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### **The Myth of Night Light**

***“Unless you’re a poinsettia, increased light can’t hurt”***

#### **The Myth**

Anyone who grows poinsettias and Christmas cacti knows that controlled light exposure is crucial for flower bud development. I heard a nightmarish story last year about a student intern who inadvertently turned on the lights of a greenhouse dedicated to poinsettia production; the entire crop was ruined as flower initiation was delayed past the holiday season. Other than these specialty flowering plants, however, the effects of artificial lighting on plant materials are rarely considered.

Two of the high-quality characteristics of an urban or suburban environment are healthy greenspaces and substantial night lighting. These two characteristics are most noticeable along streets and in parklands. If anything, one might expect that this additional light (especially high-intensity lights) would aid nearby trees and shrubs by prolonging photosynthesis. This is certainly effective in greenhouses – why not landscapes?

#### **The Reality**

Plants that have evolved under a regime of seasonal changes are exquisitely adapted to these changes. While temperature and water levels can fluctuate dramatically throughout the year, the changes in day length are constant and predictable. Summer solstice represents the longest day of the year – or, in the case of plants, the shortest night. As the summer continues, day length shortens and nights lengthen. Temperate plants cue into this shift and at a particular light:dark ratio will initiate biochemical changes to prepare for winter dormancy. An *uninterrupted* dark period is critical for this process as well as for flower bud initiation in certain plants. In general, the harsher the winters the earlier these changes occur, thus allowing native trees in colder environments plenty of time to become cold hardy.

When urban trees, especially street trees, are exposed to extended light periods, those leaves and buds nearest the source perceive an endless summer – and keep on growing. While this phenomenon is difficult to see initially, in the autumn it is quite distinctive: affected leaves retain their green color while those leaves under natural conditions have already started to senesce and change colors (see photo). When the first autumn frosts arrive, these green leaves die and the tree loses the resources that normally are scavenged during senescence. Recent research has demonstrated that high-intensity light sources, such as high-pressure sodium lamps, have the greatest impact on delaying leaf senescence and subsequent dormancy of landscape trees.



**Note street light proximity to green area of *Acer saccharum***

What does this do to the health of the tree? While the long-term effects of altered light periods on street and other urban trees have not yet been studied, the loss of resources puts a small but repeated strain on the tree. This could be manifested by reduced growth compared to similar trees in more naturally lighted environments, or by a die-off of roots most closely associated with the affected branches. Trees in optimal settings probably won't be affected, but those in marginal areas with poor soil conditions are more likely to become susceptible to other stresses or opportunistic diseases. And, of course, flowering can be disrupted in landscape plants as well as in poinsettias.

### **The Bottom Line**

- Artificially prolonged light periods can interrupt flowering cycles and delay winter dormancy.
- Marginally hardy plant materials should never be exposed to interrupted dark periods.
- Consider the location of high-intensity light sources (street lights, security lights, etc.) before installing shrubs and trees.
- The effects of high-intensity lights can be partially moderated by installing deflectors on the lights.

For more information, please visit Dr. Chalker-Scott's web page at <http://www.theinformedgardener.com>.