

Cypripedium acaule var. *album*



Orchids

And how to grow them in a home environment

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Resource Educator



Laelia tenebrosa

Agenda

- Introduction
- Taxonomy
- Some examples
- Some natives
- Propagation
- Growing at home
- Potting
- Hybridization
- Summary

Introduction

- Genus: Orchidaceae
- Genera: over 800
- Species: over 20,000
- Varietals: millions
- Hybrids: lots and lots, including intergenerics
 - e.g. SLC = sophro-laelia-cattleya
- Advent of DNA analysis is causing reclassification

Here are some examples, including 4 native to NY





Stanhopea tigrina



Stanhopea grandiflora





***Disa uniflora* and hybrids**



Cornell University
Cooperative Extension
Dutchess County

Bulbophyllum rothschildianum



Orchids native to New York



© Elaine Haug

Cypripedium parviflorum var. parviflorum



Cypripedium acaule



***Plantanthera blephariglottis* aka
*Habenaria blephariglottis***



Epipactis gigantea



Cornell University
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Dutchess County

Cypripedium parviflorum var. planipetalum

Cypripedium acaule



Common Orchids for Homes



Phalaenopsis



Miltoniopsis



Oncidium



Dendrobium



Paphiopedilum



Taxonomy

- Monocots



- Monopodial

& Sympodial



Primarily epiphytes



- Occasionally terrestrials

- Simple leaves, or none at all



Taxonomy (cont.)

Orchids flowers are bilaterally symmetrical with 3 sepals and 3 petals one of which is highly modified



Taxonomy (cont.)

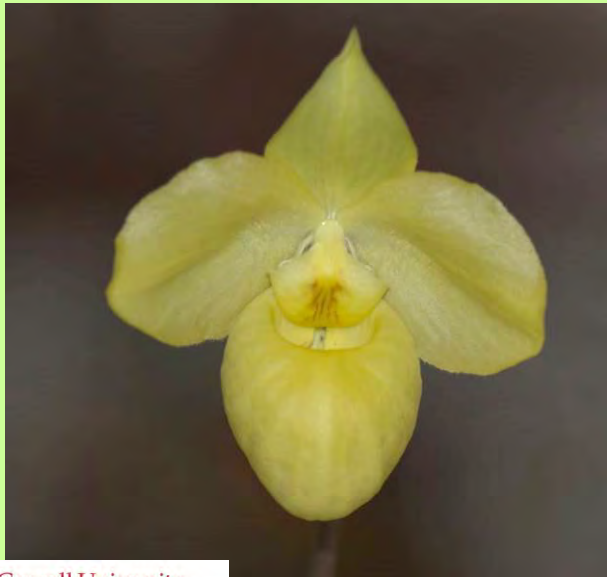


Lycaste alba



Phal. hybrid

Encyclia citrina



Paphiopedilium armeniacum



Angraecum didieri

Stanhopia tigrinum var. *nigroviolacea*



Propagation methods

- By division
- From a keiki
- From seed
- Asexual propagation
 - Meristem
 - Stem Propagation
 - Tissue culture



Propagation by Division (slow)

- Usually for sympodial types – e.g. Cattleya, Laelia, Cymbidium, Paphiopedilum
- Simple to do when repotting
- Results in genetically identical plants
- Possible every 3-5 years



Propagation by keiki (less common but quicker)

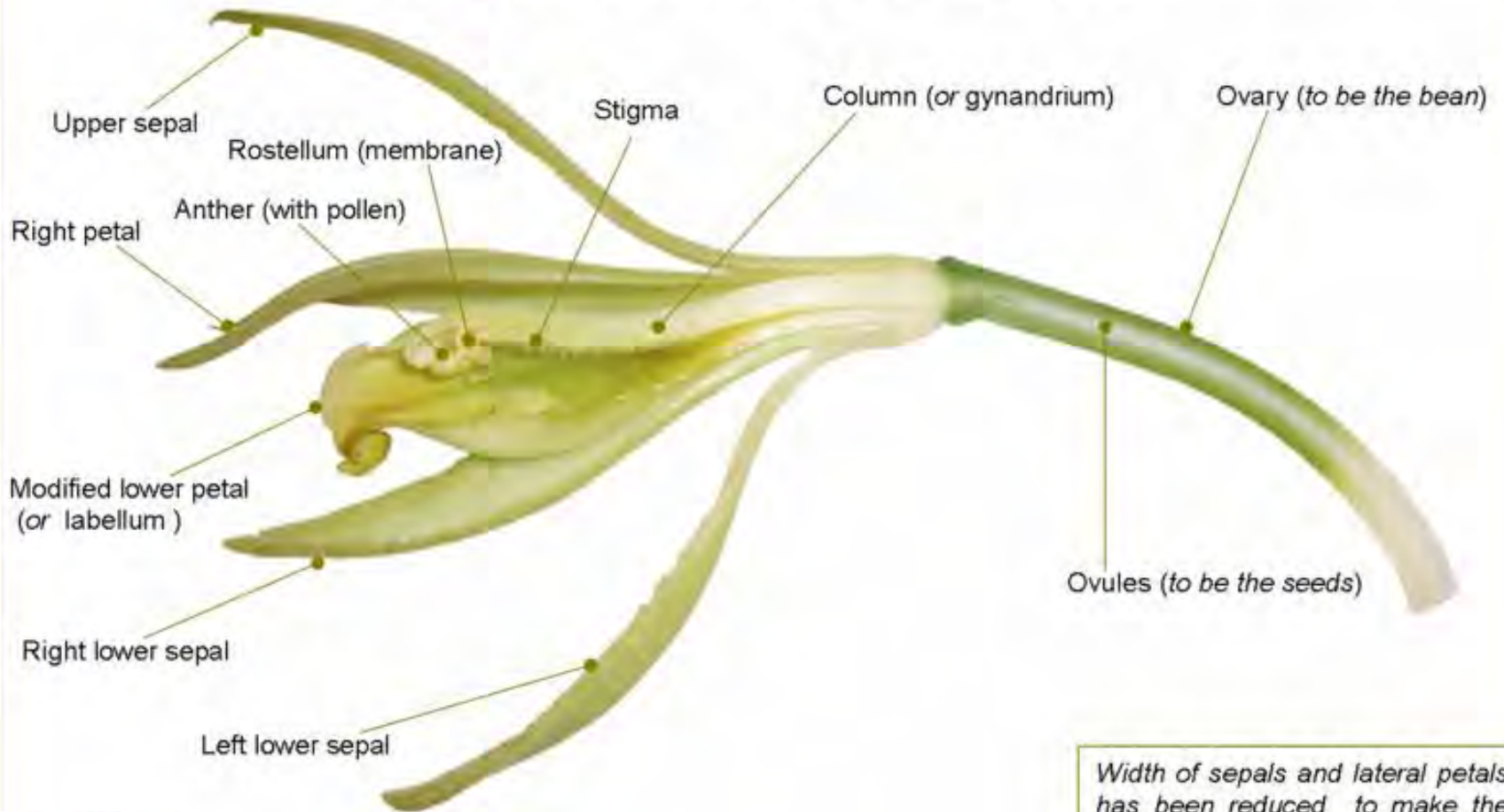
- Some orchids produce a plantlet called a keiki
 - Primarily Phalaenopsis, Dendrobium and Oncidium
 - Basically are adventitious buds spurred by growth hormones (auxins)
 - Can be induced with commercial “keiki paste”
- When a keiki appears, let it grow on the plant until it’s large enough to be potted on its own.



Propagation by seed

(Knudson 1907, reliable results 1930)

Longitudinal section of a vanilla flower



Width of sepals and lateral petals has been reduced to make the picture clearer



Anther Cap and Pollen



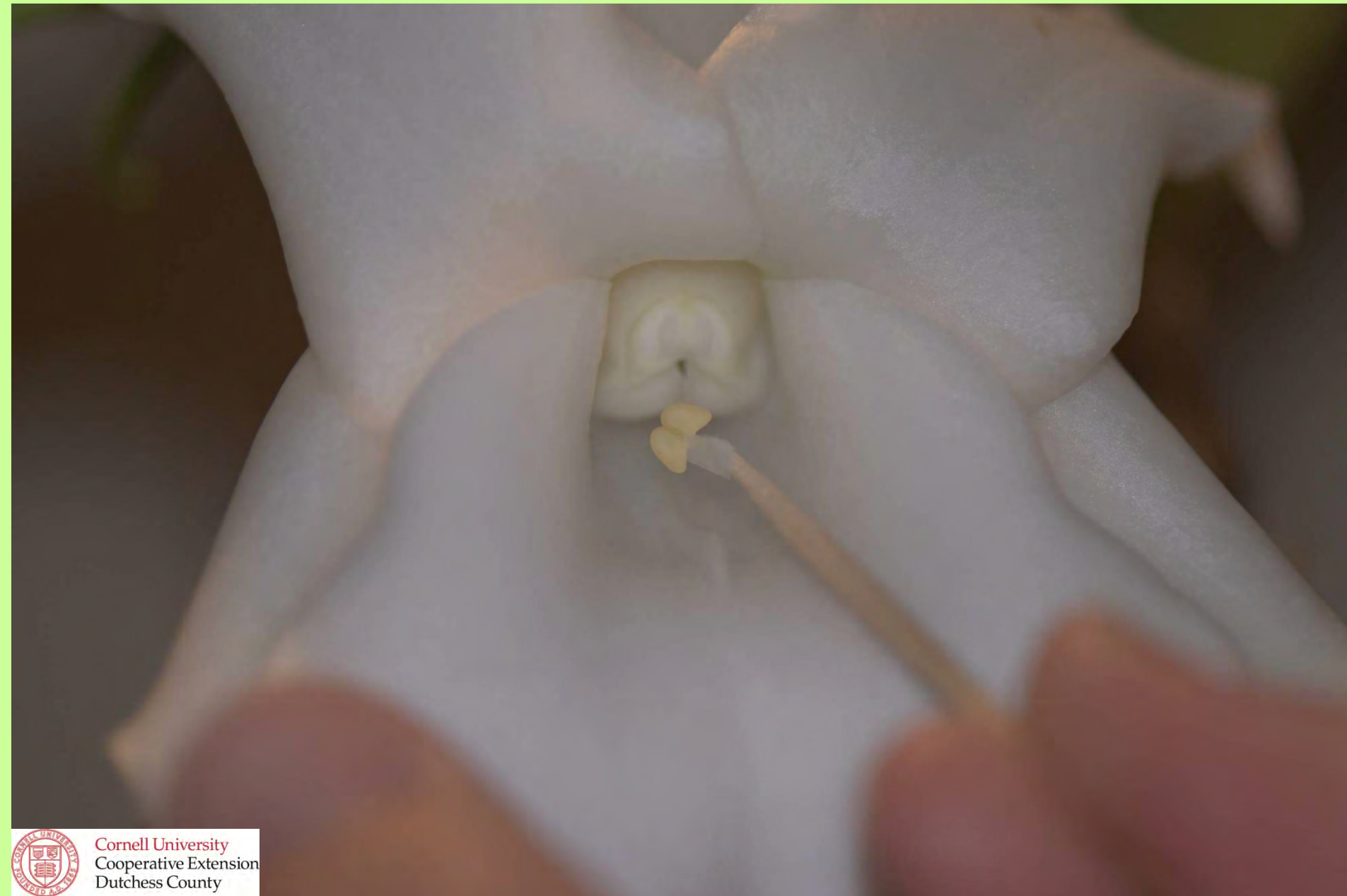
Angraecum magdalenae



Angr. magdalenae anther cap and pollen



Angr. magdalenae pollination by human



Angr. magdalenae seed capsule forming



Propagation by seed

(tricky, slow, variable results)

- Seeds are minute – like dust – but numerous
 - They harbor virtually no stored food
 - The embryo is an undifferentiated cluster of cells
- Seeds are incapable of germinating and growing on their own
 - Depend on a symbiotic relationship with mycorrhizal fungi to receive carbon and nutrients (discovered in 1903)
 - Must fall where carbohydrates and fungus both exist
- Seed propagation in labs is done *in vitro* (in glass) on sterile agar with weak fertilizer and nutrients.
 - Disinfecting seed without killing it is difficult
 - Germination may take weeks or months
 - Can take 5-7 years until plants reach flowering size
 - Flower results are variable since from seed

Asexual propagation

(tricky process, great results)

Morel, 1956 or perhaps Rotor, 1949

- Meristem process introduced to try to free potatoes from viruses.
 - Theory was meristem grows faster than the virus
 - Applied to orchids mainly for flower production
- Apical meristem excised, spun on nutrients
 - Usually used with sympodial orchids (new growth)
- Stem propagation
 - Used more with monopodial orchids since they cannot be divided

Tissue Culture

- Performed under sterile conditions – tools, medium, tissue, air, growing environment in glass
 - Many media “formulas” exist for different types of orchids
- Meristem tissue is collected from new growth, or an undeveloped bud (e.g. on stem of phalaenopsis)
- The tissue is grown on in special liquids and nutrients until the cell mass is large enough to split into PLBs (protocorm-like bodies)
- The PLBs can be rooted (by adding auxins) or divided and returned to the nutrient liquid to continue to produce tissue.
- Resulting plants are “genetically identical” clones of the mother plant.



PLBs or Callus

Commercial tissue propagation today creates the wonderful plants you can buy at “big box stores” by also propagating leaves (still sterile) grown from the original meristem material.

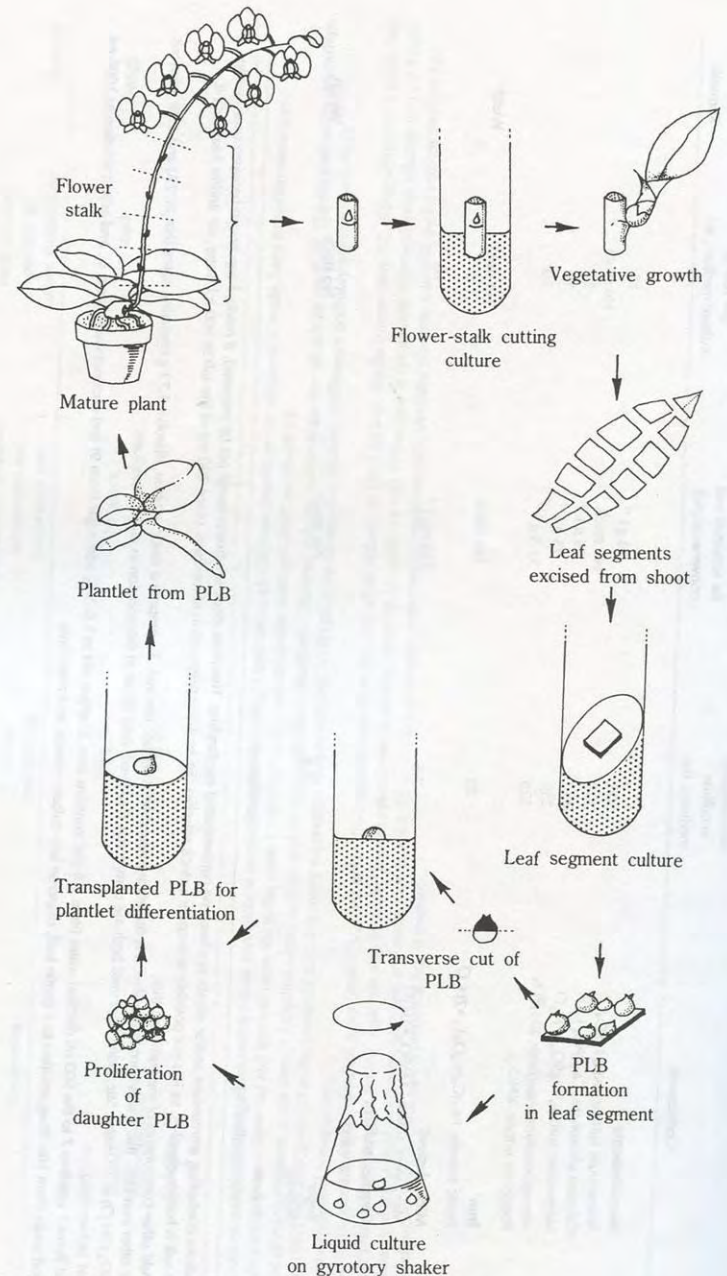


FIG. PHAL-7. Section 7.1

SO – How do you grow an orchid
at home?

DON'T PANIC!!

How to care for your orchid

Determine what orchid it is.

- There are only a few orchids sold for hobbyists
 - Phalaenopsis – “moth orchid”
 - Dendrobium – “thick stalks with flowers”
 - Miltoniopsis – “pansy orchids”
 - Oncidium – “dancing ladies”
 - Paphiopedilum – “ladies’ slippers”
1. Does your plant have a label?
 2. What do the leaves look like?
 3. What do the flowers look like?
 4. Do you successfully grow African Violets?
 5. Don’t panic.

Common Orchids for Homes



Phalaenopsis



Miltoniopsis



Oncidium



Dendrobium



Paphiopedilum



Basic Orchid Culture www.aos.org

- Air – Same as most house plants
 - Sufficient air movement is needed to avoid pests and other diseases
- Pests – Same as most house plants
 - Aphids, scale, spider mites, mealy bugs.
 - Follow Cornell recommendations for house plants
- Heat and Light – Same as most house plants
 - At least 6 hours of natural light or 14-16 hours of artificial light
 - Avoid hot afternoon sun – most orchid leaves are thick and can burn. But it won't kill the plant.
 - Avoid cold temperatures – most orchids are tropical. If you are comfy, they will be too. Cold (below 50) will kill most plants.
 - Avoid dim areas – most orchids are tropical. Too little light will not kill them, but they won't bloom. Aim for medium green leaves.
 - Mimic their natural environment – drop the temperature in your home at least 10 degrees at night, especially in autumn and winter when many orchids initiate buds.

What?

Phalaenopsis ORCHIDS

For months of longevity...

1. Water with 3 ice cubes once a week, equivalent to 1/4 cup of water.
Pour arroser mettre 3 cubes de glace 1 fois par semaine, équivalent de 60 ml d'eau.
Regar con 3 cubos de hielo por semana, equivilant a 1/4 taza de agua.
2. Place in a bright, well-lit location, avoid direct sunlight.
Placez dans un endroit bien éclairé à l'abri du soleil direct.
Ubique en un lugar brillante y bien iluminado, evite la luz solar directa.
3. 60-85 °F, never below 55 °F. Locate away from drafts.
Évitez les courants d'air. Température idéale entre 18 °C et 29 °C. Jamais sous 13 °C.
60-85 °F, nunca por debajo de 55 °F. Ubique lejos de las corrientes de aire.

235797

Phalaenopsis Orchid

Give it a Shot!
*One Shot Glass
of Water a Week!*

**Your Flowers will
Last for Months!**

*It's that easy...
enjoy!*

Water
one shot glass
of water per week
(equivalent to 1/4 cup)

Lighting
as much light as
possible without
direct sunlight

Temperature
60-80 F
(avoid drafty areas
and temps below 50 F)

Container
empty any excess
water from your

Basic Orchid Culture (cont.)

Most orchids are epiphytes. They live in trees or on rocks. In nature, rain flows past their roots, adding nutrients from leaves or other materials lodged in the tree or in their roots.

Orchids are more often killed by improper watering than anything else.

- Watering
 - Water orchids just as they dry out
 - Check the medium by weight, or with your finger
 - Water them copiously, in the sink, until water runs out.
 - If possible, use “soft” water. Minerals can build up and harm the plant’s roots.
- Fertilizer
 - General rule of thumb – use $\frac{1}{2}$ as much, twice as often
 - Weakly weekly is the mantra, less in winter.

Basic Orchid Culture (cont.)

Repotting

- When the potting mix breaks down
 - Visible dead roots
 - Healthy roots, but mainly outside of the pot
 - A heavy pot even when not watered
- When the plant outgrows the container
- Pot into a larger containers, or divide the plant
- Always use fresh growing medium
 - Need a fresh, fast-draining, but water-retentive medium
 - Match the medium to the plants' root size (fine, medium, coarse)
 - Use a medium for the plant's needs and your watering habits
 - Bark-based mixes drains well but break down rather quickly
 - Peat-based mixed retain moisture well but require more careful watering and frequent re-potting.
 - Inorganic mediums can be successful too (lava rock, coconut fiber)
- Pot for the root system, not the foliage
- Remove dead roots, reposition plant in pot for future growth



Growing requirements



Species	Day Temp	Night Temp	Humidity	Light
<i>Cattleya</i>	70-85	55-60	50-80%	Med - high
<i>Cymbidium</i> *(winter)	75-85 *65-75	50-60 *45-55	40-60%	Med - high
<i>Dendrobium</i>	80-90	60-65	50-60%	Med - high
<i>Masdevallia</i>	65-75	55-60	60-80%	Low - med
<i>Miltoniopsis</i>	Below 80	Above 55	70%	Medium
<i>Oncidium</i>	80-85	55-60	30-60%	Med - high
<i>Paphiopedilum</i> *(some varieties)	75-85 *75-80	60-65 *50-60	40-50%	Med - low
<i>Phalaenopsis</i>	75-85	Above 60	50-80%	Med - low
<i>Vanda</i>	80-95	60-70	80%	Med - high

Cattleya hybrids



Cattleya hybrids



Cymbidium hybrids





***Cymbidium* as cut flowers**

Dendrobium hybrid





***Masdevallia* hybrids**



Cornell University
Cooperative Extension
Dutchess County

Miltoniopsis hybrids

Oncidium hybrids



Special!!
BUY ANY 2
\$25.00 Plants
for only
\$40.00

Wils, Firecat 'Harmony'
This plant likes to be grown shady. Can bloom twice a year, and flowers last up to 6 weeks. Very easy to grow and bloom. Can be mounted on sturdy stems for hanging or in baskets. Spiking beautiful blooming plants available.
\$25.00 each

DELICIOUS BLOSSOM!
Vayl, Fall in LOVE 'White Fairy'
Something easy to grow and bloom. Blooms are long-lasting! Blooming beautiful plants available.
\$25.00 each

DELICIOUS BLOSSOM!
Wils, Firecat 'Harmony'
This plant likes to be grown shady. Can bloom twice a year, and flowers last up to 6 weeks. Very easy to grow and bloom. Can be mounted on sturdy stems for hanging or in baskets. Spiking beautiful blooming plants available.
\$25.00 each

Paphiopedilum hybrids



Phragmipedium sp.



*Phragmipedium
schlimii*
(species)

Cypripedium parviflorum var. *makasin*



Phalaenopsis hybrids



Vanda hybrids



Repotting

Repot when needed (Hint: how heavy is an unwatered pot?)

- Orchids are epiphytes. Their roots need air. In nature their roots attach to tree limbs or rocks.
- If grown in regular potting mix their roots will rot.
- They should be grown in a mix of very porous material which does not retain water e.g. Pine bark, charcoal, perlite.
- Growth habit dictates where the plant is positioned in the pot.

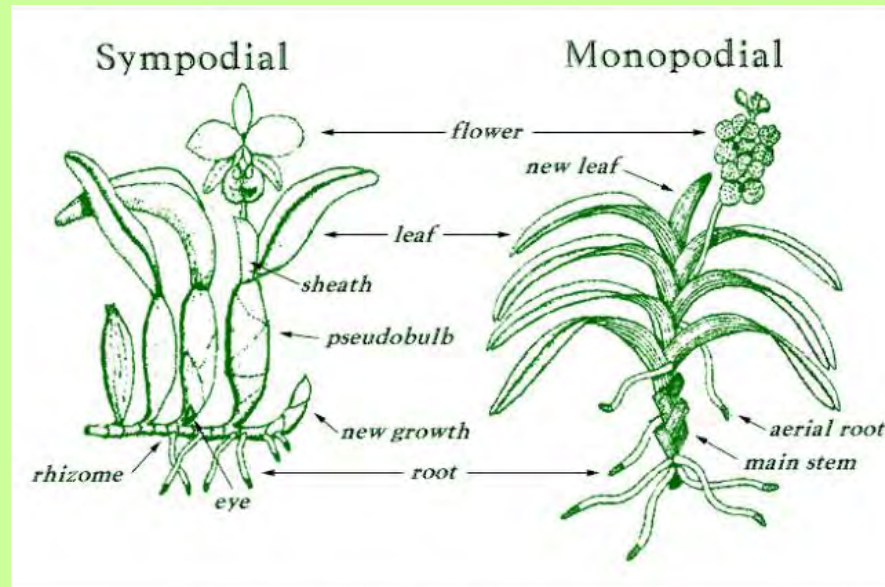


Photo copyright, American Orchid Society newsletter

Orchid Hybrids

- Early 1800's – studies of orchid seedlings and germination
- 1850's - first successful hybridization, of *Cattleya*.
- Late 1800s – confusion around seed germination and if mycorrhizal fungi were essential
- 1922 – Lewis Knudson proved seeds could be germinated on agar and sugars produced by the fungi
- 1949 – Vegetative [clonal] propagation of *Phalaenopsis* developed at Cornell by Gavino Rotor.
- 1960's to 1980's – propagation and growing techniques improved
- Today – Home Depot and BJ's sell orchids

Phalaenopsis species from phals.net



javanica



kunstleri



lamelligera



lindenii



lobbii



lowii



lueddemanniana



maculata



malipoensis



marnii



mariae



marriottiana



mentawaiensis



micholitzii



mirabilis



modesta



mysorensis



natmataungensis



pallens



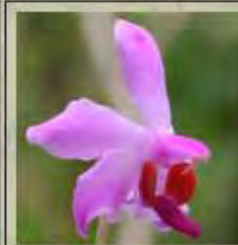
pantherina



parishii



philippinensis



pulcherrima



pulchra

Photos of *Phalaenopsis philippinensis* in culture :



Alain Brochart



Libor Jankovsky



Sergej Generalov



Alain Brochart



Alain Brochart



Alain Brochart



Hou Tse Liu



Micael Liu



Martina & Paul
Lippold



Martina & Paul
Lippold



Thomas Frey



Sascha Heikens



Sian Lim



Lanfu Wang



Lanfu Wang



Ilona Kowalska



Gene Tobia



Kirill Rapoport



Helmut Demel



Alain Brochart



Alain Brochart



Alain Brochart



Alain Brochart



Alba Men

Photos of *Phalaenopsis mariae* in culture:



Hou Tse Liu



Alain Brochart



Anne Perthus



Alain Brochart



Alain Brochart



Allen Black



Alain Brochart



Thorsten Stute



Martina & Paul
Lippold



Lanfu Wang



Micael Liu



Micael Liu



Alain Brochart



Lanfu Wang



Alain Brochart



Alain Brochart



Gene Tobia



Tropical Exotique



Tropical Exotique



Lin Cheng-Der



Lin Cheng-Der



Lin Cheng-Der



Petra Pils

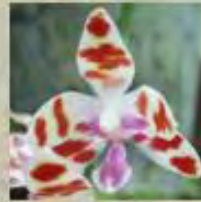


Olaf & Sylvia Tönne



philippinensis

X



mariae



Phalaenopsis Espiègle © Alain Brochart, 2004

Photos of *Phalaenopsis violacea* in culture:



Stanley Hendrawidjaja



Alain Brochart



Alain Brochart



Alain Brochart



Sergej Generalov



Judy Benson



Alain Brochart



Alain Brochart



Alexandra Dees



Alexandra Dees



Nik Fahmi (Vortex)



Nik Fahmi (Vortex)



Martina & Paul
Lippold



Martina & Paul
Lippold



Martina & Paul
Lippold



Thomas Frey



Peter Wiczoreck



Wolfgang Apel





mannii

X



violacea













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Cattleya percivaliana "Summit" FCC/AOS



Aerangis elliseii



Laelia anceps named species



Laelia anceps alba



Laelia Hybrid



B/c. Mem.
Browl
x
Schomb. jun

Santa Barbara



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Isabella virginalis - close up



Some variegated hybrids



Arachnis Maggie Oei
 (*Arachnis hookeriana* x *Arachnis flos-aeris*)
PRICE \$25

Plant: Size: 50-250cm
 Flower: Size: 7.5-10cm
 Flowering Season: Summer
 Longevity of Flowers: 15-20 days
 Fragrance: Faint
 Sunlight: Moderate-Strong

Yuan Gold "Yung Kang #2"
 (*Common Tree* x *Blc. Tassie Barbero*)
\$ 20

Color: Golden yellow flower
 Propagation: Mericlone
 Season: Irregular
 Fragrance: Yes
 Flower Size: Large
 Award Record: GM/16WOC

C. Moscombe with variegated leaves
 (*C. Mosnor* x *C. Sedlescombe*)
\$ 25

Color: Yellow with red splash
 Propagation: Mericlone
 Season: Spring
 Fragrance: No
 Flower Size: Small

Bc. Pastoral "Inno"
 (*C. Mademoiselle louise pauw*)

Color: White
 Propagation: Mericlone
 Season: Irregular
 Fragrance: Yes
 Flower Size: Large

Paphiopedilum kolopakingii



Paphiopedilum Michael Koopowitz "Ponkan" AM/AOS



Some *Paph.* species





Paph. urbanianum

98-543 mar/02



Unknown *Paph.* hybrid



In all cases, just enjoy

