

Urban Trees and Allergies in North Florida¹

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Trees are an integral part of our communities. Found on city streets, parks, parking lots, vacant areas, schools, and backyards they are a source of shade, beauty, community empowerment, and environmental benefits. Trees and the pollen they produce, however, can also be problematic for people with allergies.

Approximately 50 million people each year are affected by allergies due to plant pollens as well as airborne particles of dust and animal dander (Asthma and Allergy Foundation of America 2005). An allergy is an abnormal reaction to a very small amount of a specific substance, called an allergen (Jelks 1989). Allergens can enter the body a variety of ways: ingestion, inhalation, injection, or contact with the skin. Common symptoms of allergic reactions include watery eyes, itching, coughing, congestion, hives, runny nose, fatigue, asthma attacks, and, in severe cases, death. Approximately 7 billion dollars a year are spent on doctor visits and allergy medication, and allergies cause approximately 4 million missed work days (AAFA 2005).

Tree Pollen

All flowering plants produce tiny, dust-like grains called pollen. These grains are produced by anthers, the male reproductive structure of the plant. Pollen is dry and light and can travel by wind for several miles. Pollen must eventually reach the female reproductive structure, the ovary, of a plant of the same species. There the pollen fertilizes the ovule, which then develops into new plant

seeds. Insects, gravity, wind, and water move pollen from one flower to another.



Figure 1. A layer of pollen covering a small pond in Disney World, Orlando, Florida.

Credits: Dolores A. Russo. <http://epod.usra.edu>

Plant species that are insect pollinated do not have to produce large amounts of pollen because of the efficiency of insects in distributing pollen as they move among flowers. However, species that depend on wind for pollen dispersal must produce massive amounts of pollen since only a very small amount will actually reach female flowers in that species. The species that produce these huge volumes of wind-dispersed pollen (pines and oaks, for example) are the species that usually cause problems for people with allergies.

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Pollen quantities produced vary from tree to tree as well as from one season to the next. Changes in the weather influence the degree to which pollen affects allergy sufferers. For example, rain dampens pollen, preventing its flow into the air, and an unexpected freeze can slow a tree's pollen production. On the other hand, pollen counts increase when windy weather spreads pollen through the air, and a mild winter may cause trees to pollinate earlier and bring an early start to the allergy season, and potentially a longer season (American College of Allergy, Asthma and Immunology 2007).

Tree Allergenicity Ratings

The relation between trees, people, pollen, weather, and allergenicity is complex. Plant allergy researcher Thomas Ogren provided a simple way to characterize the differences in potential allergenic effects among trees growing in close proximity to people by creating the Ogren Plant-Allergy Scale or OPALS (Ogren 2000). The OPALS scale helps homeowners and landscapers determine the allergenicity of plants. Trees are assigned a rating of 1 to 10 to measure their allergenicity, or potential to cause problems for allergic people. Most allergenic effects of plants were taken into consideration in the OPALS rating: reaction to contact with leaves and sap, reactions to odor, and effects of inhaled pollen. Plants assigned a 1 on the scale are least likely to cause allergenic reactions in most people, whereas trees assigned a 10 should be regarded as highly allergenic.

Table 1 lists fifteen commonly used native trees in both rural and urban areas in north Florida and their OPALS rating. Two allergenic ratings are used for species in which male and female flowers occur on separate trees. The female variety's rating is listed first. The female versions of eastern red cedar, hollies, and waxmyrtle have lower OPALS allergenicity ratings, whereas the male versions of these species rate on the high end of the allergenicity scale. Trees listed with higher allergenicity ratings may cause allergies in many people.

Other trees commonly growing in north Florida residential areas with a low allergenicity rating are fringe tree (*Chionanthus virginicus*), sparkleberry (*Vaccinium arboretum*), tulip poplar (*Liriodendron tulipifera*), and southern magnolia (*Magnolia grandiflora*), with an OPALS rating of 1, 2, 4, and 5 respectively. Although eastern hophornbeam (*Ostrya virginiana*) and river birch (*Betula nigra*) both have a relatively high rating of 7, these species also have short bloom periods, which decreases the impact of their pollen on people with allergies.

Gainesville Urban Trees as an Example

Trees commonly used in north Florida residential areas are a mixture of low and high pollen producers. For example, a recently completed study of the urban forest in Gainesville, Florida found that the nine most common trees in residential areas are red maple, sweetgum, Carolina laurel cherry, waxmyrtle, laurel oak (*Quercus laurifolia*), loblolly pine (*Pinus taeda*), slash pine (*P. elliottii*), spruce pine (*P. glabra*), and water oak (*Q. nigra*) (Zipperer and others 2008). The highest percentage of trees found in residential areas of Gainesville are laurel and water oaks, which have higher OPALS ratings than slash and loblolly pines, although the pines annually produce very large amounts of pollen.

Strategies to Reduce Pollen Exposure

Trees are an integral link in our urban ecosystem. But they can incur costs in the form of maintenance needs and can cause other problems to people and built infrastructure (Escobedo and Seitz 2009). Proper landscape planning and species selection, however, can reduce the potential that trees will cause problems for people with pollen allergies. Although pollen can be carried by the wind for long distances, steps can be taken to minimize the effects of pollen around your home. The following practices can help:

- Incorporate trees with an allergy rating of 5 or less.
- Plant female-bearing plants to reduce the amount of available pollen.
- Dry clothes in an automatic dryer rather than hanging them outside to avoid pollen collecting on clothing and being carried indoors.
- Consider limiting outdoor activities during the pollen season (Florida trees often release pollen from January to June).
- Stay inside during peak pollen times (from 10 am–4 pm).
- Restrict outdoor activities during days with high winds and low humidity.
- Shower after spending time outdoors to remove pollen from hair and skin.
- Use air filters and clean regularly, or run an air conditioner and change the air filter frequently.
- Wear a dust mask when mowing the lawn, gardening, or raking leaves.

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Table 1. Fifteen Native Tree Species for North Florida with Their OPALS Pollen Rating. Note, in species with two ratings, the female variety's rating is listed first, male is listed second.

Tree Species ¹	Ogren's Pollen Allergenic Scale Rating ²
Eastern red cedar (<i>Juniperus virginiana</i>)	1, 10
Hollies (<i>Ilex</i> spp.)	1, 7
Red maple (<i>Acer rubrum</i>)	1, 7 – 8
Waxmyrtle (<i>Myrica cerifera</i>)	2, 9
Sparkleberry (<i>Vaccinium arboretum</i>)	2
Persimmon (<i>Diospyros virginiana</i>)	3
Loblolly bay (<i>Gordonia lasianthus</i>)	3
Pines (<i>Pinus</i> spp.)	4
Southern crab apple (<i>Malus angustifolia</i>)	4
Eastern redbud (<i>Cercis canadensis</i>)	5
Flowering dogwood (<i>Cornus florida</i>)	5
Carolina laurel cherry (<i>Prunus caroliniana</i>)	7
Sweetgum (<i>Liquidambar styraciflua</i>)	7
Oaks (<i>Quercus</i> spp.)	8
Winged elm (<i>Ulmus alata</i>)	8

From: Meerow, A.W. and J.G. Norcini 2003¹; Ogren, T.L. 2000².