

# Green Thumb Prints

Chatham County Center  
North Carolina Cooperative Extension Service  
45 South Street Post Office Box 279  
Pittsboro, NC 27312  
Telephone: 919-542-8202  
Fax: 919-542-8246  
Website: <http://chatham.ces.ncsu.edu>

Editor: Al Cooke, Extension Agent, Agriculture  
Layout: Susan Graham, Adm. Secretary

A quarterly newsletter about Home Horticulture

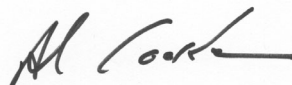
Spring, 2008

## Getting the Most Out of Drought Tolerant Plants

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I hope you find this newsletter helpful and informative. Please share your newsletter with your friends and have them contact us if they would like to be placed on our mailing list.



Al Cooke  
Extension Agent  
Agriculture  
919-542-8202  
[al\\_cooke@ncsu.edu](mailto:al_cooke@ncsu.edu)

A summer of heat and drought, of stressed plants and stressed gardeners, gradually gave way to autumn. With the change of season and moderation of temperatures, the amounts of water have diminished. Gardeners have lawns and plants. Landscapers have had reduced work; employees have been laid off. Nurseries, greenhouses, and garden centers have seen sales almost cease. Cattlemen were feeding hay they had planned to get them through the winter and started selling off herds before summer's end.

At the Siler City airport weather station, total rainfall for 2007 was 25.3 inches, little better than half the annual average. Total rain from April through September was just less than 9 inches. In August the daily high temperature averaged 95 °F. Oh, the misery!

It's still too early to fully appreciate the cost. It is quite likely that large trees that survived the summer have lost roots and will spend years declining before finally dying. It often takes me a long time to convince someone that a dying tree has been in decline for a number of years. But large trees can live a number of years on stored energy. They may not have the capacity to grow sufficient new roots to replace that energy.

These are unfortunate circumstances. And there will be opportunities. There will be plants to replace, beds to redesign, lawns to renovate, work for landscapers, and sales for nurseries.

So it's not surprising that I've gotten many requests for lists of drought tolerant plants. We've got them and I'll share them with you – vines, ground covers, trees, shrubs, annuals, perennials. I also get calls for lists of native plants or deer resistant plants or plants for this and that. I've got a number of lists linked from my Home Horticulture website, <http://www.ces.ncsu.edu/chatham/ag/homehort/homehort.html>

But the point I want to make is that you can't put the entire burden on the plants. There is no plant that is native to a site that has been a construction site. Plants are removed; soil is pushed around and compacted; building materials

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## Getting the Most Out of Drought Tolerant Plants

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are piled, spilled, moved; and a house is put in place. The site is no longer native and no plant is native to the site.

Likewise, no matter what the plant, when it comes out of the container, it is not drought tolerant. If you give it reasonable care for a couple of years, it may be. OK, there are one or two that you can remove from the container and drop on the ground that will look alright periodically assuming it's not too long between dropping them on the ground and the next rainfall.

A key part of the statement above is that it "will look alright." What may be "alright" is not always acceptable for landscape standards. There are differences in survival and performance. Performance is what we seek when we select plants for flowers, berries, trunk shape, bark color, evergreen foliage, or any of the reasons we find a plant attractive. A plant may survive and never actually produce that abundance of color or fragrance that we expected because we failed to make sure it had everything it needed.

Last fall I taught a class on landscaping for drought and one on landscaping with native plants. In both cases I made the same points that there is more involved than plant selection. So it's a good thing to select plants according to the local conditions. But that is not the end of the story. Among the important ingredients involved in landscape planting are site analysis, design, plant selection, soil preparation, careful planting, efficient irrigation, mulch, and maintenance.

### Site Analysis

Will the soil support root growth? Will it drain? Will it require tillage? Will it be able to retain and supply plant nutrients? Will you need to apply lime? Does the site face north, south, east, or west and how will that affect the microclimate on the site? Is

air movement sufficient to reduce plant disease problems? Are there heat retaining hard surfaces such as walks, walls, or fences that could affect the microclimate? Are there trees, utilities, or other restrictions overhead or underground that you'll have to adapt for? Before you plant look up, look down, look all around.

### Design

Design is largely opinion. But how you plan to use the property will affect how you arrange things. The outdoor landscape can be thought as functioning like rooms. Just as the expensive furniture goes in the "living room" rather than the utility room, plants may need to be chosen based on things like traffic flow and how you expect to use the space. Don't put your favorite shrubs near the area where boys play ball.

Designers also consider plant water needs in plant arrangements. You can create some outstanding displays that might require frequent watering, but limit them to small areas where the impact is great and so that you are watering only a small portion of the total. Such plantings might be around the front entry or the patio. Beyond that you can move into plants that require water only occasionally or under extreme circumstances. Beyond that you move into a "natural area" that should seldom if ever need supplemental water. Think in terms of water use zones. Think of a colorful island fading into a sea of green foliage plants.

### Plant Selection

While most people start looking for things like flowers, fragrance, fruit, attractive bark, or fall color, those are good choices only if the plant thrives. Survival and performance will depend more on things like sensitivity to sun and shade. It's good if the plant is drought tolerant. But in our area it will often also need to tolerate saturated soils occasionally. We use zone maps to predict a plant's cold tolerance. But it

will likely need to tolerate several months of heat. Some plants will bloom after the first warm days of winter well before our last cold days have passed. That may lead to frozen flowers rather than stunning displays.

Most plants have a track record of predictable insect and/or disease problems. Plants that do quite well in dry climates may suffer serious disease problem in our humid summers or wet winters. And if you've ever experienced pruning plants that were "overgrown," then you can appreciate the

value of knowing how large a plant may get and how quickly. Remember that some plants may be wider than tall. In any case, give them enough room and you won't have to spend your entire lifetime pruning.

If you need answers to these questions, you can find a lot of them at [www.ncstate-plants.net](http://www.ncstate-plants.net).

### Soil preparation

If it's difficult for you to get into the soil with a shovel or even a pick, imagine trying to grow roots there. In this case you will have to apply some combination of time, energy, and/or money to get that soil loosened sufficiently to allow good plant growth. You may or may not need lime and/or phosphorous; both of those need to be tilled into the soil for best results. The soil may have other nutrient deficiencies that can only be determined by lab analysis.

I spent 3 pages on "Building Soil" in this newsletter in fall 2005:

<http://www.ces.ncsu.edu/chatham/newsletters/homehort/2005/GTPFall2005.pdf>

And I addressed soil fertility in spring 2006:

<http://www.ces.ncsu.edu/chatham/newsletters/homehort/2006/GTPSpring2006.html>

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And the question of lime was there in summer 2006:

<http://www.ces.ncsu.edu/chatham/newsletters/homehort/2006/GTPSummer2006.html>

Please refer to those to learn more about these topics. For now, let me just suggest that if there is only one thing you can do to your soil before you plant, make sure it's cultivated. Whether you have a tractor or tiller or if you have to dig by hand (oh, no!), it needs to be done before you plant. If it's too big or you lack the combination of time, energy, and/or money, then choose one small area that you can deal with. Set yourself up to succeed. Choose a small area and spend an hour working to loosen the soil.

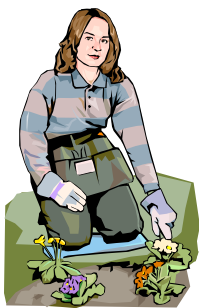
The soil will function as a reservoir for water, oxygen, and plant nutrients. To fill that function requires that roots grow readily through the soil. The more tightly compacted it is, the more difficult it is for those roots to grow. Loosen the soil.

### Careful planting

Since you know how large the plant will get, give it all the room it needs. It will prevent the plant from getting "overgrown" in a few years and save you a lot of pruning. With the soil now well prepared, dig a hole no deeper than the depth of the plant's roots. Re-loosen the soil to a width 3 times that of the root ball. Loosen the growing media around the base of the plant to find the point where roots begin. This point may be beneath the growing media. The plant can tolerate this condition in a well aerated nursery mix. But once the plant goes into soil, that point where roots and stems meet, the crown, must be no deeper than the surrounding soil.

Most people won't do it but there's nothing wrong with removing all the media and putting the roots in new soil. At an absolute minimum, be sure the crown of the plant is above the grade of the surrounding soil. Be sure the soil beneath the plant is firm so that it doesn't settle.

What goes back in the hole is the same as what came out. Many people want to fill the hole with a lot of rich material as if the roots are going to spend the rest of their lives in that hole. It is our hope that the roots will grow out into the surrounding soil. If you create an interface where one medium meets another, what happens there may be difficult to predict. But water may move readily from one medium to the other. In that case your plant may be always too wet or too dry. Any amendment to the soil should be done before you dig the hole. Your objective is a uniform growing medium where water movement is more predictable and roots can forage for what they need.



Once you have made sure that the plant is on a firm foundation and you have back filled the soil into the hole, finish up by making a small dike or water ring around the plant. Then bring in a water hose and slowly flood the hole. As you water, the soil around the plant will likely settle as air pockets are filled in. You may need to move more soil around the root ball. The water ring will help to hold water so that everything settles into place. The plant is well watered and the soil will settle comfortably around the roots.

### Mulch

Mulch reduces water loss to evaporation, reduces problems with soil borne plant diseases, moderates extremes of hot and cold in the root zone, and reduces competition from weeds. It also restricts a leading cause of plant problems – mowers and weed trimmers damaging the bark.

Do not pile mulch around the trunk. Spread mulch over the roots to a depth of 2-3 inches (4-6 inches for pine needles). Use no more than a top dressing for appearance around the base of the plants. We do not need to retain moisture around the trunk. It's more likely to set up disease problems.

If you would like to know more about the various types of mulch, see the spring 2007 edition of this newsletter: <http://chatham.ces.ncsu.edu/files/library/19/GTPSpring2007web.pdf>

For plant health all mulches have advantages and disadvantages. In almost all cases any mulch is better than none.

### Efficient Irrigation

Early after planting, the plant may need to be watered often. Just remember that water needs change with the weather and with the plant's growth. Plants use much less water in winter than in summer. Plants will use more water while in active growth in the spring than at the end of the season when they are going dormant. As plants get larger they need more water than when they were small. But even during winter, especially in sun and/or wind, evergreen plants may need to have water available.

In the first year or two after planting, the plant will need more help from you than it will later. This is part of the establishment process. To help the plant through the establishment process, you should pay attention to it on a regular basis. You may need to get your fingers into the soil to feel for moisture. Remember to check where the roots are; soil around the roots may be drier than soil farther away.

Apply water to the depth of the roots. Usually 6 to 8 inches deep is sufficient and that's the same as about an inch of rainfall or irrigation in most of our soils. Do not water again until the plant shows signs of water need. Avoid frequent, shallow watering. It promotes shallow rooting, leads to

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rapid soil drying, and increases plant stress. Frequent shallow watering is bad for plants except in the establishment period.

As you move through the establishment time, the first growing season may require regular irrigation. By the second season, you should notice that the plant can go for longer periods without your help. Many, perhaps most established plants should not need regular irrigation. Frequent irrigation encourages the plants to invest growth near the surface where drying occurs most quickly. By allowing the surface to dry out between water applications, you “teach” the plant that it will need roots down deeper in the soil.

I took some pictures of some plants at home last September. Remember how hot and dry it was? On the day I took the pictures, the average for the day was 80° F. It reached a high of 97° that day and had been 90° or above every day for a week. Our entire region was classified as experiencing extreme drought. We had been classified from abnormally dry to various stages of drought since May.

I took pictures of some plants that had been tolerating these conditions all summer – ferns, Hosta, Solomon’s seal, Nandina, redbud, and a Camellia. These plants were not watered all summer. They looked not great but not bad. Not only had these plants not been watered all summer, they have never been irrigated. Never. They were watered in when they were planted and have thrived on rain and neglect since then. For a look at these pictures go to <http://www.ces.ncsu.edu/chatham/ag/drtsurv.html>.

These plants didn’t need regular irrigation because they never got accustomed to it. It’s the way we used to

grow plants half a century ago before we had irrigation.

### Management

Plants have varying needs for attention from the gardener. While you may have selected a plant for a pleasing shape, they don’t always grow a landscape shape on their own. Nursery growers and landscapers select plants that have naturally pleasing shapes. Then they enhance that shape by routine pruning. Early in a plant’s life, judicious, selective pruning should be used to shape it and develop the form you expected; it probably won’t do that by itself. After a few years, you should not need to spend your summers hauling away plant debris if you have matched the plant to the site and managed it carefully along the way.

Plants differ in their needs for fertilizer and the times that they can use it. Fertilizer must be dissolved in water for plants to use it. If water is limited or not available then fertilizing serves little purpose for the plant. In fact, since fertilizer has such a strong affinity for water, it can cause soil to dry more rapidly. “Fertilizer burn” occurs when there is more fertilizer than soil moisture can accommodate. Water may then actually move “backwards” out of a plant into the soil. The result is leaves that look scorched. So we do not want to fertilize plants when water is not available.

Pruning can stimulate new growth. New growth, before the leaves are “hardened,” uses more water in two ways. The tender foliage allows water to transpire more readily. And water is required for new growth to occur. So if you are accustomed to shearing plants throughout the summer, you should tolerate a little more ragged appearance during a drought. And during a drought is not a good time to do major pruning to renovate large plants.

The discussion of fertilizer and pruning basically amount to one principle: during a drought, don’t do anything to

encourage excessive growth.

**Plant selection** can be as simple as seeing something at a garden center that we like. During adverse conditions such as drought we tend to ask if that plant is drought tolerant to enhance its survival. But there are many other things we can do to improve the odds. We don’t want to put the entire burden on the plant.

For an extensive selection of drought tolerant plants, visit the website at [http://www.bae.ncsu.edu/bae/programs/extension/publicat/wqwm/ag508\\_3/](http://www.bae.ncsu.edu/bae/programs/extension/publicat/wqwm/ag508_3/)

## So You Want to Grow Some Vegetables?

So you want to grow some vegetables? You can. You can get some exercise and put some food on the table. And you’ll know where that food came from and what went into producing it. I don’t promise that you’ll save money. But you may have fun.

It always helps to have a plan. A plan will include selecting an appropriate site, soil, preparation, sketching a layout of what goes where and when, what you’ll do with the harvest, and how to end the season.

### Site selection

An absolute essential that your garden site must provide is sunlight. All of the ingredients that go into a tomato, ear of corn, or head of broccoli begin with photosynthesis. Photosynthesis is that process by which solar energy is converted to food. It is the basis for life as we know it on this planet. If you don’t have full sun, all day long, then you should adjust your expectations. If your site receives less than six hours of full sun, I would suggest

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## So You Want to Grow Some Vegetables?

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planting only leaf crops such as lettuce or spinach. You may be able to grow other things but you're not setting yourself up for optimum results.

Many of us also find that the closer the garden is to the house, the more likely we are to be successful. If it isn't easy, we are less likely to notice insects or diseases, less likely to pull weeds, and less likely to harvest produce at the optimal time.

Good air movement will be important to reduce incidence of disease problems. Proper spacing between plants will help air movement. You'll also want to avoid the "frost pocket" where cool air settles overnight. Moving from a low area to a higher one may allow you to plant two weeks earlier or extend harvest weeks later in the fall.

It's also a good idea to have your garden close to a source of water. Most vegetables are more than 90% water and require a dependable supply. In some years you may produce without irrigation; in some years you won't.

### Soil Preparation

Most garden vegetables are herbaceous annual plants that need to do all their growth in a brief period of time. Having the soil prepared in advance allows you to take advantage of optimal planting dates and favorable weather. Soil should be well cultivated and loosened. If you haven't taken a soil sample yet, it may be too late to know what to do for early plantings. If you need lime or phosphorous, they should be tilled in prior to planting. You may not need them. Your soil sample is the only way to know how to prepare your soil fertility properly.

### Layout

Draw a sketch of your garden plot with an arrow indicating north. Plan for rows to run north-south for best sun exposure. Place taller crops such as corn or pole beans so that they don't shade smaller plants. If you are planning for perennial crops such as asparagus or blackberries, put them on one side (out of the way of rotation).

Plot in where you plan to grow specific crops. Note the planting date and what will go in that space next. Most fall crops will be planted about July to August.

This plan doesn't have to be a limitation. It is a planning instrument that you can work with. But hang onto it. Next year it will help you in planning your crop rotation. No matter how large or small your garden, plant rotation is the oldest and one of the most effective strategies available for control of plant diseases. See plant rotation by Vegetable Plant Families on the back page.

### Planting

Many garden vegetables can be planted directly from seed. Others benefit from being seeded indoors and transplanted into the garden. Seed must be planted at an appropriate depth and with adequate spacing.



Some seed are "sown" densely with the intention that they will later be thinned. Don't skip the thinning. Optimal spacing is based on getting the most from limited resources. You don't necessarily get more by planting more plants in

the same space.

Transplants should be gradually "hardened" by moving them outdoors to a protected location for a day or two. Try to transplant on a cloudy day or late in the afternoon to reduce transplant stress from long exposure to heat or wind. If necessary to plant on a hot sunny day, think of ways to provide light shade for a day or two.

Plants should be well watered before transplanting to reduce dehydration. Water again after planting to insure good soil to root contact. Once seeds absorb moisture, they require a dependable moisture source.

A seedling with limited roots can quickly exhaust available water resources. Whether it's a seedling or transplant, you may need to provide frequent attention until the plants are established.

### Harvest

Every vegetable has some point at which quality is considered optimal for use. After that, quality usually begins to decline. Bigger is not necessarily better. Quality also declines, once produce is harvested. To retain optimal quality, harvest early in the day before produce heats up. Harvest only what you can process. Keep it cool and process promptly.

### End of season

Most gardeners encounter problems throughout the season. There are insects, weeds, diseases. Plants that are infested should be removed and not left in the garden. If they are left, they serve as a source of new infestation next year. Even problems that were small can get very big if you leave them. Weeds should be removed before they go to seed. Allowing them to set seed multiplies the problem for next year.

When the planting is finished, remove it. Clean up the garden. If you're not going to grow vegetables there for a while, plant some cool season cover crop such as wheat or ryegrass to protect your soil.

The end of the season is the beginning point for next year's plan. What worked? What problems did you have? Enough corn? Too much eggplant? You can start making adjustments. In your adjustments, include crop rotation. Next year you should follow plants with something from a different plant family.

North Carolina Cooperative Extension Service  
NC STATE UNIVERSITY  
Chatham County Center  
P.O. Box 279  
Pittsboro, NC 27312-0279

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## Vegetable Plant Families

When possible do not follow any vegetable plant with a plant from the same family. Develop rotations that allow 3-4 seasons between families. Because plant pathogens are not always obvious, they may build to levels insufficient to cause symptoms in a single season. Planting the same or similar host in the same location the next year provides an opportunity for the pathogen to continue increasing to the point of causing serious problems. Plant rotation is among the oldest and most effective strategies for reducing plant disease problems.

**Composite family:** artichokes, chicory, endive, escarole, lettuce, salsify

**Goosefoot family:** beets, spinach, Swiss chard

**Gourd family:** cantaloupes, cucumbers, gourds, pumpkins, squash, watermelons

**Grass family:** corn

**Legume family:** beans, southern peas, edible pod peas, peanuts, soybeans

**Lily family:** asparagus, chives, garlic, leeks, onions, shallots

**Mallow family:** okra (also includes cotton)

**Mustard family:** broccoli, Brussels sprouts, cabbage, Chinese cabbage, cauliflower, collards, cress, kale, mustard, bok choy, kohlrabi, radishes, turnips, rutabagas

**Nightshade family:** eggplant, potatoes, peppers, tomatoes (also includes petunia and tobacco)

**Parsley family:** carrots, celery, parsley, parsnips

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