



# Berry Vegetable Times

2020

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### Ag Life in the time of COVID-19

I know this is a stressful time for all of us dealing with COVID-19. None of us have ever gone through any thing like this in our lifetime. At the beginning of March no one could have guessed what our world would be like in 1 short month. Yet bills still need to be paid and crops need to be harvested and others planted as life does continue to go on just in a different fashion. Taking care of all the jobs on the farm is a big deal and relies on you and your workers staying healthy. We have all heard of the importance of social distancing and how the experts feel this is helping keep the rate of the spread of the virus lower. It is hard to spread your workers out but the more distance you can keep between them the better for their health. Limiting outsiders who can come on the farm and in the packing-house to only those who must come in is a very good idea. At the beginning of each day of work all employees should be monitored for signs of illness before starting work. Here is a link to the CDC website on symptoms.

<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>

Everyone should become familiar with the symptoms so they can monitor their own and their family's health.

This information is from Mary Hartney of FFVA: She lists several websites where good information can be found:

<https://www.aradc.org/news/helpful-links-covid-19>

<http://www.croplifeamerica.org/covid19>

<https://www.tfi.org/content/covid-19-resources>

And also this website for COVID-19 relief:

<https://www.sba.gov/funding-programs/loans/coronavirus-relief-options>

In this newsletter you will find a great article by Travis Chapin, et.al. entitled COVID-19 and Food Safety: Fact & Fiction. This is a great article that will be helpful to you with workers and with dealing with buyers. I recommend you print a copy out and put in your food safety manual.

I know many meetings have been delayed and as soon as the world gets back closer to normal and things are rescheduled we will let you know the calendar of events.

Thank you for all you do to bring consumers delicious fruits and vegetables from Florida.

Stay well and safe!

*Alicia Whidden, Hillsborough Co. Extension*

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# Using reflective mulch films for heat stress management in strawberry production

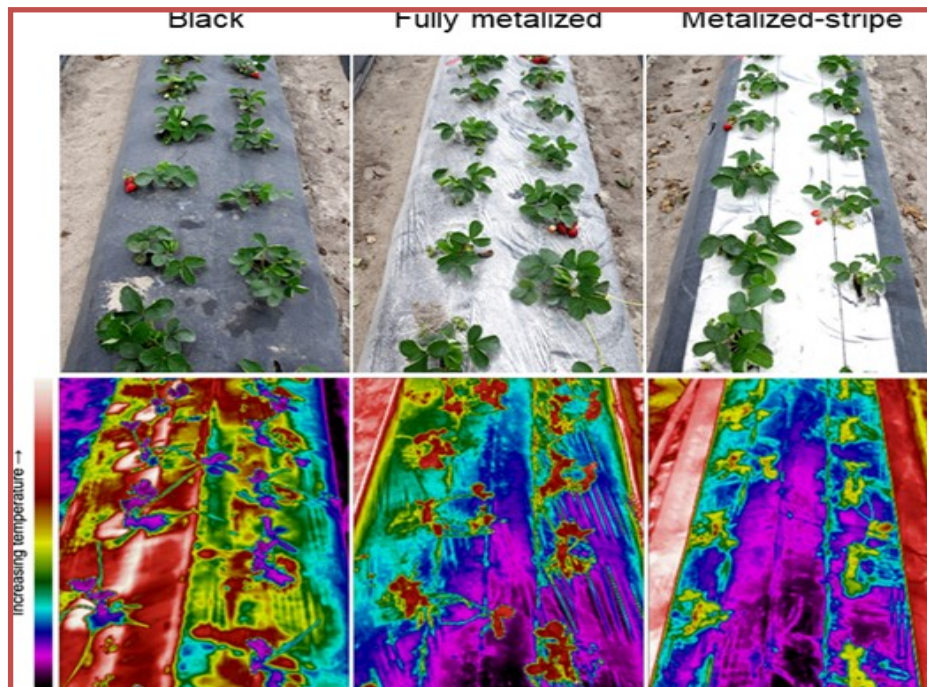
Shinsuke Agehara and Vance Whitaker, UF/IFAS Gulf Coast Research and Education Center

Winter strawberry production in Florida experiences dramatic seasonal temperature variations: extreme heat during establishment, cool temperatures during the early and mid-harvests, and high temperatures during the late harvest. Traditionally, black plastic mulch has been used by Florida strawberry growers to achieve adequate wintertime soil warming. Although soil warming by black mulch is beneficial for promoting wintertime fruit production and ripening, it also intensifies the negative impacts of high temperatures. Strawberry flower and fruit development can be inhibited severely at temperatures exceeding 86 °F. Bare-root transplants are particularly susceptible to heat stress during establishment. Heat stress can result in slow and nonuniform growth, as well as weakened defense mechanisms against diseases and insects. Excessively high temperatures during the late harvest can also cause various problems, including excessive vegetative growth, soft fruit, and low soluble solids content.

Compared to black mulch, reflective mulch films (e.g., white and metalized) can reduce soil and mulch surface temperatures by reflecting a greater proportion of incoming solar radiation. Reflective mulch films can improve establishment and early fruit production of bare-root transplants particularly when planted before October 10. Field trials at the UF/IFAS GCREC showed significant early-season yield increases of up to 70% with reflective mulch films. Other beneficial effects of reflective mulch films include reduced damage from Phytophthora crown rot, total season yield increases, and fruit size increases. Our recent trials also demonstrate that these beneficial effects can be obtained for both bare-root and plug transplants.

We have tested 100% white (white-on-black), 100% metalized, and metalized-striped mulch films for ‘Florida Radiance’, ‘Florida Beauty’, Sensation® ‘Florida127’, and ‘Florida Brilliance’ over the last five seasons. Metalized-striped mulch has a 20” wide aluminum center stripe and black shoulders. All reflective mulch films consistently outperformed black mulch, and metalized-striped mulch performed slightly better than 100% white (white-on-black) and 100% metalized films. All varieties showed positive responses to reflective mulch films. The major drawback of metalized films was the fading of aluminum coatings caused by high pH water (pH >7.5) during sprinkler irrigation. Metalized films are also more stiff than black or white-on-black mulch films, so their installation could be more complicated.

We highly recommend trying reflective mulch films, especially when planting strawberries before Oct 10. If fading of aluminum coatings and stiff texture of metalized mulch films are problematic, we recommend trying white-on-black mulch, which should perform better than black mulch and nearly as well as metalized mulch. We welcome your feedback on reflective mulch!



## Strawberry insect and mite pests for season 2019-2020

Sriyanka Lahiri, UF/IFAS Gulf Coast Research and Education Center

This strawberry season, the majority of strawberry leaf and fruit samples sent to my lab from strawberry growers in Florida for pest identification had damage from chilli thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae) (Fig. 1A-D) Some also had twospotted spider mite, *Tetranychus urticae* Koch (Arachnida: Acari: Tetranychidae) (Fig. 1E-F) damage. Chilli thrips were found in strawberry (cultivar Brilliance) research plots at GCREC in as early as the first week of October 2019. The results of insecticide efficacy trials sponsored by several industry partners showed that 20 days after treatment (DAT), Radiant® SC Insecticide (spinetoram, IRAC #5), Exirel® @ 20.5 fl. oz. (cyantraniliprole, IRAC#28), Apta® (tolfenpyrad, IRAC # 21A), and Minecto® Pro (abamectin + cyantraniliprole, IRAC #6+28) suppressed chilli thrips adults significantly. Also, at 20 DAT, only Radiant® SC Insecticide and Exirel® (high rate @ 20.5 fl. oz.) suppressed chilli thrips nymphs (juveniles) significantly. Plots receiving Radiant® had significantly high marketable fruit yield compared to all other insecticide treatments.

Results indicate that Radiant® showed promising control of both adults and nymphs with significantly high marketable fruit yield. After Radiant®, Exirel® at high rate, showed promising control of both adults and nymphs. Therefore, Exirel® can be rotated in a strawberry spray program to reduce the selection pressure on insect pests. Sivanto™ prime has also shown good suppression of adult chilli thrips. No phytotoxicity was observed from any insecticidal products. However, some strawberry growers reported that there was no effective suppression of chilli thrips even after application of Radiant® twice in the season. It must be considered that most products suppress the adult chilli thrips, but not the nymphs. Rimon® 0.83 EC (novaluron, IRAC # 15) on the other hand, suppresses nymphs only. Tank mix limitations of products that suppress thrips adults only and those that suppress thrips nymphs should be checked before combining products for field application. Also, products enlisted above should not be applied more than two times in a season, even as part of a rotation.

Greenhouse studies at GCREC using organic pesticide Captiva® Prime showed effective suppression of adult chilli thrips, but not of the nymphs. On the other hand, the generalist predatory mite, *Amblyseius swirskii* Athias-Henriot (Arachnida: Mesostigmata: Phytoseiidae) was found to be effective in suppressing nymphs of chilli thrips and is now a serious candidate to be tested in open-field experiments during our next strawberry season.

Early season worms were easily managed by weekly application of Dipel® DF Biological Insecticide.

During early to mid-February 2020, some strawberry fields in Plant City and Summerfield reported a spike in cyclamen mite, *Phytonemus pallidus* (Banks) (Arachnida: Acari Tarsonemidae) (Fig. 1G-I), infestations which was followed with twospotted spider mite and chilli thrips infestations. Cyclamine mites and eggs were found hiding under the calyx of the fruit, were miticides cannot reach easily. Samples were collected and pest identification was done in my lab. Portal® (fenpyroximate, IRAC #21A) provided most effective cyclamen mite suppression. It must be noted that miticides labeled for twospotted spider mites may not be labeled for cyclamen mites. For example, both Portal® and Agri-Mek® SC Miticide (abamectin, IRAC # 6) are labeled for cyclamen mites but Nealta® (cyflumetofen, IRAC # 25) is not.

Following the trend of the past few years, releases of predatory mite, *Phytoseiulus persimilis* Athias-Henriot (Acarina: Phytoseiidae) for twospotted spider mite management was done this year too.

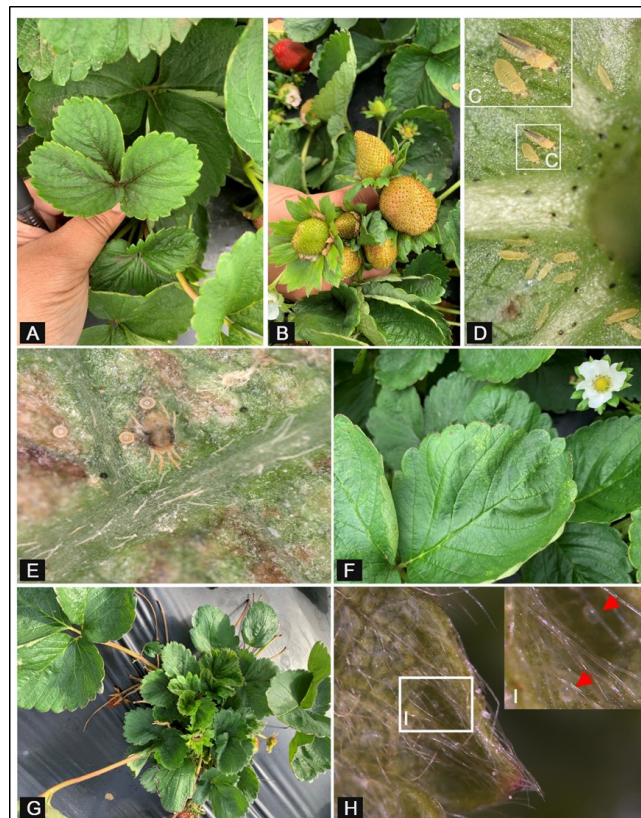


Figure 1. A) Damage rating 2 on strawberry trifoliate due to chilli thrips; B) Bronzing damage on fruits due to chilli thrips; C) and D) chilli thrips adult and nymphs at 20x; E) twospotted spider mite (TSSM) and eggs at 100x; F) Signs of TSSM infestation showing damage rating 1 with >10% stippling on leaves; G) stunted leaves suggesting possibility of cyclamen or broad mite infestation; H) transparent, oval, smooth eggs under strawberry fruit calyx and adults that are semi-transparent, pinkish in color confirms cyclamen mite infestation; and I) two eggs of cyclamen mite at 160x. Photo credits: Joseph Montemayor and Sriyanka Lahiri

## Weed Survey Results from Commercial Strawberry Fields in Hillsborough County

Nathan Boyd and Laura Reuss, UF/IFAS Gulf Coast Research and Education Center

In February and March of 2020, the Weed Science team conducted a weed survey on 41 strawberry fields in Hillsborough County. Of those fields, 36 were managed conventionally and 5 were managed organically. To our knowledge, this is the first ever weed and weed management survey conducted in Florida strawberry fields. It provides a unique snapshot of current management practices and state of the industry in terms of weed problems in the field mid to late season. It will take some time to analyze the data but preliminary results are presented in this article and a more complete overview of the information will be made available to the growers at a later date.

In the conventional fields, 100% of growers used herbicides in the row middles but only 7% applied herbicides under the plastic mulch. The ability to manage weeds on the bed without herbicides is most likely due in part to the use of a slit in the plastic mulch instead of the larger transplant hole used by most vegetable growers. There were a wide range of fumigants applied, but most growers relied on combinations of chloropicrin and 1,3-dichloropropene. The top three fumigants were Pic-Clor 60 (34% of fields), Telone C-35 (31% of fields), and Pic-Clor 80 (22% of fields). The type of plastic mulch also varied and 62% of growers used TIF and 33% used a low-density polyethylene.

A total of 47 weed species were identified in strawberry fields. The most common weed species listed from most to least common were goosegrass, cutleaf evening primrose, Carolina geranium, common ragweed, eclipta, Brazilian pusley, lamb's quarters, black medic, crows foot grass and green kyllinga. The addition of green kyllinga to this list is surprising given that it has only been identified as a serious problem in strawberry fields for the past 3-4 years. Purple nutsedge is a serious issue where it occurs but it only occurred on 20% of the surveyed fields compared to goosegrass which occurred on 83% of the fields.

Fumigants tended to have variable efficacy on weeds. Fields fumigated with K-Pam had fewer weeds than all other fields whereas fields fumigated with Dominus or Ally 33 (products with isothiocyanate compounds) had the highest weed densities followed closely by Pic-Clor 80. Surprisingly, average weed density in organic fields was almost half of that observed in conventional fields. This is likely due to more intensive hand weeding in organic fields.

Over the next several months the Weed Science team will continue to go through the data that was collected. We want to express our appreciation to Kenneth Parker and Alicia Whidden who helped us identify potential fields. We also want to thank all of the growers that worked with us to make this project possible. The information acquired provides useful information and will hopefully help growers make weed management decisions, will help direct the Weed Science research program, and will also enable us to track changes over time. This is an especially important tool to help us rapidly identify weeds that may potentially be herbicide resistant and to help track how changes in management affect weed populations over time.

Please remember... The use of any trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named and does not signify that they are approved to the exclusion of others of suitable composition. Use pesticides safely. Read and follow directions on the manufacturer's label.

## Hidden Enemies continue to sap Florida Strawberries

Johan Desaegeer, UF/IFAS Gulf Coast Research and Education Center

The 2019-20 strawberry season came with its typical nematode issues. Sting nematode problems were the most common, with symptoms starting to show up as early as December. While some damage was seen in conventional fields, the most severe damage was found in organic fields. Soil fumigants cannot be used in such fields, and few other options are available. The field below (Photo 1) was new land, previously under Bahia grass, which provided a prime food source for sting nematodes. It is a common misconception that new land will not have nematode problems. The reality is that severe nematode damage can occur in newly developed land, just as well as in fields that have been in production for years. Sting nematodes can feed on a wide variety of crops and plants, including many different grasses. No matter what the field history, it is always a good idea to have new land checked for nematodes, especially in Florida, where nematodes are everywhere. With the increasing acreage of organic strawberries in Florida, and lack of information on how to manage nematodes without chemicals, the nematology group at Balm has now started working on evaluating organic nematode management options. The initial focus is on cover crops and organic nematicides, but other potential strategies such as solarization, anaerobic soil disinfestation and the use of soil amendments are also on the table.



Photo 1 – Sting nematode (*Belonolaimus longicaudatus*) infestation in an organic strawberry field, Wimauma, January 2020.

The second most common nematode in Florida strawberries, the northern root-knot nematode (Photo 2), started showing up around February. Northern root-knot nematode is generally less detrimental to strawberries than sting nematode, mostly because these nematodes become active later in the season, when plants are well established and have large root systems that are more tolerant to nematodes. As the name implies, they prefer cooler conditions, and tend to disappear in spring as soils warm up.



Photo 2 – Below and aboveground symptoms of nematode damage on a strawberry plant; (left) small galls on roots typical of northern root-knot nematode (*Meloidogyne hapla*); (right) stunted growth, and reddish coloring of leaf edges, typical of (root-knot or sting) nematode damage; if damage occurs early-mid season, it is most likely sting, if it occurs late season it is more likely root-knot.

Relatively little root-knot nematode damage was seen this past season, probably because soil temperatures remained quite high. Usually, this nematode is more of a problem when a second crop is planted. Most vegetables, especially cantaloupe, squash or any other cucurbit, can be severely damaged by northern root-knot nematode in Florida, especially when planted early. In this case, applying a non-fumigant nematicide is recommended to get the crop established. Unfortunately, due to the Covid-19 pandemic, many strawberry growers were not able to plant a second crop, and the ones that did are struggling to get the crop sold. An interesting fact is that while Florida has more than 15 species of root-knot nematodes, the northern root-knot nematode is the only species that is found in strawberry fields, and almost uniquely in the Dover-Plant City area.



Photo 3 - Sampling a suspected nematode hot spot in a strawberry field, Dover, January 2020

Root lesion nematode is another nematode that can be found in Florida strawberry fields. This nematode does not appear to be as widespread as sting or root-knot, nor does it seem to be as damaging. Like northern root-knot nematode, the nematode prefers cooler climates, and is very common in the northern states of the US and Canada. Also, just like root-knot nematodes, lesion nematodes are endoparasites, which means they feed inside roots. No significant damage was seen in any of the fields this season. However, we did find lesion nematodes inside roots of transplants coming in from the nurseries, which is why it is important to continue to monitor this nematode. The use of aerated steam to treat strawberry transplants, which has shown good efficacy against several fungal pathogens, may be able to control these and other nematodes in transplants as well. Researchers at the Gulf Coast Research and Education Center (GCREC) are evaluating this technique to control lesion, root-knot and foliar nematodes in strawberry seedlings, and preliminary results look quite promising.



Photo 4 – Stunted and discolored strawberry plants caused by stubby root nematodes (*Nanodorus minor*), Plant City, February 2020.

Finally, this season for the first time we observed damage caused by stubby root nematodes (photo 4). The damage was seen in a lower lying area of the field, and the symptoms resembled sting or root-knot nematode damage. Although stubby root nematodes are common in Florida soils, they usually do not occur in high numbers, or are known to cause crop damage. One notable exception is potatoes where stubby root is known to transmit corky ringspot virus which can cause severe damage to tubers.

To conclude, while our research activities have temporarily shut down due to the Covid-19 situation, the GCREC nematology lab will continue to accept diagnostic samples. Samples can be shipped to the GCREC or delivered otherwise by contacting the lab ([jad@ufl.edu](mailto:jad@ufl.edu); 813-431-6246).

## Chemical and cultivar trials to manage the new *Neopestalotiopsis* disease in Florida strawberry

Juliana S. Baggio, Marcus V. Marin, James C. Mertely, and Natalia A. Peres, UF/IFAS Gulf Coast Research and Education Center

*Pestalotiopsis* is not necessarily new to strawberry. In fact, Drs. Charles Howard and Earl Albregt, former professors at the U.F. Strawberry Lab in Dover, reported a strawberry fruit rot caused by *Pestalotia longisetula* (or *Pestalotiopsis*) for the first time in 1972. More recently, strawberry isolates were identified as *Neopestalotiopsis* in reports describing a pathogen of strawberry roots and crowns. However, the fungus has always been considered a secondary pathogen. During the past two strawberry seasons (2018-19 and 2019-20), severe outbreaks were reported in Florida commercial fields, where root, crown, petiole, fruit, and leaf symptoms were observed (Figure 1). Yield was severely affected and several acres of strawberry fields were destroyed. Studies performed by our group indicate that isolates from the recent outbreaks are more aggressive and may belong to a new *Neopestalotiopsis* species.

The disease is considered a new threat to strawberry production by many growers and our group is currently working on trials to understand the disease and determine the best management practices. During the 2019-20 season, we screened *Neopestalotiopsis* isolates in the laboratory for their sensitivity to different fungicides and evaluated products in two field trials. We also assessed six commercial strawberry cultivars grown in Florida for disease resistance.

In the field trials, strawberry plants were inoculated by spraying a mixed spore suspension of *Neopestalotiopsis* isolates collected from commercial farms during the outbreaks. Fungicides were sprayed weekly over the plants according to label rates. The inoculated control was sprayed with the pathogen suspension but did not receive any fungicide treatment. For the cultivar experiment, plants were inoculated as described above, and no fungicides were applied. Foliar and fruit disease were evaluated throughout the season (Figure 2).

The fungicides Switch 62.5 WG (fludioxonil + cyprodinil) and Thiram SC (thiram) significantly reduced disease incidence in both fungicide trials (Tables 1 and 2). In the first trial, Bravo (chlorothalonil), Omega (fluazinam), and Miravis Prime (fludioxonil + pydiflumetofen) also significantly reduced disease compared to the non-treated inoculated control. Please note that the letters by the numbers for each treatment indicate whether treatments were significantly different according to the statistical analysis. In the case of the first trial, treatments that do not have an 'a' or a 'b' were statistically better than the non-treated control which had an 'ab'. Bravo and Omega are not registered for strawberry production fields but we consider these could be good options for nurseries (Omega is in the process of registration for nursery use). In the second trial, in addition to Switch and Thiram, Manzate Pro-Stick (mancozeb) also decreased disease incidence (Table 2). However, mancozeb is not registered for strawberry (neither fruit nor nursery). In summary, among the products evaluated and that are legally registered for use in strawberry production fields, fludioxonil (in Switch and Miravis) and Thiram were the most effective in reducing disease incidence. Unfortunately, our industry already relies greatly on Switch for control of *Botrytis* fruit rot (BFR). The overuse of this product can lead to increased selection for fungicide resistance; thus, applications need to be limited to the maximum recommended according to the label, and we need to continue seeking alternatives.

Among the six cultivars evaluated, all were susceptible to the pathogen, but 'Florida Beauty' and 'Florida Brilliance' were significantly more affected than 'Sensation' (Figure 3), which agrees with reports and observations from commercial growers.

This new disease is difficult to control, and we are working hard to develop an integrated disease management approach involving the needs of the strawberry nursery and production industries. We have many on-going studies to understand the origin, pathogenicity, and disease cycle of this pathogen, and to answer growers most frequent questions: "where did this come from?", "why is it so aggressive?", "how does it spread?", "what are the



conditions for the spread”?, “will it survive in Florida fields”?, and ultimately “how can it be managed”?. In the meantime, if you have any questions and want to know more about our findings, do not hesitate to contact us (Juliana Baggio, jbaggio@ufl.edu, 813-419-6629, James Mertely, jcmert@ufl.edu 813-419-6599, or Natalia Peres, nperes@ufl.edu, 813- 419-6602).

**Table 1.** Effect of different fungicides on disease incidence (% symptomatic fruit) caused by the new *Neopestalotiopsis* sp. (Field trial 1).

Treatment	<i>Neopestalotiopsis</i> fruit rot incidence (%)	
Switch 62.5WG (14 oz)	9.5	de
Thiram SC (2.6 qt)	13.0	cde
Bravo Weather Stik (1.5 pt)	13.8	cd
Omega 500F (20 fl oz)	14.7	cd
Miravis Prime SC (13.4 fl oz)	14.7	cd
Rhyme (7 fl oz)	16.4	bc
Captan Gold 4L (3 qt)	17.9	abc
Mettle 125ME (5 fl oz)	18.4	abc
Oso (=Tavano) (13 fl oz)	20.5	abc
Protexio SC (19 fl oz)	24.2	ab
Abound Flowable (15.5 fl oz)	25.8	ab
Control, inoculated	25.9	ab
Oxidate 2.0 (1% max = 1 gal)	26.0	ab
Topsin 4.5FL (20 fl oz)	26.7	a
Pr > F	<0.0001	

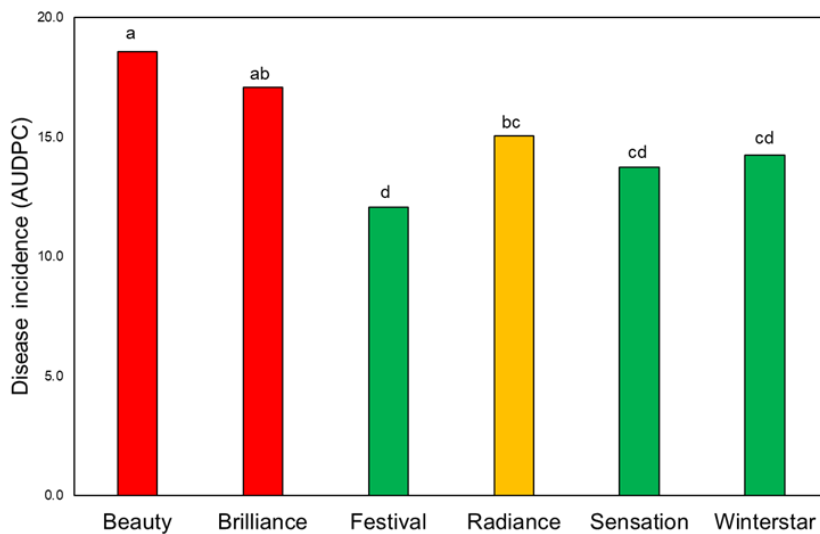
**Table 2.** Effect of different fungicides on disease incidence (% symptomatic fruit) caused by the new *Neopestalotiopsis* sp. (Field trial 2).

Treatment	<i>Neopestalotiopsis</i> fruit rot incidence (%)	
Thiram SC (2.6 qt) + NuFilm P (12 fl oz)	13.8	gf
Switch 62.5WG (14 oz)	16.0	efg
Thiram SC (2.6 qt)	16.7	defg
Manzate Pro-Stick (2 lb)	17.3	cdefg
Inspire (7 fl oz)	18.6	bcdef
Aprovia (10.5 fl oz)	20.1	abcde
Thymox (0.5% = 2 qt)	20.8	abcde
Cueva 1.5 gal)	22.1	abcde
Suffa (1 gal)	22.9	abcd
Tilt (4 fl oz)	23.0	abcd
Rovral 4F (2 pt)	23.0	abcd
Quadris Top (14 fl oz)	23.1	abcd
Uptake (12.5 fl oz)	23.1	abc
Control, inoculated	23.8	ab
Procure 480SC (8 fl oz)	24.1	ab
Actigard 50WG (0.5 oz)	24.4	ab
Rhyme (7 fl oz)	24.5	ab
Inspire Super (20 fl oz)	26.2	a
Pr > F	0.0002	



**Figure 1.** Symptoms caused by the new *Neopestalotiopsis*. **A**, overall symptoms in the field (stunted plants and symptomatic leaves). **B**, light to dark brown spots on the leaves. **C**, leaf spots containing black structures of the fungus. **D**, fruit showing symptoms and signs of the fungus. Photo credits: Juliana Baggio and James Mertely.

**Figure 2.** Fungicide efficacy trials at GCREC: strawberry plants inoculated with *Neopestalotiopsis*. **A**, Non-treated strawberry plants; **B**, plants treated with Switch. Photo credits: Juliana Baggio.



**Figure 3.** Disease incidence on leaves of different strawberry cultivars inoculated with the new *Neopestalotiopsis* sp.

## A management recommendation for 'Florida Brilliance' strawberry

Vance M. Whitaker and Shinsuke Agehara

'Florida Brilliance' has now been in commercial production in Florida for two seasons. In the first season, 2018-19, this variety accounted for about 14% of central Florida acreage according to the FSGA. This jumped to about 52% in 2019-20. Growers and researchers alike are still learning about this variety as we observe its characteristics in greater acreage, in new fields and under different weather patterns.

During the last two strawberry seasons, temperatures in central Florida in early February have been unseasonably warm. These periods have coincided with what is often called the "spring flush", in which strawberry plants become more vegetatively vigorous in response to increasing daylengths. This increased vigor is usually accompanied by decreased fruit quality regardless of the variety, including more uneven surface color, lower soluble solids and softer skin. These changes tend to be more noticeable the higher the temperature. These changes in fruit quality are also influenced by variety, and it is clear from our observations that 'Florida Brilliance' suffers more from soft skin during the "spring flush" than other varieties.



The primary management recommendations for increasing skin firmness are to reduce nitrogen fertilization and decrease watering volumes. Therefore, during the spring flush period we strongly recommend reducing water and fertilizer for 'Florida Brilliance', especially if the period coincides with unseasonably warm weather. Ideally, these practices should be implemented several days in advance of the anticipated period for maximum effect. Another fertilization recommendation for increasing skin firmness is a foliar application of calcium or silica. The application should be made weekly, starting at early bloom. The use of reflective mulch films (e.g. white or metalized) may also be effective in increasing skin firmness. By reducing soil and mulch surface temperatures, reflective mulch films may minimize excessive vegetative growth or skin softening caused by high temperatures.

In the coming season, we welcome grower feedback and any further ideas on managing 'Florida Brilliance'.

### COVID-19 and Food Safety: Fact and Fiction

The CDC, FDA and USDA all agree "*Currently, there is no evidence of food or food packaging being associated with transmission of COVID-19*", including imported foods and materials. FDA has issued guidance that if an employee tests positive for COVID-19 they "*do not anticipate that food products would need to be recalled or be withdrawn from the market*". Produce growers, harvesters, packers, and coolers should continue to follow the good hygiene practices they already have in place (e.g., washing hands and cleaning and sanitizing surfaces that may contact food or hands, often) as part of their food safety programs when handling produce. Consumers should not wash produce with soap. Soap is for washing hands and is known to cause vomiting and diarrhea when ingested. Coronaviruses need a living host (human or animal) to grow in and cannot multiply on produce or on common touch or food contact surfaces.

Some media outlets have widely circulated stories of extended survival of novel Coronavirus (SARS-CoV-2) on a variety of common surfaces. Reports of active viruses found on cruise ships after 17 days are false; what has been found is the RNA contained in the virus, which **does not** cause infection ([https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e3.htm?s\\_cid=mm6912e3\\_w](https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e3.htm?s_cid=mm6912e3_w)). While the tests used were not described, they likely rely on the detection of viral RNA sequences and are not necessarily indicative of infectious virus particles. The longest median half-life of SARS-CoV-2 virus particles documented is on stainless steel (5.6 h) and plastic (6.8 h) (van Doremalen et al., 2020; <https://www.nejm.org/doi/full/10.1056/NEJMc2004973>); this equates to approximately a one log reduction each day. Total survival time is dependent on many factors including amount in initial contamination, temperature, and relative humidity.

There has been some confusion about sanitation practices. FDA and CDC do not recommend any additional “disinfection” in food facilities beyond routine cleaning at this time due to concerns around COVID-19 (<https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/coronavirus-disease-2019-covid-19-frequently-asked-questions>). The primary way to control Coronavirus infection is to prevent spread between people, including workers. Farms, harvesters, and coolers should continue their vigilance around general hygiene and food safety practices. It is critical to ensure that workers who are not feeling well stay home, to reduce the risk of infecting other workers. During operation, employee separation and distancing should be maintained as much as possible. Review of cleaning and sanitation programs should determine if additional focus is needed to clean and sanitize common areas and touch points (e.g. door handles, restrooms, break rooms, transportation, etc.). You should continue to use the cleaning agents that are normally used in those areas according to the directions on the product label.

The United Fresh Produce Association (<https://www.unitedfresh.org/>), and other food industry groups, have developed comprehensive guidance around dealing with an employee or contract worker who tests positive for COVID-19 ([https://static1.squarespace.com/static/5e7d1107dac60a6b3e3f098d/t/5e7e017914477f68e7f8763d/1585316219871/FBIA+COVID19%2BCase+Recommended+Protocols\\_27Mar2020.pdf](https://static1.squarespace.com/static/5e7d1107dac60a6b3e3f098d/t/5e7e017914477f68e7f8763d/1585316219871/FBIA+COVID19%2BCase+Recommended+Protocols_27Mar2020.pdf)), that may be helpful in developing your own policy. A recall is not necessary if an employee tests positive for COVID-19 (see March 17, 2020 Q&A <https://www.fda.gov/food/food-safety-during-emergencies/food-safety-and-coronavirus-disease-2019-covid-19>).

In light of pressing concerns around the rapid and continued spread of the coronavirus, there have been several changes to current policies related to the implementation of the FSMA Produce Safety Rule. FDA has suspended all *routine* inspections, including inspections conducted under contract at the state level (<https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-focuses-safety-regulated-products-while-scaling-back-domestic>). *For cause* inspections and investigations will continue as needed. **UF/IFAS and FDACS have postponed all food safety workshops and On-Farm Readiness Reviews at this time.**

Additional resources include:

FDA Coronavirus Disease 2019 (COVID-19) FAQ <https://www.fda.gov/emergency-preparedness-and-response/mcm-issues/coronavirus-disease-2019-covid-19-frequently-asked-questions>

WHO Coronavirus disease (COVID-19) advice for the public <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>

UF IFAS resources devoted to considerations for COVID-19 listed here under publications [https://edis.ifas.ufl.edu/topic\\_covid19](https://edis.ifas.ufl.edu/topic_covid19), information is frequently added to this page, and is being translated into Spanish [https://edis.ifas.ufl.edu/topic\\_spa\\_covid19](https://edis.ifas.ufl.edu/topic_spa_covid19)

The UF/IFAS EDIS link above includes factsheets directly related to produce production; please find additional information here: <https://edis.ifas.ufl.edu/pdf/FS/FS35100.pdf>.

Please don't hesitate to reach out if you have any questions or concerns.

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