Describing Urban Tree Problems: A Quantification Approach
Also known as THE RULE OF 80

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There are published opinions that more than 80 percent of urban tree problems begin underground, in the soil-root system environment. Chief culprits probably are excessive moisture and deficient moisture. Correcting the problem of deficient moisture is easy; correcting the problem of excessive moisture is not. Springtime soil wetness can be a serious tree problem in urban areas, especially in northern Illinois. The 80 percent stipulation is a convenient way of quantifying and emphasizing the widespread severity of the problems. A respected arborist commented "I would place the number higher. After all, one-half of the functional workings of a tree are underground in an unseen situation." A list of some additional limitations on tree growth and health involving the soil environment include: deep planting, grass competition, excessive mulch depth, girdling roots, persisting uncut twine, soil applied herbicides, and high pH levels.

The 80 percent quantification seems to apply to other aspects of urban tree management. Diagrams of the daily rhythm of photosynthesis on clear days in June, indicate a rapid rise in the rate of photosynthesis from sunrise until noon when stomatal closure sends the rate steeply down. **Conclusion: 80 percent of daily photosynthesis occurs in the morning, giving special advantage and value to eastern exposure.** Often eastern exposure in a garden means afternoon shelter and shade.

Favorable conditions early in the growing season facilitate photosynthesis and growth. In our region, May and June provide the best conditions; the heat and drought of July may slow activities greatly**. Conclusion: 80 percent of vital above-ground growth activities occur in May and June in our region.**

Assessment of the health of a tree may often be done by scanning the top of the crown in the spring to detect failure of branches or branchlets to leaf out. The top growth seems to be the most sensitive to trouble in the soil. The top of the crown has the longest increments of growth and the greatest dynamism, in contrast to the slowly waning vigor of the lower branches. Gradual loss of lower branches is how trees develop clear trunks. **Conclusion: 80 percent of annual twig increment growth occurs in the upper half of the crown.**

Gary Watson, Senior Research Scientist at the Arboretum, has shown that only five to ten percent of the root system of a nursery tree accompanies the transplanted tree to the new site. Handling and early tree care are often poorly done during this tenuous and vulnerable period of establishment. Problems arise from deep planting, soft bottom soil, narrow-diameter planting holes, deep mulch, cone or "volcano" mulching, excessive watering, neglect of summer watering, and trunk damage from lawnmowers and weed whips. **Conclusion: 80 percent of the failure of newly planted trees comes from poor management**. Of course, Mother Nature can also be a formidable factor.