



Monoculture: Practical Applications

Henry Arnold, ASLA renowned landscape architect, states in his book, Trees in Urban Design, the following:

"Many urban sites will not support tree species diversity because of the biological limitations of the space. For example, poor air quality, disturbed water cycle, chemical pollutants, and soil restrictions prohibit all but a very few adaptable tree types to grow in these disturbed locations. Well-meaning but ill-informed efforts to create variety by planting many tree types on a single block or street are counterproductive"

"It is now established that species diversity in the forest results from a long evolutionary period of time, and that the diverse plant community is actually very fragile. Diversity does not produce stability but rather results from a long period of stability. The implication for the city is that we need to establish a stable, salubrious environment for trees before we can have tree diversity. This may require, for example, a plant succession from a single species of tree that will survive present urban street conditions to more diverse tree population on streets once they are transformed." (166)

Dr. Michael Dirr, distinguished Horticulture Professor with the University of Georgia, feels that it is very important to vary tree cultivars within an urban area. Dr. Dirr declares,

"I would not plant a whole city with any one (cultivar), but I would not be averse to an allée, street, or parking lot planting that would utilize a single superior cultivar."

Dr. Ed Gilman, Professor of Horticulture and Arboriculture from the University of Florida, offers the following scenario when considering cultivars:

"Choosing a cultivar may increase or decrease resistance to specific problems, such as disease and insects. Here's how: A disease or insect infestation occurs in City X and City Y. City Y planted a certain species of tree throughout the city years before. City X planted a cultivar of the same species of tree throughout the city the same time as City Y. City Y may actually succumb in greater numbers because the wide genetic range of the species included some trees that were extremely susceptible to the disease. By chance, City X had a cultivar that was resistant to the disease, so more trees survived. Of course, the reverse could happen, as well, with City X's trees dying if the cultivar happened to be more susceptible by chance to the disease."



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The best principle to follow on urban sites such as city streets is to plant desirable tree types that are growing in and have survived similar conditions for many years.
- Henry Arnold, ASLA

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A monoculture is a population of trees comprised primarily of a single species or cultivar. Over-planting one type of tree, especially of the same species, results in a monoculture that may encourage the build-up of insect populations or diseases that can destroy an entire planting.

The most common and infamous example is *Ulmus americana*, American elm. American elm was considered the “perfect urban tree” with an upright, vase-shaped growth habit that made it suitable for planting along streets and in parking lots. However, many cities and towns across the Midwest and into the Northeastern United States planted American elm almost exclusively. The devastating Dutch elm disease emerged and millions of *Ulmus americana* quickly fell victim. Since the demise of American elm, cultivars (i.e. ‘New Harmony’, ‘Jefferson’, ‘Princeton’, and ‘Valley Forge’) of the same species that are resistant to Dutch elm disease are making their way into the landscape industry and urban plantings.

Other examples of tree species that have succumbed to diseases or insects include American chestnut (Chestnut blight), Honeylocust (Honeylocust plant bug), London plane tree (anthracnose), and crabapple (scab, fireblight, cedar apple rust, and powdery mildew.) Examples of potential problems from over-planting are not just limited to diseases and insects. Maintenance problems arise when trees with characteristics such as weak (or soft) wood, or messy fruits are planted beyond manageable means. Such examples include Bradford pear and silver maple.

When Dutch elm disease was wreaking havoc on American elms across the Midwestern and Northeastern regions of the United States, estimates showed that American elms accounted for close to 75 percent of all urban trees planted in municipalities. The modern approach to tree planting embraces species and cultivar diversity, thus mitigating future American elm type disaster.

Diversity can be achieved through the use of many species and also by diversifying cultivars of the same species. It is important to utilize cultivars within tree species that have been identified as having greater tolerance to urban conditions.

“The critical question faced by the professionals who design, build, and maintain our urban landscapes is not what plants grew there in the past, but which ones will grow there in the future?” -Peter Del Tredici, senior research scientist at the Arnold Arboretum of Harvard University and Harvard Graduate School of Design

