

# Light- Its Role in Germination and Early Plug Growth

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As a plug progresses from a seed to a seedling and to maturity, the importance and the role of light changes. Light consists of 3 factors; intensity (how strong), duration (photoperiod), and quality (what color). Each factor has a bearing on plant growth and is important at different stages of growth.

The intensity of light is important because light triggers many important growth responses. Light intensity plays a very small role in the germination of most plugs. If germinated in the greenhouse, shade should be used to reduce the amount of light on the germination bed, particularly if germination is being done during warm summer or fall months (eg. fall pansies). Reducing light reduces heat and reducing strong light reduces the possibility of damage to emerging seedlings. Duration and quality are not important at this stage.

If germination is conducted in germination chambers, light is not necessary. The reason for not covering seeds is to increase aeration, not for exposure of light. However, the presence of light provides some leeway for the removal of the seedlings from the chamber. In the dark, seedlings rapidly stretch and a delay of a few hours in a warm, dark chamber results in significant loss of quality that can be avoided if lights are present. Therefore, when building germination rooms, lights should be included in the design. An intensity of 100-300 fc is enough to insure that seedlings don't stretch too rapidly. Using fluorescent lights (cool white, warm white or grow bulbs) vertically along the walls of the chamber insures adequate light for trays on shelves or carts. Some overhead lights may help to provide uniform light distribution. Avoid the use of incandescent lamps, they cause more stretch than any other light source. The duration can be 18 to 24 hours.

The stage after germination, when plugs are moved to the greenhouse is very responsive to light. Plugs are generally moved from the germination area in early morning or evening to reduce the stress on the seedlings. Normal greenhouse light is generally sufficient but supplemental lighting has been shown to accelerate growth of plugs. In northern states, December light is less than 1/4 of July light intensity. Contributing to this are the increase in cloud cover during the winter and dirty green-

house coverings. Lighting seedlings can result in faster growth (faster turnover), and better quality (more compact plugs, reduction of glassy stems) plugs. There is little debate on efficient light sources for supplemental light; high pressure sodium (HPS) and metal halide (MH) lamps provide useful light quality for plant growth and are the most financially efficient. HPS lamps have longer bulb life than other lights and do not reduce sunlight as much as florescent lamps. Outfitted with effective reflectors, they not only provide good light uniformity but also heat to supplement heating bills. Supplemental light intensity can range from 400 to 1000 fc for 18 hours a day for most plugs.

For 400-500 fc, 400 watt HPS lamps should be suspended about 8' above the crop on about 6' centers. If 1000-watt lamps are used, lamps must be higher (about 12' above crop level) and 4-5' apart. Obviously, fewer 1000-W lamps are needed than 400-

W lamps. Inexpensive, but relatively accurate light meters are available (GE meter) and necessary. Lighting may begin within a few days of removal from the germination area, but is not necessary after 4-6 weeks. If plugs are constantly moved in and out of the lighted area, then many plugs will be lit for most, if not all, their greenhouse life. However, even 2 weeks of supplemental light is better than none at all. In the South, winter lighting is still effective, particularly when seedlings are young.

Some growers are studying the use of growth rooms for extended growth of plugs. Essentially, they are large growth chambers where control of all environmental inputs is possible. A mixture of HPS and MH lamps are effective for plant growth and sufficient intensity and duration is possible. Better control of the environment to allow more precise growth is the goal of all growers. The proper use of light in the germination area, the greenhouse and the growth room can go a long way towards producing high quality plugs with rapid turnover.

Growers in the South have long believed that supplemental light is not useful or cost effective because they receive more light than their poor colleagues up North. Supplemental light works as well in the south as in the north, it simply is not as essential. Southern growers should not dismiss the benefits of winter supplemental light, especially for early seedling growth, transplant establishment and acceleration of flowering. To do so is to close a good book without ever opening the cover.

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