



## Light Waste – Effects on Flora

Rev. 2016-07-14



*All plants are affected by the use of artificial light at night to some degree. Also, with the length of the 'day' being increased, the chances of insect attacks and animal foraging increases. With various frequencies of light used in artificial lighting, plant health and growth in surrounding areas is compromised.*

For millions of years plants have adapted to the regular daily cycle of sunlight and darkness. During this period of time they have also become particularly attuned to certain wavelengths of light. Plants have learned to use these specific wavelengths to help them complete particular functions in their life cycles.

As children, many of us have tried to grow plants as part of our science education. We learned that plants needed several things to live; water, soil, carbon dioxide and light. If any of these essential elements were removed, the plant sickened and would eventually die.

Fewer of us have experimented with the effects of various colors of light on the plants we are trying to grow. However, there are important relationships between the colors (frequencies) of light plants receive and how well they live. Plants depend on the right frequencies, brightness and duration during a regular day to grow and develop.

Plants must have blue and red colors to complete photosynthesis and visible red and infrared to control their growth and reproduction which is also affected by the day and night lengths (photoperiodism).

For plants, photoperiodism is particularly sensitive to change and the duration of uninterrupted night in 24 hours is important for the plant's ability to create shoots, flowers and go dormant.

Even very short periods of lighting can have major negative effects on certain types of plants.

Night lighting can seriously affect the plant's growth and natural cycles for trees that are particularly sensitive to disturbance.

Flowering patterns can be changed by the red and infrared colored lights which may also force the tree to continue growth longer than the normal cycle and risk its ability to survive through winter.



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If trees do not shed their leaves when they should, the extra snow load on leaves that have not fallen may cause severe damage and even threaten their life.

Trees that are growing in continuous light may produce larger leaves and have a greater susceptibility to air pollution and be more stressed by water on their leaves.

Lights that use red and/or infrared parts of the spectrum should be avoided. High pressure sodium lamps that emit light in the red/infrared parts of the spectrum have been particularly hard on woody plants.

Shielded lights (full cut-off) should be used to prevent damage to trees.

Other effective light control technologies and procedures should be used to protect them as much as possible.

An example: palm trees which have had lights placed on them refused to flower as apparently they then thought they were living in summer all the time as the ‘days’ were longer – no flowers, no fruit! (W.R. Chaney, Purdue University)

With light domes from major cities extending over thousands of square kilometers in all directions, the effects on the surrounding fauna environment is extensive. In most cases people are unaware of this effect nor is it seriously considered as an environmental problem.

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*Trees are finely attuned to the seasons, the weather and the lengths of time they receive light as well as the types of light they experience. Man is upsetting the natural cycles of trees by flooding towns, cities and the countryside with light not necessarily beneficial to the plant's health and wellbeing.*

