



LOVELY LOTUS:  
FROM MAKEUP  
TO MEATLOAF

---

*Celebrating One of the  
World's Most Unique and  
Useful Plants*



Laura Bancroft  
tenmilecreeknursery.com  
Hartford, Alabama, USA



- 400 named cultivars from around the world
- Approximately 5000 pots are harvested each year
- Dormant tubers are sold March - May
- All pots are replanted beginning in mid-March
- Pot sizes range from 10"x 7" to 25"x12"



Plum Robe  
Ten Mile Creek Nursery



Green Clouds  
Ten Mile Creek Nursery



Pink Cloud  
Ten Mile Creek Nursery



Every pot has an irrigation line and the cultivar name is written on the pot



# True-to-Name Dormant Tubers Sold Retail & Wholesale





Red Beijing  
Ten Mile Creek Nursery



New Cloud Brocade  
Ten Mile Creek Nursery



Rubies & Pearls  
Ten Mile Creek Nursery



Jinling Jasper  
Ten Mile Creek Nursery



Mrs. Perry D Slocum  
Ten Mile Creek Nursery



Red Shanghai  
Ten Mile Creek



Green Star  
Ten Mile Creek Nursery



Torch of Nanjing  
Ten Mile Creek Nursery



Xiamen Bowl  
Ten Mile Creek Nursery



Raging Fire  
Ten Mile Creek Nursery





## Certified Organic Biomass

Approximately 45,000 pounds (24,412kg) are harvested and processed on-site





From  
Makeup...

Luxury Lotus Skincare Products by

*fresh*







*forever* fresh

Our commitment to sustainability



## The Lotus Collection

Luxury facial moisturizers, lotions, masks and eye creams to prevent and address the first signs of aging...





# LVMH *for the environment*

## LIFE 360

- **Circular Design** – repair, refill, repurpose
- **Protect Biodiversity** – protect resources, regenerate ecosystems, raise awareness
- **Decarbonization** – defined action plan to lower carbon footprint
- **Transparent Value Chains** – traceable supply chains, certification of suppliers



*“All of our products come from nature. This awareness, this interaction with nature, with biodiversity, constitutes the common thread of our LIFE 360 action plan. Biodiversity, water, climate – it’s all connected.”*

Hélène Valade  
LVMH

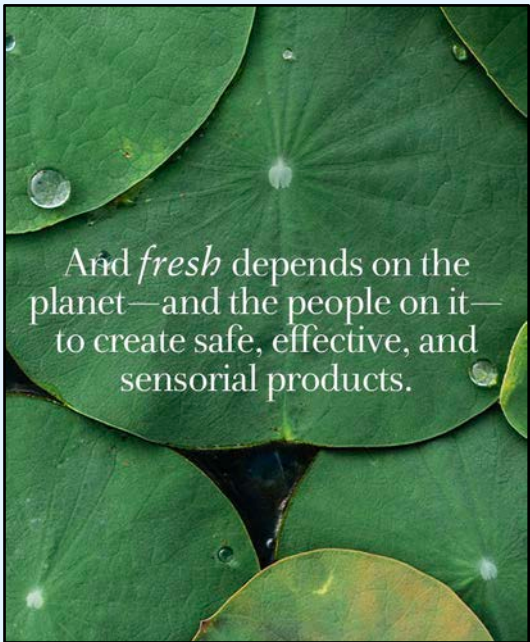
Environment Development Director



Committed to  
sustainable  
biodiversity...  
And backing it  
up!



**LVMH**  
fully funded two  
solar pumping stations  
for Ten Mile Creek Nursery  
which significantly reduces  
our power load on local  
electrical grid



Photos used with permission

# CHOOSE THE PERFECT ZINC OXIDE SUNSCREEN



# CERTIFIED ORGANIC LOTUS BIOMASS

Ten Mile Creek Nursery harvests biomass used in many sunscreens and in skincare products.



# Coppertone Neutrogena Aveeno





... to  
Meatloaf

# Lotus are delicious and good for you!

All parts of the lotus can be used for food: seeds, rhizomes, stems, petals, leaves and pollen

- **Strengthens auto-immune system**
    - High in antioxidants
  - **Reduces anxiety**
    - Helps prevent insomnia (tryptophan)
  - **Prevent cardio-vascular disease**
    - Potassium & Magnesium help regulate blood pressure
  - **May lower fasting glucose**
  - **High in fiber to help with digestion**
  - **Low in cholesterol and saturated fats**
- **Enhances metabolism**
    - Complex carbohydrates provide steady release of energy
  - **Reduces cramping in muscles**
  - **Nutritious, high in essential minerals and vitamins**
    - Vitamin C & B6, copper, manganese, iron, thiamine
  - **Anti-aging antioxidants**
    - Glutamine > proline > collagen
    - Vitamin C and EGCG promote healthy, vibrant skin
  - **Reduce inflammation**
    - Seeds have anti-inflammatory effects

Lotus Seeds  
can be  
served raw,  
roasted,  
boiled or  
pickled







Asians eat more **LOTUS ROOTS** per capita than Americans eat potatoes!



Korean BBQ Lotus Root



Lotus salad



## Lotus Petal Tea

Made from fresh or dried petals

## Lotus Leaf Tea

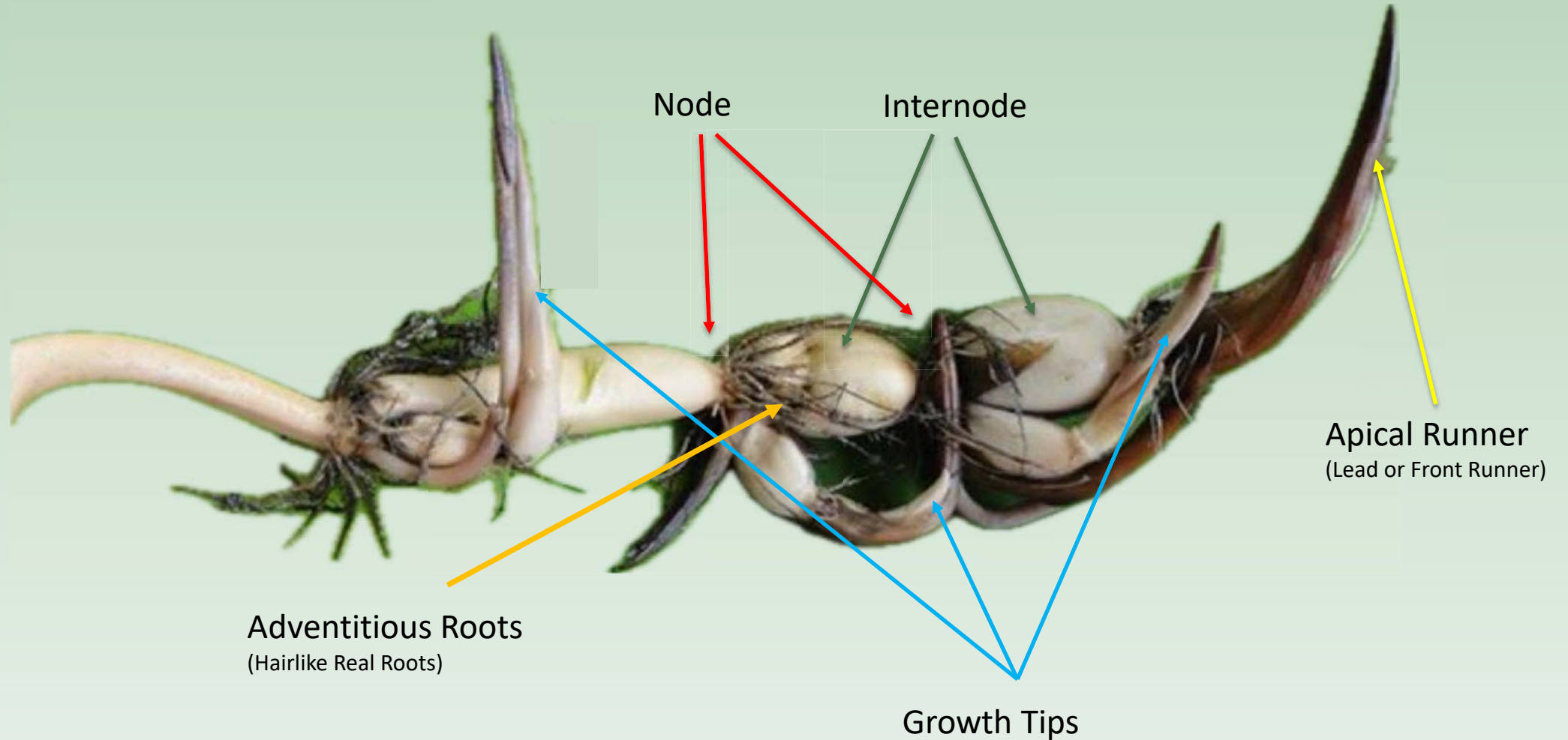
Made from fresh or dried leaves



# **Planting A Lotus Rhizome**

Lotus rhizomes produce exact genetic clones of the parent lotus

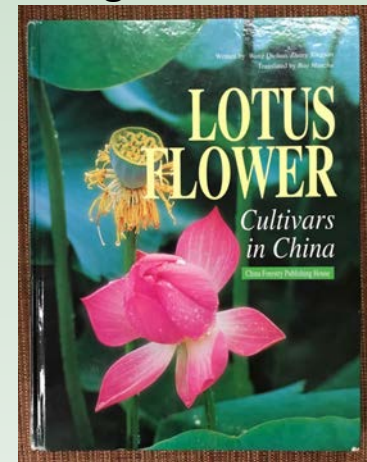
# Anatomy of a Lotus



“The lotus flower is an aquatic perennial whose growth is controlled by temperature and sunlight.”

Temperature and day length determine when a lotus rhizome breaks dormancy

- Temperature:
  - ✓ Plant when night temps average 55° F.
  - ✓ Optimum temperature for growth is 72-90°F.
- Lotus rhizomes use the nutrition stored in the rhizomes until aerial leaves begin to grow
  - ✓ Don't waste it by planting too soon!
  - ✓ Planting a lotus rhizome before the temperature is warm enough results in much slower growth
- Sunlight:
  - ✓ 6-8 hours direct light every day.
  - ✓ Too much shade means slower growth and fewer flowers.
- Soft, rich, light clay soil
- Gently circulating air



Wang Qichao, Zhang Xingyan  
*Lotus Flower Cultivars in China*

**HARVEST**

Plant rhizome

Coin leaves emerge - 1-3 weeks after planting



Rhizome production  
& dormancy

**AVERAGE LIFE CYCLE**

**\*IN POT 140-150 DAYS**  
**\*IN LAKE 180-190 DAYS**



Flowers & seeds  
3 - 3.5 months



1st bud emerges after  
3-4 aerial leaves - week 8-10



First aerial leaf emerges  
around week 6-8

# Lotus

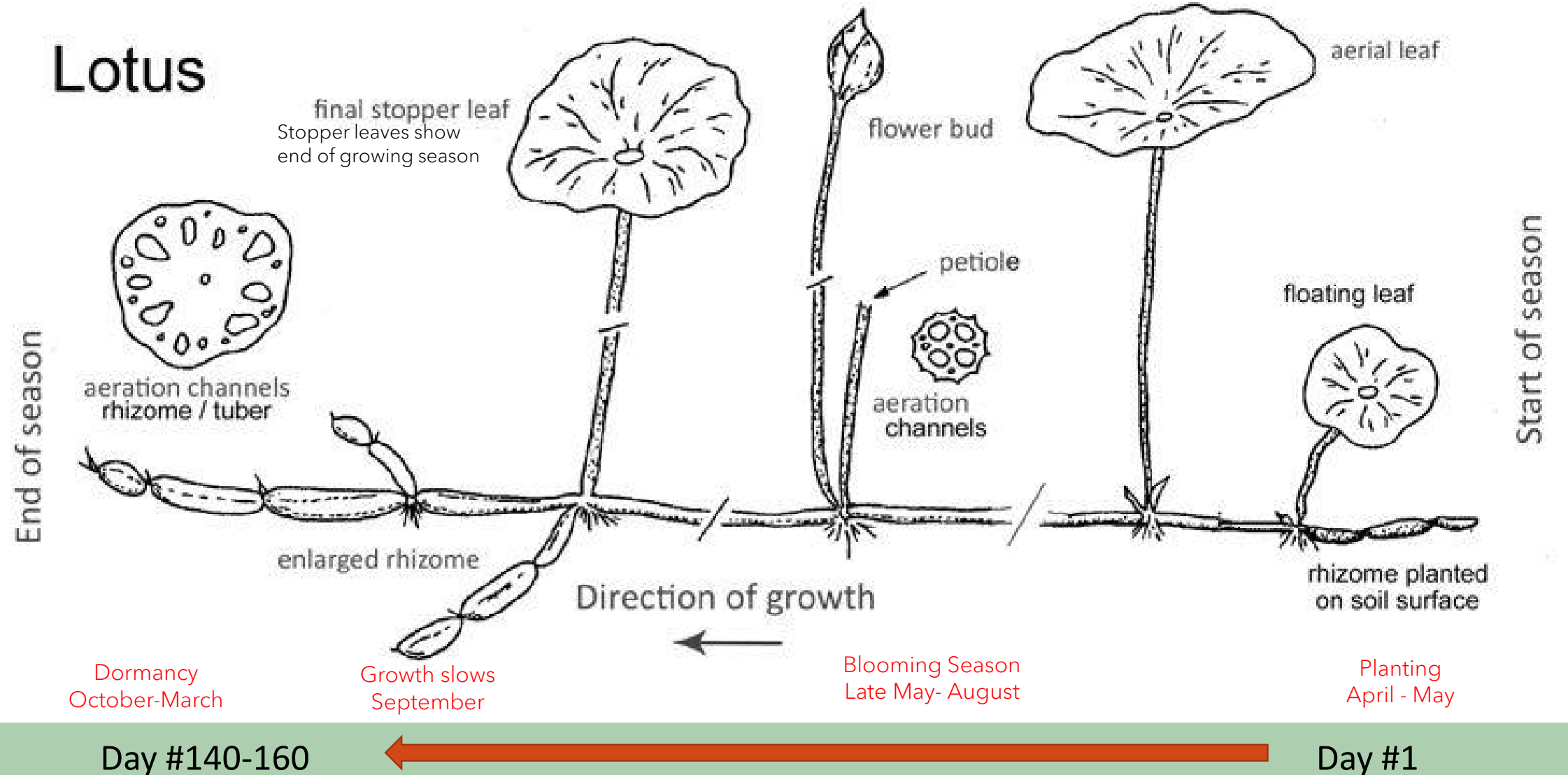


Diagram by Paula Biles

# SOIL

**1. Clay** – especially from pond or lake bottoms

\*Most growers recommend that clay should make up about 20% of the mixture

**2. Clean Topsoil / Garden Soil**

Sandy Loam (sand, silt, clay)

- Pebbles with sharp edges and large grains of sand can leave scratch marks on growing tubers
- No obvious pests
- An adequate amount of soil helps keep roots cooler



How Much  
Dirt???

# Lotus Love Wide but Shallow Pots



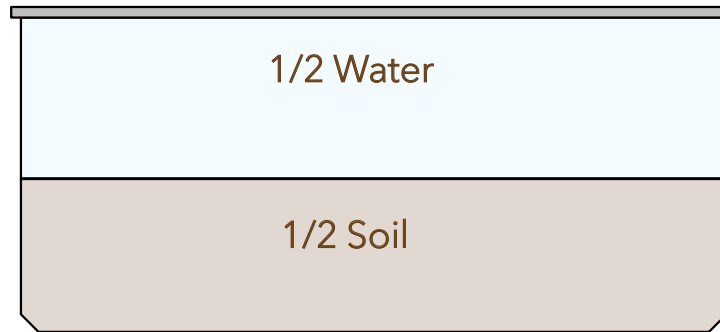
## Approximate Ratios for Filling Lotus Pots Based on Pot Height

### 1. Pots Started with Organic Fertilizer

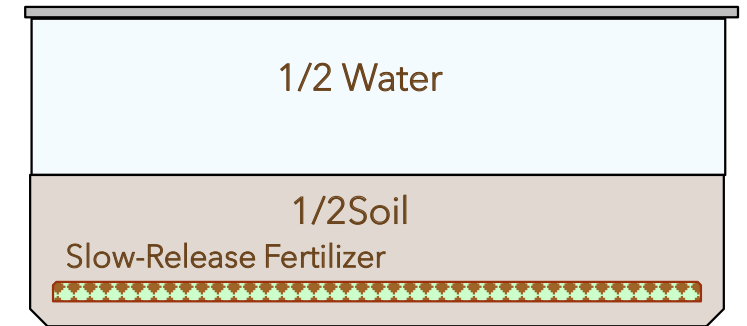


Allow mix to cure for one week before planting the rhizome

### 2. Pots Started With No Fertilizer



### 3. Pots Started With Slow-Release Fertilizer



\*Growers with large numbers of pots usually use less fill dirt so pots are not as heavy. Less fill dirt also makes harvesting easier. ~1/3 height of pot





## Planting Potted Lotus in a Garden Pond

- Start pots outside of pond until leaves appear.  
 Less water = Higher temperature = Faster growth
- Consider sight lines before placing lotus into pond
- Use 'platforms' to raise lotus to correct depth
- Consider adding 180 day slow-release fertilizer
- Wrap thin chicken wire from top edge of pot to top water level to keep fish out
- Over-winter lotus in pond
- Harvest & divide every 2 years



# GROWING LOTUS FROM SEEDS



Start seeds in mid-May in Northern Hemisphere

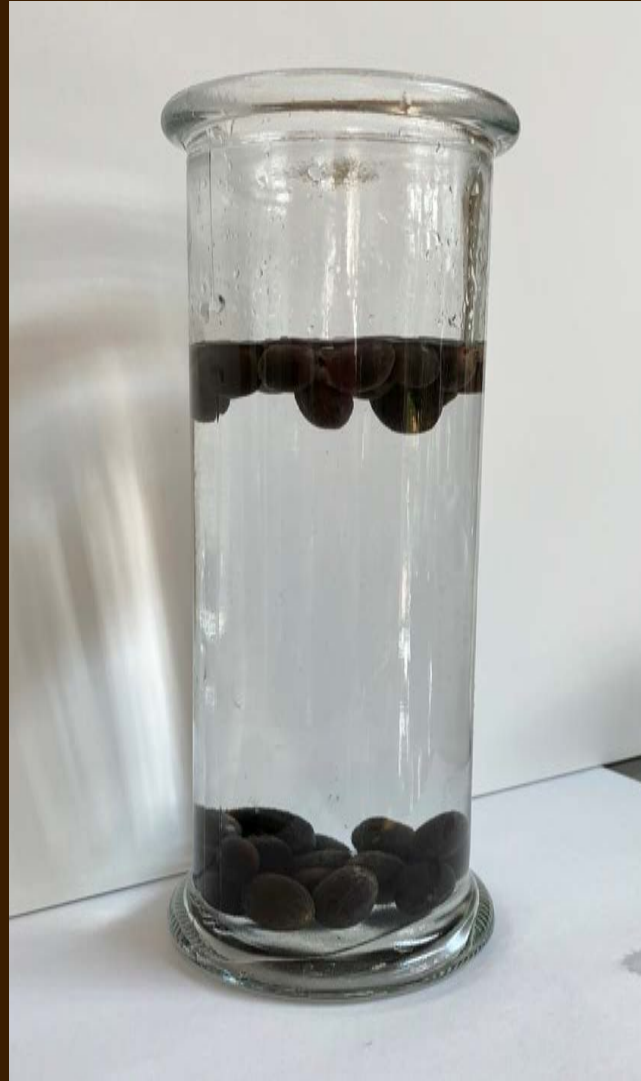
Outdoor Planting Temperature 68°-75°F



Green seeds are good to eat but will not grow!



Ripe seeds are brown and loose in seedpod.



Throw away 'floaters'

## Scarify Seeds



File away just the outer brown seed coat (pericarp)



Do not cut into pulp of seed - it will increase chances of rot.

# A Miraculous Journey in 25 Days!



## Day 1

Ideal temperature  
68-75°F



## Day 5

Cotyledon  
emerges from  
seed

Change water  
when cloudy



## Day 7-8

Leaf extends  
in length

Adventitious Roots  
anchor seeds and  
absorb nutrients to  
feed plant

Apical Runner  
produces underground  
'stems' of lotus

## Day 25 - Ready to Plant

- Seeds now have about 3 coin leaves, apical runner and hairlike adventitious roots.
- Prepare pot with mud. Make a depression in mud and plant seeds with runners and roots. Cover lightly with soil.
- Slowly add water to float the coin leaves.
- Do NOT add fertilizer!



# FACTS ABOUT GROWING LOTUS FROM SEEDS

- Seeds are almost always random hybrids!
- No guarantee what the flower color, plant size or flower type will be
- Not all seeds are fertile - do a float test and dispose of floating seeds
- Seeds started at the wrong time of the year probably will not live to produce a mature plant
- Germinating seeds is easy. Jumping from seedling to live plant is more difficult
- Yes, many will bloom the first season!
- Lotus grown from seed may 'revert' to parental phenotype
- Scarified seeds can be packed in clay to prevent them from floating and dropped directly into the shallow edges of earth-bottom ponds (8-12cm , 3-5" deep)

# **The Journey of a Lotus Flower**

65 Days from Cell to Seed



Lotus has 4-7 aerial leaves

Day 1  
Cellular Bud Forms

Day 13-15  
Bud emerges from water

Bud matures and grows  
~13-15 days after  
emerging from water

Day 30  
Flower  
Day 1

Flower  
Day 2

Flower  
Day 3

Flower  
Day 4

Petals begin to fall

Ripe Seeds Ripen for  
28-33 days after pollination

Seeds Fall  
Day 65-70

Days 30-35 after formation at cellular level  
Flower Blooms

Flower is most photogenic on Day 2  
Stamen releases sweet scent attracting insects  
Fertilization of ovule  
Anther splits releasing pollen

Stamen release sweet  
scent attracting insects  
-Mucilage on stigma  
round and bright  
indicating maturation of  
ovary



Mucilage becomes dry and black  
Fertilized seeds begin to develop





# Why Won't My Lotus Bloom?

- Not enough sunlight
- Not enough/too much fertilizer
- Planted too deep or not planted at all
- Over-crowded pot
- Pests/Disease
- Wrong cultivar
- It just doesn't like you 😊

# FERTILIZER

“Fertilizer should be added based on pot size, plant size, and season time”

- Do not overfeed lotus as early growth stage
- Increase fertilizer as lotus grows and then decrease after growth peak to encourage tuber production



Dr. Daiké Tian, PhD Horticulture  
Chenshan Botanical Garden

“ Get a soil test done so you know exactly how to fertilize.” Marilyn Eigsti

# Method #1

## No Fertilizer Before Aerial Leaves

No fertilizer until several floating leaves or aerial leaves appear

Daiké Tian,, Debbie Fass, Javier Tarillo Egner



- Add  $\frac{1}{2}$  dose fertilizer after several floating leaves or an aerial leaf appears.
- Add fertilizer according to package directions every 2-3 weeks after first dose. Increase dose slightly during active growing.



\**PondTabbs*: one 4.5g tablet per gallon of soil in pot every 2-3 weeks -

Larry & Lily Nau, James Bennett, Séverine Lyssens-Danneboom

\**18-10-10 with micros*: 45 cm x 25 cm pot - 1 tablespoon every 3 weeks - Javier Tarillo Egner

\* Any balanced N-P-K blend - Amount depends on pot size and temperature

- Decrease fertilizer to  $\frac{1}{2}$  dose 2-3 weeks before lotus go dormant



## Method #2

### Slow-Release Fertilizer Added to Potting Media

- **Slow-release fertilizer** in bottom layer of potting media when tuber is planted
  - *Dynamite* 13-13-13 3.5 T per 5 gallons of soil - Paula Biles, Marilyn Eigsti
  - *Purkote* 20-6-9 180 day 0.5 T per gallon of soil - Ten Mile Creek Nursery
  - Nutricote 18-6-8 180 day - Steve Stroupe, Geoffrey Cochrane, Kelly Billing, Susan Davis & Deb Spencer
  - Osmocote or Inorganic 19-19-19 - Varun Kumar, Mutha Kumar
- Add additional inorganic fertilizer as needed during active growing season – amount determined by pot size and amount of soil.

Most growers listed rate of supplemental fertilizer at  
1 Pondtabb per gallon of soil or ~1/2 T of balanced N-P-K per gallon of soil
- Decrease supplemental fertilizer to ½ dose 2-3 weeks before lotus go dormant



**\*NOTE – Slow-release fertilizer usually lasts only half the stated days/time when in warm water.**

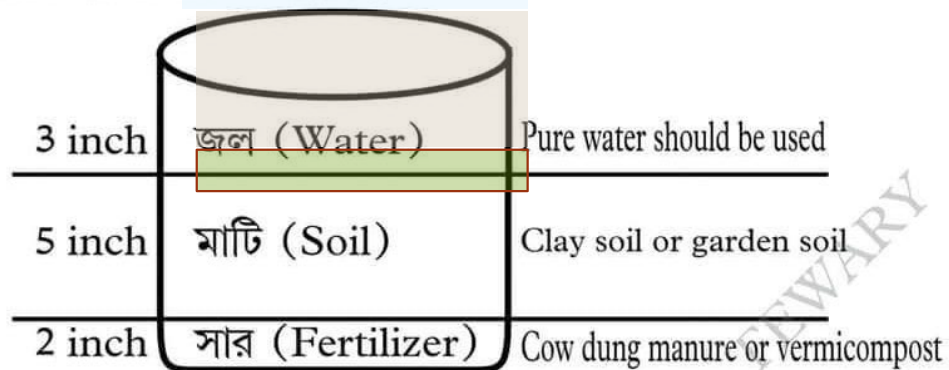
# Method #3

## Organic Fertilizer Added to Potting Media

### Sahasrar Water Garden

#### পদ্ম রোপনের পদ্ধতি (Method of planting lotus tuber)

##### Ratio for 10 inch height pot



### Using ORGANIC Compost in Potting Mix

(EX: Cow manure, bean, vermicompost (worm), chicken manure, composted plant material, peanut residue)

- Caution -- More organic content = More algae
- Prepare pot several days before planting tuber to allow for fermentation! You may need to change water a couple of times before planting.  
Zijun Li, Anirudha Sil, Davide de Silva
- Keep organic fertilizers on bottom of the pot and do not mix with soil layer above  
(Several growers also added inorganic N-P-K (Osmocote, Nutricote, Landons) to this bottom layer)
- Add *bone meal* to bottom layer with organic fertilizer
- Add inorganic *N-P-K* later as needed when plant growth is fast
- Chelated iron tablets - greener leaves



Utpal Debnath



# Feed Me!!

Watch for signs of fertilizer deprivation.

Green veins with yellow tissue between the veins.  
Yellow tissue will turn brown & dry in spots



# What's Up????

Can you make an accurate diagnosis of problems by looking at the leaves?  
That would be way too easy! Sadly, many problems look similar.



Possible Problems:

- Over-fertilization
- Under-fertilization
- Mineral deficiency
- Fungus

Know your crop- record date and amount added  
Use a conductivity meter



# Fertilizer BURN



- Usually happens within 24 hours
- Dry, crispy leaf usually starting at the edges
- Burn leaves cannot be fixed
- Remove them at water level
- Replace 50% of water
- Fertilize in coolest part of day
- Refresh water after fertilizing



# Yann's Recipe for Success! Arrrgh!



- Add 60 grams mixed fertilizer (~1/4 cup) to coffee filter pouch

50 g (3.3T) Osmocote 12-7-19 (180 day)  
+ 10 g (2 tsp.) 'hot' fertilizer 15-6-12, instant release  
60 g mixed fertilizer per pouch

*Make a Fertilizer Pouch, Me Maties*

- Twist top of filter to form pouch



50 g  
Osmocote  
180 Day

+



10 g  
15-6-12  
Fast Release

+



Paper Coffee Filter



1/4 cup per pouch  
5:1 mix of Osmocote and 15-6-12



Yann Number

- 2/3 garden topsoil + 1/3 pond mud to equal 20L (5.25 gal) in pot
- Plant 3-5 rhizomes along outside edges of container
- When 2-3 floating leaves appear add one (1) fertilizer pouch in center of pot

# Making a Homemade Fertilizer 'Tablet'

Placing fertilizer under soil helps with root absorption and algae control



Cut square of paper towel



Measure fertilizer



Pour fertilizer in center of paper

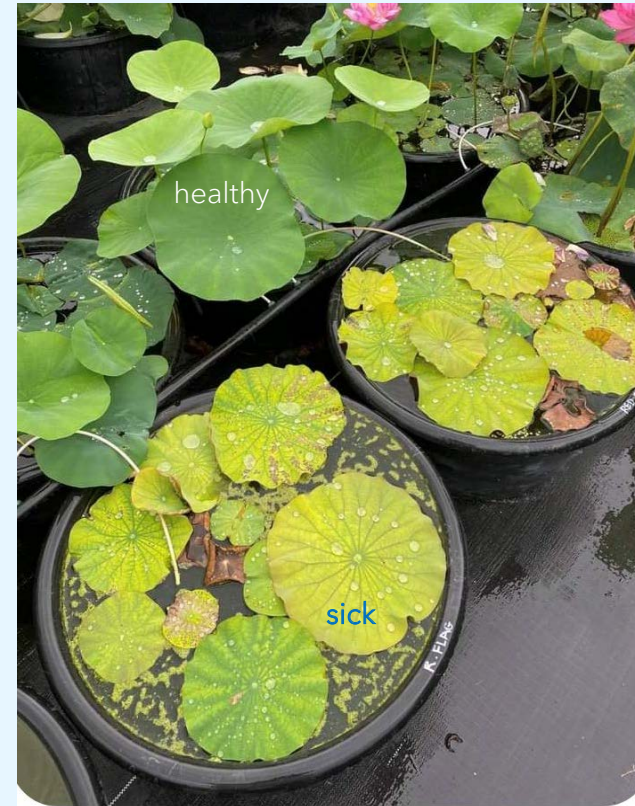
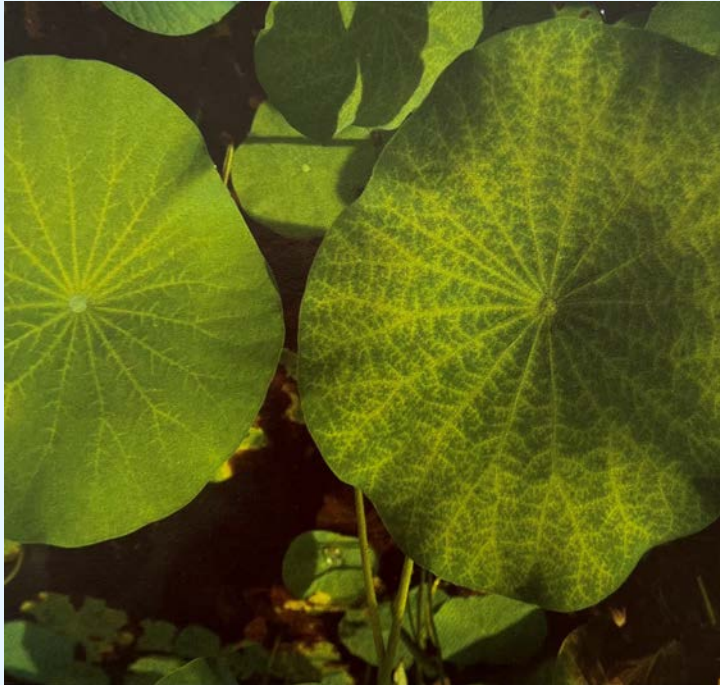


Twist edges to form a ball

- Make a hole in soil
- Place tablet in hole
- Cover tablet with soil

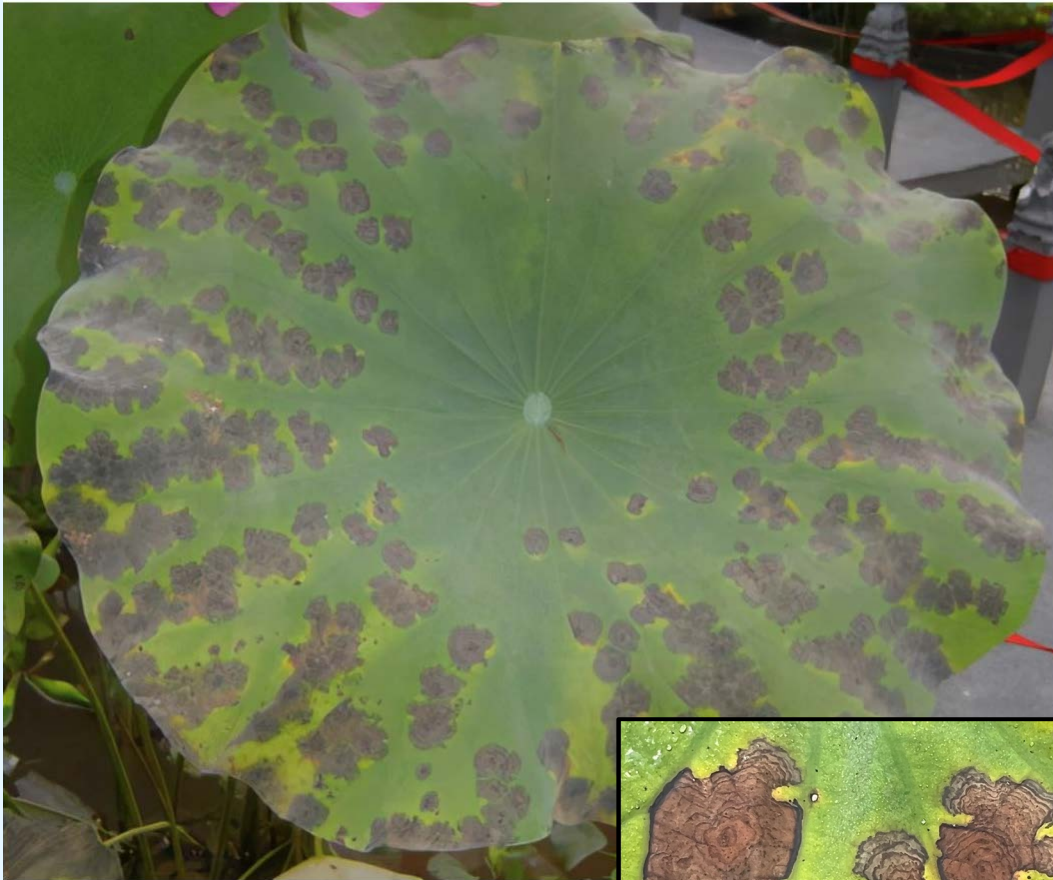
# Common Pests & Diseases

# Brown Strip Disease ( *Alfernaria nelumbii* )



- Remove diseased leaves when possible
- Spray with fungicide (stobilurin) in the morning & evening once every 15-20 days for 3 applications
- Spores over-winter on dead leaves

# Dry Spot Fungus

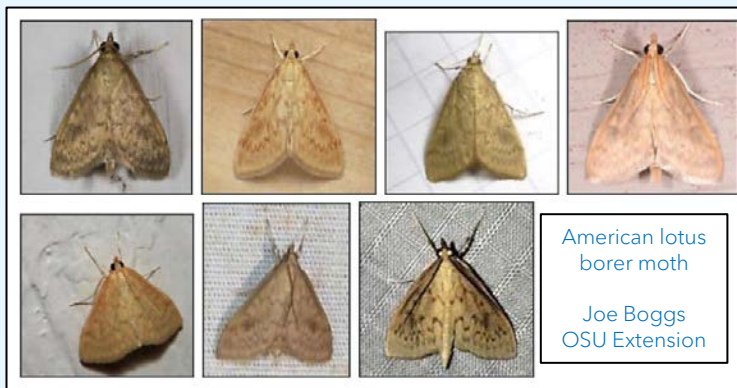


Laitimes.com

- Fungus especially common in hotter, more humid weather
- Remove and burn damaged leaves
- Spray with fungicide -  
Apply 3x at 15-20 day intervals. Mist top & under leaf surfaces
- Spores over-winter on dead leaves

# American Lotus Borer

*(Ostrinia penitalis (Lepidoptera: Crambidae))*



## Life Cycle of the American Lotus Borer

- Moth lays eggs on upper surface of leaf
- Young larvae attached to leaf by thin silken strands
- Mature larvae in silk net and/or rolled edges of leaves
- Larvae eat laminar surface of leaf
- Mature larvae tunnel into the leaf petiole to pupate
- Adults emerge from holes in the petiole

# Controlling Caterpillars - Take pre-emptive action!

## Small Growers:

- Remove by hand
- Silicon dioxide dust Jim Purcell
- Very fine mist of BT or pesticide with surfactant
- Beneficial insects (i.e. parasitic flies or wasps)



Silicon Dioxide



## Large Growers:

- Rotating applications of 2-3 different types of pesticides

Ten Mile Creek Nursery rotates  
**DiPel®** and **Monterey Garden Spray®**  
for organic caterpillar control



Bacillus thuringiensis

+



Spinosad



**"Begin spraying early  
and spray weekly!"**

Susan Davis & Deb Spencer

# Aphids



📷 Azem Ramadani/Getty Images

## Light Infestations:

- Remove and destroy infested leaves/plants
- Remove by hand
- Rinse off with hose
- Beneficial predators (i.e. lady bugs)

# Spider Mites



Garden Heaven Indoor Gardening Simplified

## For more extreme cases:

- Monterey Garden Insect Spray<sup>®</sup>,
- Pyrethrins Geoffrey Cochrane, Jay Lee
- BioAdvanced<sup>®</sup>, Ortho 3-IN-1<sup>®</sup> (these are combination insecticide with fungicide)
- TMCN : Talstar<sup>®</sup>





# Leaf-Footed Stink Bugs



- Usually cause little damage but heavy infestation may cause aborted buds and destroy seeds
- Remove by hand
- Predator wasps
- Extreme case - pyrethrins

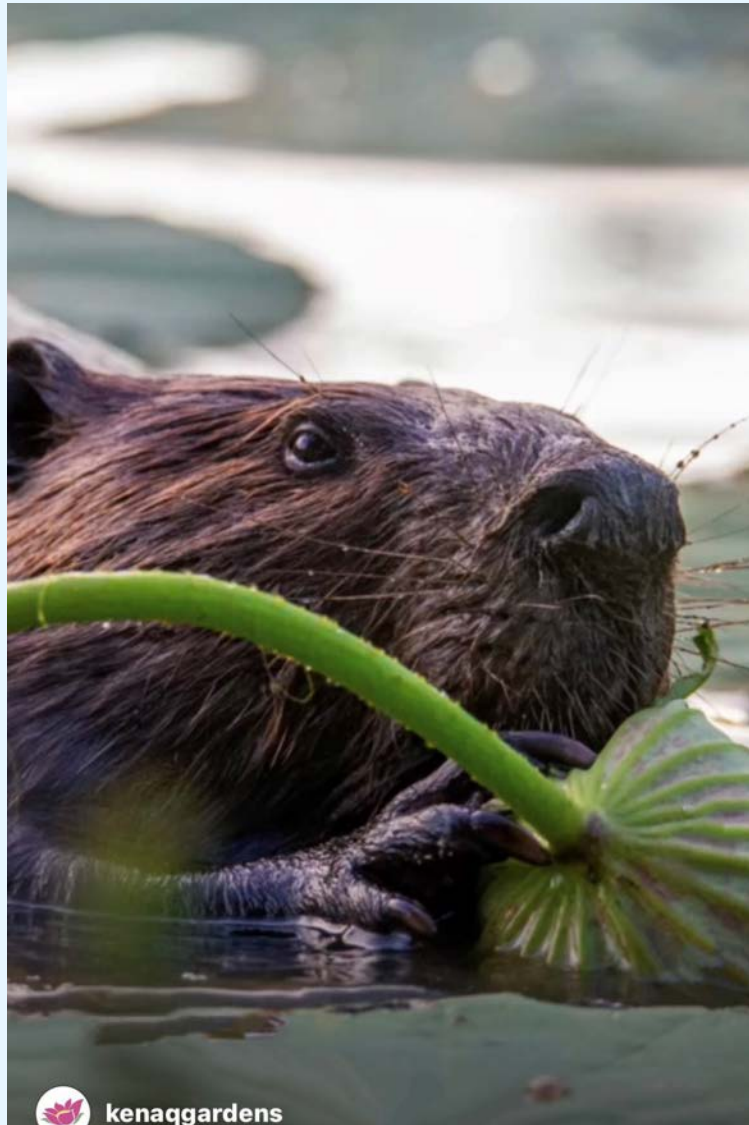



Piercing-sucking mouthparts allow them to feed on plant parts, especially seeds



# Lotus - The Salad Bar of the Pond

"Hunt snails at night" Paula Biles



 kenagardens

## SNAILS

### How to Get Rid of Pond Snails (Without Harming Fish)

1. Identify the Cause of the Infestation.
2. Manually Remove Them.
3. Use Snail Traps.
4. Use Food Bait.
5. Reduce Pond Snails' Food Source.
6. Introduce Snail Eating Predators.



 <https://www.itsafishthing.com> > how...

[How to Get Rid of Pond Snails \(Without Harming Fish\)](https://www.itsafishthing.com)

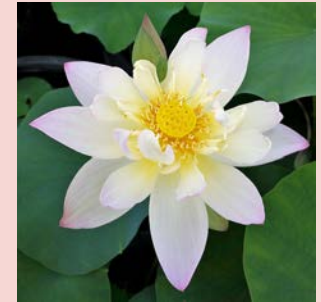
# Random Facts, etc.

- Lotus can regulate the heat inside of bud to avoid extreme temperature differentials.

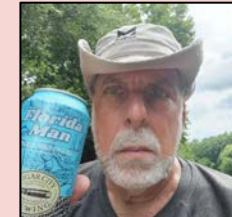
- ~ 5 grams of fertilizer = 1 Teaspoon  
~15 grams of fertilizer = 1 Tablespoon



- Light colored lotus, especially versicolors, tend to bloom earlier than darker colors



- Removing old and damaged leaves may extend blooming period.  
It may also reduce tuber production

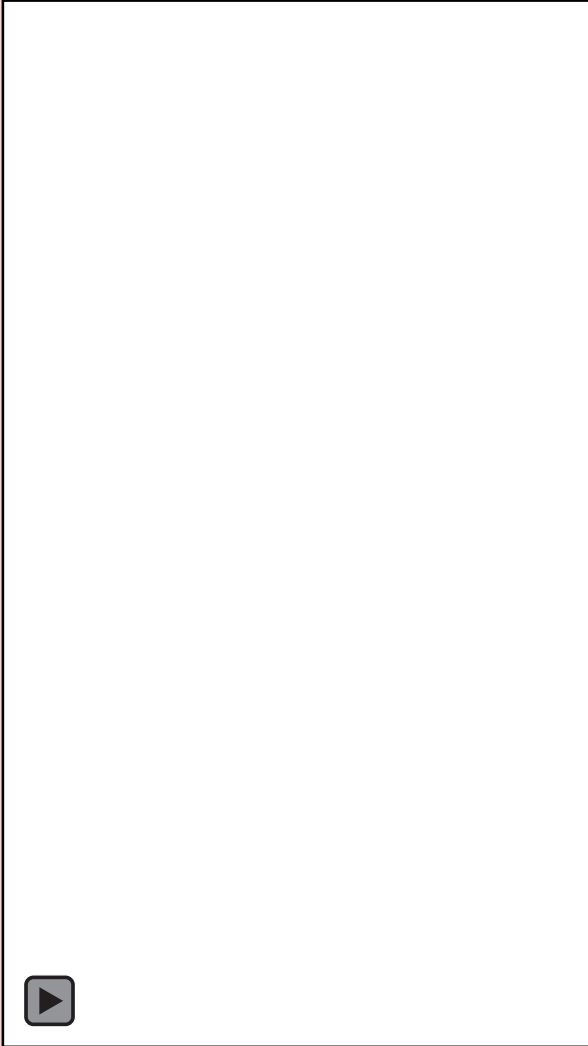


- Mollisol (black prairie soil) is a dynamite potting media! Steve Stroupe
- Lotus cultivars with heavy flowers (i.e. Ultimate 1000 Petals) really need deeper soil for stem support or the flowers will fall over.
- In very low humidity areas, lotus like overhead sprinkling or sitting at the edge of a waterfall so they get misted.

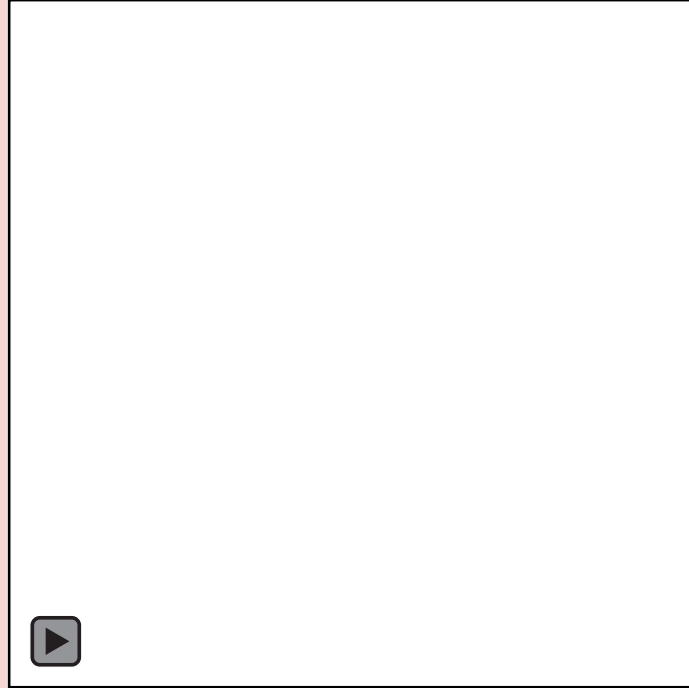
- Download PHONTO app on phone to watermark pictures



- Lotus leaves are hydrophobic



- Channels transport gases



- Lotus silk used to produce cloth



- A small layer of sand can be added to top of the pot once lotus is growing to make it “pretty”

Marilyn Eigsti, Paula Biles



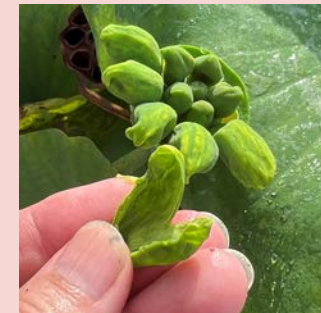
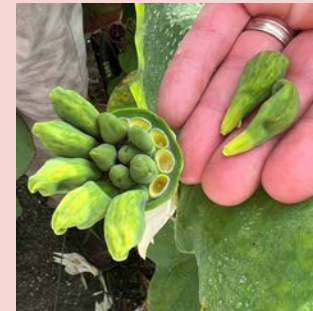
- Growers - Write the name on every pot! Dykem Brite-Mark Pens work well but heat them in a glass of hot water the first time you use them so paint will flow. Yellow & white pens stay true to color - all others fade to white. Alternate colors by year.

Laura Bancroft



- Hobbyists - Write the name of the lotus on a small slip of matte plastic with a #2 pencil and insert into soil - it will not fade!
- A leaf stem is a PETIOLE. A flower stem is a PEDUNCLE
- “Duplicate” cultivars almost never produce seeds because they produce ‘petaloid’ structures instead of normal ovules

Petaloids

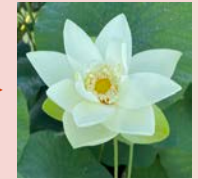
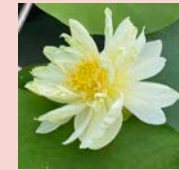


- You can miniaturize a lotus by growing it in a smaller pot.



- A real "micro" lotus will not get larger when planted in a larger pot - it is genetically predestined to be very small. There are very few real MINI lotus varieties

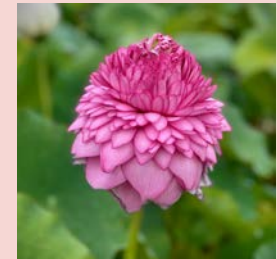
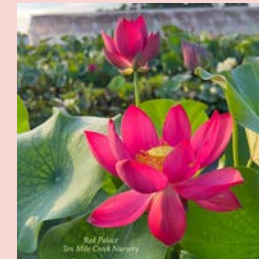
- Early-season flowers can look very different compared to late-season flowers



- Every cultivar can be identified by its grain of pollen - like a fingerprint

- Petal count ranges from 16 - 2,500

- All cultivars have stamen except *1000 Peta* varieties



- Climate (temperature, sunlight) can cause marked differences in phenophase calendar within the same cultivar ex: Momo flowers in April in Alabama but June in Maryland

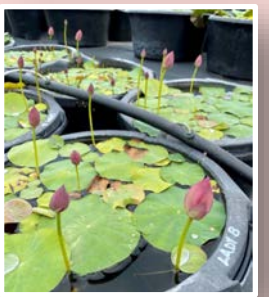
- Aborted buds can usually be traced to damage during cellular formation
  - Temperature fluctuation
  - Fertilizer burn
  - Bugs

- In areas of very high temperatures protect lotus from over-heating/UV damage by providing shade in the afternoon and protecting pot from direct afternoon sunlight.
- Hardy lotus produce good tubers but will go dormant;  
Tropical varieties do not produce good rhizomes but the flowering season is longer

- Hairlike adventitious roots are found in bundles around the node of a tuber →
- Bone meal encourages flowering.



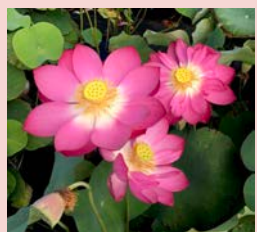
- Some cultivars, especially many bowl lotus, have the leaf and flower growing tips in reversed positions which results in flowering before aerial leaves →



- There are 5 flower shapes



- Plate-shaped flowers 'look' large in comparison to leaves →



- The spongy receptacle can hold 2 - 60 seeds depending on the cultivar →



# Best Tips for New Growers (& Old Growers, Too😊)

- **#1 Tip** Choose a free-blooming, easy-to-grow cultivar

Ganesh Anandhakrishnan, Kelly Billing, Severine Lyssens-Danneboom, Suzanne Boom



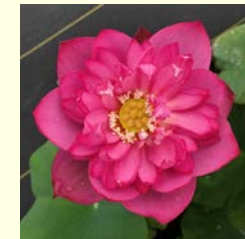
*Beautiful Dancer*

- Give them plenty of space! James Bennett



- Make sure lotus get enough sunlight Yuchu Chen

- Do not over-fertilize a new lotus Daike Tian, Steve Stroupe, Debbie Fass



*Lady Bingley*



*Amiry Camellia*

- Don't start too early in the spring Paula Biles, Suzanne Boom, Gianluca Bonomo



- Mist or use overhead watering in low humidity area. Debbie Fass, Herb Kelly

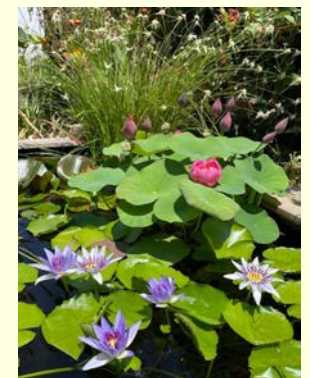
- Do not plant lotus too deep Javier Tarillo Egner



- Use a flat pot to start seeds in so leaves have room to float Zijun Li

- Plant at least 2 tubers per pot to double your chances of success Paula Biles, Susan Davis

- Plant tubers around the side of the pot. Put 1<sup>st</sup> fertilizer in center of pot Yuchu Chen



*Ladybug*  
Photo by  
Steve Hampson





- Begin insect control as soon as you see a problem Susan Davis, Deb Frazier, Jay Lee
- Cure pots with organic compost for 2-4 weeks before planting Yuchu Chin, Utpal Dabnath,
- Compost ferments quicker in high temperatures Davide de Salvia
- Too much fertilizer will cause an algae bloom
- For pots with organic compost change water twice at 2 week intervals before planting. Utpal Dabnath
- Divide the plant before there is growth in spring Laura Bancroft
- Dead-heading flowers and dead leaves may promote more flowers Dang Heip Hoang, Mutha Kumar, Varun Kumar
- Quit fussing over a newly planted tuber - plant it right and let it grow - they are 'weeds' in most places around the world Laura Bancroft



- Don't fertilize when it is too hot! Davide de Salvia
- Overflow pots monthly to avoid build-up of salts from fertilizer
- Push dead (not diseased) leaves down into soil - free fertilizer! Aniruddha Sil, Daike Tian



**"The best fertilizer  
for lotus is lotus"**

Daike Tian

# Questions

