deficient in red portions of the light spectrum, which prevents flowering in some species. Artificial lights are easily controlled by timers to provide seasonal fluctuation, increasing and decreasing light levels each month. Most species do well with 11-14 hours of light, which the following schedule provides:

JAN. (JUL.) 6:30 a.m.-6:00 p.m.	JUL. (JAN.) 5:00 a.m.-7:00 p.m.
FEB. (AUG.) 6:00 a.m.-6:00 p.m.	AUG. (FEB.) 5:30 a.m.-6:30 p.m.
MAR. (SEP.) 5:30 a.m.-6:00 p.m.	SEP. (MAR.) 5:30 a.m.-6:00 p.m.
APR. (OCT.) 5:30 a.m.-6:30 p.m.	OCT. (APR.) 6:00 a.m.-6:00 p.m.
MAY. (NOV.) 5:00 a.m.-7:00 p.m.	NOV. (MAY.) 6:30 a.m.-6:00 p.m.
JUN. (DEC.) 5:00 a.m.-7:00 p.m.	DEC. (JUN.) 6:30 a.m.-5:30 p.m.

Seedlings need very low light, starting at 200 fc when they are just out of the flask. During the following years, light should gradually be increased to mature-plant levels as the plants reach blooming size.

Studies indicate that seedlings grow more rapidly if given 14-16 hours of light year-round. However, extending light in the general growing area may adversely affect blooming in mature plants. Consequently, either seedlings should be grown in a separate area, or the light should be blocked from other plants in the same area.

Greenhouse Light Levels

LIGHT: **Approximate light levels, expressed in footcandles (fc).** These light levels may be used as a starting point, but it is important to watch each plant carefully and to modify the light at the first indication of stress. Light levels should always be changed gradually.

Plants generally utilize morning light most effectively, since their metabolism is frequently most active in the morning; but as with most rules, there are exceptions. If the habitat climate shows frequent morning overcast, then the plant may benefit from higher light in the afternoon.

Greenhouse plants should be watched carefully during seasonal shifts in light patterns to guard against the possibility of sunburn. Species grown in light which is too low may not bloom, but low light seldom causes the serious damage that can result from excessively high light.

Cultivated species may adapt to different light conditions, but they are unlikely to thrive and may not bloom unless they receive light at the appropriate levels and times. The most widely distributed species are those most likely to be adaptable to various light levels. The following generally accepted cultural divisions describe light levels:

- **Very high.** Over 5000 footcandles--nearly full sun except at midday, when full summer sun in most latitudes may reach 10,000 fc. Full sunlight through clean fiberglass is usually 5000-7000 fc on a clear day.
- **High.** 4000-5000 footcandles--bright light, just under 50% of the full midday sun. Although most plants utilize light most efficiently at 5000 fc, many orchids use light most efficiently at much lower levels.
- **Intermediate.** 1800-4000 footcandles--dappled sunlight.
- **Low.** 1000-1800 footcandles--reduced sunlight, so that if a hand is passed over the leaves it does not produce a shadow.
- **Very low.** Less than 1000 footcandles--deep shade.

Light can be measured with a light meter. If no direct-reading light meter is available, footcandles may be measured with a 35 mm camera that has through-the-lens metering. The procedure is simple. First, set the camera for a film speed of ASA 25 and a shutter speed of 1/60 second. Center the needle in the viewfinder by adjusting the camera's *f*/stop while focusing on a clean, white sheet of paper which has been placed where the plant actually grows. Then convert the *f*/stops to approximate footcandles as follows:

f/2:	*f*/2.8:	*f*/4:	*f*/5.6:	*f*/8:	*f*/11:	*f*/16:
100 fc	200 fc	370 fc	750 fc	1500 fc	2800 fc	5000 fc

When artificial lights are used in the growing area, the *f*/stop readings may be quite low and yet the light may be adequate. Artificial light is constant, whereas natural light fluctuates during the day as the wind moves leaves and clouds causing shadows.

Orchids grown in the home normally require supplemental lighting. Fluorescent lights are most frequently used in a one-to-one ratio of cool-white and Gro-Lux bulbs which provide nearly full-spectrum light. Growers also successfully use the newer "full-spectrum" fluorescent and high-intensity lights. Halide lights should be combined with sodium bulbs since alone they are