

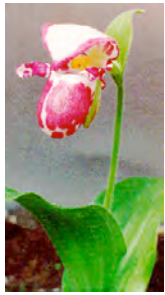
Lady's Slipper Orchid Propagation

Cypripedium reginae

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Introduction

The orchid is a rare flower that makes up the second biggest family among the flowering plants. Amazingly, it consists of 725 genera and a whopping 10,000 to 15,000 species. In this paper, the focus will be on the genus *Cypripedium* and more specifically the species *reginae*.



Cypripedium reginae is best known as the Pink and White Lady's Slipper or the Showy Lady's Slipper. In 1893, this orchid was declared the Minnesota State Flower and is one of the state's rarest wildflowers.

To actually see one in the wild, one would have to visit flourishing swamps, bogs, or damp woods. In addition, the wild *Cyp. reginae* also grows extremely slow, taking 4 to 16 years to produce their first flower. Sometimes they will live for 50 years and grow to be four feet tall.

However, these extraordinary and stunning flowers do not require a long hike in the woods to be enjoyed. They can be grown outdoors in backyards of northern climates. They require vernalization so southern climates are not suitable. One note though is that patience is a virtue with regard to orchids because as stated above, growth is slow.



Cypripedium Propagation

Cypripedium species are propagated using the methods of plant tissue culture with one exception: instead of using explants, the plants are originated from seed. This process allows growers to avoid the lengthy process of segmenting the plant tissue into small pieces.



Because orchid seed in the wild has little or no ability to absorb required nutrients and carbohydrates on its own, the seed forms a symbiotic relationship with a fungus. The fungal filaments invade the cells of the seed and the seed then absorbs and digests nutrients and carbohydrates provided by the fungus. However, in *in vitro* culture, the fungus can be removed from the process. The essential requirements are added directly to the agar medium:

1. Macro and micro nutrients
2. Sugar, mainly in the form of glucose
3. Plant growth regulators such as auxins or cytokinins for stimulation of germination and development.

This process requires the utmost sterile conditions as in most *in vitro* culture. The medium, seed surface and instruments must be sterilized. In addition, all procedures must be performed under aseptic conditions otherwise contamination will quickly infiltrate the cultures.

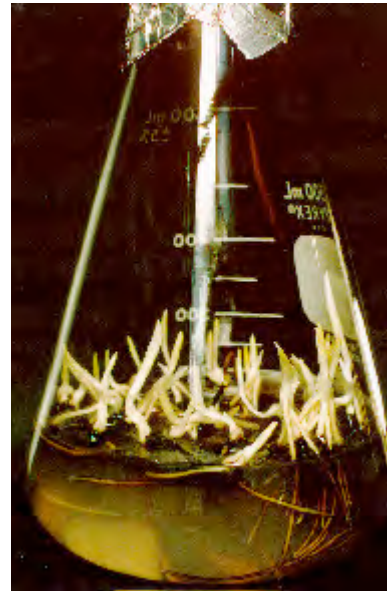
Getting *Cypripedium* seeds to germinate can be made difficult by their innate seed dormancy. These orchids are a temperate zone species and require long periods exposed to cold temperatures or stratification to break seed dormancy.

Once germination has occurred on the growth media there comes a time in its young growth that the plants need to be transferred to new growth media or need to be “reflasked”. The reasons for the transfer vary but are outlined below:

1. The plantlets may require different amounts of nutrients, sugars or growth regulators than they did at the germination stage.
2. Nutrients in the germination media may be exhausted or waste materials may have accumulated.
3. The plantlets may be crowded and require more space to grow.

Once again, the transfer of the plantlets to new media requires completely sterile media, instruments, and conditions.

The plantlets will continue to grow in the new media to a point where the root tips will exhibit a brown color (the tips will usually be bright yellow during active growth). When this stage begins to occur, it means that active growth is no longer taking place. The plantlet is dormant, preparing for cold temperatures, and requires stratification. If the plantlets are not removed from the media at this time, they will likely die. To vernalize these seedlings, remove the plants from the flasks, rinse until no media remains on the plant or roots and place in plastic freezer bags with a small amount of water to prevent the seedling from drying out. The bags should then be placed in the refrigerator. Monitoring the refrigerator is important to ensure that the seedlings are not exposed to freezing temperatures. The seedlings should remain refrigerated until spring.



To improve their chances of survival, it is recommended that you grow your seedlings indoors for one or two seasons before planting them outside. The plants should be transferred to larger pots as required by growth.

Basic directions for growing your potted seedling indoors



and retains moisture. Provide a neutral pH. Mixes that contain some fertilizers work well.

Provide part shade in the windowsill – no direct

Set into a tray or small individual plastic pots so their roots have sufficient room for growth. Spread roots horizontally and point roots slightly downward. Use a humus type soil that contains perlite, drains well



sunlight. Fluorescent bulbs also will work. RH should be 50%.

A room temperature between 22- 26C is ideal.

Water with only distilled or rain water. Soil needs to be moist at all times but not saturated. Plants will benefit from a diluted balanced fertilizer once or twice between spring and early summer. City water is acceptable after plants are placed in the garden.

Between summer and next year's dormant bud, the seedlings will grow about three to five leaves. As the plants enter their dormant stage their leaves will turn yellow, then brown, and then die. The dormant bud will retain its green color.

When plants are dormant, remove any remaining seasonal growth by cutting it to about 1 cm above the soil surface. Place plants in freezer bags. They require refrigerator vernalization until spring for at least a 3 to 4 month period. Soil must be kept slightly moist at all times but not saturated. After the vernalization period plants are treated as explained above for one more growing season before they should be moved outdoors.

(Notes: Your seedlings should be hardened off prior to outdoor planting and a soil that contains peat moss should be used when plants are moved to the garden.)



References

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Minnesota State Flower. www.shgresources.com

Wild Beauties for the Back Yard. www.wnrmag.com

Propagation Methods. www.uslink.net/~scl/lab.html

Who Can Grow Cypripedium Seedlings? www.uslink.net/~scl/who&how.html

