Small Fruit News

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In This Issue

Get A Grip On Weeds In Strawberries

Lauren María Alexander

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Be mindful when tilling that Canada thistle has underground rhizomes that can resprout when chopped up.
Photo credit: Kathy Demchack

It's not uncommon for weeds to pop up early in the spring and catch you off guard. And spring is just around the corner.

Weeds that germinate in the fall and survive through the harsh winter months often will appear in surprising numbers, presenting a formidable challenge.
With a little knowledge and pre-paration, however, strawberry growers can prevent weed germination in the fall through a mixture of techniques and avoid the unwelcome surprise come spring.

According to Kathleen Demchak, Senior Extension Associate at Penn State University, production systems, such as matted-row versus plasticulture, will affect the extent of germination and growth of winter annuals.

“If you’re in matted-row production systems where you’re normally applying straw in the late fall and early winter to your strawberry plants — and if that straw blows off, or if you have bare spots where it wasn’t applied very thickly — winter annuals can germinate and take off in the springtime,” Demchak says.

Plasticulture systems that use row covers also provide an ideal growth environment for weeds during the winter months, she explains.

Apply Herbicides

Regardless of what production sys-tem you employ, using pre-emergence herbicides on your fields before the weeds germinate will help.

Two recommended pro-ducts are Devrinol (United Phosphorus Inc.) and Sinbar (DuPont). Devrinol can be used in early fall, though Demchak advises waiting until strawberry plants have established enough runners and daughter plants.However, Devrinol breaks down in sunlight, so is ideally used just before mulching for the winter, she adds.

In addition to its use as a pre-emergent, Sinbar offers kickback activity to control weeds that have already emerged.

“If the weeds are already emerging, it will basically burn the young weeds, but just for a very short time. If the weeds are getting to the point where they are more than an inch tall, it will not likely get full control of them,” she explains.

Taking action ahead of time is crucial, because once spring arrives and weeds have emerged, there are very few control options left. Using a burndown herbicide is one technique, but Demchak cautions this method only burns the tops of the weeds, leaving the root system intact. Another option at this stage is hand pulling.

Weeds To Watch

In Pennsylvania where Demchak is based, common chickweed is by far the Number One weed problem. After that, it’s shepherd’s purse.

“With shepherd’s purse, it’s not a terribly competitive weed in terms of size, but it can produce a crazy number of seeds, so you can end up with a lot of plants for that reason,” she explains.

Common chickweed is able to toler-ate shade better than most plants, and it also roots at its nodes, creating a large “mat” with the ability to pro-duce more than 10,000 seeds. It germinates in the fall and flowers, and sets seed in the spring and early summer.

Similarly, shepherd’s purse ger-minates in late summer/early fall, and produces seeds in the late spring and early summer. The seeds from shepherd’s purse are held in heart-shaped pockets on the plant, and are in the tens of thousands, Demchak says.

Dandelion and Canada thistle also are troublesome. Canada thistle has underground rhizomes that can resprout when chopped up, so it’s important to be aware of this when tilling, otherwise you may end up with a colony in the middle of your field, she warns.

“One of the things we recommend for Canada thistle in the spring is using burndown material. Because its root reserves are fairly low at that point, it will help. Growers also can use Stinger (Dow AgroSciences), but they should be aware that it does have a 30-day preharvest interval. Be sure to check the label; it can only be used in certain states,” she says.

Cultural Controls

Herbicides aren’t the only option for weed control. Crop rotation and cover crops are also strong management tools that can reduce the number of springtime weeds, Demchak says.

“We definitely recommend using rotations that

give you options for controlling weeds before the strawberry plants go in. For example, grow annual crops where you can use tillage to a greater extent than in strawberries to deplete the weed seedbank," she says.
By rotating crops, growers are able to apply herbicides that can't be used on strawberries, providing additional control by the time strawberry planting rolls around. For rotations, Demchak recommends growing crops in the grass family such as corn, oats, rye, or wheat.

"Rye has some allelopathic effects in terms of inhibiting weed seed germination, so that's another crop we'll often recommend growers rotate with," she says.

In addition to helping with weeds, grass crops don't harbor the same diseases commonly found in strawberries, so they have the added benefit of avoiding disease buildup.

Pick-Your-Own Berries With A Twist

Lauren María Alexander

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Visitors can pick berries from 16,000 plants grown in a hydroponic system from July to August each year. (Photo courtesy of Summer Breeze Strawberries)

Visitors can pick berries from 16,000 plants grown in a hydroponic system from July to August each year. (Photo courtesy of Summer Breeze Strawberries)

Although Lisa and Daniel Conklin have only been managing their pick-your-own operation Summer Breeze Strawberries for two years, they have hit the ground running during that time, establishing themselves as the go-to berry picking operation in their area.

Located in Castille, NY, the hydroponic strawberry farm currently produces 16,000 strawberry plants for visitors to come pick from July to August each year. In addition to berries, the Conklins produce beans for pick-your-own, and also grow salad mix, cilantro, basil, parsley, and beets.

The Conklins purchased the hydroponic system from its original owner who retired from production in 2014, and moved it three hours to its current location. Without any prior knowledge of hydroponic production or any hands-on agricultural experience, the couple dealt with a steep learning curve, and say they are still learning.

"We spoke to the previous owner Paul all the time to help us in the beginning," Lisa Conklin says. "One of the big things, is that it is definitely more labor-intensive than we thought. People have no idea how much time it takes to make everything look neat and tidy."

Appearance Is Everything
The biggest challenge Conklin and her husband have dealt with on the farm is making sure that visually, everything meets the discerning eye of the visitors.
Despite the fact that her plants are in raised pots and don't have to compete with weeds for nutrients, she still finds herself battling with them to keep up with appearances.

"It's primarily an aesthetic thing; people just want the space to be weed-free. I usually just try to stay on top of pulling them by hand, but we have sprayed Roundup (glyphosate)," she explains.

The Conklins pride themselves on large, shiny berries, which they achieve in major part through their hydroponic system.

“We have beautiful berries, they just glisten — people are amazed. Because the berries are not on the ground they don’t get dirty, and they get big because we’re feeding our plants a pretty steady, regular diet. We’re not just looking for the soil to give them the nutrients they need, we’re giving it to them directly through the medium. If our plants start to look puny then we add more nitrogen. If the fruits aren’t really coming on then we need more calcium,” she says. Conklin says the quality of the fruit is also partly due the varieties they use — ‘Seascape’ and ‘Albion’ —which are both available from a number of minor and major distributors.

Pest Control

Since the hydroponic system is not within a protected environment, Conklin has had to battle with major pests for her berry crop, the most troublesome of which have been birds. The pots are currently surrounded by 12-to-14-foot poles which the nets rest on, providing protection from hungry pests.

Lisa Conklin of Summer Breeze Strawberries says many customers young and old enjoy the experience of picking fruit without having to bend over. (Photo credit: Maggie Puskas)

“If we don’t have bird netting set up, they come in and lay eggs in the pots,” she says “They’re a huge pest. The robins in particular are a huge nuisance here in the spring if we don’t have protection.”

Whereas netting is the Conklins’ primary defense against the birds, they use fencing for ground dwelling pests such as deer, raccoon and skunks.

While animal pests are a major problem, Conklin says that tarnished plant bug is her biggest insect pest on the farm.

“Tarnished plant bug is our biggest pest and we have to watch out for that all the time,” she says. “If we notice it, we have to start a spray program to get rid of it immediately because it can have a huge effect on the berries. If the tarnished plant bug comes in when the plants are blossoming, they sting the end of that blossom and it stunts their growth. It makes it so you don’t have a nice, big, pretty berry.”

Although Summer Breeze Strawberries is not certified organic, Conklin says she tries to spray as little as possible and use organic fungicides and pesticides to control everything except for tarnished plant bug.

“We tried to use an organic product last year for tarnished plant bug and it did not work. We lost a whole rotation of crops,” she says.

Satisfied Customers

After pushing past the public’s initial mindset that hydroponically produced berries are not flavorful — a perception which Conklin says she continues to fight — she reports that both her returning and new customers are very happy with the quality of the products they’re picking.

“It’s really about changing people’s misconceptions about changing what hydroponic production really is. There have been so many advancements in hydroponic farming; it’s not how it used to be,” she says.

One of the major benefits of having the strawberries in raised pots is that older clientele, or clientele that is otherwise unable to bend up and down, is able to enjoy the strawberry picking experience.

“We have a lot of older customers that come in who have not been able to strawberry pick for

themselves in years because they can't get down to the ground and get back up. When they find us and realize that they can pick for themselves — I love that. They have a little bit of independence and the joy of doing something they used to do that they thought was no longer in their life," she says.

The Benefits Of Social Media

To reach out to customers, Conklin says she uses Facebook, and employs fun, attention-grabbing posts to keep her customers' attention during slow times of year.

"I do some very light advertising, but I have to say Facebook is my best mode right now, and I continue to get traffic to the page and new likes. If it's a really booming day, I'll take a picture and post it, and people will come in that same day. It's a very instant form of reaching people," she says.

In the coming years Conklin plans to diversify her crop mix, and also hopes to expand her customer base by continued advertising through Facebook.

"A big thing is trying to get reach beyond the community where we live, and expand our market to a bigger area. Right now we're pretty local, but we would love to get people coming regularly from as far away as Rochester and Buffalo."

Tips to Increase Yields and Improve Harvesting

Charlie O'Dell

Previously published online in Growing Produce January 2016

Charlie O'Dell

I begin my annual fall-to-winter blueberry pruning about the time of our first hard fall frost as plants begin to go dormant. First I remove "droopers" — long, willowy stems hanging over into row middles.

While doing so this past year, I noted that most of them began just below high basal stem removal cuts made several years ago. Others originated higher up on stems that came from such old high-cut "stumps." In the photo, note that the top pruning cut was a stem removal cut made years ago. The bottom cut was made just this past fall and was made properly: within 2 inches of the ground, and removed both drooping canes in one low cut.

Why We Make High Basal Cuts

I have seen these basal stem removal cuts made several inches above the ground and plant crown in many older blueberry plantings in this region, along with my 36-year-old plantings. The reasons growers made these high basal cuts can be summarized:

Willowy stem growth shown here from an old high-cut stump. (Photo credit: Charlie O'Dell)

1. Scientists such as Dr. Gary Pavlis' Extension research in New Jersey on blueberry pruning showed the need for stem removal cuts to be made within 2 inches of the ground and crown. This knowledge was unknown many years ago and is proven to result in crown rejuvenation producing strong, upright, vigorous growth of new stems. We knew there are records of old blueberry plantings five or more decades old, but we did not realize maintaining profitable yields with larger-size berries in old plantings requires maintaining crown vigor and stem renewal using near-ground stem cuts and old stumps removal.
2. From the standpoint of worker comfort and less back pain from pruning, workers found it was much easier to remove old stems higher up, which sure beat bending way over to cut stems off close to the ground, especially if the boss was not watching!
3. Many growers did not have long-handled, heavy, large-size lopping pruners with jaws that could reach around older, large-diameter stems.
4. If large-size lopping pruners were found with jaws that could open wide enough, some workers did not have the strength to make the cuts in such large diameter, hardwood stems and old stumps.
5. Using hand saws to remove those large diameter old stems, especially from old stumps, was just too slow; many growers could not finish pruning each year.
6. The lithium-ion battery had not been invented many years ago, nor commercialized for use in lightweight, hand-held reciprocating power saws with pruning-specific cutting blades.

What Happens When You Make High Basal Cuts?
The results of many years of too-high basal stem removal cuts: Growers may have too many weak, willowy, drooping stems that make difficult mowing, harvest, and field work. Such willowy, drooping stems bear fruit near the ground, easily missed in picking, and can be mashed under-foot.

The cure is to cut off those old high-pruned stumps and excess stems (eight stems per plant is optimum), making the cuts 2 inches or closer to the ground. Two successful options exist to bring back your older plantings to profitable yields with larger size berries:

1. Using knee pads and a small, hand-held reciprocating power saw with pruning blade or a small chain saw, remove all the old stumps and attached stems on up to one half of each plant. On the other plant half, little pruning is done that winter, so that you will obtain a fruit harvest from that portion of the plant, uninterrupted. New, strong, straight stems will arise from the cut portion of the plant and are thinned to three or four of the strongest on that one-half of plant, then annually pruned to keep just those three or four stems.

   When these new stems begin fruiting in profusion by the third year on that half of the plant, the other half of the plant is removed in the same fashion. Over the course of four to six years you have completely renewed this planting, while still obtaining a harvest each year, weather permitting of course.

2. A second option used successfully involves a small chain saw along with those good knee pads to get down and cut off the entire old plants 2 inches or closer to the ground level, realizing there will be no harvests for the following two years. The next growing season after these whole-plant removal cuts, six to eight of the strongest, biggest new stems

are selected and kept. All others are removed annually for the first two years, again close to the ground.

By the third year from cutting off plants, good harvests resume and are maintained until these first-selected stems are five years old. Three of them can be removed in the fifth year, three more in the sixth year, as young replacement stems kept in year three now take their place. After the sixth-year harvest, annual winter pruning should remove the two to three oldest stems annually, always close to the ground, so keep those knee pads handy!

Some growers using this method choose to cut off only a few rows of the old plants each year, until the entire planting has been renewed over time. If your older planting is healthy, but has a lot of high stumps and/or too many stems, and declining yields of smaller berries, proper renewal pruning is vital to the profitability and the longevity of your planting, and is so much less expensive than replacing the old field with a new planting!

Remember, it is never too early to begin this process on older fields during this current winter pruning season.

Precision Cold Protection Pointing To Profit For Blueberry Producers

Paul Rusnak

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One University of Florida student's assignment to help develop cold-weather protection strategies so blueberry growers can save money has come up all aces.

Tori Bradley, a UF College of Agricultural and Life Sciences graduate student, interned with faculty and studied the economic advantages for growers who use precision cold protection, according to a new UF/IFAS Extension document, "Improving The Precision Of Blueberry Frost Protection Irrigation."

Tori Bradley
Photo courtesy of UF/IFAS

Bradley analyzed the differences between precision cold protection and uniform cold protection. Blueberries bloom in late winter or early spring in Florida, making them susceptible to frosts. For uniform strategy, growers start frost protection irrigation when the temperature hovers between 31°F and 35°F.

By using the precision method, growers can save an average of $44 per acre per season on irrigation pumping costs, depending on their location in Florida, according to Bradley and her faculty mentors.

After consulting with her graduate coordinator, Bradley approached Tatiana Borisova, an associate professor and Extension specialist in the UF/IFAS Department of Food and Resource Economics, to do a six-week research project on protecting blueberries during cold periods. She also worked with Mercy Olmstead, a UF/IFAS assistant professor in horticultural sciences and stone fruit Extension specialist, Jeff Williamson, a UF/IFAS horticultural sciences professor and Extension horticulturist, and Elizabeth Conlan, UF/IFAS horticultural sciences graduate student.

Precision agriculture recommends management strategies to growers, Borisova said. These recommendations are based on research and real-time monitoring of plant and environmental conditions. Specifically, the system calls for growers to apply water only when the plant can be damaged by cold, based on horticultural science research and real-time weather data, not necessarily based on the temperature dipping to near or below 32°F. The method implies that for every bud stage for a crop – in this case, blueberries – water is turned on at different temperatures. That's because a crop's sensitivity to cold increases from one bud stage to the next.

But frequently, growers do not have real-time weather information, or they don't trust it, Borisova said. UF/IFAS faculty are working to further improve the bud-sensitivity recommendations for blueberry cultivars grown in Florida, and trying to help growers adopt bud-sensitivity recommendations these methods to better protect their blueberry crops.

Bradley's research was made possible through the UF/IFAS research internship program. The research-Extension project, "Critical Bud Temperature Determination in Low-Chill Peach and Blueberries," is funded by the Florida Department of Agriculture and Consumer Services Specialty Crop Grant Program and is being led by Olmstead.

Ensure Your Berry Production Success With Pollinators

Charlie O'Dell

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Planting bee-friendly food sources help native pollinators to continue their valuable work in your crops.

We berry growers may spend a lot of thought and actions on ways to improve our berry yields and fruit quality. Such production concerns are natural, but do we give much thought and action to improve the lot of honeybees and our native pollinators that create the fruit-set and thus our berries? Do we realize that loss of natural habitat for our pollinators, possible misuse of some pesticides (especially during bloom-time), and mites and diseases collectively have drastically reduced the numbers of pollinators in recent years?

For example, with our honeybees, it is estimated that 31% of their colonies in the U.S. died in the winter of 2012-13 due to colony collapse disorder. According to USDA, almost 90% of all plant species need the help of pollinators!

Some 190,000 pollinating species are invertebrates, including flies, beetles, butterflies, moths, and bees, and some 1,000 species are vertebrate animals including bats and hummingbirds, all work to provide this invaluable benefit to us all. I believe all berry growers would benefit from taking time to read an 8-page publication, available online at http://plants.usda.gov/pollinators/Native_Pollinators.pdf.

Honeybees Aren't The Only Pollinators
While reading this publication, I learned there are about 4,000 species of bees native to the U.S. that are mostly solitary nesting bees,

except for bumblebees and hornets which live in social colonies, as do our non-native honeybees. Our native bees are generally not very conspicuous as they go about their pollinating work compared to honeybees and bumblebees, but they too are extremely valuable pollinators of our food crops, worthy of our study and protection.

As our dwindling numbers of honeybees are facing tough times nowadays, our native pollinators assume an ever more important, valuable, and necessary role in our berries' and fruit crops' production. So, how can we help provide for them, since we need them?

Good Food Source Is Vital

To attract and hold good populations of native pollinators near your berry crops, they must have adequate sources of food, shelter, water and nesting sites, as shown in Table 2 on page 6 of the above-referenced publication. The most desirable and easiest way to quickly begin to attract native pollinators and honeybees is to plant patches or small gardens containing a diversity of native wildflowers, including sunflowers.

For spring blooms, cranesbill, chives, and thrift are suggested by native plant nurseries, perhaps lupines and heirloom single-petal roses (not double-type blooms) for early summer blooms, lavender for mid-summer blooms, and sunflowers and black-eyed Susan plus verbena for late summer blooms. Your goal is to provide continuous blooms, nectar, and pollen all across the growing season.

When Weeds Are A Good Thing

Native weeds also provide biodiversity of food, shelter, and nesting sites for pollinators, but our preference for neatness may prevent most berry growers from wanting visible weed patches that folks would see when visiting their farm or passing by. Perhaps on an unused back corner we could allow a small native weeds area as a set-aside for the benefit of pollinators and other wildlife.

Also consider planting attractive, more socially-acceptable pollinator patches of native wildflower mixtures adapted to our various regions that are available from leading seed companies. These small, attractive plantings should be planted close by each of our berry fields.

In our outer fence-lines, we should consider planting native pollinator-friendly trees such as sugar maple, hackberry, crabapple, and serviceberry, for example. In front of them near this fence-row we could plant some native perennial plants like Echinacea (coneflower) that are very showy in bloom and are loved by hummingbirds, butterflies, and native insect pollinators.

Another overlooked perennial loved by native pollinators is agastache (giant hyssop, also known as hummingbird mint). It can be planted among the Echinacea, such as the variety Raspberry Summer with its beautiful bright, dark pink spikes of tubular blooms attractive to a host of native pollinators, including hummingbirds. Both of these perennials could also be planted with the small wildflower plots near each berry field. There are many good plant nurseries that specialize in offering native plants and seeds beneficial to our pollinators; check them out and make planting plans for pollinators!

Based on research and Extension work at Mississippi State University and by cooperating berry growers like Robert Hayes at Dumas, MS, we know hummingbirds are attracted with feeders to eat populations of the fruit-destructive spotted-wing drosophila (SWD) fruit fly. It makes common sense to plant these attractive, blooming wildflowers and perennial native plants close by our berry fields too!

I believe we berry growers could help all our pollinators including our fruit fly-eating

hummingbirds by having these good, natural nectar and pollen sources close to our berry fields. Such plantings may eliminate the need of purchasing and frequently filling and having to frequently clean hummingbird feeders in our berry plantings. Also, the more I learn about native plants and the need for planting them to aid pollinators, the less I like all of my lawn grass that takes up so much space that our native plants and pollinators need and could use!

A big thank you goes to Cheryl Jones, of GreenwoodNursery.com for providing LandSteward.org and other sources of information on native plants and native pollinators.

Blueberry Cultivar Development at The University of Georgia
A Progress Report on Southern Highbush for 2015

D. Scott NeSmith

The UGA Blueberry Cultivar Development Program generates and evaluates hundreds of selections of southern highbush and rabbiteye blueberries each year. The UGA Blueberry Research Farm near Alapaha is the primary field site for evaluating new selections and replicated advanced selections. The following is a brief progress report for select southern highbush trials at Alapaha during 2015.

General Season Overview

The 2015 chill hours (hours < 45 F) from Oct. 1 thru Feb. 15 were 944 for the Alapaha site. This was higher than normal accumulation (825 hours is 10 year average), and much higher than 2 of the last 3 years (550 in 2013; 685 in 2012). The spring season heat unit accumulation in 2015 was 921 heat units (base 50 F) from Feb. 15 through May 1, which is higher than “normal” since the 10-year average heat units for this period is 831. These weather patterns resulted in near normal ripening times when compared to 10 year averages. There was some early season freeze damage experienced in 2015 that primarily affected the earliest flowering selections. Notable minimum temperatures at Alapaha and dates were: 19.9 F on Jan. 8; 25.7 F on Feb. 14; 22.1 F on Feb. 20. Comprehensive flowering notes, cropping notes and fruit characteristic evaluations were taken for numerous selections and advanced selections of southern highbush blueberries, along with data for standard cultivars.

Performance of Southern Highbush Replicated Advanced Selections

In the past 6 to 8 years, we have established several Advanced Selection replicated trials at the Alapaha site. These trials have multiple replications of 10 to 15 plants for the Advanced Selections, along with cultivar standards. These trials are a culmination of advanced material from earlier selections trials, and offer a more comprehensive look at performance. This report contains data on trials that are 2 to 5 years old. All trials were started from 1 gallon plants, were grown in soil amended with pine bark, and were irrigated using a single line of drip tape. Overhead irrigation for frost protection is not available. Data presented are a numerical scale, where values range from 1 to 10, with a value of 6.0 or less being considered not commercially acceptable (with the exception of cropping score).

Table 1 shows data for several popular varieties and some UGA Advanced Selections for the 5-year-old trial at the Alapaha Farm. The standard varieties showed near long-term average ripening dates. Even though ‘Star’ is still widely grown throughout South Georgia, results show that it lags in performance when compared to many new varieties. ‘Rebel’ remains one of the earlier ripening varieties, but early flowering time requires that the variety be frost protected to maximize production.

'Meadowlark' was a little earlier than 'Rebel', but crop load was very light for this variety. Selection 02-28 was the earliest of all in this trial, and it too had a reduced crop load due to its early flowering. However, this selection has very good fruit quality, and will continue to be looked at for possible utility in the early market. 'Suziblue' continues to look good, although, ripening was later than 'Rebel'. But, 'Suziblue' crop load and flavor were better than 'Rebel'. 'Farthing' crop load was among the highest in this trial in 2015, but berry color and size were only fair, and it ripened later in the season. One of our newest releases, TH-921, ripened a week earlier than 'Farthing', had a very good crop load, good overall berry quality, and very good flavor. TH-921 is part of our new "Southern Misses" series, and has been name 'Miss Alice Mae™'.

For late season southern highbush, 'Camellia' continues to perform well, with overall very good berry quality (Table 1). 'Camellia' remains one of the most vigorous southern highbush we have released, and it performs very well year in and out at the Alapaha site. 'Sweetcrisp' had very high berry quality, especially with regards to firmness and flavor, but fell a bit short in crop load, which has occurred for this variety in most

In a separate advanced selection trial of 4-year-old plants, similar performance was observed for cultivar standards (Table 2), with 'Rebel' and 'Star' being the earliest ripening. 'Suziblue' was later ripening, but it had a very good crop load. TH-948 is another new UGA release from the "Southern Misses" series, and goes by the name 'Miss Lilly'. This new release flowers late (more than 2 weeks after 'Rebel' and 'Star' this year), while still ripening fairly early, which makes it suitable for growing without frost protection. The plant is narrow and very upright, likely being suitable for machine harvesting with proper pruning. TH-948 fruit are large and flavorful, and the plant is the most vigorous in the trial.

years past. TH-896 is a late season selection with large fruit having quality rivaling 'Sweetcrisp'. Plants of TH-896 do grow slowly, however, and further evaluations are needed to determine long-term performance and stability. Other promising later ripening advanced selections include TH-669 and TH-828B. Each of these has various positive attributes and merit further evaluation.

Table 1. Ratings of some fruit and plant characteristics of 5-year-old Advanced Selections of southern highbush blueberry along with standard cultivars. Data are from Alapaha during 2015. Plants were established in Fall 2010.

Selection or Variety	Date of 50% Flower	Date of 50% Ripe	Berry Size	Berry Scar	Berry Color	Berry Firmness	Berry Flavor	Crop Load	Plant vigor
Camellia	Mar. 14	May 12	8.5	7.0	8.0	7.5	8.0	5.5	9.5
Rebel	Mar. 1	May 1	6.8	7.3	7.0	7.0	6.2	6.0	6.5
Star	Mar. 2	May 2	6.8	7.0	7.0	7.2	7.2	6.5	8.0
Suziblue	Mar. 1	May 4	8.0	7.3	7.0	7.5	7.2	7.5	7.5
Farthing	Mar. 6	May 14	6.5	7.5	6.8	7.5	7.0	8.0	7.0
Sweetcrisp	Feb. 12	May 6	7.5	7.0	6.5	8.3	8.0	3.0	7.5
Meadowlark	Feb. 19	April 27	9.0	7.0	8.0	8.5	7.0	1.5	8.5
02-28	Feb. 15	April 26	8.5	7.5	7.2	8.0	7.5	2.5	8.8
TH-669	Mar. 10	May 12	7.0	7.0	7.0	7.0	7.0	7.0	9.0
TH-828B	Mar. 14	May 8	8.5	6.8	8.0	7.5	7.0	5.0	7.5
TH-896	Mar. 14	May 16	8.5	8.0	7.8	8.6	8.2	6.0	7.0
TH-921	Mar. 9	May 6	7.5	7.5	7.5	7.5	7.8	8.2	8.2
TH-925	Mar. 16	May 5	8.0	7.2	7.5	7.0	7.5	3.8	8.2

This trial contains several other notable later ripening Advanced Selections (Table 2). Selection TH-889 flowers and ripens after 'Camellia', and has high quality fruit. The plant is more compact than 'Camellia'. Similarly, TH-940 is later season than 'Camellia', but fruit are marginal with regards to firmness. More testing of these selections is needed. TH-917 is the third new release of the "Southern Misses" series, and goes by the name 'Miss Jackie'. This selection flowers and ripens near the time of 'Camellia', but does have more controlled growth than 'Camellia'. Also, fruit of TH-917 have very good holding quality on and off the bush. This new variety should make a nice companion or alternative variety for the 'Camellia' and 'Legacy' season.

Table 2. Ratings of some fruit and plant characteristics of 4-year-old Advanced Selections of southern highbush blueberry along with standard cultivars. Data are from Alapaha during 2015. Plants were established in Fall 2011.

Selection or Variety	Date of 50% Flower	Date of 50% Ripe	Berry Size	Berry Scar	Berry Color	Berry Firmness	Berry Flavor	Crop Load	Plant vigor
Camellia	Mar. 15	May 16	8.5	7.0	8.0	7.5	7.5	5.8	7.5
Rebel	Mar. 2	May 2	7.0	7.2	7.2	7.3	6.0	7.0	6.8
Star	Mar. 2	May 2	7.0	7.0	7.0	7.3	7.2	5.0	7.5
Suziblue	Feb. 28	May 7	7.5	7.3	7.0	7.5	7.3	7.2	8.0
TH-889	Mar. 22	May 16	8.0	7.5	8.0	7.8	7.8	3.8	6.9
TH-917	Mar. 15	May 14	7.8	7.5	7.5	7.8	7.8	6.5	7.5
TH-940	Mar. 14	May 22	7.5	7.0	8.0	6.5	7.0	7.5	7.2
TH-948	Mar. 18	May 8	8.5	7.0	7.5	7.0	7.5	5.5	9.5
TH-1008	Feb. 26	May 5	8.8	7.5	7.8	7.8	8.0	3.0	8.0

Results from the 3-year-old Advanced Selection trial (Table 3) show several early ripening selections. These younger plants tended to flower later overall than plants in the 4 and 5 year old trials. 'Georgia Dawn' was released in 2012, and it continues to be very early ripening. In this 2015 trial, 'Georgia Dawn' ripened a full 10 days earlier than 'Rebel', but it also flowered earlier as well. Much of the 'Georgia Dawn' early crop was lost to freezes during flowering. Frost protection is absolutely essential for production of this variety. But, if frost protection is successful, 'Georgia Dawn' offers the potential for very early fruit production. Advanced Selections TH-944, TH-1091, and TH-1125 all had fruit that ripened earlier than 'Rebel', but 'Rebel' cropping was much better due to later flowering times that help avoid some freeze damage. TH-831 and TH-1111 showed good firmness and flavor, and TH-831 had very good berry size as well. These Advanced Selections need further observations to see how they progress as plants mature.

Table 3. Ratings of some fruit and plant characteristics of 3-year-old Advanced Selections of southern highbush blueberry along with standard cultivars. Data are from Alapaha during 2015. Plants were established in Fall 2012.

Selection or Variety	Date of 50% Flower	Date of 50% Ripe	Berry Size	Berry Scar	Berry Color	Berry Firmness	Berry Flavor	Crop Load	Plant vigor
Georgia Dawn	Feb. 16	April 20	7.5	7.5	7.0	7.0	8.0	4.3	8.2
Rebel	Mar. 4	April 30	7.5	7.0	7.0	7.2	6.5	6.5	8.2
Star	Mar. 6	May 3	7.8	6.7	6.9	7.3	7.0	5.8	6.8
Suziblue	Mar. 3	May 3	8.5	7.3	7.0	7.8	7.3	6.0	7.5
TH-831	Mar. 17	May 11	8.5	7.5	8.0	7.5	7.5	6.5	8.0
TH-944	Feb. 24	April 26	8.0	7.0	7.0	7.0	7.0	4.5	8.3
TH-1091	Feb. 23	April 27	7.3	7.0	6.8	7.2	7.5	3.2	8.3
TH-1111	Mar. 7	May 1	7.0	7.0	7.0	7.5	7.5	6.0	9.0
TH-1125	Feb. 27	April 28	8.5	7.2	7.0	8.0	7.0	2.3	8.5

Table 4. Ratings of some fruit and plant characteristics of 2-year-old Advanced Selections of southern highbush blueberry along with standard cultivars. Data are from Alapaha during 2015. Plants were established in Fall 2013.

Selection or Variety	Date of 50% Flower	Date of 50% Ripe	Berry Size	Berry Scar	Berry Color	Berry Firmness	Berry Flavor	Crop Load	Plant vigor
Georgia Dawn	Feb. 28	April 27	7.5	7.5	7.0	7.0	7.8	5.5	8.5
Rebel	Mar. 10	May 5	7.5	7.0	7.0	7.5	6.0	4.5	7.0
Suziblue	Mar. 8	May 3	8.0	7.0	7.2	7.5	7.3	6.5	8.5
TH-1093	Mar. 12	May 13	7.0	7.5	7.0	8.0	8.5	5.0	8.2
TH-1191	Mar. 11	May 10	7.8	7.2	7.2	7.5	7.8	5.0	9.0

Table 4 depicts the first evaluations for the 2-year-old Advanced Selection trial. The younger plants tended to flower and ripen later than the 3 to 5 year old plants. 'Georgia Dawn' again showed considerable earliness. The notable selections from this young trial were TH-1093 and TH-1191. TH-1093 has exceptional flavor and fruit quality, and is being looked at for a high quality mid-season southern highbush. TH-1191 had good berry size, firmness, and flavor, and shows very good plant vigor. We need additional years of evaluations to better determine the suitability of these Advanced Selections as candidates for becoming new released varieties.

New Southern Highbush Selections of Interest

In addition to the Advanced Selection trials, we also have numerous new selections (less than 4

years old) growing in non-replicated smaller trials at the Alapaha Farm. Data for several of these selections and some cultivar standards from a 4-year-old trial are presented in Table 5. A standout selection in this pool is TH-1356 which continues to demonstrate great potential as a machine harvested southern highbush variety. The plant has a narrow base, is very upright, and ripe fruit detach readily while green fruit adhere to the plant (Fig. 1). We are trying to rapidly increase this selection for more detailed trials. We also continue to look for improved varieties with regards to a number of traits, including: early ripening material (TH-1241, TH-1321, TH-1327, TH-1332, TH-1334, TH-1409); improved berry size (TH-1282, TH-1305, TH-1321, TH-1332, TH-1334); good berry quality (TH-1321, TH-1327, TH-1332, TH-1334); and strong plant vigor (TH-1241, TH-1249, TH-1282, TH1303, TH-1305, TH-1356, TH-1365). These new selections will be evaluated further in the next 3 years. We have already propagated most of these to start new Advanced Selection trials. Also, we continue to generate 200 to 300 new selections of blueberries each year. Our goal is to provide relevant material to help improve and sustain the southern highbush industry for years to come.

UGA Blueberry Varieties' Availability and Licensing

The first plant licenses for the "Southern Misses" varieties have been issued, and limited availability is expected by Fall 2016. For more information on licenses and license holders for these and other UGA Blueberry Varieties, contact UGA's Technology Commercialization Office at 706-542-5942. Also, visit GeorgiaCultivars.com for more detailed variety information.

Table 5. Ratings of some fruit and plant characteristics of 4-year-old new Selections of southern highbush blueberry along with standard cultivars. Data are from Alapaha during 2015. Plants were established in Fall 2011.

Selection or Variety	Date of 50% Flower	Date of 50% Ripe	Berry Size	Berry Scar	Berry Color	Berry Firmness	Berry Flavor	Crop Load	Plant vigor
Camellia	Mar. 14	May 14	8.5	7.0	8.5	7.5	8.0	7.0	9.5
Rebel	Mar. 4	April 30	7.0	7.5	7.5	7.5	6.0	5.5	7.5
Star	Mar. 3	May 8	7.5	7.0	7.0	7.5	7.0	4.5	6.8
Suziblue	Mar. 4	May 1	7.5	7.0	7.0	7.5	7.0	5.5	6.5
TH-1241	Mar. 4	April 25	8.2	7.5	7.2	7.5	7.5	4.0	8.5
TH-1245	Mar. 12	May 10	7.5	8.0	7.0	7.5	7.5	5.0	8.0
TH-1247	Mar. 5	May 5	7.5	8.0	7.0	7.5	7.5	6.5	8.0
TH-1249	Mar. 16	May 7	7.8	7.5	7.0	7.5	7.5	5.0	8.5
TH-1282	Mar. 19	May 19	8.3	8.3	7.3	7.0	7.5	6.0	9.5
TH-1303	Mar. 10	May 13	7.5	7.0	7.5	7.5	7.2	8.5	9.0
TH-1305	Mar. 10	May 5	8.5	7.5	7.0	7.5	7.5	4.5	9.5
TH-1321	Feb. 15	April 25	9.0	7.5	7.2	8.8	8.5	1.5	8.0
TH-1327	Feb. 18	April 26	8.0	7.2	7.2	8.0	7.5	1.5	7.5
TH-1332	Feb. 18	April 25	9.5	7.5	7.0	8.5	7.8	1.0	8.5
TH-1334	Feb. 20	April 25	9.0	7.3	7.3	8.0	7.5	1.0	8.5
TH-1356	Mar. 1	May 1	7.5	7.5	8.0	8.0	7.0	6.5	9.2
TH-1365	Mar. 24	May 19	7.3	7.0	7.0	7.5	7.3	6.0	8.5
TH-1409	Feb. 18	April 26	7.3	7.5	7.3	8.5	8.5	1.0	8.0

Figure 1: *TH-1356 southern highbush. Possible machine harvest candidate.*

EPA Takes Strong Steps to Prevent Poisonings and Protect Workers from Paraquat Herbicide

March 3, 2016. Edited by RGB

The U.S. Environmental Protection Agency (EPA) is proposing to take action to stop poisonings caused by accidental ingestion of the herbicide paraquat, which can also cause severe injuries or death from skin or eye exposure.

EPA is taking what it terms "tough steps to prevent people from accidentally drinking **paraquat** and to ensure these tragic deaths become a thing of the past." "We are also putting safety measures in place to prevent worker injuries from exposure to this pesticide," said Jim Jones, assistant administrator for the office of chemical safety and pollution prevention.

Since 2000, there have been 17 deaths – three involving children caused by accidental ingestion of paraquat. These cases resulted from the pesticide being illegally [and stupidly] transferred to beverage containers and later mistaken for a drink and consumed. A single sip can be fatal. Paraquat is one of the most widely-used herbicides in the U.S. for the control – burndown - of weeds in many agricultural and non-agricultural settings and is also used as a defoliant on crops such as cotton prior to harvest.

To prevent these kinds of tragedies, EPA is proposing:

- New **closed-system packaging** designed to make it impossible to transfer or remove the pesticide except directly into the proper application equipment;
- **Special training for certified applicators who use paraquat** to emphasize that the chemical must not be transferred to or stored in improper containers; and
- **Changes to the pesticide label and warning materials** to highlight the toxicity and risks associated with paraquat.

In addition to the deaths by accidental ingestion, since 2000 there have been three deaths and many severe injuries caused by the pesticide getting onto the skin or into the eyes of those working with the herbicide. To reduce exposure to workers who mix, load and apply paraquat, EPA is proposing:

- **Prohibiting application from hand-held and backpack equipment**, and
- **Restricting the use to certified pesticide applicators *only***. *Individuals working under the supervision of a certified applicator would be prohibited from using paraquat*. This is a stringent requirement not seen with other pesticides.

The proposal will be available for a 60 day public comment period. EPA will consider all public comments before finalizing these proposed actions later this year. Actions on specific pesticides are one way that EPA is protecting workers from pesticide exposure. EPA's revised Worker Protection Standard and proposed Certification and Training Rule will also protect farmworkers and pesticide applicators.*To view related documents and submit comments*, go to docket EPA-HQ-OPP-2011-0855 at www.regulations.gov. For more information on paraquat: https://www.epa.gov/ingredients-used-pesticide-products/paraquat-dichloride.

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Primocane-Fruiting Blackberries in the Southern United States: Experiences and Stories

John R. Clark
University of Arkansas

In this article I highlight:
- primocane blackberry development history
-identification of heat issues
-addressing heat issues in breeding
-year (heat) and variety impacts on fruiting

Background

Many of you have heard me tell the story of how primocane-fruiting (PF) blackberries came about, some many times. The short version of the story is that a wild plant was found by L.G. Hillquist in Ashland, VA that exhibited PF. Although never released as a variety, "Hillquist" made its way to Arkansas and was used in a 1967 cross in the Arkansas blackberry breeding program. The one plant selected from this cross did not primocane fruit. In the 1990s, this selection was used in an investigation of PF inheritance by Jim Moore's last graduate student Jose Lopez Medina. Thousands of seedlings were grown in his study, and 14 were selected that exhibited PF in 1997. I felt honored to be involved with what I believed would be blackberry-world-changing technology. And as I write this 19 years later, this is becoming true; there are thousands and thousands of PF blackberry plants in the ground now.

However, that day back in 1997 stands out in more ways than one. First, the berries produced on these plants were not impressive. They were small, often misshapen, variable in color, and not very good in flavor. In 2000, I sent two of these selections to my good friend and collaborator Chad Finn with USDA-ARS in Oregon. I viewed these plants in mid-October 2001 and I could not believe my eyes! It was two weeks before Halloween, a misty cool day, and the plants had lots of very large berries that ranged from overripe to green, plus flowers and buds still developing. I came home excited. I had seen the future, and it was looking good.

I had begun to make crosses with the original 14 selections, and in 2000 I saw the first seedlings from these crosses. I examined the unirrigated seedling field in late June and there were primocane flowers produced on many seedlings. I went back a few weeks later to see how the berries were developing, and the field was a dismal sight—berries were often dried up, flowers dead, and few new flowers were developing.

What was the problem with these plants in Arkansas? My thinking as I departed the seedling field in 1997 was the same again in 2000; it is too hot for these plants to bloom and set fruit in the Arkansas environment. It seemed easy to hypothesize this was what was happening – I decided that about 90^{o}F and above for a week or more resulted in major consequences on these flowering and fruiting variables. That was my story and I stuck to it.

Michele Stanton and advisor Joe Scheerens at the Ohio State University conducted a study in 2005 that used the first two PF varieties ever released, Prime-Jan® and Prime Jim®, which had been introduced in 2004. They subjected the plants to 75^{o}, 85^{o}, and 95^{o}F temperatures in growth chambers, and found as temperature increased, flowering was greatly impacted. They measured an immense array of variables, but their major findings matched up quite well with my hunch. And now years later, I still think that approximately 90^{o}F or above for multiple days contributes to limiting PF blackberry performance.

Live and Learn

After seeing that dismal seedling field in 2000, I thought about dropping the whole idea of breeding PF blackberries. But, I had followed

the impact PF had on red raspberries and could not let go of the idea of what an innovation this would be for blackberries. But, if I was going to pursue PF blackberries in Arkansas, I needed to figure out a way to see fruit if I was to select improved offspring. I decided two things: one was to select based on floricane fruits, and second was to plant on a site with irrigation and better care than the first seedlings were provided. I had noticed that the floricane fruits of the PF selections were much like floricane fruits of our standard, floricane-fruiting (FF) blackberries, so it made sense to evaluate PF blackberries on floricanes also. In June 2002 I was evaluating seedlings from another round of crosses of the first PF selections and I got mighty excited looking at the performance of many progeny on floricanes. One population of seedlings (one cross) produced an array of great offspring and one of these became Prime-Ark® 45, released in 2009. It produced primocane flowers, so I knew that it was PF, but later learned it did not produce the same fruit level or quality on primocanes in Arkansas; the PF berries were small, misshapen, much like was seen before. However, in testing this plant in coastal California, it was found that the primocanes yielded great quantities of large berries. At the same time, I found that it produced a tremendous yield of floricane berries in Arkansas and a measurable yield of primocane berries in some years, which could be of quite good quality and size in more "moderate" summers.

Further Progress

The Arkansas breeding program has been vigorously crossing and selecting PF blackberries since the early 2000s. Great progress has been made in enhancing fruit quality, incorporating thornlessness with PF, and expanding other desirable traits in the PF package. These efforts culminated in 2012 with the release of Prime-Ark® Freedom followed by Prime-Ark® Traveler in 2014. These varieties are both thornless; the former targeted primarily for the home-garden market, the latter for commercial shipping. However, breeding for heat tolerance has proven to be a challenge. These PF varieties still only perform well in Arkansas in years with mild summers.

Comparisons Among Years and Cane Type

From 2012-2015, there was substantial variation in summer heat in Arkansas. The year 2012 was the hottest in 32 years, the other years more moderate. Table 1 provides a characterization of the temperatures for the most important months for PF performance.

Table 1. Summary of temperatures (^{o}F) at the Fruit Research Station, Clarksville, AR for 2012 through 2015 during the months of June through August.

Year	Ave. high June, July, Aug.	Days above 90°F	Days above 95°F
2012	90	68	42
2013	87	36	6
2014	85	20	1
2015	87	30	4

One can readily see that 2012 was the hottest: 68 days above 90^{o}F, 42 days above 95^{o}F, average for the three months of 90^{o}F. The other three years (2013, 2014, and 2015) had average highs of 87, 85, and 87^{o}F, but days above 90^{o}F were 36, 20, and 30, with only 6, 1, and 4 days above 95^{o}F.

Trial plantings were harvested in Arkansas for yields in these years. Table 2 provides FF and PF yields for Prime-Ark® Traveler and Prime-Ark® 45 for two plantings, one established in 2011 and the other in 2012, along with the FF varieties Ouachita and Natchez. First, lets look at 2012 data from the 2011 planting.

Table 2. Floricane yield of two primocane-fruiting and two floricane-fruiting blackberry varieties in replicated trials that were established in 2011 and 2012 at the University of Arkansas Fruit Research Station, Clarksville.

Variety	2011 Planting (lbs/acre)			2012 Planting (lbs/acre)		
	2012	2013	2014	2013	2014	2015
			Floricane harvest			
Prime-Ark®						
Traveler	9,827 c[z]	20,003 c	8,767 b	11,649 cd[z]	11,851 b	7,995 b
Natchez	26,047 a	32,514 ab	17,897 a	34,208 a	19,383 a	-
Ouachita	16,389 b	27,457 b	13,366 ab	20,567 bc	11,113 b	15,463 a
Prime-Ark® 45	18,170 b	28,374 b	10,638 b	18,597 bc	9,131 b	7,390 b
			Primocane harvest			
Prime-Ark®						
Traveler	0	3,842 b	6,673 a	4,428 a	6,752 a	9,178 a
Prime-Ark® 45	0	5,821 a	5,793 a	6,957 a	4,441 a	9,404 a

[z] Means in the same column within cane type followed by the same letter are not significantly different by t-test, $P \leq 0.05$.

Most striking is that in 2012 there was no measured yield for the PF varieties on primocanes. Why? The extreme heat of 2012 shut the process down. I remember visiting the trial in early October 2012, and seeing the cane tips with no PF activity, or only a few small or damaged flower buds or flowers, and little evidence of attempts for PF earlier in the season. The next day I traveled to coastal California and stood in a field where the grower was projecting a yield of 45,000 lb/acre on Prime-Ark® 45. I could hardly believe that environment would have such a drastic effect.

Next, look at the floricane yields for 2013 in the 2011 planting, very high for the PF varieties compared to 2012 largely due to they *did not fruit the prior year* on primocanes. The 2013 yields for the 2012 planting were not as high as for the 2011 planting, and this could be due to the plants being younger (PF blackberries generally do not flower the year of planting in Arkansas). It is also interesting to note that Prime-Ark® 45 was almost always equal to Ouachita in yield, and Prime-Ark® Traveler statistically similar to Ouachita in three of six comparisons. Further, the greater the primocane yield in one year, the more reduction in floricane yield the next summer. Finally, it is very clear that the floricane yield potential almost always exceeded that of the primocanes in Arkansas (one exception in 2015).

Now, look at the primocane yields for 2013-2015. They ranged from an average of the two varieties of 4,832 lb/acre for 2013 in the 2011 planting, to 9,291 lb/acre for 2015 for the 2012 planting, all compared to no yield in 2012. Their highest yield was in 2015, and these are the highest PF yields ever recorded at Clarksville. There could be other factors contributing to primocane yields than just temperature, but I believe this is the major one. Yields on PF blackberries in the very moderate temperatures of coastal California can exceed 40,000 lb/acre, due to the more appropriate temperatures. Additionally, California growers plant at higher densities (more narrow rows particularly) which contribute to these incredible yields.

Finally, I am often asked about Prime-Ark® Traveler's performance compared to Prime-Ark® 45. As can be seen in the table, Prime-Ark® 45 was higher in seven of 11 comparisons, with only three of these statistically significant. Prime-Ark® Traveler' was higher in four of 11 comparisons, none statistically higher. Overall, this suggests that Prime-Ark® Traveler' will likely not match Prime-Ark® 45 in yield. But, factors such as lower acidity, less bitterness, lack of

thorns, and more uniform berry size (Prime-Ark® Traveler seldom produces double or misshapen fruits compared to Prime-Ark® 45) may contribute to its desirability, plus variety diversification is always important to consider in production.

What to Recommend?

Over the years as the impact of heat was experienced again and again on PF blackberries, and people asked me about planting this innovative plant in the South, I usually discouraged them. I later began to encourage considering Prime-Ark® 45 for floricane production, due to the high yield potential, earliness (with Natchez, sometimes earlier), and very high quality berry. I feel the same about Prime-Ark® Traveler, although it is new and not tested as thoroughly. Additionally, if temperatures are moderate, one can expect the bonus PF crop. However, there is variation in maximum temperatures in the South, particularly in higher elevations of the Appalachians. This potential in higher elevations has not been fully evaluated as far as I know, but still is an idea to consider. But, as Dr. Gina Fernandez found a few years ago in the mountains of North Carolina, PF blackberry fruit do not tolerate freezing temperatures, while red raspberries do to some extent, and this reality has to be considered also. Some have tried shade cloth to reduce temperatures and help fruit set and development, but I have not heard of great success with that approach.

There is much more to this story, and more developing every day. Primocane-fruiting blackberries provide for many positive additions to blackberry production in the world. I hope that it can contribute in the southern U.S., or at least to part of the South. Challenges, and some answers, are showing up at every turn. Sounds like farming, doesn't it?

Longtime American Fruit Grower Contributor Honored for Work in Berries

Christina Herrick

Previously published online in Growing Produce, March 2016

Charlie O'Dell was presented with the NARBA's 2016 Distinguished Service Award. (Photo credit: NARBA)

Charlie O'Dell, *American Fruit Grower*® and *Western Fruit Grower®* magazine's expert on berries, was presented with the National Raspberry & Blackberry Association's 2016 Distinguishing Service Award following his presentation at the conference's luncheon entitled "A Lifetime In Berries" on March 3 in Williamsburg, VA.

O'Dell was approached in 1982 by George McConnell to take his place as the regular berry contributor for *American Fruit Grower* and *Western Fruit Grower* magazine.

Tour goers of the NARBA conference got a chance to see some high tunnel research at Virginia State University's research station in in Petersburg, VA. (Photo credit: NARBA)

"He kindly visited me at my campus office in 1982 and asked if I would be interested in writing the berries articles for this respected

national fruit industry magazine. I said 'yes,' and was very honored, traveled to Willoughby, OH to meet Richard Meister and staff and am so grateful to be able to continue doing these berries articles for the past 34 years," O'Dell said. "I am still learning and sharing with berry growers what I learn. *American Fruit Grower*® has provided me a voice for berries far beyond campus, way beyond Virginia, a dream come true!"

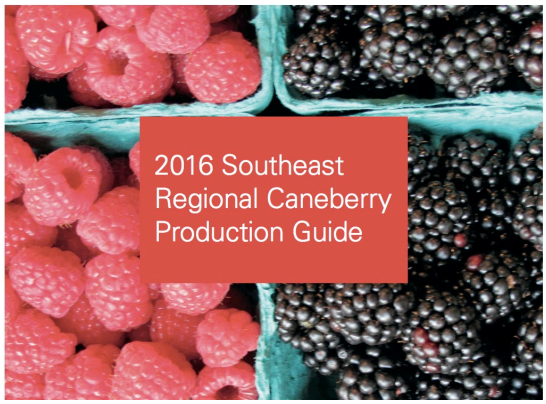
Following O'Dell's speech, he received a standing ovation, and then the surprise presentation.

"It was a total surprise to me," he says. "It is a beautiful plaque too that will hang in a prominent place at home!"

The NARBA conference, held March 1-4, offered the nearly 250 attendees tours of local growing operations, the research station at Virginia State University in Petersburg, VA, as well as other local industries who purchase berries from area growers.

2016 Southeast Regional Caneberry Production Guide is now available.

In collaboration with David Lockwood at the University of Tennessee, Elena Garcia at the University of Arkansas and Gina Fernandez, NC State University/NC Cooperative Extension Service (NCCES), and the Southern Region Small Fruit Consortium, we are pleased to announce that the



We have it available in 3 formats:

1. An online version that includes links to videos http://content.ces.ncsu.edu/southeast-regional-caneberry-production-guide. This is the first NCCES numbered publication to include videos!

   There is also a PDF version in 2 formats. Both are 44 pages long and includes all the text, color images and figures that the online version has but no videos.

2. The PDF version that is a smaller file size (3.2 MB) is available here: http://content.ces.ncsu.edu/2016-southeast-regional-caneberry-production-guide-handout (lower quality but really not bad).

3. A high quality PDF version (12 MB) is available on request.

Spring Caneberry (Raspberry and Blackberry) Chores 2016

Dr. Gina Fernandez, Small Fruit Specialist at NC State University

Chores and timing may be somewhat different in your area or for your cropping system. For IPM recommendations and general production

practices, see the Southeast Regional Caneberry Integrated Management Guide. http://www.smallfruits.org/SmallFruitsRegGuide/Guides/2016/2016BrambleSprayGuide.pdf And for production practices see the NEW Regional Caneberry Production guide: http://content.ces.ncsu.edu/southeast-regional-caneberry-production-guide

Plant growth and development

- Plants deacclimate quickly
- Bud differentiation (additional flowers formed)
- Bud break
- Flowering
- Primocane emergence

Pruning and trellising

- Finish pruning and make sure all floricanes are tied to the trellis before budbreak
- Remove canes from field to minimize spread of diseases
- Rotate shift trellises to horizontal position before budbreak; rotate to upright position immediately after flowering.
- Prepare for flower to fruit monitoring (see article in separate part of newsletter)

Weeds

- Weed growth can be very vigorous at the same time as the bramble crop peaks
- Weed control is best done earlier in the season, with pre-emergent herbicides before harvest commences
- Hand-weed perennial weeds in and around plots

Insect and disease scouting

- Growers with a history of cane diseases and/or mites often find that certain fungicides and oils are most effective just prior to bud break. The period of time in the spring when the plant is flowering is the most important season for control of insects and diseases. Know what your pests are and how to control them.

Water management

- Test irrigation system and look for leaks
- Bramble plants need about 1”-2” water/week. This amount will be especially critical during harvest

Nutrient management (based on NCDA&CS recommendations, also see your state recommendations)

- See Caneberry Production Guide
    - http://content.ces.ncsu.edu/southeast-regional-caneberry-production-guide

Marketing and miscellaneous

- Service and clean coolers
- Make sure you have enough containers for fruit in the coming season
- Prepare advertising and signage for your stand
- Contact buyers to finalize orders
- Hire pickers
- Prepare signage for field orientation; it is easier to tell pickers where to go if rows are numbered
- Check buds and canes for cold damage
- Monitor and record peak flowering date for each variety

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Editor and Contributor Wayne Mitchem

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