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Green Thumb Prints

A quarterly newsletter about Home Horticulture

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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.



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How to Hire a Landscaper

How do you hire a landscaper? It's probably not terribly different from hiring a painter or carpenter. You may start by asking your friends and family. If that doesn't work, you have to look a little further. Even if friends and family make good recommendations, your tastes and requirements may be individual. Your friends and family may have personalities that get along well with people with whom you are less comfortable.

It is always a good idea to first define what it is you want. Design? Installation? Maintenance? Move or prune a few plants? A complete redesign and overhaul? Some of the things you need may include Design; Grading; Drainage; Erosion Control; Soil amendment; Irrigation; Planting; Lawn sodding or seeding; Hardscape – walks, walls, patios, decks; Nightlighting; Water gardens; Mulch; Maintenance; Pest control; Tree evaluation, pruning, or management; Tree removal; and/or Lawn care – mowing, edging, blowing, fertilizing.

You will make better use of your service provider's time (and your funds) if you think about what you need first. It may be useful to ride around and look for things you like. Ask neighbors who did their work. Good, professional landscapers depend a lot on referrals from satisfied clients.

But eventually you get to screening individual service providers. You will find a lot of variables out there in the world. So let's try to cut through some of the lingo.

Legal requirements:

- Landscape Architect – North Carolina State Law GS 89A requires that anyone using the title Landscape Architect or engaged in the practice of landscape architecture must be a Registered Landscape Architect. This law is a "practice act" regulating the practice of landscape architecture as well as the use of the title. Landscape architects tend to work on a large palette, designing malls and subdivisions for traffic flow, water movement, building placement, and things like that. Many landscape architects never study plant materials – but some do! And some work on much smaller scale. Ask.
- Landscape Contractor – North Carolina State Law GS 89D requires that anyone using the title Landscape Contractor must be registered by the

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Landscape Contractors Registration Board. This law is a "title act" regulating the use of the title only. Anyone who thinks they can do the work can set themselves up in business as a "landscaper," "landscape installer," or "landscape designer." But a Landscape Contractor must pass exams covering soils, grading, plants, and a number of other topics.

- **General Contractor** - For projects including grading, building, public utilities, improvements, or structure with a cost exceeding \$30,000, North Carolina State Law GS 87 requires a General Contractor.
- **Pesticide Applicator** – A pesticide applicator's license is required for any applicator that applies a pesticide to control weeds, insects, plant diseases, or other pest control products for compensation. They may use the same product that you could buy to do it yourself. But if they do it as part of the job, then they must be licensed. That means they pass an exam, pay their fees, and attend recertification training. Even if they "only use ___," (fill in the blank) they must be licensed.

Credentials:

Some landscape professionals also pursue other credentials or certifications. These titles usually indicate some demonstrated knowledge of subject matter sufficient to pass an exam. Some of these include Certified Plant Professionals, Certified Landscape Technicians, Certified Turfgrass Professionals, and Certified Arborists. Each of these certifications is offered by a professional association and has its own requirements.

Many professionals will also be members of one or more organizations. While membership usually only requires paying a fee, it often indicates that the business or individual is a participating member of the profession. It's one of the things professionals do for professional benefits as well as for continuing education opportunities.

Education:

Some high school graduates have received training in horticultural practices sufficient to enter the landscape business. Others pursue college degrees. "Green industry" professionals may have one or more degrees from colleges or universities in crop science, horticulture, arboriculture, environmental science, or related fields. Knowledge of plant science may provide a solid understanding for applying principles of plant management.

Experience:

Many "green industry" practitioners start out with "a pick-up and a mower." In some cases, that is all they have to recommend themselves. However, from just such a start, some of these same individuals have been in business for 10 or 20 years or more and may have learned a lot the hard way.

Everyone has to start somewhere. It is up to the consumer to determine where a potential service provider started and how far he or she has come. No single qualification is the one that makes the difference; none carries a guarantee of satisfaction. Taken together, they all contribute to a professional approach.

The Job Agreement:

The Service Provider may ask what you want. What do you, the potential client, bring to the bargain. Do you have a good idea of what you want? Do you need a design? An installation? Maintenance? All of these? Are there specific plants you

want or don't want? The more you know about what you want, the more likely you are to get it.

A knowledgeable green industry practitioner may be able to help you verbalize your own ideas and visions. He or she may bring into the conversation words and terms that are new to you. But you will make better use of your time as well as the provider's if you think about what you want. Collect pictures of things that you like and ask yourself why you like them. You probably don't want to attempt reproducing a specific picture. But if you know what you like about it, or what you don't like, it may help to provide structure for your objectives.

Write down and share with your landscaper what you want. I once had a client with a large "natural" area. Since trees naturally shed limbs on a regular basis, it did not occur to me that the client wanted those removed frequently from a "natural" area. She did and was quite perturbed that she had to tell me. We obviously (to me) had different perceptions of the concept of "natural" area. Once we understood that, we were able to overcome the misunderstanding. Don't be afraid to ask for the "obvious."

How will the work be done?

A potential area for misunderstanding is how work may be scheduled. Weather is an obvious factor that may affect not only working conditions but also the end result. Soil that is worked when it is very wet or very dry may suffer damage that can take years to overcome. There are optimal times for certain planting activities. You may have to find a balance between your immediate needs and your service provider's professional judgment about the optimal time of year for long-term success. Impatience can impair the results.

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Certain activities are better done in an order for efficiency of cost and labor. If you really need the lawn before your daughter's wedding next week, it can probably be done for a price. If you want the lawn for the long term, it's more practical to install the irrigation system beneath it first, rather than tearing up the lawn to do it later.

Some landscapers will subcontract certain portions of a job. These service providers often find that someone who specializes in irrigation or large tree maintenance may provide you a better result at the same or lesser cost. You may want to know if multiple business operators will be visiting your property.

What will it cost?

One of my college professors liked to ask, "If you can't afford to do it right, how can you afford to do it over?"

Much of the work of landscaping can be done by unskilled labor. But understanding where a plant is likely to survive or not, understanding how to interpret a soil analysis, or understanding how plants can die slowly over time when poorly installed requires professional involvement. Even if the truck only sits at the curb all day long, someone still has to make payments on it. Your service provider should have liability and workmen's compensation insurance. Running a business includes many costs that are not obvious.

I was once asked to help mediate an understanding for a property owners association that was dissatisfied with their service. Before our on-site meeting, I drove through the property and came up with a "windshield estimate" of an annual cost of providing maintenance for the properties – about \$250,000 to \$300,000. During the course of our discussion I learned that the annual maintenance contract was

for \$50,000. Obviously, there was a large discrepancy between what service could be provided and the client's estimate of the value of the service.

The client and the service provider need to get very specific about what will be done and to what standard of excellence.

No matter what the cost, you can get it done cheaper. And if the cheapest possible price is your objective, you can save yourself and the professional a lot of time by stating that up front. Many reputable landscapers pride themselves on not trying to do the cheapest job.

Whatever the cost, if you are paying the bill, you have a right to know what you are paying for. Different companies may itemize that differently.

Some will completely separate materials and labor. Others will offer a price based on a plant in the ground or finished mulching. If you don't like the way the company does business, it's a good idea to abort this agreement before it's agreed.

If you and the service provider have discussed what will be done, how and when it will be done, what it will cost, and how it will be billed and paid, then there should be few unpleasant surprises down the road.

Some Final Thoughts

No garden or landscape is ever finished. The completion of an installation is the beginning of a landscape garden. Plants are living, growing things. The best of designs and installations can quickly "go to seed" without good maintenance. Someone needs to be out there every week monitoring and working. If you don't plan for that, then you will certainly be disappointed. A landscape is not a product; it's an activity.

Many customers want plants guaranteed to live. Life doesn't give us any guarantees. A plant is a living thing that has certain requirements for its life processes to continue. Many of these

cannot be provided in advance. Those who provide the long-term maintenance will provide the best plant guarantee.

They pay attention to plant water needs and adjust the irrigation. They monitor for early signs of disease or insect problems. They prune to shape and direct plant growth. They continue to guarantee that the plant gets what it needs.

You can pay for that service, or you can do it yourself. I don't think it is reasonable to expect every plant that goes in the ground to live for even an entire year. Businesses that offer maintenance contracts may guarantee that plants will survive for a given period. Other businesses will offer only an occasional inspection and perhaps certain suggestions for action. But the long-term success of the landscape depends on the maintenance.

If a plant is dormant when it is planted in fall or winter, then it is reasonable to expect it to break dormancy the following spring. Beyond that, we can all expect to die and all our plants will die – eventually.

A landscape continues to change. As plants grow they create more shade, which changes the environment. Other plants may benefit or suffer as a result. The plant's water needs will change. While an attractive landscape may be a work of art, it is never a finished painting that we expect to be the same forever. It's a living thing.

For more on how to select a landscaper or a tree service and for a list of landscape businesses working in Chatham County, visit our web site at <http://www.ces.ncsu.edu/chatham/ag/homehort/GreenInd/master.html>

Starting Plants from Seeds

If you want to get the jump on the season or if you want transplants that are not available locally, you can grow your own. It's not hard; you just have to pay attention to a few details.

Start with high quality seed from a dependable source. Purchase only as much as you need for one year. Excess can be stored dry and cold (sealed in a refrigerator), but viability may decline over time.

Seeds need specific conditions in order to germinate. These include moisture; a certain temperature range; oxygen; and, for some species, light. All of these will be affected by the growing medium. No specific medium is best for all growers or all conditions. Use what your experience shows will work best for you. In general, the medium should be fine textured and of uniform consistency. It should retain some moisture but also be loose and well aerated. It should be free of insects, disease organisms, weeds, and weed seeds – sterile. Commercial potting media usually contain a mix of fine pinebark, sphagnum peat, and perlite. These usually work fine. Do not use garden soil indoors.

Plastic cell packs can be reused but should be sterilized. You may also use 4" pots, or even things like cottage cheese containers. Just make sure there is adequate drainage from the bottom.

Moisten the growing medium then place it in your container to within 1" of the top. For medium to large seeds, make furrows 1 – 2 inches apart and 1/8" to 1/4" deep. Tap the seed packet to space the seeds uniformly in the rows and cover lightly. Fine seeds can be lightly broadcast on the surface and gently pressed into the medium. These seeds may need light to germinate, so avoid burying them.

If the growing medium was moist before you seeded it, then you can spray the surface with a fine mist or place the containers in a tray that holds about an inch of water. Avoid splashing.

Once the seeds become moistened, the embryo begins to grow inside. It must have a continuous source of moisture for survival. When the seeds are first planted, cover the container with a sheet of plastic wrap to prevent surface drying. Each seed will have an optimum temperature range for germinating. Unless you have other guidelines, aim for about 65° to 75° F. Do not place the tray in direct sun as overheating may occur.

Once the seedlings appear, remove the plastic cover. Keep in bright light and water only as often as needed. If you are using fluorescent lights or "grow lights" keep them no more than 6 inches above the plants for 16 hours daily.

Once the seedlings begin to grow and true leaves are formed, seedlings will need space to develop without interference from their neighbors. If the seedlings are in a community container, use a tool to dig them out and transplant them into an individual container. Punch a hole in the new medium, plant the seedling at the same depth it was growing, firm the medium around the roots, and water gently. Begin fertilizing with a dilute liquid fertilizer.

Before transplanting the plants outdoors, give them a hardening period. Gradually decrease temperature and reduce watering beginning 2 weeks before transplanting out. Place the plants in a protected outdoor area on warm days and gradually increase the time of outdoor exposure.

Optimal days for transplanting will be overcast with little wind. If it's sunny or windy, try to transplant late

in the day and/or provide some short-term protection.

Class: I will conduct a class on Plant Propagation at the Agriculture Building in Pittsboro, May 3, at 6:30 p.m. We will cover propagation by seed as well as cuttings and layering. Complete details and registration form at <http://www.ces.ncsu.edu/chatham/ag/homehort/WinterSpring2006Classes.html> or by calling Susan Graham at 542.8202.



That *&(^# Grass!

Locals have been calling it "bamboogras" for years. Others call it Japanese Stiltgrass and a variety of other things. Botanists call it *Microstegium vimineum*. We addressed this topic at length last spring (<http://www.ces.ncsu.edu/chatham/newsletters/homehort/2005/GTPSpring2005.html>), so here's a quick review.

Microstegium is prevalent along floodplains and stream sides. It is also commonly found at forest edges, open woods, floodplain forests, wetlands, uplands, fields, thickets, clearings, roadsides, trail sides, damp fields, swamps, lawns, ditches, utility corridors, and gardens. It is thought to be established in some of these areas by seed that are transported on human shoes and clothing. It is well adapted to low light conditions surviving in deep shade. It is blamed as a threat to

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That *&(^# Grass!

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native plants and natural habitats in both moist and dry locations. It establishes readily in areas mowed, tilled, or otherwise disturbed.

How can you deal with it?

Manual – Because the plant is shallow-rooted, hand pulling is easy and a good option. By waiting for it to get larger (early- to mid-summer), it's taller and easier to reach. You may be able then to clear large patches quickly. Because hand pulling may disturb the soil, more seed may be brought to the surface to germinate. Late season pulling may reduce the likelihood that these new seedlings will produce seed themselves. If you are hand pulling after July, it is likely that the plants you pull could have viable seed even though they are not obvious. These plants should be bagged and disposed to avoid further seed dispersal.

Mechanical – *Microstegium* can be mowed with a mower, weed trimmer, or scythe. Mowing early in the year may allow re-growth and seeding earlier than would have occurred otherwise. Mowing too late (August) may result in seed dispersal during the mowing process.

Chemical – For extensive infestations, application of a systemic herbicide such as glyphosate (Roundup or other brands) can provide good control. For wetland sites an aquatic formulation of glyphosate is Rodeo. In certain locations, selective grass killing herbicides may be used. Grass specific products include clethodim (Envoy), fenoxaprop (Acclaim Extra), fluazifop-P-butyl (Fusilade, Ornamec), and sethoxydim (Poast, Vantage). Each of these products has site-specific requirements. It is important to read and follow the label precisely to avoid undesirable (sometimes illegal) consequences.

Microstegium has also been controlled through use of the same pre-emergence herbicides that are used to control crabgrass. These products must be used before the seed germinate. Timing has not been established, but blooming of Forsythia has been used as a good reminder. It is probably too late to get much benefit from these products this year.

All of these options have advantages and disadvantages. None of them is a one-size-fits-all proposition. In every case, property owners or managers will need to evaluate the situation and determine an appropriate strategy for both long- and short-term management. It is not likely that this plant will be eradicated from even small areas without human persistence.



Tree Diseases, Treatments, and Prevention

OK, that title is a misnomer. This is not really about tree diseases. It's more about things that cause trees to die. And even though it appears that trees sometimes die quickly, trees do almost nothing quickly. Depending on the age and size of the tree, serious injury to roots may result in death years later.

What I will address in this item is how to avoid/prevent the two most common causes of tree death that I encounter: root damage and trunk damage.

Root damage often begins with clearing a lot for construction. But sometimes it begins with tilling a new spot for a vegetable garden, a flowerbed, or a lawn. It goes with not un-

derstanding where the roots grow. The roots that absorb water and nutrients are in the top 6 – 12 inches of soil, and they often extend as much as twice as far from the trunk as the branches do. Every root is important to the tree.

If you “only cut one root,” that root may be connected to 25% of the microscopic roots that actually absorb what the tree needs. If you would preserve trees, you have to keep the equipment out of the root zone. That would include bull dozers, shovels, tillers, ... in short, fence off an area twice as far from the trunk as the branches reach and keep the heavy equipment off. You can see why it's easier to save the small trees than the large ones.

Trunk damage may be done by the same machine that damages roots. It is also done by mowers and trimmers. If you try to mow or trim right up to the trunk of a tree with a machine, eventually you're going to scrape the bark. That scrape almost always opens up the portion of the trunk where water and nutrients are transported within the tree. That wound will never heal. That wound serves as a point of entry for rotting organisms or boring insects. You can avoid this one by using a combination of mulch and hand tools to keep vegetation from growing around the trunks of trees. Don't pile the mulch around the trunk. In the best world, your mulch will be 2 – 4 inches deep out at the drip line of the tree and taper to nothing at the trunk.

The biggest problems for trees may be humans.



Caution: List too Large for Newsletter

In recent issues of *Green Thumb Prints* we have included lists of plants for various uses. One of the lists frequently requested is one of “native plants.” This term is not well defined. Are we talking about the plants that were here before Europeans or before humans or at some other time? And are we talking about plants native to the continent, the state, or to an even smaller geographic or political entity to which plants pay no attention at all?

The thousands of plants native to North Carolina are included in the *Manual of the Vascular Flora of the Carolinas*, which runs to more than 1100 pages of fine print, diagrams, and maps. The tiny maps indicate counties in which certain plants are found.

From this volume I have selected a small number of the plants that were reported in Chatham County back in the 1950s and ‘60s when the work on this book was done. It was too late to be a good indication of what was native in any historical period other than the 20th century when a lot of exotic species were already present.

But I have narrowed this list down to 361 trees, shrubs, annuals, perennials, mosses, ferns, vines, grasses, and aquatics. It will probably not be satisfactory to anyone including myself – some of my favorite “natives” are not there. Lots of “weeds” are there. There are a number of plants that many of us consider “invasive.” It’s still a big, unwieldy list.

This is purely a book list. I can tell you plants that I see along the roadsides that are not in the book. Either they have been introduced since the book was written or the authors missed them. Either or both are possibilities. Since I am not going to do a complete inventory of the county, I

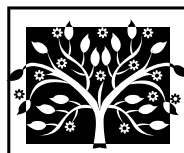
have chosen to include none of those that are not in the book. Lists by their nature are selected or exhaustive and this one is selected. I’ll be glad to consider another version from anyone who cares to create one.

And I’ll consider criteria for amending this one. Criteria for amending would essentially be a standard that I can apply to a plant one at the time and say “yes” or “no.” It would be good to have some other criteria by which to shorten the list. As it is, it’s mainly names that I recognize – interesting trees, problem weeds, or a plant with a flower. Since I created this list, it’s essentially my selections of interest. I find it interesting that poison ivy is native (or naturalized). I’ve never planted it (although I have a picture where someone apparently did).

At any rate, please have a look if you have internet access at: <http://www.ces.ncsu.edu/chatham/ag/homehort/NatHome.html> Please also look at the “Reasons for Using Native Plants in the Landscape” that you’ll find linked there.

For those who do not have internet access, a copy of this information is available on request. Call 919.542.8202.

Class: I will conduct a class on Landscaping with Native Plants at the Agriculture Building in Pittsboro, April 19 at 6:30. Complete details and registration form at <http://www.ces.ncsu.edu/chatham/ag/homehort/WinterSpring2006Classes.html> or by calling Susan Graham at 542.8202.



Qualifiers for Quagmires: Landscape Plants for Wet Sites

by Thomas G. Ranney, Richard E. Bir, M. A. (Kim) Powell, and Ted Bilderback, Department of Horticultural Science, NC State University

Wet, poorly drained soils present one of the most difficult challenges for growing plants in the landscape. Excessive moisture displaces oxygen in the soil and plant roots can suffocate as a result. Many plants are intolerant of having their roots submerged for extended periods of time. Even though standing water may not be present, poor drainage is often responsible for reduced growth and survival of plants in our landscapes.

When landscaping sites with poor drainage, it is advisable to start with plants that are tolerant of those conditions. Plants native to wet bottomland areas often thrive under these conditions. When selecting and planting trees and shrubs for poorly drained sites, it is important to recognize that plants often need to acclimate to these conditions before they are able to tolerate flooding and low aeration. Even plants that are very tolerant of poor drainage will have shallower root systems on poorly drained sites.

Over time, physiological and anatomical changes in the plant can also help to improve tolerance to poor drainage. As a result, it is often desirable to start with small plants that have been grown under conditions as similar to the planting site as possible when planting trees and shrubs on poorly drained sites.

Although many of plants listed here can tolerate poor drainage, their growth will often be improved if more desirable growing conditions can be provided. Creation of raised beds, swales, grassed waterways, and drainage lines can help to divert and route excess water away

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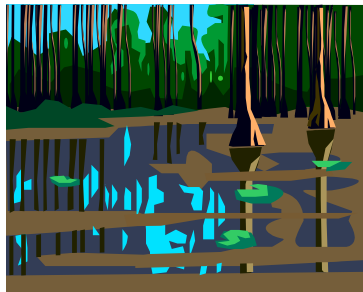
Qualifiers for Quagmires

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from planting sites and should be considered if drainage is excessively slow. Below is a list of candidate plants for the landscape that can tolerate varying degrees of wetness. Plants with an asterisk (*) following their name indicates that those species have been known to tolerate flooded conditions for extended periods of time.

Trees

Acer negundo (boxelder)
Acer platanoides (Norway maple)
Acer rubrum (red maple)*
Aesculus pavia (red buckeye)
Alnus glutinosa (black alder)
Amelanchier canadensis (serviceberry)
Betula nigra (river birch)*
Carya aquatica (water hickory)
Catalpa speciosa (catalpa)
Celtis spp. (hackberry)
Chamaecyparis thyoides (Atlantic white cedar)*
Diospyros virginiana (persimmon)
Fraxinus caroliniana (Carolina ash)
Fraxinus nigra (black ash)*
Fraxinus pennsylvanica (green ash)*
Fraxinus quadrangulata (blue ash)
Larix spp. (larch)
Liquidambar styraciflua (sweetgum)
Maclura pomifera (osage orange)
Magnolia grandiflora (southern magnolia)
Magnolia virginiana (sweetbay magnolia)*
Nyssa aquatica (water tupelo)*
Nyssa sylvatica (black gum)
Nyssa sylvatica var. *biflora* (Swamp Tupelo)*
Nyssa ogeche (ogeechee tupelo)
Pterocarya spp. (wingnut)
Pinckneya bracteata (fevertree)
Pinus taeda (loblolly pine)
Platanus spp. (planetree)*
Pyrus spp. (pear)*
Quercus bicolor (swamp white oak)
Quercus laurifolia (laurel oak)



Quercus lyrata (overcup oak)
Quercus nigra (water oak)
Quercus nuttallii (nuttall oak)*
Quercus palustris (pin oak)*
Quercus phellos (willow oak)
Quercus virginiana (live oak)
Salix spp. (willow)*
Taxodium spp. (baldcypress)*
Thuja occidentalis (eastern arborvitae)
Thuja plicata (giant arborvitae)
Ulmus alata (winged elm)
Ulmus parvifolia (lacebark elm)

Shrubs

Aronia arbutifolia (red chokeberry)
Baccharis halimifolia (groundsel tree)
Cephalanthus occidentalis (button bush)*
Clethra acuminata (cinnamon clethra)
Clethra alnifolia (summersweet)
Cornus alba (tartarian Dogwood)*
Cornus sericea (red osier dogwood)*
Cornus amomum (silky dogwood)*
Cyrilla racemiflora (swamp cyrilla)
Dirca palustris (leatherwood)
Euonymus americana (American euonymus)
Fothergilla spp. (fothergilla)
Hibiscus syriacus (rose-of-sharon)
Ilex cassine (dahoon holly)
Ilex glabra (inkberry)
Ilex verticillata (winterberry)*
Ilex vomitoria (yaupon holly)*
Illicium spp. (anise-tree)
Itea spp. (sweetspire)
Leucothoe fontanesiana (leucothoe)
Lindera benzoin (spicebush)
Myrica spp. (bayberry/waxmyrtle)
Rhamnus caroliniana (Carolina buckthorn)
Rhododendron arborescens (sweet azalea)
Rhododendron atlanticum (coastal azalea)
Rhododendron vaseyi (pinkshell azalea)

Rhododendron viscosum (swamp azalea)
Rosa virginiana (virginia rose)
Sambucus canadensis (elderberry)
Spiraea tomentosa (hardhack)
Vaccinium corymbosum (highbush blueberry)
Viburnum alnifolium (hobblebush)
Viburnum cassinoides (witherod viburnum)
Viburnum opulus (European cranberry-bush viburnum)

Herbaceous Perennials and Shallow Water/Bog Plants

Acorus calamus (sweet flag)*
Astilbe spp. (astilbe)
Butomus umbellatus (flowering rush)*
Calla palustris (bog arum)*
Caltha palustris (marsh marigold)*
Canna x generalis (water canna)*
Carex spp. (sedge)
Eleocharis acicularis (spike rush)*
Eupatorium dubium (Joe Pye weed)
Equisetum hyemale (horsetail)*
Hibiscus moscheutos (rose mallow)
Iris ensata (Japanese water iris)*
Iris laevigata (water iris)*
Iris pseudacorus (yellow flag)*
Iris siberica (Siberian iris)
Iris versicolor (blue flag)*
Iris virginica (southern blue flag)*
Juncus spp. (rush)*
Leersia oryzoides (rice cutgrass)*
Lobelia cardinalis (cardinal flower)
Lobelia siphilitica (great lobelia)
Lysimachia clethroides (gooseneck loosetrife)
Myosotis scoparius (water forget-me-not)
Orontium aquaticum (golden club)*
Peltandra virginica (hardy arum)*
Pontederia cordata (pickerel weed)*
Sagittaria spp. (arrowhead)*
Sarracenia spp. (pitcher plant)
Saururus cernuus (lizard's tail)*
Schoenoplectus validus (soft stem bulrush)*
Scirpus americanus (common threesquare)*
Spartina alterniflora (cordgrass)*
Typha spp. (cattail)*
Vernonia noveboracensis (iron weed)

Understanding Fertilizer - Organic or Not

Because you care about water quality, you need to understand fertilizer. If that sounds confusing, you should be aware that among the most common pollutants in water in the United States, in North Carolina, and in Chatham County are nutrients that are also routinely applied to lawns and gardens as fertilizers. Nitrogen and phosphorous are primary concerns and in Chatham County phosphorous is a big player. If you don't want to take my word for that, I invite you to look into the State's 303(d) list of waters not meeting water quality standards. Roberson Creek (running through Pittsboro) and Loves Creek running through Siler City are both listed. Nitrogen and phosphorous are both concerns for the Haw River and Jordan Lake with mandated reductions awaiting final approval. (NC Division of Water Quality, http://h2o.enr.state.nc.us/tmdl/TMDL_list.htm)

I don't intend to spend this article preaching about water quality. It's common knowledge that the Pittsboro wastewater treatment plant is a big contributor to the Roberson Creek problems. But we as gardeners also need to take responsibility for how we use fertilizer products. I'm actually going to focus on Best Management Practices that help you get what you want from fertilizer rather than what you don't want. Tons and tons of fertilizer are sold every day to people who have no training in how to calibrate the amount of fertilizer they are using. I talk to many people who regard fertilizer as medicine to solve plant problems. It is neither medicine nor food. If we apply too much, or if we apply it at a time when plants can't use it, then what happens?

So let's have a quick course in fertilizer. Call it Fertilizer 101.

Fertilizer is a term we use for raw materials that we supply to plants. It may

come in a bag, or it may be the result of organic decomposition. There are 17 different chemical elements that plants need. Most of these nutrients do not need to be supplemented and are necessary in some cases in only grams per acre. Some are supplied by air and water (carbon, hydrogen, and oxygen). Some bind to soil and will stay with the soil. If the soil erodes as it may when land is cleared, some fertilizer, especially phosphorous, may end up in streams.

Plants can only absorb nutrients that are dissolved in water (see the connection?). The water with nutrients may be absorbed by plants, it may run to streams, or it may move down through the soil to ground water. The water may evaporate, leaving the nutrients in the soil. These nutrients then function as salts and bind to any available water molecule. Sometimes the attraction of these salts for water is greater than that of plants. When that occurs, the salts absorb water "backwards" out of plants and we may observe "fertilizer burn" on foliage.

Many nutrients, as I suggested, are usually adequate in the soil. Some of these nutrients may need to be supplemented but can also build up in the soil and will not need to be applied again for long periods of time, perhaps years. And one – nitrogen – is very unstable in the soil and always needs to be managed. Organic gardeners take note: you too must manage nitrogen one way or another. Without nitrogen, plants will typically be small, grow slowly, and have yellow foliage. Note again that yellow foliage is not diagnostic for nitrogen deficiency. There are many things that can cause yellowing. And if there is an excess of nitrogen, it represents a threat to water quality – regardless whether the nitrogen came from organic or synthetic sources.

So, how do you know what to apply

and when? With the exception of nitrogen the only way to know if you need other fertilizers and how much is to have the soil analyzed. As suggested repeatedly in *Green Thumb Prints*, the NC Department of Agriculture will analyze soil that you sample and submit at no charge. That seems to me a "no-brainer" but seems prohibitive to many people. My thinking is that if you're not paying attention to what the soil can supply, you probably have no business adding any fertilizer to it.

Except for nitrogen. Nitrogen is not stable in the soil. It frequently reaches the soil bound up as proteins in organic matter. These proteins are mineralized by bacterial activity in the soil to become ammonium, NH_4 , a nitrogen form that plants can use. Ammonium can be held in the soil temporarily. If plants do not use it, bacteria will convert it to nitrate, NO_3 , another form that plants can use. Throughout this process the nitrogen may be converted to a gaseous form – NH_3 , N_2O , or N_2 – and "lost" to the atmosphere. Nitrate that is not used by plants may move with water in the soil – either to ground water where it can build to unhealthy levels or to surface water where it contributes to diminished water quality.

It's not important to know all the things that can happen to nitrogen in the soil. What is important to know is that you can't stockpile it in the soil now for use next spring. Nitrogen is so unstable in the soil that your soil analysis will not analyze for nitrogen. It is generally assumed that even if you get the report back within two weeks, nitrogen levels analyzed will be out of date. Your soil report will usually suggest that you apply nitrogen at a rate equal to about one pound of nitrogen per 1000 square feet.

To apply that amount of nitrogen re-

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sponsibly, you need to be able to calculate how much nitrogen is in your source (whether it's manure or a bag of fertilizer) and to calibrate your application on the ground. Now you have to know arithmetic! You can't be responsible with fertilizer if you don't do the arithmetic.

Fertilizer content is usually provided in percentages. Commercial fertilizers have the numbers on the bag. The order is nitrogen (N), phosphorous (P), potassium (K). N-P-K. So a bag of 15-0-14 fertilizer contains 15% N, no phosphorous, and 14% K. If it's a 40 pound bag, then $15\% \times 40 = 6$ pounds of N and $14\% \times 40 = 5.6$ pounds of K.

We will also need to know how much

of that product to use to apply only one pound of nitrogen. This is the old formula they teach to horticulture students: **Want over Have X 100 = amount to apply.** You want one pound, and you have 15%. $1 / 15 \times 100 = 6.6$. 6.6 pounds of the product (15-0-14) provides one pound of nitrogen.

For commercial organic fertilizers you may also find numbers on the bag, box, or bottle. Look carefully for decimals. Bags of manure are sometimes printed as .5 - .5 - .5. It's easy to miss the decimal. For bulk fertilizer such as a truckload of chicken litter or horse manure, you have a couple of options. You can use averages that you can find in a chart at

<http://www.soil.ncsu.edu/publications/Soilfacts/AG-439-18/> (or contact your Extension office for a copy of Nutrient Content of Fertilizer and

Organic Materials, AG 439-18). Or to be more accurate, you can submit a sample for nutrient analysis by the Department of Agriculture - \$5.00. The amount of nutrients available can vary depending on how the material is handled and stored or even how you apply it.

In the example above, we found the bag to contain 6 pounds of nitrogen. To apply one pound of nitrogen to 1000 square feet, you can divide the bag into 6 equal portions and measure out 1000 square foot sections. Or you can calibrate your spreader. *Remember suggested settings are just a beginning point for calibration and the older the spreader the less dependable the settings are.* You really need to calibrate at least once every year.

Table 1 Recommended application rate for various granular fertilizers to apply 1 pound of nitrogen

Application rates per:					
Source	1,000 Square Feet		100 Square Feet		10 Square Feet
	Pounds	Cups	Pounds	Cups	Tablespoons
10-10-10	10	20	1	2	4
8-8-8	12.5	25	1.2	2.5	5
12-4-8	8	16	.75	1.5	3
16-4-8	6	12	.5	1	2
5-10-10	20	40	2	4	8
12-6-6	8	16	.75	1.5	3

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When do you fertilize? Fertilizer to be effective needs to be applied at a time when plants can use it and get the most benefit from it. Following are some general guidelines about when to fertilize various crops:

1. Trees and shrubs – once these have reached mature size, routine applications are no longer necessary. Base fertilizer applications on size, desired size, and observed annual growth rates with about 6 to 18 inches optimal. Most effective applications are granules broadcast on the surface around the drip line during late fall to late winter. Trees and shrubs near fertilized lawns usually get more than enough fertilizer from those applications.

2. Fruit plants – base application on size and annual growth rates with about 10 to 18 inches optimal. Broadcast fertilizer around the drip line in late winter. Excess fertilizer may affect fruit quality.

3. Vegetables – Apply fertilizer at planting. Repeat in about 4 to 6 weeks for most vegetables. Some vegetables will benefit from a third application. Excess fertility can reduce productivity for some plants such as tomatoes.

4. Flowers – Annual flowers can be fertilized frequently during the growing season. Generally fertilize at planting and repeat at about 4 to 6 week intervals. Perennial flowers will usually perform better with much less fertilizer. Fertilize at planting the first year. In subsequent years fertilize to coincide with the beginning of new growth or not at all. Bulbs can be fertilized when underground growth begins in late fall or no later than early shoot growth in the winter.

5. Lawns – Fescue or bluegrass lawns should be fertilized in September, at Thanksgiving, and at half rate for Valentines Day. Warm season grasses such as bermuda, centipede, or zoysia should receive the first application after (not before) spring green up is complete – late April to May. For centipede only ½ rate and only that one application, May to June. Bermuda can be fertilized monthly through early September. Zoysia should receive ½ rate three times at about 8 week intervals through the summer.

There will be a lot of fertilizer advertisements during the spring using a variety of tactics to sell fertilizer. Learn to ask intelligent questions. If they suggest your lawn should be fertilized, are they talking about cool or warm season grasses (see 5 above)? Neither needs to be fertilized in April.

Whatever you're fertilizing, it's helpful the think about the overall situation. Fertilizer must have water to work whether it's organic, water soluble, or slow release. If water in the soil is not sufficient, fertilizer can damage plants by absorbing water from them. So if it's dry and you can't water, don't fertilize.

Organic fertilizer: I'm trying to get your attention here. Do I have it? I'm glad for you to use organic strategies. It probably means you're doing a better job of paying attention. But I hear between the lines that some folks think that you can't apply too much organic fertilizer or that organic fertilizer can't harm water quality. Hog manure can make a good organic fertilizer. But when a hog lagoon overflows into a river, that's not good. You have to pay attention to how much to use and when to use it.

Organic fertilizers are probably better for the workability of your soil and the

biological life in it. But the essential nutrients eventually must break down into a form that plants can use. Plants need phosphate and nitrate. Plants don't absorb compost directly; they absorb the molecules that are breakdown products of that compost or that manure or that fish emulsion. You can't get away from chemicals; plants still need those essential nutrients. And organic fertilizers can provide them. And they can provide more than plants can use. In fact many manure products applied repeatedly result in fields with excess phosphorous, copper, and/or zinc. Those can be problems.

So please continue being organic. And please pay attention. I've long felt that one of the biggest advantages of organic gardeners is that they have to be better managers. They have to anticipate and prevent problems. They are not looking for products to provide solutions. Please don't disappoint me now!



Upcoming Classes:

Please call 542.8202 to learn if space is available and to pre-register.
Pre-registration is necessary to insure adequate materials are available.
\$5 registration fee will cover cost of materials and refreshments

April 19 6:30 p.m. **Landscaping with Native Plants**, Agriculture Building, Pittsboro.

Al Cooke, Extension Agent, Chatham County

“Native” is not as well defined as we would like. But we’ll consider a lot of great plants that you can add to your gardening palette.

April 25 7:00 p.m. **Attracting Wildlife to Your Backyard**, Agriculture Building, Pittsboro.

Dr. Chris Moorman, Extension Wildlife Specialist, Department of Forestry, NC State University

If you like to sit at the window and watch deer and bunnies and birds amongst your plants, here’s how to get them.

April 26 7:00 p.m. **Controlling Wildlife in Your Backyard**, Agriculture Building, Pittsboro.

Dr. Chris DiPerno, Extension Wildlife Specialist, Department of Forestry, NC State University

What 4-legged friends are eating your garden? Deer? Rabbits? Voles? Strategies for understanding and living with these and more will be offered.

April 27 Women in the Woods Workshop, 11:30 a.m., Siler City or 6:30 p.m. Agriculture Building, Pittsboro.

Dr. Dennis Hazel, Forestry Extension Specialist at North Carolina State University

Women often end up being the sole owners of and principle decision makers on private forest land. In many cases, they have outlived spouses who previously made management decisions. Even where women share ownership, they increasingly share responsibility for physical and fiscal management of their forests. A variety of topics will be covered including forest terminology, understanding available resources, and selling timber. The central theme is helping women know what professional and other resources are available to help them and how to obtain those resources.

May 3 6:30 p.m. **Plant Propagation**, Agriculture Building, Pittsboro.

Al Cooke, Extension Agent, Chatham County

Ever wanted to grow your own? Here’s a chance to learn more about growing plants from seed or cuttings.

May 11 7:00 p.m. **Alternative Income from your Forest Land**, Agriculture Building Pittsboro.

Dr. Mark Megalos, Outreach Forestry Associate, NC State University.

Workshop will review a range of possibilities to diversify income from your current forest and farming operations. We will explore options to add value to your current operations. Landowners can learn where to go for additional assistance and determine if these opportunities fit with their property, goals and personalities.

May 25 6:30 p.m. **Keep Chatham Green and Growing: Our Forests – Past, Present, & Future**, Agriculture Building Pittsboro.

Topics: The Ecology and Forest History of NC's Piedmont Forests --- Fred White;
Impacts of Forestry Practices on Habitats --- Chris Moorman;
Alternative Forest Harvest Systems to Restore, Renovate or Manage Desirable Forest Conditions --- Rick Hamilton

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