EVENTS ON THE HORIZON

JULY 10: Onslow County Master Gardeners Monthly Meeting: Onslow County Complex, 4024 Richlands Hwy. Jacksonville. 9:00 - 11:00 am.

JULY 14: Onslow County Beekeepers Assoc. Monthly Meeting: Onslow County Complex, 4024 Richlands Hwy. Jacksonville. 7:00 - 9:00 pm.

JULY 14: Satellite Plant Disease and Insect Clinic: Onslow County Complex, 4024 Richlands Hwy, Jacksonville. 10:00 am - Noon

AUGUST 4: National Nite Out: Kerr Street Park, Jacksonville

AUGUST 11: Onslow County Beekeepers Assoc. Monthly Meeting: Onslow County Complex, 4024 Richlands Hwy. Jacksonville. 7:00 - 9:00 pm.

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LOOKING BACK

This past season has once again contained some very unusual weather patterns. It seems that abnormal is the norm. Twice this winter night time lows dipped into the mid-teens and in the middle of May we had a week of cool, cloudy weather with night time temperatures in the low sixties. The effect on plants has been quite dramatic. Winter kill has been fairly common on centipedegrass and winter injury has been prevalent on a variety of trees and shrubs. The cool period in May followed by bright sunshine produced air pollution injury, most likely ozone damage on a host of garden vegetables. It may also account partly for the failure of many tomato varieties to set fruit in home gardens.
The burning of coal and other fossil fuels gives rise to various chemical pollutants such as \(\text{SO}_2\) (sulfur dioxide), \(\text{NO}_x\) (nitrogen oxides such as nitrite, nitrate, etc.), \(\text{O}_3\) (ozone) as well as a variety of other hydrocarbons. Ozone and peroxyacetyl nitrate (PAN) produced in these reactions can become injurious to plants depending on concentration and duration of exposure. Ozone causes up to 90 percent of the air pollution injury to vegetation in the United States and negatively influences plant growth and development causing decreases in yield. Ozone injury to watermelons is common in the mid-Atlantic area. After ozone, PAN is the next most phytotoxic air pollutant.

**Movement of Pollutants into Plants:** Most of the polluting gases enter leaves through stomata, following the same pathway as \(\text{CO}_2, \text{NO}_x\) dissolves in cells and gives rise to nitrite ions (\(\text{NO}_2\), which is toxic at high concentrations) and nitrate ions (\(\text{NO}_3\) that enter into the nitrogen metabolism of the plant as if they were absorbed by the roots). In some cases, exposure to pollution, particularly \(\text{SO}_2\), causes stomates to close, which protects the leaf against further entry of the pollutant but also stops photosynthesis. In the cells, \(\text{SO}_2\) dissolves to produce sulfite ions, which can be toxic, but at low concentrations they are effectively detoxified by the plant. \(\text{SO}_2\) air pollution can actually provide a sulfur source for the plant.

**Crops Affected:** Tomato, watermelon, squash, potato, string beans, snap beans, pinto beans, tobacco, soybeans, cantaloupe, muskmelon, alfalfa, beets, sunflower, carrots, sweet corn, gourds, green peas, turnips, grapes, peaches, and strawberries are some of the more susceptible crops to air pollution damage. Cucumbers, pumpkins, and peppers are less susceptible. Watermelon and squash are the most sensitive of the cucurbits followed by cantaloupe.

**Symptoms: Oxone:** Ozone is considered the most damaging phytotoxic air pollutant in North America. Injury is most likely during cloudy, humid weather with stagnant air masses. Symptoms consist of small, irregular shaped spots or flecks that range in color from dark brown to black or light tan to white. Symptoms also include stippling (small darkly pigmented areas approximately 2-4 mm in diameter), bronzing, and reddening. These symptoms usually occur between the veins on the upper leaf surface of older and middle-aged leaves, but may also involve both leaf surfaces for some species and cultivars. The type and severity of injury depends on the duration and concentration of ozone exposure, weather conditions, and plant genetics. Some or all of the symptoms can occur on vegetables under various conditions. Symptoms on one cultivar can differ from the symptoms on another. With continuing ozone exposure the symptoms of stippling, flecking, bronzing, and reddening are gradually replaced with chlorosis and necrosis. Early ozone foliar damage can resemble severe spider mite injury. The presence of mites can be confirmed by examining the underside of the leaf. As the exposure to ozone continues the spots may fuse forming larger necrotic areas. Due to the tissue collapse induced by ozone, leaves are prone to infection by pathogens such as *Alternaria* sp (early blight) and will senesce sooner. Plants that are exposed to high ozone concentrations metabolize less carbon dioxide, resulting in less carbon available for soil microbes to utilize. Consequently, soil enrichment and carbon processing decline resulting in decreased soil fertility. Symptoms of ozone damage can appear on one side of a plant or stem depending on the source of pollution and micro-climate.

The injury pattern on the foliage is initially observed on older mature leaves near the crown or center of the plant, often progressing with time to the younger foliage. Ozone injury on beans appears as bronzing on the upper leaf surface and as the problem progresses necrotic lesions are formed that coalesce and become reddish brown.

**Management:** While there is no treatment for ozone injury it may be possible to select certain cultivars that are more tolerant of air pollution compared with others. Little research has been done in this area.
QUINCE RUST ON PEAR TREES

Many people with ornamental or fruiting pears have noticed many of the branches dying back this year. Usually this is the result of a bacterial disease called fireblight. However, this year the fruit appears to be orange in color due to the production of spores by the fungus called quince rust. Removal of the infected branches and fruit by pruning if practical is helpful. The disease does not kill the trees in a single season, but does form cankers and repeated infections over the years can weaken trees. The use of fungicides such as Bayleton, Immunox, Daconil or Mancozeb can be helpful in preventing infections if the tree is of a size where spraying is practical.

SQUASH VINE BORER

The squash vine borer is a very destructive pest of squash and pumpkins. The first symptom is a wilting of the plant followed by collapse of the main stem. The adult is a clear-winged moth that lays eggs on the stem in late May to early June. The eggs hatch in a week and the larvae tunnel in to the stems and mature in 4 weeks. Mature larvae burrow into the soil, pupate and emerge 2-3 weeks later giving rise to a 2nd generation in early August. Success of any insecticide treatment depends upon early and repeated treatments. Unfortunately homeowners have very few products available to them (esfenvalerate and permethrin). They should be directed to the basal stem area. Some homeowners slit the stem lengthwise with a sharp knife and remove/kill the larvae. Others put a shovel full of soil on to the stem to encourage supplemental rooting so the squash vine can overcome the feeding effect of the larvae.

BUILDING YOUR REFERENCE LIBRARY

Hibiscus: Hardy and Tropical Plants for the Garden
By: Barbara Perry Lawton.
Portland Oregon.
$27.95

SPOTLIGHT

WATCH OUT FOR ALIEN INVADERS!

Watch out! Alien invaders are everywhere! Some of them hitched a ride with others; some were brought here intentionally. What? Alien invasive WEEDS! Whether aquatic or terrestrial, they have cost the US billions over the years.

Why are aquatic invasive weeds of concern? Because they...

- form dense growths that impede water flow and increase flooding,
- impair water use for fishing, boating, and other activities, and
- create breeding habitat for mosquitoes and other pests.

The “big three” in eastern NC are alligatorweed, water hyacinth, and parrotfeather.

Alligatorweed (Alternanthera philoxeroides) is believed to have arrived in the US sometime around 1897. It is native to South America and may have arrived in ship ballast water. The first sighting was in Alabama, but it has spread throughout the southeastern states. Attempts to control it are mainly through herbicide application programs, although there has been some success using the Alligatorweed fleabeetle. The plant has a clover-like flower, but does not produce seed. Propagation is through plant fragmentation. Of the three plants, this one is the most widespread in eastern NC waterways and ditches. It even manages to grow on land, and has invaded farm fields; likely transported with the soil when ditches are cleaned out. The state has a cost-share program to help counties and municipalities control the plant.

Water hyacinth (Eichornia crassipes) is a very attractive plant; however, one plant can quickly become thousands. In fact, its beauty is one way that it gets spread. People purchase a plant for their water garden; then, when they get too many plants, they decide to “give some a good home” in a local pond. The plant then takes over. The Brazil native was first introduced to the US as an ornamental aquatic plant at a New Orleans, LA exposition in
1884. It escaped from cultivation and reached Florida by 1890. It is illegal to own or possess the plant in Texas, and carries a hefty fine. It can still be bought and sold in North Carolina. Water hyacinth propagates through both fragmentation and seed formation. Some is found in local waterways, but it is most problematic in ponds.

Parrotfeather (*Myriophyllum aquaticum*) is another attractive plant that people purchase for their aquarium or pond. The plant then “escapes” (birds, flooding, improper plant disposal) to local ponds and waterways. As with the other two plants, it came from South America around 1890. It has spread throughout the southern states and up both coasts. There are several local waterways with small populations of this plant. The parrotfeather is also sprayed, if found during herbicide application to control alligatorweed.

Please help control the spread of these plants and other invasive species. One state came up with a catchy tune to remind boaters of how to help:

“The Ballad of Aquatic Invasive Species”
http://www.uwex.edu/erc/music/song_ballad_of_aquatic.html

If you have any questions about these and other invasive plants, please contact your local NC Cooperative Extension office.

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