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Allergies, Asthma and City Trees

By Thomas Ogren

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Some urban tree species cause an inordinate amount of asthma and allergy problems, while other tree species cause little or no health problems. A large part of the problem is that the arborists and landscape professionals, who plant these trees, often don't know the difference.

The type of trees (and shrubs) used in modern city landscapes has changed dramatically in the past three decades. In the past, the majority of street trees used were perfect-flowered, insect-pollinated trees, such as the once so common American elm tree.

Today though, many of the most widely used city trees are wind-pollinated species. Most of these species are unisexually flowered (dioecious and/or monoecious) and further compounding the problem, thousands of popular cultivars sold today are touted to be "seedless," "low-maintenance," "pod-free" or "litter-free."

These fruitless, seedless trees are male plants, all male, and male trees produce prodigious amounts of allergenic pollen. Female trees produce NO pollen what so ever.

In dioecious-flowered trees such as most ash, willow and poplars, it is easy to propagate male only trees because they are separate-sexed. Monoecious trees, which in Nature always have both sexes (male and female flowers) on the same tree, also usually produce abundant pollen. It is possible to have all-male trees from the monoecious species. On many species the sexes will be born on separate branches, such as on a Honey Locust tree. If you take cuttings, or budwood, only from the branches with male flowers, then, you'll get an all-male tree. Lots of monoecious Acer spp. cultivars are male-only plants. In a somewhat different way, there are also numerous monoecious species where only the top or only the bottom will have either male or female flowers. For example, the bottom half of a mature Italian Cypress for example is all-male. Female wood is found only at the top of the plant. Thus, scion wood taken from the bottom usually produces "seedless" plants.

The terms "dioecious," and "monoecious," are botanical terms, not horticultural terms. We could perhaps say that a manipulated, asexually propagated all-male cultivar, taken from a monoecious

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species, is now "dioecious," but this is not quite correct. A proper dioecious tree is one that in Nature is separate-sexed. These modern engineered trees are never found in Nature.

Interestingly, the first reference in print I ever found to this single sexing-out with monoecious street trees, was in a USDA booklet, from 1982, called "Genetic Improvement of Urban Street Trees."

How Bad Is Allergy Now?

In 1959 the official rate of allergy in the U.S. was between 2 to 5% of the public. By 1999 the official rate of allergy had increased to an incredible 38% of Americans. Asthma, which was once considered rare, is now the number one chronic childhood disease in the US.

Where are Allergies and Asthma the Worst?

The most common allergen of all is pollen and since there are so many more plants growing in the country than in the city, it would make sense then that there is more allergy and asthma in the countryside. Right? No, wrong! Allergies and asthma are far worse in the city than they are in the country.

Several things contribute to this:

1. Pavement makes a poor pollen trap. Pollen in the city often lands on pavement where wind can cause it to become airborne again. In naturally vegetated areas where there is much more vegetation, pollen often lands on and becomes stuck in grasses, shrubs and vines or in trees.
2. Cities have more air pollution, which weakens the immune system and lung function.
3. Stress, which is generally higher in cities, can contribute to both asthma and allergy development.
4. Increased carbon dioxide levels within cities causes pollen-forming plants to produce more pollen with each bloom cycle, and also often causes urban plants to bloom more often.
5. Pollen loads are actually far greater in cities because there is a sexual imbalance within the plant community. In the city there is a preponderance of male trees and shrubs, while in the rural areas there is almost always a complete balance of plant sexuality. The excess of male plants in the city results in an excess of pollen.
6. The very lack of female plant materials in the urban environment also is a prime factor in the epidemic of allergy and asthma. Female flowers carry an electrical negative (-) charge (the trees are grounded with their roots) and airborne pollen holds a positive (+) charge. The tree and the pollen are mutually attractive; thus a female plant becomes a very effective pollen trap for pollen of its own species. But with almost no female trees and shrubs in modern landscapes, most of the pollen remains airborne.

How to Improve Health and Air Quality through Tree Selection

Landscaping to reduce allergies, especially pollen allergies, is an idea that is coming into its own. In the past few years several books have been written on the subject and interest is growing rapidly. With the addition of OPALSTM, (Ogren Plant-Allergy Scale) arborists now have a means to design allergy-free plantings. This scale ranks all landscape plant materials on a simple 1 to 10 allergy basis. Trees that produce zero pollen, e.g., female cultivars, usually rank the best - number one. Trees that have abundant, highly allergenic pollen, especially those with very long bloom periods, are usually ranked the worst - in the 9-10 range. There are many trees and shrubs, however, that fall somewhere in between. Using a list of over 100 factors, OPALSTM numerically ranks each species and then further

ranks the individual cultivars. There are often dramatic allergy differences even between two species in the same genus.

How Are Plants Allergy–Ranked?

OPALSTM was developed based on the following considerations: "What do plants that are well known to cause allergies have in common?" and "What do plants that are well known NOT to cause allergies have in common?" With these two questions it was possible to build two opposing sets of medical–botanical–allergy criteria. One set is positive and one set is negative. Examples of negative criteria: tiny flowers, exerted stamens, small (less than 25 microns in diameter) sized pollen grains, extended bloom period. Examples of positive criteria: complete flowered, sticky, heavy pollen grains, presence of nectaries, brief bloom period.

There are now over a hundred criteria used to develop OPALSTM rankings. Individual landscapers, city arborists, the USDA and the American Lung Association have already use the scale to make better landscaping decisions.

Based on the plant–allergy scale it is now possible to state, for example, that *Acer rubrum* - 'Red Sunset' maple, is ranked number one and causes no allergies. By comparison, 'Autumn Spire,' a male cultivar of red maple does cause allergies and is ranked number nine. Most Pine trees will rank at

numbers 4 to 5 and will cause some allergy. *Platanus* species (sycamore) rank number eight, and cause quite a bit of allergy. A male Canary Island Palm, *Phoenix canariensis*, which is considered one of the worst at a ranking of 10, will produce an abundance of pollen that will cause severe allergic reactions to many living nearby.

Pollen dispersal rates have been measured since 1972 (Gilbert Raynor, NY meteorologist) and although many pollen grains travel far in the air, research shows that most often 99% of a tree's pollen falls out and sticks within fifty feet of the tree. This means that the closer one is to the pollinating tree the greater the exposure. Thus, the job for arborists is to plant trees that will not expose everyone near them to allergenic pollen.

So, How Do You Tell the Boys from the Girls?

It isn't always that obvious by looking at a tree (especially a young tree) as to whether or not it is a pollen–free female or a pollen–producing male. But since so many city trees are now asexually produced cultivars, the sex is predetermined. In the book *Allergy–Free Gardening*, which is the result of 15 years of research on this subject, several thousand trees were individually sexed and allergy–ranked. In some cities, pollen control ordinances are already on the books, although most of these could be improved and updated. Albuquerque, New Mexico is particularly interesting, since it has attempted to curb allergies by prohibiting the sale and planting of any male cultivars.

As the public grows more knowledgeable about allergy–free landscapes, municipal arborists and landscape specialists will want to be ahead of the curve. They will want to show their clients that they are well–informed on the subject. In the future, instead of planting high allergy–trees, they will need to plan and plant 'healthy' urban landscapes.

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Thomas Ogren is the author of Allergy-Free Gardening, Ten Speed Press. Tom does consulting work on plants and allergies for the USDA, county asthma coalitions, and the Canadian and American Lung Associations. He has appeared on HGTV and The Discovery Channel. His book, Safe Sex in the Garden, was published in 2003. In 2004 Time Warner Books published his latest book: What the Experts May NOT Tell You About: Growing the Perfect Lawn. His website: www.allergyfree-gardening.com

Allergies May Run In Families

By Charles Anderson

Allergies are not a laughing matter for anyone. They can make you feel terrible and weak. Scientists have determined that allergies might be genetic. It is not yet proven, but studies are being done to find support for this theory. Scientists believe that a child may inherit asthma or allergies in their genes.

A thorough examination of the symptoms is needed in order to determine the difference between allergies and asthma attacks. If your problems are asthma-related, you will have difficulty breathing at times and your chest seems to tighten. If you have allergies, you may present with the similar symptoms to asthma, but, additionally, you might develop rashes and have sinus problems. Hay fever is also typically caused by allergy attacks.

If both you and your significant other have asthma, you might want to watch closely your children's symptoms and behavior as they grow up. Asthma develops as early as the toddler stage. You will want to be aware of how they play as well as how easily they seem winded. Typically, a young child should not get winded very quickly (as compared to other similarly-aged children), though they commonly do much faster than older child or teen.

As for allergies, you might have to simply wait to see if your child develops allergies as well. However, if either you or your significant other has any type of food allergy, you may want to have the child tested prior to introducing them to such foods. You should pay careful attention to make sure that they do not display any signs of an allergy upon introduction to new foods. Generally, if milk allergies are present, babies will show indications of lactose intolerance during the first year. It may then be necessary to feed them a soy-based formula.

You may want to speak to your doctor about any concerns that you may have pertaining to your family and allergies. Your doctor should be able to address your concerns, inform you about alternatives and give you testing information. You may also want to ask your pediatrician to look for any signs of asthma while they are having their check-ups. They will also suggest signs that you should look for that might indicate asthma in your child. If you are a parent, it is important to keep yourself informed about both allergies and asthma.

Charles Anderson writes for several web sites, including

and



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