Small Fruit News

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North Carolina State University • Clemson University • The University of Arkansas
The University of Georgia • The University of Tennessee
Virginia Polytechnic Institute and State University

SPECIAL REPORTS:

New Short Day Cultivars from UC Davis

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Figure 1: *Fronteras has high plant vigor with an upright plant architecture. In California trials, the fruit for Fronteras is substantially larger and firmer than Ventana or Benicia.*

NC Strawberry Association's June 2014 newsletter recently included a new variety named *Fronteras;* it was one of the "other varieties" listed by Lassen Canyon that is available by test agreements with University of California at Davis. According to the release notice, Fronteras has excellent flavor, substantially better than Ventana in early spring. Fronteras has a good disease resistance profile, with no substantial deficiencies, and nursery productivity for Fronteras is considered superior to that for Ventana.

Fronteras has excellent disease resistance to Macrophomina, which is now becoming a major disease problem in California and Israel. According to Dr. Freeman of the Volcani Center, Israel, elevated temperatures (global warming) and banning of methyl bromide, have both contributed to serious outbreaks of charcoal rot in Israel's nurseries and open fields.

In This Issue

Table 1: Disease Resistance Scores: UC Cultivars & New Selections, 2011-13 [z]

Genotype	Phytophthora Resistance Score (5=best)	Verticillium Resistance Score (5=best)	Colletotrichum Resistance Score (5=best)	Fusarium Resistance Score (5=best)	Macrophomina Resistance Score (5=best)
Camarosa	3.6	2.7	2.2	2.9	2.6
Ventana	2.1	2.9	3.0	4.2	4.3
Benicia	3.5	1.6	2.5	3.4	4.0
Merced	4.5	3.0	1.8	3.6	3.3
Petaluma	3.9	4.2	2.2	3.0	5.0
Grenada	3.9	3.3	1.9	1.2	4.7
Fronteras	4.1	3.7	2.5	4.9	5.0

[z] Source: The UC Davis Strawberry Cultivar Improvement Program release announcement, UC Strawberry Bulletin 2014-1, Douglas V. Shaw and Kirk D. Larson).

Last year, Dr. Barclay Poling, Professor Emeritus, NC State, signed a Research Agreement with UCD to evaluate another new short day variety from UCD called *Merced*, which is going to be available from Lassen Canyon for the upcoming season. Balamore Farms in Nova Scotia may also have limited quantities of Merced for plug propagation. If you are interested in seeing some photos of Merced during this past season at Cunningham Research Station (Kinston), please go to this URL: (http://strawberries.ces.ncsu.edu/2014/05/strawberry-update-with-some-thoughts-about-merced-and-radiance-5-pm-sat-may-31-2014/). I am afraid there is very limited experience with Fonteras on the East Coast. You may wish to go to this pdf file to read more about it: http://www.plantsciences.ucdavis.edu/ucstrawberry/sheet_pdf/UCStrawberryBulletin2014_1.pdf , as well as two other new short day introductions from the Strawberry Improvement Program at UC Davis, *Pataluma* and *Grenada*.

Our new listing of strawberry plant suppliers may be found on the NC Strawberry Association website: **http://www.ncstrawberry.com/**

Zeus XC and Zeus Prime Cleared for Use in Blueberry, Caneberry, and Grape

Wayne Mitchem and Katie Jennings
Vineyard and Orchard Floor Management
N.C. State, Clemson Univ., and Univ. of Georgia, Cooperatively

After numerous years of research, assistance from the IR-4 Program, and support from FMC, small fruit growers have an excellent addition to their herbicide portfolio with the registration of Zeus. Zeus XC and Zeus Prime contain sulfentrazone which is a preemergence herbicide that controls a number of broadleaf weeds including galinsoga, pigweed species, lambsquarter, morningglory species, wild mustard, smartweed, spotted spurge, purslane, prickly sida, and nightshade species. Zeus will provide some control of annual grasses like large crabgrass, foxtail species, and goosegrass. A real advantage Zeus has over other preemergence herbicides is its ability to control yellow nutsedge.

Zeus Prime is a combination of surfentrazone and carfentrazone. The carfentrazone component is the same active ingredient found in Aim, a postemergence herbicide that controls emerged species like Palmer amaranth (and other pigweed species), morningglories, cocklebur, mallow, spiderwort, and prickly lettuce.

The use rates for Zeus XC are 8 to 12 fl. oz/A while Zeus Prime use rate is slightly different at 8 to 15 fl. oz/A. When applied in a band (herbicide strip) having a width that is 50% or less of total row width sequential applications can be made as long as there are 60 days between applications.

Zeus is pH sensitive, therefore water with a pH below 5 or greater than 9 will need to be buffered prior to using Zeus. Crops need to be established at least 2 years. As with any preemergence herbicide, Zeus will need rainfall for activation. A minimum of ½ inch or water within 14 days of application is necessary for activation. Zeus has a 3 day PHI.

Trials conducted in NC have shown sequential applications of Zeus XC and Zeus Prime to effectively control annual broadleaf weeds. Although both formulations provide preemergence control of annual grasses, these trials have shown that tank mixing Zeus with oryzalin (Surflan and others) will result in longer residual control of annual grasses, especially in fields with heavy grass pressure. Both Zeus XC and Zeus Prime will need to be applied in combination with a non-selective postemergence herbicide for broad spectrum postemergence weed control.
Article text here

Resistance of Botrytis to fungicides: what else do we know?

Reprinted from Univ FL Berry/Vegetable Times, Summer 2014

Achour Amiri and Natalia Peres
GCREC Plant Pathology

During the past few years, we have been investigating the development of fungicide resistance in the fungus Botrytis cinerea. The situation is critical as many of the strains sampled have been found to be simultaneously resistant to multiple fungicides. The frequency of resistant isolates varies to some extent from farm to farm, but resistance to multiple fungicides was widespread as resistance has been found in all farms sampled. In order to develop practical disease management recommendations, experiments have been set up to i) investigate the importance of different sources of Botrytis inoculum and characterize their sensitivity to commonly used fungicides; ii) develop fungicide rotational programs to delay resistance development to new products; and iii) evaluate the fungicide spray recommendations by the Strawberry Advisory System for Botrytis fruit rot control.

Two main potential sources of Botrytis inoculum for Florida strawberry fields have been investigated: inoculum persisting between seasons on dead strawberry plants and inoculum on new nursery transplants. Samples (whole plants including fruits and mummies) were collected from 5 different fields from April to August during two consecutive years to determine the survival of the fungus over the summer. We found that Botrytis was present on samples in April but its frequency diminished in May and, interestingly, it could no longer be detected on samples collected between June and August. These results suggest that Botrytis does not survive on dead plants over the summer in Florida and, therefore, they do not serve as a source of Botrytis inoculum for the following season.

Transplant samples have been collected from five nurseries in Nova Scotia and Quebec in 2012 and from 14 nurseries from five different regions (North Carolina, Nova Scotia, California, Ontario, and Quebec) in 2013. We found that 20 to 70% of transplants carried Botrytis infections.

Interestingly, a large portion of these isolates were already resistant to Pristine and Cabrio, as well as Scala. Resistance to Elevate was less frequent whereas resistance to Switch and Fontelis was not detected. These results demonstrate the role of nursery transplants as a source for Botrytis inoculum early in the season which, in some cases, is already resistant to fungicides. New phytosanitary procedures that integrate nurseries and FL strawberry fields should be developed to lessen the impact of this introduced inoculum early in the season and avoid the spread of resistant strains.

Laboratory and field tests have also been conducted to evaluate rotation treatments that were effective and also helped delay the selection for resistance to the new fungicides Fontelis and Luna (not registered for strawberries yet). In addition to fungicide rotation programs, tank mix treatments with Fontelis and Luna were also tested. Tank-mixtures of Luna with the multi-site fungicides Captan and Thiram and the rotation of Luna with Switch were the most effective treatments for controlling the disease. Fontelis also performed better when rotated with Switch or when rotated or tank- mixed with Captan or Thiram.

Besides being the most effective treatments when tank-mixed with Luna or Fontelis, the multi-site fungicides captan and thiram selected less for resistance, especially for Luna. These results indicate the importance of these materials for fungicide resistance management. They should be incorporated in tank-mixes or in rotation with Fontelis and Elevate which are still partially effective. Since Luna is not registered, Switch will remain as the backbone of Botrytis

fruit rot management but it should not be overused.

Finally, two trials have been conducted to evaluate fungicide recommendations from the Strawberry Advisory System (SAS). Plots were treated either weekly (conventional, 15 sprays) or only when conditions were conducive for disease development based on weather conditions (SAS, 8 sprays). Fungicide sprays included Captan, Thiram, Captevate, Switch, Pristine, Scala and the new SDHIs Fontelis and Luna. Plots were harvested from January to March to assess the impact of the different spray regimes on yield and Botrytis incidence. Results confirmed that the two most effective products for Botrytis fruit rot control are Switch and Luna. Unfortunately, it is still unclear when Luna will be registered for strawberries. The results also confirmed that Pristine is no longer effective for Botrytis control in FL. Results also showed that resistance to Scala has reached such levels that this fungicide is no longer effective for Botrytis fruit rot control in FL. Thiram, Captevate and Fontelis were intermediate and should be used when SAS indicates that conditions are moderately conducive for Botrytis development. Switch is the most effective, as expected, and should be saved for use when the Advisory System gives alerts for a high risk of Botrytis development, i.e., weather conditions are highly conducive.

Recommendations from the Strawberry Advisory System have been updated and adjusted according to our findings and we are confident that these recommendations can help growers to achieve an effective control of Botrytis fruit rot with a lower number of fungicide applications.

How the IR-4 Project helps Florida Specialty Crop Growers

Reprinted from Univ FL Berry/Vegetable Times, Summer 2014

By Michelle Samuel-Foo[1] and Peter Dittmar[2]

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Have you ever wondered how pesticides for specialty crops get registered?

The IR-4 project is the entity that works towards helping growers of specialty crops in Florida and around the nation solve their pest management issues by procuring registration of reduced risk pesticides that integrate well into existing Integrated Pest Management (IPM) programs.

IR-4 or 'Interregional research project No. 4' is a federally funded cooperative unit that has served as the major resource for supplying pest management tools for specialty crop growers since 1963. IR-4's mission is to "facilitate registration of sustainable pest management technology for specialty crops and minor uses." This is achieved by developing data from residue trials according to US Environmental Protection Agency (EPA) mandated good laboratory practices (GLP) guidelines to support new tolerances and labeled product uses.

Background and Rationale

Specialty crops are fruits, vegetables, tree nuts, herbs, ornamentals and other high value horticultural crops that are grown on 300,000 acres or less. They make up about 40% of the total value of U.S. crop production. Chemical companies that develop and sell plant protection products (pesticides) focus their resources on research and development, registration, production, and marketing of crop protection products in major markets where there is likely to be a favorable return on

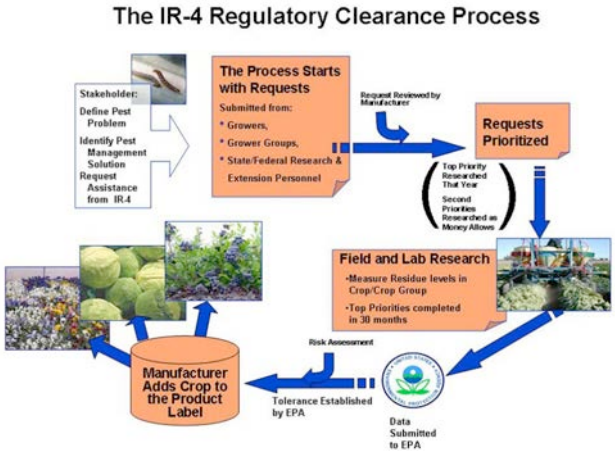
investment. Potential sales in small markets typically do not justify investments in the development of the required data for either initial or continuing registration of commercial pesticides for minor/specialty crops due to the smaller market base. This results in a major void for specialty crop growers to protect their crops because in order for a pesticide to be legally used in the US, its use must be registered or exempted by the US EPA as mandated by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). IR-4 is the only program that generates GLP data in support of petitions submitted to the US EPA to secure the establishment of new tolerances and labelled uses for specialty crops.

How is IR-4 organized?

The IR-4 project consists of 4 regional programs that are housed at land grant universities across the country (Southern, Western, North Central and North Eastern), a USDA-ARS component and a centralized "IR- 4 headquarters" located at Rutgers University in Princeton, NJ. Each region conducts GLP residue field trials and generates data to support tolerance petitions that get submitted to the EPA. The IR-4 Southern Region (SOR)
Office is domiciled at the University of Florida in Gainesville and serves as the home base for both the Southern region field program and analytical laboratory. Approximately 100 residue field trials are conducted annually across the IR-4 SOR.

Research at UF and helping Florida growers

At the University of Florida, the IR-4 Southern Region Program maintains two dedicated 'IR- 4 Field Research Centers' that are located at the Plant Science Research and Education Center (PSREC) in Citra FL and the Tropical Research and Education Center (TREC) in Homestead FL. At these two sites, GLP
residue field trials are conducted annually, based on EPA commercial production areas. Once the trials are completed, frozen residue samples harvested from the experimental sites are analyzed and the results get compiled at IR-4 headquarters where they are bundled into petitions that are submitted to the EPA to establish a tolerance for a particular chemical/commodity combination. Dr. Peter Dittmar leads the IR-4 FRC in Citra (EPA region 3- vegetables, citrus, herbs, and other commodities) and Dr. Jonathan Crane leads the FRC in Homestead (tropical fruits). The IR-4 Southern region office works closely with numerous faculty and extension personnel from the University of Florida at the various research centers across the state. IFAS personnel communicate grower needs and issues to IR-4, submit project requests, aid with prioritizing project needs and generate efficacy and performance data in support of project requests when needed. For 2014, efficacy data are being generated by faculty at the UF-GCREC to support project requests and registrations for several herbicides and insecticides. Over the years, IR-4 has responded to over 750 requests from Florida for registration of pest management products for food crops. The program provides an essential service to specialty crop growers in Florida and across the US by enabling reduced risk pesticide registrations to control key insect, disease, and weed pests.



This diagram illustrates the overall IR-4 regulatory clearance process. Project requests are submitted based on pest or disease problems and this is the initial step that engages the IR-4 project and alerts them to a need in the field. Growers are encouraged to contact their local extension and research faculty contacts or

the IR-4 Southern Region Field Coordinator for assistance with submitting requests. Requests are prioritized annually (via conference calls or biennial meetings) in the IR-4 SOR and if selected as national priorities at the annual IR-4 Food Use workshop (held every September in rotating locations across the country), this translates into residue field studies the following year as an initial step towards registration.

The IR-4 regulatory process at work in strawberries

IR-4 has played an integral role in the registration of pesticides important to strawberry production (see table for examples). A current registration in strawberry that is being pursued is the reduction of the Clopyralid (Stinger ®) preharvest interval to 2 days. The project clearance request (PCR) was submitted to IR-4 in the spring of 2013. Crop safety data based on research funded by the Florida Strawberry Growers Association were provided by Dr. Dittmar to accompany the request. The PCR was nominated as an A priority project at the regional level during the IR-4 SOR annual priority setting process meaning that the request required immediate action. In general, for a project to receive an A priority rating, performance data (efficacy and or crop safety) need to accompany the request. When the PCR was discussed at the IR-4 national food use workshop later that fall, it remained an A priority project with manufacturer support, which meant that IR-4 would dedicate resources towards pursuing the project and that GLP residue field trials across the country would begin the following field season. The IR-4 FRC at UF's PSREC in Citra, FL is one of the 7 locations slated to conduct the residue trials. Upon completion of the field trials, frozen samples from all locations will be shipped to the USDA-ARS analytical laboratory in Tifton GA for residue analysis and if residues are below allowable limits the data will be sent to EPA in pursuit of a registration.

Strawberry (13-07)			
2,4-D	Clopyralid	Malathion	Penthiopyrad
Abamectin	Fenhexamid	Mefenoxam	Polyoxin
Acetmiprid	Fenpyrazamine	Metam-sodium	Pyraclostrobin
Acibenzolar	Fenpyroximate	Methomyl	Pyriproxyfen
Acifluorfen	Flonicamid	Methoxychlor	Quinoxyfen
Azoxystrobin	Flumioxazin	Methoxyfenozide	Sethoxydim
Bifenazate	Fosetyl	Milsana	Simazine
Buprofezin	Glyphosate	Myclobutanil	Spinosad
Captan	Harpin	Naprpamide	Terbacil
Chlorantraniliprole	Hexythiazox	Novaluron	Thiamethoxam
Chlorpyrifos	Hydrmethylno	Paraquat	Thiram
Clethodim	Imidacloprid	Pendimethalin	Trifloxystrobin

Table showing an alphabetical listing of active ingredients (including insecticides, fungicides and herbicides) registered for use in strawberries through the IR-4 Project.

Interested in learning more about the IR-4 Project?

If you'd like more information about the IR-4 project, would like to learn about submitting requests to IR-4, or you have questions about how the program achieves pesticides registrations for specialty crops, please contact Dr. Michelle Samuel-Foo, the IR-4 Southern Region Field Coordinator at the University of Florida mfoo@ufl.edu or 706-614-5754 (cell).

Editors note: *NC State University has an IR-4 has a Field Research Center and the process outlined in this article is followed in NC as well as other states.*

Vance Whitaker's goal: A better strawberry

Charles Johnson

New strawberry varieties in the pipeline promise better flavor while retaining the disease resistance of currently used cultivars, says Vance Whitaker, University of Florida plant breeder at the Gulf Coast Research and Education Center.

Note: Article originally published online, Southeast Farm Press, November 13, 2012

Vance Whitaker pauses to finger runners of strawberry plants in the greenhouse housing the lines he uses to make the crosses necessary to turn out new varieties.

"The Florida strawberry variety situation is changing a little bit," says the University of Florida's strawberry breeder at the Gulf Coast Research and Education Center at Baum.

He may look like an eager, fresh-faced high schooler working on a science project, but Whitaker has already been on the job three years.

Looking at the 378 strawberry selections currently in the greenhouse, change seems distinctly possible. Throw in the 10,000 seedlings he will evaluate this season, and it's reasonable to think that one or two, at least, could someday be widely grown on Florida strawberry farms. These varieties in the pipeline toward release could be significantly different from those now being grown in the state.

Since the last few strawberry varieties released in Florida show relatively good disease resistance, fine shape and shipping characteristics, Whitaker can look at other things, like flavor.

"Because my predecessors made so much progress, I have more freedom to focus on flavor," he says. "Most of the material I evaluate already has good shape and some disease resistance. This gives me freedom as a breeder to focus on other things.

""I see that Florida is going to have to have a competitive edge with Mexican imports. If we ask what's going to be the quality that gives Florida a bump in the marketplace, flavor is the obvious thing."

Grower management will remain the key to producing good strawberries for the market. Better flavor, though, could differentiate them from competitors. Growers already realize that.

"In a recent survey, growers consistently put flavor in the top two traits they valued," Whitaker says. "They have undergone a shift in their trait priorities, which was unexpected. I would have thought firmness, size, shape and shipping would be more important to them. It really surprised me."

Consumers already know strawberries are good for them, so he questions whether breeding for incremental increases in attributes like antioxidants would be worthwhile.

"Instead of making it 10 percent more healthy, why not work to get a better-tasting berry? Then people might eat twice as many of them. I see improved flavor as a way to promote health, a way to get people to eat the amount of fruits they should be eating. I think the next frontier in strawberries is to add better flavor to the appearance, which is already good."

Improved over time

Over the past couple of decades, the strawberries Florida grows have improved quite a bit, Whitaker thinks. That provides the base for his breeding program.

"Sweet Charlie, the first big University of Florida variety, was introduced in 1992. Festival came

along in 2000 and was really a game changer; within a few years, it was the dominant variety and still has about 50 percent of the crop. Now a new variety, Radiance, has taken off and is doing well. This year, we have another one, Winterstar, that growers are definitely interested in growing."

Winterstar, a 2005 selection initially released in 2011, deserves the attention it has recently been getting, he says. A cross between Radiance and Earlibrite, with large, deep red fruit, some think it sweeter than either of its parents.

"It's one of our notable cultivars. The University of Florida has three cultivars out for this season, which is a reflection of the work done by the former breeders in this program," Whitaker says.

"Don't get me wrong. I think Festival and Radiance are decent tasting, very good strawberries. Some of the newer varieties coming along did better in group taste tests, where the testers used clickers. The two selections coming behind the released varieties far and away got more votes for taste."

Taste, simple to recognize, gets scientifically complex. Food scientists' work often focuses on taste. A strawberry releases 300 volatile chemical compounds that the human nose can sense, and some of these affect flavor either positively or negatively.

"Breeders can't ignore volatiles," he says. "We have to figure out which volatiles are affecting the sweetness."

Developing new varieties based on taste requires precise work by the breeder. "It's time-consuming; it's tough," Whitaker says. "There are no short cuts."

He says he eats his share of strawberries, but taste panel opinions are more critical in picking winners among all the varietal options in the lab and field.

Flavor changes constantly during the season, depending on environmental factors, making his job even trickier.

"In this area, on average, soluble solids decline by half from January to March," he says. "That explains why taste can be pretty good at the beginning of the season and not so good later in the season. The hotter the average temperatures, the lower the soluble solids. When it gets hot as we go into spring, there's a 50 percent drop in sugars in the berry. That affects flavor."

With that in mind, he tries to identify strawberry lines that do well in a wide temperature range.

"It's possible to select for a high average and for flavor to be stable. I try to steer away from selections that react a lot to the environment. I want the Florida strawberry grower to keep the buyer with him throughout the season, rather than have the buyer switch to California berries because of flavor. The important thing is the stability of sugars as the season goes along."

Inverse relationship

Sugar and strawberry yield have an inverse relationship, as well, and that makes the breeder's task a little bit tougher.

"Yield and sugar are a trade off.We can get more than a 25 percent increase in yield in one generation, but get 9 percent less sugar," Whitaker says.

"Unless the breeder takes this into account and chooses parents with good yield and good sugar, you'll go backward in sugar. Now, whenever I choose parents I put a little more emphasis on sugar — I choose parents that only have positive values for both sugar and yield."

If Florida growers use the new strawberry varieties to differentiate themselves from Mexican-grown berries, won't Mexican farmers grow them, as well? After all, Mexico ships Festival strawberries, competing with Florida production.

"I think the university and the Florida Strawberry Growers Association will restrict Radiance and the other new varieties," he says. "They will put safeguards in place. They previously did not restrict varieties going to Mexico, so the Mexicans grow a lot of Festival.

"Varieties have a way of getting out, despite the best efforts to protect them. That's why it's best to have a stream of new things coming along and being adopted by Florida growers before everybody else gets them. The reality is, we've got to keep replacing them with the next step up."

The grower association is the domestic licensee for the university's strawberry varieties, handling contracts with nurseries. The association retains part of the revenues from royalties, boosting research efforts with grant funding.

Grants very helpful

"This year, they gave over $400,000 in grants to work on strawberries," Whitaker says. "The University of Florida got a lot of it. It's very helpful. The international royalties far exceed domestic, though. Our varieties are now sold in 42 countries. Ekland Marketing Company of California handles international licensees and royalty collection outside the U.S. and Canada."

Ekland deals with the university's Fortuna, Festival, Sweet Charlie, Winter Dawn and Earlibrite varieties.

"Our varieties are being grown in the world's major production areas," he says. "Ekland works in concert with the Florida Strawberry Growers Association to make it happen."

Whitaker, 32 years old, grew up in Oak Ridge, N.C., a small town in an area where tobacco was the major crop. His father was a land appraiser and lender for the Farm Credit Service. They lived on 20 acres outside town and Whitaker developed a love for gardening and landscaping.

He attended North Carolina State University and concentrated on ornamental horticulture, then got a Masters and Ph.D. from the University of Minnesota, where he focused on disease resistance in roses.

Roses and strawberries are related, members of the same family, and that led him to befriend those in the strawberry industry, which led to the University of Florida job.

"I've been blessed to get to do a job like this," he says.. "It's fun, and I'm doing something worthwhile — what more could anybody ask?"

Whitaker thinks the university could release a new strawberry variety, or possibly even two, in 2013.

"We'll have a good idea what the top two are in February. We'll look at grower trials, then go ahead and release them. We've got other material in the pipeline coming along behind these.

"When you consider how many seedlings we grow, for every success in strawberry breeding there are 15,000 to 20,000 failures. Is it firm enough? Is the flavor good enough? If there's one thing wrong with a seedling, it goes on the trash heap.

"If it's no better than the current one being grown, that may be enough to throw it out — as much as that hurts."

New Red Raspberry Cultivar Released

Reprinted with permission from The Bramble, Summer 2014, the newsletter of the North American Raspberry & Blackberry Association. For more information visit www.raspberryblackberry.com

Vintage is a new primocane-fruiting red raspberry from the USDA Agricultural Research Service breeding program in Corvallis, OR, released in cooperation with the Oregon State Agricultural Experiment Station and the Washington State University Agricultural Research Center. Vintage is a high-yielding cultivar that produces large, firm fruit that are bright-red-colored and have outstanding flavor. The cultivar should be widely adapted to wherever primocane-fruiting raspberries are grown and provide growers with an alternative to Autumn Bliss or Heritage with much better fruit quality, particularly flavor and color. An application for a U.S. plant patent has been submitted.

Vintage has been evaluated most extensively in trials at Oregon State University's North Willamette Research and Extension Center (Aurora, OR) as well as observation plots with the USDA-ARS in Corvallis, OR, Washington State University (Puyallup, WA), Agriculture and Agri-Food Canada (Abbotsford, BC). In addition, Vintage has been evaluated in commercial fields with growers in Oregon and with Pacific Berry Breeding in Watsonville, CA.

In trial, Vintage produced yields that, over three years, were comparable to Heritage, which is considered high yielding in Oregon. Compared to Heritage, the harvest season of Vintage started 22 days earlier, reached 50% harvest 19 days earlier and finished approximately 10 days ahead in 2008-10. The harvest season was 11 days longer than that of Heritage.

Vintage consistently produced fruit that were 33% heavier than those of Heritage and were of similar firmness. The fruit are an ideal color for the fresh market being bright and much less dark than those of Heritage. Heritage and Vintage had similarly shaped conic fruit although Vintages fruit can be somewhat rounder. While both cultivars had acceptable drupelet coherence, Vintage fruit had slightly less drupelet coherence than Heritage fruit. Vintage fruit consistently separated much more easily from the plant than did Heritage fruit.

When eaten, Heritage fruit are perceived to be seedier than those of Vintage. Probably the most outstanding characteristic of Vintage is that the fruit have outstanding flavor that consistently was scored as excellent, while those of Heritage were scored as being bland but inoffensive. We have evaluated many primocane-fruiting cultivars including Autumn Bliss, Autumn Britten, Caroline, Rafzaqu (HimboTop®), Jaclyn, Joan Irene, Joan J, Polana, Polka, and Summit, among others, and none have had as good a flavor as Vintage in our environment. Although Vintage and Heritage fruit were found to have a similar percentage of soluble solids, Vintage had a slightly higher juice pH and a titratable acidity that was almost

50% less than that of Heritage. Vintage fruit, in addition to having a full raspberry flavor, were perceived to be sweeter as a result of the higher sugar to acid ratio. In informal evaluations of IQF fruit by an expert but untrained panel, Vintage consistently scored better than other primocane-fruiting cultivars. In addition to the outstanding color, size, firmness and flavor that make Vintage a good fresh market option, the fruit are non-darkening when stored in plastic clam shells under refrigeration, but softened after 7 days in storage (E. Thompson, personal communication).

Vintage plants are stockier than Heritage, not as tall but with thicker canes. The plants will get Phytophthora root rot. In typical plantings, this has led to the occasional plant loss and in the very "hot" Phytophthora screening fields at Washington State University plants did succumb to root rot in the second year. In California, Vintage was susceptible to irrigation water with high bicarbonate levels that caused yellowing and interveinal chlorosis on older leaves.

Plants can be ordered from Lassen Canyon Nursery (www.lassencanyonnursery.com), North American Plants (www.naplants.com), Norcal Nursery (www.norcalnursery.com), and Northwest Plant Co. (www.nwplant.com).

Article and photos provided by Chad Finn. For more detailed information see: Finn, C.E., B.C. Strik, B.M. Yorgey, and R.R. Martin. 2013. Vintage red raspberry. HortScience 48:1181-1183.

Editors note: *Dr. Gina Fernandez, NC State reports she has a plot of Vintage at the Peidmont Research Station (PRS) in Salisbury and at the Mountain HC in Mills River. This is the first year they will have fruit. The fruit so far has been nice. It may do better in the mountains than the Piedmont. However, her experience has been that most of the raspberry cultivars from the PNW do not do well anywhere in NC.*

Spotted wing drosophila 2013 impact assessment survey summary

eFly Spotted Wing Drosophila Working Group, 2014.

Prepared by Hannah Burrack, NC State University

One of the missions of the eFly Spotted Wing Drosophila (SWD) Working Group is to assess the impact of SWD in affected host crops. These crops have included blueberries, blackberries, cherries, grapes, raspberries, and strawberries. Beginning in 2012, eFly SWD Working Group has developed annual impact statements with an emphasis on the eastern US. The eFly SWD Working Group includes entomologists, extension professionals, fruit growers, and fruit marketers.

During the most recent meeting, held January 8 & 9 2014 in Savannah, GA, participants[i] developed an impact assessment instrument and subsequently distributed a mixed-mode survey via either an online questionnaire or in person paper surveys distributed at grower meetings held throughout the eastern United States from January 9 through February 22, 2014. In total, 87 respondents completed the survey online, and 162 respondents completed paper surveys. Meetings where paper surveys were distributed were held in AL, GA, MO, NC, NJ, and PA. The online questionnaire was made available at the eFly SWD Working Group website (swd.ncsu.ces.edu); emailed as a link to grower email lists, grower organizations, and cooperative extension agents; and was available from January 20 through February 28, 2014.

Respondent geographic diversity
Survey respondents were from at least 28 different states (Figure 1); five respondents declined to provide their location or were from outside the United States. Demographic information in addition to state was collected

from respondents to the online survey, and of those respondents (n=87), 39% were conventional fruit growers, 8.5% were organic fruit growers, 9.4% were extension agents or specialists, 0.85% were fruit marketers, 1.7% were crop consultants, 3.4% were homeowners, and 3.4% were engaged in other activities or did not provide demographic information. Demographic information beyond state was not collected on paper surveys as all respondents were growers.

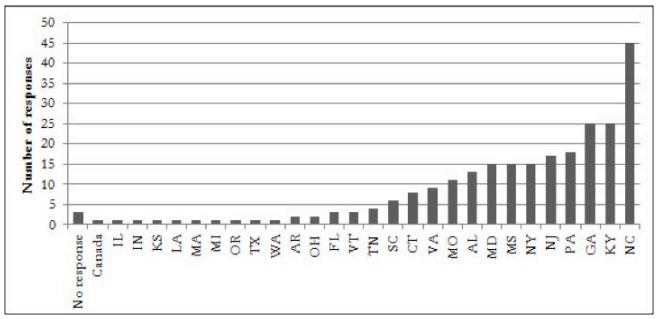


Figure 1: *Number of respondents by state, combined online and paper surveys. Four respondents declined to provide state information.*

Because information about SWD infestation at the farm level is potentially sensitive, states or crops within a state with fewer than two responses are not presented separately in the tables below, but these data were included in pooled summaries over all states or across a crop.

Crop information for respondents

Over half of the respondents grew multiple SWD host crops (Figure 2), and the greatest number of responses, representing the largest proportion of US acreage were from blueberry growers (Table 1). A relatively large number of blackberry and raspberry growers also responded.

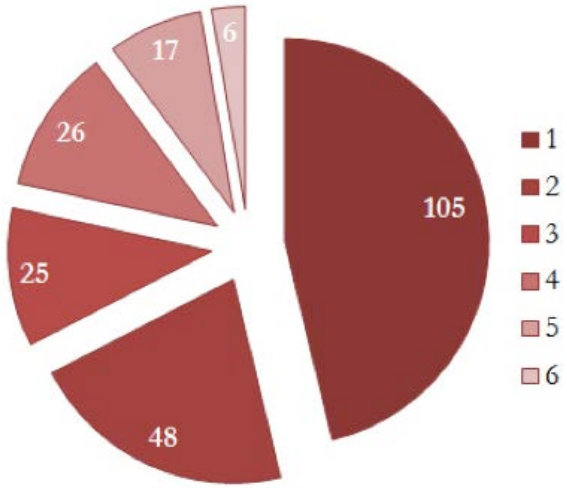


Figure 2: *Number of spotted wing drosophila host crops (1 to 6) grown by respondents, excluding unspecified "other" responses.*

Table 1: Spotted wing drosophila host crops grown by respondents.

Crop	Number of respondents growing crop	Total acres represented	Percentage of total US acres
Blueberries (highbush)	155	9,338	12%
Blackberries	102	816	5.5%
Raspberries	80	275	1.3%
Strawberries	72	542	<1%
Cherries	32	120	<1%
Grapes	62	28	<1%

Acreage totals are via 2007 Census of Agriculture (specialty crop data not yet available for 2012 Census of Agriculture).

Crop level impacts

The average, minimum and maximum reported percentage loss across all responses for each crop was calculated (Tables 2-7). In addition, average loss by crop was calculated for each state with more than two total responses and compared to the value of each crop within a state. Crop values for each reporting state were obtained either from the USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013, or estimated based on reported acreage in 2012 Census of Agriculture and reported crop value and yield per acre from USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013. Due to federal sequestration, final statistics for the 2013 crop year were not available. The total observed losses for each crop were then summed. Potential crop losses were also calculated based on the total value of a crop within all reporting states and the average percentage loss observed across all states. In the case of blueberries, blackberries,

and cherries, potential losses were higher than observed losses. However in some cases, notably raspberries, strawberries, and grapes, crop loss in reporting states was higher than averaged potential loss, due to particularly high loss percentages in states with the high crop value.

When totaled across all crops, the observed loss due to SWD during 2013 in states represented in our survey was $26,151,907.

We further compared the effect of farm size on reported crop loss across all reporting growers (Tables 8-13). In general, small farms experienced higher crop loss than larger farmers across, and small farms were also more likely to experience 100% crop loss due to SWD than were larger farms. At least one blueberry, blackberry, or raspberry grower reported 100% crop loss, but no strawberry, cherry, or grape growers reported 100% crop loss. This suggests that SWD damage may be more severe in blueberries, blackberries, and raspberries than in the other reported crops.

Management practice impacts

Reported crop losses did not occur in a management vacuum, so we also asked respondents about input increases associated with SWD, specifically insecticide usage and labor. A majority (59% of all respondents) said that they had increased their insecticide usage after SWD had been detected in their area or on their farm and 44% of respondents said that they had experience in an increase in labor associated with SWD management (Table 14). Growers who experienced an increase in insecticide usage estimated that this cost 88% more per acre, and growers with an increase in reported labor costs estimated this increase to be 12%. Therefore, our crop loss figures should be viewed through the lens, in most circumstances, of significantly increased insecticide use and often an associated increase in labor costs.

Because the questions related to management practice increases were asked to respondents once on the survey, the responses are summarized for two different groups of growers for each crop (Table 14). First, reported management increases for all growers of a given crop are presented, and second management increases for those growers who reported only growing a single crop are presented. As the majority of respondents grew more than one crop (Figure 2), the second summary is more accurate within a given crop but applies to a narrower subset of respondents. In order to estimate the total potential costs associated with insecticide usage across all crops, we used reported cost increases for growers of single crops and scaled these values by the total acres represented in our survey (Table 1). Where single crop values were not reported due to low responses, the value for all growers of a given crop was used (raspberries, strawberries, cherries). The estimated cost of increased pesticide usage for respondents to our survey was $1,339,418.

Table 2: Estimated blueberry crop value lost due to spotted wing drosophila in responding states. Crop value data via USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013 unless otherwise noted.

Crop	Number of responses	Average percentage crop loss	Minimum observed loss	Maximum observed loss
Blueberries (all)	139	4.7%	0%	100%
State	Number of responses	Average percentage crop loss	2012 estimated crop value	Estimated 2013 crop value loss
AL	8	3%	$1,484,000	$445,20
CT	7	13%	$4,336,675*	$563,768
FL	2	0%	$62,073,000	$0
GA	17	4%	$94,130,000	$3,765,200
KY	10	3%	$3,593,819*	$107,815
MD	10	5%	$1,375,288*	$68,764
MO	8	4%	$1,947,488*	$77,900
MS	15	3%	$15,550,000	$466,500
NC	19	2%	$71,000,000	$1,420,000
NJ	15	5%	$80,805,000	$4,040,250
NY	9	2%	$3,893,000	$77,860
PA	12	3%	$10,369,874*	$311,096
SC	5	2%	$5,691,886*	$113,838
TN	3	39%	$3,573,742*	$1,393,759
VA	4	13%	$4,246,373*	$552,028
			Estimated observed loss across reporting states	$13,003,298
			Potential total loss across reporting states	$17,111,297

*Values determined based on reported acreage in 2012 Census of Agriculture and crop value ($1.69/lb fresh and processed combined) and yield per acre (5940 lb) estimates from USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013.

Table 3: Estimated blackberry crop value lost due to spotted wing drosophila in responding states.

Crop	Number of responses	Average percentage crop loss	Minimum observed loss	Maximum observed loss
Blackberries (all)	88	12%	0%	100%

State	Number of responses	Average percentage crop loss	2012 estimated crop value	Estimated 2013 crop value loss
AL	6	0%	$2,623,700*	$0
CT	4	40%	$365,325*	$146,130
FL	2	18%	$5,081,344*	$914,642
GA	8	14%	$9,465,249*	$1,325,134
KY	11	0.45%	$4,068,397*	$18,308
MD	10	20%	$747,257*	$149,451
MO	6	0%	$4,300,879*	$0
NC	18	10%	$6,725,309*	$672,530
NJ	2	0%	$1,461,301*	$0
PA	8	23%	$2,441,038*	$561,439
SC	3	7%	$2,723,335*	$190,633
TN	3	6%	$5,131,161*	$307,870
VA	9	11%	$4,466,933*	$491,363
			Estimated observed loss across reporting states	$4,286,137
			Potential total loss across reporting states	$5,416,115

*Values determined based on reported acreage in 2012 Census of Agriculture and crop value ($2.11/lb fresh) and yield per acre (7870 lb) estimates from USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013. Eastern yield estimates in research trials range from 18,000 to 20,000 lb/acre, so values are likely conservative.

Table 4: Estimated raspberry crop value lost due to spotted wing drosophila in responding states.

Crop	Number of responses	Average percentage crop loss	Minimum observed loss	Maximum observed loss
Raspberries	67	16.3%	0%	100%

State	Number of responses	Average percentage crop loss	2013 estimated crop value	Estimated 2013 crop value loss
CT	7	31%	$1,110,690*	$344,314
KY	6	4%	$555,345*	$22,214
MD	10	3%	$774,900*	$23,247
MO	3	7%	$400,365*	$28,026
NC	7	19%	$891,135*	$169,316
NJ	2	17%	$1,097,775*	$186,622
NY	9	31%	$8,846,775*	$2,742,500
PA	12	15%	$3,616,200*	$542,430
VA	7	14%	$1,743,525*	$244,094
VT	2	20%	$1,420,650*	$284,130
			Estimated observed loss across reporting states	$4,586,893
			Potential total loss across reporting states	$3,334,550

*Values determined based on reported acreage in 2012 Census of Agriculture and crop value ($2.05/lb fresh) and yield per acre (6300 lb) estimates from USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013. Eastern yield estimates in research trials range from 7000 to 10,000 lb/acre, so values are likely conservative.

Table 5: Estimated strawberry crop value lost due to spotted wing drosophila in responding states.

Crop	Number of responses	Average percentage crop loss	Minimum observed loss	Maximum observed loss
Strawberry	60	3.9%	0%	50%

State	Number of responses	Average percentage crop loss	2013 estimated crop value	Estimated 2013 crop value loss
AL	3	0%	$2,109,584*	$0
GA	5	8%	$1,869,252*	$149,540
KY	5	0%	$2,763,823*	$0
MD	11	3%	$2,937,396*	$88,122
NC	8	4%	$29,435,000	$1,177,400
NY	9	4%	$6,880,000	$275,200
PA	9	4%	$8,480,000	$339,200
TN	3	0%	$3,818,614*	$0
VA	6	15%	$3,872,022*	$580,803
			Estimated observed loss across reporting states	$2,610,265
			Potential total loss across reporting states	$2,424,462

*Values determined based on reported acreage in 2012 Census of Agriculture and crop value ($1.54/lb fresh, excluding CA values) and yield per acre (8670 lb, excluding CA yields) estimates from USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013.

Table 6: Estimated cherry crop value lost due to spotted wing drosophila in responding states.

Crop	Number of responses	Average percentage crop loss	Minimum observed loss	Maximum observed loss
Cherry	24	3.1%	0%	20%

State	Number of responses	Average percentage crop loss	2013 estimated crop value	Estimated 2013 crop value loss
KY	3	0%	$37,386*	$0
MD	12	4%	$171,618*	$6,865
PA	3	0%	$1,220,706*	$0
VA	3	10%	$91,345*	$9,135
			Estimated observed loss across reporting states	$15,999
			Potential total loss across reporting states	$47,153

*Values determined based on reported acreage in 2012 Census of Agriculture and crop value ($0.594/lb) and yield per acre (2330 lb) estimates from USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013 for tart cherry.

Table 7: Estimated grape crop value lost due to spotted wing drosophila in responding states.

Crop	Number of responses	Average percentage crop loss	Minimum observed loss	Maximum observed loss
Grape	49	2%	0%	20%

State	Number of responses	Average percentage crop loss	2013 estimated crop value	Estimated 2013 crop value loss
AL	4	0%	$2,649,219*	$0
GA	6	0%	$5,624,000	$0
KY	12	2%	$3,195,398*	$63,908
MD	7	4%	$3,476,144*	$139,046
NC	16	2%	$4,469,000	$89,380
PA	4	5%	$20,555,000	$1,027,750
TN	3	15%	$4,619,545*	$692,932
			Estimated observed loss across reporting states	$2,013,015
			Potential total loss across reporting states	$891,766

*Values determined based on reported acreage in 2012 Census of Agriculture and crop value ($669/ton) and yield per acre (7.63 ton) estimates from USDA NASS Noncitrus Fruit and Nut Preliminary Summary, January 2013.

Table 8: Reported percentage crop loss in blueberries by farm size.

Very large farms (Greater than 100 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
22	5.3%	0%	30%
Large farms (100-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
11	2.4%	0%	10%
Medium farms (10-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
25	3.4%	0%	20%
Small farms (Less than 10 acres			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
81	5.2%	0%	100%

Table 9: Reported percentage crop loss in blackberries by farm size.

Large farms (100-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
6	18.5%	1%	50%
Medium farms (10-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
11	11.4%	0%	35%
Small farms (Less than 10 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
71	11.7%	0%	100%

Table 10: Reported percentage crop loss in raspberries by farm size.

Medium farms (10-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
6	5.8%	0%	25%
Small farms (Less than 10 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
61	17.4%	0%	100%

Table 11: Reported percentage crop loss in strawberries by farm size.

Medium farms (10-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
13	4.3%	0%	20%
Small farms (Less than 10 acres			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
46	3.9%	0%	50%

Table 12: Reported percentage crop loss in cherries by farm size.

Small farms (Less than 10 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
22	3.4%	0%	20%

Table 13: Reported percentage crop loss in grapes by farm size.

Large farms (100-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
2	0%	0%	0%
Medium farms (10-50 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
7	2.6%	0%	10%
Small farms (Less than 10 acres)			
Number of responses	Average loss	Minimum observed loss	Maximum observed loss
39	2.1%	0%	20%

Table 14: Input increases associated with spotted wing drosophila summarized by crop. Note that growers were asked about input increases across their entire farm, not for individual crops. Categories with fewer than two responses are indicated by -

Crop (n respondents)	Number of respondents increasing pesticide use	Reported percentage increase and reported additional cost per acre	Average reported cost increase/acre for additional pesticide use	Number of respondents with increasing labor costs	Average percentage of labor increase
All respondents (248)	146	88%	$165/acre	110	12%
Respondents only growing blueberries (63)	37	108%	$95/acre	25	18%
All respondents growing blueberries	99	84%	$153/acre	72	25%
Respondents only growing blackberries (13)	12	139%	$341/acre	7	15%
All respondents growing blackberries (88)	75	87%	$192/acre	56	27%
Respondents only growing raspberries	-	-	-	-	-
All respondents growing raspberries (67)	59	87%	$202/acre	49	29%
Respondents only growing strawberries (6)	1	10%	-	2	10%
All respondents growing strawberries (60)	50	70%	$185/acre	43	28%
Respondents only growing grapes (20)	7	39%	$109/acre	6	78%
All respondents growing grapes (49)	36	59%	$178/acre	24	31%
Respondents only growing cherries	-	-	-	-	-
All respondents growing cherries (24)	24	71%	$184/acre	17	75%

Research and extension priorities

At their most recent meeting, the eFly SWD Working Group developed a ranked list of the top 5 highest priority SWD research and extension activities (Table 15). Rankings on these priorities were then solicited via in-person impact assessment surveys (Tables 15-18). We did not ask about priority rankings in online surveys.

Table 15: SWD priority activities as ranked by eFly SWD Working Group members and paper survey respondents across all crops.

eFly SWD Working Group Priority Rankings		Survey response priorities across all crops (N responses)	
Research	**Extension**	**Research**	**Extension**
1. New pesticide modes of action	1. Educating growers about SWD	1. New pesticide modes of action (123)	1. Educating growers about SWD (132)
2. Pesticide resistance assessment and management	2. Developing mechanisms to communicate about SWD	2. Identifying new management tools and programs (127)	2. Expanding pesticide labels (126)
3. Methods to improve existing pesticides	3. Extension agent training	3. Methods to improve existing pesticides (122)	3. Developing mechanisms to communicate about SWD (126)
4. Identifying new management tools and programs	4. Expanding existing pesticide labels to control SWD	4. Sampling methods and programs that predict risk (125)	4. Extension agent training (127)
5. Sampling methods and programs that predict risk	5. Developing mechanisms to measure loss due to SWD	5. Pesticide resistance assessment and management (121)	5. Developing mechanisms to measure loss due to SWD (126)

Table 16: SWD priority activities as ranked by paper survey respondents who grew blueberries or caneberries.

Blueberry grower survey priorities (N responses)		Caneberry grower priorities (N responses)	
Research	**Extension**	**Research**	**Extension**
1. Identifying new management tools and programs (83)	1. Educating growers about SWD (86)	1. Identifying new management tools and programs (102)	1. Educating growers about SWD (86)
2. New pesticide modes of action (81)	2. Expanding pesticide labels (83)	2. New pesticide modes of action (96)	2. Expanding pesticide labels (83)
3. Methods to improve existing pesticides (80)	3. Developing mechanisms to communicate about SWD (83)	3. Methods to improve existing pesticides (97)	3. Developing mechanisms to communicate about SWD (83)
4. Pesticide resistance assessment and management (80)	4. Extension agent training (83)	4. Sampling methods and programs that predict risk (101)	4. Extension agent training (83)
5. Sampling methods and programs that	5. Developing mechanisms to measure loss due to	5. Pesticide resistance assessment and	5. Developing mechanisms to measure

Table 17: SWD priority activities as ranked by paper survey respondents who grew strawberries or cherries.

Strawberry grower survey priorities (N responses)		Cherry grower priorities (N responses)	
Research	**Extension**	**Research**	**Extension**
1. Identifying new management tools and programs (37)	1. Expanding pesticide labels (37)	1. Identifying new management tools and programs (17)	1. Expanding pesticide labels (17)
2. New pesticide modes of action (36)	2. Educating growers about SWD (39)	2. Sampling methods and programs that predict risk (17)	2. Educating growers about SWD (17)
3. Methods to improve existing pesticides (36)	3. Developing mechanisms to communicate about SWD (37)	3. New pesticide modes of action (16)	3. Extension agent training (16)
4. Sampling methods and programs that predict risk (37)	4. Extension agent training (37)	4. Methods to improve existing pesticides (16)	4. Developing mechanisms to communicate about SWD (16)
5. Pesticide resistance assessment and management (35)	5. Developing mechanisms to measure loss due to SWD (36)	5. Pesticide resistance assessment and management (16)	5. Developing mechanisms to measure loss due to SWD (16)

Table 18: SWD priority activities as ranked by paper survey respondents who grew grapes.

Grape grower survey priorities (N responses)	
Research	**Extension**
1. Sampling methods and programs that predict risk (26)	1. Educating growers about SWD (28)
2. New pesticide modes of action (26)	2. Expanding pesticide labels (27)
3. Identifying new management tools and programs (27)	3. Extension agent training (27)
4. Methods to improve existing pesticides (25)	4. Developing mechanisms to communicate about SWD (27)
5. Pesticide resistance assessment and management (26)	5. Developing mechanisms to measure loss due to SWD (28)

Hannah Burrack, Jesse Hardin, and Katherine Swoboda, NC State University Department of Entomology; Gina Fernandez, NC State University Department of Horticultural Sciences; Ric Bessin, University of Kentucky Department of Entomology; Elina Coneva, Auburn University College of Agriculture; Steve Dalton, Fruit of the Spirit Farms, Hendersonville, NC; Renee Holland, University of Georgia Cooperative Extension; Les Dozier, President of Arkansas Blueberry Growers Association; Powell Smith and Susan James, Clemson University Cooperative Extension, Ash Sial and Dan Horton, University of Georgia Department of Entomology; Donn Johnson, University of Arkansas Department of Entomology; Gerard Krewer, organic blueberry grower and consultant; Joseph LaForest, Southern Integrated Pest Management Center; Jackie Lee, Oklahoma State University Department of Entomology and Plant Pathology; Oscar Liburd, University of Florida Department of Entomology; Joel Lineberger, Kildeer Farms, Kings Mountain, NC; Doug Pfeiffer, Virginia Tech University Department of Entomology; Cesar Rodriguez-Saona Rutgers University Department of Entomology; Daniel Shires, North Carolina State University Cooperative Extension; Dave Trinka, Michigan Blueberry Growers, Inc; Debby Weschler, Executive Secretary, North American Blackberry and Raspberry Association; Albert Wildes, President, Georgia Blueberry Association.

NC State Horticultural Science Graduate Student Wins Award from AMSEV

Sara Spayd, Professor
Horticultural Science Department
NC State University

Nick Basinger won the award for best student oral viticulture presentation from the American Society for Enology and Viticulture and from the Eastern Section of the American Society for Enology and Viticulture. His presentation "Effect of Herbicide Strip Width and Late-Season Weed Competition on Winegrape Vine Growth, Berry Quality, and Yield. **Nicholas T. Basinger**, Katie Jennings, David Monks, Sara Spayd and Wayne Mitchem, North Carolina State University, Raleigh" was given at the joint National and Eastern Section Annual Conference of the American Society for Enology and Viticulture held June 25-26,2014 in Austin, TX.

Photo of Nick Basinger pictured with ASEV Board of Director Member Kristen Barnheisel (Inglenook Winery, Rutherford, CA) who chaired the National ASEV student paper competition.

Photo of Nick Basinger with Dr. Jodi Creasap-Gee (Kent State University, Kent, OH), President of the Eastern Section of the ASEV.

Summer 2014
Caneberry Chores

This list was developed by 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.

Plant growth and development

- Fruit development for floricanes fruiting types
- Rapid primocane growth
- Flower bud development for primocane fruiting types later in summer
- Floricanes senesce

Pruning and trellising

Floricane-fruiting raspberries:

- May need to adjust primocane numbers if canes are too thick (i.e. remove less vigorous primocanes at their base)
- Train primocanes to the trellis
- Pinch black raspberry primocanes at 2 to 3 ft. to promote lateral growth

Primocane-fruiting raspberries:

- Train primocanes within a trellis to hold canes erect

Erect floricane -fruiting blackberries

- Tip the new primocanes when they are about 6" to 12" below the top wire of the trellis to encourage lateral branching
- Continue tipping at monthly intervals to maintain desired branching and height of canopy (laterals should reach top wire)
- Prune out spent floricanes after they have produced fruit, do not thin out primocanes until mid-to late winter
- Train primocanes to trellis to minimize interference with harvest. Shift trellises or V trellises make this relatively easy

Trailing floricane-fruiting blackberries

- Train new primocanes to middle of trellis, on the ground in a weed-free area, or temporarily to trellis outside of fruiting area (depends on trellis type)
- Cut back side shoots to 18" (after dormancy in cold climates)
- Remove spent floricanes after harvest

Primocane-fruiting blackberries

- Tip canes at 3-4 ft to increase branching and fruiting potential.

Weed management

- Mow along side of row to maintain the width of the bed to 3 to 4 ft.
- Weed growth can be very vigorous at the same time as the bramble crop peaks.
- Weed control is best done earlier in the season before harvest commences.
- Mow middles regularly to allow pickers to move through rows easily.

Insect and disease scouting

- Pay particular attention to the possibility that spotted winged drosophila may be present or arrive in your fields this year. This new pest is very attracted to bramble fruit, particularly later in the season. Consult your local entomologist for updates on scouting methods and occurrences. Scout for insects
- Spotted winged drosophila
- Raspberry crown and cane borers (canes girdled and wilt)
- Psyllid
- Two-spotted spider mite
- June beetle
- Japanese beetles
- Stink bugs
- Fire ants
- Scout for diseases
- Botrytis
- Rusts
- Orange felt (orange cane blotch) (blackberry)
- Sooty blotch (blackberry)
- Orange rust
- Powdery mildew
- Double blossom (blackberry)
- Cane blight (blackberry)
- Powdery mildew

Water management

- Raspberry and blackberry plants need about 1-2 inches of water/week; this amount is especially critical during harvest.
- Give plants a deep irrigation after harvest.

Nutrient management

- Take leaf samples after harvest and send to a clinic for nutrient analysis
- Blackberry growers should give plants additional nitrogen after harvest, check with your local recommendations.

Harvest and marketing

- The busiest time of the year for a blackberry or raspberry grower is the harvest season. Each plant needs to be harvested every 2-3 days. For larger plantings, that means fruit is picked from some part of the field every day of the week.
- Pick blackberries when shiny black for shipping. Those that are dull black are fully ripe and suitable for PYO only.
- Pick directly into clamshells with absorbent pads, or for PYO use clean cardboard flats, take-home baskets, or sanitized re-usable containers.
- Keep harvested fruit in shade and move into coolers as soon as possible to lengthen the shelf life of the fruit.
- Use forced-air precoolers for best removal of field heat.
- Store at 32 to 34°F and 95% relative humidity.
- Freeze excess fruit for jam, juice, or wine.

Strawberry Seasonal Checklist 2014 July/August Growers Checklist

By E. Barclay Poling, Professor Emeritus, NC State

1. Harvest is over. Destroy plants now! Plowing and disking under old plants is the best strategy for preventing further spread of diseases.
2. Other immediate field operations: remove and recycle plastic – some growers use tobacco balers to compress the plastic before it goes to the landfill; consider planting a cover crop – with all these rains there is lots of good moisture!
3. Before making the same plant order as last year, critically evaluate the relative profitability of your different markets (U-pick, Ready Pick, and/or Off-farm). For example, if you experienced further decline in U-Pick sales, this may the time to scale back Chandler production (this variety is primarily a U-Pick variety)
4. If your crop was really late this year, have you considered growing an early ripening variety Sweet Charlie? But, you will have to hurry to place this plant order, as Sweet Charlie supplies may be limited.
5. One thing YOU DO NOT WANT TO DO is go with extra early Chandler planting dates. If Chandler is producing in excess of 100 flowers per plant, your planting date is probably too early – consider a slightly later planting date if you keep running into problems with excess blooms and small berries. Also, early plantings have the undesirable effect of making the crop later in the spring by another 3-5 days (that might mean not being open on a critical weekend).
6. Consider staggering your Chandler plug planting dates over a week's time, so that not all of your crop peaks at the same time. Tobacco growers will typically stagger their planting dates because of tobacco harvest labor limitations – this same idea can be profitably applied by Chandler growers who seem to keep having challenges with extreme crop concentrations that can make it difficult to get fields cleanly picked even in good weather!
7. Another Chandler crop diversification strategy is to consider planting cut-off plants! Chandler cut-off plants can produce larger berries than plugs for easier picking, and the berries will begin to ripen sooner on cut-off plants than plugs. Thus, you may wish to experiment with Chandler cut-off plants from California as a strategy for producing larger berries in the mid-season when Chandler plug berry size drops off. It may be worth a try!
8. Camarosa yields were somewhat lower in 2014, and this may be related to the colder winter and spring season. It may be worthwhile to apply a row cover in late fall when average daily high temperatures fall

below 65 F about 3 weeks (apply in early Nov in Piedmont NC). The covers must be removed before Thanksgiving to promote plant hardening for winter.

9. Don't wait until the last minute to order plants or tips – tips need to arrive one month prior to planting.
10. Soil test in early July. Lime early in the summer to raise pH to 6.0 to 6.2. Incorporate lime when existing beds are broken down.
11. Use overhead irrigate to soften soil as needed and subsoil completely.
12. MAKE A POINT TO STAY IN CLOSE CONTACT WITH YOUR PLANT SUPPLIER THIS SUMMER AND DO NOT BE AFRAID TO ASK FOR PERIODIC REPORTS UPDATES ON PLANT HEALTH
13. Get mist system set up by early August if growing your own tips. Also order soil, trays, and fertilizer.
14. Stick tips by mid-to-late August, depending on location.
15. For planting in mid-Sept (Western NC), apply preplant fertilizer in mid August.
16. Make a fumigation plan, set a schedule, acquire necessary materials. Be sure to allow appropriate plant-back intervals and an additional cushion in case of bad weather.
17. Check out your fumigation rig and do any adjustments and repairs well in advance of fumigation.
18. Renew respirator fit testing (must be current within one year of fumigation.)
19. Attend the Strawberry Preplant Meeting for your area (look for announcements on this website as well as **http://strawberries.ces.ncsu.edu**)
20. **Plan on attending the Southeastern Strawberry Expo, Nov. 17-19, 2014, in Pinehurst, NC** (look for announcements on this website **http://www.ncstrawberry.com**

NC Strawberry Association is Supporting 7 Strawberry Pre-plant Meetings in North Carolina, Virginia and South Carolina in July and August, 2014

Grace B. Tuschak
Education Outreach Coordinator
North Carolina Strawberry Association

Please mark your calendar for the following meetings in NC, VA and SC:

(1) July 21 (Mon) **– Tidewater VA and NC:** at the Creeds Ruritan Barn, 1057 Princess Anne Rd., Virginia Beach, VA 23457. Dinner is at 6:30 pm and program start at 7:00 pm. Please pre-register for meal by July 16 at 757-385-4769.

(2) July 22 (Tue) **– Charlottesville, VA**: Piedmont VA Community College, Schultz Center, Room 116, 601 College Drive, Charlottesville, VA 22902, 5:30 to 8:00 PM, dinner at 5:30. Pre-register for meal by contacting Gail Milteer, 757-569-1100 or gail.moodymilteer@vdacs.virginia.gov

(3) August 5 (Tue) **– Sandhills (Lee, Moore, and Richmond Counties):** Moore County Extension office at 707 Pinehurst Ave, Agricultural Center, Carthage, NC 28327, 6-8:30 pm. RSVP by July 26 to paige_burns@ncsu.edu, 910-997-8255.

(4) August 7 (Thur) **– Central Piedmont:** Alamance County Extension Office. 209 N. Graham-Hopedale Rd., Burlington. Starts at 5:30 and includes sponsored meal. Please pre-register by July 25 to 336-570-6740 or msdanie2@ncsu.edu.

(5) August 19 (Tue) **- Nash, Wilson, Edgecombe and Franklin Counties**: Nash County Ag Center Auditorium. 1006 Eastern Avenue, Nashville, NC. Sponsored meal at 6pm. Please call 252-459-9810 by August 15 to register for the meal. Further information please contact Colby Griffin, Office: 252-641-7815, or colby_griffin@ncsu.edu.

(6) August 21 (Thur) **– Eastern North Carolina**: Duplin County Center. 165 Agriculture Drive, Kenansville, NC Sponsored Meal at 6 pm. Contact: Tom Hroza, 910-296-2143, or tom_hroza@ncsu.edu.

(7) August 25 (Mon) **– South Carolina:** Agribusiness Center for Excellence at Pelion High School, 600 Lydia Dr., Pelion, SC 29123. Starts at 6pm. Further information contact J. Powell Smith, PhD., at 803-359-8515 or jpsmth@clemson.edu.

Please check these websites for additional meeting details in July and August: **http://strawberries.ces.ncsu.edu/ and http://www.ncstrawberry.com/**

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