



Nutritional Disorders in Citrus: Identification and Management

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The citrus fruit crop is widely grown and is primarily grown in tropical and subtropical areas of the world. The family Rutaceae includes the genera Citrus and closely related genera Fortunella, Poncirus, Eremocitrus, and Microcitrus. Citrus is the most frequently cultivated of these genera and is famous for producing fruits including oranges, mandarins, lemons, limes, and grapefruits. They can be grown successfully even up to an elevation of 900m above mean sea level. A well-drained loamy soil of uniform texture upto depth of 2-3 m having good fertility is considered ideal for its cultivation. These trees are demanding feeders and are prone to many disorders related to mineral nutrition. Its species are also sensitive to an excess of certain elements in the soil or the irrigation water, especially to an excess of chloride, sodium, boron and manganese, which can injure the trees.

Nutritional Disorders in Citrus

Nutritional disorders are a result of chemical imbalances in plants brought on by a persistent lack of or surplus of chemical components. Nutrient deficiency symptoms occur when a crucial component for plant growth is not present at the level necessary for growth and development. A decline in citrus productivity could be brought on by nutritional issues. Granulation, Creasing, Exanthema, Leaf mottling and Rind Splitting are the main nutritional disorders of the Citrus.

(1) Granulation (Dry Juice Sacs)

Granulation is known as different names, e.g. dryness, kaosan and crystallization. This disorder is first reported from California in 1943.

Symptoms: Fruit's sugars and organic acids quickly deteriorate as a result of granulation, and disorganised juice sacs turn hard and even lose their edible value. Flat and Insipid taste and assume a granular texture occur. Granulation was thus becoming a danger to the growth of the citrus industry.

Nutritional Cause: High Ca, Mn and Low P, B

Management:

- Grown for tolerant cultivar.
- The incidence of granulation could be reduced to 50 per cent by applying two to three sprays of NAA (300 ppm) in the months of August, September and October.

(2) Creasing

Creasing, also known as albedo breakdown, is a physiological disorder that affects the albedo (white part) of citrus fruit. Creasing caused by excessive loss of cohesion between albedo cells (the white layer under the skin) stressed by expansion of the pulp.

Symptoms: Citrus creasing is a disorder characterized by multiple cracking in the albedo, resulting in weak rind. Such fruit is not packed. Irregular grooves & furrows in the rind occurred. Fruit skin affected. Colorless albedo raised.

Nutritional Cause: Multi-nutrient (Low Ca, Mg and Higher N, P, K)

Management:

- Creasing can be reduced with pre- harvest sprays of calcium as well as GA₃.
- Spraying of citrus fruit with 1% or 2% Ca(NO₃)₂ or CaCl₂ throughout fruit development from late November to early May increased the proportion of unaffected fruit from 30 to 65-80 %.

(3) Exanthema/Ammoniation or Die back

Symptoms: Dieback starts from twigs. Twigs can develop blister-like pockets of clear gum at nodes. Wilting of terminal shoots followed by death of leaves and finally tree dies. Young shoots may develop into branches which appear curved or “S-shaped.

Nutritional Cause: Deficiency of Cu and Excess N.

Management:

- Use of resistant rootstocks for propagation is also useful.
- Good cultural practices, improvement in soil fertility and drainage, control of insect pests, nematodes, etc. may be useful to minimize the incidence of decline.
- Apply copper sulphate @ 500 g/tree as basal + 2 foliar sprays of copper sulphate at 500 g/100 lit of water twice at 30 days interval before flowering.

(4) Leaf mottling

History: Leaf mottling of citrus was first noted in 1957 in Batangas, Philippines.

Symptoms: Yellow and green patterns on old leaves. Initial stage- parts adjoining mid rib & veins remain green. Young emerging leaves smaller, chlorotic and shoots dieback.

Nutritional Cause: Deficiency of Zinc

Management:

- Used disease free planting material for establishment of orchard.
- Use an annual foliar spray zinc sulphate 0.5% on the spring flush leaves when they are about two-thirds their full size.

(5) Rind Splitting

Symptoms: Radial or longitudinal cracking occurs lengthwise on the fruit. Sometimes fruit splits completely from distal to proximal end. More severe in thin rind mandarins.

Nutritional Cause: Deficiency of Ca, B and Excess N

Management:

- Application of recommended dose of fertilizer in 3 or 4 splits.
- Apply light irrigation at frequent intervals.
- Select stocks and varieties that resistant cracking.





Conclusion

Citrus is a micro nutrient loving plant. Its need to proper irrigation and fertilizers. Many disorders occur due to nutrient deficiencies and toxicity. As per recommended providing fertilizers and micronutrients these disorders can be avoided.

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Granulation	Creasing
	
Exanthema	Rind Splitting