about their headphones—cards containing every conceivable way to contact Bose.

Get your customers involved in your plans. Create your own “board of customers” to react to store changes in the works. Hold drop-ins and receptions as a setting to get customer ideas. Offer rewards for the best customer suggestions. Post customer ideas in a public area in the store along with the actions you have taken. Suggestion boxes work when customers experience that customer input matters. Encourage your front-line employees to ask customers: “What is one thing we can do to improve our service to you?” and share their scout reports on a frequent basis.

***“Companies must monitor all the details (now very transparent to customers) and get early warning on emerging trends or evolving glitches.”***

## Protect Me from Effort and Anxiety

A value proposition is the complete package of offerings a seller proposes to a customer in exchange for the customer's funds. It includes the product (or outcome for non-object selling companies), the price, and the process (or experience) involved in getting the product or outcome. There are certain qualities or features all buyers assume will typify that value proposition. Buyers, for instance, assume the products they buy will be as promised, the price fair, and the process relatively comfortable.

These “givens” are a lot like the air we breathe—we take air for granted unless it is removed. But, adding air does not make us happy campers. If the commercial plane we board lands in the right city, we do not cheer; but, if it lands in the wrong city, we're upset. We assume banks will be safe, hotels comfortable and hospitals clean. These “taken for granted” attributes are service air—noticed only when they are absent (or perceived to be at risk of being absent). The gourmet meal recollection will be totally overwritten by the nightmare of food poisoning because the restaurant failed to pay attention to routine health standards. Service air may be boring stuff, but it is called “air” for a reason! And, customers are devoted to organizations that ride herd on making sure the basics are always done perfectly.

## Understand My Ever Changing Expectations

We often think of service as the process of meeting a customer's need. But, it goes much deeper than that. All needs are derived from a problem to be solved. Great service providers are great listeners. They know that unearthing the essence of the problem will point to a solution that goes beyond the superficial transaction. It takes building the kind of rapport with customers that engenders trust. It entails standing in the customers' shoes to get a fine bead on their hopes and aspirations.

Understanding the customer takes more than simply sending out a survey or running an occasional focus group. It means viewing every person who comes in contact with the customer as a vital listening post—a scout able to gather valuable intelligence about the ever-changing customer and provide early warning about issues and concerns. It involves installing a wide range of tools and techniques for customer intelligence gathering. Call your own business, disguise your voice, and request something out of the ordinary. It can provide great intelligence about what your customers experience.

## Give Me a Joyful Surprise

Customers want sparkly and glitter, a cherry on top of everything. As

*(continued on page 15)*





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(continued on page 13)

customers, we want all our senses stimulated, not just those linked to the buyer-seller exchange. Features have become far more titillating than function; extras more valued than the core offering. It means that attracting customer devotion today requires a stand that calls attention to the experience. It is a position that is exciting, bold, and innovative.

Think of the service experience like a box of Cracker Jacks®. What can be your “free prize inside?” The power of surprise lies in its capacity to enchant, not just entertain; to be value-unique, not just value-added. Hotel Monaco puts a live gold fish in your hotel room; Sewell Lexus dealerships in the Dallas area programs your radio station from your trade-in and lets you discover it.

First time visitors to Nicholson-Hardie Garden and Nursery in Dallas are surprised to see one of two large calico cats lounging on the checkout counter within petable distance. But, what most takes their breath away is the business card holder identifying the two “employees” as Sammy Cat and Frank Cat. And, the cats’ business titles? The Rat Pack!

## Inspire Me With Your Obvious Values

Great service should reflect a deeper purpose or destiny, befitting of the organizations values not just its strategy. Service with character also means a sense of innocence, naturalness, purity—a grounding. We describe someone as grounded when we see them as uncorrupted. We like being charmed by what we do not understand; we do not enjoy being hoodwinked by what we should have understood. Such service need not be completely

obvious to the customer in its design, but it must not feel devious to the customer in its execution.

What makes service inspirational? It moves us when it comes from someone who is passionate about their work. We are stirred when service is delivered by someone who is considerate, kind and thoughtful. It takes us to a higher plane when it reflects an apparent zeal to “do the right thing.” It is service with character. Given the too often cynical and uncaring side of business today, it leaves customers wanting to return when they have had an encounter with goodness and purity.

Bouquets is a floral shop located in downtown Denver, near many parking meters. Many businesses refuse to give change for meters, except to customers, because it depletes their cash till and takes employee time. Bouquets replenishes a bag of quarters daily, designated specifically to make change for anyone who asks, says co-owner BJ Dyer, “Coins are offered with a smile and a business card. Many people later become customers when they need flowers,” Dyer says. The Bouquets generosity reveals their true colors to customers.

Customers who are merely satisfied remain your customer only as long as everything goes their way. But when something better comes along, other providers temporarily slash prices or if they experience even small service problems ...whoosh, off they go to the competition. But loyal customers are different. They don’t just come back; they don’t simply recommend you; they insist their friends do business with you.

***“All needs are derived from a problem to be solved.”***

They forgive you when you make mistakes and defend you to others who have bad experiences with you. They give you candid feedback when they spot (or experience) a problem, even if you sometimes take their feedback for granted.

Loyal customers act as a volunteer sales force championing you to others at home, work, in social circles – and even around the globe via recommendations on blogs, online bulletin boards and web sites. And because they feel committed to you and see both emotional and business value in the relationship, they will typically pay more for what they get from you...because they are convinced it is worth it. The formula for creating and sustaining such loyalty comes through inclusion, trust, understanding, joy and character. Put these in your customers’ experience and watch their admiration soar right along with your bottom line! ♪



*Chip R. Bell is founder and senior partner with The Chip Bell Group and manages their office near Atlanta. Prior to starting CBG in 1980, he was Director*

*of Management and Organization Development for NCNB (now Bank of America). Dr. Bell holds graduate degrees from Vanderbilt University and the George Washington University. Additionally, he was a highly decorated infantry unit commander in Viet Nam with the elite 82nd Airborne. Chip presented the Keynote Presentation at the Nursery/Landscape EXPO on Thursday, August 14, 2014.*



Each quarter, TNLA publishes an article and a quiz. Those holding TCNP, TCLP, or TMCNP certifications can complete the quiz and return it to TNLA to earn 1 CEU credit. The quiz for this quarter can be found on page 33. Fill in the quiz and return to TNLA according to the instructions on that page.

# Effective Whitefly Management

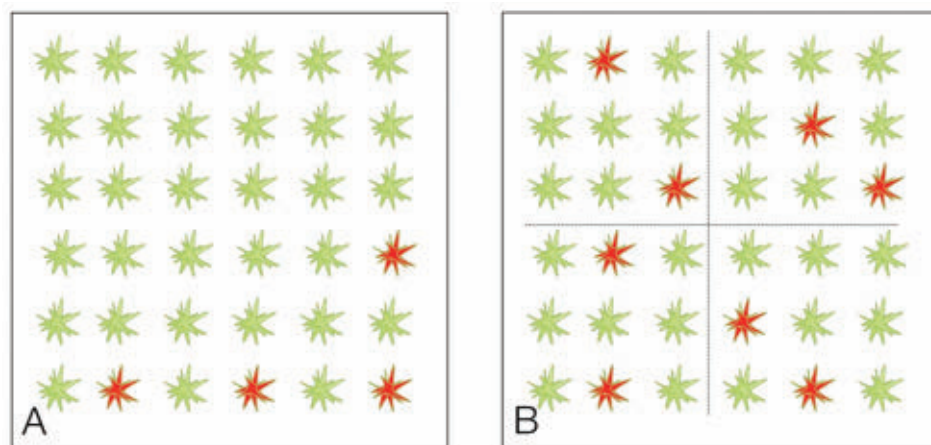
By Erfan Vafaie

**T**here are several hundred species of whitefly in the order ‘Hemiptera’ (a.k.a. true bugs), which means that they suck; both literally and figuratively, just like most other hemipteran pests such as aphids, stink bugs and leafhoppers. Their piercing mouthparts penetrate the phloem of plants, inject toxic saliva to aid in digestion and suck up nutrients. Whiteflies must filter through a lot of phloem to get their nutrients, so they excrete copious ‘droplets’ of poop, known as honeydew. Honeydew is a sugary solution that is sticky and can act as an inoculant for sooty mold; a black mold that resembles a coating of soot. Whiteflies can feed on hundreds of plant species and reproduce rapidly, with a female laying 150 – 300 eggs in her lifetime. Insufficient monitoring can result in high whitefly populations, which is substantially harder to manage than a small population. An effective integrated pest management approach requires good monitoring practices, a preventative strategy, mechanical

and biological controls and lastly, the judicious use of effective chemicals to manage populations when necessary.

Crops should be scouted weekly for whiteflies. A combination of sectioning the plot into quadrants and random sampling can be used to ensure that a sample is

representative of the infestation of the whole (see Figure 1). Check the underside of one leaf of each plant for whitefly adults (Figure 2a), nymphs (Figure 2b) or signs of whitefly presence, such as shiny leaves coated in honeydew (Figure 2c). Also take note of red-eyed nymphs, as they will soon emerge as new adults, resulting in

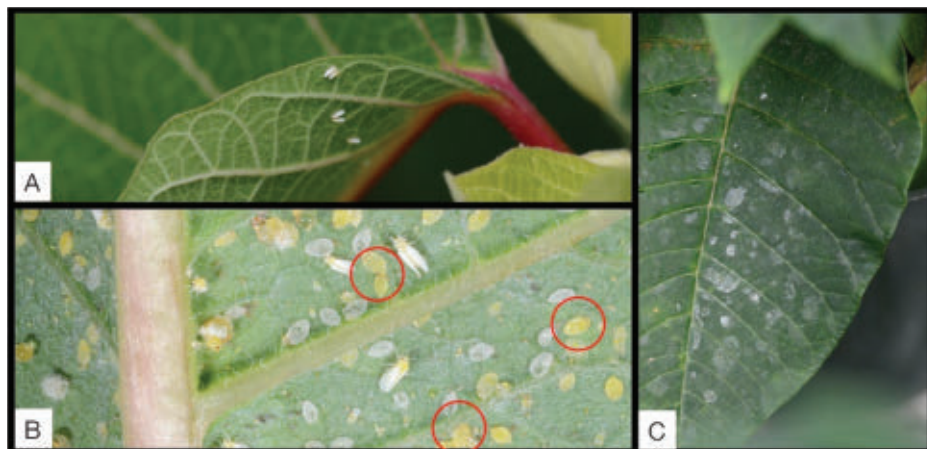


**Figure 1. Take a sample that is representative of the entire crop. Monitored crops are denoted in red. What not to do (A): look at a few plants along the edges, where they are closest and convenient. This strategy will miss budding infestations that are far on the other end of the plot. An example of good monitoring practice (B): section the crop into equal parts and randomly monitor within those sections to get a representative sample of the whole. Effective monitoring identifies pests early, enabling cost-effective pest management.**

a quick increase in adult whitefly populations (Figure 2b). Collect data on the whitefly populations from week to week to determine when control is necessary.

Two methods for assessing whitefly population levels are common: whitefly counts and presence-absence sampling. Whitefly counts involve counting and recording the number of whitefly adults present on the underside of the leaf. The University of Arizona Cooperative Extension recommends an action threshold of three adults per leaf, which can be applied to most crops. High value crops or crops susceptible to whitefly-vectored plant pathogens often have a much lower threshold. If certain sections of your crop exceed that threshold, consider a spot treatment. If the average number of adults exceeds 3 adults per leaf, then a crop-wide treatment may be necessary. For presence-absence sampling, simply record whether whitefly is “present” or “absent”, regardless of the number of adults. Although less accurate, this method of sampling can be quicker and effective for large quantities of a particular crop. Over 60% presence exceeds the typical action threshold and a management strategy should be implemented. However, there are practices that can be used to reduce the risk of whitefly infestations in the first place.

Cultural and preventative strategies are critical for reducing the risk of whitefly infestations. Remove any weeds, old plants or ‘pet’ plants in the area that may act as alternative hosts for whiteflies: remember, they have hundreds



**Figure 2. Monitoring for whitefly adults, nymphs and honeydew. Adults can easily be seen with the naked eye (A), whereas nymphs require a closer look (B). A simple hand lens can be used to distinguish the final stage nymphs by their red eyes (B; red circles). Shiny leaves and surfaces (C) are often a quick giveaway of a high infestation of honeydew producing pests.**

of plant hosts, so unnecessary plants may act as a reservoir for further infestation. Thoroughly inspect new plants and cuttings for whiteflies and treat (or reject) them before introducing them to an area with more susceptible hosts. Refrain from excessive irrigation and fertilization, as it can stress plants, making them a more desirable host. When practical, different crops can be isolated from each other using a screen with pores of 405 microns or smaller. Reducing UV penetration onto the crop (i.e. UV-absorbent plastic) can also decrease whitefly activity, as it disrupts their navigation. If infestation still occurs after taking preventative measures, it's time to bring out re-enforcements.

An early infestation can be dealt with by removing infested leaves or by using high-pressure water spray on the underside of leaves to remove adults and nymphs. Early whitefly populations can

also be managed by natural predators, such as lady beetles, lacewing, minute pirate bugs, big eyed bugs and parasitoids, such as *Eretmocerus eremicus* and *Encarsia formosa*. Parasitoids are a type of parasite that result in the death of its host due to the development of a new parasitoid offspring, making them effective at managing pests. Many natural predators are commercially available, but the effective use of biological control requires caution in the timing and types of chemical sprays used for other pests. Often one of the easiest and economic biological control measures is through conservation of naturally occurring predators through judicious use of insecticides, beneficial habitat to encourage natural predators and the use of biorational insecticides. However, if the whitefly infestation gets out of hand, then it's time to bring out the ‘big guns’.

*(continued on page 19)*





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(continued on page 17)

Although the regular use of broad-spectrum insecticides is seductive, integrated pest management encourages their judicious use and rotating modes of action. Here are some tips to consider when infestation is high:

- Use biorational insecticides where possible, such as insecticidal soaps and oils, in order to preserve beneficial insects.
- When using broad-spectrum insecticides (labeled against many pests), apply spot treatments where pest infestations are localized and time sprays to prevent harm to beneficial insects.
- Ensure coverage of leaf undersides when using contact sprays, as nymphs will tend to feed there.

- Systemic soil-drenched insecticides tend to target the pest directly through feeding, making them safer to beneficials.

Insecticide active ingredients work through different modes of action, which must be rotated on a regular basis in order to prevent insecticide resistance, especially when relying on a weekly spray program. Check modes of action through the “Resistance Management for Sustainable Agriculture and Improved Public Health” website ([www.ira-online.org](http://www.ira-online.org)). When using insecticides, always make sure to read the label before purchasing, storing and using it. The label is the law and has pertinent information to ensure the product works effectively as advertised and to keep you and the environment safe.

By tackling a strong integrated pest management (IPM) program for one major insect pest at a time, an overall IPM program can be established to help reduce pest pressures, reduce the risk of insecticide resistance and stay economically viable. ☞



Mr. Erfan Vafaie is an Extension Program Specialist in Greenhouse Nursery and Ornamentals. He recently joined the Texas AgriLife

Extension Services team in December, from a background working with pests such as whiteflies, aphids, and vinegar flies. His past focus was primarily in biological control. He is currently developing his program to best suit the needs of the greenhouse ornamental and nursery industry in Texas.



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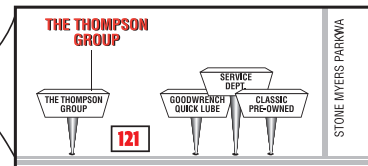
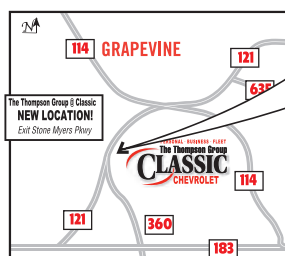
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## GreenVi\$ion

# Earth-Kind® Landscape Principals IV: Appropriate Plant Section

by Mengmeng Gu, Ph. D.



Mengmeng Gu,  
Ph.D. is an Assistant  
Professor/Extension  
Specialist at TAMU.  
She received her BS in  
landscape horticulture  
and MS in ornamental  
horticulture from  
Beijing Forestry  
University

**W**e'll focus on the fourth aspect of seven Earth-Kind landscape principals in this article:

- Planning and design
- Soil analysis and preparation
- Practical turf areas
- **Appropriate plant selection**
- Efficient irrigation
- Use of mulches
- Appropriate maintenance.

Plants are the major component of landscapes. Each plant has its niche in the ecosystem. It is the landscape professional's job to select the right plants and use them in appropriate locations in landscapes, based on their knowledge of the site and plant material. All landscape elements, including plant materials, should have their functions.

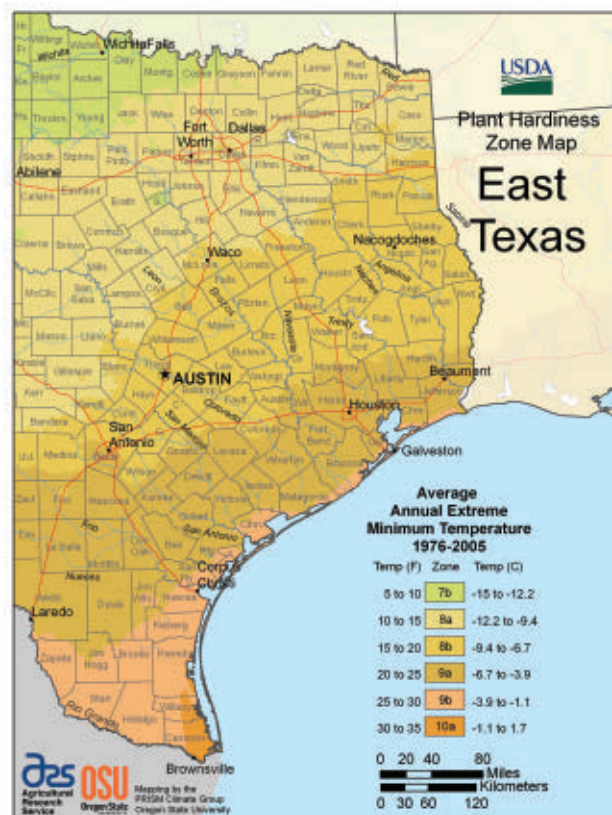
## Plant Functions

When considering plant functions, plants could be divided into the following categories: trees, shrubs, perennials, annuals, groundcovers, and vines.

There is no clear distinction between a tree and a shrub with both having woody structures. Trees are categorized as single-trunked versus shrubs are multi-trunked without a distinctive main trunk. Use crapemyrtle as an example----- 'Choctaw', 'Muskogee', and 'Natchez'

could grow to 30' and are normally grown as trees. 'Apalachee', 'Lipan', 'Osage', 'Potomac', 'Sioux', 'Tuscarora', 'Tuskegee', 'Wichita' and 'Yuma' are normally grown as small trees or large shrubs. Those grown as dense or miniature shrubs include 'Catawba', 'Cedar Lane Red', 'Cherokee', 'Chickasaw', 'Hopi', 'Pecos', 'Pocomoke', 'Powhatan', 'Seminole', 'Tonto', 'Zuni' and the Razzle Dazzle® series. Plants can also be divided into evergreen plants, which have new leaves growing out and old leaves falling continuously during the

(continued on page 25)



**Fig 1. West Texas ranges from 6b to 9a and East Texas ranges from 7b to 10a.**

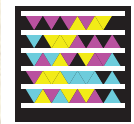


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(continued from page 23)

year, and deciduous plants, which shed all leaves at one time, usually in the fall.

Trees (often single-trunked) are the tallest among all plant categories. Trees' main function is to provide shade in landscapes, most of the time of a year for deciduous trees and all year around for evergreen trees. Trees do flower like many other plants, but the flowers may not be as showy (e.g. oaks, poplars, sycamores, pines and elms) as the goldenrain tree. On the other hand, some trees may exhibit showy characteristics, such as bark and colorful fall foliage.

Shrubs probably have the most diverse texture, sizes, growth habit and shape, ranging from tall narrow stick-like Italian cypress to mounding creeping juniper that forms a mat on the ground. Shrubs may have some trunks or have foliage stems all the way to the ground. Flowering shrubs put out attractive flowers from early spring to late fall. Some have very dense canopy and foliage, good candidates as hedges, and some display graceful arching branches. Shrubs provide a lot of various interests to the landscape.

Perennials and annuals, both being herbaceous, differ in their life cycles---perennial could sustain over years while annuals normally survive only one season. Biennials need two seasons to complete a life cycle----first year vegetative and the second year reproductive. Many annuals available in the market are not true 'annuals', but simply treated as annuals when extreme high or low temperature wipe them out of the landscape. The sizes of perennials and annuals could range from 6" to 8' tall, but most of the sizes are around 1-3'. Perennials and annuals provide the longest and most vivid

colors in the landscape through their flowers or colorful foliage.

Groundcovers and turf provides the lowest height interest in the landscape with turf tolerating traffic better than most groundcovers. However, groundcovers are perfect for hard-to-maintain or hard-to-mow areas, such as areas with a steep slope and parking lot islands, or areas where turf grass does not grow well.

Vines, woody or herbaceous, need certain structures and the shape or size of structures often defines the shapes or sizes of vines. In other aspects, vines are very similar to shrubs, perennials and annuals.

In the landscape, trees provide the overall structure; shrubs/vines are the major interest spot (form, color or texture); and perennials and annuals

(continued on page 26)



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(continued from page 25)

provide the highlights. Groundcovers and turf provide the foundation of 'landscape canvases'.

### Cultural Aspects of Plant Selection

The next aspects to consider when selecting plants are the cultural aspects: temperature---hardiness/heat tolerance, sun/shade preference, soil conditions, water requirements, and other maintenance requirements.

Temperature---hardiness/heat tolerance----is the deciding factor whether plants will survive the area. The 2012 USDA Plant Hardiness Zone Map is the standard by which landscapers can determine which plants are most likely to survive winters at a location. The 2012 map is based on the average annual minimum winter temperature

from 1976 to 2005, divided into 10-degree F zones. Most literatures use the USDA Plant Hardiness Zone to indicate the plants overwintering capability in certain areas. The USDA Plant Hardiness Zone of a particular location could be found using the ZIP code at the USDA Plant Hardiness website <http://planthardiness.ars.usda.gov/PHZMWeb/>.

Another temperature factor is the heat during summer. Plants in winter at certain locations in a particular USDA Cold Hardiness Zone may not 'over summer' at another location of the same zone. The American Horticultural Society has produced a Heat-Zone Map, which helps landscapers and gardeners to determine whether plants could 'over summer'----survive through the heat during summer.

**Sun/shade preference** ----Sunlight is the driving force for EVERYTHING on earth, including plants in the landscape. Different plants have different light needs. They adapted to the light levels, through physiological and morphological changes, available from their ecological niche. Plants develop different 'light requirements' after thousands of years' of evolving. Those physiological and morphological changes would not likely change when we grow them in the landscape with light levels different from their requirements. What would happen then? Plants suffer and may eventually die.

Hosta is a very good example. Hostas are shade-LOVING plants. If planted under full sun, they'll probably suffer or die, no matter what great soil or water you give

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them. The only thing that could be done is changing the light level---reduce it. Building a structure over, or plant a shade tree will help, among many other measures you could take. Moving them to a shadier condition--find a place fitting their needs (light, in this case)---is probably the most cost effective way. Another example is the crape myrtle on the north side of my house planted by the previous owner. Without enough sun light, it grew but never flowered. We're ready to cut it down.

**Soil**---Except for sunlight and proper air temperature, soil provides almost everything else essential for plant growth. Chemical and physical properties of soil in the landscape will have a huge effect on the plant performance in the landscape. All plants enjoy soil rich in organic matter and good in drainage. Some plants prefer soil with certain properties, like low pH. But most plants have different levels of tolerance of soil of poor drainage or certain pH levels.

**Water**---Water is the next most important thing for plants in the landscape, in terms of both quality and quantity. Saying it's important doesn't mean the more the better. Water is like light---the appropriate amount is the best, not too much and not too little. After the severe drought in Texas in 2011, probably not too many will argue against water conservation.

Plants vary in their water quantity requirements. With increasing water restriction in many areas, more and more landscapers and homeowners are looking for drought tolerant plants as a way of water conservation. Here are some general rules for selecting drought tolerant plants:

**C4/CAM vs. C3 plants**-----Based on their metabolism processes, plants could be divided to C4, CAM (crassulaceous acid metabolism), and C3 plants. Most landscape plants and cool-season grasses are C3 plants, warm-season grasses, amaranthus and pigweed are C4 plants, and CAM plants mainly include succulent plants, pineapple, agaves and prickly pear. Generally, C4 and CAM plants are more drought tolerant than C3 plants.

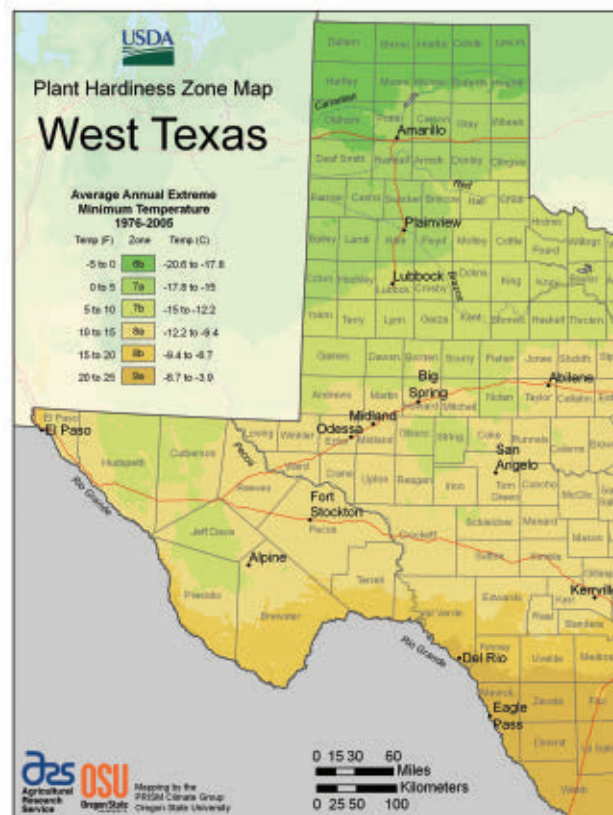
**Upper canopy vs. understory plants**-----In a natural plant habitat, the plants at upper canopy share the same water source with understory plants as their roots are all close to each other. Plants at upper canopy are exposed at a water-demanding environment: 1) direct and more exposure to sun requires more cooling, mainly from evapotranspiration; 2) there is more air movement (wind) at upper canopy that accelerate water loss; and 3) relative humidity is lower at upper canopy and that accelerates water loss too. With the same amount of water to tap into, plants at upper canopy have to develop certain ways to cope with the relative 'drought' compared to understory plants.

**Total plant leaf area**-----Plants lose water mainly through stomata. Although stomata density (the number of stomata on a unit leaf area) varies, generally larger leaves have

more stomata than smaller leaves. So as a whole, plants with less/no leaves or smaller leaves probably have better drought tolerance than those with more leaves or bigger leaves.

**Leaf morphology**-----Plants could also change it leaf morphology to adapt to drought conditions. High hairy density (trichomes---leaf hair), a waxy surface, bluish color or thicker leaf blade are all leaf characteristics that will help plants conserve water and thus more drought tolerant.

Water quality refers to its pH, alkalinity and salinity. With grey water (normally having higher electrical conductivity; EC---a measure of salt content) used more and more in the landscape, especially in West Texas, more and more attention is paid to salinity management in the landscape. ☺



**Fig 2. Most areas of Texas are in AHS Heat Zone 8-12**  
[http://www.ahs.org/pdfs/05\\_heat\\_map.pdf](http://www.ahs.org/pdfs/05_heat_map.pdf).



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## Notes from SFA Gardens

# Planting Seeds, One Child at a Time

by Elyce Rodewald



*Elyce Rodewald is the Education Coordinator for SFA Gardens in Nacogdoches, TX.*

**M**any people assume that my home garden should be wonderful because I work at SFA Gardens. The truth is my garden at home is a mess...so far from “Southern Living” that it isn’t funny. Wild lettuce and McCartney rose crowd around the sturdy crinum and old roses. Faithful milkweed and coneflowers fight to be seen above the greenbriar. The bird bath and St. Francis statue have disappeared into a mass of goldenrod and a bumper crop of garlic.

You would never know I am still an avid gardener. I have been diligently planting seeds...thousands as a matter of fact. I’ve been helped by wonderful volunteers,

students and SFA Gardens staff who share my love of gardening and spend countless hours helping to plant, weed and care for the garden. So why is my landscape in such disarray? Because the garden we are growing is different from the beautiful displays at the SFA Gardens. Our gardens are growing minds, and our seeds are ideas, opportunities and experiences that we throw out to the fertile minds of children.



Spring planting actually starts in January as our after-school friends return from holiday break. They are always anxious to start new adventures in gardening and investigating. Soon school groups join us in February with fifth graders exploring real-life examples of earth science—meeting ancient rocks and examples of deposition and erosion. Meanwhile, the second graders explore flowers, make soil soup, discover the wonders of seeds, and visit with the amazing honeybees. In March, third graders “Go Wild” over native Texas plants and ecosystems, and in April, fourth graders are “Wild About Science”—learning to use a compass, determining water quality in the marsh, measuring trees, and collecting data about camouflaged “worms.” By the end of April we are in a planting frenzy as 80+ SFA Elementary Education interns, led by their professors, introduce thousands of children to science and nature during the annual Bugs, Bees, Butterflies, and Blossoms Festival. A few more school groups in May, then we are in the home stretch—June and four wonderful weeks of Pineywoods Camp. When the year is done, there have been about 13,000 school children who have enjoyed an outdoor learning experience.

*(continued on page 31)*





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(continued from page 29)

Do we see the fruits of these gardening efforts? Yes, definitely! Pre-visit and post-visit testing proves that children learn better in the outdoors with hands-on lessons. With the help of Dr. Cheryl Boyette, we have also implemented effective, non-traditional methods of evaluating our programs throughout the year. These techniques measure participants' increases in environmental knowledge, outdoor skills, conservation ethics and attitudes and their personal connection to nature. Using evaluation methods that include photo-analysis of student interests, student journals, games, observations, rubrics of skills and concept mapping exercises, we are able to cross reference findings and observations to add reliability and validity to our program evaluations. We are constantly adjusting and refining our programs to meet the needs of our audience and the missions of the University, the Arthur Temple College of Forestry and Agriculture and the SFA Gardens.

Is it difficult to cultivate this garden? I think not really so difficult at all. We hear a lot about "nature deficit disorder" these days. Richard Louv's book, *Last Child in the Woods* has set the national tone of concern we all have for youth disconnected from the natural sciences. I understand what all the fuss is about, but I also feel that the remedy is simple. Let the kids play outside, or better yet, play outside with them. It is difficult to stop a child's natural curiosity and sense of wonder in the out of doors. We strive to create an environment where children and adults can expand their knowledge, explore the natural world, develop curiosity, nurture a sense of wonder, create

community connections, discover inter-relationships and observe stewardship. We encourage our participants to question what is and imagine what could be.

As a centerpiece to the environmental education program at SFA Gardens we now have the Ina Brundrett Conservation Education Building. Built with sustainable design principles, the building features flexible laboratory and classroom space, storage areas and restrooms. Dr. Creech is excited that the building melts into the surroundings and gives us opportunity to showcase "a low-maintenance landscape of bullet-proof native plants like possumhaw hollies, parsley haws, silverbells, pink muhly grass and a wonderful colony of dwarf loblolly pines." In addition, we are excited to announce that this energy efficient building will soon have a solar power array as the result of a Green Mountain Energy Sun Club grant. It's a first in Nacogdoches – and fits our philosophy of walking softly on the earth.

I offer a huge "thank you" to all the people who understand how important it is to bring children outside—school administrators who stretch the field trip budget, teachers who push their own comfort level to bring their classroom outdoors, parents and grandparents who go the extra mile (literally!) to bring their children to camp. As horticulturists, nurserymen, greenhouse growers, landscapers and enthusiastic gardeners, we all need to nurture the next generation. This garden we are tending is an important one, and we are all planting seeds, one child at a time. ☺

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1. Whiteflies are in order \_\_\_\_\_.
2. \_\_\_\_\_ is a sugary substance excreted by the whiteflies.
3. What two methods can be used for assessing whitefly population levels?
4. At what threshold in a whitefly counts does the University of Arizona Cooperative Extension recommend before taking action?
5. At what percent of present whiteflies exceeds the typical action threshold in presence-absence sampling?
6. \_\_\_\_\_ and \_\_\_\_\_ strategies are critical for reducing the risk of whitefly infestation.
7. In cultural practices for reducing the threats of whitefly infestations, refrain from excessive \_\_\_\_\_ and \_\_\_\_\_ as this can stress plants, making them a more desirable host.
8. \_\_\_\_\_ are a type of parasite that results in the death of its host due to the development of its new offspring within the host.
9. Although the regular use of broad-spectrum insecticides is seductive, \_\_\_\_\_ encourages their judicious use and rotating modes of action.
10. What other three pests are in the same order as whiteflies?

### PLEASE RETURN THE COMPLETED QUIZ TO:

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## In Memoriam



**WILLIE J. GRANATO** born on November 27, 1925 in San Antonio passed away on July 12, 2014. Willie lived in Poteet for 66 years and worked his entire life creating successful

businesses including farming, ranching, and most recently a wholesale nursery. He was a TNLA member since 1994.

Willie was preceded in death by his parents, Joe and Maggie Granato, his wife Antonette Monaco Granato, 6 brothers and 1 sister. He is survived by his brother, Gene Granato, nephews: Joseph V. Granato and John Venicasa, Jr. and a niece, Margaret Rose Zepeda.



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#### Educator

##### Anna Vogler

Bexar County Master Gardeners  
2320 Encino Cliff St  
San Antonio, TX 78259

#### Government Employee

##### Edward Lopez

San Antonio River Authority  
8934 Palm Crest  
San Antonio, TX 78211

##### Michael Sanchez

San Antonio River Authority  
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Hondo, TX 78861

##### Ling Y. Liu

City Of San Antonio  
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##### Randy Hagman

Bull Creek Management  
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Austin, TX 78731

#### Government Employee

##### Daphne Richards

Texas A&M AgriLife Extension -  
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[aggie-horticulture.tamu.edu/travis](http://aggie-horticulture.tamu.edu/travis)

##### Denise Delaney

City Of Austin Watershed Protection  
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Austin, TX 78767-1088  
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#### Landscape

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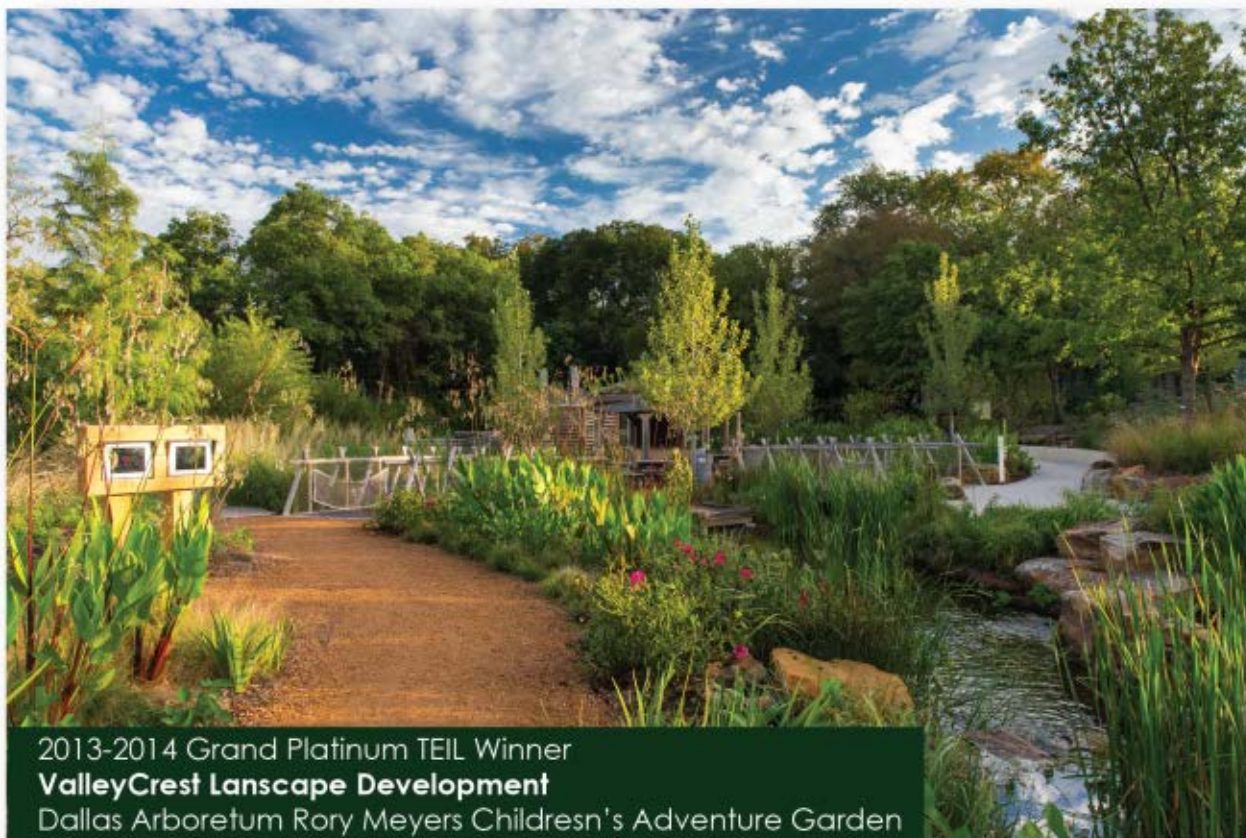
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### SEPTEMBER

- 12 Greater Houston Plant Conference, Houston
- 22 Plug & Cutting Conference, Orlando, FL
- 30 Field & Cover Production Tour, Minneapolis, MN

### OCTOBER

- 3 Organic Pesticide CEU Event, College Station
- 6 Texas Fruit Conference, Bryan, TX
- 22-24 PLANET Green Industry Conference, Louisville, KY

### NOVEMBER

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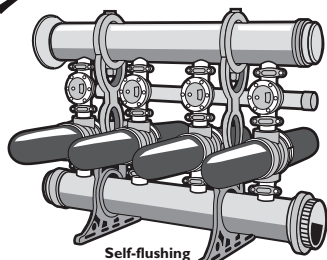
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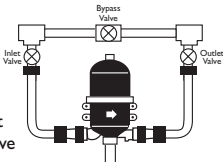
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