



# Introduction to Static Hydroponic

Vegetables

May 12, 2018

1:00 – 4:00 p.m

Northern Marianas College

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## Housekeeping

- Cell Phones Off Please
- Comfort Room to Your Right
- Water Dispenser to Your Left
- To save on paper, we can you provide electronic copy of the presentation on your flash drive

## Workshop Outline

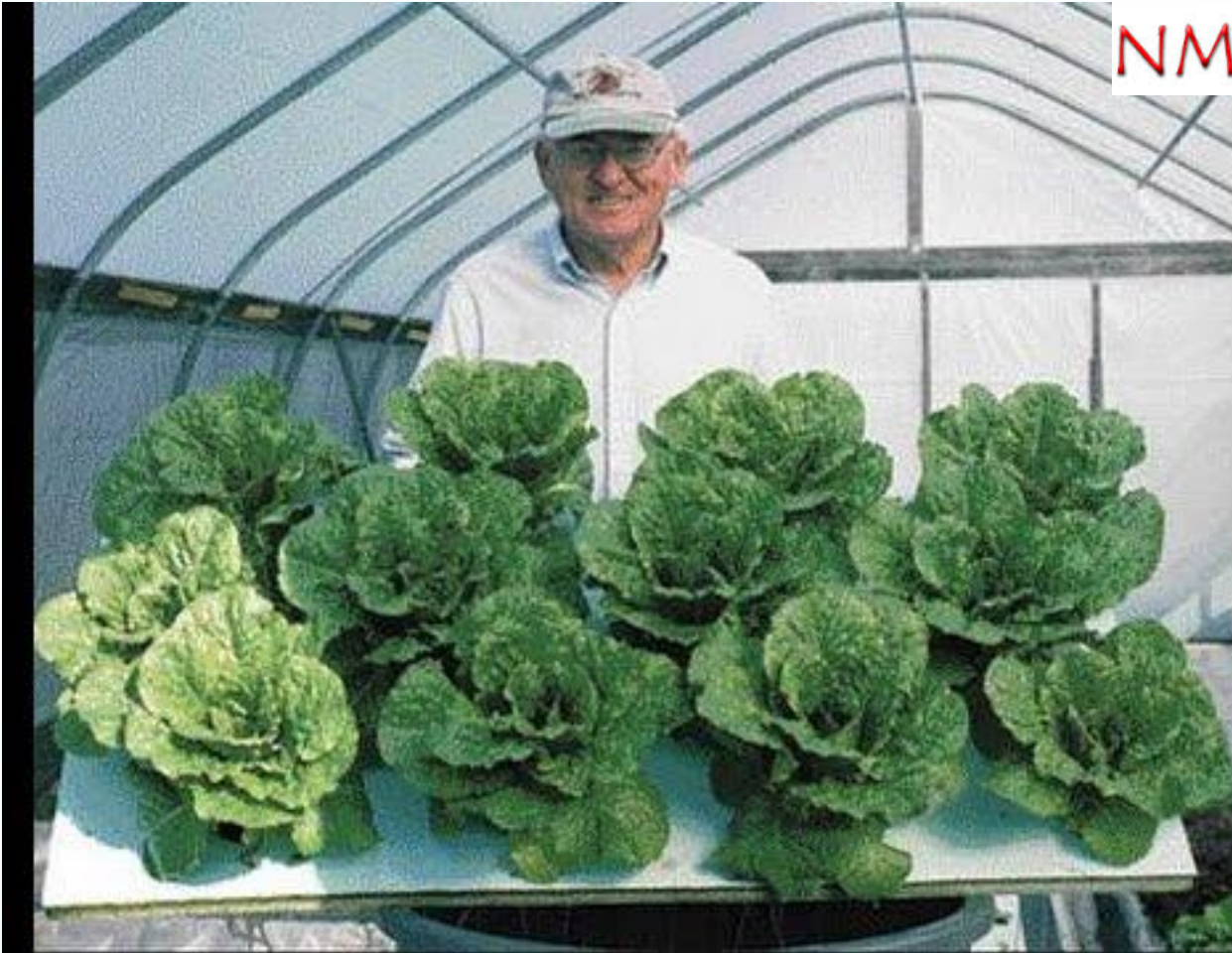
- Background
- Circulating vs. Non-circulating
- System Components
- Nutrients
- Monitoring
- Other Considerations



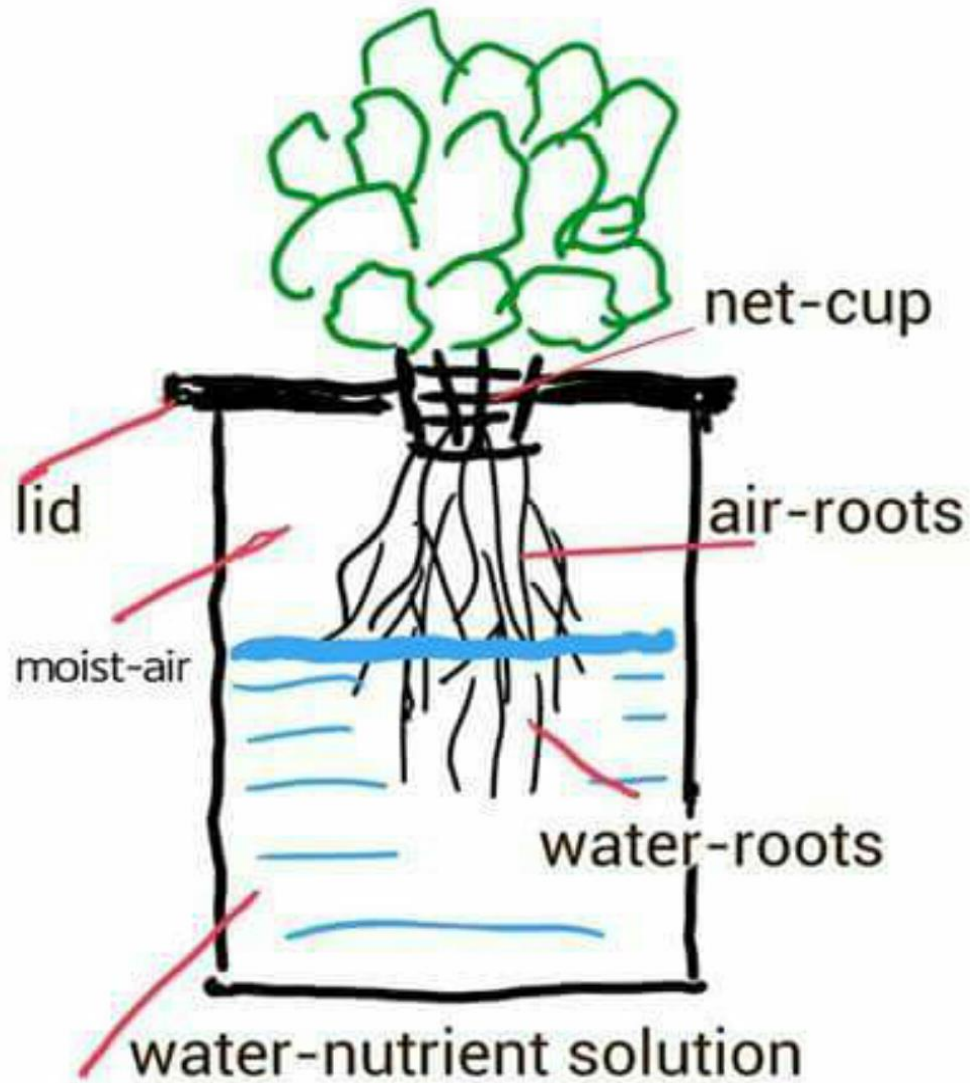
# What is hydroponics?

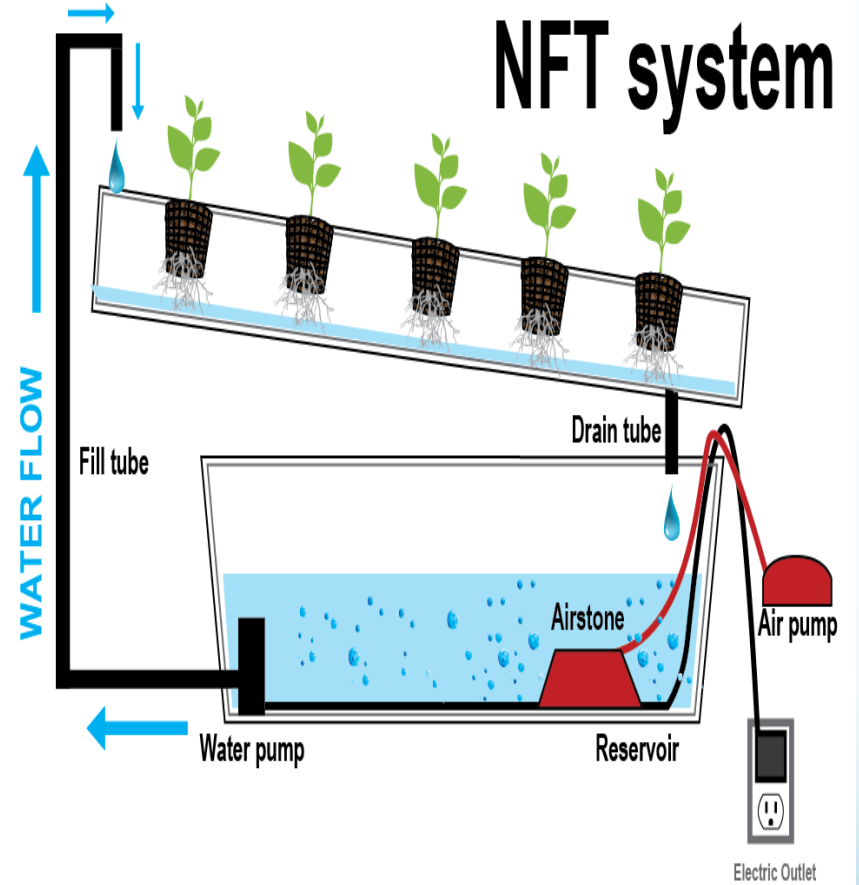
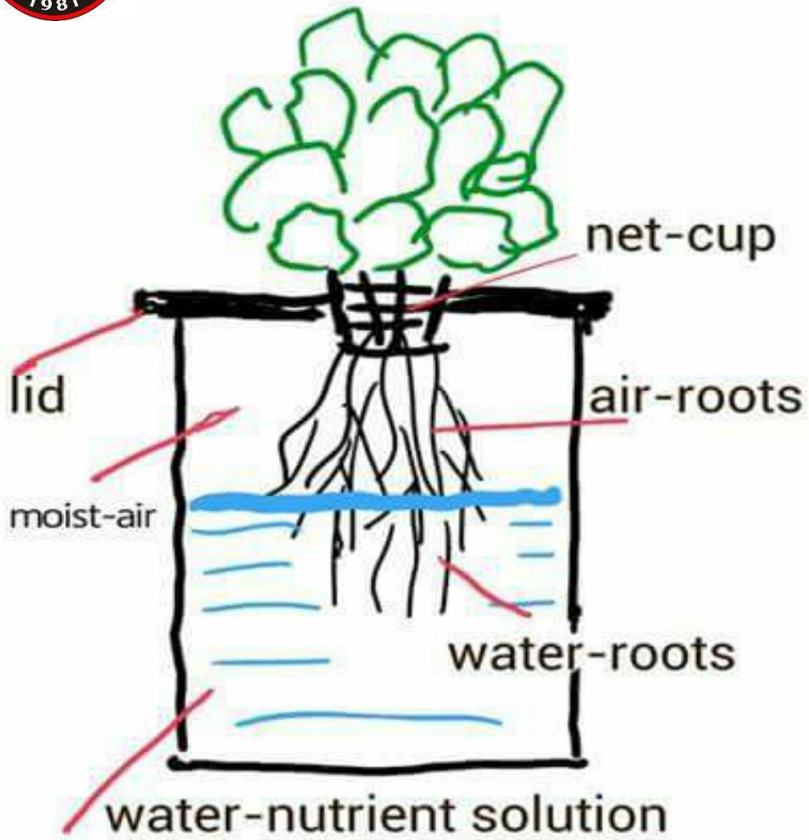
**hydroponics** - the process of growing plants in sand, gravel, or liquid, with added nutrients but without soil.





Dr. Bernie Kratky, University of Hawaii, Hilo, (Retired)





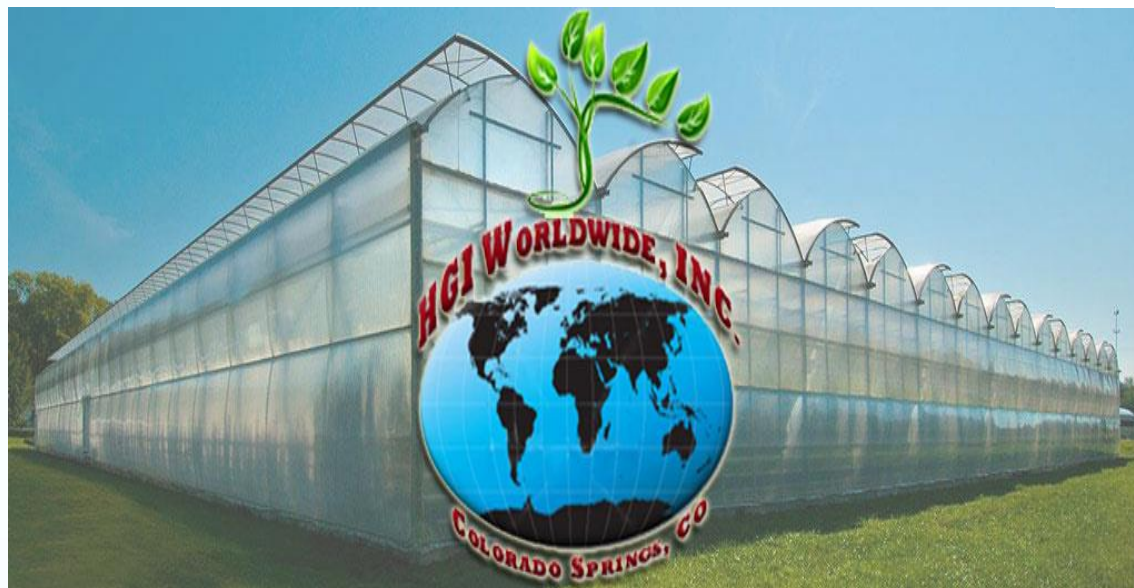


NMC  CREES





NMC  CREES



HYDR  -GARDENS



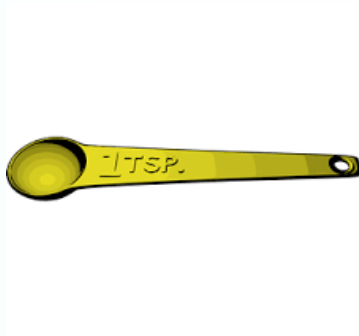


**CHEM-GRO LETTUCE FORMULA 8-15-36**  
GUARANTEED ANALYSIS

Total Nitrogen (N) .....	8.00%
Nitrate Nitrogen.....	7.50%
Ammoniacal Nitrogen.....	0.50%
Available Phosphoric Acid (P2O5).....	15.00%
Soluble Potash (K2O).....	36.00%

TRACE ELEMENTS

Boron as (B) .....	0.20%
Copper as (Cu).....	0.02%
Iron (Chelated) as (Fe)..	0.40%
Total Manganese as (Mn).....	0.20%
Soluble Manganese as (Mn) .....	0.20%
Molybdenum as (Mo) .....	0.01%
Zinc as (Zn).....	0.05%
Chlorine as (Cl), not more than.....	2.00%



## Dosage

**Lettuce Formula = 2.5 grams/gallon of freshwater**

**Calcium Nitrate = 1.9 grams/gallon of freshwater**

**Magnesium Sulfate = 1.3 grams/gallon of freshwater**



This is a 5lb bag of our specially formulated hydroponics cucumber growing food. It has the ideal balance of growing nutrients needed for healthy cucumber plants.

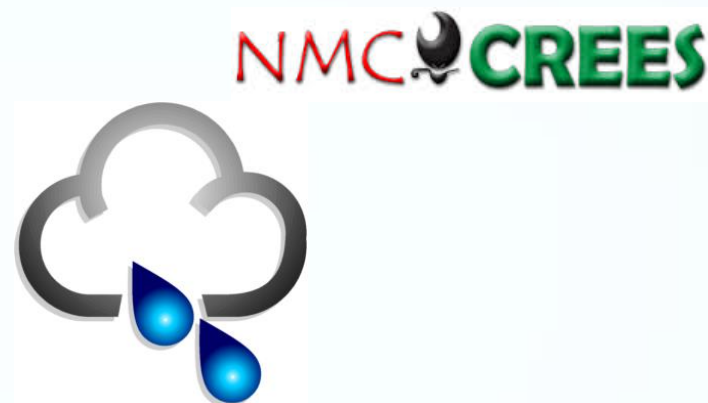
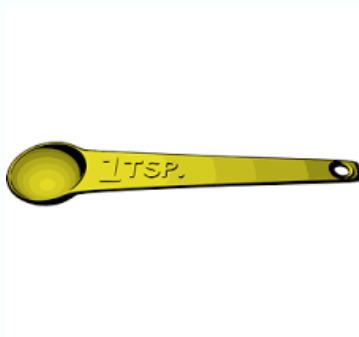
### **CHEM-GRO CUCUMBER FORMULA 8-16-36**

#### **GUARANTEED ANALYSIS**

Total Nitrogen (N) .....	8.00%
Nitrate Nitrogen.....	7.00%
Ammoniacal Nitrogen.....	1.00%
Available Phosphoric Acid (P2O5).....	16.00%
Soluble Potash (K2O).....	36.00%

#### **TRACE ELEMENTS**

Boron as (B) .....	0.05%
Copper as (Cu).....	0.05%
Iron (Chelated) as (Fe)..	0.20%
Total Manganese as (Mn).....	0.10%
Soluble Manganese as (Mn) .....	0.10%
Molybdenum (Mo) .....	0.01%
Zinc (Zn) .....	0.05%



## Dosage

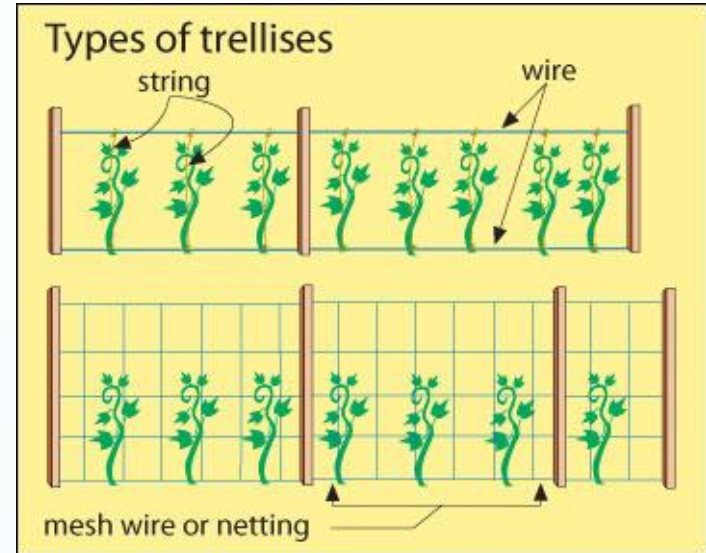
**Cucumber Formula = 1 teaspoon/gallon of freshwater**

**Calcium Nitrate = 1/2 teaspoon/gallon of freshwater**

**Magnesium Sulfate = 1/2 teaspoon/gallon of freshwater**



# Trellises





NMC  CREES





NMC  CREES







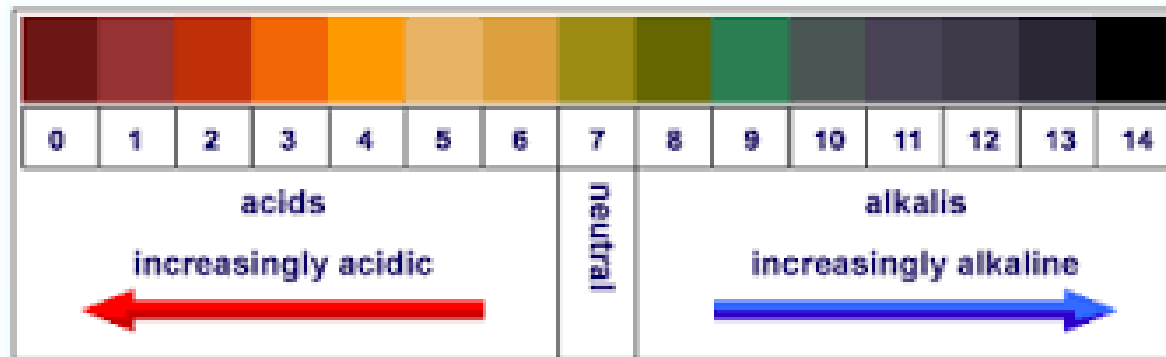




Calcium Nitrate ( $\text{CaNo}_3$ )



Magnesium Sulfate ( $\text{MgSo}_4$ )



Lettuce 5.5 - 6.50

0.8-1.2 ms/cm

# Simple PLANT DEFICIENCY Guide

## Calcium

New leaves misshapen or stunted. Existing leaves remain green.

NEW GROWTH

## Iron

Young leaves are yellow and white with green veins. Mature leaves are normal.

## Nitrogen

Upper leaves are light green where lower leaves are yellow. Bottom or older leaves are yellow and shrivelled.

OLD GROWTH

## Potassium

Yellowing at the tips and edges, usually in younger leaves. Dead or yellow patches develop on leaves.

## Carbon Dioxide

White deposits on leaves. Stunted growth, and plant die back.

## Manganese

Yellow spots and or elongated holes between veins.

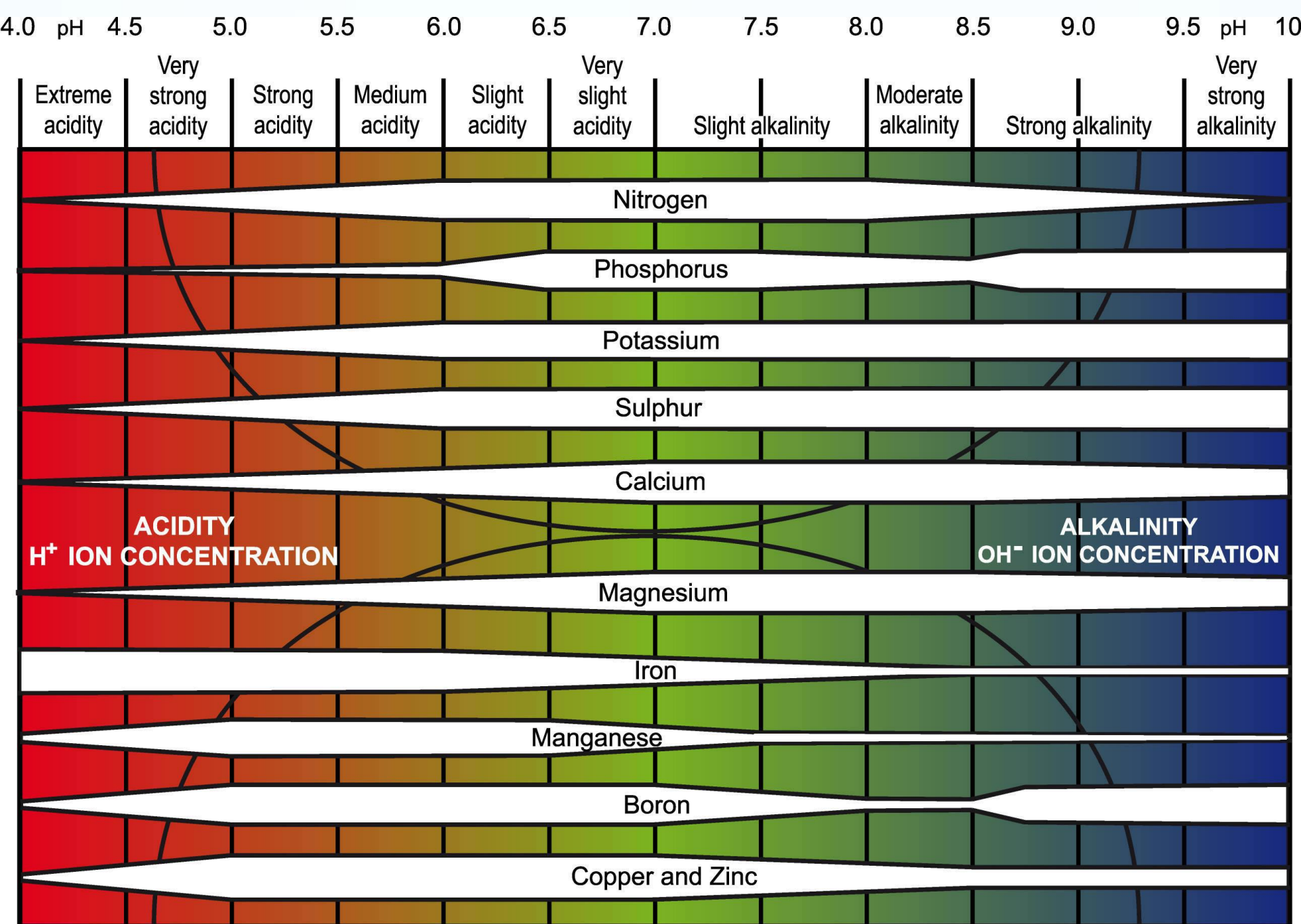
## Phosphate

Leaves are darker than normal and loss of leaves.

## Magnesium

Lower leaves turn yellow from outside going in, veins remain green.







# THE GARDEN SUNLIGHT GUIDE



**LOW SUNLIGHT**  
3 - 4 HOURS A DAY



**MEDIUM SUNLIGHT**  
4 - 6 HOURS A DAY



**HIGH SUNLIGHT**  
6 - 8 HOURS A DAY



**Asian Greens**



**Beets**



**Eggplant**



**Arugula**  
(Rocket)



**Broccoli**



**Okra**



**Cos Lettuce**



**Carrots**



**Peppers**



**Lettuce**



**Potatoes**



**Strawberries**



**Parsley**



**Radishes**



**Tomatoes**



**Swiss Chard**



**Turnips**



**Watermelon**