



Avoiding Plant Injury from Landscape Lights

by H. Marc Cathey

IN THE late 1960s, a simple, inexpensive, and obvious redesign of street lighting fixtures by the General Electric Corporation (GE) preserved the health of millions of our trees. I was working at the USDA Agricultural Research Service (ARS) laboratories in



Beltsville, Maryland, at the time and, based on our research, we recommended that every street light fixture have adjustable internal deflectors to focus light on streets and buildings and

avoid casting light on trees and other plants. This flexibility in lighting fixtures had not been necessary for the use of incandescent, mercury vapor, and metal halide lamps because they did not put out such intense light as the new high-pressure sodium lamps that were introduced starting in 1965 to address a national concern about security in neighborhoods, business districts, and along interstate highways.

The golden yellow light cast by high-pressure sodium lamps was in the middle of the visible light spectrum, where people most easily see light. The high-pressure sodium lamps were also brighter and twice as energy efficient as mercury vapor and incandescent lamps. While a 60-watt incandescent bulb emitted only 810 lumens, a 275-watt high-pressure sodium bulb emitted 25,000 lumens.

PHOTOPERIODIC EFFECTS

Our concern was what effect the installation of so many of these high-powered lights might have on plants. Several plant processes are triggered by daylength, or more accurately, the length of the dark period. Many plants “sense” darkness through the chemical changes that occur in the absence of light. If the light period

is extended, or the dark period is interrupted by sufficient artificial light, some plant process can be manipulated. Other photoperiodic processes include abscission, seed germination, and dormancy.

It was the dormancy factor we decided to investigate. If dormancy was delayed in trees and shrubs sited near the sodium lights, then we expected some serious problems to surface. Normally, trees and shrubs slow their growth as days shorten in the fall. Leaves of deciduous species are shed, and growth above ground stops. If artificial lights interfere with the long-night stimulus that triggers these critical processes, tissues will not harden properly and, as a result, will be subject to cold temperature damage.

In testing done in controlled environments at the ARS laboratories, we found that the standard mercury vapor and metal halide lamps used in street lights did not delay the onset of dormancy in plants in the fall of the year. High-pressure sodium lamps, however, supplied the red and far red region of the visible light spectrum, which delayed dormancy and promoted the continued growth of trees such as sycamores, elms, and zelkovas into winter. We were also concerned that these lights might delay or reduce flowering in daylength-sensitive plants. By placing deflectors in the street light fixtures, General Electric resolved most of our concerns and greatly reduced the likelihood that plants could be damaged.

SYMPTOMS OF LIGHTING PROBLEMS

As you walk around your garden and neighborhood this winter and spring, keep an eye out for the following characteristics of injury from lighting. I suspect that you will be able to identify a few plants that have been affected.

■ **Retention of leaves:** Because of delayed dormancy, normal leaf abscission—the process by which leaves drop

from stems—will not occur and the shoots nearest the lamps will retain their leaves well into the next growing season.

■ **Continued growth:** Shoots continue to elongate rather than becoming dormant. The plants will look like they are growing towards the lamps.

■ **Dieback:** In temperate regions, plants that continue to grow rather than going into dormancy show signs of damage the following spring—the affected shoots will die back six to 16 inches only on the side nearest the lamps.

■ **Flowering:** If your house is located near a street light, in some cases, house plants sitting on a windowsill exposed to street lighting may not flower on time. This is a rare occurrence, but chrysanthemums, Christmas cacti, poinsettias, and kalanchoes are among the plants that can be affected by street lights.

If you observe signs of light damage that you believe may be caused by incorrectly installed street light deflectors, call your local department of public works and ask if the deflectors can be adjusted.

LANDSCAPE LIGHTING

Street lights are not the only source of problems with delayed dormancy in landscape plants. The high-powered security and landscape lights that some homeowners and commercial landscape managers are installing can also cause plant damage.

To reduce the likelihood that these lights could affect the flowering schedules or dormancy of daylength-sensitive plants, be sure security lights are angled away from plants and put landscape lights on a timer so they go off automatically when they are not needed. In addition to conserving energy, your neighbors will probably appreciate the reduced glare! ☺

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