

# 柑橘種植法

顧玉成·楊波●編著



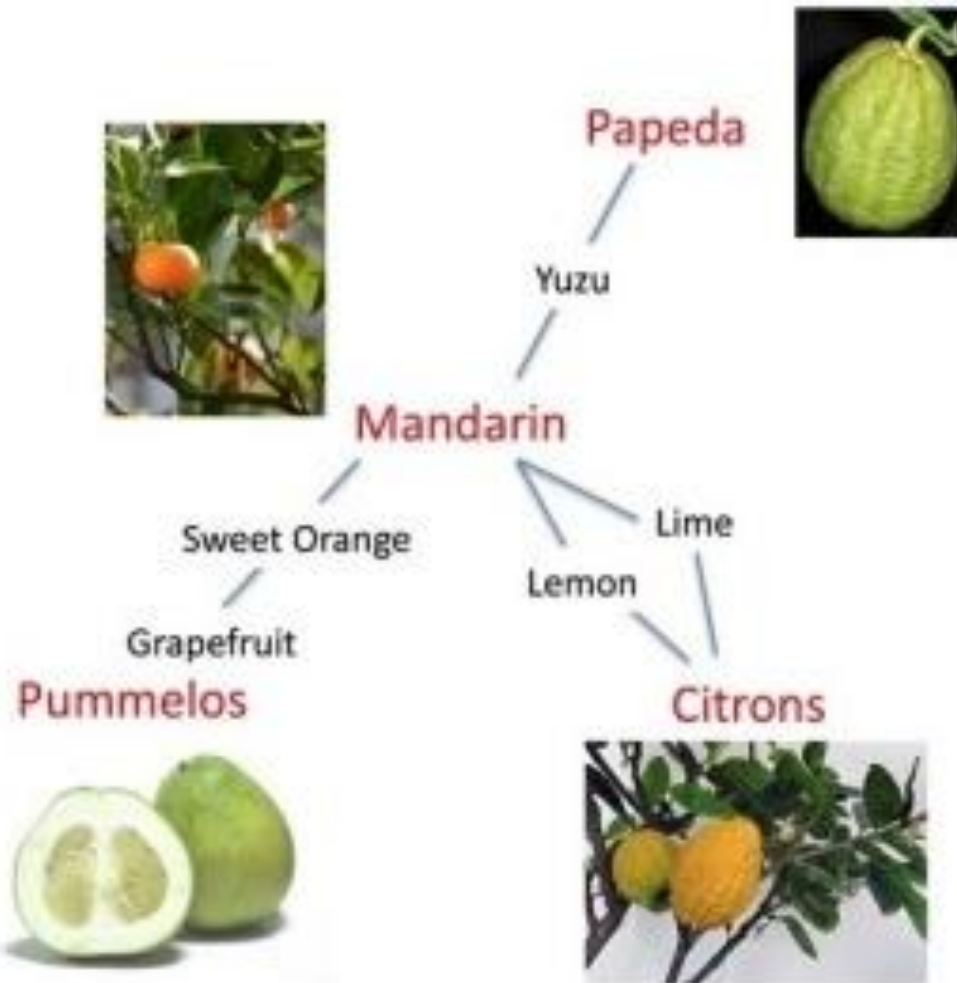
# 柑橘类水果的种植和管理

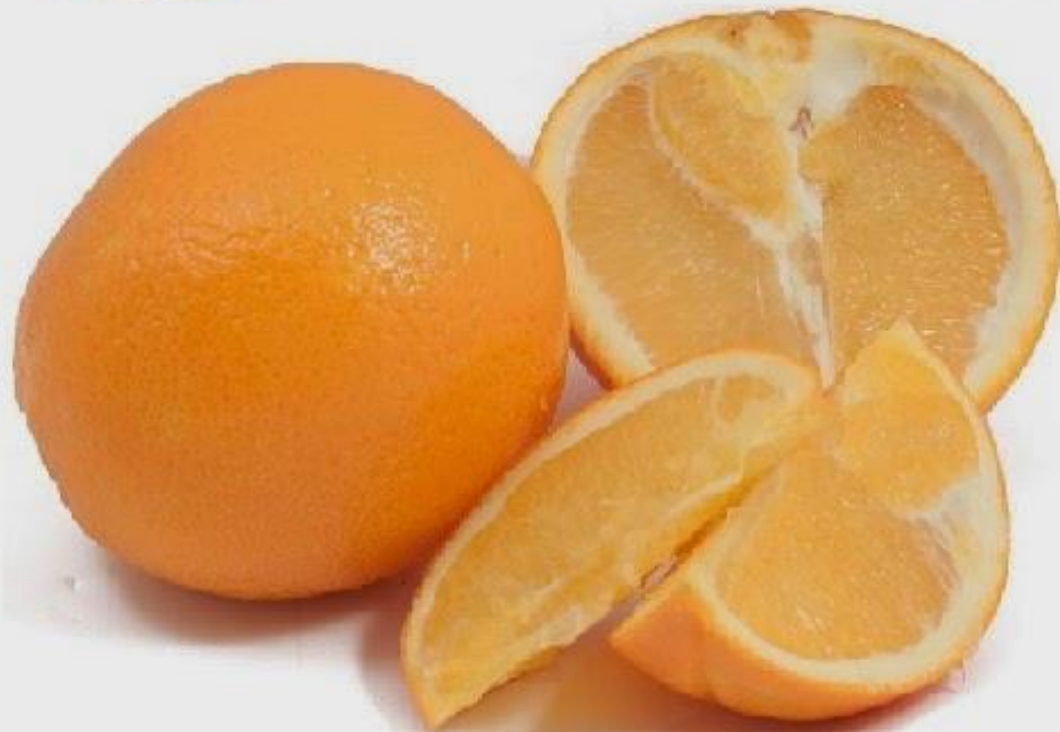
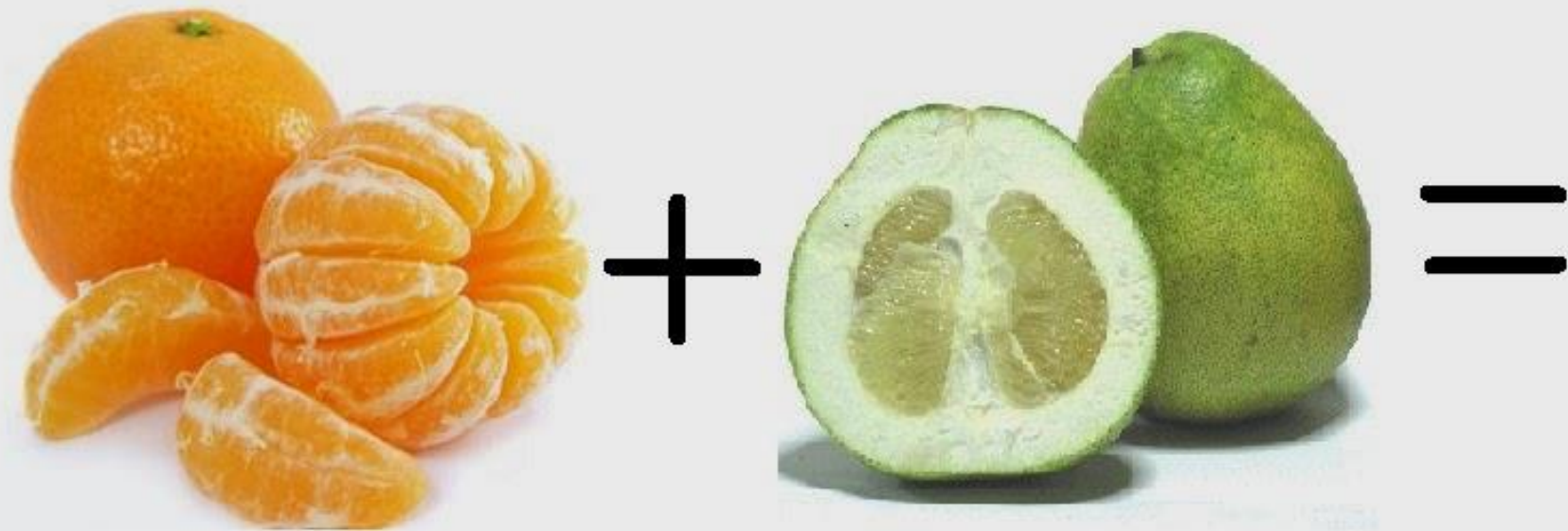
1	Flower, fruit and uses	花, 果实和用途	
2	Health benefits	健康益处	
3	Climate and Photoperiod	气候和光周期	
4	Soil	土壤	
5	Planting	种植	
6	Fertilizing	施肥	
7	Watering	浇水	
8	Tree Care	果树管理	
9	Overwintering	过冬保护	
10	Propagation	繁殖	
11	Pest management	虫害处理	
12	Disease management	病害处理	

# 柑橘品种/起源

Gānjú pǐnzhǒng/origin

祖先: 柚子, 柑橘, Papeda, 香橼







葡萄柚



Duncan Grapefruit

柑橘



Dancy Tangerine



Honeybell Tangelo

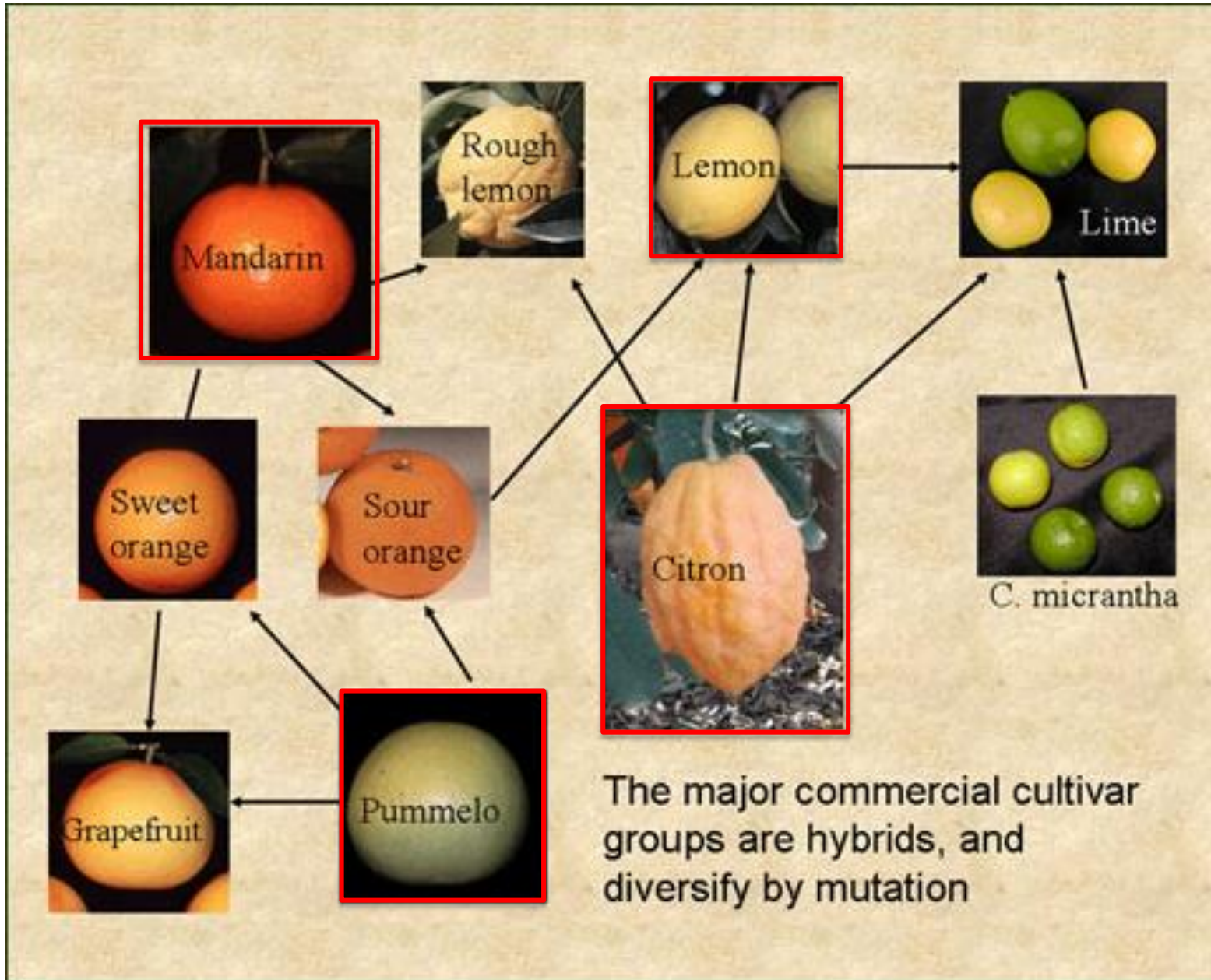
橘柚



# Pomelo, lemon, orange, tangerine, mandarin

柚,  
柠檬  
橙子  
橘子  
柑橘

Yòu,  
níngméng,  
chéngzi,  
júzi,  
gānjú



# Kinkan

Kinkan are a type of Kumquat that originated in China.





大又甜  
更美味

# 金橘

椭圆形

外面甜,里面酸



圆形

外面甜,里面也甜



# 金橘

椭圆形：外皮厚



圆形：外皮薄



大又甜  
更美味

# 金橘

椭圆形：外皮厚

圆形：外皮薄





# 酸橘





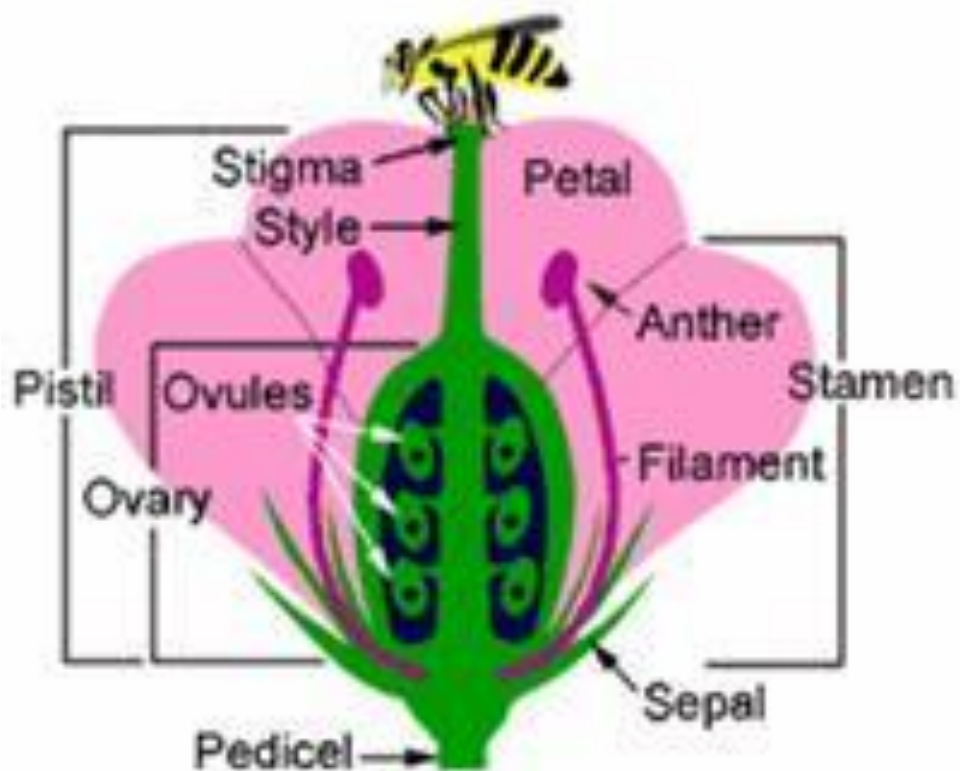
# **(柑橘类水果)**

## **(Citrus)**

柠檬，葡萄柚，柑橘，柚子

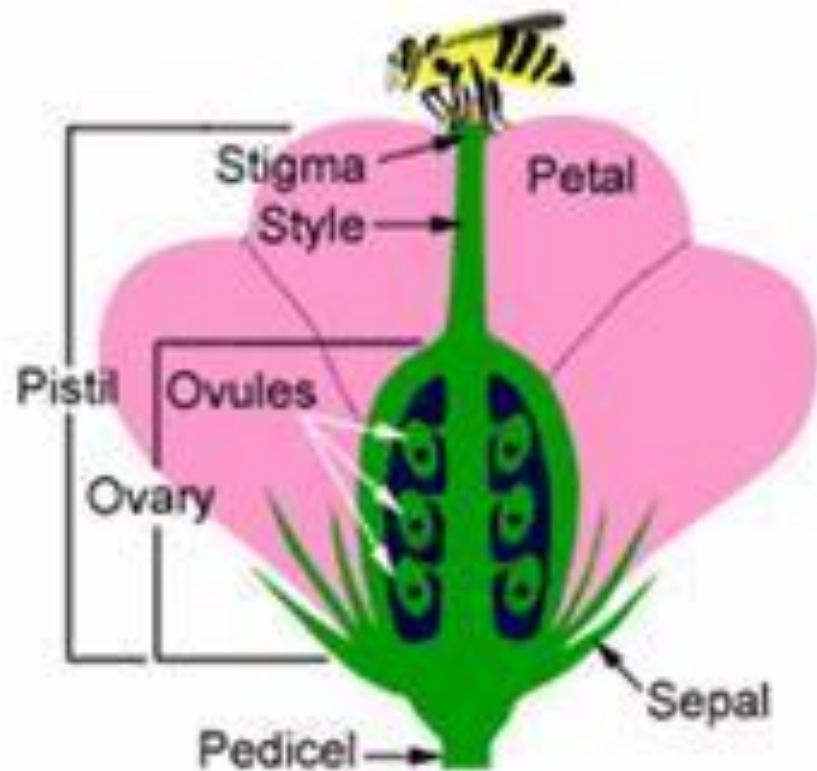
1. 柑橘类水果的花,果实和用途  
Citrus flower, fruit and uses

# 两性花



**Figure 20.** Complete flower structure

# 单性花



Imperfect (pistillate) flower structure

**柑橘类的花,雌雄同株**  
**Citrus flower is bisexual**



人工授粉: 7 to 9 a.m.







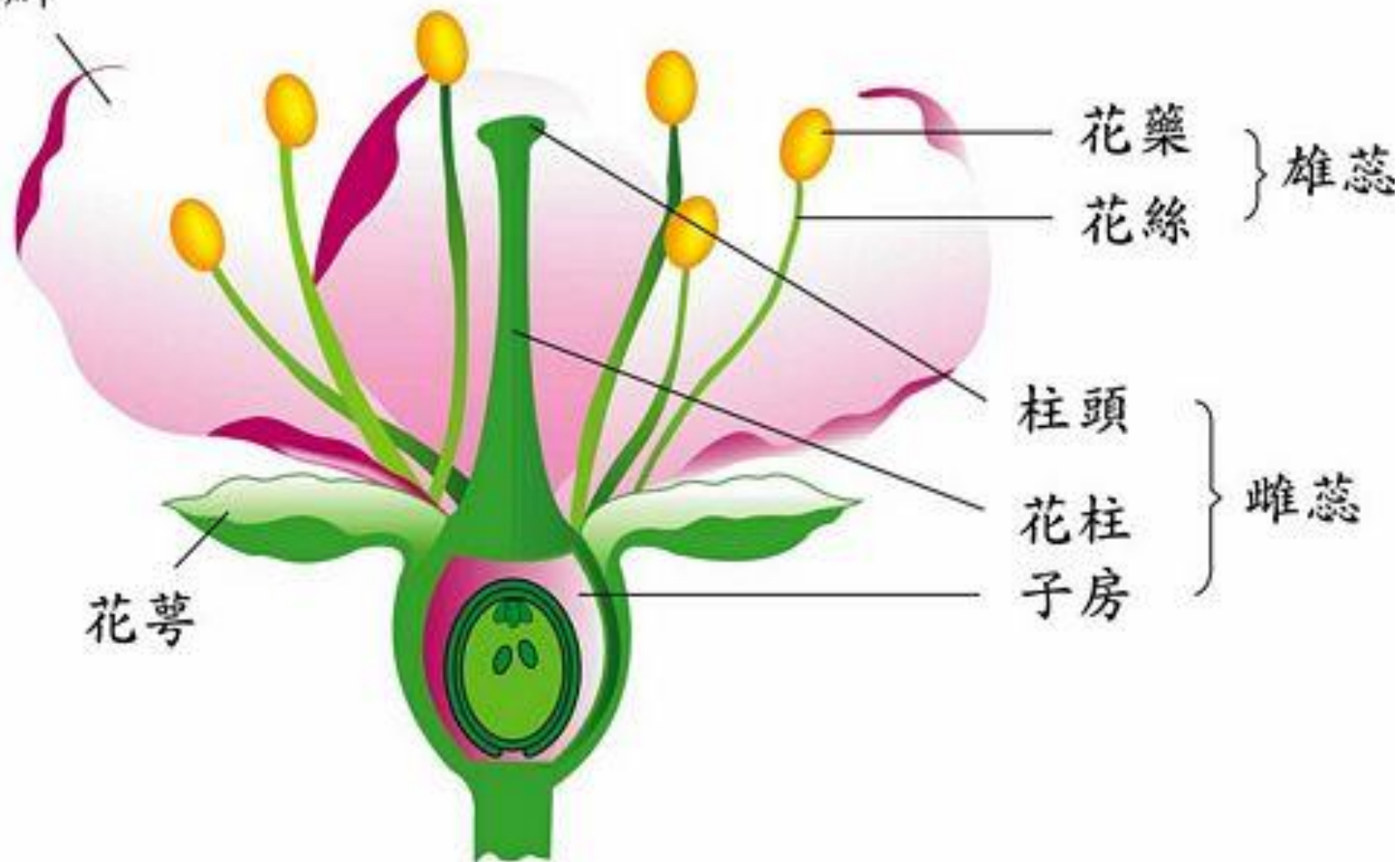
# 异花授粉

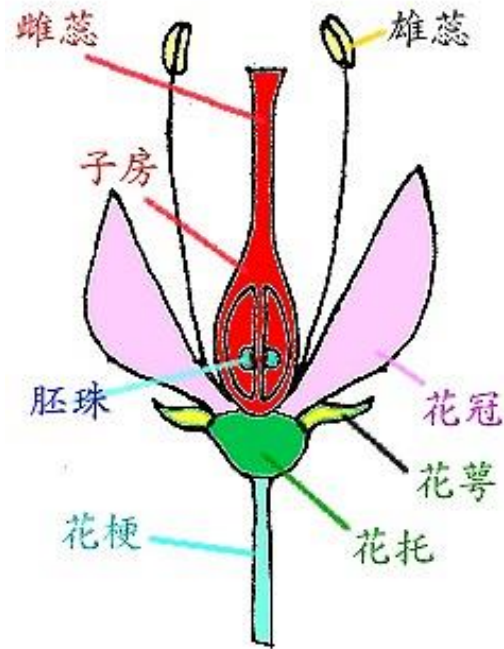
- |                      |        |
|----------------------|--------|
| 1. Apples            | 1. 苹果  |
| 2. Almonds           | 2. 杏仁  |
| 3. Blueberries       | 3. 蓝莓  |
| 4. Cherries          | 4. 樱桃  |
| 5. Avocados          | 5. 鳄梨  |
| 6. Cucumbers?        | 6. 黄瓜? |
| 7. <b>Pomelo</b>     | 7. 柚   |
| 8. <b>Grapefruit</b> | 8. 葡萄柚 |
| 9. <b>Mandarin</b>   | 9. 橙子  |
| <b>Orange</b>        | 10. 南瓜 |
| 10. Pumpkins         |        |

# 自花授粉

- |                      |        |
|----------------------|--------|
| 1. Guava             | 1. 番石榴 |
| <b>2. Lemon</b>      | 2. 柠檬  |
| 3. Apricot           | 3. 杏   |
| 4. Nectarines        | 4. 油桃  |
| 5. Peaches           | 5. 桃子  |
| 6. Pears             | 6. 梨   |
| <b>7. Grapefruit</b> | 7. 葡萄柚 |
| 8. Tomato            | 8. 番茄  |
| 9. Bean              | 9. 豆   |
| 10. Egg plant        | 10. 茄子 |

花瓣

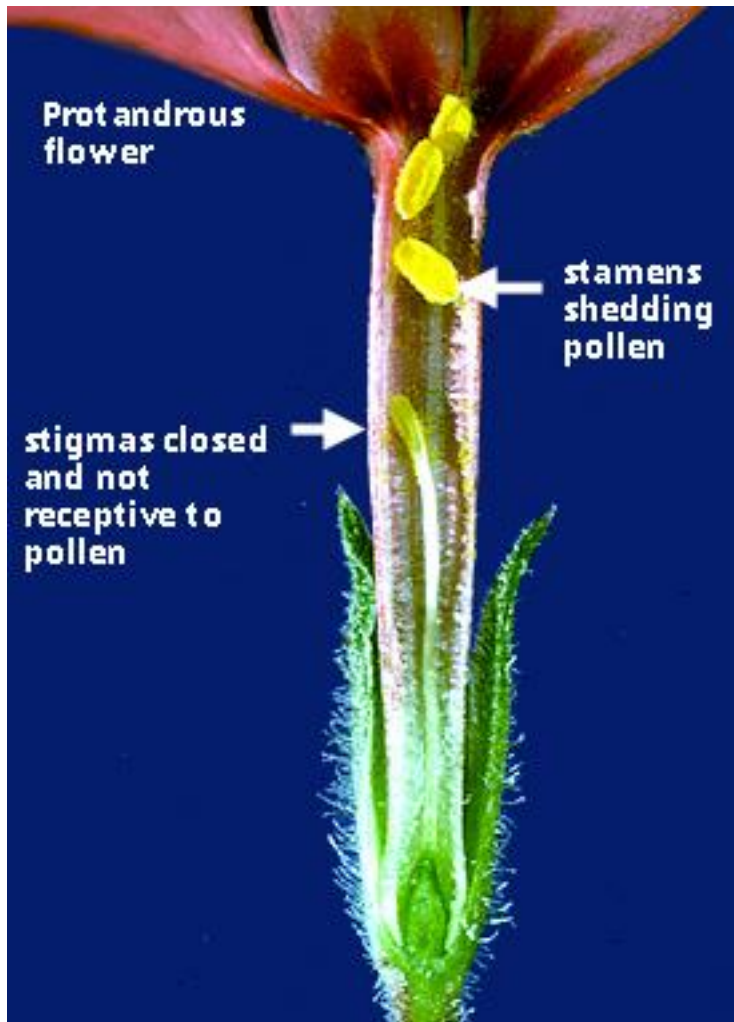




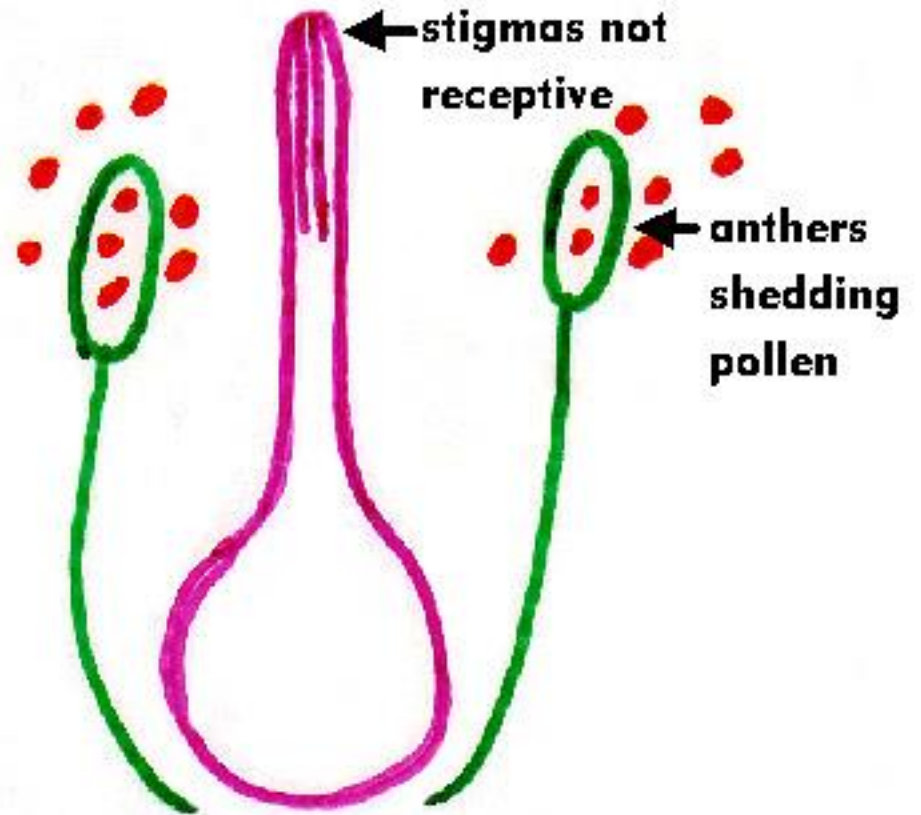
In an upright flower the anthers may be below the stigmas and vice versa in a hanging flower so that pollen will not fall on the stigmas. The most frequent device is that whereby the stamens ripen before the stigma is ready to receive pollen. This is known as protandry. The reverse condition (protogyny) occurs in some flowers whose stigmas mature before their stamens shed any pollen.



# 雄性先熟



**Protandry** – the androecium matures before the gynoecium

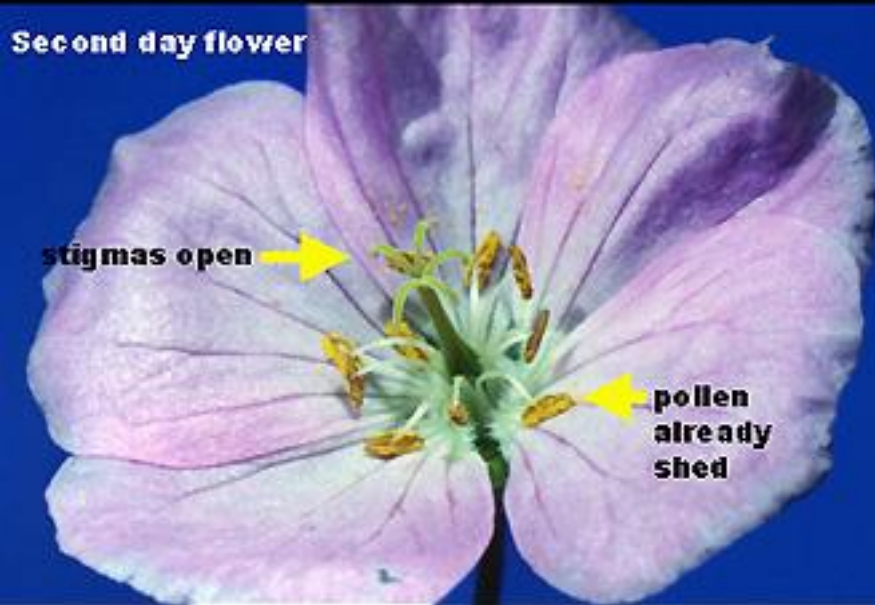


# Protandry

First day flower

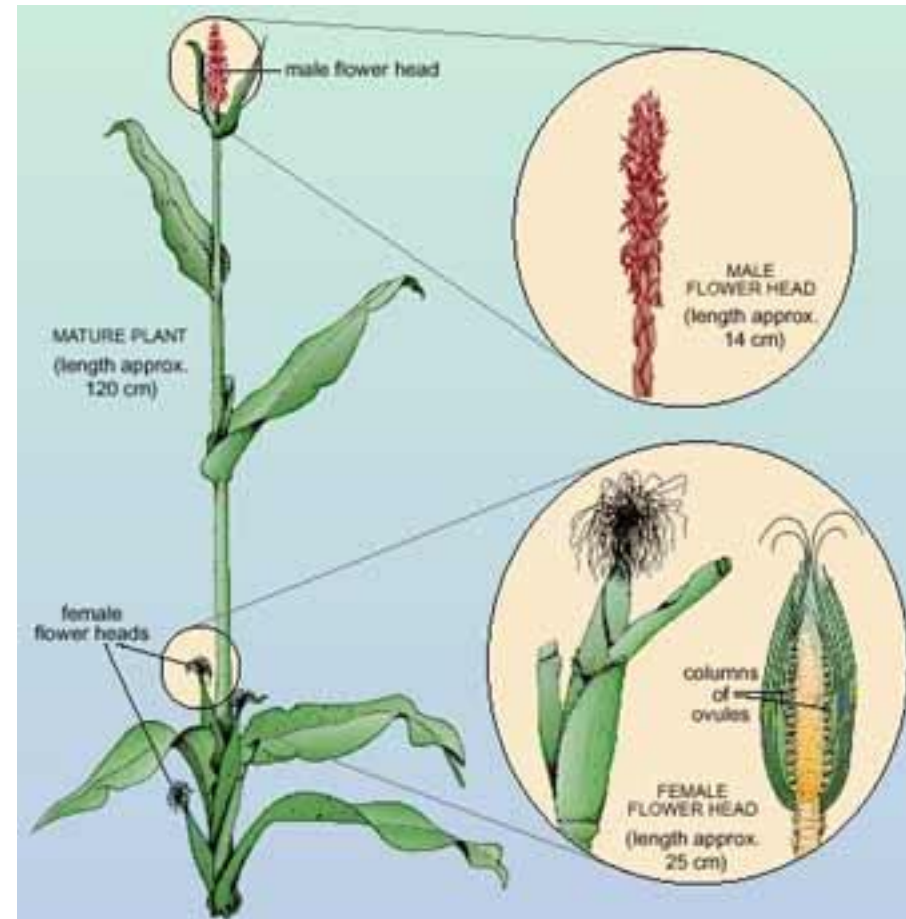


Second day flower



water lilies, magnolias  
and Corn

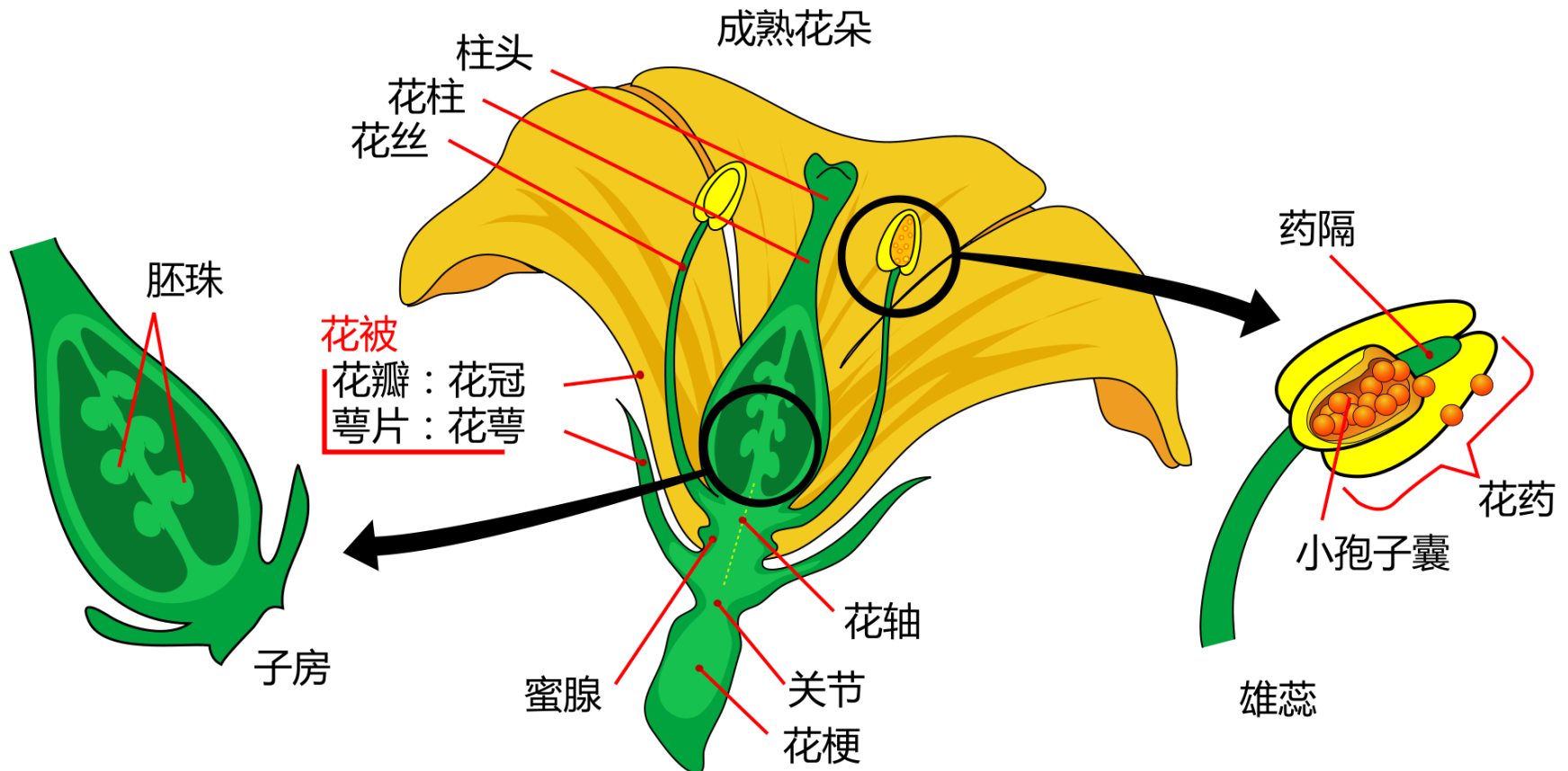
睡莲 和玉 兰（木兰科）  
玉米



# Self incompatible (SI)

SI acts by inhibiting the germination of pollen on stigmas, or the elongation of the pollen tube in the styles.

自不相容行为通过抑制花粉对柱头的萌发，或抑制花粉管在花柱头的伸长率。



# 异花授粉

- |                      |        |
|----------------------|--------|
| 1. Apples            | 1. 苹果  |
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| 8. <b>Grapefruit</b> | 8. 葡萄柚 |
| 9. <b>Mandarin</b>   | 9. 橙子  |
| 10. Pumpkins         | 10. 南瓜 |
| 11. Pecan            | 11. 胡桃 |

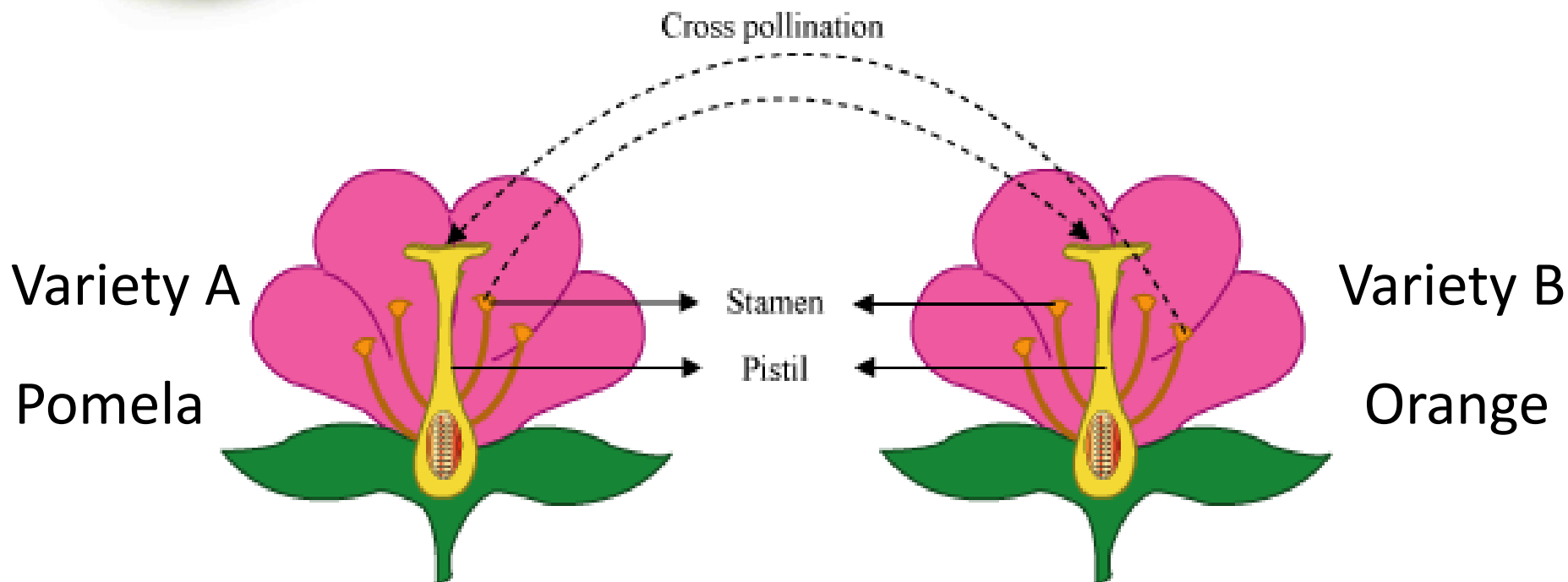
# 自花授粉

- |                      |        |
|----------------------|--------|
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| 9. Bean              | 9. 豆   |
| 10. Egg plant        | 10. 茄子 |





# 柚, 橙子



## Characteristics of Citrus Varieties and Need for Bees

Variety	Sexually Incompatible	Parthenocarpy	Bees Required
Dancy	No	Very Weak	No
Temple	No	Very Weak	No
Orlando	Yes	Weak	Yes
Minneola	Yes	Weak	Yes
Robinson	Yes	Weak	Yes
Osceola	Yes	Weak	Yes
Nova	Yes	Weak	Yes
Lee	?	?	?

## **What Cross-Pollination Doesn't Do**

The flavors of the fruits won't change when oranges and lemons pollinate each other. Those growing on orange trees will continue to be oranges, and those growing on lemon trees will continue to be lemons. If your oranges taste sour, that acidity is most likely due to lack of sufficient heat or to their being picked too early rather than their proximity to lemon trees.

## **Crops planted next to bitter melon**

buenaventura43

Every year for 18 years I plant bitter melon on the same bed with tomatoes, wing beans, and other vegetables. All the vegetables that are planted together with bitter melon did not become bitter in taste.

更大  
更  
美味







**Store No.819566**



# 柑橘类的花,果实和用途



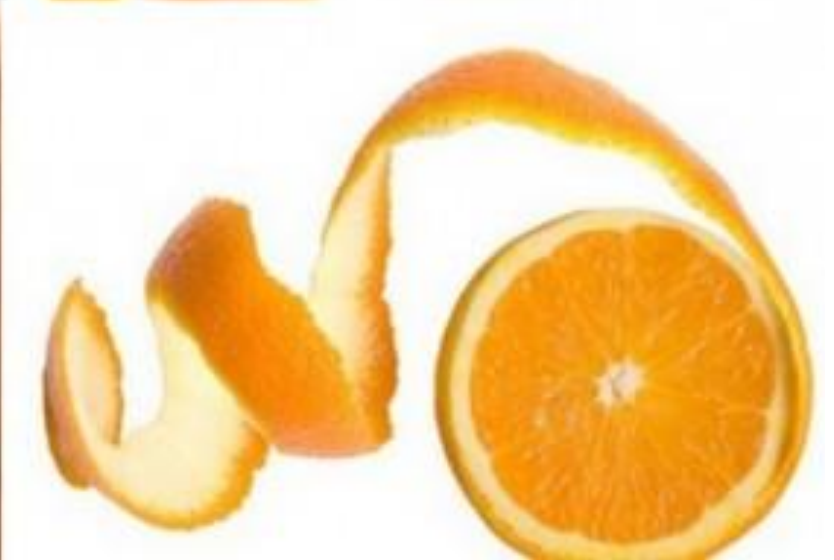


# 18 SURPRISING WAYS TO USE ORANGES









20

# ORANGE OIL

USES & BENEFITS THAT WILL ASTOUND YOU



*Essential Oils*  
informer





**Citrus Peel Ice Cream Bowl****Real Simple**

Serve your summer sorbet in a citrus peel.

**10 Homemade Cleaners Made From Citrus Peel****One Good Thing by Jilliee**

From an all purpose cleaner to a degreaser, these recipes are tried and true.

**Don't Toss Your Citrus Peels!****Local Kitchen Blog**

Many great reasons for hanging on to your citrus peels can be found here.

**DIY All-Purpose Cleaning Solution****Trash Backwards**

Turn some orange peels and vinegar into a powerful, non-toxic, zero waste, all-purpose cleaning solution! Easy peasy!

**Citrus Rind Candle****Instructables**

This is the project of the day. A

**Citrus Peel Seedling Starter Pot****My Roman Apartment****Citrus All-Purpose Cleaner****Little Brick Ranch**

Save your orange peels (or any citrus

**Apartment Therapy**

Orange peels...as firestarters.

# 柑橘类

## 2.健康益处

# Medicinal properties of Citrus

1. Scurvy; 水手-坏血病
2. Reduce constipation (便秘)
3. Lower Blood pressure (降血压)





**Serving Size 8 fl. oz. (240 mL)**  
**Servings Per Container 7**

**Serving Size 8 fl. oz. (240 mL)**

Servings Per Container 7

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**Calories 110    Calories from Fat 0**

---

**Calories 110    Calories from Fat 0**

% Daily Value\*

<b>Sodium</b> 10mg	<b>0%</b>
--------------------	-----------

<b>Sodium</b> 10mg	<b>0%</b>
--------------------	-----------

**Total Carbohydrate** 26g **9%****Total Carbohydrate** 26g **9%****Total Carbohydrate** 26g **9%**

<b>Protein 2a</b>	<b>0%</b>
-------------------	-----------

<b>Protein 2a</b>	<b>0%</b>
-------------------	-----------

**Vitamin D 25% • Niacin 4% • Thiamine 10%**

**Vitamin D 25% • Niacin 4% • Thiamine 10%**

Not a significant source of calories from fat, trans fat, saturated fat, cholesterol, dietary fiber, vitamin A and iron. Percent Daily Values are based on a 2,000 calorie diet.

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Ingredients: Organic orange juice, tricalcium citrate, and Vitamin D3.

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# Oranges - Nutritional Facts per 100 g

## Nutrients mg Percentage

Folates	30 µg	7.5%
Niacin	0.282 mg	2%
Pantothenic acid	0.250 mg	5%
Pyridoxine	0.060 mg	4.5%
Riboflavin	0.040 mg	3%
Thiamin	0.100 mg	8%
Vitamin C	53.2 mg	90%
Vitamin A	225 IU	7.5%
Vitamin E	0.18 mg	1%
Vitamin K	0 µg	0%
Sodium	0 mg	0%
Potassium	169 mg	3.5%
Calcium	40 mg	4%
Copper	39 µg	4%
Iron	0.10 mg	1%
Magnesium	10 mg	2.5%
Manganese	0.024 mg	1%
Zinc	0.08 mg	1%



# AMAZING BENEFITS OF ORANGES!

## Constipation reliever

Oranges, as well as all other acidic fruits have an alkaline effect in the digestive system, stimulating digestive juices and relieving constipation



## Repair damaged sperm

Oranges, as we all know, are incredibly rich in Vitamin C. Vitamin C has been found to protect sperm from genetic damage that would otherwise cause birth defects!



## Strengthens Immune System



Polyphenols, a type of antioxidant, reduce inflammation and efficiently combat viruses and other bacteria

## Improves mood

Oranges contain vitamin B6, otherwise called the "mood vitamin" as B6 acts in the brain to help produce serotonin and thus makes us happier



## Healthy Bones

Oranges are a great source of magnesium, a mineral required for the absorption of calcium in the body, thus helping to maintain and form healthy bones and teeth



## Prevents Arteriosclerosis

Arteriosclerosis is the hardening of the arteries. Vitamin C in oranges, if consumed regularly, slows this degenerative process.



## Prevent High Blood Pressure

Try eating ONLY oranges for a couple days, and drink plenty of water. Oranges contain potassium and are sodium-free making them the perfect support system for our blood system. Sodium from processed foods should be eliminated and potassium-rich fruits increased, if you want to get rid of hypertension

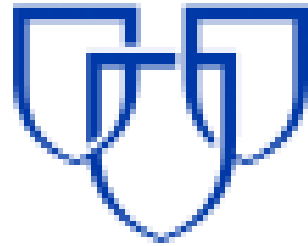


## Cancer Fighter

Citrus fruits contain substances called limonoids that last in the blood stream for up to 24hrs after consumption. Limonoids are cancer fighters, acting as a strong antioxidant preventing the breakdown of cell DNA



MAYO  
CLINIC



Dietitian's tip:

Orange juice is an excellent source of potassium, a mineral that helps regulate blood pressure and cell function. If you want to substitute a banana instead of the orange juice, the potassium content is similar.





I like to drink grapefruit juice but hear that it can interfere with some prescription medications. Is that true?

Answers from Katherine Zeratsky, R.D., L.D.

Yes. Grapefruit and certain other citrus fruits and products can interfere with several kinds of prescription medications.

Don't take these interactions lightly. Some can cause potentially dangerous health problems. Check with your doctor or pharmacist before consuming any citrus products, including grapefruit, if you take prescription medications.



The list of medications that can interact with **grapefruit** is long and includes commonly prescribed medicines that:

Fight infections — erythromycin

Reduce cholesterol — atorvastatin (Lipitor), lovastatin (Altoprev), others

Treat high blood pressure — felodipine, carvedilol (Coreg), others

Treat heart problems — amiodarone (Coradarone, Pacerone)

Treat depression — diazepam (Valium, Diastat), fluvoxamine, others

Prevent organ rejection in transplant recipients — cyclosporine (Sandimmune, Neoral, others), tacrolimus (Prograf, Astagraf), others



In addition, researchers have identified other fruits and juices that may interact with medications. This is because many citrus varieties are grafted on a grapefruit stem. Tangelos (Honeybell and Minneola) are tangerines crossed with grapefruit. Seville oranges and their juice should also be avoided if you take medication that interacts with grapefruit.

Another potential problem is that some products may contain grapefruit but don't say so in the name or on the ingredients list. For example, numerous "citrus" flavored soft drinks have been identified as possibly containing grapefruit juice or grapefruit extract.



Eat half a grapefruit before each meal and lose 10 pounds in 10 days! Citrus does have a few powerful antioxidants with known cholesterol and blood pressure lowering effects. But can it help with weight loss? A recent study looked at the age-old claim in an effort to get some answers.

Answer: low calories and exercise



**维生素C is unstable**

# 存储对Orange的维生素C含量的影响

The orange juices from frozen concentrates

- 1) Concentrate: 86 mg to 39 to 46 mg/c after 4 weeks of storage.
- 2) Ready-to-drink juices averaged significantly lower reduced vitamin C: 27 to 65 mg/c at opening and 0 to 25 mg/c at expiration 4 weeks later.
- 3) Decomposition rate of reduced vitamin C was similar for all juices, about 2% per day once opened.

## 2. 降血压

Lower Blood pressure

**Potassium deficiency  
diseases - High blood  
pressure**

J Hum Hypertens. 1993 Feb;7(1):33-8.

**Direct evidence: Can guava fruit intake decrease blood pressure and blood lipids?**

Singh RB1, Rastogi SS, Singh NK, Ghosh S, Gupta S, Niaz MA.

Author information

**Abstract**

A randomized, single-blind, controlled trial was conducted to examine the effects of guava fruit intake on BPs and blood lipids in patients with essential hypertension. Of 145 hypertensives that entered the trial, **72 patients** were assigned to take a soluble fibre and a potassium-rich diet containing 0.5-1.0 kg of guava daily (group A) and 73 patients to their usual diet (group B), while salt, fat, cholesterol, caffeine and alcohol intake were similar in both groups. Mean age, mean body weight and male sex, were similar, and so were risk factors, mean BPs, mean serum sodium, potassium, calcium, magnesium, triglycerides, cholesterol and HDL-cholesterol in both groups. Dietary adherence to guava intake was checked by a questionnaire. After **four weeks** of follow-up on an increased consumption of dietary **potassium** and low sodium/potassium ratio, group A patients were associated with 7.5/8.5 mmHg net decrease in mean systolic and diastolic pressures compared with group B. Increased intake of soluble dietary fibre (47.8 +/- 11.5 vs. 9.5 +/- 0.85 g/day) was associated with a significant decrease in serum total cholesterol (7.9%), triglycerides (7.0%) and an insignificant increase in HDL-cholesterol (4.6%) with a mild increase in the ratio of total cholesterol/HDL-cholesterol in group A patients compared with group B. **It is possible that an increased consumption of guava fruit can cause a substantial reduction in BPs and blood lipids with a lack of decrease in HDL-cholesterol due to its higher potassium and soluble fibre content, respectively.**





### 3.气候和光周期

Climate and photoperiod

# 柑橘类树

1. 亚热带  
sub-tropical)
2. 可达18-22英尺的高度
3. 大树：冰冻时不需要保护  
小树：冰冻时需要保护

# 光合作用

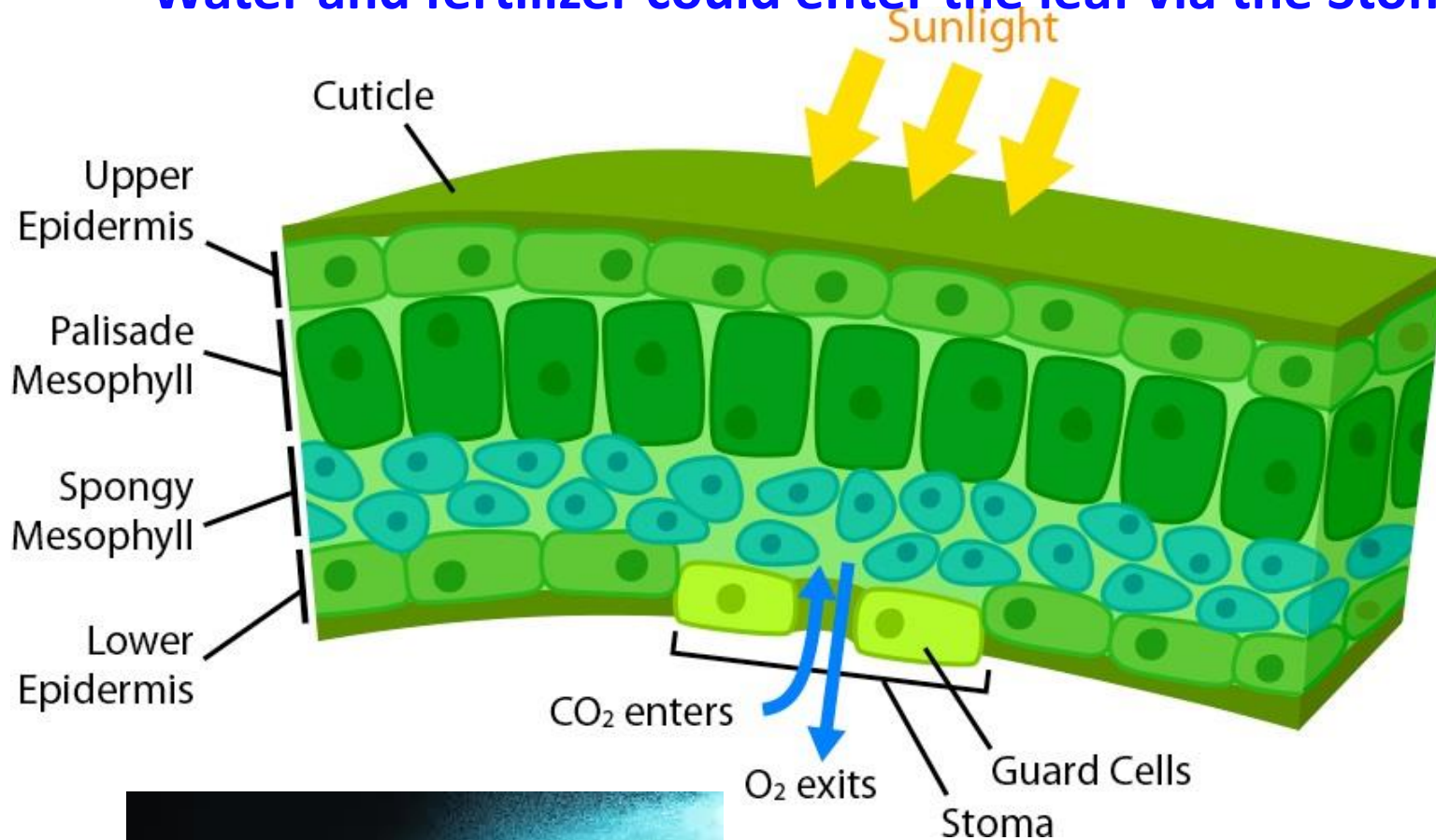
# Photosynthesis





水肥可以从气孔进入叶子吸收

Water and fertilizer could enter the leaf via the Stomata



Water  
Fertilizer



**Fig 16.4** Foliar fertilizers can be effective for quickly correcting nutrient deficiency symptoms.

满29  
包邮

喷雾营养液



叶面肥

林夕园艺

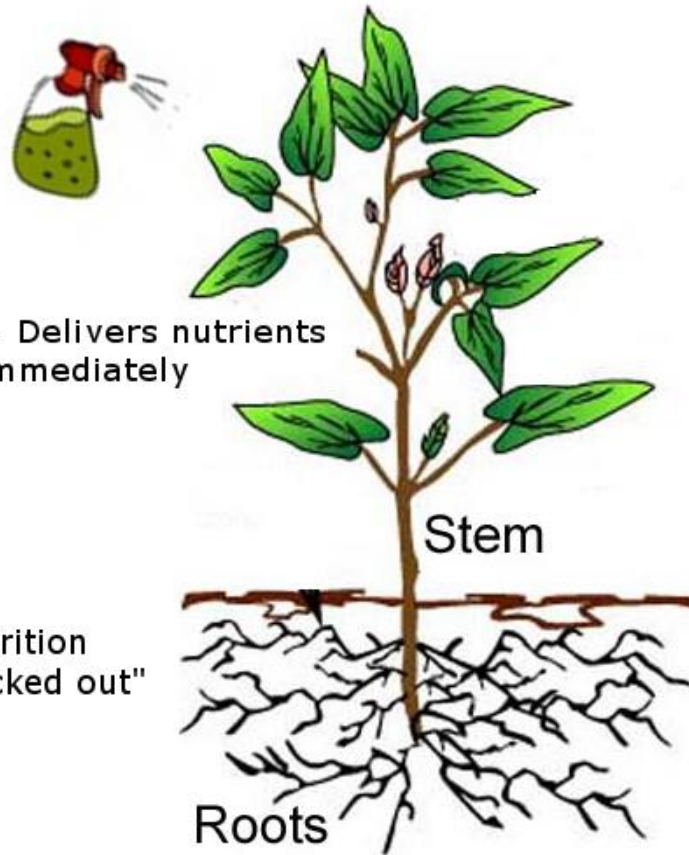
# Benefits of Foliar Feeding

1. Saves Money - Reduces need for conventional fertilizers

2. Fast Acting - Delivers nutrients to the leaves immediately

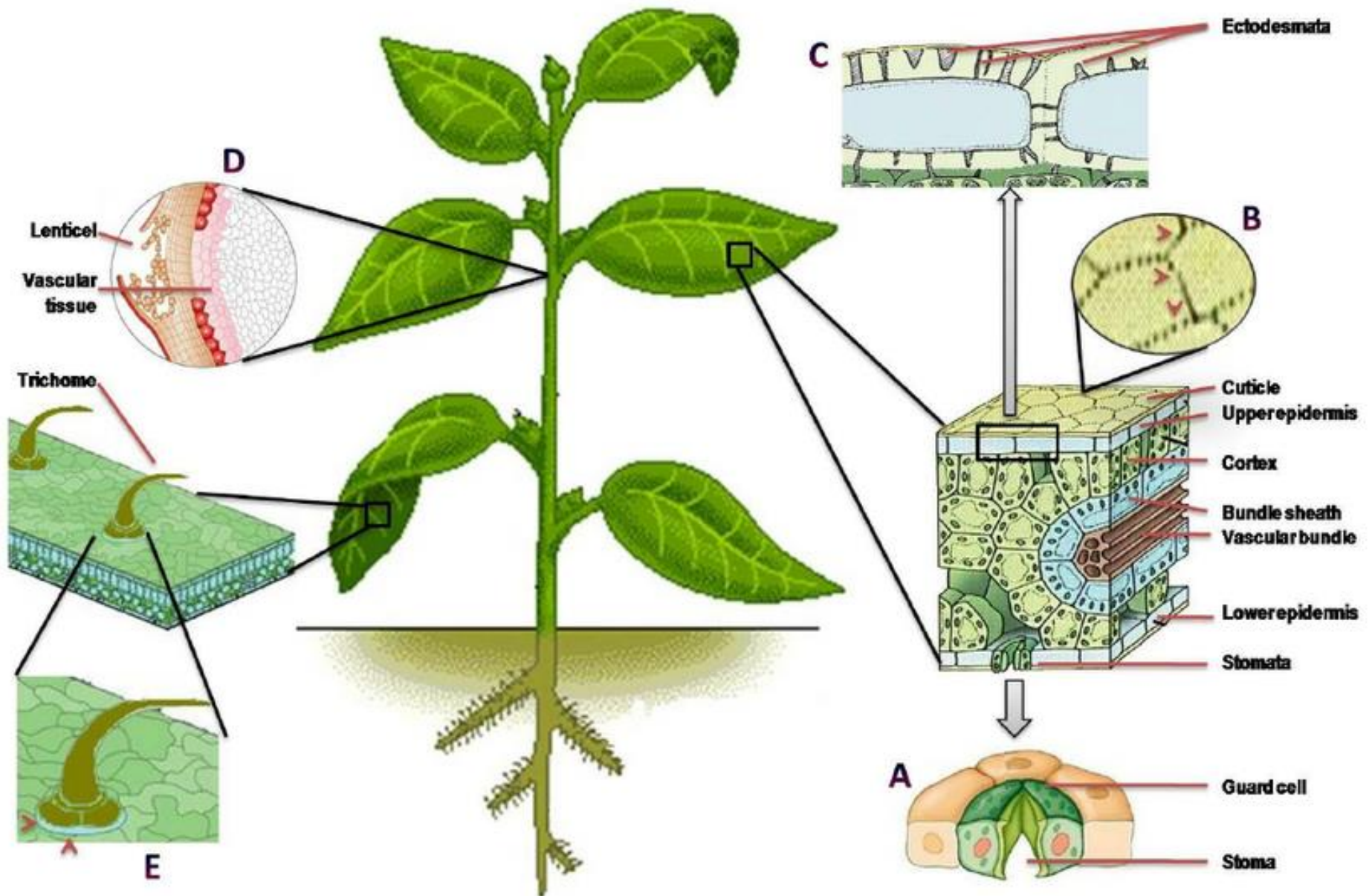
3. Provides nutrition if roots are "locked out"

4. Helps break through nutrient lockout



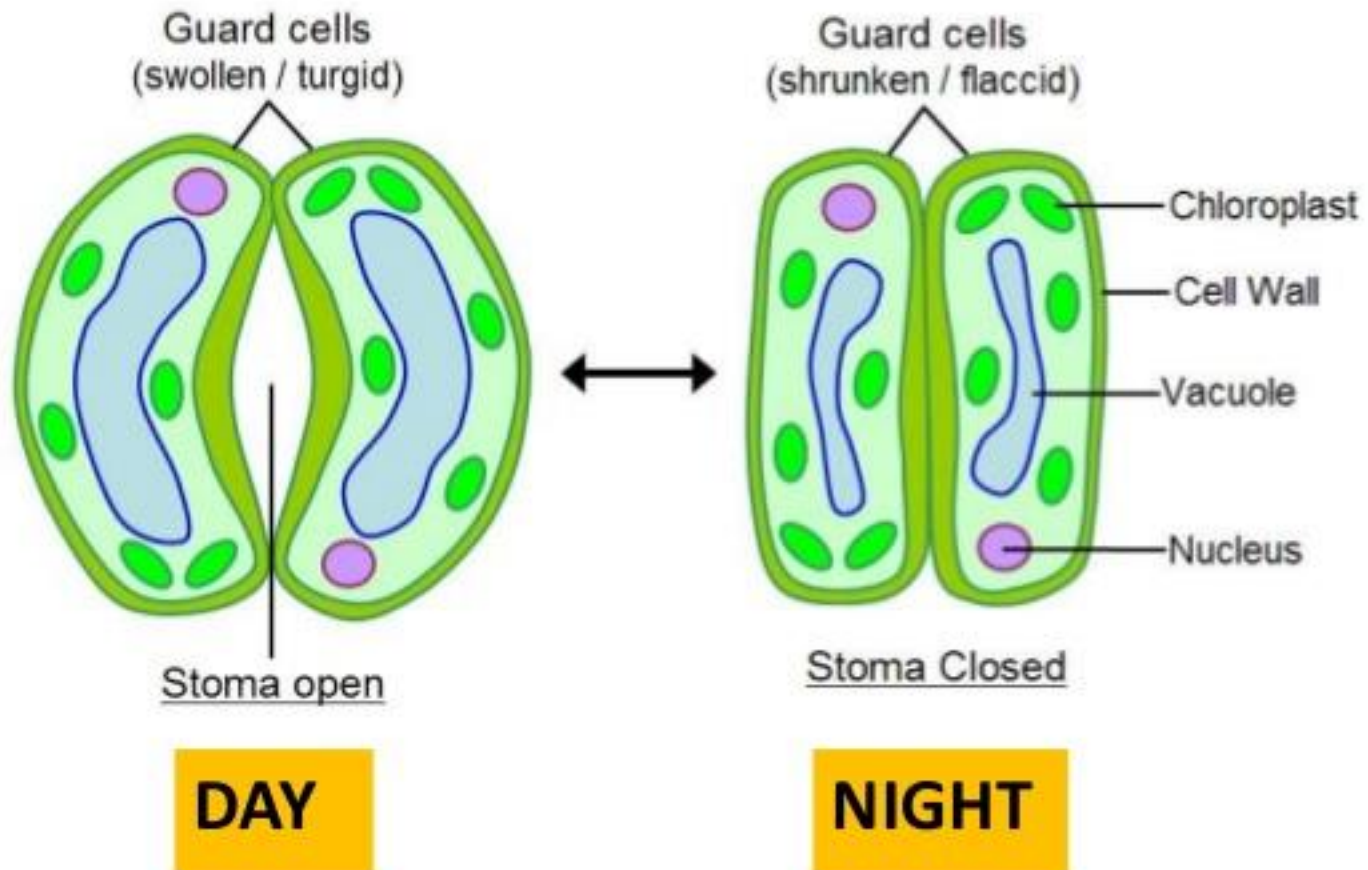


# Various points of entry of Iron and phosphorus as foliar spray



**Minimum 6 to 8 hrs of sunlight**

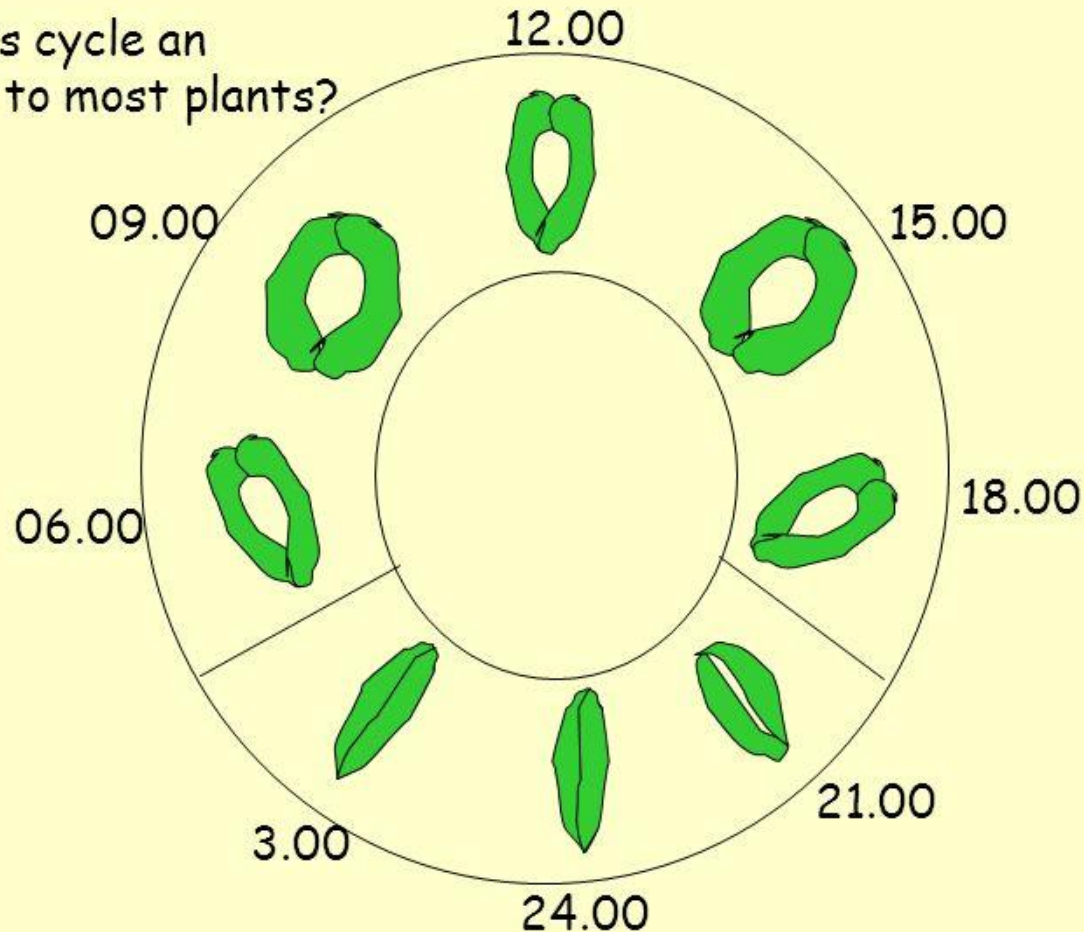
# When are stomata open and when are they closed?



**Knowledge of time of stomatal opening allows one to determine what day of sunlight is optimum for plant growth**

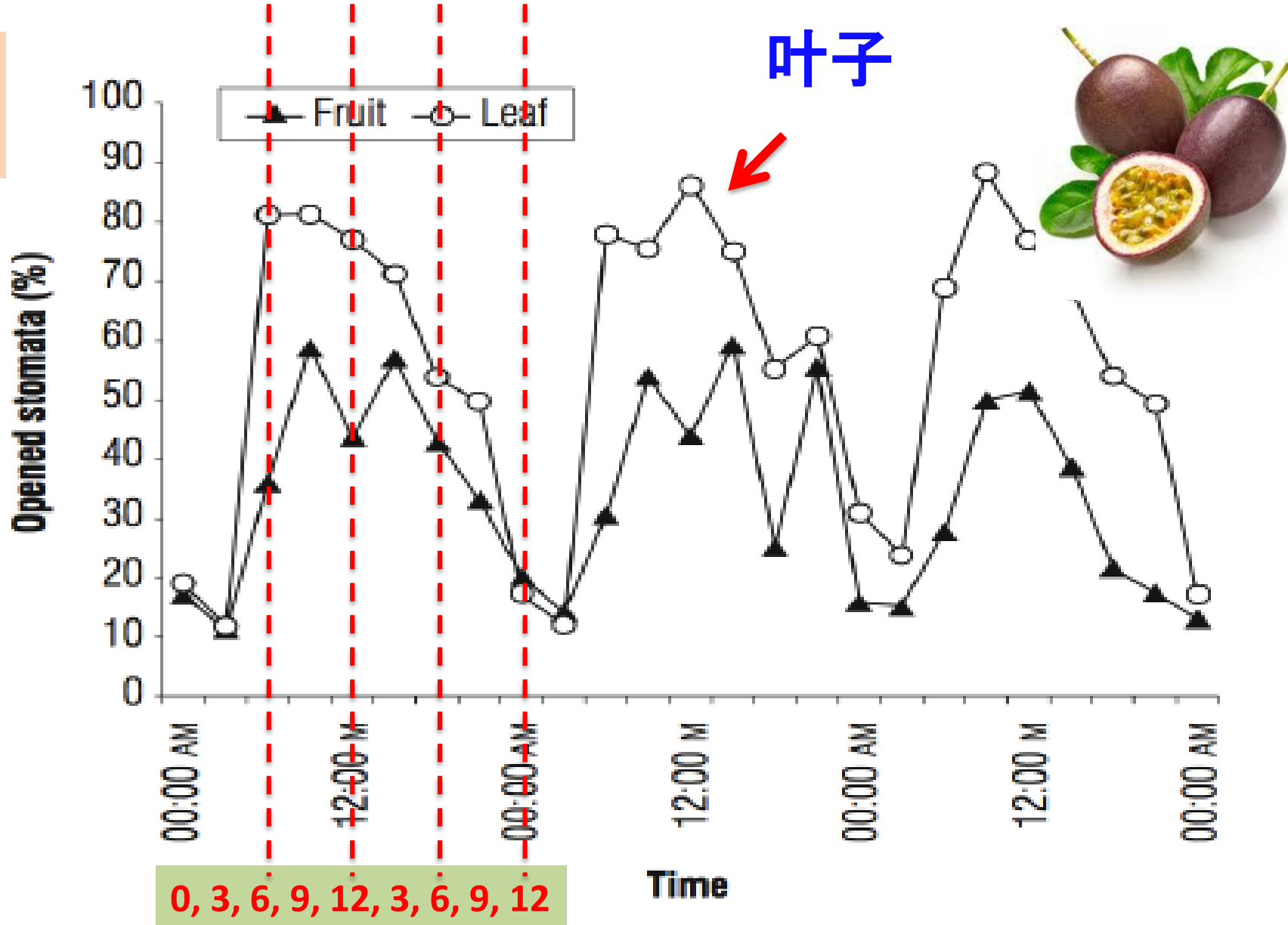
## 24h Cycle of Stomatal Opening and Closing

Why is this cycle an advantage to most plants?





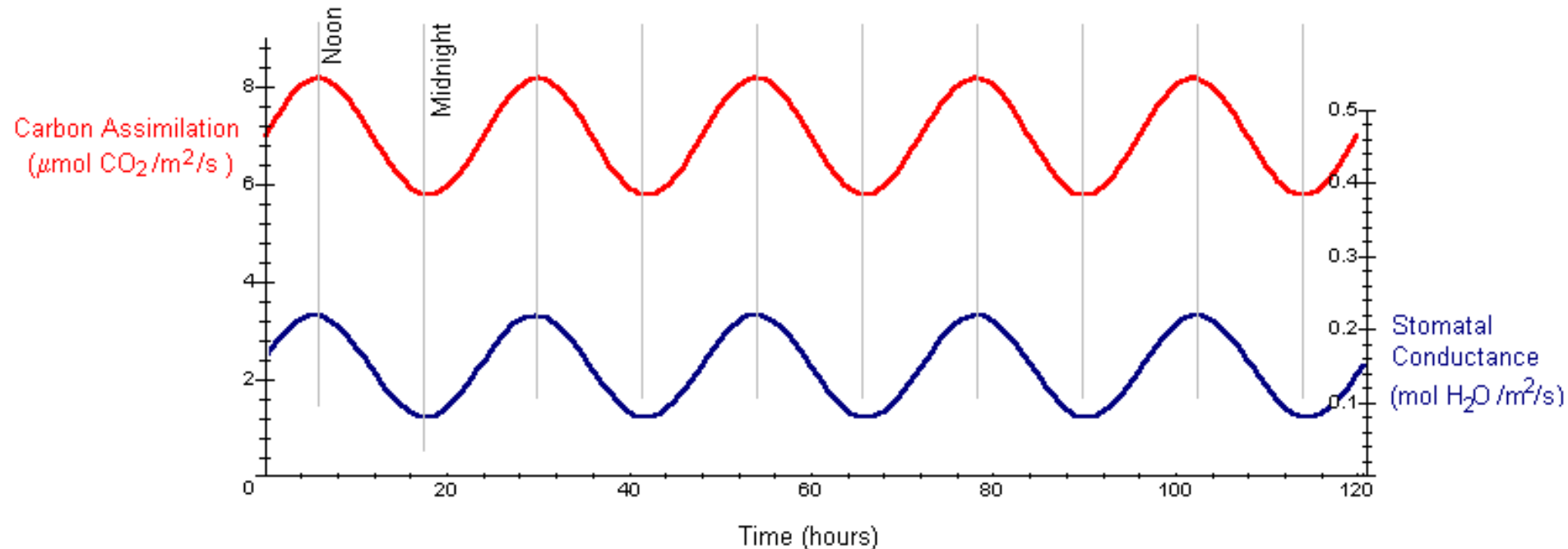
6 am  
to  
3 p.m



**FIGURE 1.** Opened stomata in fruits and leaves of the purple passion fruit over 72 h.

# Stomata opening and photosynthesis share same rhythms

**: -Time of opening of stomata is the same as time of food synthesis**



Under normal 24 hour day-night cycle or under constant moderate light and constant intercellular  $\text{CO}_2$

**Best time is 6 am to 3 p.m**

## 4.土壤

The guava will tolerate many soil conditions, but will produce better in rich soils high in organic matter. They also prefer a well-drained soil in the pH range of 5 to 7. The tree will take temporary waterlogging but will not tolerate salty soils.

休斯顿的粘土层可达20 feet深

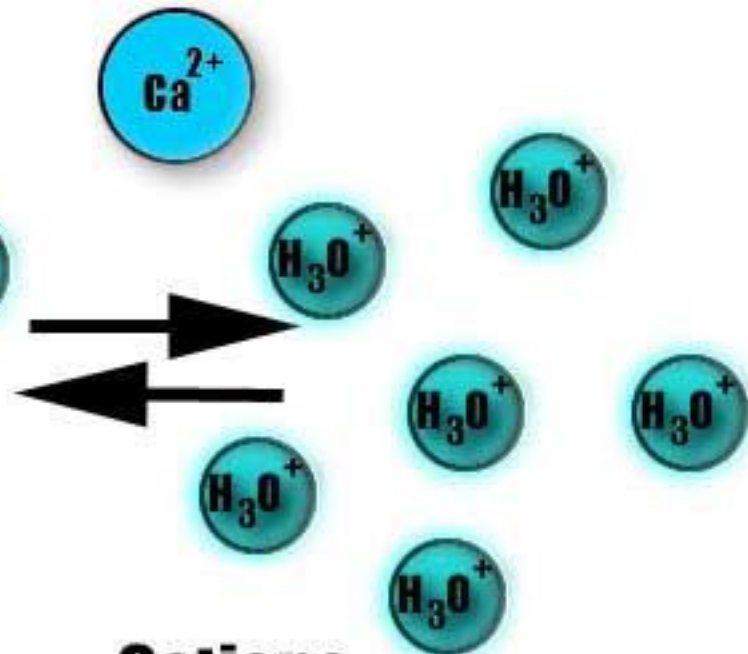




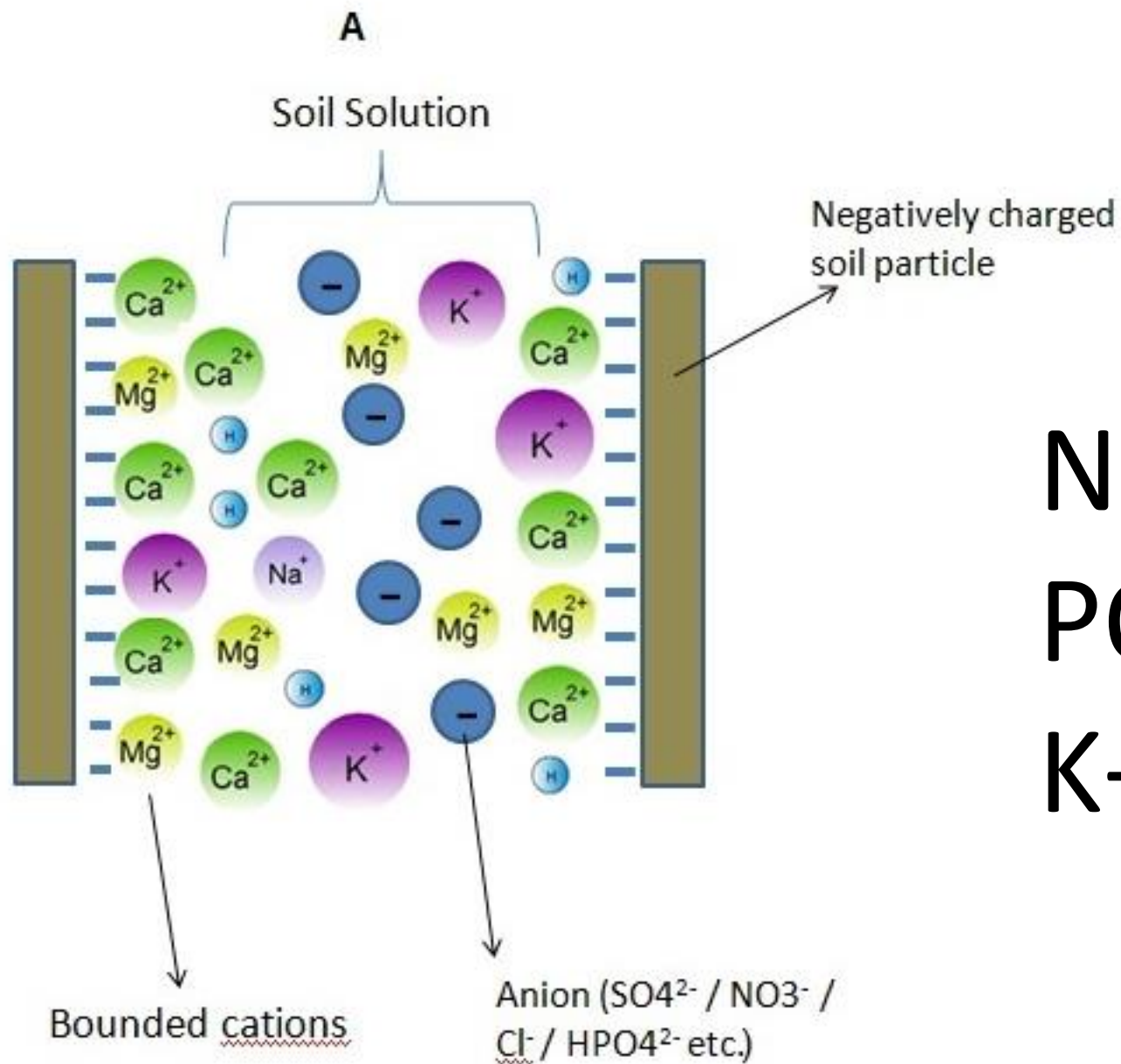
## Houston Clay soil, up to 20 feet deep



**Adsorbed  
Cations**

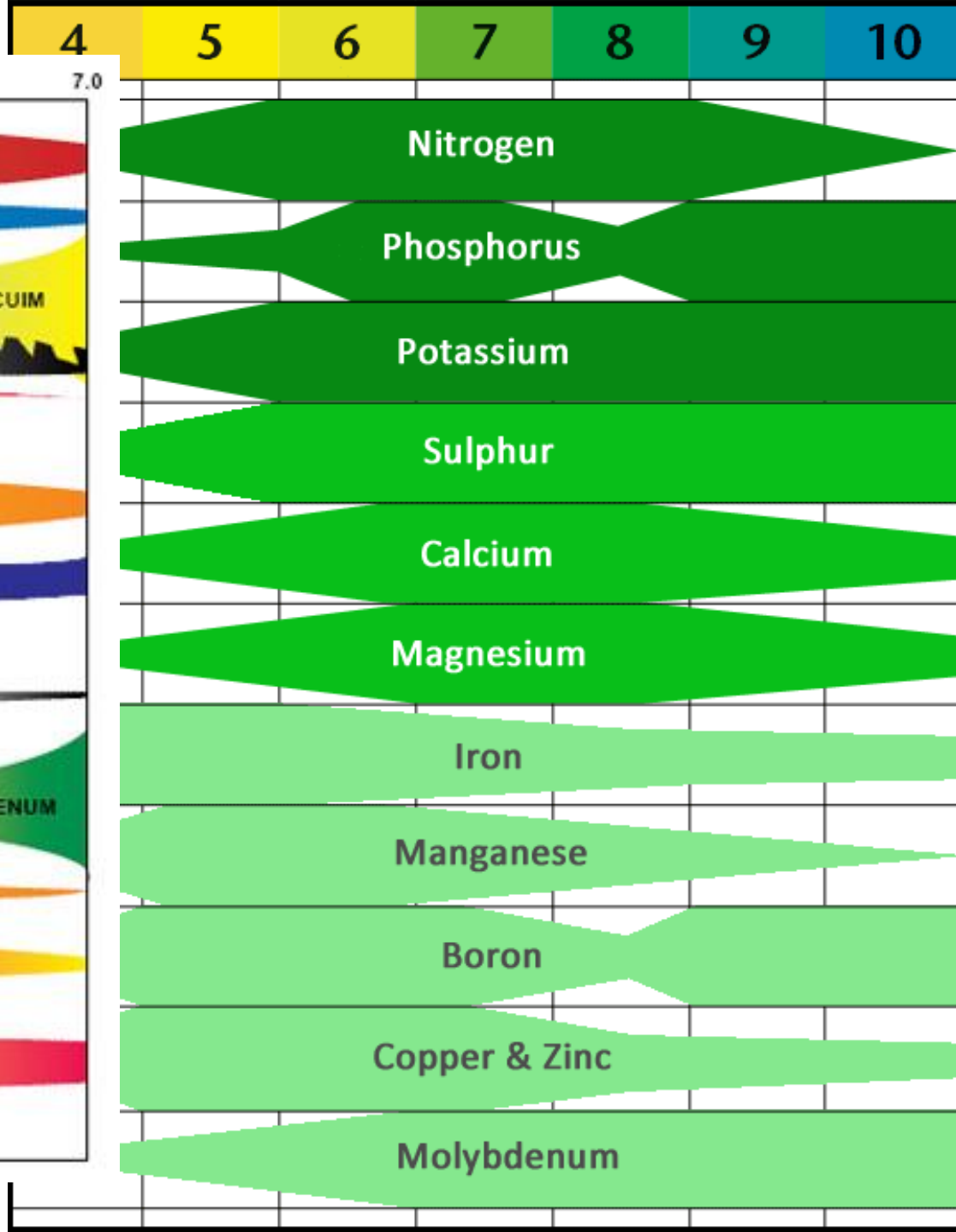
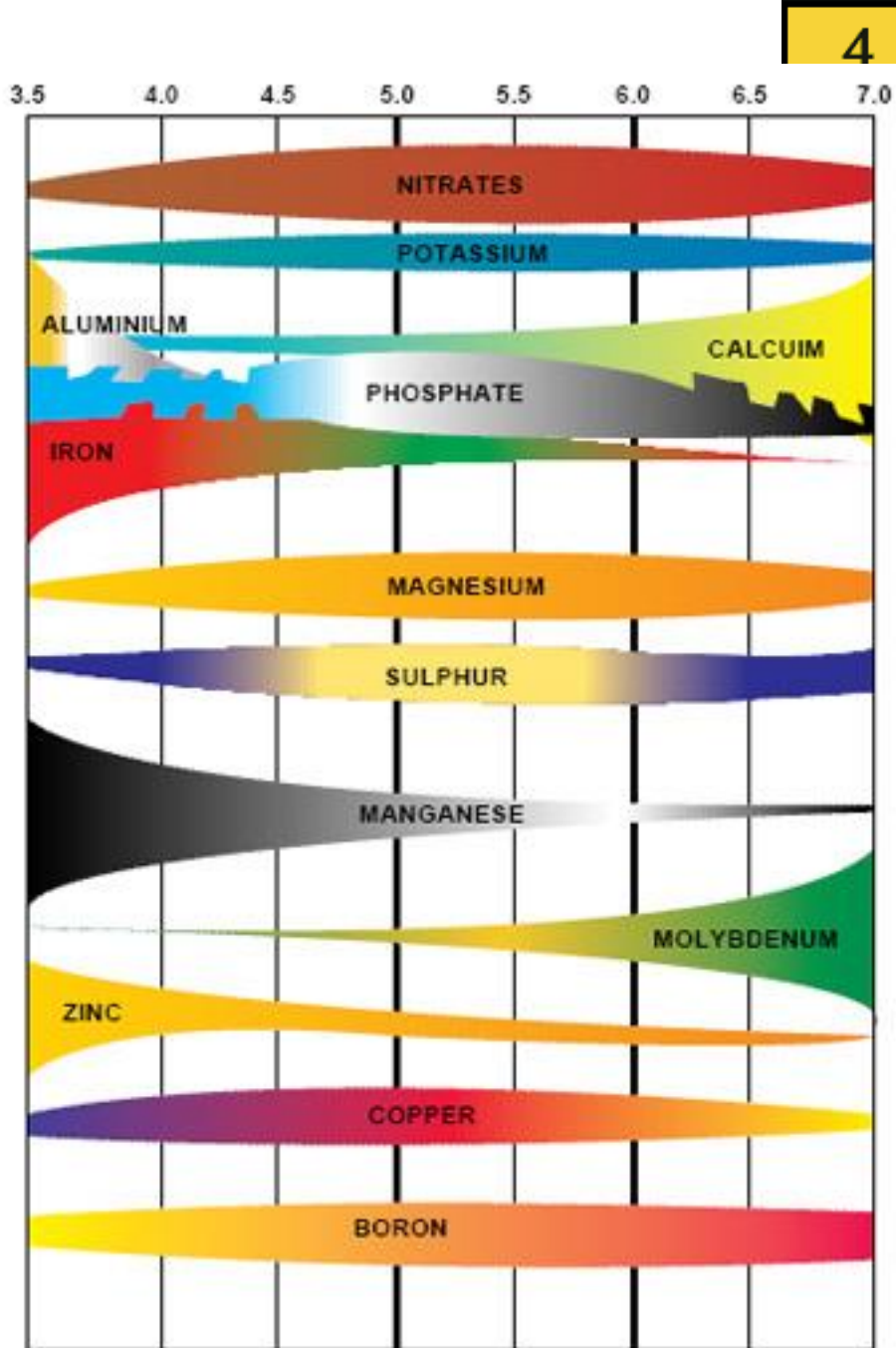


**Cations  
in Solution**



$\text{NO}_3^-$   
 $\text{PO}_4^-$   
 $\text{K}^+$











**A grapefruit tree could bear 300 fruit every year with good compost and mulch**





# WHAT CAN I COMPOST?

**YES!**

THESE ITEMS CAN BE  
COMPOSTED



EGG SHELLS



GRASS CLIPPINGS



FRUIT AND VEGETABLE  
SCRAPS



TEA BAGS AND COFFEE  
GROUNDS



HORSE, COW, CHICKEN  
OR RABBIT MANURE



LEAVES AND GARDEN  
PRUNINGS

**NO!**

DO NOT PUT THESE IN YOUR COMPOST

MEAT OR BONES

DAIRY PRODUCTS

BAKED PRODUCTS

COOKED RICE

NAPPIES

DOG POO

CAT LITTER

GLOSSY PAPER

WALNUT SHELLS

DISEASED PLANTS

WEEDS WITH SEEDS

NON-ORGANICS

PLASTIC BAGS

TREATED WOOD

SCRAPS



A grapefruit tree could bear 300 fruit every year with good compost and mulch

用1-2 英寸的有机腐殖土环绕果树

One to two inches of Organic compost  
around the tree





Different grades  
of gardening sol



earthworm



# 地膜, 以保持水

## Mulch to keep moisture







**Store No.819566**







## 5. 种植 (Planting)

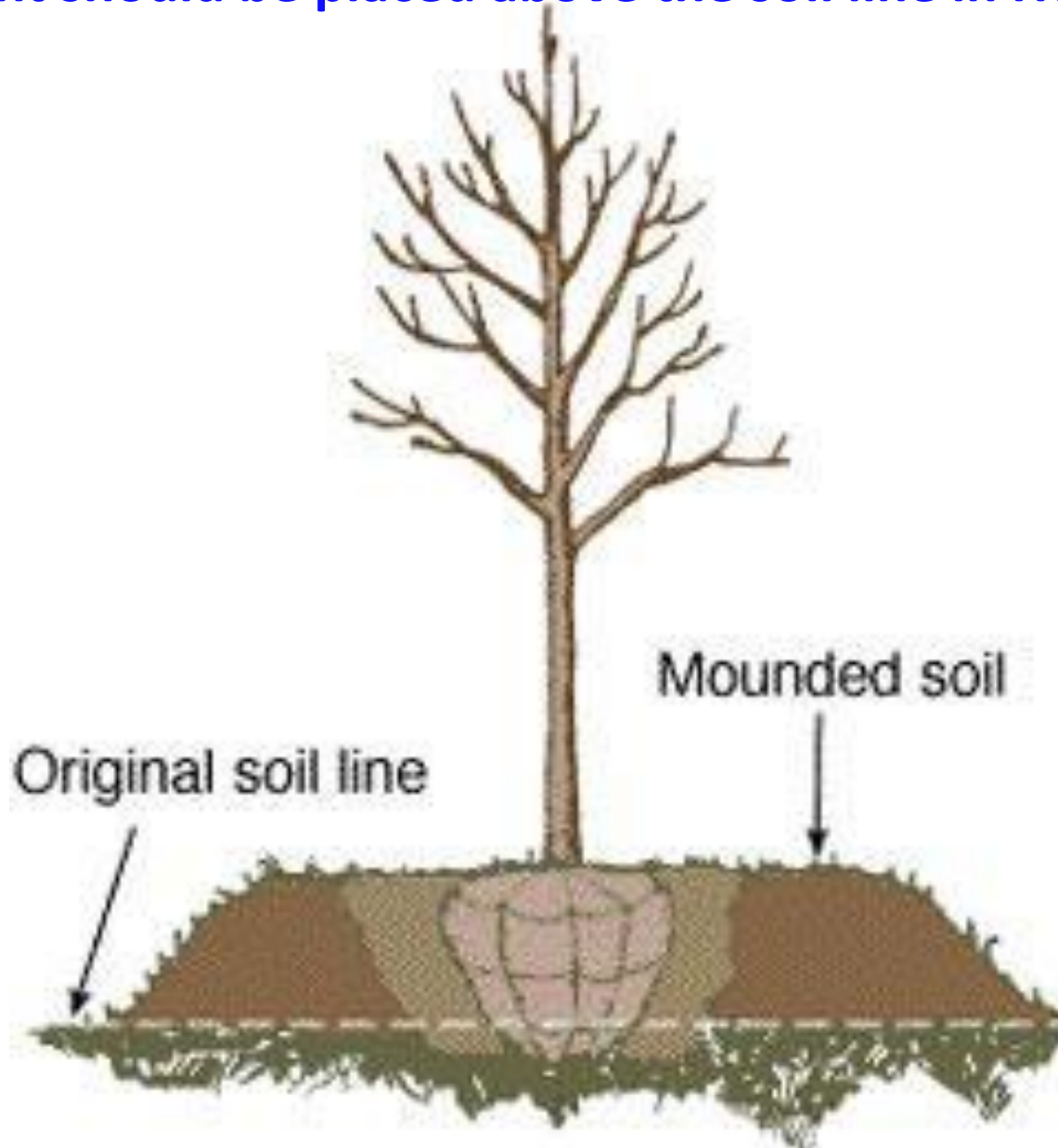
昨天看了种树积水的讨论，赶紧把新种的三角梅挖出来重种。果然是水坑呀





新移栽的果树要在土壤线以上

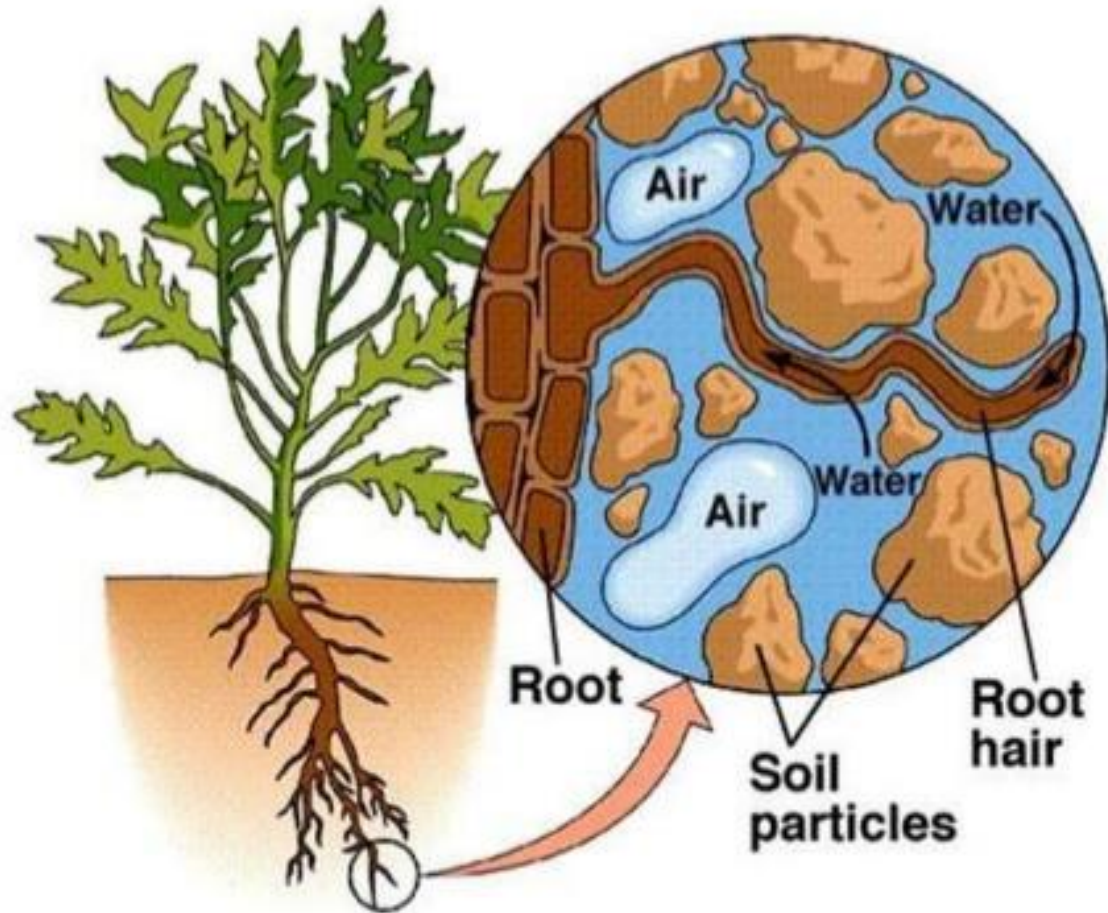
New plant should be placed above the soil line in Houston





# How are root hairs adapted for absorption?

1. are long and provide a large surface area
2. have a thin cell wall



## Break up the root system



Almost no soil





## Break up the root system



## Good root system

1. Buy small plant
2. Break up root
3. Do not buy root bound plant
4. Rinse away ½ inch of soilless medium on all side of root ball





## 用 Mulch 保持湿度



Where to buy rice straw ?

STANDLEE PREMIUM WESTERN FORAGE CERTIFIED STRAW GRAB & GO COMPRESSED  
BALE, 50 LB. BALE

☆☆☆☆☆☆☆☆ 2.1 out of 5 stars. Read reviews.

**\$10.99**; SKU #102619099

**Tractor  
Supply Co  
(TSC)  
Free UPS  
Ship to  
store**





# 树皮 Tree bark



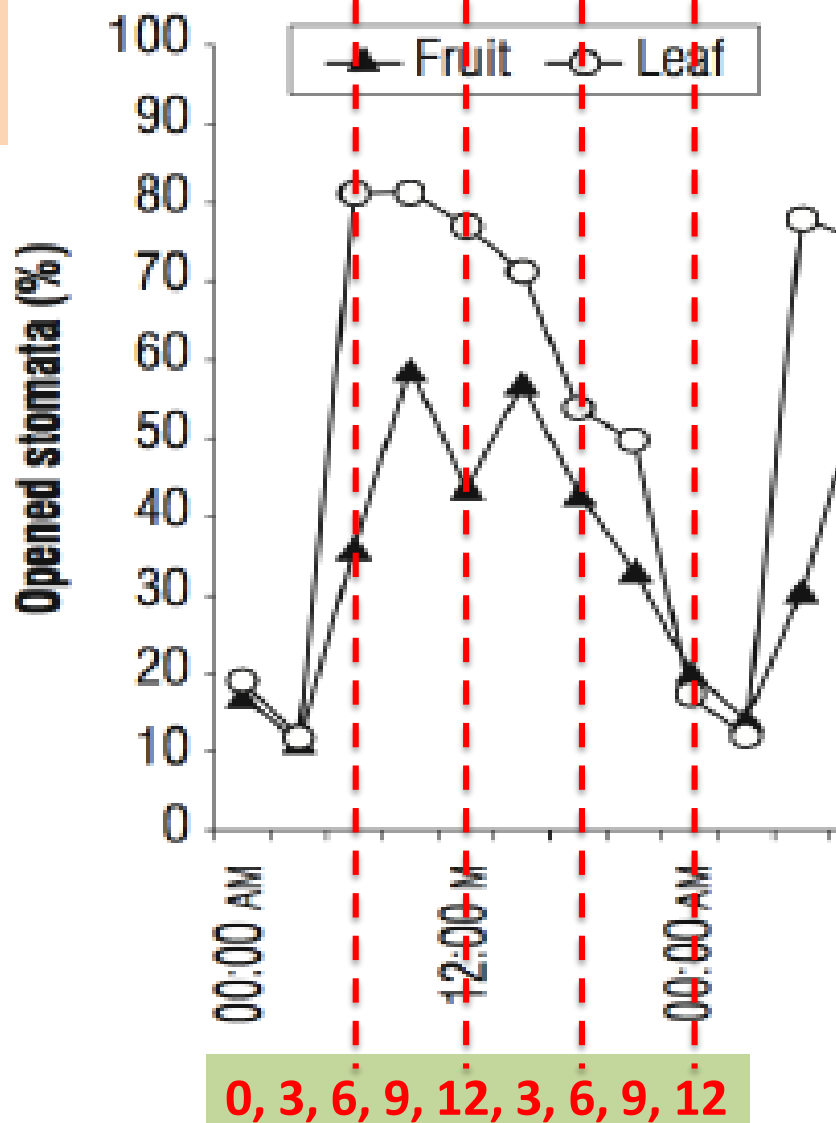
**树的间距： 距其它的树8-12 英尺**

**Spacing:**

Guava trees in the home landscape should be planted 8 to 12 ft (4.6-7.6 m) away from other trees



6 am  
to  
3 p.m



**Plant at site  
with lots of  
morning  
Sunlight**

**FIGURE 1.** Opened stomata in fruits and leaves of the purple passion fruit over 72 h.

# 6. 施肥

Citrus trees are heavy nitrogen feeders, make sure your fertilizer contains more nitrogen (N) than phosphorous (P) and potassium (K). Use at least a 2-1-1 (N:P:K) ratio.

**环绕树覆盖1-2英寸的腐殖土**

**Apply one to two inches of Organic compost  
around the tree**

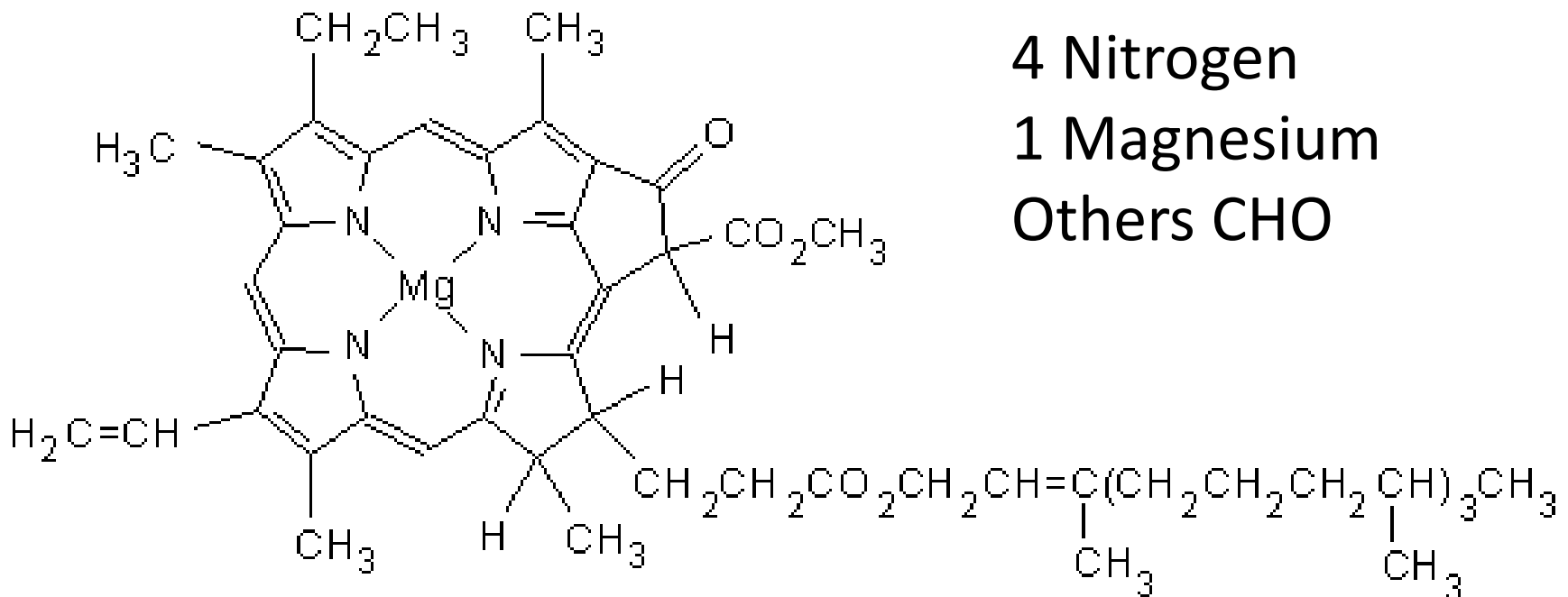
**And add two bags of chicken manure in the spring**

# 叶绿素

## Chlorophyll

Nitrogen and magnesium are part of chlorophyll that make food

Intensity of green color of leaf indicate the Nitrogen sufficiency





# N P K Definition

## THE LEAF MAKER

### NITROGEN

N

- Production of new cells and enzymes.
- Production of green pigments.
- Responsible for leaf and stem growth.
- Helps plants with rapid growth.

## THE FLOWER INDUCER / FRUIT MAKER

### POTASSIUM

K

- Encourages uptake of water.
- Essential in the development of flowers and fruits.
- Increases plants resistance to diseases.
- Helps plants make better use of light and air.

## THE ROOT MAKER / FLOWER INDUCER

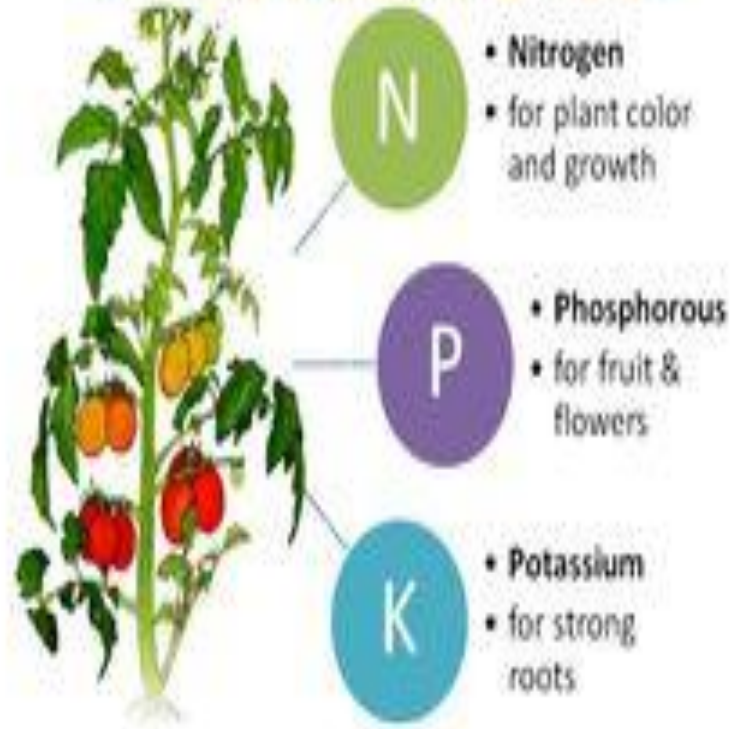
### PHOSPHORUS

P

- Encourages root growth and blooming.
- Essential part of the process of photosynthesis.
- Involved in the formation of all oils, sugars and starches.
- Helps with the transformation of solar energy into chemical energy.

Nitrogen is for green leaf

## Understanding Fertilizer Numbers



## Leaf color from light green to dark green



# Sunniland

HELPING OUR CUSTOMERS GROW SINCE 1884

FERTILIZER FOR SOUTHERN GARDENERS



## CITRUS

AVOCADO & MANGO

## FERTILIZER

6-4-6

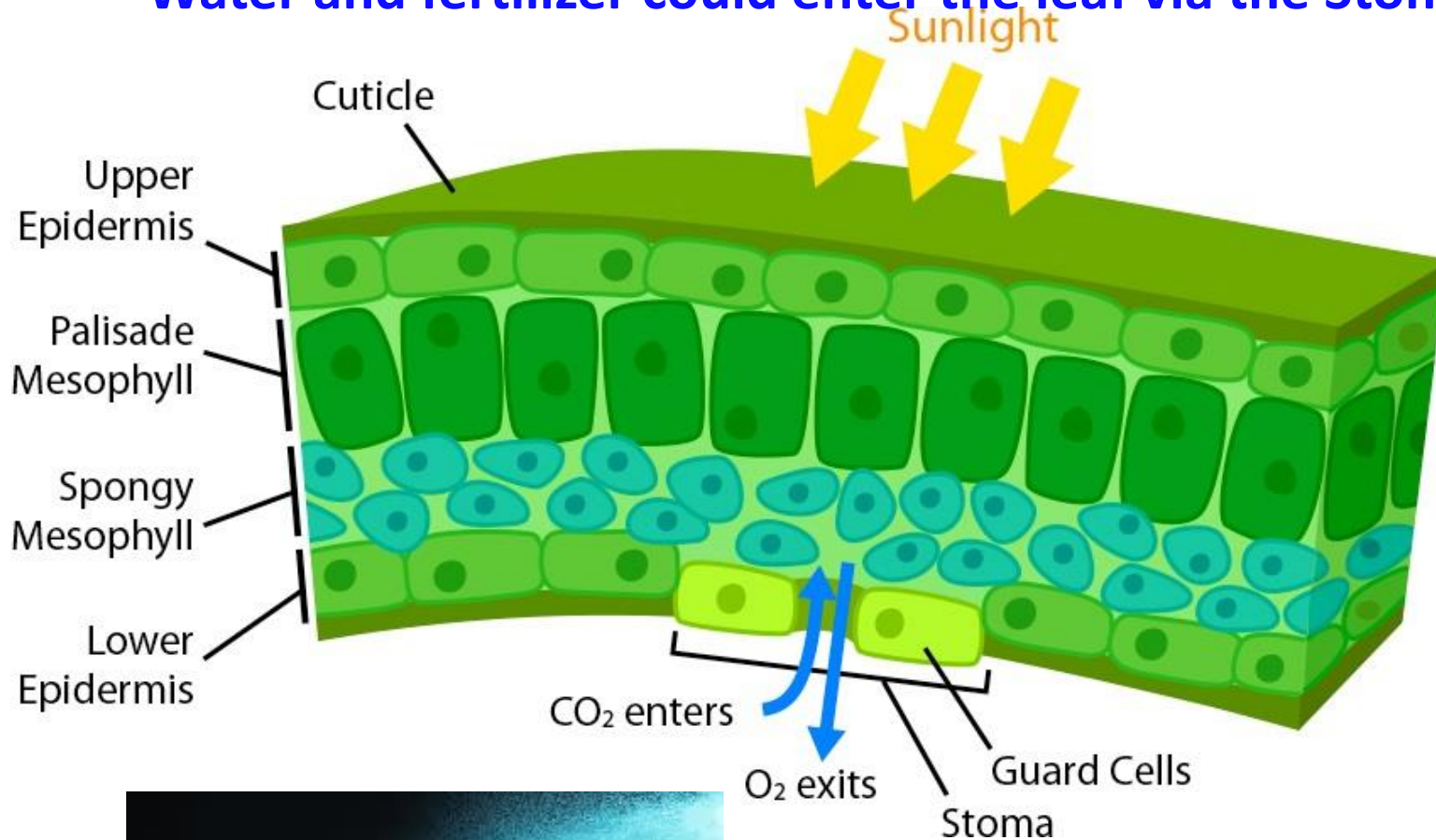
\*The perfect food for Citrus, Grapefruit, Tangerine, Orange, Lemon, Avocado, Banana, Guava, Guayaba, Papaya, Pineapple, and other Southern Fruits.

NET WT. 5 LBS. (2.26 KG.)



水和肥可以通过叶子的气孔吸收

Water and fertilizer could enter the leaf via the Stomata







**Fig 16.4** Foliar fertilizers can be effective for quickly correcting nutrient deficiency symptoms.

满29  
包邮

喷雾营养液



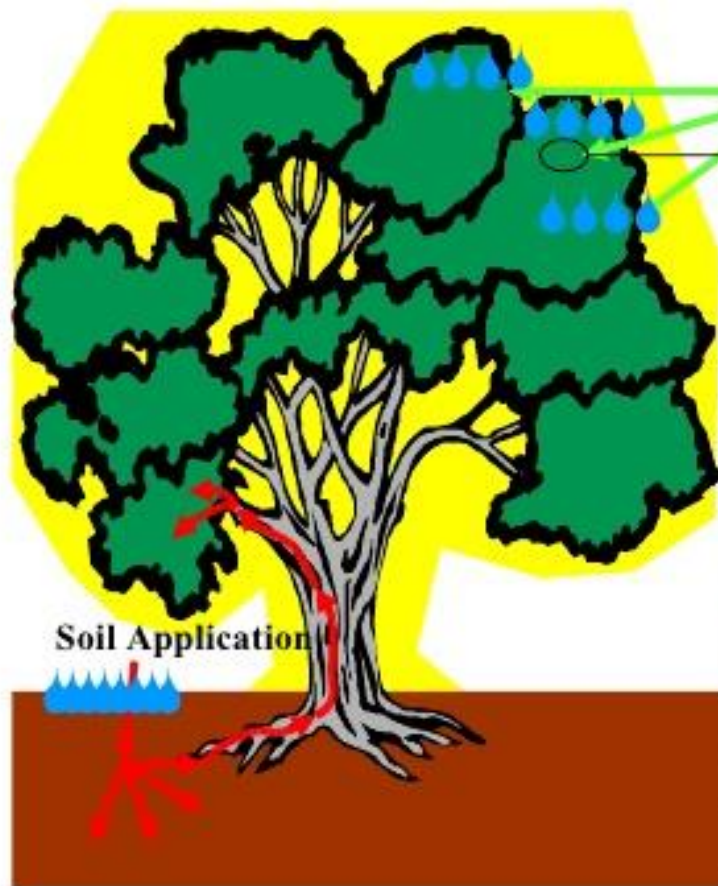
叶面肥

林夕园艺

# Advantage of Foliar Fertilization over Soil Fertilization

## Soil Application

- Ties up
- Slow acting
- Less efficient
- Leaches



Foliar Application

## Foliar Application

- Faster uptake (*within hours*)
- No tie up by soil
- More efficient (*3-100 times*)
- No leaching
- Activate plant metabolism stimulating photosynthesis, uptake of water and nutrients

**Foliar applications are faster acting and more efficient!**

# Chicken Manure

A low nitrogen 1-1-1 or 1-2-1 ratio is better.

-Ideally, the nitrogen component should be half water insoluble, or slow release, and half water soluble. Water-insoluble nitrogen breaks down slowly and feeds the tree over a period of months. Compost or horse and chicken manure are great slow release fertilizers.

**1 CU. FT. BAGS—ABOUT 40 LB**



Table 3.1. Broiler and turkey manure nutrient content as removed from the production house (lb/ton). Nutrient data complied from Barker, (1990), NRAES-132 (1999), and data compiled from South Carolina farms.

	CHICKEN				TURKEY			
	Broiler Litter	Broiler Cake <sup>1</sup>	Roaster Litter	Breeder Litter	Grower Litter	Grower Cake <sup>1</sup>	Poult Litter	Breeder Litter
Moisture (%)	21.5	40.0	22.5	33.5	26.5	45.0	20.0	22.0
TS (%)	78.5	60.0	77.5	66.5	73.5	55.0	80.0	78.0
Density (lb/cu. ft.) <sup>2</sup>	27	34 <sup>3</sup>	27	35	30	35 <sup>3</sup>	26	27
Nutrient Content (lb/ton)								
NH <sub>4</sub> -N	11	12	14	8	12	20	10	8
Organic-N	60	34	57	26	42	25	30	27
Nitrate-N	0.7	NR <sup>4</sup>	NR	NR	0.3	NR	NR	NR
Total-N	72	46	71	34	54	45	40	35
PAN								
Surface Spread	42	26	41	20	31	25	23	20
Incorporated	45	30	45	22	35	31	26	23
P <sub>2</sub> O <sub>5</sub>	69	53	72	56	64	47	43	47
K <sub>2</sub> O	46	36	46	33	39	30	27	18
Ca	44	34	42	89	37	26	26	72
Mg	8.1	7.0	8.7	7.5	6.9	5.4	5.1	4.6
S	12.1	9.2	14	8.2	8.7	6.3	6.1	7.4
Zn	0.64	0.60	0.68	0.57	0.61	0.47	0.46	0.50
Cu	0.53	0.41	0.50	0.22	0.52	0.48	0.39	0.40
Mn	0.71	0.69	0.75	0.63	0.70	0.56	0.53	0.43
Na	10	10	13	8.5	7.4	5.5	4.7	4.3
As	0.06	NR	NR	NR	0.005	NR	NR	NR

<sup>1</sup> Surface manure cake removed between flocks and prior to adding additional bedding (NRAES, 1999).

<sup>2</sup> Litter Density (lb/cu. ft.) = 77.29 - 0.643 TS (%),  $r^2 = 0.9751$  (does not include caked litter).

<sup>3</sup> Density value from NRAES (1999)

<sup>4</sup> NR = Not Reported

About 40  
Pound





# COMPOSTED CHICKEN MANURE

**BACK TO NATURE COMPOSTED CHICKEN MANURE** is 100% manure, fully composted with no filler material added. This compost can be used in various applications such as flower beds, vegetable gardens, lawns, trees and shrubs. **BACK TO NATURE COMPOSTED CHICKEN MANURE** adds organic matter and humus to regenerate low organic soils.

## DIRECTIONS FOR USE:

**FLOWER BEDS AND VEGETABLE GARDENS** – Spread a 1" to 3" layer over the area to be planted and till to a depth of 3" to 8" or lightly rake into the top 2" of soil. Water thoroughly. If your beds are already planted, spread ½" to 1" over the soil around your plants. Water thoroughly. Then resume regular watering schedule.

**LAWNS** – **EXISTING:** Spread ¼" to ½" over existing lawns and water thoroughly. **NEW:** Spread a 1" layer over entire area to be planted. Till to a depth of 3" to 5" with existing soil, mixing thoroughly, or lightly rake into the top 2" of soil. Plant seeds or lay sod and water adequately.

**TREES AND SHRUBS** – Dig planting hole at least twice the size of the root ball to be planted. Place the plant in the hole so that the top of the root ball is at least 2" to 3" above surrounding grade level. If you wish to add **COMPOSTED CHICKEN MANURE** to the soil you will be returning to the hole, mix 5 parts soil to 1 part **COMPOSTED CHICKEN MANURE** and backfill to a level even with the surrounding grade level. Be certain that the root flare at the base of the trunk is exposed when planting. If it is not exposed in the planting ball, remove enough soil to expose it prior to planting. Do not allow compost or mulch to cover the root crown of newly planted or existing trees. Whether you amend the backfill soil or not, apply a 1" layer of **COMPOSTED CHICKEN MANURE** on top of the soil from the trunk to the drip line of the plant and water thoroughly. A layer of decorative mulch may be placed on top of the **COMPOSTED CHICKEN MANURE** if desired.

**INGREDIENTS :** 100% Composted Chicken Manure

**BACK TO NATURE COMPOSTED CHICKEN MANURE** performs best when mixed with the soil. We do not recommend using this product straight or in soil-less growing mixes. This product contains no chemicals, insects, weeds, or harmful pathogens. Tannins in the compost may stain concrete or wood.



US COMPOSTING  
COUNCIL  
Seal of Testing  
Assurance

Manufactured by:  
**BACK TO NATURE, INC.**  
P.O. Box 190  
Slaton, Texas 79364  
[www.backtonaturecompost.com](http://www.backtonaturecompost.com)



PLEASE RECYCLE

# What to get from Chicken manure

## N,P,K

Chicken	Dairy Cow	Horse	Sheep	Rabbit
1.1, 0.8, 0.5	0.25, 0.15, 0.25	0.7, 0.3, 0.6	0.7, 0.3, 0.9	2.4, 1.4, 0.6

It is actually far better because it contains large amounts of organic matter, so it feeds and builds the soil while it nourishes the plants.

Sources: Rodale's All-New Encyclopedia of Organic Gardening, An Illustrated Guide to Organic Gardening, by Sunset Publishing, and the Rodale Guide to Composting.



# Calculating actual NPK from fertilizer bag on sale



50 Lb

N=18%

P=24%

K=6%

**Actual N = 0.18 x 50 Lb bag =9 Lb**

# What to get from Chicken manure

## N,P,K

Chicken	Dairy Cow	Horse	Sheep	Rabbit
1.1, 0.8, 0.5	0.25, 0.15, 0.25	0.7, 0.3, 0.6	0.7, 0.3, 0.9	2.4, 1.4, 0.6

Chicken manure has 1.1% Nitrogen:  
therefore 40 Lb chicken manure is about 0.44 Lb nitrogen

Guavas are fast growers and heavy feeders, and benefit from regular applications of fertilizer. Mature trees may require as much as 1/2 pound actual nitrogen per year. Apply fertilizer monthly if you could

# What to get from Chicken manure

## N,P,K

Chicken	Dairy Cow	Horse	Sheep	Rabbit
1.1, 0.8, 0.5	0.25, 0.15, 0.25	0.7, 0.3, 0.6	0.7, 0.3, 0.9	2.4, 1.4, 0.6

- Young tree, use 1 bag in Spring and another in June
- NO PRUNING