What's Growing On?

BASTROP COUNTY MASTER GARDENER ASSOCIATION

February 2020

Why Is My Tree Dying?

By Carolyn Turman

So you have a "sick" tree. It has brown spots on the leaves and you think it may be dying. What can you do?

I heard about this training offered for Master Gardeners called "First Detector" and wanted to know more about the plant disease issues we face in Bastrop County so I signed up to learn. The course was taught by Texas A&M professors as an advanced training course for Master Gardeners. You can find less intensive First Detector training online or in workshops, so it is available to everyone. Check out https://www.firstdetector.org/contact-workshop.

I finished the course and then the fun began as we were tasked with going out and finding issues within our county. I came away from the class very enthusiastic about finding sick oak trees and determining if they had Oak Wilt as it was taking a foothold in our area. Just in case you did not catch that, only people who are studying plant diseases would actually want to find a sick plant.

We were given 5 steps to follow when trying to diagnose an issue:

- Identify the plant
- Assess the nature of the problem
- Develop a suspect list
- Narrow list of suspects
- Optional: Get Help

First and foremost, identify the tree so you can research the issue effectively. Misidentification can take you down a wrong path as it did me. I put out

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Bastrop County Master Gardeners

PLANT SALE

Ken Estepp Show Barn in Mayfest Park, Bastrop
25 American Legion Drive, Bastrop, TX 78602

Come shop with us for your spring planting needs. The plant sale will feature native and adapted plants. We'll have annuals, perennials, pollinators, herbs, vegetables and shrubs. And did I mention—Tomatoes? Just in time for the best tomato season of the year!

Inside this issue:

Seed Starting Tips

by Howard Nemerov

After teaching two seed-starting classes, students presented questions outside the class's scope that I will attempt to answer here.

How long can seeds remain viable in storage?

At one end of the spectrum, media reports on old seeds found by archeological expeditions. For example, researchers found a 2,000-year-old date palm seed at Masada,[1] an ancient Israeli fortress "located atop an isolated rock cliff at the western end of the Judean Desert overlooking the Dead Sea.[2] In a word: dry.

Masada: Bad for growing; good for seed storage.

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Upcoming Events

H.E.B Backyard classes

- Feb 22: Vegetable Gardening Basics—presented by Gail Smith
- Feb 29: Good bugs-Bad Bugs—presenter TBD
- Mar 7: Herb Gardening—presented by Catherine Pressler
- Mar 14: Texas Superstars—presented by Pat Anderson

Lunch and Learn

- Feb 18: Seed Starting—presented by Howard Nemerov
- Mar 10: TBA

H.E.B Backyard classes at Bastrop HEB, 104 Hasler Blvd. in employee classroom. 10–11 a.m.

Lunch and Learn classes at First National Bank in Elgin, 1312 Highway 290 East. 11:30 a.m.–12:30

Meet our new board! L–R: Patricia Todd, VP; Barbara Durkin, Treasurer; Mark Stewart, President Elect; Terri Pierce, Secretary; Madeline Kresge, President

the word that I was looking for sick oak trees. A friend told me she had oak trees on her property that were dying so I went out to her place and the trees did look sick and some had already died. I took some samples home to try to identify the tree, the first of the 5 steps. I looked up trees online at http://texastreeid.tamu.edu/content/listOfTrees/. Based on pictures I thought maybe this was a case of Oak Wilt so I returned to their property and, together with the owners, took samples in accordance with the instructions at https://plantclinic.tamu.edu and headed up to the Texas A&M Plant Disease Diagnostic Laboratory in College Station to drop them off.

Wow. What a place. We arrived and saw several specimens that had been brought in for diagnosis. Somebody even brought in a small tree, exposed roots and all. As an added bonus to our trip, we were given a tour of the lab.

We were also able to talk with Sheila McBride, Extension Program Specialist*. She immediately identified the samples we brought as Post Oak and said there were no reported incidents of Oak Wilt in Post Oaks. They were tested, which takes 2 – 3 weeks and the results for Oak Wilt were negative. The trees were sick but the most likely cause was Hypoxylon Canker of Oaks which is not limited to oaks. All part of learning in the field! See articles written by Dr. David Appel and Sheila McBride. Free download at https://www.agrilifebookstore.org/Hypoxylon-Canker-of-Oaks-p/eplp-030.htm.

This is a huge Post Oak that has since died. As of now, there does not seem to be a way to stop the decline of Post Oaks. Post Oaks, with shallow root systems, are very sensitive to environmental change, in particular to weather (the constant change from drought to heavy rains to drought type weather) but also packing of soil in the canopy line and disruption of the root system (example: by digging or trenching over the roots). An informative article on post oak decline can be found at https://plantclinic.tamu.edu/2016/09/02/rapid-decline-of-oaks/.

There are ways to help prevent the spread of Oak Wilt. A basic step is to avoid pruning or wounding oaks in the spring and ALWAYS paint any cuts or wounds immediately! More about this in the next article as part of this three-part series on Oak Wilt. The next article will be about which oaks are susceptible to Oak Wilt and why. The third will be about how to identify the disease and what you can do to prevent Oak Wilt from spreading.

Check out the websites listed in this article for more information. Become a Master Gardener so you can attend the Advanced training with Texas A & M professors and become a First Detector. Watch for upcoming Master Gardener classes in your county at https://txmg.org/bastropcounty.

Resources:

Master Gardener Advanced Training, Texas First Detectors, Central Texas, May 20-21, 2019 hosted by Williamson County Master Gardener Association.

Trainers:

Dr. Kevin Ong, Sheila McBride, M.Sc, Dr. David Appel, Mr Ergan Vafaie, Masters in Pest Management, V. Hannah Ayala, Extension Assistant at Texas Plant Disease Diagnostic Laboratory.

New Website Features

Check out our website, which features project slideshows, a new photo gallery section, and an events calendar to check out upcoming activities. Find news articles and our newsletters. Thanks to Dave Posh for keeping the info timely for us https://txmg.org/bastropcounty/

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Russian scientists grew flowers from 32,000-year-old seeds "preserved by the Siberian permafrost." [3] In a word: cold.

Philip Kauth, PhD, is Director of Preservation at Seed Savers Exchange (SSE), one of the largest non-profit seed preservation organizations in the world, with 13,000 members and preserving over 20,000 plant varieties.[4] SSE's mission is to "conserve and promote America's culturally diverse but endangered garden and food crop heritage for future generations by collecting, growing, and sharing heirloom seeds and plants." [5]

At the more workaday end of the spectrum, Kauth notes: "Onion seeds are one of those crop types that do not last as long as other seeds. They can remain viable for longer than a year with ideal storage conditions, which is below freezing. If you were to store them at room temperature they'll last about a year." [6]

Kauth's general recommendations on storing seeds include keeping seeds *dry* and *cold*, just as it works in Nature.

> *I tell people make sure your seeds are dry! Dry seeds will last much longer. The best place to store seeds is in a freezer. Yes, you can freeze seeds as long as they are dry and they will last years and years. Our long-term storage vault is at 0 F, and seeds like tomatoes and peppers can last 100 years before seeing a significant drop in viability. So if people have a chest freezer, that is the best place to store them. We use heat sealed foil packs, but you can use jars.*[7]

More realistically, SSE's Community Seed Network notes: "Under frozen conditions, such as in any household freezer, many seeds will last 10 or more years, easily." [8]

[Disclaimer: Author is Life Member of Seed Savers Exchange.]

Do seeds need light or dark conditions to germinate?

Depending on variety, some plants need light to germinate, some need dark, and some tolerate either. Calendula supposedly needs dark to germinate, and seeds germinate in 10 days.[9] I covered a flat with a towel, and placed it in a dim room. I placed a second flat under lights, with seeds covered about ¼-inch with germinating mix. The second flat had better germination rate (37.5% versus 52%). Also, seeds germinated in 3 days. While this experiment needs to be replicated a few more times to determine any significant trend, it indicates that you needn't worry too much, as long as you cover seeds with the proper mix.

Won't my lights generate enough heat to germinate heat-loving seeds?

If your lights generate enough heat to germinate tomato seeds in less than a week, they'll also cook tender young seedlings and quickly dry your soil, reducing germination rates. A heating mat and thermostatic control is the ideal way to go. Using bottom heat set at 78°F, my tomato seeds emerged 3–4 days after planting.

One person mentioned their tomato seeds from the January 11 class just recently emerged. They had no heating mat. University research indicates that tomato seeds will eventually germinate under cooler conditions, as low as 60°F.[10] But this delays first harvest, shortening your harvest window before summer's heat and bugs shut down production.[11]

Lights that generate a lot of heat are also energy-inefficient. Electric lights consume only the wattage listed on their package. If more of that energy radiates off as heat, less energy is left to produce light. Seedlings

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need light; less light equals poorer growth. Tomato seedlings grow better with more light and temperatures around 70°, and once they emerge they only need bottom heat if growing in a cold room. Why cook their tops?

What growing mix do you recommend?

For seed starting, soilless mixes give you the most control over nutrient levels, root growth, and disease control. Texas A&M AgriLife Extension notes: "Use of a loose, fertile, disease-free soil mix is a basic key to success." [12]

Homemade peat-lite mixes combine milled sphagnum peat moss with horticultural vermiculite and perlite. Since these main ingredients are nearly nutrient-free, add nutrients to suit your needs. Generally, literature recommends a balanced N-P-K fertilizer for all-purpose usage. AgriLife recommends a peat-lite recipe you can make at home, and recommends 8-8-8 fertilizer.[13]

This type of mix is light weight, making it easier to handle larger nursery pots, as well as trays of starts. The three main ingredients are porous, reducing the risk of damping off due to wet soil and allowing good root penetration, yet they hold moisture well, reducing watering.

Because peat moss is hydrophobic (resists absorbing water when dry) I include coconut coir in my mix, because coir readily absorbs water (hydrophilic). Below is my peat-lite recipe, complete with organic N-P-K and micronutrient amendments.

Sterile Seedling Mix based upon Cornell Mix

- 4 quarts sphagnum peat
- 2 quarts coconut coir
- 2 quarts vermiculite
- 1 quart perlite
- 35 cc ground dolomitic limestone
- 20 cc Allganic Nitrogen Plus
- 20 cc Roots Bat Guano
- 5 cc Potassium sulfate or 25 cc dry MaxiCrop powder
- 25 cc greensand (skip if using MaxiCrop, which has micronutrients)

Note that peat-lite mixes need dolomitic limestone to balance out the acidic peat moss. Nutrients are generally most available when soil is slightly acidic.[14] Peat moss has a pH around 3.0–4.5.[15] Tomatoes prefer a pH of 6.5–6.8.[16]

Seeds contain enough nutrients to feed themselves during germination, which is why I also place ½-inch of sterile germinating mix on top of the sterile seedling mix: 50% coconut coir and 50% vermiculite; no amendments. After the radicle emerges from the seed, grows downward and develops true roots, it reaches the nutrient-rich growing mix, obtaining food just when needed. Likewise, this very light germinating mix doesn't form a crust, so it won't suppress seedling emergence.

When it's time to transplant from your seed-starting flat, a sterile mix isn't so important. Adding organic

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matter like compost at this point may even help transition starts to the garden, where they must work with some microbes to glean nutrients from the soil, while resisting other microbes which might attack the plant. As a result, my second-stage growing mix includes compost and rabbit manure for nutrient sources, plus greensand for micronutrients.

Growing Mix based upon Cornell Mix – Starts and Larger

- 4 quarts Sphagnum peat
- 2 quarts coconut coir
- 2 quarts compost
- 2 quarts vermiculite
- 1 quart perlite
- 3 pints rabbit manure
- 35 cc ground limestone
- 25 cc greensand

When are my seedlings big enough to transplant from flat to start pot?

Size is less important than development. Some varieties grow larger, some faster, depending on biology.

The first picture is Pepper – Italian Sweet Fryer, taken 5 days from emergence. Top growth consists primarily of two cotyledons, or seed leaves. These leaves originate inside the seed. As the pepper seed emerges from the soil, the original shoot—also from the seed—emerges in a hook. As this hook straightens, it pulls the cotyledons upright so they can better absorb light to produce energy for seedling growth.[17] In the center are two embryonic true leaves: They don't originate in the seed, but develop due to photosynthetic processes begun in the cotyledons.

The next picture is of Verbesina encelioides (Cowpen Daisy), taken 16 days after emergence. These seedlings have produced 2–3 sets of opposing true leaves. They still have cotyledons, but the true leaves have grown large enough to hide them. These seedlings were transplanted into start pots after taking this picture: they're ready.

AgriLife Extension recommends: "Seedlings are ready to transplant when they have the first set of true leaves." [18] Since I use open flats containing about 3-inches of peat-lite, I let seedlings grow until there are 2–3 sets of true leaves, because they develop larger root systems. Plants being grown in starter cells will need transplanting sooner—likely after the first set of true leaves develop—because cells provide limited space for root development.

The third picture shows Zinnia seedlings, 8 days from emergence. There's one set of cotyledons and one set of true leaves, with an embryonic set of second true leaves in the center. The close-up picture may appear misleading: This plant is only 2-inches wide and 1.5-inches high. That means the true leaves are barely 1-

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inch long, much smaller than mature Zinnia leaves. This plant is not ready for transplanting. The flat contains enough soil for seedlings to grow larger root systems *and* leaves. I will transplant when these seedlings have two sets of mature true leaves, with a third embryonic set in the growing tip.

Care and culture play major parts in deciding how fast seedlings mature. These seedlings grow under lights placed 2–3 inches from their tops, in a homemade peat-lite soilless mix with custom-blended water-soluble fertilizers, in a temperature between 70°–78°. This is why a native plant—whose genetics communicate urgency to get up and reproducing before summer heat shuts down physiological processes—is ready to transplant in just over two weeks from emergence, whereas tomatoes' genes respond to the same environment by producing transplant-ready seedlings in just over three weeks, 7 days longer.[19]

Pay attention to your plants: They will tell you what care and culture they need, and when they need transplanting.

What if I'm not interested in all the investment and work to set up a home seed starting system?

You tried something new and gained some appreciation for what's needed to succeed.

Do what lights a fire under you: that's your mission. Bastrop County Master Gardeners Association needs experts with so many different knowledgebases to support our public mission. One person cannot become expert in them all. Do what you love, let others do seed-starting, and don't worry about it.

Endnotes

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