**New York Botanical Garden: Paphiopedilum (slipper orchid)**

The orchid family, Orchidaceae, is one of the largest of all flowering plant families, with plants growing in many different habitats. Successful orchid culture is the result of imitating an orchid's natural habitat as closely as possible.  All orchids need appropriate light, temperature, humidity, moisture, nutrients, ventilation, potting medium, and maintenance.

The 60 species of *Paphiopedilum* (slipper orchids) are mostly terrestrial plants named for their interesting pouch-shaped lip. These orchids grow in pockets of organic matter on the tropical forest floor, on cliffs and on trees below the leaf canopy. This natural setting of loose, fast-draining, growing medium and gentle, filtered, light is also what they need in the home, though the variation in habitat of origin implies variation in ideal home conditions.

Both species and hybrids are widely available to home growers and while relatively easy to grow, some plants are more demanding than others. It is a diverse genus divided into multiple sub-genera and then numerous sections and sub-sections within them. *Paphiopedilum* are often grouped to generalize their care but not all plants are captured within these broad groupings.  Among the plants covered here, the mottled leaf types are considered easiest for home growers.

* **Mottled leaf***- Paphiopedilum* in the warm-growing, mottled leaf group, including the Maudiae Hybrids, bear one or two flowers at a time, once a year. They are mostly terrestrial orchids that grow in loose organic matter on the forest floor.
* **Green leaf**- plants in the cooler-growing, green-leaf group mostly originate at higher elevations and bear one to two flowers at a time. Flowering once a year, usually in winter, this group is considered more difficult to grow successfully and includes the colorful Complex Hybrids.
* **Multifloral group** - a strap-leaf, multifloral group with green leaves likes warmth and more light than the two other groups. Plants bear multiple flowers simultaneously or sequentially from a stem.
* There are other *Paphiopedilum* that fall outside of the care routines of the groups covered here, including those that grow in limestone rock crevices.

**Light:**

*Paphiopedilum*require bright but indirect light. In the New York City area, an unobstructed, east-facing window with gentle, morning sunlight is usually perfect. In a south or southwest-facing window where light is harsher, protect the plant from direct sunlight with a filtering curtain or distance from the window. A filtered, west-facing window can work well if the intense light doesn't overheat the plant. The multifloral group likes more light and can be kept at a brighter window.

With the use of a light meter, you can directly measure the light exposure of a potential growing area. A bright, sunny day out of doors may measure 10,000 foot-candles, while a south-facing window may be about 5,000 foot-candles.*Paphiopedilum* is considered a low-light orchid and requires about 1,000 to 1,500 foot-candles of light. The multifloral group prefers brighter light in the 1,000 to 2,000 foot-candle range.

LED artificial light can be used to supplement light for most orchids. Be careful not to place the light too close and burn the plant. Look for a full-spectrum light option made for plants.

**Water and Humidity:**

Orchids are killed more often by the common mistake of over-watering than anything else. *Paphiopedilum*does not have a water storage organ like some orchids, so while restraint is essential, it should be kept in a moist (but not wet) medium.  It needs to be watered when the potting medium has dried on the top. Watering frequency is likely to change during the year. Day length, humidity and individual heat systems will affect the rate at which water evaporates from the growing medium.

Always water in the morning. Place the plant in a sink and allow the water to soak through and drain out completely. It is best to use tepid water, as it will help to dissolve fertilizer salts and not shock the plants. Never let the plant sit in a run-off dish of water or you will run the risk of root rot.

Humidity in the air is just as necessary as moisture in the soil, though *Paphiopedilum* can tolerate lower levels of humidity than many orchids. A minimum of 40% relative humidity is required to grow*Paphiopedilum*whereas an average home in the northeast may have humidity as low as 25%. Both heating in winter and air conditioning in summer remove a lot of moisture from the air. Supply extra humidity with humidifiers, or group plants on a gravel-lined tray that is filled with water to increase air moisture through evaporation. You can use a simple hygrometer to assess the humidity and keep it in the 50%+ range that *Paphiopedilum*prefers. Humidity should be kept higher at the warmer end of the temperature range and lower at the cooler end to prevent problems.

**Air Movement:**

The high humidity in tropical habitats is often accompanied by gentle and constant air movement through the locations in which these orchids grow. Stagnant, humid air is as detrimental to orchids as cold drafts. Air movement is essential evaporates moisture on leaves and stems and helps protect plants from the spread of disease. If you are keeping your orchids in a closed room, an open window (when temperatures are in the target range), the movement of air from a humidifier or from a fan are an often neglected factor in growing healthy orchids.

**Temperature:**

Most orchids need a distinct fluctuation between day and night temperatures to successfully produce flowers. Warm-growing *Paphiopedilum* in the mottled-leaf and multiflora groups prefer day temperatures between 75 and 85°F., with night temperatures between 60 and 65°F. Cool-growing *Paphiopedilum* in the green leaf group prefer day temperatures between 70 and 80°F., with night temperatures between 55 and 60°F. Lowering night temperature for several weeks can help to initiate flowering. For the multifloral group, a two month cool period at 50 to 60ºF. initiates flower spikes.

**Nutrition:**

*Paphiopedilum* do not require heavy fertilizing.  Generally, a balanced, powdered fertilizer (20-20-20) is best, at ¼ the recommended strength, given to the orchid every other time that you water the plant. It's better to give an orchid too little fertilizer than too much.Feeding can be reduced to once a month in winter. Once a month, flush the growing medium with water to prevent salt build up which can damage roots.

**Encouraging Flowering:**

An orchid needs to have all its needs met to generate the energy necessary to flower. Adequate light, careful watering, and proper temperature and humidity levels all contribute to a flowering *Paphiopedilum*. In nature, orchids experience a 10ºF. temperature difference between day and night. This differential is important when trying to initiate flowering. The multifloral group of benefits from a 6 to 8 week cool period at 50 to 60ºF. to initiate flowering. Flowers typically appear from autumn to spring and last for one to two months.

**Care After Flowering:**

After *Paphiopedilum* finish blooming and the spike has turned brown, the spike should be cut down to the base.

**Re-potting:**

When the potting medium has deteriorated, plants should be re-potted. This is best accomplished every year to two years when new growth is beginning. Usually, plants in bud and flower prefer not to be transplanted. It is important to remove as much of the old potting medium from the roots as possible by gently shaking or rinsing the roots under water. Take care as the roots of this orchid can break easily! Any rotting roots need to be removed immediately with sterile tools.

Orchids require good drainage and good root aeration to grow and *Paphiopedilum* need moisture retention as well. The classic mixture for *Paphiopedilum* is fine-grade fir bark with a little charcoal and perlite. A plastic pot can be a good choice for retaining moisture.Be sure to use only quality orchid potting mixes and never substitute landscape mulches for orchid potting mediums.

You can divide large plants at the same time as you re-pot by pulling or cutting apart the rhizome carefully to preserve the leaf fans. The root junction should be buried in potting mix about one inch below the surface.

**Hygiene:**

Cleanliness is important for orchids. Wash orchid leaves occasionally with mild soapy water to reduce the harmful effects of excess debris and minor insect infestation. Since orchids are susceptible to viral diseases, use gloves when handling them and/or wash hands often between handling. When cutting stems always use tools sterilized in a 10% bleach solution (1 part bleach to 9 parts water)) and/or alcohol, or use a clean, single-edged razor blade.

**What to watch for:**

**Over-watering** reduces air circulation around the roots, leading to root rot. If a plant looks off-color, yellow and weak, gently shake it out of the pot and check the roots for signs of root rot. Root color should be beige or white; black or brown roots indicate rotting. You may be able to save the plant by removing the rotting roots and re-potting in fresh potting medium.

**Drooping, wrinkled leaves** and yellow leaf tips are an indication that your *Paphiopedilum* is not getting enough water. The same symptoms occur if a plant has been over-watered, is not draining well or sits in run off water and its roots are no longer healthy enough to take up water.