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Keeping Your Vegetable Garden in Shape in the Offseason

BY CHRISTOPHER ENROTH

Humans aren't the only ones who can get out of shape in winter. Once it is not in production, your vegetable garden needs some attention in autumn to build soil and control weeds over the winter months. The following techniques are used by professional gardeners and growers to keep their vegetable beds in shape and prepared for the next growing season.

Mulch – "Apply mulch" is a common piece of advice during the growing season, but it's also beneficial to cover a fallow garden bed with an organic mulch. Organic mulches break down over time, adding organic matter to the soil. Organic matter builds healthy soil by feeding soil microorganisms and improving soil tilth.

These are recommended types of mulch:

 Shredded leaves. An often-overlooked resource in the landscape, fall leaves can be quite beneficial as a mulch.
Shred the leaves before applying to increase the surface area, giving more opportunity for decay microorganisms to munch away. Smaller leaf particles are also less prone to catch a breeze and blow away.

Arborist wood chips. Another underutilized but useful resource, arborist wood chips can provide an adequate winter mulch. Due to their woody structure, wood chips will take longer to decompose, and they can harbor pests, such as snails and squash bugs, during the growing season. It is best to incorporate wood chips into the soil to speed up their decomposition.

 Compost. Recommended for nearly every gardening situation, compost is decomposed organic materials (landscape wastes like leaves and wood chips). You can also find composted manures and composts made from various byproducts such as composted food scraps or sewage.

One mulch to avoid is grass clippings gathered from a yard treated with pesticides. Many lawn herbicides can carry over to the garden, stunting or killing crops.

Tarps – Using tarps to cover a garden bed is a great strategy to hold soil and keep weeds down. A black tarp warms the surface of the ground. This encourages weed seeds to germinate, but the seedlings die from lack of light. This technique creates a stale seedbed. Don't till in the spring after you remove the tarp because you will bring viable weed seeds to the surface. Instead, till and prep beds in the fall; then in spring, lightly cultivate the top half-inch of soil if you are direct-seeding crops to give good seed-to-soil contact. Transplants can be planted directly into a stale seedbed.

Many gardeners and growers use silage tarps, found at most farm stores. Please note: Clear plastic tarps do not work well as a winter soil cover.

Cover Crops – Once thought of as solely an agricultural application, cover crops have become very popular in home gardens. There are many different cover crop mixtures, but most can be categorized as spring or fall mixes. Fall cover crops are planted late in the growing season, typically when summer crops are pulled out of the garden. Most of those germinate and grow in the autumn and then winter-kill, leaving behind a residual mulch that helps to protect and build up garden soil. Some species mixed into fall cover crop mixtures will survive till spring; you will need to kill those before you plant.

Before you check out of the garden this fall, consider mulching, covering, or cover cropping to boost your garden's fitness level for the spring to come.



The remains of a fall cover crop in the spring. The mixture of annual grasses and legumes winter-killed, leaving behind a residue mulch keeping down weeds and building soil structure.

Making Your Own Tissue Culture Medium

BY BRUCE BLACK

Plant propagation is the process of using existing plants to make new plants. Many gardeners are familiar with some types of propagation, especially dividing plants and putting leaves in water and soil. Tissue culture, also called micropropagation, is a form unfamiliar to many.

In tissue culture, you make new plants "in vitro," on a nutrient medium under sterile conditions. Leaves, stems, buds, seeds, roots, and even as little as a few cells can develop into a full clone of the mother plant. Orchids are a common plant used for tissue culture. Sterile conditions are important because fungi can grow on the nutrient media. This is often a problem with doing tissue culture at home, but sterilizing the plant material and tools and not breathing on the sterile medium can reduce the chance of fungal growth.

In 1985, two plant propagators debuted a recipe for home tissue culture medium (Table 1). Their recipe enables hobbyists and gardeners to do tissue culture using ingredients they are likely to have at home. In addition to the ingredients outlined in the table, the following supplies are needed for making medium at home:

- · bleach
- · aluminum foil
- · rubbing alcohol
- · clean, empty spray bottle
- · clean glass jars with lids
- · saucepan
- · pressure cooker
- · pressure-safe glass containers
- · anti-germ face mask

Table 1. Recipe for home tissue culture medium

Ingredient	Amount ¹
Sugar	1/8 cup
Tap water	1 cup
All-purpose soluble fertilizer	1 cup of stock solution ²
Inositol tablet (250 mg) ³	½ tablet, crushed
Vitamin tablet with thiamine	¼ tablet, crushed
Agar flakes	2 tablespoons

Table modified from Home Propagation Techniques, North Dakota State University Extension Service, 2010 (go.illinois.edu/homepropagation).

¹This mixture makes 1 pint of medium.

² Prepare the fertilizer stock solution by mixing ¼ tablespoon of a balanced, water-soluble fertilizer, such as 10-10-10, in a gallon of water.

³Inositol is sometimes sold as myo-inositol.

Start by washing all the glassware with a 10% bleach solution, and prepare pieces of aluminum foil a few inches bigger than your glass jars and containers. To make the medium, combine the ingredients specified in Table 1 in a saucepan; bring to a boil for 2 to 5 minutes, until the agar is dissolved. While the medium is boiling, sterilize the pressure-safe glass containers and aluminum foil by spraying them with rubbing alcohol, allowing the alcohol to evaporate. Once the agar in the medium has dissolved, pour the medium into the glass containers and cover them with foil, crimping to seal around the top of the container. Also, prepare a jar with tap water (to be sterilized for later use cleaning plant pieces), and cover it with foil in the same manner.

To sterilize the medium, place the glass containers in a water bath in a pressure cooker at 15 psi for 15 minutes. Simultaneously, clean your work area with a 10% bleach solution and spray the jars and lids with rubbing alcohol to disinfect, again allowing the alcohol to evaporate. When the medium has spent 15 minutes in the pressure cooker, carefully release the pressure and use a heat-resistant pad to remove the jars, allowing medium to cool slightly. Put on your face mask and pour the sterile medium into jars to a depth of 1/4 to 1/3 full; put the lids on the jars and place them in the refrigerator until use (at least overnight). Also, put the now sterile water in the fridge until you use it to clean your plant material before placing it on your medium.



Home tissue culture medium in baby food jars. (Left) Medium that has set up; (right) freshly poured, darker medium.

Whether you buy growing medium or make your own, give tissue culture a try if you are looking for a new and interesting challenge in your gardening that can also be done indoors this winter.

Watch for my winter *Gardener's Corner* article, a follow-up that will explain how to clean and grow plants on tissue culture medium. For more information until then, visit *Home Propagation Techniques* from North Dakota State University Extension Service (go.illinois.edu/homepropagation).

Soil Testing: A Key to Good Gardening

BY JENNIFER FISHBURN

The most important test a smart gardener can take is a soil test, which is used to determine the level of nutrients in the soil and the soil's pH. A soil test can reveal why some plants aren't growing well in a particular area.

it is recommended that soil be tested every three years because soil nutrient levels can change. Soil sampling can be done any time of the year, but the ideal time is late summer to early fall, when the garden season has ended. It is desirable to take samples before soil temperatures drop below 50 °F. Be sure to wait 6 to 8 weeks before testing a recently fertilized area.

The pH value is the measure of acidity or alkalinity of the soil. The pH scale ranges from 0 to 14, with 7 being neutral. Numbers less than 7 are considered acid; numbers greater than 7 are alkaline. Soil pH directly affects the availability of nutrients. Most soil nutrients are readily available when soil pH is at 6.0 to 7.5. When the pH rises above this value, nutrient elements including phosphorous, iron, manganese, copper, and zinc become less available to plants.

Not all plants perform well in the same soil pH ranges; blueberries and rhododendrons, for example, need a soil that is acidic, with a pH of 4.5 to 5.5. Soil pH values above or below the optimal range may result in plant symptoms of nutrient deficiencies.

Soil test results are only as good as the sample provided to the testing lab. The guidelines here will help ensure you get good results.

Divide your property into sections according to use and soil type – vegetable gardens, flower gardens, lawn – and submit a sample for each area.

Use a clean soil probe, spade, hand trowel, or shovel to collect samples. Avoid using brass, bronze, or galvanized tools because they can contaminate samples.

A soil sample must be representative of the area being tested, so a soil sample is a composite of numerous subsamples. Collect at least eight subsamples from a 100-square-foot area, randomly selecting and evenly spacing your subsamples. When testing under a tree, take sub-samples starting at the trunk out to the outer edges of the branches.

Soil sampling depths depend on what plants are growing in that location. Recommended depths are 4 in. for established lawns, 6 to 8 in. for vegetable and flower gardens, and 6 to 12 in. around trees and shrubs.

If using a shovel, spade, or hand trowel, dig a hole and set that soil aside. Then cut a slice of soil ½- to 1-inch wide from one side of the hole. Remove any leaves, roots, thatch, and debris, and place the slice in a clean, plastic container. A soil probe can be pushed into the soil to the desired depth; pull out the core sample and place it in a clean container.

Repeat this process within the sampling area and mix the subsamples. For each area, spread the combined sample on a clean paper and allow the soil to air-dry. Place about 2 cups of thoroughly mixed soil in a paper sack or plastic bag, and seal the bag shut.

Label each sample with a description of the area it was taken from (lawn, vegetable garden, flower garden, rose garden, fruits, pin oak tree, etc.). If the soil is from a bare area, indicate what will be grown there. Include your name and address inside the mailing carton.

Put samples in a sturdy box and mail to a soil testing lab. (For a list of labs in Illinois, visit extension.illinois.edu/soiltest.) Within two weeks, you should receive results indicating the amounts and types of fertilizer or other soil amendments to apply to your soil.

While soil test results provide a great deal of information, a standard soil test will not identify poor soil drainage, soil compaction, overwatering or underwatering, or environmental disorders. However, you can make a good start on improving your landscape conditions by doing careful soil testing and heeding the results.



Garden Preparations for Winter

BY ANDREW HOLSINGER

Preparing your garden and lawn for winter may add some splendor to the landscape. Plants respond to their environment, so before the mercury drops, be mindful of tasks that can keep your plants looking great throughout the year.

Addressing any foliage disease issues that occurred during the growing season with good sanitation practices is beneficial. Remove fallen infected leaves to reduce further infections next year. If you've had disease or insect problems, cut back herbaceous (nonwoody) perennials to reduce the risk that diseases will spread or insects overwinter.

If you haven't had such issues, you can leave those perennials intact and enjoy the dried blossoms and seedheads on plants like purple coneflower and black-eyed Susan. Ornamental grasses may be left uncut until spring to add winter interest to your landscape.

Mulch is a great tool to moderate winter temperatures and prevent frost heaving or heaving of plants from the soil as the result of winter's freeze/thaw cycles. Using shredded leaves as a mulch for woody perennials will help protect them from winter weather. For mulching strawberries, straw or pine needles are preferred. Remove leaves from the lawn to help prevent matted leaves from smothering the turf.

Trees and shrubs are susceptible to winter temperatures according to their hardiness. For marginally hardy plants, planting in more protected areas can be helpful to their survival in more severe winters. Before you plant, investigate the hardiness of the tree or shrub you are considering.

In planting near a road or sidewalk, consider a plant's salt tolerance. Protective screens can help reduce salt spray from streets or block winter winds that can cause desiccation (drying out) of plant tissues. Broadleaved evergreen plants tend to dry out in the winter because their leaves transpire and lose water; if the ground is frozen, they cannot take up water to replenish their supply. To add to the moisture reserves of shrubs and trees, be sure to water them in the fall as needed.

Animal damage is common during the winter. Installing protective barriers can help prevent damage from deer and rabbits. Voles also cause damage that sometimes goes undetected in the winter.

Insects looking for a winter home may choose yours if your windows are not properly sealed. Avoid this by caulking around window and door frames and any other cracks or crevices where insects may gain entrance. A vacuum is valuable for removing any insects you do find inside.

Knowing when the first fall frost usually happens in your area can help you reserve some dates on your calendar to clean up your garden and ready it for winter. Taking the time will yield valuable rewards.



This vole damage discovered in a lawn in spring shows how damage can happen underneath the snow. Keep snowfall in your area in mind in determining the height of a protective fence around woody plants; snow cover can raise animals' access to your plants.



Needled evergreens like this false cypress often experience winter drying that needs attention in spring.



Tulips: Worth More than Gold!

BY MARTHA A. SMITH

The history of the tulip is really fascinating. Have you heard of Tulipmania? This phenomenon occurred four centuries ago (during the 1620s), when tulip bulbs were sold for incredible prices and fortunes were made – and lost – overnight through speculation in bulbs. It was reported that tulips were worth more than gold!

The tulip was originally a wildflower growing in central Asia. It was first cultivated by the Turks as early as 1000 AD. The Dutch history of tulips didn't begin until 1593, when botanist Carolus Clusius discovered the flowers growing in Vienna, Austria, and began cultivating them in the Netherlands. According to lore, a group of Dutchmen stole a portion of Clusius's collection and cultivated seed for sale.

Initially the tulip was a rarity only the very wealthy could afford. In 1624 the price of one Rembrandt-type bulb reached 10 times the annual income of a skilled craftsman, or the price of a large house.

Fortunately for us, today's cost of tulip bulbs is nowhere near the price of gold. Most of us can readily purchase tulips and other spring-blooming bulbs to plant in our gardens in October. To ensure a long show of color, select a variety of bulbs – early-, mid-, and late-season. Also look for those that are known to be true perennializers, which means a greater chance that they will come back each year.

Early bloomers tend to be shorter and do best in the front of the garden or other spots where they can be seen. When these beauties bloom, we are still in our late-winter hibernation and not frequently outdoors, so plant them in a highly visible area, such as one viewed from a window or along a walk or driveway. Early bloomers have two advantages over later blooming tulips. Because they bloom when temperatures are cooler, the blooms last longer, and by the time you are out working in your garden the foliage has died back. (Tulips need about 6 weeks for foliage to die back, so the foliage from early bloomers will be gone by the time you want to get in the garden.) Species tulips generally are 6 to 10 inches tall, with early- to mid-season flowers that open wider than the later blooming Darwin types. Some offer a double show, such as *T. clusiana var. chrycantha*. When chrycantha petals are closed you see the bright red exterior, but when they open you see the clear sunny yellow interior.

Tulips listed as mid-season will bloom as the days are warming up. Triumph Tulips, used mainly for forcing, are the largest group of tulips blooming mid-spring in USDA zones 3 to 8. Very showy, with clear colors, many are not reliably perennial. Darwin hybrid tulips are best for perennializing (returning every year). Mid-season bloomers generally average 18 to 22 inches tall. A mass planting of Darwin tulips is truly an impressive site. Plant these in the middle to the back of the border to allow the foliage to die back unnoticed. 'Apeldoorn'(red), 'Golden Apeldoorn' (yellow), and 'Blushing Apeldoorn' (twotoned red and yellow) combine very well. Or simply select one color, such as 'Pink Impression,' and plant en masse.

Late-season choices offer a wide variety of both single and double tulips. Double bloomers, with multiple layers of flower petals, are also called rose or peony-type. Be aware that by planting tulips that bloom late in spring, you risk a shorter flower display if summer heat arrives early. 'Angelique' is a beautiful, pale lilac-pink mixed with streaks of white and cream. It is a fragrant and popular choice but is not a dependable perennial. If you simply must have 'Angelique,' treat it like an annual. Don't bother waiting for the foliage to die back – simply cut the plant to the ground after it is done blooming and replant next fall. To ensure bulbs that will come back, select varieties known to perennialize.

Check out your favorite spring bulb website or catalogue. If you pay attention to time of bloom, you will create a long season of tulip blossoms – once valued more than gold!





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Consider Edibles for Fall Container Gardens

BY CANDICE HART

Summer is such a busy time for gardeners that many of us fail to think about what we could plant to have a fall vegetable garden harvest or to provide color to our fall landscapes. By growing colorful fall vegetable transplants in containers, you can achieve both. Think about refreshing your tired summer annual containers by swapping them out with colorful edibles.

Vegetables and flowering annuals are grouped into categories based on how much cold they can tolerate. When you are thinking of a fall garden, the plants to consider are those listed as very hardy or frost tolerant. Started in mid- to late summer, these crops will be able to survive the coming colder temperatures, allowing enough time for vegetables to mature and be harvested.

Here are a few great cool-season vegetables to take your fall containers to the next level by adding great ornamental features as well as great taste:

• Kale. A hearty and great-looking green, kale thrives in fall's cooler climate. Select several different varieties, like Lacinato, Red Russian, and Curly Leaf, to add texture and interest to your containers.

• Swiss chard. This salad-garden favorite develops beautiful pink, red, yellow, white, or orange full stems; their being edible is a bonus. Swiss chard, which grows 12 to 18 inches tall, is an excellent choice to add a bit of height to your fall container. You can harvest its delicious dark green, crinkled leaves at any time for salads or cooking.

• Beets. Beets work well in combination with many other greens in a container. You may have planted seeds as an early spring crop, but plant again in midsummer to harvest beets in fall. Don't forget that beet leaves (greens) are edible, like chard; they are different varieties or selections of the same plant species.

• **Bok choy.** Try something you have may have never grown before, like the Chinese vegetable bok choy. Start directly from seed in a container, or start transplants ahead of time. Plants take less than 60 days to mature; they are great sautéed.

• Nasturtiums. Nasturtiums have both flowers and leaves that are edible and make a tasty, peppery addition to salads. They are easy to grow from seed or purchased transplants, and their brilliant colors and low-growing habit make them a perfect choice for around the edge of a container. Nasturtiums have interesting, scalloped, sometimes variegated foliage, too, and their habit can be trailing or mounding.

For even more color this fall, add other ornamental and edible cool-season flowers, like pansies, to your containers.

U of I Extension has many resources available for vegetable gardeners on our various vegetable gardening websites. Here is a place to start: web. extension.illinois.edu/vegguide.

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