

Orchids need Light to Grow

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Why LIGHT?

Plants use light as a source of energy (photosynthesis) and to control many life processes including vegetative growth (photomorphogenesis) and flowering.

The challenge of WINTER LIGHTING

The biggest challenge comes when we want to grow orchids in a greenhouse, solarium or on a window sill. Winter days are short, often cloudy, with less light especially from November through February. Plants may not get enough quantity of light to maintain vigour or bloom unless we use supplemental artificial light.

Quantity of LIGHT?

Green plants need light to grow. Many orchids do well with bright diffuse light but the quantity needed will vary with the kind of orchid. Too much light may burn leaves or overheat leaf tissue, cause foliage to become uncharacteristically red, or retard growth whereas too little will not support growth or flowering. Low light Paphiopedilums, medium light Phalaenopsis and high light Vandas can be grown together by placing the plants at differing distances from an artificial light source and/or with some shade or light diffusing measure when supplementing natural light.

Light quantity (illuminance) can be expressed in SI units (1 lux = 1 lumen per square metre) or in non-SI units as foot-candles (1 foot-candle is approx. 10 lux). These units refer to what the human eye perceives and not to the photosynthetically active radiation (PAR) or specific light wave lengths used by green plants for photosynthesis. We quantify light for our purposes and when estimating what plants require for growth and blooming but must always be aware that lumen output can be misleading if the emitted light spectrum is inappropriate for plant growth and development.

Full sun provides 30,000 to 100,000 lux (approx. 3,000-11,000 ft cdl) whereas an overcast/cloudy day delivers much less illuminance (100 to 1000 lux). Sunlight provides both light quantity and a complete light spectrum. Sunlight quantity remains the same at whatever height a plant is placed provided that there is no shading or light diffusing material including tree foliage between a plant and the sun.

As a general guideline, complete spectrum light requirements of high light vanda/cattleya is approx. 30,000 to 50,000 lux, moderate light oncidium/lycaste/phragmipedium is approx 20,000 lux, and low light paphiopedilum/jewel orchids should receive about 10,000 lux. The requirement of individual plants can vary with age (seedling vs. adult), and between individuals even of the same species/hybrid.

Artificial light sources vary in quantity of light emitted. If a point or line source (single bulb/tube) is used, only leaves directly beneath it will receive the full declared quantity of light from that source. To provide a more uniform illuminance over a greater area, the point source can be extended laterally by using additional tubes arranged side by side or lamps arranged in an array. A more powerful light source could also be positioned further above the plants. Where artificial light from a single powerful bulb is the sole source of illumination, the grower can use an overhead track system to permit all round illumination over time.

Quality of LIGHT?

Plants need access to a complete light spectrum such as sunlight which is composed of different colours/wave lengths. Various parts of the spectrum are used by a plant for photosynthesis. Sunlight is the best source but if this is not possible, artificial light can be used to replace sunlight or to supplement weak sunlight in winter. A full/complete spectrum light source is best. Blue light is especially important to keep a plant compact (photomorphogenesis) and red/far red light, to sense the light and dark periods (photoperiodism) and thus the period of darkness. Some orchids are day neutral but most seasonal bloomers are sensitive to the period of darkness. Ensure that you vary the photoperiod over the year. Twelve hours continual darkness in winter and 8 hours continual darkness in summer is a reasonable goal. Moonlight is not disruptive but any source of red light during the sensitive period of darkness including from street/interior lights or security lights can disrupt the sensing mechanism.

LIGHT Sources?

Sunlight is the cheapest but we can supplement/replace sunlight with artificial light such as fluorescent tubes, LED grow lights, high pressure sodium or high intensity metal halide lamps. T5 and T8 refer to the diameter of the fluorescent tube, T5 being the most narrow (5/8 in. or 16 mm dia.) and recent addition to the series. T8 is 1-inch in diameter. T5s are more efficient in terms of power used to produce lighting. T5 tubes (14, 21 or 28 watt) provide 1350, 2100, 2900 lumens, respectively. Multiple T5 or T8 tubes mounted in parallel will increase the area illuminated.

LED grow lights are provided in round, square or rectangular arrays of bulbs designed to provide a complete spectrum for plant growth and blooming. For example, a full spectrum LED panel could consist of an array of lamps providing Red, Far Red, Blue, Ultra Violet, Infra Red, and White. LEDs are very efficient, long lasting, use less electricity, produce only a small amount of heat, and are easy to install. They may be initially more expensive depending on the setup but the benefits could outweigh the cost. When using LED setups, consider having an uninterruptable power supply (with battery backup) or at least a surge-protected power bar to limit damage to the system. Learn more about this technology before making a decision to try it.

One resource is the article found at - <http://www.illumitex.com/wp-content/uploads/2014/04/Horticultural-Brochure-4.25.14.pdf>

Whichever light source you choose, consider electrical and safety requirements including ground fault protection and how to use or vent heat produced by lamp ballasts if applicable. Too much heat can be a challenge as fans needed to remove hot air will also dry the growing area. LED setups do not generate as much warmth so in colder areas, additional heating might be needed.

LED Sources – Look for LED-grow-light strips and arrays online, from hydroponic outlets and aquarium dealers.

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