North Carolina Cooperative Extension partners with communities to deliver education and technology that enrich the lives, land and economy of North Carolinians. Through educational programs, publications, and events, Cooperative Extension field faculty deliver unbiased, research-based information to North Carolina citizens. We can answer your questions on a wide array of topics. To find out how we can help you, browse our site at www.watauga.ces.ncsu.edu or contact us by email or phone.

OUR GOALS

- Enhancing agricultural, forest and food systems
- Strengthening and sustaining families
- Developing responsible youth
- Building quality communities
- Conserving and improving the environment and natural resources.

OUR MISSION

Meet the Watauga County Staff


EDDY LABUS, Extension Agent, Agriculture, Responsibilities: Livestock, Tobacco, Field and Forage Crops, Pesticide Education.

RICHARD BOYLAN, Extension Area Specialist Agent, Agriculture. Responsibilities: Alternative Agriculture.


WENDY PATOPRSTY, Extension Agent, Natural Resources. Responsibilities: Watershed Science Educator for Watauga River Basin.

KAREE MACKEY, Extension Agent, 4-H Youth Development. Responsibilities: 4-H and Youth.


SUSANNE WINEBARGER, Administrative Secretary. Responsibilities: Administration, Agriculture, Community and Economic Development.

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“North Carolina Cooperative Extension partners with communities to deliver education and technology that enrich the lives, land and economy of North Carolinians.”
Farm-City Celebration

Plans are on a roll for a new Farm City Celebration for 2009. We are moving to August and to the outdoors, adding a more casual picnic atmosphere. In addition, we are adding exhibits, demonstrations and other entertainment for the whole family. Join us Saturday, August 15 from 2:00-4:00 for family fun (no charge). At 4:00, we will have the awards ceremony and then at 5:00, we will have the picnic, with barbeque chicken. Tickets will need to be purchased in advance for the meal. The location is at the Historic Blair Farm, on Deerfield Road near the golf course. This historic home will be open for tours as well. The farm has ties to the kraut factory, which is now the location of the Cooperative Extension office building.

Farm-City Award Nominations

Award nominations for Farm City are due by July 10.
Please consider nominating those you know making a difference in the community and deserve recognition.

Award categories:
Friend of Agriculture: Individual or business that has made significant contributions (financial or otherwise) to local agriculture through farming, horticulture, nurseries, gardening.
Woman in Agriculture: Woman who has made significant contributions (financial or otherwise) to local agriculture.
Youth in Agriculture: Youth who has made significant contributions (financial or otherwise) to local agriculture.
Urban Gardening Award: Individual or business that has made significant contributions to edible landscapes, gardening/producing food in the city.
Agri-tourism award: In honor of Pauline and Constantine Alimanestiano. Agri-tourism is tourism based on attracting visitors to farm operations such as pick-your-own, wineries, Christmas tree farms, herb farms, greenhouses and farm stands.
Youth Volunteer Award: Youth who have exemplified the spirit of volunteering in their community
Adult Volunteer Award: Adults who have exemplified the spirit of volunteerism in their community
Farm and Food Steward Award: This award is given by the High Country Chapter of the Carolina Farm Stewardship Association to an individual or organization in recognition of their contributions to maintaining Southern Appalachia’s tradition of food independence and to building a local food system through economic, environmental and socially-sustainable agricultural practices.
Active at Work Award: For companies or employees that do a great job in promoting physical activity and a healthy workplace. Sponsored by the Be Active Appalachian Partnership.
L.E. Tuckwiller Award: Recognizing towns and communities for their outstanding efforts in “community development”. Sponsored by the Boone Area Chamber of Commerce

The nomination form is available on-line at http://watauga.ces.ncsu.edu or can be obtained by contacting 264-3061.

AGRICULTURE, NATURAL RESOURCES & ENVIRONMENT

Elongate Hemlock Scale

The Elongate Hemlock Scale has recently become a difficult insect pest for both Christmas tree growers producing Fraser Firs and landowners with hemlock trees, shrubs, and hedges. The scale has been documented in our area for twenty to thirty years, however only until the past few years have we seen an increase in the pest populations and damage. The Elongate Hemlock Scale has spread throughout the Christmas tree producing counties in North Carolina, and NCSU and Cooperative Extension have been assessing different products to control the pest since 2003.

As an armored scale, the elongate hemlock scale has a hard covering, which makes pesticide penetration difficult. The scales feed on epidermal tissue instead of vascular tissue, which means that traditional systemic pesticides aren’t as effective on this pest. The scale is also an introduced pest, which means that there are relatively few natural enemies that keep the scale population in check.

The Elongate Hemlock Scale is thought to have at least two complete, overlapping generations per year in the Southern Appalachians. The females each lay 12-16 eggs that are protected, just as the female is, by the armored protective body covering. After a month, the eggs hatch into first instar nymphs, also know as “crawlers” and these migrate onto new needles. The crawler stage is the most vulnerable to pesticide treatments. All life stages of the scale can be found any time of year, as eggs are laid throughout the growing season.

The parasitic wasp, Encarsia citrina, can be useful in reducing hemlock scale numbers. When you see scale with hole in it, then it has been parasitized. Parasitoids are usually active during the growing season. Other scale predators include brown lacewings, Harmonia ladybeetles, and dusty wings.

Pesticide controls for the Elongate Hemlock Scale on Christmas tree farms should be targeted for the end of June to early August, when the crawlers are at their highest concentrations. More information on specific products for commercial growers can be recommended by the Watauga Cooperative Extension Center. Homeowners can use horticultural oil as a foliar treatment, and products that are used to control the hemlock woolly adelgid have varying degrees of effectiveness on the scale. Treatment guidelines for homeowners are to treat only when the incidence is fairly high, usually more than 40%. Commercial tree growers treat when levels are above 30% incidence.

Look for the scale by looking at the underside of fir and hemlock needles. Affected needles often look yellow and splotchy on the topside of the needle. It is easier to treat smaller trees with less density, so it’s important to be observant in both the field and landscape. The adult scale appears as an immobile, brown insect with an oblong body shape. Crawlers are generally yellow and about a third of the size of the adult. Hand lenses can be useful when identifying crawlers. The scale is most noticeable during June, July and early August, when the scale appears to have a white, waxy appearance on the underside of needles. More information on this pest can be found at: http://ento.psu.edu/extension/fact-sheets/elongate-hemlock-scale
**Beware of Invasive Plants!**

(Article reprinted with permission from the NC Native Plant Society)

Many exotic introduced plants have become naturalized in North Carolina and some are replacing our native plant species. Not all exotic species are considered harmful. Not being native to NC, they lack the natural predators and diseases, which would naturally control them in their native habitats. The rapid growth and reproduction of invasive plants allows them to overwhelm and displace existing vegetation and, in some cases, form dense one-species stands.

Invasive species are especially problematic in areas that have been disturbed by human activities such as road building, residential development, forest clearing, logging, grazing, mining, ditching, mowing, erosion control, and fire control activities. Invasive exotic plants disrupt the ecology of natural ecosystems, displace native plant and animal species, and degrade our biological resources. Aggressive invaders reduce the amount of light, water, nutrients and space available to native species. Some can even create increased erosion along stream banks, shorelines and roadsides.

Some exotics hybridize with related native plant species, resulting in changes to a population's genetic makeup; others have been found to harbor plant pathogens that can affect both native and non-native plants, including ornamentals. Others contain toxins that may be lethal to humans and other animals. Some invasive plants compete with and replace rare and endangered species and encroach upon their limited habitat.

Other problems include disruption of native plant-pollinator relationships, tree and shrub mortality due to girdling, reduced establishment of native tree and shrub seedlings, reduction in the amount of space, water, sunlight and nutrients that would be available to native species, and altered fire regimes. Our native fauna, including insects, birds, mammals, reptiles, fish and other animals, is dependent on native plants for food and shelter. While some animals can feed on a wide number of plant species, others are highly specialized and may be restricted to feeding on several or a single plant species. As exotic plants replace our native flora, fewer host plants are available to provide the necessary nutrition for our native wildlife.

In some cases, invasive plants replace nutritious native plant foods with lower quality sources.

Each exotic plant is less native host plant for our native insects, vertebrates and other organisms that are dependent upon them. For a comprehensive list of invasive plants, as well as native plant alternatives, please visit the North Carolina Native Plant Society's website at www.ncwildflower.org.

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**Stormwater Wetland Construction on Boone Greenway**

You may have seen the huge piles of soil mounded up along the Greenway Trail on Hunting Hills Lane this past winter and wondered what is going on out there. It looked like a giant construction project in the rivers floodplain. It is a construction project, but more for the environment and wildlife than humans. Although in the long run, humans will reap the benefits of this stormwater wetland construction.

The Town of Boone, Watauga County Cooperative Extension, and NCSU Biological and Agricultural Engineering are working together with funds from the NC Clean Water Management Trust Fund to construct a wetland to mitigate stormwater runoff from entering the New River. Stormwater runoff is one of the leading causes of surface water quality degradation in the nation, and the New River is no exception. Every time it rains, our rivers and streams are exposed to pollutants such as oil and gas from roads, trash and debris, pet waste, sediment from erosion, and excess nutrients and chemicals. Stormwater runoff also produces thermal pollution, degrading river habitat for trout in the mountains.

This constructed stormwater project consists of a one-acre wetland in the floodplain to treat stormwater from 30 acres of impervious parking lots, roads, buildings and even runoff from the newly constructed baseball fields. Stormwater wetlands are effective environmental protection practices because they remove sediments, nutrients, metals, chemicals, and bacteria from stormwater. The Stormwater Wetland Design Update published by the North Carolina Cooperative Extension Service indicates that a well-vegetated stormwater wetland will reduce outflow temperatures by 3 to 5°F more than wet ponds, which will be good for our trout streams.

The Boone wetland was designed to capture and treat the runoff produced by the first flush (precipitation = 1.2 inches) because that is where the rain picks up most of the pollutants. A flashboard riser outlet structure was sized to drawdown this volume of water over a 72-hour period to optimize the stormwater treatment. The constructed wetland consists of deep pools, shallow water, and temporary inundation areas that create a diverse ecosystem for wetland plants and animals.

The wetland construction is complete, and the planting has just been finished. The wetland has a huge variety of native herbaceous obligate and facultative wetland species planted by volunteers. Over 50 different species in all will be planted and seeded for diversity everywhere from swamp butterfly weed, marsh hibiscus, and pickel weed (basically lots of beautiful flowering plants to create habitat for mosquito predators).

We have all heard the warnings: Don’t let standing water collect because it breeds mosquitoes. This is true; mosquitoes require shallow, stagnant, anaerobic water conditions. Adult females find environments such as puddles or containers where they will find high nutrients and bacteria to lay their eggs. Many people perceive that wetlands are breeding grounds for mosquitoes. This is usually not true. There is growing evidence to show that healthy functioning wetlands can actually reduce mosquito populations. Healthy wetlands provide habitat for dragonflies and their larvae, frogs, birds, and other mosquito predators. Mosquitoes only become a problem in areas that don’t support these beneficial species. Wetland restoration and manmade wetlands can reduce the mosquito population in two ways: 1) provide proper habitat for natural enemies of mosquitoes, and 2) prevent flooding in areas that aren’t normally wet and thus support mosquitoes but not their predators.

With this project completion, a viable, healthy ecosystem has been created within the Town of Boone, and it will be conserved in perpetuity. Educational signage will be installed to inform greenway visitors about stream and wetland ecology, watersheds, clean water, native plants, and natural resources protection. The Town of Boone will also be installing benches and trails to observe the wetland. This preserved land will benefit the river ecosystem for years to come.

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The 2009 Watauga Master Gardener Volunteer Training Program is proud to announce twelve new Master Gardener Volunteer Interns that will be involved in horticultural volunteer projects across Watauga County. After a twelve-week intensive training, volunteers are now poised to help educate and share their knowledge with community groups and individuals in need. The trained volunteers will be assisting with gardening projects with the Hunger and Health Coalition, OASIS, Daniel Boone Native Gardens, as well as Extension gardening and kids’ programs. In addition, the volunteers will be assisting the Watauga Extension office with the many calls and plant questions that arrive with the summer growing season. As part of their official training, volunteers developed horticultural skills that can help create healthier gardens and landscapes, resulting in a balanced approach to pest and disease problems.

Congratulations to the 2009 Watauga Master Gardener Volunteer interns: Kit Fisher, Tom Robbins, Linda Caraway, Anis Crofts, Dell Slack, Jody Bargerstock, Carol Hancock, Doris Ratchford, Karen Gross, Jeanne Coward, Kathy Bundt, and Jackie Wright (not pictured).

The Master Gardener Training Program is a national program whose purpose is to train volunteers with horticultural knowledge to assist county Extension offices with home gardening topics. The Watauga Master Gardener Training Program is offered once a year through the Watauga Cooperative Extension Programs. Contact the Watauga Extension office if you would like more information on the program or if you have a community gardening project that might be a future project for the Master Gardener Volunteers.
What Do Growers Need to Know About Food Safety Issues?

Classes Offered for Fruit & Vegetable Growers in October

As growers, we all need to make the safety of the foods we sell a top priority. Our customers, whether local or distant, deserve the best and safest foods we can possibly produce. Problems with the safety of some fresh-produce items in recent years have made headlines and caused sales of the suspected produce to plummet, whether the produce was really a cause of illness (e.g. Spinach contaminated by E. coli in 2006) or not (the US-grown tomatoes initially suspected in the 2008 Salmonella outbreak were not contaminated, yet tomato growers lost nearly $130 million in sales last year).

Growers can be aware of these issues, yet not paralyzed by fear or the threat of lawsuits. The keys to success are education, preparation, and implementing fresh produce food safety practices on your farm. Some growers may also need to obtain third-party certifications such as GAP (Good Agricultural Practices). But long before pursuing any outside certification, a grower should learn the practices that enhance food safety and put them into practice.

The New River Headwaters Area Alternative Agriculture Program will offer a series of classes in October 2009 to guide growers through evaluating and improving their own fresh produce food safety practices. Each class will meet from 6:00 - 8:00 PM and is free to all interested farmers. The dates and topics to be covered are:

- Tuesday, October 20: Fresh Produce Food Safety Issues and Considerations for Small Farms
- Wednesday, October 21: Implementing Fresh Produce Food Safety Practices on Your Small Farm
- Tuesday, October 27: Developing a Fresh Produce Food Safety Plan for Your Small Farm
- Wednesday, October 28: GAP certifications and Food Safety Audits - Does Your Farm Need Them?

For growers wishing to get started on improving their own Fresh Produce Food Safety practices immediately, Cooperative Extension offers many excellent resources to help growers understand and implement fresh produce food safety practices. They are all freely available at: http://www.ncsu.edu/fvsi/nfreshproduce/index.php

Growers wanting further information on Fresh Produce Food Safety issues, concerns, and these upcoming classes can also call the Watauga County Cooperative Extension Center at 828-264-3061.

Prepare Calves for Fall Sales

If you have a spring calving herd, then now is the time to start thinking about how to market your calves. Beef producers would like to receive top dollar for their calves. Graded feeder calf sales usually see higher prices paid for preconditioned calves. There are several things you should do when preparing to market your calves.

Calves that have horns and/or are not castrated bring less money than properly prepared calves. Horned calves cause damage to other cattle and suffer more stress when dehorned at an older age. Bull calves tend to fight more and suffer greater stress when castrated over the age of three months. If you have not dehorned or castrated, then the sooner these practices are done the better. Implanting calves has a return of $25 for every dollar spent.

Locate a feeder calf sale or group sale, and find out what vaccinations they require. Most feeder calf sales offer premiums on groups of cattle that are managed with the same vaccinations. Even if you are not selling with a group, you should vaccinate for blackleg. Blackleg is a clostridial disease and is found in the soil. It can cause losses, generally the sudden death of calves.

With the wet summer, parasite loads will be larger, so deworming calves should increase returns. The rainy weather also increases the number of horned and face flies. There are many options available for fly control from ear tags to rubs and pour-ons. When using an insecticide, be sure to follow label directions. Watch cattle closely for pink-eye and treat as necessary.

The easiest way to increase your calves’ price is to follow management practices that make your calves more desirable to buyers.
General Guidelines - Managing Vegetable Diseases Organically

PREFACE - Due to the rainy spring and early summer, it may be more challenging than ever to successfully manage plant diseases this year. The following principles, written by Meg McGrath of Cornell University, are useful to implement on all farms. For more information on any of these practices, contact Richard Boylan, Area Agent for Alternative Agriculture, at richard_boylan@ncsu.edu or by phone at 828-264-3061.

- Know what diseases to expect and potential impact on yield.
- State recommendations for conventional crop production cover diseases occurring in area. Cornell’s is available on-line at: www.nysaes.cornell.edu/recommended. It includes symptom descriptions and information about management practices appropriate for organic production, such as rotational periods.
- Learn about the life cycle of pathogens that could occur.

- Knowing the potential sources for a pathogen, how it spreads, and conditions favoring disease development are essential as these are the focus of management practices.
- Select resistant varieties when possible.

Unfortunately, there are not many vegetable varieties with genetic resistance, and few of these are currently available as organic or untreated seed. See separate list.
- Obtain seed that has been tested for seedborne pathogens when possible.

Some seed companies have the resources and produce the quantity needed to test seed. Companies lacking these resources should be able to provide information on where the seed was produced, how much scouting is done, and what diseases, if any, were present.
- Consider hot-water treating seed when seedborne pathogens are a concern.

Treating seed with hot-water needs to be done just before planting and it needs to be done carefully as there is a small margin between the temperature and length of exposure needed to kill pathogens and the treatment conditions that will kill seeds. Note that the highest temperature seed can tolerate varies among crops and some crops cannot tolerate the temperature needed to kill pathogens. See article.
- Practice good sanitation. Use new or clean, disinfected planting materials (egg trays for growing transplants and tomato stakes). Clean greenhouses before seeding transplants. Hose-off farm equipment between fields or management unit.
- Rotate land away from susceptible crops for soil-borne pathogens.

Note that rotation is not effective for all soil-borne pathogens, including those able to infect a wide range of plants (white mold fungus), those able to survive spermatophytically (Rhizoctonia), and those with means to be easily re-introduced into a field (cucurbit powdery mildew fungus). Rotation is most effective for pathogens that survive without host’s short periods (3 years at most). Rotating among crop families is not always sufficient as some pathogens are able to infect crops from different families. For example, Phytophthora capsici causes Phytophthora blight in cucurbits, pepper, eggplant, tomato, snap bean, lima bean but not potato. Thus, effective use of rotation necessitates knowledge of pathogen biology. Additionally, the unit of land being rotated (preferably an entire field) needs to be maintained separate from others. Cultivators and other farm equipment used within a unit need to be cleaned before working in another unit, and water should not flow between units following a heavy rainstorm.
- Separate susceptible crops with later plantings located upwind of earlier plantings. Effective distance depends on the mode of pathogen dispersal. Greater distances will be needed when the pathogen is dispersed by wind than splash watering.
- Use practices that promote soil health. Amending soil with compost, reducing tillage, growing cover crops, and other practices that improve soil health may promote beneficial microorganisms that control pathogens. Also, a crop with a healthy, large root system will be better able to resist and tolerate root rot pathogens.
- Maintain healthy plants.

Plants that are healthy but not too luxuriant are thought to be able to resist disease. Research is needed to document observations.
- Avoid conditions that favor disease development.

Plant when conditions are favorable for plant growth to minimize losses to damping-off. Most fungal and bacterial pathogens causing foliar diseases need a period of free moisture on their host in order to complete the infection process. Wetness periods can be minimized by planting rows parallel to the prevailing wind direction, avoiding dense plant populations, managing weeds to maintain good air movement, trellising plants when possible, and using trickle irrigation or overhead irrigation when plants are dry and a good drying period will follow. Wet soils are favorable for some fungal pathogens, notably Pythium and Phytophthora species. Select fields with soil that drains well and use raised beds when growing susceptible crops.
- Use disease-forecasting systems to determine when diseases are likely to occur.

There are 2 basic types of systems. The forecasting system for cucurbit downy mildew (pathogen survives only on living host tissue) in the eastern USA uses information on regional disease occurrence, favorable conditions for spore production, release, and movement by wind from where the disease is occurring, plus favorability of conditions for disease development where the spores are predicted to land. This system is free to use, www.ces.ncsu.edu/depts/pp/cucurb/ Other systems assume the pathogen is present and use field data on daily temperature and moisture (RH, leaf wetness, and/or rainfall) to predict the favorability of these conditions for disease development and to recommend when fungicide applications are needed. EAST and TOM-CAST developed for early blight in tomato have proved useful for other diseases (e.g. leaf blights in carrot). WISDOM considers crop maturity when forecasting early blight in potato. BLITECAST is for late blight. Sensors, data loggers, and software needed to collect on-farm data and run forecasting systems can be purchased from companies such as Spectrum Technologies (www.specometers.com). Regional bacterial blight programs have been run by Extension in some states. Another option is to subscribe to services that provide weather and disease as well as other pest predictions at the farm scale (www.skybit.com).
- Manage weeds and insects that can carry pathogens.

Weeds can be alternate hosts for some pathogens as well as contributing to favorable conditions for disease development by increasing humidity. Insects that vector pathogens include aphids (viruses), thrips (TSWV), leafhoppers (aster yellows), and cucumber beetles (bacterial wilt). Controlling these insects is often the only way to control the pathogen.
- Destroy volunteer crop plants. These can harbor pathogens.
- Avoid moving pathogens during farming operations.

Bacteria and splash-dispersed fungal spores are often present on foliage when plants are wet and can be easily moved when plants are handled by farm workers or when a high-pressure sprayer is used. Workers pruning tomatoes should routinely clean hands, preferably by wearing plastic gloves which can be dipped into a disinfectant.
- Examine plants weekly for disease symptoms and for insect vectors.

Thorough examination is needed to detect diseases near the onset of development when applying rescue treatments can slow development.
- Minimize the opportunity for soil-borne pathogens to be splash dispersed to crops.

Covering soil with organic or plastic mulches provides a barrier between pathogens in soil and the crop. Hairy vetch mulch has also been shown to stimulate plant defenses in tomato. Trellising tomatoes greatly reduces number of fruit in contact with soil.
- Accurately diagnose disease problems.

If the first symptoms observed are not sufficient to make a definitive diagnosis, examine other plant parts for symptoms and other plants to determine distribution. Submit samples to state diagnostic lab if still in doubt.
- Apply approved rescue treatments if yield likely to be affected without this intervention and disease is at early stage in development.

Rescue treatments can be effective when started very early in disease development. Accurate diagnosis is critical.
- Maintain records of disease occurrence, impact, and efficacy of management practices used.

These records will be invaluable in the future.
- Incorporate diseased crop debris after harvest.

Crop debris is broken down faster by microbes when in soil than left on the surface, thus reducing the survival time of pathogens that can only survive in crop debris.
- Live in soil in absence of host.
- Alternate hosts (weeds, other crops)
- Plants in another location
- Survival structures (e.g. fungal sclerotia, nematode cysts)
- Insect vectors

Mechanisms for Dispersal
- Wind
- Rain and irrigation
- Soil
- Seed
- Insects and other vectors
- Humans (handling, machinery)

Management Practices
Control the Source of Pathogens
- Select certified 'disease-free' seed and transplants.
- Treat seed with hot water.
- Rotate land to a nonsusceptible crop for at least one year (longer for some diseases).
- Control weeds.
- Control insect vectors.
- Plant when pathogen does not normally occur. Exclude exotic pathogens.
- Destroy infected plants when disease is detected early, few plants are affected, and the pathogen likely has not had opportunity for extensive spread.
- Amending soil with compost might increase activity of beneficial microorganisms.

Minimize the Opportunity for Dispersal
- Cover soil with mulch.
- Do not handle plants when they are wet.
- Disinfect pruning and cutting tools frequently.
- Physically separate plantings of similar crops.

Reduce Plant Susceptibility
- Select disease-resistant varieties.
- Maintain plant vigor through proper nutrition, watering, weed control, etc.
- Avoid luxuriant growth.
- Plant when temperatures are favorable for germination and growth of the plant.
- Hairy vetch mulch has been shown to induce resistance in tomato.

MAKE THE ENVIRONMENT LESS FAVORABLE FOR DISEASE DEVELOPMENT
- Locate plants where there is good air movement, avoid shady areas, and plant rows parallel to the prevailing wind direction.
- Use raised beds.
- Plant when conditions are not favorable for disease.
- Grow a diversity of crops.
- Stake or trellis plants when possible.
- Avoid a dense plant population.
- Control weeds.
- Provide adequate soil moisture - do not over or under water.
- Use trickle irrigation or use sprinkle irrigation in morning before a good drying period.
- Examine Plants Weekly. Identify Cause of Any Problems. Suppress Disease Development
- Rescue treatments. Most effective when used preventively or at the first sign of disease.

GUIDELINES FOR MANAGING VEGETABLE DISEASES WITH FOCUS ON BIOLOGY
(Meg McGrath, Cornell University, LIHREC, Riverhead, NY)

- Requirements for Disease
- Pathogen (disease-causing organism)
- Susceptible plant
- Favorable environmental conditions
- Time

MANAGEMENT OF DISEASES
FOCUS ON PREVENTION. INTEGRATED APPROACH. NO CURES. COMPONENTS OF DISEASE CYCLE TO TARGET IN MANAGING

- Sources of Disease-causing Organisms
  - Infested debris
  - Infested seed or infected transplants
  - Live in soil in absence of host
  - Alternate hosts (weeds, other crops)
  - Plants in another location
  - Survival structures (e.g. fungal sclerotia, nematode cysts)
  - Insect vectors

- Mechanisms for Dispersal
  - Wind
  - Rain and irrigation
  - Soil
  - Seed
  - Insects and other vectors
  - Humans (handling, machinery)

- Management Practices
  - Control the Source of Pathogens
    - Select certified 'disease-free' seed and transplants.
    - Treat seed with hot water.
    - Rotate land to a nonsusceptible crop for at least one year (longer for some diseases).
    - Control weeds.
    - Control insect vectors.
    - Plant when pathogen does not normally occur. Exclude exotic pathogens.
    - Destroy infected plants when disease is detected early, few plants are affected, and the pathogen likely has not had opportunity for extensive spread.
    - Amending soil with compost might increase activity of beneficial microorganisms.

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  - Cover soil with mulch.
  - Do not handle plants when they are wet.
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- Reduce Plant Susceptibility
  - Select disease-resistant varieties.
  - Maintain plant vigor through proper nutrition, watering, weed control, etc.
  - Avoid luxuriant growth.
  - Plant when temperatures are favorable for germination and growth of the plant.
  - Hairy vetch mulch has been shown to induce resistance in tomato.

  - Locate plants where there is good air movement, avoid shady areas, and plant rows parallel to the prevailing wind direction.
  - Use raised beds.
  - Plant when conditions are not favorable for disease.
  - Grow a diversity of crops.
  - Stake or trellis plants when possible.
  - Avoid a dense plant population.
  - Control weeds.
  - Provide adequate soil moisture - do not over or under water.
  - Use trickle irrigation or use sprinkle irrigation in morning before a good drying period.
  - Examine Plants Weekly. Identify Cause of Any Problems. Suppress Disease Development
  - Rescue treatments. Most effective when used preventively or at the first sign of disease.
Goat Management for Weed and Brush Control

The recent interest in farming and local food has increased the number of people who are interested in raising small livestock. When most people think of goats, they think of an animal that eats tin cans and can survive almost anything. This is a myth. Goats need quality management to not only survive but to thrive.

There are three basic uses of goats: meat, milk and fiber. However, these are not necessarily the only uses. Goats provide great brush and weed control when managed properly. Goats offer the ability to clean up land in an environmentally friendly way. Goats are browse animals, meaning they prefer to eat brush and weeds converting them into meat, milk and fiber, which is an added benefit.

Many landowners have land that is overgrown with briars and brush, which seem impenetrable. Goats are great at controlling brush and helping to return land to a more manageable use. Research conducted at NC State University shows that multiflora rose bushes were practically eliminated after four grazing seasons using goats. Research at WVU on a power line right of way, shows that goats reduced brush cover by 98% over 5 years. The effectiveness of the fence depends on the design, how well the fence maintains a charge, and if your goats are trained to the fence.

Temporary fences are generally an electric fence of some kind. Temporary electric fences are probably the most commonly used fencing with goats. The effectiveness of the fence depends on the design, how well it is maintained. High tensile electric fences are effective as long as you keep the fence clear and the electric maintained.

Electric fencing requires a fence charger. There are many options available from chargers that run off of electric, solar powered chargers and battery powered chargers. These options allow fences to be placed almost anywhere. Electric fences also make great divider fences and can increase the rotation of grazing areas. Rotation is important whether you are grazing animals on forages or are using them for brush control. Allowing grazing areas a rest period of 28 to 35 days lets the forage recover and causes a decrease in the parasitic load.

Several goat producers across the country have found a way to increase their income. They rent their goats out for brush and weed control. If you raise goats and want to increase the income from them, then rental goats may be the answer. Many homeowners, municipalities and companies are looking for cheaper and greener ways to control vegetation. Rental goats or brush clearing services use goats to clear land and control unwanted vegetation. There are many factors to consider when planning this enterprise, and you should not jump in without a good plan in place.

Goats offer a good option for vegetation management, with a small investment. Be sure to do your homework, and learn how to manage the goats.

Goat Management for Weed and Brush Control

SPRING GREENS: Great for Cancer Prevention

By Margie Munroe

Greens not only taste great, they work hard to keep you well. People who eat merely three to five cups each week have been found to have a lower incidence of a variety of cancers including lung, colon, breast, prostate and ovaries. If you’ve been through or seen loved ones go through cancer treatment, you can say that a few cups of greens are definitely worth a pound of cure.

The greens that smell sulfur-like when you cook them are members of the Brassica family and include kale, collards, cabbage and Brussels sprouts. They contain organosulfur compounds that lessen the occurrence of a wide variety of cancers, up to 44%. These beneficial compounds work in the body several ways. They activate detoxifying enzymes in the liver to help neutralize carcinogenic substances and even induce some cancer cells to commit suicide. Beneficial compounds signal our genes to increase production of enzymes involved in detoxification, the cleansing process where our bodies eliminate harmful compounds.

Greens contain beta-carotene and vitamin C, which are both anti-oxidants that protect cells from damage, reducing our chances of developing cataracts and lowering our risk of skin cancer. Vitamin C is vital for proper function of the immune system, which keeps us healthy.

Here are a couple of recipes to get you started with eating three to five cups each week:

Old-Fashioned Collards

-1 pound collard greens, coarsely chopped
-1 medium onion
-2 cans reduced sodium chicken broth
-1 slice turkey bacon
-1 tablespoon butter or reduced fat margarine

Place all ingredients except butter in a large pot with a lid. Bring to a boil. Lower heat and simmer for 10 to 15 minutes. Drain broth from greens and toss in butter or margarine before serving.

Anticipating Too Many Tomatoes?

FROZEN TOMATOES ARE GREAT FOR A COLD WINTER DAY

It is possible to quickly freeze raw tomatoes without blanching them first. They may be frozen without their skins or frozen whole with their skins. Frozen tomatoes are best used in cooked foods such as soups, sauces and stews as they become mushy when they’re thawed.

To wash, wet each tomato with water, rub its surface, rinse it with running water, and dry it with a paper towel. After washing, cut away the stem scar and surrounding area and discard it before slicing or chopping the tomato. Washing tomatoes in a sink filled with water is not recommended since contaminated water can be absorbed through the fruit’s stem scar. The use of soap or detergent is neither recommended nor approved for washing fruits and vegetables, because they can absorb detergent residues.

Tomatoes may be frozen whole, sliced, chopped, or puréed. Additionally, you can freeze them raw or cooked, as juice or sauce, or prepared in the recipe of your choice. Thawed raw tomatoes may be used in any cooked-tomato recipe. Do not try to substitute them for fresh tomatoes, however, since freezing causes their texture to become mushy. Tomatoes should be seasoned just before serving rather than before freezing; freezing may either strengthen or weaken seasonings such as garlic, onion, and herbs.

-Freezing whole tomatoes with peels: Prepare tomatoes as described above. Cut away the stem scar. Place the tomatoes on cookie sheets and freeze. Once frozen, transfer the tomatoes from the cookie sheets into freezer bags or other containers. Seal tight. To use the frozen tomatoes, remove them from the freezer a few at a time or all at once. To peel, just run a frozen tomato under warm water in the kitchen sink. Its skin will slip off easily.

-Freezing peeled tomatoes: If you prefer to freeze peeled tomatoes, you can wash the tomatoes and then dip them in boiling water for about 1 minute or until the skins split. Peel and then freeze as noted above.

To extend the time frozen foods maintain good quality, package foods in material intended for freezing and keep the temperature of the freezer at 0 degrees F or below. It is generally recommended frozen vegetables be eaten within about 8 months for best quality.

(Alice Henneman, MS, RD, UNL Extension in Lancaster County)
**Home Gardening on the Rise**

**NC COOPERATIVE EXTENSION OFFERS ON-LINE RESOURCES**

According to the National Gardening Association, 37 percent of all U.S. households, or about 43 million families, plan to grow vegetables, fruit, berries or herbs in 2009. That’s up 19 percent from 36 million families in 2008.

In a survey of households planting vegetables, 54 percent say they are growing their own food to save money. Some people are worried about the industrial food system and want more control over their own food supply. Others site the superb flavor and nutritional value of garden grown vegetables, plus the ability to grow what isn’t found in grocery stores.

To assist those who have gardening questions, NC Cooperative Extension has put together excellent gardening resources:

www.ces.ncsu.edu/depts/hort/consumer/ag_publications.html

This website brings you to NCSU and NC-CES Horticultural Publications, available as PDF documents.

www.ces.ncsu.edu/depts/hort/consumer/hortinternet/

The NCSU Horticulture Department has compiled information on various types of plants and garden topics at this website.

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**Bethyl and Mabel Schools to Begin Gardening Projects this Fall**

Yes, there is one good thing about school starting in mid-August. There’s time to cultivate school gardens. When the weather is beautiful, most of us would rather be outside. Many classroom subjects “come to life” in a garden, including wildlife habitats and pollination, nutrition and cooking, botany, soil science, math, microbiology and many others. For more information, check out the National Gardening Association’s Gardening with Kids website: http://www.kids-gardening.com/. Gardening tools, books and curriculum connecting gardening with the subjects, soil amendments and compost is funded by the Childhood Obesity Demonstration Project.

Bethel and Mabel schools were selected because they participated in the Farm-to-School pilot project during the 2008-2009 school year. Master Gardener volunteers will help prepare the garden beds this summer, but more help is needed. If you would like to volunteer this summer, contact Margie Mansure at 264-3061.

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**HIGH COUNTRY FARM AND GARDEN TOUR AUGUST 8-9, 2009**

The 2009 High Country Farm and Garden Tour, hosted by Blue Ridge Women in Agriculture, will be held Saturday, August 8th and Sunday, August 9th from 1-5 pm. Participants will be able to visit farms located in Wilkes, Ashe, Allegheny and Watauga Counties. Wristbands are $20 in advance or $25 if purchased at a farm and are good for one carload of people for the entire weekend or pay $10 per farm. Volunteers are needed and can attend the tour for free on the day they are not volunteering. For more information or to purchase your wristband, please visit www.brwia.org or call 304-923-7474.

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**4-H NEWS**

**4-H CENTENNIAL HIGHLIGHT**

4-H celebrates its centennial year in 2009. While 4-H reached 100 nationally in 2002, it was not until 1909 that 4-H began to take root in North Carolina. The 4-H movement began springing up at a time when there was a need for agricultural education and improvement.

“4-H didn’t really start in one time or place. It began around the start of the 20th century in the work of several people in different parts of the United States who were concerned about young people.

The seed of the 4-H idea of practical and “hands-on” learning came from the desire to make public school education more connected to country life. Early programs tied both public and private resources together for the purpose of helping rural youth.

During this time, researchers at experiment stations of the land-grant college system and USDA saw that adults in the farming community did not readily accept new agricultural discoveries. But, educators found that youth would “experiment” with these new ideas and then share their experiences and successes with the adults.

So rural youth programs became a way to introduce new agriculture technology to the adults. A.B. Graham started one such youth program in Ohio in 1902. It is considered the birth of the 4-H program in the U.S. When Congress created the Cooperative Extension Service at USDA in 1914, it included boys’ and girls’ club work. This soon became known as 4-H clubs - Head, Heart, Hands, and Health.” (http://www.national4-h-headquarters.gov/about/4h_history.htm)

Mr. Graham contended that “Not only must provision be made for the three R’s in school, but also for the three H’s as well -

- The head for wealth of information and knowledge,
- The heart for moral and spiritual strength, and
- The hand for manual dexterity and skill.” (http://www.ohio4h.org/centennial/Founder4.html)

Today, 4-H is one of the largest youth development programs in America. As in the past, there are four H’s and they stand for:

- Head- Managing, Thinking
- Heart- Relating, Caring
- Hands- Giving, Working
- Health- Being, Living

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**4-H NEWS**

**4-H SUPER SUMMER**

A variety of topics will be explored in the 4-H Super Summer series. Spaces are still available for:

**PIZZA ADVENTURE WEEK LOCAL FOOD FOR LOCAL KIDS**, Monday-Thursday, July 6-9

Ages 6-10 explore local sources of food as you collect ingredients for pizza. Make pizza and have other food fun. See a cheese factory, dairy and other farms, do a farmer’s market scavenger hunt and more!

**BATH SCIENCE**, Monday, July 27

Make your own soap, lip balm and bath salts

**AEROSPACE ADVENTURES**, Wednesday, July 29

Make and launch your own rocket. This workshop is a blast!

**FOOD CONNECTIONS**, Thursday, July 30

Explore where some of your favorite foods come from and make some sweet treats from scratch!

Hint: Hershey and Wrigley would be proud!

Pre-registration is required. Call the Extension office at 264-3061 for more details or to register.

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**4-H “To Make The best Better” for 5-8 Year Olds!**

Looking for something fun, inexpensive and educational for your 5-8 year old to do this summer? Do you want a chance to explore and learn new things with your youngster? Watauga 4-H is introducing a new group that may be for you! This summer Ms. Shelley Armour, Ag teacher/FFA advisor at WHS & former 4-Her, and Maya Losardo, former 4-Her, will be forming a Cloverbud 4-H group for 5-8 years olds. It is a wonderful opportunity for your children to explore new things such as citizenship, science, performing arts, and even some math! They will be learning how to “make the best better” and how to explore a topic in order to learn more.

The topics planned for this summer include: expressive arts, theater, foods and fitness, nature, and more.

This summer meetings will be on Thursdays, June 18, July 2, July 9, July 30 and August 6. Meetings will start at 6:00p.m. The June 18 session will be held at the Agricultural Conference Center, but other sessions may meet elsewhere, so be sure to get your name on the interest list by calling the Cooperative Extension Office at 264-3061.

We look forward to seeing you there!
### July

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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>2</td>
<td>4-H Cloverbud group (5-8 year olds), 6pm - 7pm, location TBA</td>
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<td>6</td>
<td>Farm City Committee planning meeting, 8:30am - 10:00am, Agricultural Conference Center</td>
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<tr>
<td>9</td>
<td>4-H Cloverbud group, 6 pm, location TBA</td>
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<tr>
<td>22-25</td>
<td>Taking Charge of Your Diabetes, 9am - 1 p.m., Agricultural Conference Center in Boone</td>
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<td>27</td>
<td>4-H Bath Science workshop</td>
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<td>28</td>
<td>Extension Advisory Council meeting, 11:30am - 1:30pm, Agricultural Conference Center</td>
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<td>29</td>
<td>4-H Aerospace Adventures, 10am - Noon, Old Cove Creek School picnic shelter</td>
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<td>29</td>
<td>Plant and Insect Clinic at the Watauga Farmers’ Market, 4pm - 7pm. Bring your plant problems or insect samples to be identified by Extension Agents and Master Gardener Volunteers.</td>
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<td>30</td>
<td>4-H Food Connections, 2pm - 4pm</td>
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<td>30</td>
<td>4-H Clover Group, 6pm - 7pm, location TBA</td>
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<tr>
<td>30</td>
<td>Watauga Extension Mountain Greenery Field Day, 1pm - 6pm. Pesticide credits will be available. Location TBA.</td>
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### August

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<tr>
<td>1</td>
<td>4-H Club Information Session</td>
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<td>3</td>
<td>Farm City Celebration, Blair Farm</td>
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<td>6</td>
<td>4-H Cloverbuds, 6pm - 7pm, Agriculture Conference Center</td>
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<td>8-9</td>
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**FARMERS’ MARKETS EXPANDED HOURS MAKE BUYING LOCALLY GROWN FOOD EASIER**

Do you crave high quality, locally-grown food but want to sleep in on Saturday morning? Swing by the Watauga County Farmers’ Market on your way home from work on Wednesdays from 4-7 p.m. beginning June 17 until September 30. Located at Horn in the West.

For those who live on the Western side of the county, check out the new Johnson County Farmers’ Market, open Saturdays, 8 a.m. till noon. The market is located in the metal quonset building just off the corner of 421 and 167 in Mountain City. On July 7th the market will be open on Tuesday nights from 3-7 p.m. and will continue through October.

The Valle Crucis Farmers’ Market is open Fridays, 2 - 6 p.m., just in time for the weekend. It is located behind the original Mast Store.

The High Country Farmers’ Market is now located at Earth Fare on King St., Sundays from 10 a.m. until 2 p.m.