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OSU Extension - Auglaize County Weekly Horticulture Newsletter – 10-11-19

Ripening Green tomatoes

Freezing temperatures may arrive Sunday morning which will bring an end to the tomato growing season. With the late planting this season there are still plenty of tomatoes left to harvest. You can harvest all of the large green tomatoes to enjoy later. There are two harvesting methods. One is to carefully dig the plant and remove the soil. Then hang the plant in a sheltered warm and dry location and allow them to ripen. The other harvesting method is to remove each tomato from the plant. Store the green tomatoes in an opaque sealed container, a box, a plastic grocery bag with some ventilation holes, or a paper bag. Store the tomatoes in a warm semi-humid place out of the sunlight. Place a ripening banana along with the tomatoes to speed up the ripening process. If you do not want the tomatoes to ripen all at one time, then place a banana in a container with just a few tomatoes and leave the others in a container by themselves. Check the container for ripe tomatoes and enjoy them.

Cleaning up the garden

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Once freezing temperatures arrive it is time to clean up the garden and prepare it for next season, unless you still have some cool season vegetables in the garden. Remove all plant material from the garden or till it under. If you have a compost pile, place the plant material in the pile, unless the material was diseased. Do not put diseased plant material in a compost pile, especially tomatoes, potatoes and vine crops. Till the soil and level off the garden in preparation for next season. Instead of having the soil exposed all winter long, scatter rye over the soil and lightly till it into the soil to help improve soil health and hold nutrients from leaving the garden.

Rye can be purchased in small quantities from Johnny's and some other seed sources or locally in larger quantities from your local fertilizer company. There is some risk with seeding the rye in regarding to how and when to kill the rye next spring. It is best to kill the rye by applying glyphosate 2 to 4 weeks before you plant the garden. For small seeded plants such as carrots, onions, and radishes it is best to kill the rye 3 to 4 weeks before planting. It must be killed at this time because of allelopathic chemicals from the rye will kill the germinating vegetables. Till in the dead rye to prepare the seedbed. The biggest risk with a rye cover crop is that the dead rye will hold moisture potentially causing a delay in tilling the soil.

Local Observations

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Harvesting potatoes

Good Afternoon! I pray you are well! Back to dry weather!

It rained only 1 day this past week. Rainfall on Sunday, October 6th, ranged from 0.01" at about 5 miles east of Waynesfield to 0.3" at about 3 miles west of St. Marys. Rainfall for the week was the same as for Sunday's rain. The average for the week was 0.11". We have seen mostly below normal temperatures this past week.

I'm still harvesting tomatoes, watermelon and Swiss chard. I harvested my sweet potatoes. They were not very large. I sure hope my bees are doing better. I found some larvae in it, but not very many, so I'm not sure how good they will be.

VegNet

No news this week

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BYGL

No News this week.

Other Articles

Gardening Basics 2: Your Garden's Soil Type

October 8, 2019 | Meghan Shinn
Source: https://www.hortmag.com/weekly-tips/cultivation/gardening-basics-2-your-gardens-soil-type

by Tammie Painter

Like people, plants prefer living in certain conditions; in the wrong conditions they become stressed. As with people, too much stress leads to poor health, reduces vigor and opens a door to pests and diseases. Although some resilient plant species can adapt to less than ideal situations, most face a struggle for survival when placed in the wrong garden location. In this post, the second of three in a series, explains types of soil and how to determine which one you have.

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Key condition #2: Soil type
In many cases your garden's soil type comes predetermined, unless you install raised beds or take on the task of changing your soil by regularly amending it.

Your soil type is important because it affects how well your soil holds water and nutrients. It also determines which plants will do well in your garden. For example, most rhododendrons have no problem with clay soil, but Russian sage (*Perovskia atriplicifolia*) suffers in this heavy medium.

The basic soil types are clay, loam and sand. Clay soil is characterized by being heavy, holding a great deal of water and nutrients, draining poorly and hardening during dry spells. Light, loose sandy soil drains quickly, but this rapid drainage leaches nutrients. Loam possesses a Goldilocks mix of fine and coarse particles, which means good drainage while still retaining nutrients. Your soil may also be a mix of types, such as sandy loam.

The difficulty with soil type is that plants rarely come with tags letting you know which soil they prefer (although many garden species will do well in loam). While you may be tempted to grow anything that catches your eye, a healthy garden requires evaluating soil type before planting time.

Plants placed in clay soil must be able to handle a wide variety of moisture conditions – from super soggy to bone dry. Plants intolerant of clay can develop root rot from excessive moisture and they will have trouble extending their roots deep into this dense soil. This shallow root system leads to unstable plants that can tolerate neither dry nor wet conditions. Likewise, clay-adapted plants in sandy soil will quickly dry out and, as the roots delve deeper looking for moisture and nutrients, the plant will fail to develop lush aboveground growth.

The solution is to understand your soil type and either choose plants adapted to it, amend it with regular applications of compost or grow plants in containers or raised beds filled with the soil that they need.

You don't need a degree in geology to determine your soil type. Just perform this simple test:
1. Pick a time when the weather has been mild and dry for about a week and when rain isn't predicted for the next 24 hours.
2. Soak a 12-by-12-foot section of a garden bed with water. If your soil varies across your garden, test several areas at once.
3. Leave your test area uncovered and undisturbed for 24 hours.
4. Scoop up a small chunk of soil, squeeze it in your hand and note what happens. If you are left with a ball of dirt that mostly held its shape (and may still be wet), you have clay soil. If you can form a ball that holds

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together but crumbles when you brush your fingers over it, you have loam. If the soil crumbled out of your hand as you squeezed, you have sandy soil.

‘Snip, edit, grow’ with gene editing techniques for improving food security

Source: https://www.hortidaily.com/article/9150420/snip-edit-grow-with-gene-editing-techniques-for-improving-food-security/

The Earth's increasing population and changing climate pose major threats to food security. Experts estimate that the world's population will reach 9.7 billion by 2050, with higher temperatures and changes in rainfall adversely affecting crop yields in many regions.

Countering this threat will require plant researchers and crop breeders to increase yield—that is, the amount of food a plant can produce. However, they must also decrease losses by making crops more resistant to disease and changing environmental factors. One of the most promising solutions to this dual challenge is genome engineering via gene editing, which allows targeted improvement of the key genes regulating the factors that contribute to yield and stress tolerance.

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Over the past several decades, gene editing techniques such as CRISPR/Cas9 have made waves in research and public policy. These cutting-edge techniques benefit from ongoing innovation and emerging discoveries that have improved their specificities and expanded their utility from simple genomic modifications to the editing of RNA, transcriptional regulation and even engineering virus resistance.

Magdy Mahfouz, KAUST associate professor of plant science and head of the Genome Engineering Lab, part of the University's Center for Desert Agriculture, and his research team are working to improve the specificity, delivery and usage of existing gene editing tools for crop bioengineering. Mahfouz's group also develops new and innovative methods, including engineering virus resistance and using germline engineering to produce crops with improved agricultural traits such as heat tolerance, salt stress and resistance to disease.

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Sharpening the molecular scissors
CRISPR/Cas9 gene editing uses the Cas9 protein as "molecular scissors" to cut the DNA at a specific site. This break in the double-stranded DNA may disable a gene, create a new mutation once it is repaired or provide a place for a new gene to be inserted.

Cas9 is directed to its specific site by a guide RNA; researchers can easily specify this guide RNA sequence, thus targeting Cas9 to any region of the genome. The CRISPR system revolutionized and democratized gene editing research by doing away with the need for complex protein engineering, increasing speed and precision and reducing cost.

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In a test tissue, such as a leaf or root, CRISPR/Cas9 editing occurs in individual cells. One challenge is to generate a complete plant from a single edited cell—this can be readily done for some crops, but it requires a lengthy plant tissue culture process. Moreover, sometimes producing Cas9 in cells requires the addition of foreign DNA.

To facilitate the generation of gene-edited plants that do not contain foreign DNA, Mahfouz and his lab are working on a new germline engineering platform that targets a specific cell and does away with the time-consuming tissue culture process.

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"Ideally, you want a crop that carries no foreign DNA. With germline engineering, you deliver the upgraded proteins straight to the cell without the need to add foreign DNA," Mahfouz explained. "The protein makes the edit and then decays. Editing can be achieved with the traditional CRISPR approach too, but it takes several generations to regenerate an edited plant and segregate out the foreign DNA. We think germline engineering has the potential to save a lot of time, money and effort."

The GMO controversy

A recent decision from the European Court of Justice ruled that crops created using CRISPR/Cas9 would be classed as genetically modified organisms (GMO) and be subject to stringent regulations in Europe. However, the research community has challenged this decision.

"CRISPR-edited crops should not be classed as GMOs because they do not have a transgene from another organism. Edited plants only have some small changes in their genes, similar to changes that occur naturally. If you take two plants from a field, for example, no two plants will have exactly the same DNA sequence," Mahfouz said.

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While Europe has taken a more conservative approach, in the U.S., CRISPR-edited mushrooms are already in the market.

"The applications [of gene editing] are almost unlimited. I think these tools will reshape the future of agriculture and the future of gene therapy," Mahfouz noted. "More than 20 to 30 percent of genetic diseases are caused by mutations—so just being able to treat these alone will have a huge impact.

"There are ethical issues to consider, of course...but the big difference in agricultural applications is that the gene editing machinery is precise and can be separated out, so the resulting crop has no foreign DNA and is indistinguishable from conventional varieties."

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Cheap as chips: identifying plant genes to ensure food security

International team led by Göttingen University describes method to spot genes that control traits

UNIVERSITY OF GÖTTINGEN

Source: https://www.eurekalert.org/pub_releases/2019-10/uog-cac100819.php

IMAGE: PROFESSOR TIM BEISSINGER ON A TRACTOR DURING THE PLANTING PHASE OF THE EXPERIMENT **view more**

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CREDIT: ABISKAR GYAWALI

An international team of scientists led by the University of Goettingen has developed a new approach that enables researchers to more efficiently identify the genes that control plant traits. This method will enable plant breeders and scientists to develop more affordable, desirable, and sustainable plant varieties. The application will be most valuable for the fruit, vegetable and grain crops that not only end up on our dinner table, but are also critical for global food security and human nutrition. The research was published in *BMC Plant Biology*.

The new method is an extension of a tool known as GWA (Genome Wide Association). GWA studies use genetic sequencing technologies coupled with advanced statistics and computation to link differences in the genetic code with particular traits. When using GWA to study plants, researchers typically manage large sets of genetically identical plants. However, developing these sets of "inbred lines" is costly and time-consuming: it can take over six years of preparation before such a study can even begin. The new technique is modelled after an approach often used to study human DNA, in which DNA samples from thousands of individual people, who are certainly not identical, are compared.

The researchers wanted to discover whether this approach would be successful in plants. Since measurements of individual plants can be highly variable, the scientists developed a method that enabled them to combine the advantages of a GWA study with additional statistical analysis techniques. To test their idea, they investigated whether their combination of approaches could accurately detect genes involved in plant height, a trait that has been extensively studied in the scientific literature. The scientists planted four fields of an early variety of white maize (white corn) and measured the height of the plants. They identified three genes, from the potential 39,000 genes in the maize genome, which were controlling plant height. The effects of all three of these genes were supported by previous studies on other maize varieties. This showed that their method had worked.

"Scientists usually have to measure huge numbers of genetically identical plants in order to have a powerful enough study for finding genes", says Professor Timothy Beissinger, head of the Division of Plant Breeding Methodology at the University of Goettingen, "but we used a diverse maize population and showed that our approach was powerful without relying on identical plants at all". Abiskar Gyawali, a University of Missouri (USA) PhD student who is the first author, went on to say, "This is great news for researchers interested in finding genes in crops where inbred lines are not available or are time-consuming to produce".

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Beissinger stated, "The exciting thing is that this study reveals the potential for our method to enable research in other food crops where research funding is not as high. Due to industry and government support, resources are already available to do large-scale studies in maize. But for scientists studying the countless vegetables, fruits, and grains that many communities rely on, funding for massive studies simply isn't possible. This is a breakthrough which will enable cheap and quick identification of trait-gene associations to advance nutrition and sustainability in food crops world-wide."

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