

Weather Summary and Environmental Problems of Ornamental Plants in Ohio: 2004

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Introduction

This report includes a compilation of Ohio weather conditions and noteworthy environmentally induced plant problems in 2004. Observations were drawn from information provided in Ohio State University Extension's *Buckeye Yard and Garden Line*, the Ohio Department of Natural Resources *Monthly Water Inventory Report*, the National Weather Service, and the State Climatologist's Office for Ohio.

Discussion

Weather Background

This section discusses precipitation and temperature reports for the season. This section contains tables showing statewide precipitation from January through September, the number of days with temperatures over 90°F, and the average temperatures and departures from normal for three locations in the state, April through September.

January precipitation was above normal across most of the state; the northwestern portion was below normal. Precipitation fell as both rain and snow during every week of the month. The first four days of the month had the most significant amount of rainfall. Several central counties

along and south of Interstate 70 were declared disaster areas as a result of flooding.

February precipitation was below normal across most of the state, with more than a dozen reporting stations receiving less than 0.50". Most of the precipitation fell during the first week. The state was still above normal for precipitation amounts for the year.

Precipitation was scattered during March and was generally above normal except for the western third and in some areas of central and east-central Ohio. Snow amounts were above normal in northeastern Ohio as Geauga County reported 28" of snow for the month. This was notably above the area's normal of 15" for March.

April was below normal for the northwestern part of the state, resulting in the second driest April in 110 years. Several weather stations reported less than an inch of precipitation for the month. Precipitation was above normal for the southeastern portion of the state; Jefferson County reported 6.56" of rain for April.

May was wet, as precipitation was markedly above normal statewide. Regional precipitation averages ranged from 8.09" to 6.31". This was the second wettest May for the state during the past 122 years. Knox County received 11.78" of

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rain in May. Precipitation occurred during every week with some locally severe storms on several days. Year-to-date precipitation was above normal for the state except for northwestern Ohio.

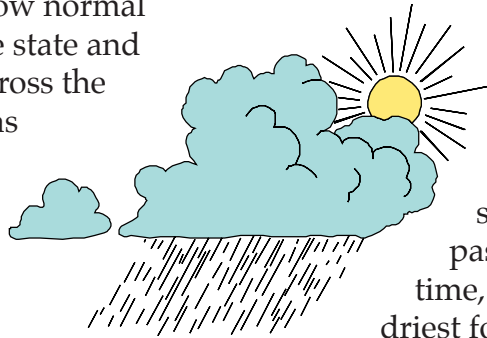
June precipitation was below normal in the southern third of the state and generally above normal across the rest of the state. Tuscarawas County reported 11.09" while Clermont reported the least amount at 1.23". Most of the precipitation occurred during the week of June 9 to 17. Precipitation for the calendar year was still above normal except for northwestern Ohio.

Precipitation in July left portions of the west-central and south-central region below normal; the rest of the state was above normal. Van Wert County reported the greatest amount of precipitation with 9.45", and Jackson County reported the least with 1.78". The majority of the rain fell in the second half of the month.

August also brought above-normal precipitation in most of the state, except for the southwest and south-central regions and a few other scattered locations. Coshocton County reported 8.50" of rain, and Ross County reported 1.34". As in July, most of the rain fell in the second half of the month.

The heaviest rain fell on August 27 across the northeastern area, resulting in severe flooding, with the worst conditions occurring in Columbiana County. The area was in a state of emergency as flash floods washed out several roads and bridges. Estimates indicated that nearly 7" of rain fell in about a six-hour period. Early estimates put the damage at more than \$10 million. Precipitation for the year was still above normal for most of the state.

In September, precipitation was noticeably above normal in the eastern half of the state as a result of hurricane season. It was below normal in the western half, where hurricane after-effects did not occur. The



southeast region averaged 10.25" of rain, while the west-central area averaged 0.92". This was the wettest September for the southeastern and south-central regions in the past 110 years. At the same time, September was the 10th driest for the west-central and southwest-central regions.

Remnants of Hurricane Frances moved through the eastern half of the state on September 9 and dumped anywhere from 3" to 8" of rain. A week later, effects of Hurricane Ivan brought heavy rains to the same areas. Precipitation for the calendar year was above normal statewide.

October precipitation was generally above normal in the southern half of Ohio and below normal in the northern half. The first 12 days were rather dry with light and spotty showers. Precipitation was still above normal statewide. Highland County reported 6.39" while Sandusky County reported 1.35".

Overall, the growing season of 2004 was cool and wetter than normal.

Temperature

Temperatures were generally warmer than normal across the state in April and May and cooler than normal during June, July, and August. The last two summers have been cooler than 2002. See Table 2 for a summary of days over 90°F for June, July, and August for the last three years. Table 3 is a breakdown of the number of days over 90°F for the 2004 season.

Table 1. Statewide Precipitation, January through September, 2004.		
Month	Average Inches Precipitation	Above or Below Normal
January	3.76	+1.19
February	1.38	-0.88
March	3.32	+0.15
April	3.30	-0.28
May	7.01	+3.10
June	4.87	+1.02
July	4.60	+0.52
August	4.26	+0.82
September	4.30	+1.35

Source: Data from Ohio Department of Natural Resources — Monthly Water Inventory Reports.

Table 2. Number of Days Over 90°F in June, July, and August.			
	2002	2003	2004
Cleveland	21	5	0
Columbus	30	5	2
Cincinnati	37	5	4

Table 3. Number of Days 90°F or Above: June – September 2004					
Location	June	July	August	September	Season Total
Cleveland	0	0	0	0	0
Columbus	0	2	0	0	2
Cincinnati	0	2	2	0	4

Month	Cleveland		Columbus		Cincinnati	
	Avg. Temp. F°	Departure F°	Avg. Temp. F°	Departure F°	Avg. Temp. F°	Departure F°
April	49.0	+1.4	52.6	+0.60	53.5	-0.2
May	62.1	+3.6	66.8	+4.2	67.0	+3.3
June	66.7	-0.8	70.1	-1.10	71.0	-1.0
July	71.4	-0.5	73.7	-1.4	73.3	-3.0
August	68.1	-2.1	70.6	-2.9	70.6	-3.9
September	65.8	+2.5	68.0	+1.5	68.5	+1.1

Source: Average temperature is an average of all high and low temperatures recorded daily for the given location. Data for Cleveland were taken from: www.csuohio.edu/nws/climate/cle/climatecle.html Data for Columbus and Cincinnati were taken from: www.nws.noaa.gov/er/iln/lcdpage.htm

Some useful websites for weather-related topics are listed here:

Ohio Department of Natural Resources
Division of Water, monthly water inventory report
<http://www.dnr.state.oh.us/water/>

National Oceanic and Atmosphere Administration (NPOAA) drought report
<http://www.drought.noaa.gov/>

USDA Topsoil Moisture Chart
http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/topsoil.html

Degree day, phenology update for Ohio
<http://www.oardc.ohio-state.edu/gdd>

Environmental Problems in Landscapes

Low temperatures the second week of May led to frost damage on many garden plants. *Buxus* spp. (boxwood), *Acer saccharum* (sugar maple), and many perennials were damaged as a result. Recommendations were to prune out frost-damaged foliage or allow new growth to cover the damage.

Mushrooms and Other Fungi in Lawns and Gardens

A wet spring led to perfect environmental conditions for mushroom development in lawns, gardens, and flower beds. Numerous calls were made to Extension offices with people inquiring about the kind of mushroom and what should be “sprayed” to eliminate them. There are no sprays recommended to eliminate mushrooms. The best remedy is to wait until they dry up or use a rake or mower to knock them down. Mushrooms tend to sprout from underground fungal growth after prolonged periods of wet weather and often in areas where dead organic matter has accumulated.

Shotgun or artillery fungus continued to persist as a landscape problem and reared its ugly head in mid-April. The fungus, *Sphaerobolus stellatus*, is commonly found in mulched beds and is one of the many organisms responsible for decomposing organic matter in the landscape. The problem with this fungus is that it produces small cup-shaped fruiting structures that shoot spore masses high into the air. The black globules that resemble spots of tar remain stuck to

anything they touch and can be difficult to remove.

Improper Mulching Continues

Volcano mulching is a problem that has been continually addressed by Extension educators, yet it still is practiced in the landscape. This inappropriate method of piling mounds of mulch against the tree trunk can cause a tree to decline in the landscape. Trees that are mulched too deeply can develop stem girdling roots (SGR). As these SGRs continue to grow, they may circle and eventually girdle the tree. A two- to three-inch layer of mulch is sufficient and should be applied such that it is a few inches away from tree trunks and shrub stems.

Other mulch problems include *mulch roots* when shovels or mechanical edgers are used to create a ditch around the edges of mulched areas. The challenge with this practice is that tree roots are often severed, and the resulting tree root system is then confined to the mulched area.

Wet Soils and Sour Mulch

Torrential rains in May left some soils too wet to work. The best advice, of course, was not to work wet soils. However, there are times when plants have to be planted in the landscape. When this occurs, the recommendation is to minimize compaction damage by working in as small an area as possible and avoiding equipment and pedestrian traffic on waterlogged soils. Planting during the wet spring of 2004 was likely responsible for plant stresses later in the season.

A wet spring also provided the perfect conditions for *sour mulch*. Normally, mulch has a pleasant, humus-like odor that is similar to compost or fresh-cut wood. However, under extreme wet conditions,

mulch undergoes anaerobic (without oxygen) decomposition, and the microbes produce organic alcohols and acids that have a strong sour odor or an acrid or alcohol-like smell. This *sour mulch* can damage fibrous plant roots and may kill herbaceous plants and turfgrass. If you have this mulch, spread mulch out in a thin layer on a driveway or tarp to aerate until the odor and volatiles dissipate. This may take several days.

Walnut Toxicity

Extension offices frequently receive questions about the adverse effects of black walnut on nearby plants in the landscape. This plant chemical warfare is known as an alleopathy. The roots of black walnut (*Juglans nigra* L.) and butternut (*Juglans cinerea* L.) produce a substance known as juglone that occurs in the leaves, bark, and wood of walnut, but in lower concentrations than in the roots. Juglone is poorly soluble in water and does not move very far in the soil. Many plants, such as tomato, potato, blackberry, blueberry, azalea, mountain laurel, rhododendron, red pine, and apple, may be injured or killed within one or two months of growth within the root zone of these trees.

The toxic zone from a mature walnut tree occurs on average in a 50' to 60' radius from the trunk, but can be up to 80' or more. Young trees 3' to 8' in height can have a root diameter twice the height of the tree's canopy, with susceptible plants dead within the root zone and dying at the margins. Susceptible plants that have contact with walnut roots wilt shortly thereafter, even when there is ample soil moisture. Wilting may occur on only part of a plant, or the whole plant may be affected. If detected early, plants in the early stages may recover if additional water is applied. Later, wilting becomes more severe, and browning of the leaves

along with wilting usually results in the death of the plant.

Though there is anecdotal information on plants that are affected, there is no sound scientific research on the subject. Ohio State University Extension (OSUE) has a list of plants that have been observed growing near black walnuts and whether they are affected. OSU Extension Fact Sheet *Black Walnut Toxicity to Plants, Humans, and Horses* (HYG 1148-93) can be obtained from county Extension offices or online at ohioline.osu.edu

Yellow Leaves on Maples

A lively discussion occurred this year on BYGL when participants were pressed to diagnose interveinal yellowing of maple leaves in a commercial landscape. First impressions were to consider manganese deficiency. However, the discussion quickly branched out into the difficulties of diagnosing such a common problem. Rather than gravitating toward a common cause, the diagnostician must consider other possibilities to avoid overlooking other plant-health issues. Here is the result of the discussion:

“First, use soil tests and foliar analysis to identify if a nutritional disorder exists and what that disorder may be. Quick fixes of foliar-applied iron chelates could provide temporary greening, but may in the long term exacerbate the problem under some circumstances if the problem instead is manganese deficiency. The soil test will address the issue of nutrient unavailability due to high pH. The foliar analysis will help identify elements actually in short supply within the leaf.

“Second, look at the roots. Conditions inhibiting movement of nutrients into the plant could show up as deficiency symptoms even if the nutrient is available in the soil. Check for girdling

roots, girdling twine or wire, disease, or damage from compaction or poor drainage. Air spades provide a non-destructive method of examining root conditions, though careful examination with hand tools is always possible. Samples can be submitted to the C. Wayne Ellett Plant and Pest Diagnostic Clinic.

“Third, determine if the tree was properly installed. Poor preparation or improper planting can contribute to a host of problems years after the initial installation. Finally, consider local environmental stresses that might be causing leaf drop or discoloration. Step back and look at the whole landscape to determine if heat, drought, construction, or traffic patterns are an issue. Pinpointing the cause of leaf chlorosis is not as simple as it might seem. Make use of available resources and do not focus on the easiest answer, as it might not be the correct answer.”

Flood Damaged Trees and Other Plants

The floods in August led to the question: “What is the long-term effect of flood water on trees?” It depends on many factors, such as if the tree species is an upland or lowland species (e.g., flood plain species) and how long the tree roots were flooded. The good news was that most trees, even upland or flood-sensitive ones, escape injury if flood waters recede within seven days. From the BYGL:

“If flood waters cover roots of sensitive trees for longer periods, injury may occur. Flood injury may be exhibited by symptoms such as curling of leaves, leaf chlorosis, and leaf drop. Branch dieback may also occur. In extreme cases of prolonged exposure to flooding, the entire tree may die. Water temperature and

running or stagnant water conditions may also play a role. Flooding restricts the amount of oxygen in the soil, especially in slowly moving or stagnant water. Cold water helps slow or delay the response of the trees to flooding, while swiftly running water removes layers of soil exposing roots or it may deposit silt and soil on top of the roots. Actively growing tree roots use oxygen at higher rates than when they are dormant.

“Silt deposited when flood waters recede further restricts oxygen availability to the roots, especially on newly planted trees or young seedlings. Tree roots also must contend with toxic compounds carried by the flood waters or produced as a byproduct of anaerobic (without oxygen) decomposition of dead plant materials. A simple bioassay, using tomatoes planted into the deposited silt and soil, will determine if toxic compounds are present.

“Species native to upland habitats, such as pines, white and red oak, sugar maple, tulip tree, black walnut, redbud, linden, and flowering dogwood, exhibit little tolerance to flooding. Healthy, native bottomland species, such as silver maple, green ash, American elm, hackberry, hawthorn, osage-orange, walnut, box elder, river birch, cottonwood, and sycamore, seemed to fare best even after extended periods of flooding. Some species, such as baldcypress, black willow, and water tupelo, tolerate months of floodwaters. Seedlings and saplings of these species that were completely inundated suffered the same fate. Similarly, overmature and stressed trees did not do well.

“Stress allows the weakened trees to be invaded by insects and disease organisms. These ‘secondary attackers’ prey on stressed trees, most likely due to

restricted defense systems of the trees. Stem borers are an important group of insects to be concerned with after a flood or other severe stress event. Borers affect both the water- and food-conducting systems in the trees, creating additional stress, which eventually may lead to plant death.

“Diseases most likely to occur are root rots and cankers due to stressed root systems; also, wounded stems and branches provide easy entrance for diseases.”

Dry Plants in September

Despite all of the weather information indicating that the state was above normal in precipitation amounts, September was warm and dry for the west central and southwest part of the state. Gardeners were encouraged to water trees and shrubs deeply to avoid damage and potential loss to new plants. Those in the eastern portion of the state didn’t want to hear any more about water; they’d had enough.

References

1. Dr. Jeffery Rogers, State Climatologist, with the State Climatologist’s Office for Ohio, provides current and archived weather information for several locations in the state. This information is available at: <http://www.geography.ohio-state.edu/faculty/rogers/statclim.html>
2. The National Weather Service Forecast Office, Cleveland, Ohio, at: <http://www.erh.noaa.gov/cle/climate/cle/climatecle.html>
3. The National Weather Service Forecast Office, Wilmington, Ohio, at: <http://www.erh.noaa.gov/er/iln/lcdpage.htm>
4. The Buckeye Yard and Garden onLine is available at: bygl.osu.edu

