Long-term Impact of Drought on Trees & Shrubs

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Objectives

- Severe Weather Extremes
- Plants Response to Drought
- Biotic & Abiotic Factors
- Tree Care Maintenance

Severe Weather Extremes

- Winter Cold
- Frozen water is not available to the tree.
- Late Spring Frosts
- Temperature fluctuate between 20s' and 60s.
- Damage is dessication (drying) of shoots, buds, and foliage.

Severe Weather Extremes

- Summer Drought
- Leaf Scorch
- **Scorch** has been described as milder than wilt in scope, and the result of a progressive restriction on the vascular system, meaning it is more chronic than acute in nature. Leaves suffering from scorch do not become flaccid before turning necrotic.

Severe Weather Extremes

- Summer Drought
- Leaf Wilt
- **Wilt** is characterized by leaf drooping, followed by chlorosis, necrosis, and abscission. It is typically caused by a major disruption to the main translocation system of the roots, stems, and petioles caused by relatively sudden (acute) agents like drought or vascular disease.

Plants Response to Drought

- Photosynthesis Stops.
- Buds, Bark, and Roots decline.
- Slowing Plant Growth.
- Inability to make defensive chemicals.
- Sunscald or Frost Crack from Winter Injury.

Plants Response to Drought

- Plant tissues damage are more prone to invasion by fungi or bacteria.
- Shoots dieback.
- Entire plant wilts.
- Roots systems begin to decline and prolonged drought will kill the plant.

Plants at Increased Risk

- Plants in the first year of transplant.
- Any plant in a difficult site – For example clay soils or sites with limited space.
- Plants with poor root systems.
- Mechanical damage from construction.

Trees with Shallow Roots Susceptible to Drought

- Maples
- Elms
- Honey Locust
- London Plane

Trees That Tolerate Heavy Clay

- Hedge Maple (Small)
- River Birch
- Honey Locust
- Flowering Plum (Small)
- London Plane
- Bald Cypress
- Hawthorne (Small)
- Elm
- Silver Maple
- Autumn Blaze Maple
- Spruce
- Austrian Pine
- Pear (Medium)
- Swamp White Oak
- Crab Apple

Trees That Tolerate Clay

Trees That Tolerate Poor Soil

- Hedge Maple
- River Birch
- White Pine
- Hornbeam
- Flame (Amur) Maple
- Turkish Filbert
- Honey Locust
- Hackberry
- Austrian Pine
- Silver Maple
- Hawthorne
- Kentucky Coffee Tree
- Larch
- Catalpa
- Elm
- Ginkgo

Trees That Tolerate Poor Soil

Diseases Promoted by Drought

- Armillaria Root Rot
- Dutch Elm Disease
- Pine Wilt Nematode
- Verticillium Wilt – Especially Norway Maples
- Canker Fungus

Abiotic Factors

- Sensitive to Pesticides
- Herbicides
- Insecticides
- Phytotoxicity
- Sensitive to De-Icing Salts
- Construction
- Pollution

Biotic Factors

- Insects
- Animals
- Humans - St. Patrick's Day Massacre
- Climate – High winds
- Plant Competition for Water & Nutrients

Tree Care Maintenance

1. **Water** – a new tree planted (2 inch caliper) needs 15-20 gallons per week from May 15 to November 15 for two growing seasons.
2. Large Mature trees can use 100-300 gallons of water a week.
3. When the temperature goes above 80 degrees in the summer, mature trees may need 5 gallons of water per inch diameter.
4. For example, a 10 inch diameter tree would need 50 gallons of water per week to sustain through a drought.

Tree Care Maintenance

1. **Mulch** – Mulch the tree out 2-3 feet from the truck to protect the tree from lawn mower damage or weed whip damage.
2. It is preferred to use organic mulch versus rocks.
3. Apply the mulch 2-3 inches deep.
4. Place the mulch at least 6 inches away from the trunk on small trees under 12 inches in diameter to allow the tree to perform transpiration and respiration.
5. Place mulch 12 inches away from the trunk on large mature trees over 12 inches in diameter.

Tree Care Maintenance

1. **Aerate** - Most roots of the tree are in the upper 12-18 inches of soil.
2. Overtime the soil gets compacted and the roots saturate the space.
3. Ideal oxygen content to soil is 12% but drops as the soil is compacted.
4. Trees start to show damage in the canopy at 8% oxygen content and will decline or die below 5%.
5. Soil aeration is done to stimulate new feeder root growth and improve the oxygen content of soil.

Tree Care Maintenance

1. **Fertilization / Micronutrients**
2. Newly planted trees typically do not need fertilizer.
3. However, new research suggests that minimum amounts of fertilizer and micronutrients can help a newly plant tree survive stresses such as drought, transplant shock, and potential insect/disease issues.
4. Large mature trees overtime have absorbed all the nutrients in the soil.
5. Large mature trees will need fertilizer/micronutrients to help with long-term health.

Tree Care Maintenance

1. **Maintenance Pruning** –
2. Trees require performing 3-5 year intervals. Newly planted trees should be allowed to grow for two years before pruning to allow the tree to recover from transplanting.
3. The tree should be pruned in year three, in years 6-8, in years 11-13, in years 16-18, and in years 21-23.
4. Large mature trees should be pruned very five years to remove dead or diseased branches, hanging branches, and any storm damage.

Long-Term Tree Care Maintenance

- Select Native Species
- Select the Proper Sites
- Follow Proper Planting Techniques
- Water, Water, Water
- Monitor Weather

New Tools for EAB Detection

Train Pointers for EAB Detection

Borer Buzzards for EAB Detection

Tree Quiz

- Utility Tree
- Dead Tree
- Banded Tree
- Tagged Tree

Tree Quiz

- **Utility Pole**
- Dead Tree
- Banded Tree
- Tagged Tree

Arborist Division Staff -2007

Questions?

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