

## SOLUTIONS



## Choose Wisely for Pesticide Formulation Effectiveness

by Ed Skvarch, UF/IFAS Extension St. Lucie County

When a pesticide chemical is being manufactured, rarely can it be used in its raw or unformulated state, so the manufacturer must further modify the product by combining it with other materials such as solvents, wetting agents, stickers, powders, or granules. This combination of the products active and inert ingredients is known as a formulation. Formulations allow for easier transportation and handling by your application equipment, and as an applicator, it's your responsibility to choose the formulation wisely so that it will best meet your control requirements, be effective against the pest, and preserve the environment around you.

**Interpreting an ingredient statement:** Often the product name tells you something about the formulation. Below is an ingredient statement for the herbicide Buctril 4EC. However before looking at this statement, there are few important terms that I would like you to understand.

**Active Ingredient (AI):** The active ingredient (a.i.) in a pesticide formulation is the actual chemical that controls the pest. When looking for the active ingredient look no further than the front label in the ingredient statement section just above the EPA registration number. It is a requirement by the EPA that the active ingredients are clearly stated on the label. Some products may contain one active ingredient while others may include several; however it's important to understand that all active ingredients must be listed separately in

the active ingredient statement.

**Inert Ingredient:** Inert ingredients are materials added during the formulation process to help stabilize the product. These ingredients are also added to help the product mix better with water, aid in transportation and handling while also assisting in the effectiveness and penetration of the product. The exact manufacturers' inert ingredients won't be found on the label as these ingredients are trade secrets. What you will find in place of the exact inerts is "other ingredients" or "inert ingredients" with a general explanation. Some of the different types of inerts may include water, emulsifiers, dye, surfactants, spreaders, stickers and wetting agents.

**For the rest of the article and to take the test and to get 1 CORE pesticide credit please visit the following website:** <http://www.growingproduce.com/crop-protection/ceu-series-choose-wisely-for-pesticide-formulation-effectiveness/>

## In This Issue

- 1 Choose Wisely for Pesticide Formulation Effectiveness
- 1 Pest Update: Dieback of Eugenia
- 2 Which Preemergent Herbicide Do I Use?
- 4 New Cultivar of Tung Tree, 'Anna Bella'
- 4 Proposed WPS Changes
- 6 New Mexican Petunia Cultivars
- 7 UF Releases New Gerbera Daisy Varieties
- 8 Florida Ornamental Plant Industry Outlook 2014

## Pest Update

By A. J. Palmateer, Edited by E.V. Campoverde, UF/IFAS Extension Miami-Dade County

**Dieback of Eugenia.** *Syzygium paniculatum* (Myrtaceae; syns. *Eugenia myrtifolia*; *E. paniculata* var. *australis*) is an economically important plant in the South Florida ornamental industry. Known as Eugenia, it is a popular landscape choice in warm climate areas, such as California, Florida, and Hawaii. It is used as a potted plant, in espaliers, topiaries, and in hedges in USDA Hardiness Zones 10 and 11 (Figs. 1-2).

Continued on p. 5



# Which Preemergent Herbicide Do I Use?

by Shawn Steed, UF/IFAS Extension Hillsborough County

Woody ornamental growers have been asking for the last few years about effective pre-emergent herbicides. It seems like herbicides they have been using in the past have reduced efficacy against weeds they are commonly seeing now. Common weeds encountered in local nurseries are beggar's tick, artillery weed, woodsorrel, bittercress, thickhead, tassel flower, spurge, grasses, and galinsoga.

A demonstration plot was constructed at UF/IFAS Extension Hillsborough County office with the help of our industry partner Diamond R Fertilizer, to trial and determine efficacy of 18 herbicides, one organic mulch, and one organic mulch/herbicide combination against weeds commonly seen. We wanted to answer a few questions: Do mulches work as good as herbicides? Do brand names work as good as generic products? Which type of herbicide

works better, liquids or granulars? Which herbicides work on what weeds? How long does efficacy last? We also wanted to replicate real nursery conditions. So we used old potting soil with weed seeds and incorporated freshly collected weed seeds on the surface of the soil. This would replicate an old three gallon plant that has been on the nursery for a year and you are continuing to weed it. What herbicide is going to work best in this situation? We then applied preemergent herbicides to the plots and watered daily. We used the high labeled rate on all herbicides. Our demonstration trial was carried out September and ran until December. Although this was not replicated science, only a demonstration, it was repeated twice, and we learned some interesting things. Here is a list of our treatments and some of our results when we looked at the weed coverage from two trials at 30 days after treatment.

Herbicide Treatment	Average % plot coverage	Average Number of Grass Plants	Average Number of Spurge
Control (Untreated)	97.5	155	35
Snapshot	47.5	0	0
TI 2.5G	72.5	0	0.5
Rout	42.5	1	1.5
Double O	47.5	2.5	14
Showcase	27.5	0	0
OHII	50	0	1.5
Biathalon	62.5	0	8
Corral	60	5.5	11.5
FreeHand	13.5	0	0
Jewel	47.5	1	0
Tower	6	0	1
BroadStar	43.5	9.5	2
SureGuard	21	1	3
Oxadiazon 2G	70	3	17
Oxadiazon 50WSB	40	0	1
Wood Shavings	57.5	7	17.5
Wood Shav + Biath	55	11	14
Simazine	20	39	43
Marengo*	0	0	0

\*Marengo had only one data set

**Table 1-Preemergent herbicide plot observations and weed counts 30 days after treatment.**

We found that our top performers for all weeds were Marengo, Tower, and FreeHand. Almost all our treatments worked fine on grasses. For spurge control, (which is a common problem in Hillsborough County,) Marengo, Snapshot, Showcase, FreeHand, and Jewel worked great. Bittercress was managed best with Tower, Marengo, SureGuard, and BroadStar. For our small sample, we found that liquid formulations performed better than granular products. We also found that in general, brand name products performed better than the generic counterparts. It also seemed that beggar's tick (*Bidens alba*) was the weed that escaped the most through the treatment.

It would be wise to make the following considerations when choosing herbicides. First, look at the weed complex you are dealing with and match herbicides that will best control your weeds and are compatible with the plants you grow. Don't forget to make sure the herbicides are labeled for the location and stage (e.g. greenhouse, shadehouse, field, container, liner,

etc ) you are growing. Next, find a rotational chemistry that you can employ to minimize resistance and weed complex shifting. When a grower uses a single herbicide, the weed complex will shift over time and the herbicide becomes seemingly ineffective. Finally, keep economics in mind. Choose herbicides that will give you the best control per dollar for your situation. Below is a chart of our herbicide treatments at the high rate and the cost to treat 1000 ft.<sup>2</sup>

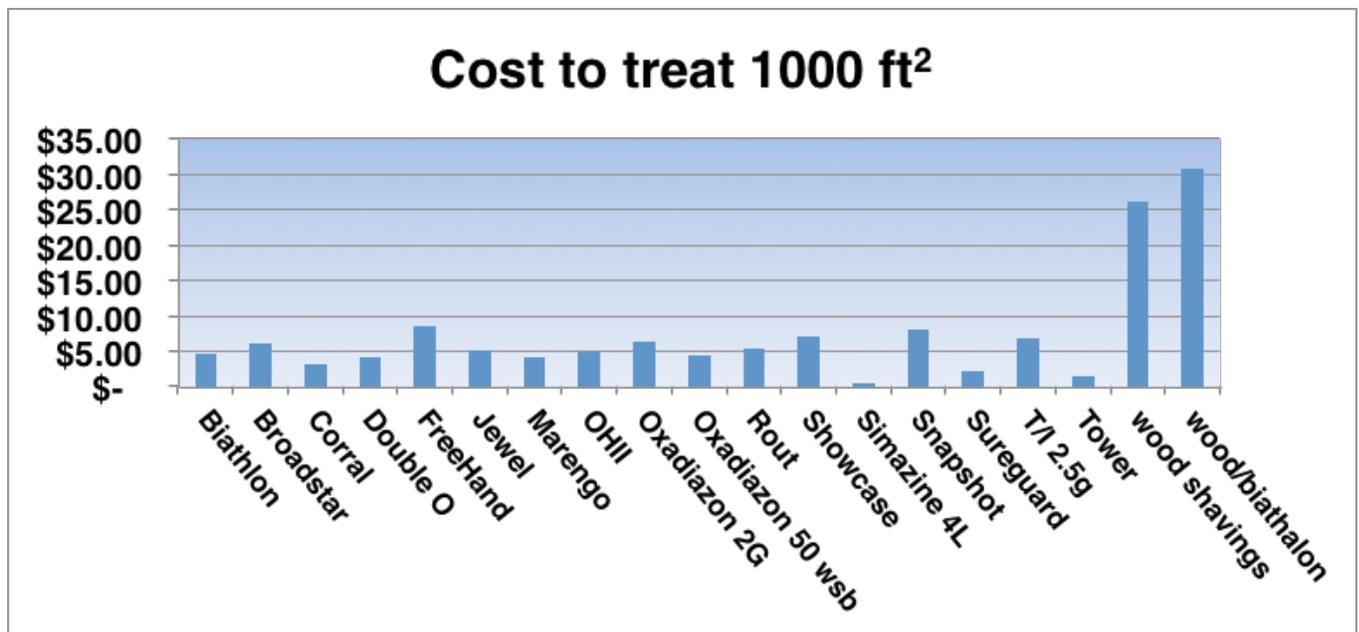


Fig. Herbicide costs per 1000 ft.<sup>2</sup> using the high labeled rate. Wood shavings were applied at a depth of 0.5 inches.

# New Cultivar of Tung Tree, 'Anna Bella'

By Shawn Steed, UF/IFAS Extension Hillsborough County

I came across this new sterile variety of tung tree (*Vernicia fordii*) while reading through a USDA-ARS report. The flowers are stunning and thought it might make a great candidate for local niche production. The tung tree is from China and was produced in the Southeast US for the production of tung oil; an oil that has a great property of drying when applied. Non-sterile tung trees are considered a Category II invasive which means they are slow to get started in changing the landscape (as opposed to a Cat I invasive which takes over). Tung trees can grow to 40 foot and have a smooth bark. They are deciduous and poisonous and can cause allergic reactions. The flowers appear first before they set leaves. Specimens have been located in Central and North Florida according to UF's Center for Aquatic and Invasive Plants <http://plants.ifas.ufl.edu/node/31>



The cultivar 'Anna Bella' was collected and housed in the germplasm collection at the Thad Cochran Southern Horticulture Research Laboratory in Poplarville, MS. If you were on the International Plant Propagation Society Southern Region Meeting a few years back this was one of the tour stops. There were no records of the cultivar in production so with the efforts of Timothy Rinehart they trialed the plant and released it to the industry. The nice thing about this cultivar (other than the amazing flowers) is that it is sterile and produces no viable fruit, so no need to worry about invasiveness and fruits in the yards.

If you would like more information about 'Anna Bella' here is a link to the article from where this information was derived <http://www.ars.usda.gov/is/AR/archive/apr14/tree0414.htm> and here is a link to the Thad Cochran Southern Horticulture Research Laboratory [http://www.ars.usda.gov/main/site\\_main.htm?modecode=64-04-05-00](http://www.ars.usda.gov/main/site_main.htm?modecode=64-04-05-00)

## Proposed WPS Changes

by Erin Harlow, UF/IFAS Extension Duval County



Worker Protection Standards Training (WPS) is an important part of running a safe production facility and is required for farms, forests, nurseries, or greenhouses that use products with an Ag use label. The main goal of WPS is to provide information to employees about their risks associated with working around or with pesticides. New changes are being proposed to the current requirements. Some of the new changes include:

- Providing WPS training yearly instead of every 5 years
- Initial training must be completed in two days instead of five days
- Records would have to be kept for two years
- Handlers have to be a minimum of 16 years old, unless immediate family
- Definition of immediate family would increase to include other family members such as in-laws, grandparents, and grandchildren
- A buffer areas of 25-100 feet around the field during applications in farms, forests, nurseries, and greenhouses instead of just nurseries and greenhouses
- Records must be kept for two years – application information, labeling, and

safety data sheets and be available to representatives as well as workers and handlers

- Applications would no longer be required to be posted at a central location for 30 days after the application

For more information, to access the full list of proposed changes or to provide comments about the changes to WPS requirements please visit the EPA's website at <http://www.epa.gov/pesticides/safety/workers/proposed/index.html>

# Pest Update, *Continued from p. 1*

**Symptoms:** Include vascular discoloration in dead and dying branches and the main stem and wilting and death of terminal and lateral branches (Fig. 3). Disease can occur sculpted (pruned) or non-sculpted plants. Leaves turn necrotic (dead) and remain attached for a week or longer after death, although branches and plants affected by the disease eventually defoliate.

If you split a stem of a dying or dead branch, you can see the brick red vascular discoloration at their insertion points along the main stem (Fig 4).

**Pathogen:** The fungus, *Neofusicoccum parvum* (= *Fusicoccum parvum*, teleomorph *Botryosphaeria parva*) causes the dieback disease. *N. parvum* is actually a complex of closely related species that have a wide host range, with 43 different hosts reported in the Microbiology Fungal Database. This fungus has been associated with dieback on many other tropical and subtropical hosts, including avocado, guava, citrus, eucalyptus, and mango. The fungus grows rapidly in culture, producing fluffy gray colonies that darken with age (Fig. 5). It can produce unicellular conidia (Fig. 6) that eventually form septa and become pigmented with age, but many isolates grow vegetatively without producing spores.

**Disease Cycle and Epidemiology:** Dieback occurs mainly in the late summer (high temperatures). The severity of external and internal symptoms increases as temperature increases. Sunlight does not impact disease severity, so the production of Eugenia in full sun is not a contributing factor to the disease. Research findings working with related pathogens that cause dieback diseases have shown that drought stress induces disease.

## Management Recommendations

- Sanitation:** Good sanitation measures are recommended to manage this disease. Sanitize all tools used to prune or work with plants before each use. Some growers dip pruning tools in bleach and dunk them in oil after drying (to minimize rust). Examples of disinfectants for tools include:
  - 25% chlorine bleach (3 parts water and 1 part bleach);
  - 25% pine oil cleaner (3 parts water and 1 part pine oil);
  - 50% rubbing alcohol (70% isopropyl; equal parts alcohol and water);
  - 50% denatured ethanol (95%; equal parts alcohol and water) or
  - 5% quaternary ammonium salts.

Soak tools for 10 minutes (or as directed by the product label) and rinse in clean water. Do not mix quaternary ammonia with bleach.

- Stress Free Plants:** Maintaining plant health is important for dieback management, because plant stress contributes to disease outbreaks. Slow-release fertilizer formulations are suitable for subtropical and tropical weather conditions in combination with and adequate moisture through irrigation. Do not allow soil in the root zone to dry out completely, especially to the point where plants are wilting.
- Pruning:** Removing diseased branches: If you have to prune a symptomatic branch, remove the diseased cuttings from the landscape or nursery. Once symptoms (i.e., branch dieback) are present, the affected tissue should be pruned a minimum of 4 inches below the lowest symptomatic branch on the main stem. After pruning, ensure that the exposed vascular tissue of the freshly cut stem appears greenish white (healthy) as opposed to the diseased brick red tissue shown in Figures 4. If the freshly pruned vascular tissue is still discolored, cut lower on the stem until only healthy tissue remains. Fungicide applications after pruning help to minimize infection of the freshly cut tissue. When using contact fungicides, be certain to achieve good coverage, especially on new wounds made during pruning.
- Chemical Control:** Product options are available and should be applied in a preventative manner. This disease is most severe under hot and humid conditions, so a preventative management program should begin with fungicide applications in early to mid-spring.

a) Systemic activity products: with the ability to get into the plant tissue.

Triazoles: such as myclobutanil, propiconazole, tebuconazole, or triadimefon.

Strobilurins: such as azoxystrobin, pyraclostrobin or trifloxystrobin.

b) Contact activity products: do not have the ability to access the plant's vascular system.

Chlorothalonil, copper formulations and mancozeb.

Contact activity products are cheaper alternatives but are generally applied more often and at higher rates than systemic fungicide products. For more information, please read the EDIS publication: <https://edis.ifas.ufl.edu/pp283>



**Fig 1:** Large-scale eugenia production for the topiary market.

**Fig 2:** Eugenia pruned into popular patterns, such as spirals and balls.

**Fig 3:** Symptoms of branch dieback are affecting the mid-plant canopy and main stem of this eugenia.

**Fig 4:** The split stem of a diseased branch showing typical brick red vascular discoloration.

**Fig 5:** Fluffy gray colony of a *Neofusicoccum parvum* isolate growing on acidified potato dextrose agar.

**Fig 6:** Unicellular conidia of *Neofusicoccum parvum*, the causal agent of branch dieback of eugenia.

# Mexican Petunia: new sterile cultivars and management of invasive populations in natural areas

Dr. Rosanna Freyre, Dr. Gary W. Knox, Dr. Carrie Reinhardt-Adams, and Dr. Sandra B. Wilson, UF/IFAS Extension

Mexican Petunia, *Ruellia simplex* (also known as *R. brittoniana*, *R. coerulea*, *R. tweediana*) was introduced to Florida sometime before 1940 from Mexico and it has become a staple landscape plant in the Southern U.S. It has very high flowering, attracts butterflies and bees, has low maintenance requirements, and is adaptable to both dry and wet environments (Wilson et al. 2004). However, this species has naturalized in disturbed uplands and wetlands of seven continental U.S. states plus the Virgin Islands, Puerto Rico and Hawaii. In 2001, the Florida Exotic Pest Plant Council upgraded *R. simplex* from a Category II (potential problem) to Category I, and its status has not changed since (FLEPPC, 2013).

There are tall and dwarf cultivars available of *R. simplex* in purple, pink and white flower colors. All of them set fruits and are potentially invasive. Until 2012, the only exception was the sterile *Ruellia* 'Purple Showers'. This cultivar has large purple flowers, but tends to get very tall and has problems of lodging.

In 2007, Rosanna Freyre developed the first focused *Ruellia* breeding program at UF-IFAS in Gainesville aiming to create new sterile cultivars for the landscape plant industry. Breeding methods involve polyploidization and interspecific hybridizations. Selected plants are trialed in three different locations in Florida. In 2012, the sterile 'Mayan Purple' and 'Mayan White' cultivars were released (Freyre et al., 2012 and 2013) which have profuse flowering and medium-tall height. These were followed by 'Mayan Pink' in 2013, which has medium height (Freyre et al., in press). These cultivars are grown at Riverview Flower Farms, and are available at Home Depot stores in south and central Florida. They will be on display at the FNGLA demonstration gardens at EPCOT this year.

Our research project also involved management of invasive *R. simplex* populations in natural areas, conducted by Carrie Reinhardt-Adams. Results indicate that a 2% foliar glyphosate application sufficiently controlled *R. simplex* in the short-term (1 year). Multiple (2 or 3) applications of glyphosate applied at 3-month intervals did not produce a greater reduction in *R. simplex* cover than a single application in the short-term. Additionally, resulting *R. simplex* aboveground cover did not

differ with season of glyphosate application. This research suggests that land managers could achieve acceptable levels of control of *R. simplex* with a single application of glyphosate and that season of glyphosate application is not crucial to level of control (Adams et al. 2014). Long-term monitoring is in progress to determine how glyphosate applications will affect the long-term control of *R. simplex* and the reemergence of native vegetation.

## Literature Sources:

- Adams, C.A., C. Wiese, L.C. Lee, S.B. Wilson, A. Smith, and R. Freyre. 2014. Managing Mexican petunia (*Ruellia simplex* C. Wright) in the home landscape. EDIS publication, University of Florida, IFAS. ENH. (in press).
- Freyre, R., A. Moseley, S.B. Wilson and G.W. Knox. 2012. Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia. *HortScience* 47:1245-1251.
- Freyre, R., A. Moseley, S.B. Wilson and G.W. Knox. 2012. Fruitless *Ruellia simplex* R10-102 ('Mayan Purple') and R10-108 ('Mayan White'). *HortScience* 47:1808-1814.
- Freyre, R. and S.B. Wilson. 2014. *Ruellia simplex* R10-105-Q54 ('Mayan Pink'). *HortScience* (in press).
- Wilson, S.B., P. C. Wilson and J.A. Albano. 2004. Growth and development of the native *Ruellia caroliniensis* and invasive *Ruellia tweediana*. *HortScience* 39:1015-1019.

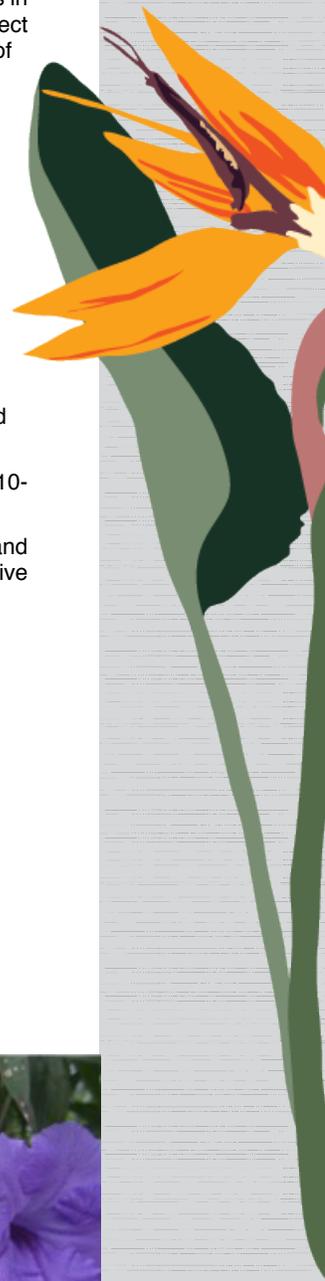


Fig 1: *Ruellia simplex*  
Fig 2: Mayan Pink  
Fig 3: Mayan White  
Fig 4: Mayan Purple

## UF Releases New Gerbera Daisy Varieties

*Dr. Zhanao Deng and Shawn Steed, UF/IFAS Extension*

Dr. Zhanao Deng, Environmental Horticulture Department at the Gulf Coast Research and Education Center in Balm, recently released some gerbera daisy varieties. His gerbera daisy releases in the Funtastic™, line called, 'Tangerine Eye' and 'Golden Eye'. These gerberas have been bred and tested for use in large containers. They are powdery mildew resistant and produce large flowers in colors complementing the Funtastic™ line and are orange-red and yellow-orange.

Mature plants of 'Funtastic™ 'Tangerine Eye' were about 20 inches tall and 24 inches wide (Figure 1). Leaves were simple and pinnately lobed, with deep lobes in the basal third and shallow lobes from the central third up to the top third. The upper and lower leaf surfaces were medium-green. Flowers (Figure 2) were of the single type and had a diameter of 4.1 to 5.4 inches. The upper and lower sides of the outer ray florets were orange-red and yellow-orange, respectively. Disc florets were orange-red. Peduncles were 14.2 to 17.7 inches long.

Mature plants of 'Funtastic™ Golden Eye' were about 21 inches tall and 26 inches wide (Figure 3). Leaves were simple and pinnately lobed, with deep lobes in the basal third, shallow lobes in the central third, and no obvious lobes near the top third. The upper leaf surface was medium-green. Flowers (Figure 4) were of the single type and 4.1 to 4.7 inches in diameter. The upper side of the outer ray florets was bi-colored, yellow near the base and transitioning to orange toward the apex. The lower surface was yellow. Disc florets were orange. Peduncles of mature flowers were 16.9 to 20.5 inches long.

If you would like to read more about these cultivars here is a link to the factsheet <http://edis.ifas.ufl.edu/pdf/EP/EP48200.pdf>



**Fig 1:** A single plant (about 10 weeks old) of 'Funtastic™ Tangerine Eye' grown from a single tissue culture liner in an 8-inch container.

**Fig 2:** Flower of 'Funtastic™ Tangerine Eye'.



**Fig 3:** A single plant (about 10 weeks old) of 'Funtastic™ Golden Eye' grown from a single tissue culture liner in an 8-inch container.

**Fig 4:** Flower of 'Funtastic™ Golden Eye'.

**Statewide Editorial Team:** Shawn Steed, Aparna Gazula, Alex Bolques, Vanessa Campoverde, Camille E. McAvoy, Liz Felter, Erin Harlow, David Holmes, Matthew Lollar, Juanita Popenoe, Bill Schall, Ed Skvarch, Jessica Sullivan



# Florida Ornamental Plant Industry Outlook 2014

by Matt Lollar, UF/IFAS Extension Seminole County Adapted from Hayk Khachatryan and Alan Hodges

Florida's ornamental plant industry ranks second largest in the U.S. with more than 7,000 registered nurseries and nearly 3,000 registered stock dealers. The capital assets for these businesses average \$1.18 Million per farm (2007 U.S. Census of Agriculture). The condition of the industry remained steady until 2008 when it began to decline, following the trend of the real estate market. The number of floriculture producers has decreased from 702 in 2011 to 634 in 2012 (USDA-NASS). The following are key factors influencing the Nursery and Landscape Industry.

## IBIS World Reports Projections for 2013 (for Ornamental Plant Industry Subsectors)

- Plant and Flower Production – 1%
- Flower and Nursery Stock – 1.2%
- Nursery and Garden Stores – (0.9%)
- Landscape Services – 5.7%
- Florists Sector – 5.7% (5% over a 5 year period)

## External Factors Affecting the Industry Nationally

- The number of discouraged workers has increased (>800,000 in Florida).
- Consumer confidence has decreased.

- The number of houses sold and new constructions has increased from 2012.
- The number of nursery establishments is down by 23%.

## Predictions/Assumptions

- Larger producers will continue to enjoy lower per unit production and distribution costs.
- Improvements in the housing sector and increased consumer disposable income will stimulate demand for horticultural products and services.
- Identification of export markets is a key success factor, but is much easier for larger corporations.
- Transportation costs have remained relatively flat over the past 3 years.
- Competition from imports of foliage and cut flowers will remain a challenge.

Information was adapted from "Florida Nursery and Landscape Industry Outlook for 2014" a presentation by Dr. Hayk Khachatryan: [https://ufifas.adobeconnect.com/\\_a1048984014/p7ch25kvq8o/?launcher=false&fcsContent=true&pbMode=normal](https://ufifas.adobeconnect.com/_a1048984014/p7ch25kvq8o/?launcher=false&fcsContent=true&pbMode=normal)