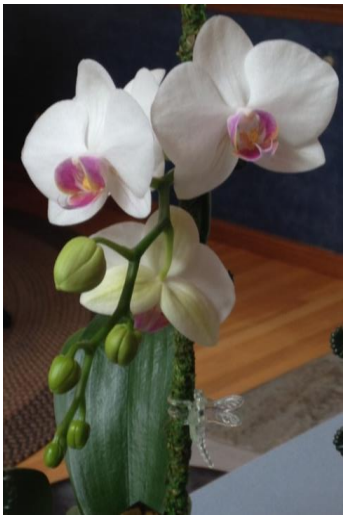
Shelby Kolstad



Propagation of *Phalaenopsis* cultivar – "Moth" orchid
Orchidaceae (Orchid Family)

Overview:
There are approximately 60 species and numerous cultivars in the *Phalaenopsis* genus. In nature they are an epiphytic shade plant that attaches and grows on trees where they absorb rainwater and nutrients from decayed plant material that accumulates around them. They have aerial roots that can extract moisture from the air during dry seasons. They are found in China, Southeast Asia, Philippines, India, and many other subtropical countries. Ideal growing conditions are light shade and temperatures of 64^0F – 77^0F with 60-80% humidity[1].

Phalaenopsis have 3 sepals and 3 petals that are designed to attract pollenating insects. They bloom 2-3 times a year and come in a variety of shapes, sizes and colors. Different species bloom at different times of the year.

Phalaenopsis orchids are popular ornamental houseplants because of their long lasting blooms (2-3 months), low light requirements, and they come in a variety of sizes and colors. In Chinese medicine, the *Phalaenopsis* flower is dried and used in an herbal tea for relaxation and to build the immune system. It has been found that they have an antimicrobial effect.[1]

Sexual Propagation:
It is possible to grow orchids from seeds, but it is extremely difficult. In the wild, orchids are pollinated by insects, but they can also be pollinated by hand and develop seed capsules. It usually takes several months from pollination until a seed capsule is mature. It is best to harvest seed just before the time of their release from the capsule because they are extremely small and there may be up to a million seed per capsule. Seeds can be collected by placing a bag around the maturing seed capsule before it ripens and splits to release its seed. Mature capsules can be removed using a sterilized scalpel. If the capsule has already begun to split, the seeds can be collected by tapping over a piece of paper or envelope. If the capsule is whole, it will have to be cut lengthwise into sections to remove seeds.[2]

Seeds must be dried by exposing to air, and then sown immediately or stored for later use. Stored seeds should be in an envelope or a clean jar to prevent contamination and moisture. Seeds that are stored in a refrigerator can stay viable for several years as long as they do not come into contact with moisture.[3]

Germination can be done by sowing seeds directly on the surface of orchid medium and placing them in light or darkness depending on the type of orchid. Seeds from tropical epiphytes (those that don't root in soil) should be placed in light, whereas terrestrial orchid seeds germinate best in darkness. When the seeds have germinated and grown to a certain size, they can be transferred to individual containers.[3]

In the wild, orchids require sugars that are produced by symbiotic mircofungi in order to germinate. To imitate this, the seeds can be germinated on an agar-based media that contains the necessary nutrients. Seeds propagated by this method must be gathered and germinated under totally sterile conditions because they are easily killed by airborne bacteria.[4]

Asexual Propagation:

Orchids are generally propagated asexually because it yields uniform copies (clones) of orchid varieties by taking advantage of offshoots, and by the division of pseudobulbs. Most orchids will not grow from cuttings except for a few members of the *Dendrobium* genus. Tissue culture propagation is the primary method used by commercial propagators.[5]

Offshoots occur on a few orchid varieties, such as *Phalaenopsis*. An offshoot or "keiki" (the Hawaiian word for "baby") is a plantlet that will develop along the stem. It has separate air roots that can be cut from the parent plant and potted in a bark medium when they develop leaves and roots 2-3 inches long.[7]

Division of pseudobulbs and rhizomes is another asexual method where an overgrown orchid is divided into two or more separate plants. Division should be done just as new growth begins, but never while a plant is in flower. The root ball of the parent plant can be pulled apart by hand leaving 2-3 pseudobulbs per division. This will allow the new plants to have enough energy stored for it to flower the following season. Plants with pseudobulbs should not be allowed to dry out, and should be repotted immediately.[5]

Division of orchids with rhizomes requires cutting the rhizome with a sterilized knife after the plant has flowered. Some growers recommend letting the cut rhizomes sit until dormant buds begin to break and new growth begins. Afterwards, the plantlets can be separated and the divisions repotted in bark medium as new plants.[5]

Cuttings are uncommon, but may be taken from the stem of a *Dendrobium* after its flowers fade. The flower spike (stem) is up to 1 foot long and can be cut from the parent plant into sections with 3-4 nodes each. A cut end from each section should be dipped in a rooting hormone and put into a medium of pebbles, sphagnum moss or bark. Cover with plastic wrap to keep humidity high and place in a dark location with a temperature of 75^0F to 85^0F. A heat mat can help. Mist cuttings regularly to keep them moist, and mist weekly with a foliar fertilizer until the cuttings develop leaves and roots.[6]

Meristem tissue culture is used by commercial orchid breeders who want to mass-produce clones of a particular cultivar that is especially beautiful. It is a type of micropropagation where a growth tip is cut and grown in an agar growing medium until it can be divided many times to make numerous plants. Tissue culture allows for fast multiplication of plants with the added bonus of producing virus-free plants because the meristem tissue lacks vascular tissue and prevents the spread of viruses to cells.[5]

Advantages and Disadvantages of Sexual Propagation vs. Asexual Propagation

The advantage of sexually propagating orchids is the ability to produce new varieties through breeding. A drawback is it requires hand-pollination because the natural insect pollinator is not available. Also, orchid seeds need a specific fungus for germination, and after months or even years, flowers may not be true-to-type.[5]

Asexual propagation includes division, cuttings, and tissue culture – all of which provides true-to-type plants. The orchid industry was the first to recognize the advantage of tissue culture propagation because it provides mass-produced uniform and true-to-type plants of a desired cultivar. Tissue cultured plants are grown in a sterile condition with the advantage of being healthier, and disease and pest free which results in very few losses.[5] In the early stages, micropropagated plantlets require less care because there is no need to water or fertilize because the growing medium has all the requirements for growth.[5]

There are at least three disadvantages to micropropagation. A micropropagation facility is expensive, and the tissue culture process increases the likelihood of mutations because hormones and growth regulators in the growing medium artificially accelerates growth which can result in genetic variations. Mutations are unpredictable and uncontrollable. There may be many, or none at all, and the results will not be seen until the plants flower.[5] However, the biggest disadvantage of asexually propagating orchids is the loss of genetic diversity which means the loss of many potentially beautiful orchid varieties that could have arisen through breeding.

References:

1. Ching-Yan Tang and Wen-Huei Chen (2007) *Breeding and Development of New Varieties in Phalaenopsis.* Orchid Biotechnology: pp. 1-22. Available from http://www.worldscientific.com/doi/suppl/10.1142/6424/suppl_file/6424_chap01.pdf

2. American Orchid Society. *Orchid Care* [Internet]. Available from: http://www.aos.org/orchids/orchid-care.aspx

3. American Orchid Society. *How Are Orchids Propagated?* [Internet] Available from: http://www.aos.org/orchids/additional-resources/how-are-orchids-propagated.aspx

4. American Horticultural Society 1999. *Plant Propagation*. New York (NY): DK Publishing, p. 178.

5. American Orchid Society. 2011. *Propagating Orchids.* [Internet] Available from: http://www.flor.hrt.msu.edu/assets/Uploads/Propagatingorchids.pdf

6. SF Gate. San Francisco Chronicle Online. Hearst Publications. *How to Grow Orchids from Cuttings*. [Internet]. Available from: http://homeguides.sfgate.com/grow-orchids-cuttings-26350.html