

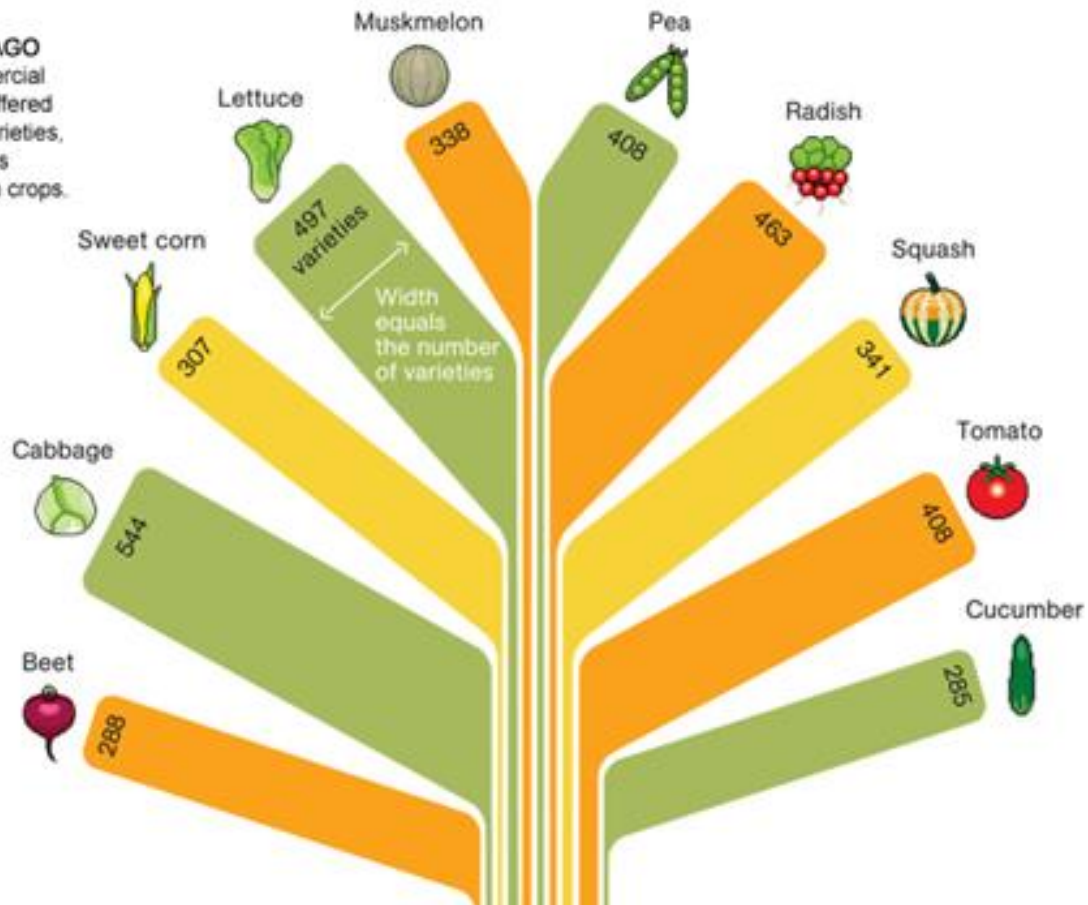
PRE AND POSTTEST FOR PROPAGATION

- 1. PROPAGATION CAN ONLY BE DONE IN NURSERIES BECAUSE OF THE EQUIPMENT SUCH AS MISTERS AND GREENHOUSES THAT IS NEEDED.**
- 2. GRAFTING IS A WAY TO TWO DIFFERENT PLANTS TOGETHER THAT ARE NOT RELATED.**
- 3. SOME PLANTS PRODUCE BABIES ON THEIR STEMS, LEAVES AND BLOOM SPIKES.**
- 4. TISSUE CULTURE OR TEST TUB PROPAGATION IS JUST ANOTHER FORM OF GROWING CUTTINGS.**
- 5. SEEDS ARE THE BEST WAY TO PROPAGATE MOST PLANTS.**

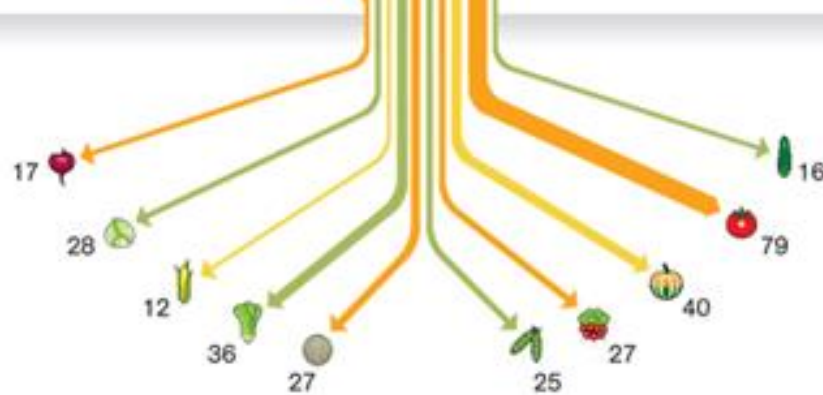
TEST YOUR

SEED KNOWLEDGE

A CENTURY AGO
 In 1903 commercial seed houses offered hundreds of varieties, as shown in this sampling of ten crops.



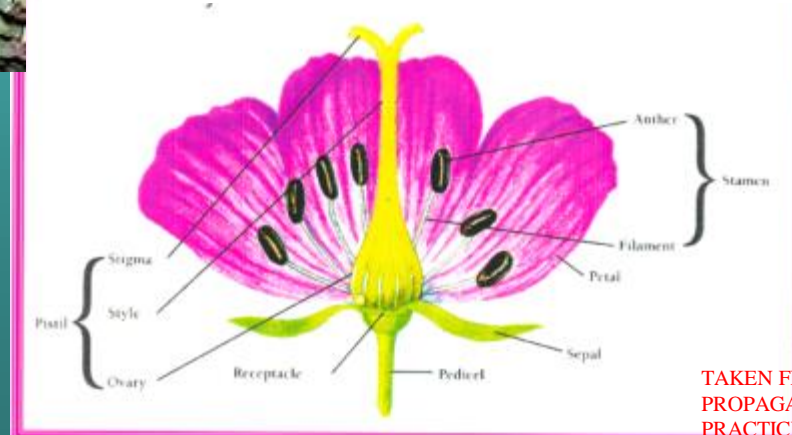
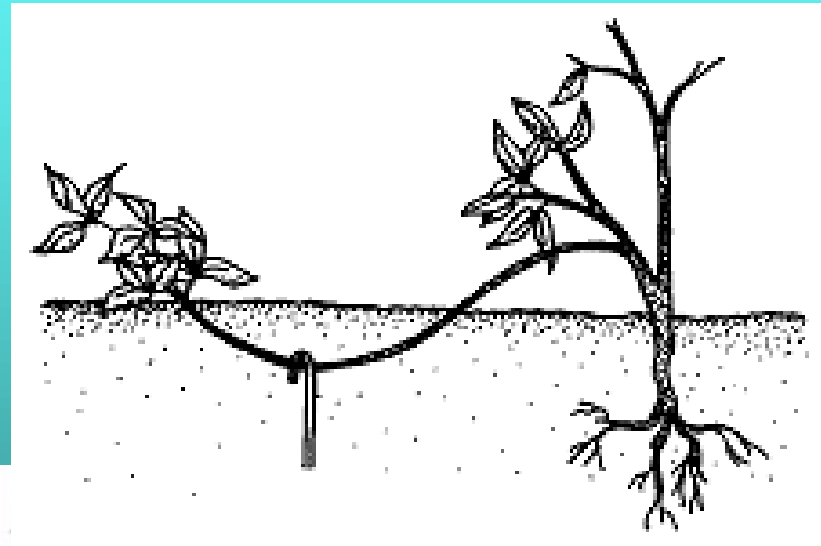
80 YEARS LATER
 By 1983 few of those varieties were found in the National Seed Storage Laboratory.*



* CHANGED ITS NAME IN 2001 TO THE NATIONAL CENTER FOR GENETIC RESOURCES PRESERVATION

JOHN TOMANIO, NGM STAFF. FOOD ICONS: QUICKHONEY
 SOURCE: RURAL ADVANCEMENT FOUNDATION INTERNATIONAL

PROPAGATION SEXUAL & ASEXUAL



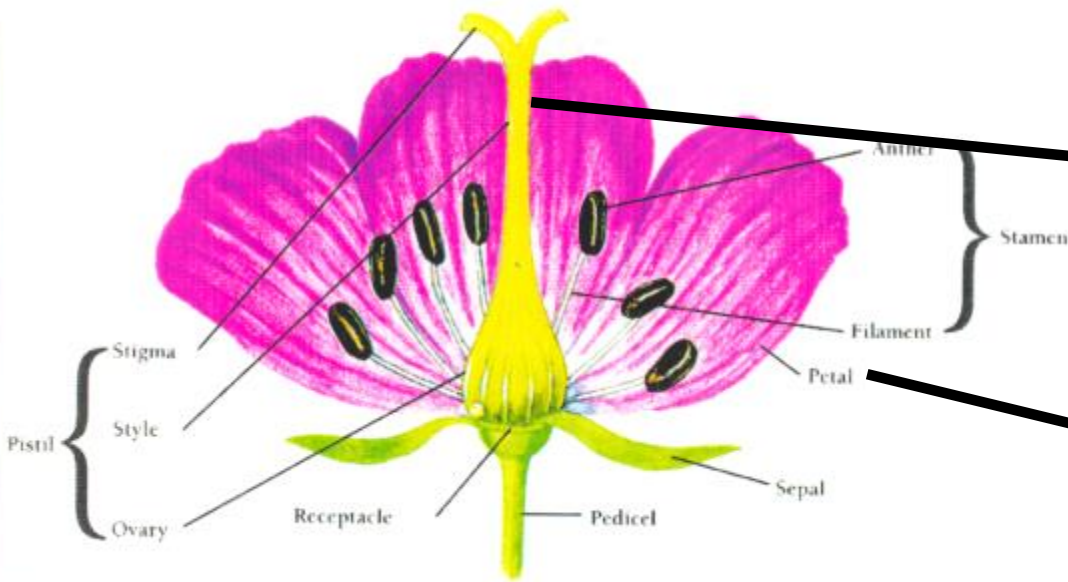
TAKEN FROM PLANT
PROPAGATION PRINCIPLES AND
PRACTICES

SEXUAL PROPAGATION



ANATOMY OF A FLOWER

Anatomy of a Flower



SEXUAL PROPAGATION ADVANTAGES?

- **CHEAPER TO PRODUCE MANY PLANTS.**
- **GENETIC DIVERSITY**
- **MANY SEEDS ARE EASY TO GROW**

SEXUAL PROPAGATION DISADVANTAGES?

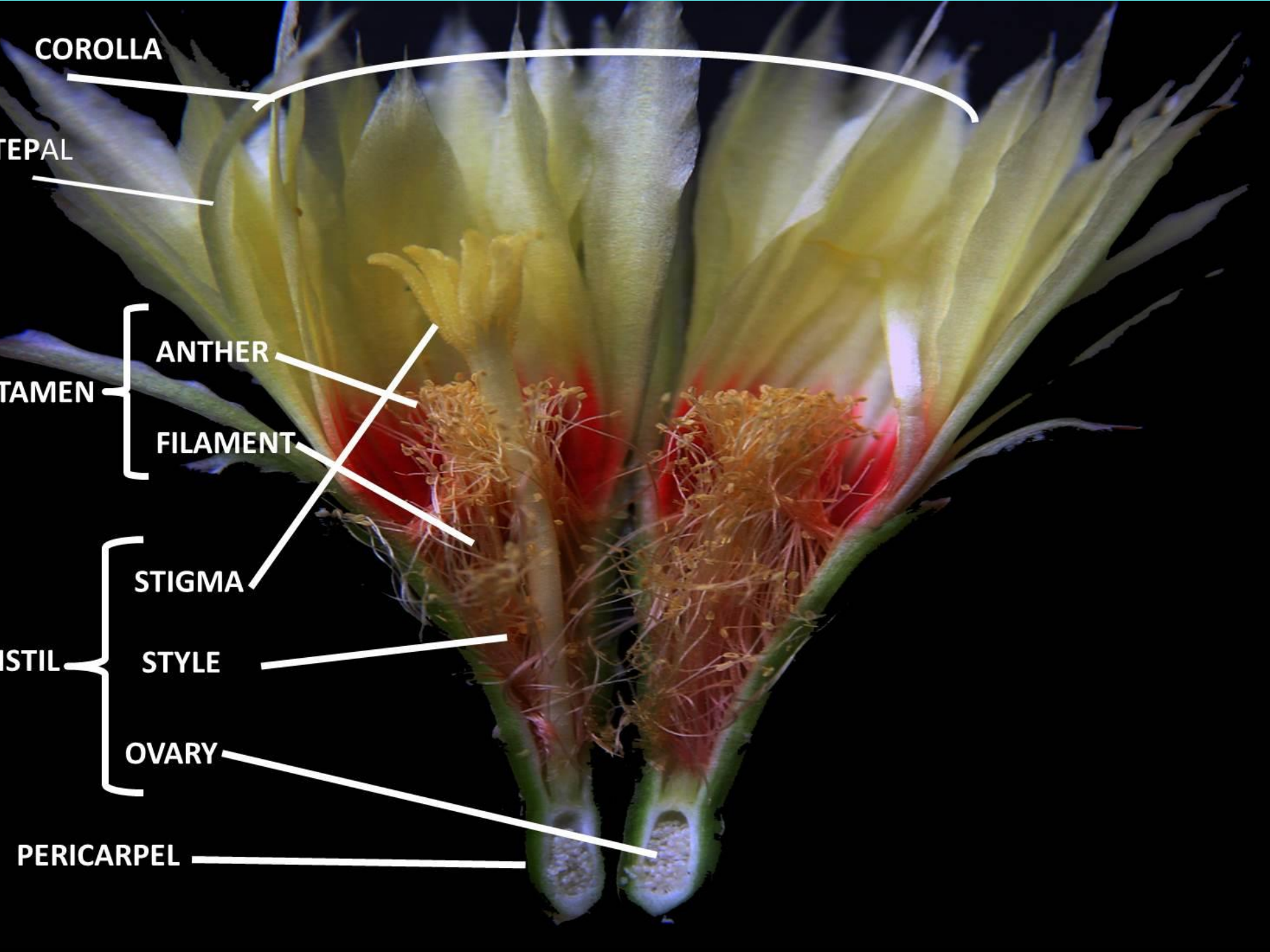
- **SEEDLINGS DIFFER- LACK OF UNIFORMITY**
- **SEEDS MAY BE RARE- HARD TO LOCATE AND EXPENSIVE**
- **LOSS OF SEEDLING DUE TO DISEASE**

BASIC POLLINATION



**REMOVE POLLEN
FROM ANTHIER**

**PLACE
POLLEN ON
SIGMA**



COROLLA

SEPAL

STAMEN

ANTHOR

FILAMENT

STIGMA

STIGMA

STYLE

OVARY

PERICARPEL

EXAMPLES OF POLLINATION TECHNIQUES



THE MALE FLOWER IN CORN IS SUPERIOR OR ABOVE THE FEMALE



THE FEMALE FLOWER IN CORN IS INFERIOR OR BELOW THE MALE
POLLINATION IS BY WIND SO CORN IS PLANTED CLOSE TOGETHER

EXAMPLES OF POLLINATION TECHNIQUES

MALE
FLOWER



SQUASHES HAVE BOTH MALE AND
FEMALE FLOWERS ON THE SAME PLANT
FEMALE FLOWERS HAVE A SMALL FRUIT
PART OF THE STEM



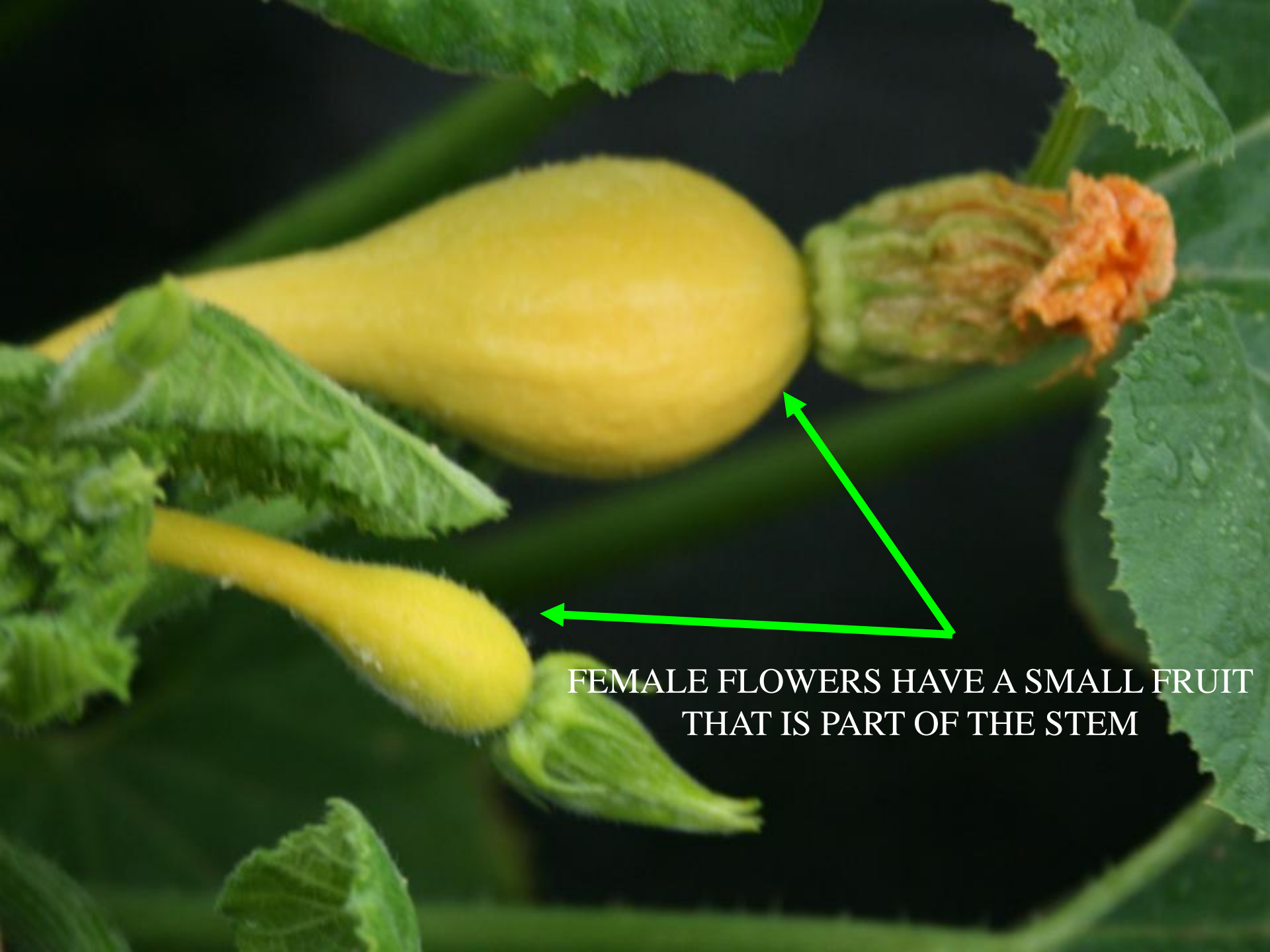
EXAMPLES OF POLLINATION TECHNIQUES



SQUASHES AND MELONS* HAVE BOTH MALE AND FEMALE FLOWERS ON THE SAME PLANT

FEMALE FLOWERS HAVE A SMALL FRUIT THAT IS PART OF THE STEM

* MELONS ALSO HAVE PERFECT FLOWERS



FEMALE FLOWERS HAVE A SMALL FRUIT
THAT IS PART OF THE STEM

NOT ALL
POLLINATORS
ARE
HONEYBEES

To most people, the word "pollinate" suggests bees. And though most of the world's nearly 30,000 species of bees are champion pollinators, many other animals make the reproduction of flowering plants possible. The flower offers the animal a floral reward—usually nectar or pollen—and the animal inadvertently moves the pollen within a flower or from flower to flower. This often unseen and generally underappreciated ecosystem service is responsible for the reproduction of nearly 80% of all flowering plants and brings us an estimated 1 out of every 3 bites of food we consume. You live in A World of Pollinators. Conserve and celebrate them!





UNKNOWN SOURCE FROM FACEBOOK

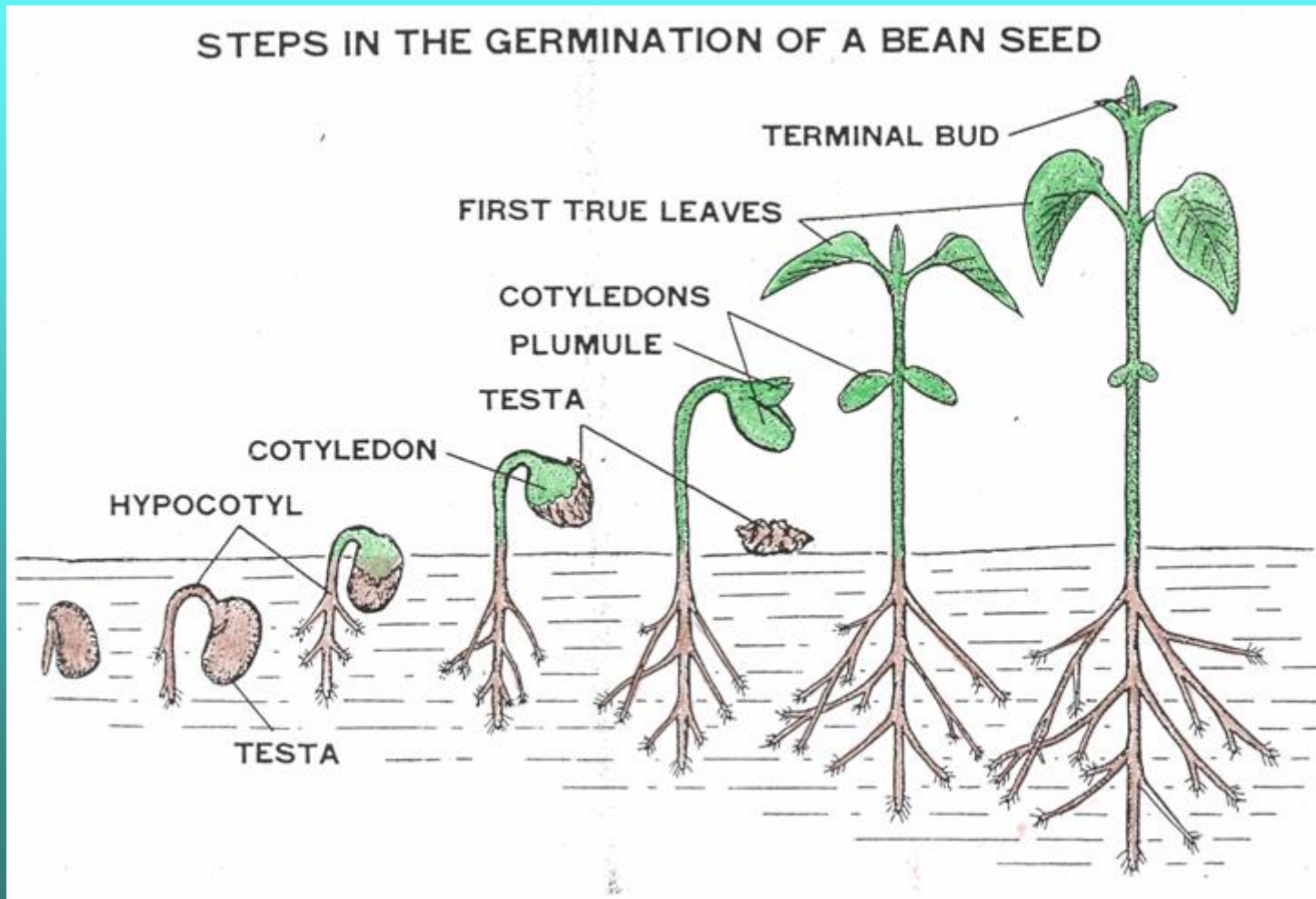


UNKNOWN SOURCE FROM FACEBOOK

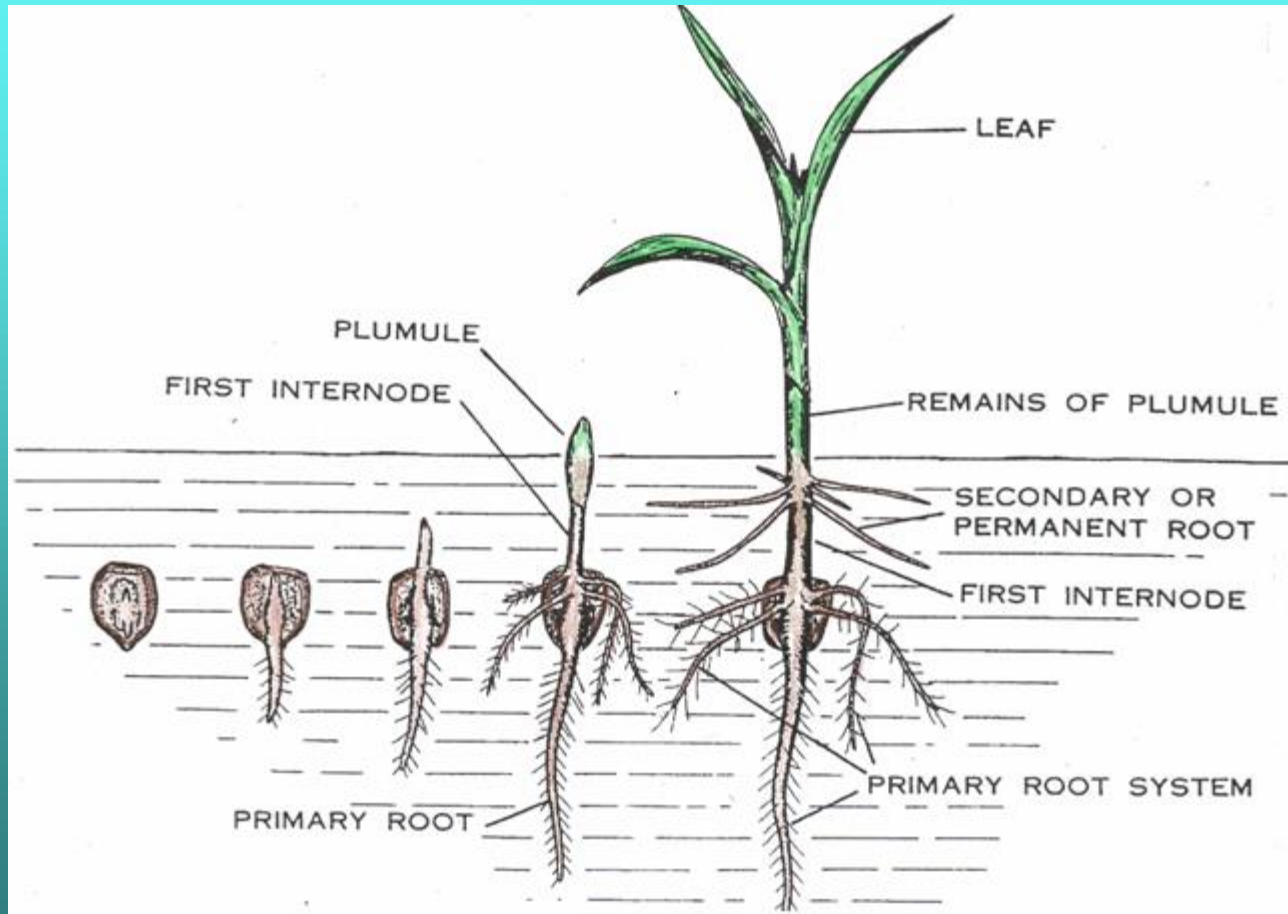
HYBRIDIZATION



BASIC GERMINATION OF A DICOT SEED



BASIC GERMINATION OF A MONOCOT SEED



PALM SEEDS



PALM SEEDS



PALM SEEDS

**2 TO 2.5 FEET
OF ROOT**



MANGROVE SEEDS SPECIALIZED FOR TROPICAL CLIMATES



MANGROVE SEEDS SPECIALIZED FOR TROPICAL CLIMATES



HELP FOR SEEDS TO GERMINATE

Scarification of seeds



HELP FOR SEEDS TO GERMINATE

ACID TREATMENT

- **SULFURIC ACID (H₂SO₄)**
- **THE TEMPERATURE OF THE ACID AND THE TIME OF SOAKING IS VERY IMPORTANT**
- **USE A GLASS, CHINA OR EARTHENWARE CONTAINER**
- **STIR WITH A GLASS ROD BUT NOT OFTEN**
- **REMOVE SEEDS AND WATER WELL JUST BEFORE PENETRATION OF THE SEED COAT**
- **DON'T SPLASH WATER INTO THE ACID**
- **WEAR PROTECTIVE CLOTHING ,GLOVES AND GOGGLES**





**BAOBAB TREES DEPEND ON ELEPHANTS
TO EAT THE FRUIT AND DEPOSIT THE
SEEDS**

HELP FOR SEEDS TO GERMINATE HOT WATER TREATMENT



HOT WATER TREATMENT



WATER TREATMENT FOR LEACHING GERMINATION INHIBITORS



HELP FOR SEEDS TO GERMINATE

SCARIFICATION AND HOT WATER TREATMENT



HELP FOR SEEDS TO GERMINATE

STRATIFICATION



TILLANDSIA SEEDS



TILLANDSIA SEEDS



TEST VIABILITY OF SEEDS



PAPER TOWEL &
PETRIE DISH TESTS



PLANTING SEEDS



**STERILE
SOILESS
POTTING
MIX**



**FRESH SEEDS
THAT HAVE
BEEN STORE
CORRECTLY**

SUPPLIES FOR PLANTING SEEDS





**POTS AND PEAT
PELLETS**



**HYDRATING
PEAT**

GROWING SEEDLINGS IN A MIN GREENHOUSE



MOISTEN PEAT



**REMOVING
EXCESS PEAT
BEFORE
PLANTING**



PLANTING SEEDS



POTS IN MINI GREENHOUSE AFTER SEEDS PLANTED

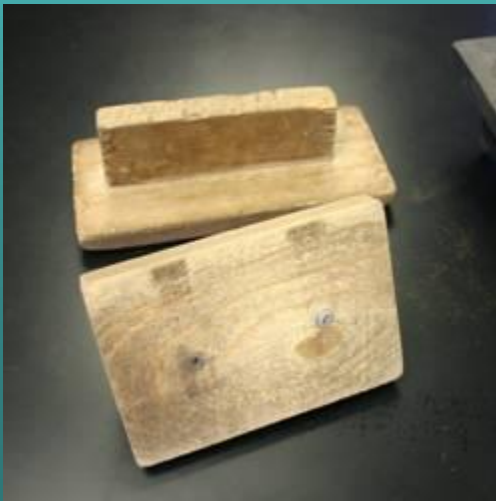


NEW HERB PLANTS READY TO REMOVE FROM MINI GREENHOUSE

TOOLS FOR PLANTING SEEDS



DIBBLES



**SOIL
TAMPERS**





MAKING HOLE FOR SEED WITH DIBBLES

© Z - H Z A T P



© D M M S

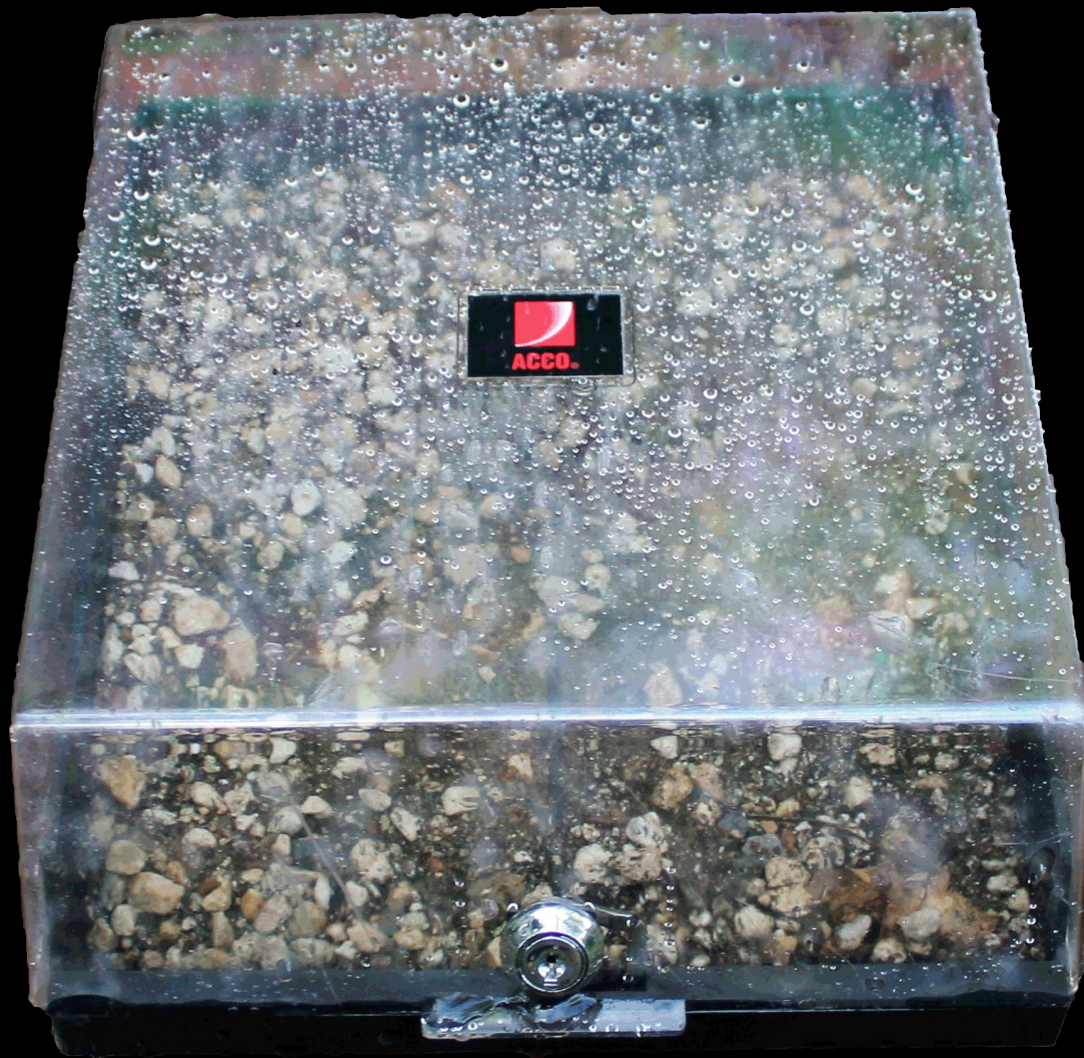


MAKING HOLE FOR SEEDLINGS WITH DIBBLES



Q
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RECYCLING CONTAINERS



RECYCLING CONTAINERS





**ARMORED CACTUS
SEEDLINGS**





CYCAD SEEDS

- **MANY CYCAD SEEDS ARE NOT READY TO PLANT AT SHEDDING**
- **SEVERAL MONTHS ARE NEEDED FOR EMBRYO TO DEVELOP**
- **LAY SEED FLAT SIDE DOWN AND PARTLY EXPOSED**
- **CONTAINER NEEDS SOME DEPTH**
- **WELL DRAINED SOIL**
- **BOTTOM HEAT 80F HELPFUL**

CYCAD PROPAGATION





Phone: (011) 261-4402, Fax: (011) 261-4403
Web: www.johannes.de
Los hildebrandtii (1)





PLASTIC TUBS FOR SEED GERMINATION



PICTURE EXTENSION MASTER
GARDENER FACE BOOK

**CYCAD
PROPAGATION**



SPROUTING SEEDS IN BAGS



INCUBATORS FOR SEEDS



REPTILE INCUBATOR



OUT DOOR SEED BEDS



0 1 2 3 4 5 6 7 8 9

PROTECTING OUT DOOR SEED BEDS



PROTECTING OUT DOOR SEED BEDS



SEED STORAGE



**STORE DRY SEEDS IN AIRTIGHT JARS
50% HUMIDITY AT 40F TO 45F**

SEED VIABILITY

Seed Viability

Approximate age at which seed of good initial viability stored under cool, dry conditions still gives a satisfactory stand of vigorous seedlings with a normal rate of seeding.

<i>Seeds</i>	<i>Years</i>	<i>Seeds</i>	<i>Years</i>
Asparagus	3	Leeks	3
Beans	3	Lettuce	5
Beets	4	Martynia	2
Broccoli	5	Muskmelons	5
Brussels Sprouts	5	Mustard	4
Cabbage	5	Okra	2
Cabbage, Chinese	5	Onions	1
Cardoon	5	Parsley	1
Carrots	3	Parsnips	1
Cauliflower	5	Peas	3
Celeriac	5	Peas, Southern (See Cowpeas)	...
Celery	5	Peppers	2
Chervil	3	Pumpkins	4
Chicory	5	Radishes	5
Ciboule	2	Roselle	3
Collards	5	Rutabagas	4
Corn	2	Salsify	1
Corn-salad	5	Salsify, Black	2
Cowpeas (Southern Peas)	3	Sorrel	3
Cress, Garden	5	Spinach	5
Cucumbers	5	Spinach, New Zealand	5
Dandelions	2	Squash	4
Eggplant	5	Swiss Chard	4
Endive	5	Tomatoes	4
Fennel	4	Turnips	4
Kale	5	Watercress	5
Kale, Sea	1	Watermelons	4
Kohlrabi	5		

2,000-year-old seeds were discovered in 1963 inside an ancient jar in Israel. They were planted in 2005 and a tree that had been extinct for over 1800 years sprouted.



REASONS FOR SEED LOSS

- **LOW GERMINATION PERCENTAGE**
- **CONTAINS LARGE AMOUNT OF INERT MATTER**
- **SUBJECT TO DISEASES**
- **SUBJECT TO INSECTS**

REASONS FOR SEED LOSS

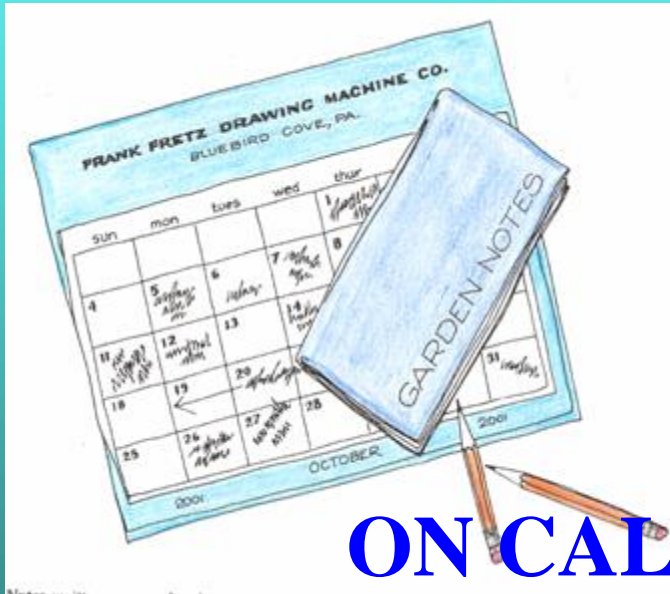
- **NOT ADAPTABLE TO CLIMATIC & GROWING CONDITIONS**
- **CONTAINS A LARGE AMOUNT OF OTHER CROP SEEDS**
- **CONTAINS A LARGE AMOUNT OF WEED SEEDS**

REASONS FOR SEED LOSS

POOR STORAGE



KEEP GOOD RECORDS

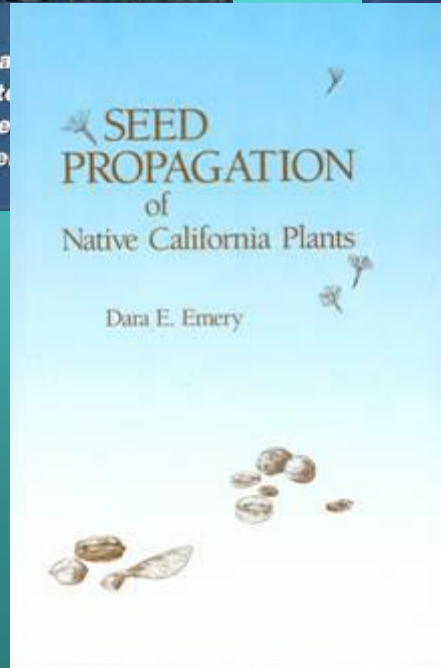
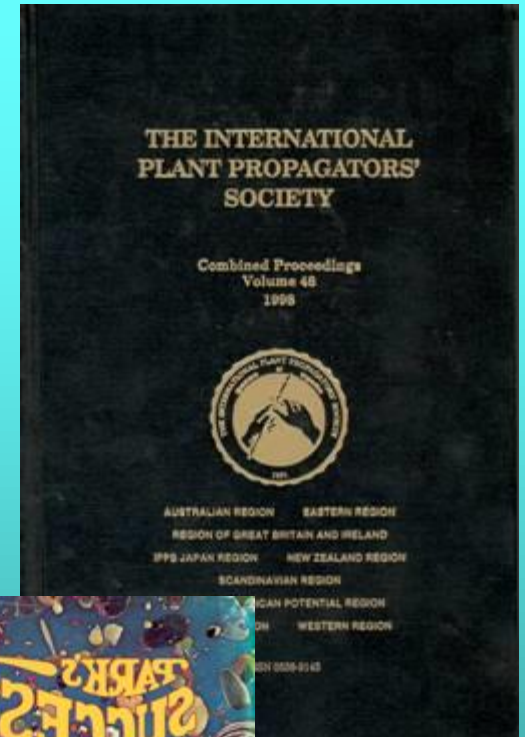
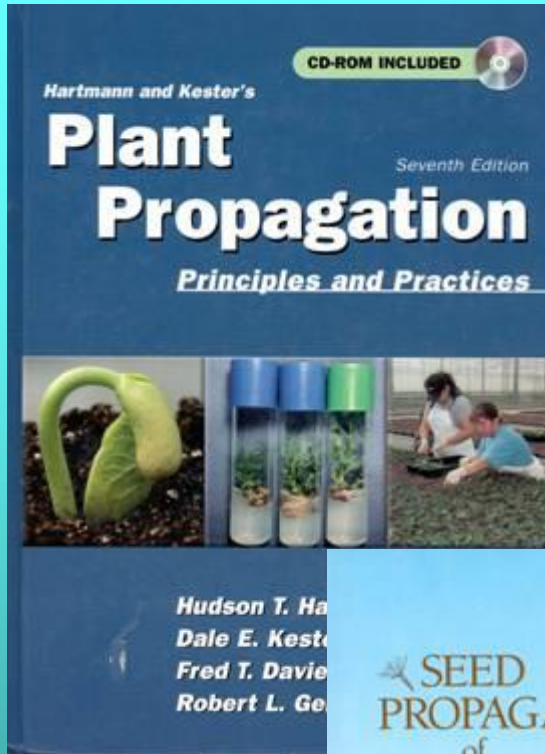


<u>Record Keeping Sheet</u>		
<u>DATE</u>	<u>ITEMS PURCHASED</u>	<u>COST</u>

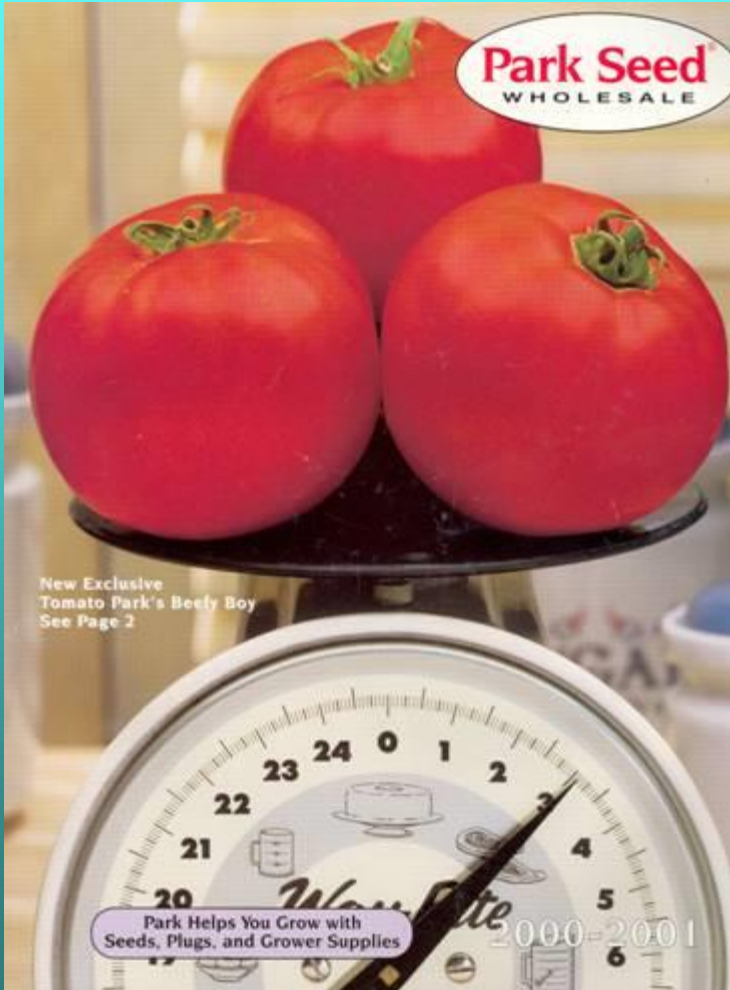
**ON CALENDARS, JOURNALS OR
RECORD SHEETS**

**WHERE DO YOU FIND
INFORMATION ON
PROPAGATION?**

BOOKS



CATALOGS



VERBENA x hybrida

WARM 11,000 S D 75° 20 days

Crop time from:	to Packs	to 4" Pots
seed	11-13 weeks	14 weeks
288 plug	6-7 weeks	7-9 weeks

Among the finest low-growing bedding plants, Verbena provides a rainbow of color in summer for sunny beds, borders, and hanging baskets. **Culture:** Pre-chill seed in refrigerator for 5 to 7 days prior to sowing. Sensitive to high moisture — water and drench sowing medium with Banrot at 1/2 teaspoon per gallon the night before sowing. Sow without additional watering and cover with 1/4 inch of medium. Put in dark place until germination occurs. When seedlings are large enough to handle, transplant to packs and grow on at 60°F.

BLUE LAGOON. Upright Type. The first true-blue (not purple!) Verbena, this fragrant variety features slender, dark-green foliage topped with exquisite large flowers. Ideal for mass plantings in sun, tubs, and containers, 'Blue Lagoon' is an essential component of color theme plantings such as "red, white, and blue". Grows 8 to 10 inches high. Seed available Dec. 2000.

3961-9—(D) 1/32 oz. \$3.95; (E) 1/16 oz. \$7.25; (F) 1/8 oz. \$13.50;
(G) 1/4 oz. \$25.50; (J) oz. \$88.50

NOVALIS HYBRID. Upright Type. Blooms early and evenly in the flat, while retaining its compact habit. Florets with large white centers create umbels of unsurpassed appeal. Outdoors it retains its uniform, mounded 10-inch habit. Free-flowering, long-blooming, and heat-tolerant — a plus for

**WHEN IS A SEED NOT A
SEED?**

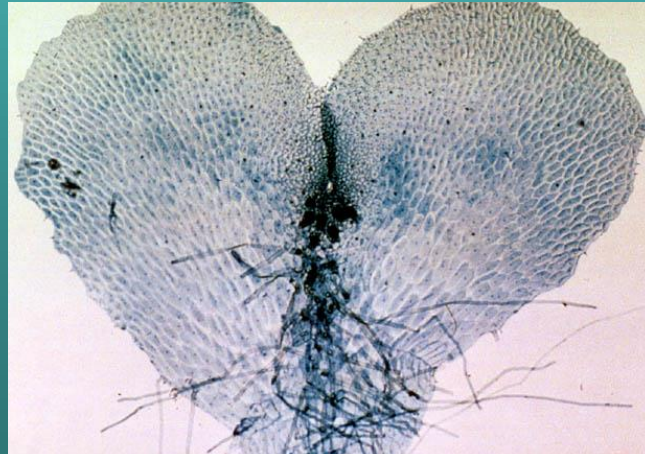
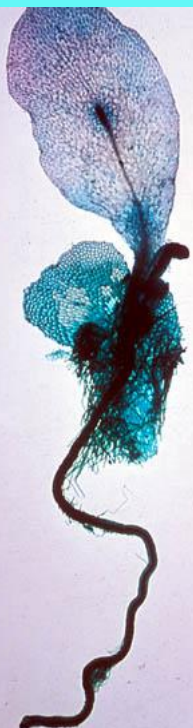
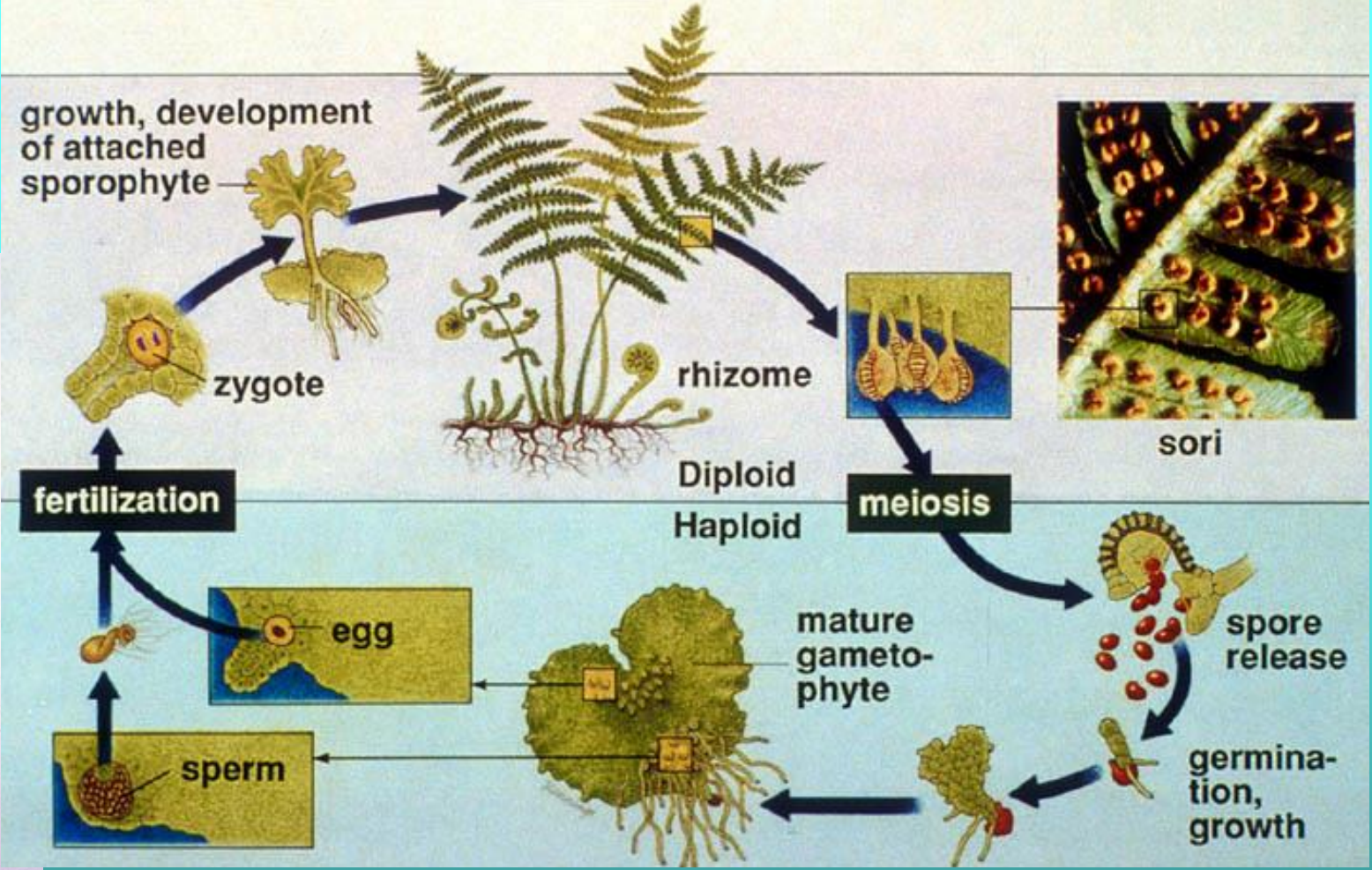
WHEN IT'S A SPORE



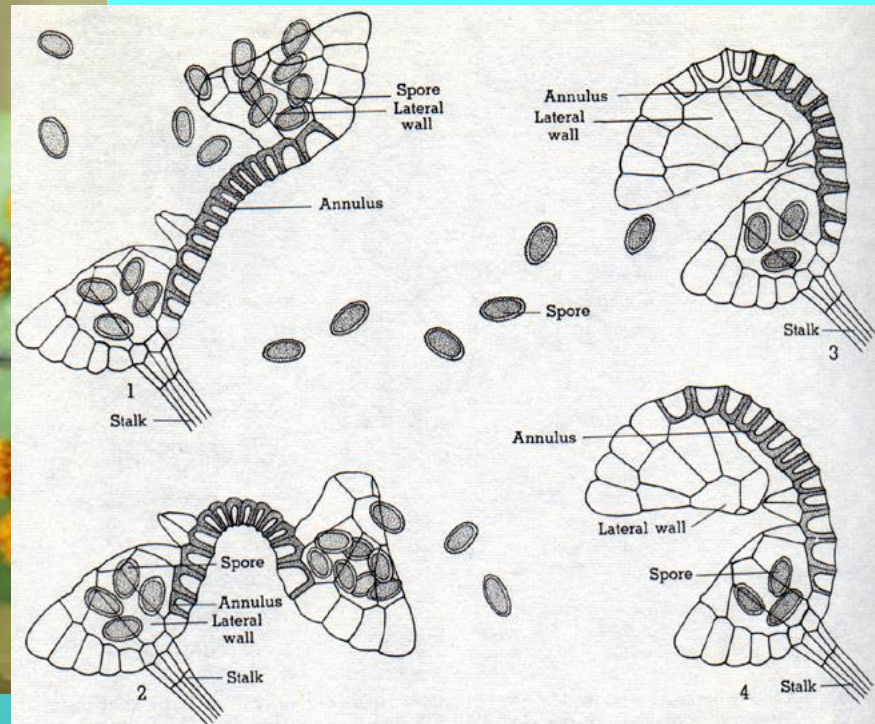
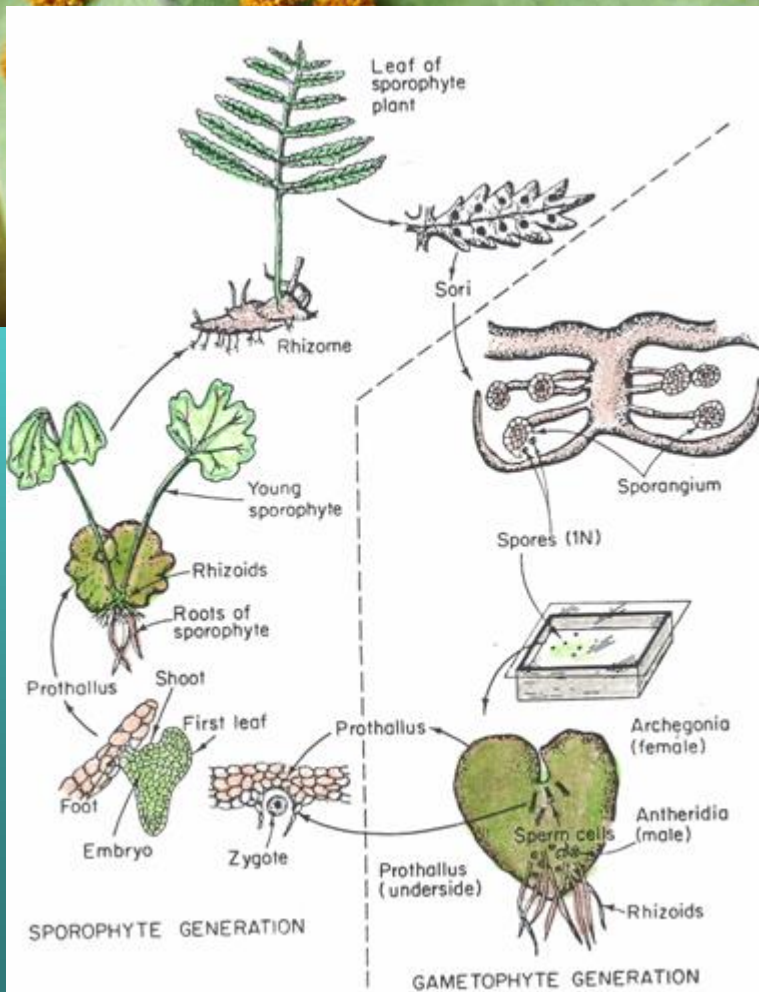
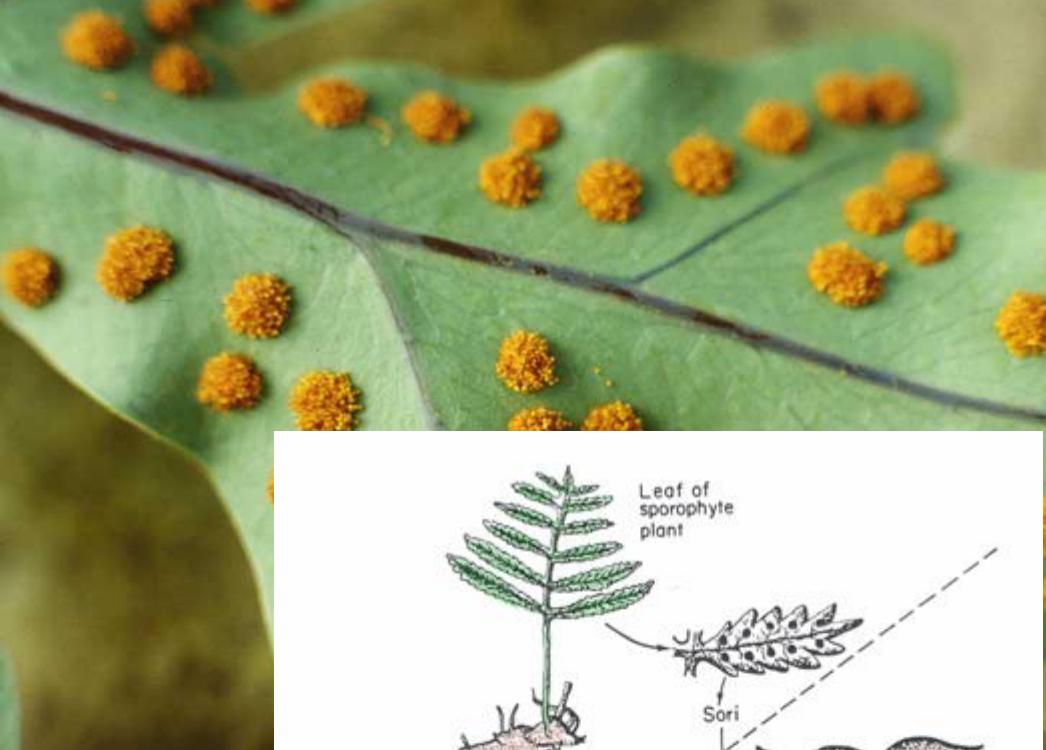
**FERTILE
FROND**



**NON-FERTILE
FROND**



FROM Dr. LEARY CCSN



GROWING FERNS AT HOME





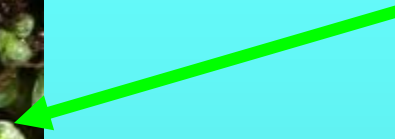
GROWING FERNS AT HOME

AFTER 4 MONTHS





FROM THIS TO THIS



**IT'S ALL IN
YOUR
PERSPECTIVE**



SPOT SAY IT'S TIME FOR A BREAK





NEXT



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PHOTOS

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REFERENCES

- **PROPAGATION PRINCIPLES AND PRACTICES**
- **Dr. LEARY CSN**

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