PLANT NUTRIENT DEFICIENCY SYMPTOMS

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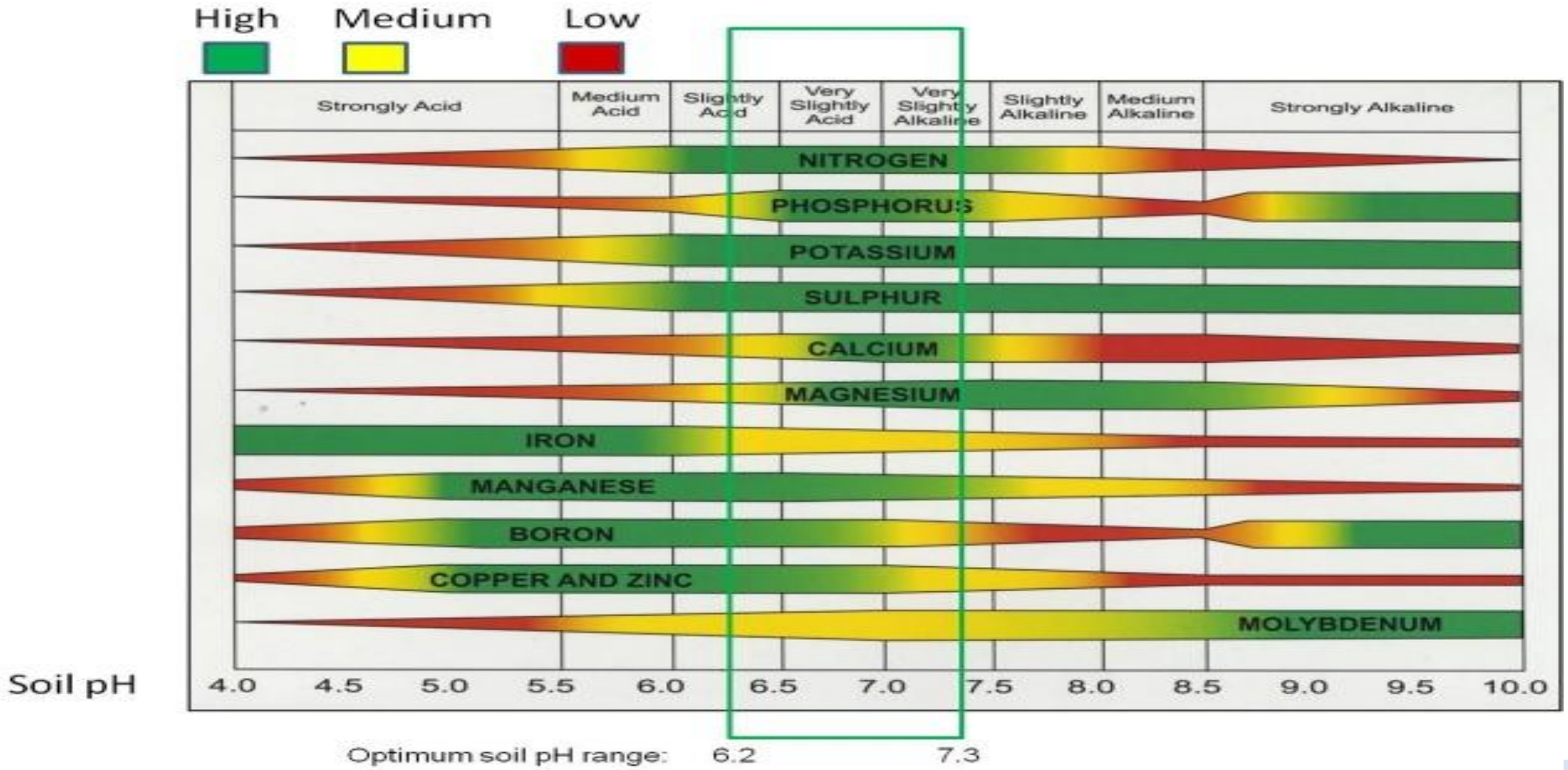
How does nutrient deficiency occur in plants

- Due to short supply of the nutrient in soil/plant
- Impaired absorption from soil due to soil condition like Acidity, salinity,
- Damaged or undeveloped roots;
- Insufficient or excessive irrigation, water logging
- Improper pH range
- Specificity on nutrients at different phenological stages
- Eg N requirement in the active growth stage
- P and K requirement in blooming and fruiting stage
- Cause stunted growth and complete crop loss if neglected
- Timely addition of supplements can avert crop loss

Field level identification of a nutrient deficiency

- Inspection of crop failure and ruling out abnormal soil conditions affecting nutrient up take like, pH, water logging, EC etc
- Symptoms associated with Pest and disease attack
- Occurrence of symptoms in immature or mature leaves or whole plant to identify mobile or immobile elements

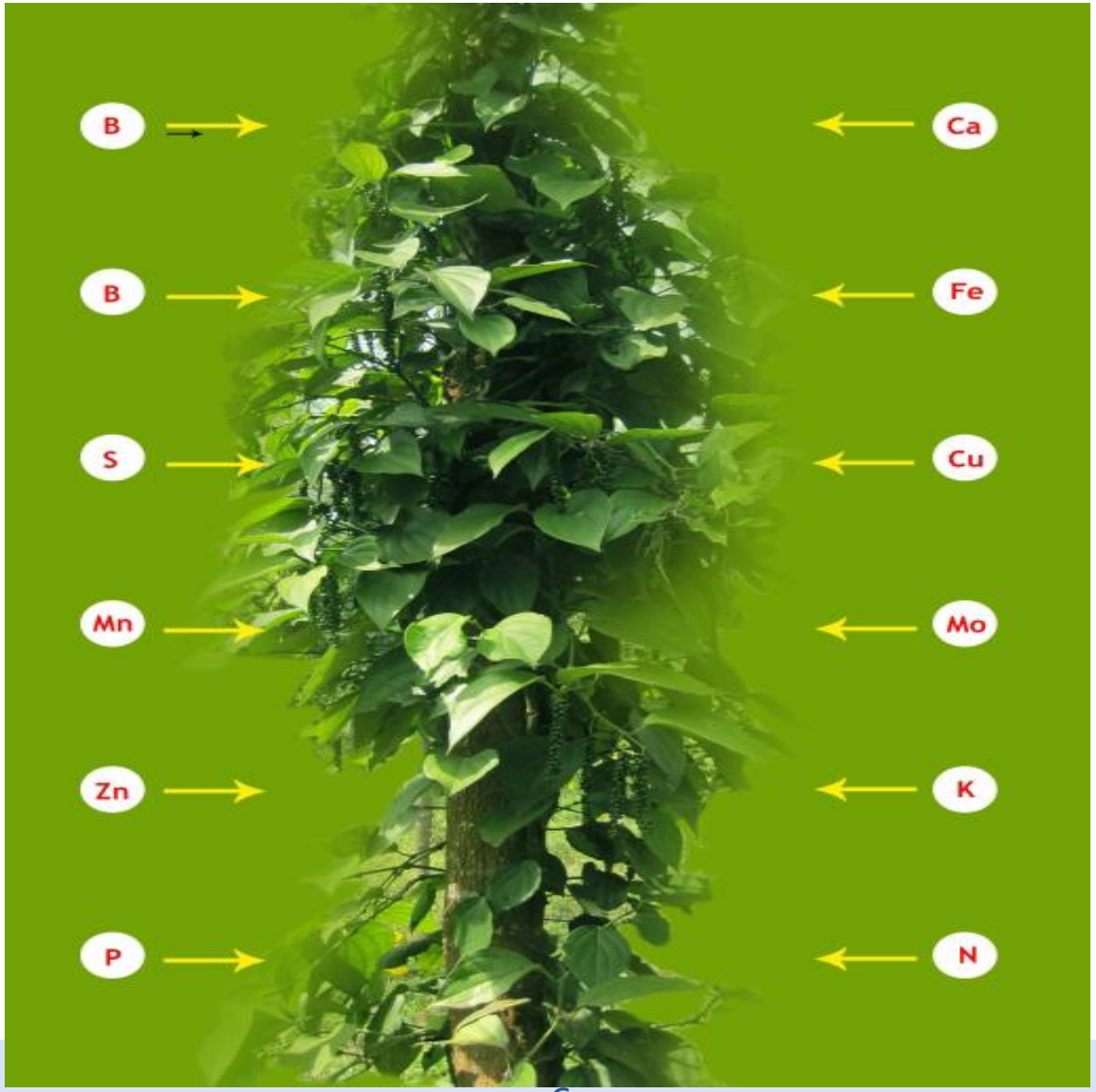
How soil pH affects availability of plant nutrients



Terminology associated with nutrient deficiency

Terminology	Definition
Stunting	Decreased growth; shorter height of the affected plant
Burning	Severe localized yellowing; scorched appearance
Chlorosis	General yellowing of the plant tissue; lack of chlorophyll
Inter veinal chlorosis	Yellowing in between leaf veins, with veins remain green
Mottling	Spotted, irregular, inconsistent pattern
Necrosis	Death of plant tissue; initially turns browns and dies
Mobile	Ability to move from one plant part to another
Immobile	Unable to be moved from one part of the plant to another
Generalized	Symptoms not limited to one area of a plant, but rather spread over the entire plant
Localized	Symptoms limited to one leaf or one section of the leaf or plant

Mobility of Nutrient in plants



Essential element	Mobility in plants
Nitrogen	Mobile, lower leaves show chlorosis first
Phosphorus	Mobile, lower leaves show deficiency first
Potassium	Mobile, lower leaves show deficiency first
Calcium	Not mobile plants: upper leaves and the growing point show deficiency symptoms first
Magnesium	Mobile lower leaves show deficiency first
Sulphur	Partially mobile upper leaves tend to show deficiency first
Boron	Not mobile upper leaves and the growing point show deficiency symptoms first
Copper	Not mobile upper leaves and the growing point show deficiency symptoms first
Iron	Not mobile upper leaves show deficiency symptoms first
Manganese	Not mobile upper leaves show deficiency symptoms first
Zinc	Not mobile upper leaves and the growing point show deficiency symptoms first
Molybdenum	Not mobile upper leaves show deficiency symptoms first

Deficiency symptoms

Nitrogen – Required mostly in the

Active growing stage

Symptoms

- Pale green colour of the younger leaves and yellow colour of old leaves
- In advanced stages poor secondary growth or stunted growth

Banana

- Pale yellow colour of younger leaves which deepens on older leaves

Phosphorus

Symptoms-general

- Mobile symptoms first appear in older leaves
- Bronzish, purplish, or reddish coloring in the lower parts of mature foliage.
- In severe starvation brownish dotting and necrosis of leaves occur

Taro – Symptoms

- Yellowish and brownish necrotic older leaves

Potassium

General

- Partially mobile and symptoms occur in younger leaves
- Pale-green to dark-yellow new foliage of younger leaves
- Severe cases in some crops, foliage may roll and turn purplish

Banana

- Leaf-margin yellowing, rotting, scorching, Crinkling, curling, shrinking, necrosis
- Symptoms irreversible

Calcium

General

- Weak growing points are a distinguishing symptom
- Tip burns
- Malformation of newly-grown parts
- Blossom-end rots
- Flower drops
- Small fruits

Banana

- Weak growing points are a distinguishing symptom

Magnesium

General

- Mobile within plants, lower leaves show deficiency first
- Leaves show yellowish, bronze or reddish color
- leaf veins remain green
- Interveinal chlorosis

Pepper

- Interveinal chlorosis

Sulphur

General

- Symptoms resemble those of Nitrogen
- Usually seen in upper younger leaves
- Chlorosis of the younger leaves
- In severe cases entire plant can be chlorotic and stunted
- Tapioca- Chlorosis of young leaves

Micronutrients

Iron –General Symptoms

- ❖Not mobile within plants Upper leaves show deficiency symptoms first
- ❖Interveinal chlorosis progressing over the entire leaf
- ❖Severe deficiency leaves turn entirely white
- ❖Factors contributing to Fe deficiency include imbalance with other metals, excessive soil P levels and high and low soil pH, wet and cold soils

Cardamom

Manganese

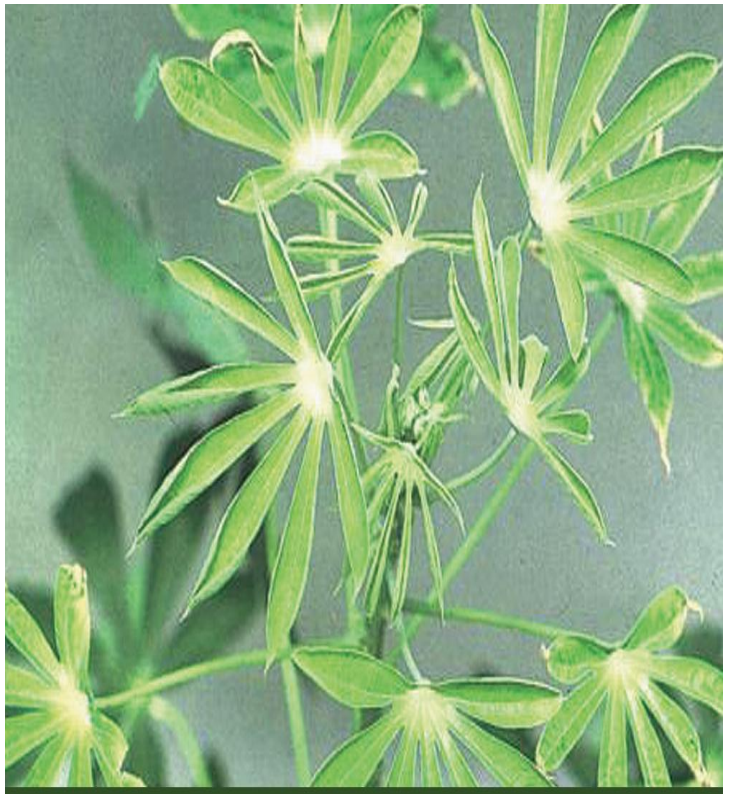
General Symptoms

- Not mobile within plants
- Upper leaves show symptoms first
- Most often on high organic matter soils
- Soils with neutral to alkaline pH
- Low native Mn content
- Interveinal chlorosis
- Appearance of brownish black specks

Copper

General symptoms

- Not mobile within plants
- Upper leaves and growing point show deficiency symptoms first
- Organic matter rich soils more prone to deficiency
- Reduced leaf size, white tip
- Uniformly pale yellow leaves
- Leaves may lack turgor and may develop a bluish green cast, become chlorotic and curly
- Flower production retarded



Zinc

General symptoms

- ❖Not mobile within plants upper leaves and the growing point first show deficiency symptoms
- ❖Death of meristematic tissue
- ❖Deformed new leaves
- ❖Interveinal chlorosis
- ❖Occurs most often on alkaline soils and soils with high available P levels

Boron

General symptoms

- Immobile within plants, upper leaves and the growing point show deficiency symptoms first
- Reduced leaf size and deformed new leaves
- Interveinal chlorosis, if deficiency is severe
- May cause distorted branches and stems
- Related to flower and or fruit abortion, poor grain fill and stunted growth
- May occur on very acid, sandy textured soils or alkaline soils

Molybdenum

General symptoms

- Not mobile within plant, upper leaves show deficiency symptoms first
- Interveinal chlorosis
- Wilting
- Marginal necrosis of upper leaves
- Occurs principally on very acid soils, since Mo becomes less available with low

Reference
Soil Fertility Handbook, 2018,Department of Agriculture &Farmer's Welfare, Thiruvanathapuram,1-256


Thank You