

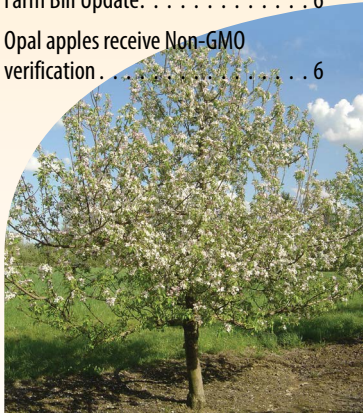
FACTS FOR *Fancy Fruit*



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Crop conditions

Most crops are still dormant although in more southern areas of the state some crops are starting to shows signs of development. Early developing apples such as Pink Lady are already at or beyond 1/2 inch green

Cold injury to tree fruits: We all know it's been a long cold winter, but what effect did it have on our fruit crops? First the good news: the transition to very cold temperatures occurred gradually so the fruit trees and vines had plenty of opportunity to acclimate and develop some hardiness to the cold. The other piece of good news is that in most places we had good snow cover. Both these factors helped reduce the amount of cold damage. Ok, now the bad news. Not only were minimum temperatures very cold, but it stayed cold for a long duration. For example, at the Purdue farm here in Lafayette on January 6-7, the temperature was between -10 and -15F for 27 hours straight. When I look at the data from other sites around the state, many locations in central to northern Indiana experienced a similar cold snap, 27-29 hours consecutively below -10F and lows around -15F. In more southerly areas in Indiana, minimums were "only" -9F or so.

There are many factors that determine the amount of damage that results from cold conditions but two of the main factors are how cold it got and how long the temperature stayed that low. Apples have a high tolerance to cold and I doubt we'll see any cold damage. Peaches however, are a lot more tender. Dr. Dick Hayden used to say that you begin losing peach

flower buds at -10F and for each degree lower, you lost 10% of the buds. At -20F they would all be killed. Based on this general rule of thumb, we would estimate that we have perhaps 50% of flower buds still alive. BUT what was so unusual this year was the duration of cold. With such extended periods of cold conditions, I expect close to complete bud death of peaches in the central and northern areas of the state. To check on the status of peach buds in your orchard, cuts some fruit buds in half with a sharp pocket knife or razor blade. Brown coloration indicates bud mortality. We made a short video on how to check for damage to peaches following the spring freeze in 2012: The same technique can be used on flower buds. (Hirst)

<http://www.youtube.com/watch?v=DcS2XGAqoFk>

Cold injury assessment and pruning in grapes: This has been a long cold winter and there is significant winter injury in grapes. We experienced lows in the teens below zero across most of the state, and some of those events were extended for 12 hours or more. Now that the threat of extremely cold weather has passed we can evaluate winter injury and adjust pruning severity to make up for cold injury. Bud damage is assessed by collecting canes from positions that would normally be left at pruning, bringing those canes indoors to warm up for 48 hours or more, then cutting through the buds with a razor blade to evaluate bud health. Live buds will be bright green while cold injured buds will be black or brown. A very good description of this procedure with pictures is available at the Cornell University Grape Pages website at: <http://www.fruit.cornell.edu/grape/pool/winterinjurybuds.html>

Typically, if less than 25% of the buds are damaged you can prune normally. If 25-50% of the buds are damaged then you'll want to adjust the number of buds retained accordingly. For example, if 40% of the buds are damaged then 60% are alive. If you need 50 buds per vine for the proper crop load, then you'll have to leave 83 buds to end up with 50 primary shoots. To determine how to adjust the bud number multiply the inverse of the percent live buds ($1/.60$) times the desired number of buds ($1/.60=1.7$; $1.7 \times 50 = 83$ buds). If more than 50% of the buds are damaged then you'll probably want to do minimal pruning now and wait until after budbreak to determine where live buds occur in order to have an adequate number for balancing the vines.

We have cut hundreds of buds from our vines in Lafayette and Vincennes and find that all varieties have some bud damage. Even the very cold hardy Minnesota varieties like Frontenac and Marquette are showing damage. Reports from growers around the state confirm what we have seen in our trials. Damage is severe on all but the most hardy varieties. Here is the rundown:

- Tender vinifera and hybrids such as Chambourcin, Cayuga White, and Vidal have essentially 100% bud damage: 0% survival.
- More hardy hybrids such as Traminette, Noiret, Corot noir, and Seyval have more than 75% bud damage: 25% survival.
- Labrusca varieties such as Concord, Steuben

and Catawba have about 60% damage: 40% bud survival.

- Hardy hybrids such as Foch have 25% damage: 75% survival.
- Minnesota and Elmer Swenson varieties are showing 20-40% damage.

My recommendations are to prune varieties with 75% or greater bud survival more or less normally, leaving a few extra buds to assure a full crop. On varieties with only 50% bud survival, prune very light. Just remove wood from which production would be impractical. On varieties with less than 25% bud survival, I suggest you wait and see what happens. It is likely that there is considerable trunk and cordon damage that will need to be addressed.

Spring freeze damage can also be a significant economic problem for Midwest grape growers. Widespread damage occurred in 2007 and 2012 from a warm March followed by the freezing temperatures in April. Over the past few years frost damage in Indiana has been sporadic. A technique called long pruning or double pruning helps avoid spring frost and freeze damage, especially on varieties that tend to bud out early. This type of pruning is only applicable to spur or no-tie training systems. The procedure utilizes the apical dominance of buds on a cane. The first buds to begin growing are those on the tip of a cane, while buds closer to the cordon begin growth later. To perform long pruning, select canes to be used for fruiting spurs during the normal pruning practice, but leave those canes long,

with 10-15 more buds than desired. Spurs are normally pruned to 3 to 4 nodes for fruiting, but if they are not cut back, then the extra buds will help delay the development of the desired basal 3 to 4 buds, which helps avoid frost injury. After the date of the last probable spring freeze has passed, the canes are shortened to the desired length to properly adjust the shoot number for the vine. Growth of the basal buds can be delayed as much as two weeks if weather conditions are favorable. While this procedure requires an extra trip through the vineyard, it can mean the difference between a full crop and little or no crop. (Bordelon)

Is winter over yet? How trees

keep score: Plants keep a tally of the cold they experience so they know when winter is over. This is a safeguard to prevent plants responding to a couple of warm days in the middle of winter. Each plant species, and variety within a species, has a given number of "chilling hours" that it must accumulate before it is ready to respond to warm conditions in the spring. If the required chilling requirement is not met, budbreak in the spring is typically sporadic and protracted resulting in poor flowering and fruit set.

Peach cultivars can range from very little chilling requirement such as Florida Prince (150 chilling hours) up to Redhaven (950 hours) and Contender (1050 hours). This is one of the reasons we don't grow Florida peaches in Indiana, because their low chilling requirement would likely be satisfied in November then they would start budding out and losing

Facts for Fancy Fruit is a newsletter for commercial and advanced amateur fruit growers. It provides timely information on pest control, production practices, and other topics likely to be of interest to fruit growers. All growers and interested persons are welcome to subscribe.

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hardiness on a warm day in December. Most apple cultivars require 600-1000 hours of chilling, although there are some low-chill apples that are mostly grown in subtropical or tropical areas.

So why are we even discussing this? It was a long, cold winter so there was plenty of chilling, right? Well, you would certainly think so, but not exactly. The most effective temperatures for chilling are 36-48F, and temperatures below 34F don't count. So this past winter, in Lafayette we went over 30 days in Jan.-Feb. and only accumulated 42 chilling hours because most of the time it was simply too cold to be effective.

This could have been a real problem for us if it had stayed too cold for chilling accumulation then suddenly warmed up in the spring.

Luckily, as things slowly warm up we are having many days in the 40s which are very effective chilling temperatures. Now we just need to keep our fingers crossed for a late spring and no late freezes. (Hirst)

Straw removal on strawberries:

The proper time to remove straw from matted row strawberries is when the bare-soil temperature at 4 inches averages about 40-43° F. This usually coincides with mid to late March in central Indiana, however this year's weather has kept soil cooler than normal. Plants will begin pushing new leaves as the soil temperatures rise steadily through the month, so the straw should be raked off the tops of the beds and into the row middles. Leaving some straw on top of the beds for plants to grow up through provides a clean surface for fruit. Straw should be removed from strawberry beds before the plants grow enough to cause yellowing of foliage. Allowing the leaves to become etiolated (yellowed with long petioles) due to late straw removal can reduce yields by as much as 25%. However, uncovering the plants early may promote early growth and increase chances of frost or freeze injury. The difference between early removal and late removal may increase first harvest by about three days, so there is no

real advantage. After the straw is removed the frost protection irrigation equipment should be set up and tested and made ready for frost during bloom. (Bordelon)

Spring weed management in

strawberries: There have been several herbicide label changes for strawberries.

There is a new formulation of Gramoxone, a revised supplemental label for Sinbar, and labels for Prowl H20, Aim, Blazer, Chateau, Solix 3, and Goal. Growers should read the 2014 Midwest Commercial Small Fruit and Grape Spray Guide (https://ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx) to familiarize themselves with these changes. Changes that may influence weed management decisions for early spring are listed below.

Gramoxone Inteon is the new formulation for strawberries. This formulation is designed to be safer to the user. However it is still restricted use and the signal word is still "Danger". Gramoxone Inteon contains an "alginate" which is made from seaweed and slows absorption into the bloodstream. There is also an alerting agent that smells like decaying grass, and emetic and purgative, and a green dye. The new formulation also comes with some rate changes. With the old formulation (Gramoxone Max) the rate range was 1.7 to 2.7 pints per acre. Rates for the new formulation are 2.5 to 4 pints/acre.

Chateau (flumioxazin) is registered for pre and post emergence weed control in dormant strawberries. In dormant strawberries, the rate is 3 oz/acre. Also apply a crop oil concentrate at 1% or a non-ionic surfactant at 1/4% by volume. Chateau will control emerged chickweed, field pansy, and oxalis if sufficient contact is made with the weeds. Chateau will not control all emerged weeds. Scout the field and check the labels. 2,4-D amine may still be required to control other emerged weeds.

Select 2EC (clethodim) is a grass specific herbicide registered in strawberry. It is applied at 6 to 8 ounces per acre. It is effective

on small, actively growing grasses. It has improved activity over Poast on cool-season and perennial grasses. Add 1 qt/100 gal spray of crop oil concentrate. Repeat application at 14 days for perennial grasses. Ammonium sulfate can be added at 2.5 lb/acre to improve activity on perennial grasses. Do not apply within 4 days of harvest. Select will not kill old established grasses. Avoid spraying on hot humid days or some crop burning will result.

Ultra Blazer 2E (acifluorfen) is registered for use in annual and perennial strawberries. In matted row plantings, applications can be made after renovation and when plants are dormant during fall or early spring. The PHI for matted row strawberries is 120 days, so growers need to carefully consider spring application dates. (Bordelon)

Spring weed management in grapes and berries:

Early spring is a good time to make the first herbicide application of the year. There are several options for grapes, brambles and blueberries including both pre- and post-emergent herbicides. In most situations, there will be some emerged weeds present in the planting at this time of the year. That means a post-emergent herbicide will need to be used to kill those established weeds. A pre-emergent material can be tank mixed at this time to provide residual weed control. Most pre-emergent herbicides will provide only 6 to 8 weeks of control. So, if applied in the early spring, they may not provide sufficient control of summer grasses (foxtail, barnyard grass, goosegrass, crabgrass, etc.). If those are the main weeds on concern, growers may want to delay application of pre-emergent herbicides until a bit later in the season. A good option is to apply a broad spectrum post-emergent herbicide such as glyphosate (Roundup, Touchdown, etc.) now then come back in about 4 weeks with a second application of glyphosate tank mixed with a pre-emergent herbicide. That should provide reasonably good season-long weed control. Growers should review the weed control chapter in the

2014 Midwest Small Fruit and Grape Spray Guide (https://ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx) and Midwest Small Fruit Pest Management Handbook for a complete discussion of weed management in small fruit crops. (Bordelon)

Raspberry anthracnose: The most important spray of the season for control of anthracnose on brambles is the delayed dormant spray of lime sulfur, Sulfoxir or copper hydroxide. This is one spray that you can't afford to miss. One of these materials should be applied when new leaves are exposed 1/4 to 3/4 inches; if you are late in your application and don't spray until a few leaves have unfolded, cut the rate to reduce the risk of leaf burn. See the 2014 Midwest Commercial Small Fruit and Grape Spray Guide (https://ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx) and the product labels for complete information on rates and timing. (Bordelon)

Pruning brambles: March is a good time to finish pruning summer-bearing brambles. Last years fruited canes should be removed now if they were not removed last summer or fall. Remove weak or spindly floricanes and thin to 4-6 canes per foot of row. Laterals on blackberries and black and purple raspberries should be trimmed back to about 2/3 to 3/4 of their original length to promote flowering on strong wood. Red raspberry canes can be tipped if desired, but should not be tipped more than 1/4 of the cane length. If the planting is trellised, the canes should be tied to the wires now before growth starts. Fall bearing types can be mowed to the ground now for a fall-only harvest, or the fruited tips can be removed if a summer and fall harvest is desired. Remove and destroy the prunings to help prevent anthracnose and botrytis. This year there is significant winter injury in blackberries. I will not be surprised to see floricanes completely fail to leaf out, or leaf out then collapse during the first hot weather. (Bordelon)

Pruning blueberries: Spring is the

best time to prune blueberries. Practice "renewal pruning." Try to establish an even number of canes of various age classes. A well-pruned blueberry bush should have about 15-25 canes (depending on age, cultivar and growth habit) with approximately 1/3 in the 5-7 year-old class, 1/3 in the 2-4 year-old class, and 1/3 new canes for renewal. Pruning should open the center of the bush to encourage new canes to grow upright. Also, remove low, drooping branches. Detailed pruning to remove weak growth in the tops of the canes will reduce the number of fruit and improve fruit size. (Bordelon)

Pheromones and Pheromone Traps: One way insects communicate with individuals of the same species is with pheromones. Pheromones are volatile chemicals released by an insect that usually can be detected only by individuals of the same species. There are a number of different types of pheromones, but the most common type is the sex pheromone. Usually the females will emit a tiny amount of a chemical that attracts the male to her and increases the likelihood of mating. Because the chemical is volatile, air currents carry it. The male detects the pheromone in the air with receptors on his antennae. He then flies upwind to find the source of the pheromone, a prospective mate. The chemical compositions of pheromones for a number of pest species have been identified and synthetic copies can be produced in the laboratory. Synthetic pheromones can be used in conjunction with traps to catch male insects.

There are a number of fruit pests that can be monitored with pheromone traps. For growers who have not used traps before, I suggest starting out by trapping for codling moth, spotted tentiform leafminer, or peachtree borers. As you gain experience with the traps and learn how they can improve your pest management practices, you may want to begin trapping for additional pests.

The proper timing for setting out pheromone traps for fruit pests are:

Pest	Start Trapping
Redbanded leafroller	Green tip
Spotted tentiform leafminer	Green tip
Oriental fruit moth	Pink (in peaches)
Codling moth	Pink
Fruit tree leafroller	Pink
Lesser peachtree borer	Late April
Obliquebanded leafroller	Mid-May
Peachtree borer	Late May

Monitoring with pheromone traps lets you know when the insect is active. This allows you to better time control practices or, in some cases, to determine if control is even necessary. If you choose to control spotted tentiform leafminers with sprays targeted at the adults, having pheromone traps will help you know when the moths are flying in large numbers. For codling moth control, we can use a combination of pheromone trap catches and degree day accumulations to better time sprays. This will be covered in more detail in the next issue of Facts for Fancy Fruit.

Listed below are some, but certainly not all, of the suppliers of pheromones and traps.

Gemplers; P. O. Box 270; 100 Countryside Dr.; Belleville, WI 53508; 800-382-8473; www.gemplers.com

Great Lakes IPM; 10220 Church Rd., NE; Vestaburg, MI 48891-9746; 989-268-5693; www.greatlakesipm.com

Scentry Biologicals Inc.; 610 Central Ave.; Billings MT 59102; 800-735-5323; www.scentry.com

Trece Incorporated; P.O. Box 129. 1031 Industrial St.; Adair, OK; 866-785-1313; www.trece.com

trece.com

Just a few notes about using pheromones. 1. It is preferable to use more than one trap for each insect pest for which you are trapping. Sometimes, for reasons we don't entirely understand, a trap placed at a particular location may not catch many moths, which could give you misleading information. If you have two or three traps, you can be a lot more confident in the results. 2. Pay attention to how frequently the lures need to be replaced. When you replace a lure, don't throw the old lure on the ground. If you do, it may compete with the lure in the trap and lower your trap catch. 3. If you are trapping for more than one insect, don't handle more than one type of lure with your bare hands. You can contaminate the lure with the other pheromone and it will lose effectiveness. 4. When monitoring for the clearwinged moths such as the peachtree borers, remember that these pheromones are not as species specific as most pheromones. Therefore, you may catch some moths that are not pests of fruit. So, you will need to identify the moths in the trap to make sure they are peachtree borers. (Foster)

Oil Sprays: One of the first and most important parts of a good insect and mite management program is the application of an early season oil spray to control European red mites, San Jose scale, and several species of aphids. Scales overwinter on the tree as nymphs and European red mites and aphids overwinter as eggs. Because two-spotted spider mites do not overwinter on the tree, oil sprays are not an effective control measure for that species. Although scales, European red mite eggs, and aphid eggs may appear to be inactive, they are living organisms and, therefore, must respire, or breathe. The application of the oil creates an impervious layer over the pests that will not allow the exchange of gases, causing the pest to die of suffocation. We have seen a resurgence of San Jose scale in recent years in some orchards. If you had scales on your fruit last fall, then a

well-timed oil spray is highly recommended. Earlier oil sprays are more effective than late sprays for San Jose scale control.

Oil sprays should be applied between 1/2-inch green and tight cluster. Apply a 2% rate at the 1/2 inch green stage or a 1% rate at tight cluster. Oil sprays should not be applied during, immediately before, or immediately after freezing weather. For best results, apply when temperatures are 45oF or above, and not just before rain showers. Remember that oils are not directly toxic to the pests. They only work by suffocation. Therefore, the better the coverage, the better control you will receive. Our data have shown that mite control is improved if oil is applied at tight cluster rather than at 1/2 inch green.

One question that has arisen as a result of our research that showed that predator mites overwinter on the tree is: What effect will early season oil sprays have on predator populations? In other words, will the oil sprays kill the predators and create more serious European red mite populations? Our research showed that oil sprays, whether applied at green tip or tight cluster, had no detrimental effect on mite predators. Therefore, we recommend the use of early season oil sprays as a good management practice.

If you plan to use a preventive miticide this year, a reasonable question to ask is: Is it still necessary to apply an early season oil spray? I believe that the oil application is still a good idea, for two reasons. First, it will provide control of aphids and scales, as well as European red mites. Secondly, I believe that the use of oil will reduce the likelihood of developing resistance to these miticides. Therefore, I still recommend oil sprays even if other miticides are going to be used. The addition of an insecticide with your oil spray will give some increase in aphid control but will not improve control of mites or scales. (Foster)

Guthion and Endosulfan Updates - Remember that azinphosmethyl (Guthion) can no longer be used on any fruit crops. Its use was extended by a year because of the reduced fruit crops in 2012 but it's label has now expired. Even if you have existing stocks of these products, there are no longer legal to use.

Endosulfan (Thionex, Thiodan) is also being phased out. Its use on nectarines, peaches and sweet cherries expired on July 31, 2012. The label for pears expired on July 31, 2013. It cannot be used after July 31, 2015 on apples or blueberries and July 31, 2016 is the last day it can be used on strawberries. Endosulfan cannot be used on any crop after July 31, 2016. Again, existing stocks cannot be used after the listed dates. (Foster)

Mite Management in Apples

When I first started working at Purdue over 25 years ago, the management of European red mites was one of the greatest challenges facing apple growers. We had very few effective miticides, and the ones we had were not all that good. With the assistance of many growers and several very talented graduate students, we were able to develop an effective system for managing mites that reduced our reliance on miticides and instead focused on maximizing the impact of natural enemies, primarily predatory mites, on the European red mite population. That program is still effective today, but now we are blessed to have a wide variety of very effective miticides at our disposal. In this article I will outline what I think is the most effective approach to managing European red mites on apples.

1. Put on a timely Superior oil spray. See the article above.

2. Conserver predator mites. If properly conserved, the predator mites, primarily *Amblyseius fallacis*, will usually control about 90% of the mite population. The best way to conserve those predators is to avoid using insecticides that are toxic to them. The most highly toxic pesticides that should be

avoided include Asana, Baythroid, Danitol, Decis, Permethrin (Ambush/Pounce), Proaxis, Warrior, Carzol, Lannate, Vydate, Dicofol, and Nexter. Sevin is also toxic to predators so it should only be used as a thinning agent.

3. Preventive miticides. Some miticides such as Agri-Mek, Apollo, Savey, and Zeal can be used early in the season before you know if you are going to have a problem this year. Only use these products if you had a serious mite problem last year. This is a change from previous years when I recommended using these products every other year as part of a rotation. We now have enough rescue miticides available and overall mite populations have diminished enough that we no longer need to use these products on a regular schedule.

4. Scout. You should begin scouting shortly after petal fall. Most growers will know where they usually see mite problems first and scouting efforts should begin there. Often that will be in Red Delicious trees or along a gravel road. Pick four leaves from each of five trees and select the leaves from different parts of the tree, high, low, inside, outside, etc. Use a 10X hand lens to look for mites. Also, notice any predators that you might see. The treatment threshold varies during the season, 2.5 mites per leaf before June 15, 5 mites per leaf in the remainder of June, 7.5 mites per leaf from July 1 – 15, and 10 mites per leaf from July 16 – 31. After August 1, you can stop sampling whenever the population falls below 10 mites per leaf. My observations over the years has been that populations will usually start to decline after about July 20.

5. Rescue treatments. Treatments should be made when the threshold is exceeded. There are a number of good to excellent rescue miticides available. Check page 22 of the Midwest Tree Fruit Spray Guide (ID-168) (<https://ag.purdue.edu/hla/fruitveg/Pages/bulletinsmain.aspx>). Notice the column that lists the MOA or mode of action. To avoid the development of resistance and to keep this

valuable tools available, rotate between modes of action. For example, if you use Nexter (MOA group 21), don't follow that up with an application of Portal (also MOA group 21).

Farm Bill Update

USApple continues to work with our coalition partners in the Specialty Crop Farm Bill Alliance to ensure the new Farm Bill is properly implemented. We are also active in the Coalition to Promote U.S. Agricultural Exports which is working in support of the Market Access Program (MAP). As the appropriations process gears up, the MAP coalition is meeting with key Members of the House and Senate Appropriations Committees to sure up support for this critical program. While it is funded through the Farm Bill, MAP has been a target in previous years of House and Senate members with an agenda to further cut government programs and spending. (US Apple Association)

Opal apples receive Non-GMO verification

In a move designed to avoid consumer confusion, the Opal apple will carry Non-GMO labelling to set it apart from a non-browning apple being considered for approval by the U.S. Department of Agriculture. The GMO Arctic apple is not available and has not been approved for sale, but FirstFruits Marketing, Yakima, Wash., sought the Non-GMO Project Verified certification to ensure consumers know the Opal's slow-browning characteristic is natural. "We want consumers to have confidence that Opal is not a GMO product and not confuse Opal with the new GMO variety currently under consideration by the USDA," Keith Mathews, chief executive officer of FirstFruits Marketing, said in a news release.

"We understand that some consumers are concerned about GMO products and felt it was important to clarify the natural non-browning characteristic is just that - natural."

Opal is the first U.S. apple variety sold fresh that has been verified as non-GMO by the organization, according to the release. The Non-GMO Project offers an independent verification for non-GMO food and products, according to the release. Non-GMO Project verification of both organic and conventional Opal apple varieties will help consumers understand that Opal's resistance to browning is all natural, according to the release.

The Opal apple variety, a combination of topaz and golden delicious varieties, was developed by traditional breeding techniques in the Czech Republic, according to the release. The variety was brought to market in 1999. In North America, the variety - with the technical designation of UEB 32642-is grown exclusively by Broetje Orchards and distributed under the trademarked Opal brand name by First Fruits Marketing in North America. The Opal variety have the golden color and sweetness of a golden delicious apple, but without that variety's tendency to bruise. The Opal variety is also resistant to oxidation when cut, according to the release, which makes them slow to brown. While genetically modified apples are not currently available for sale in the U.S., the Canadian-based Okanagan Specialty Fruits Inc. has been seeking deregulation of its non-browning GMO Arctic apple from the USDA for several years. Thousands of comments have been received by the USDA about deregulation of the Arctic apple, mostly opposed to its release.

(thepacker.com)



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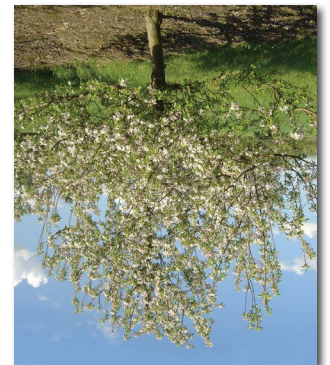
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