

ARTICLE ID: 58

Nutritional disorder and its remedies of fruit crops

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Introduction

Nutritional disorders are basically physiological disorders in the plants that affect productivity as well as quality of fruits. Disturbance in the plant metabolic activities resulting from an excess or deficit of environment variables like temperature, light, aeration and nutritional imbalances results in disorders. In fruits crops, the deficiency of micronutrient causes many more disorders than that macronutrients. Nutritional disorders have become widespread with diminishing use of organic manure, adoption of HDP, use of root stocks for dwarfing, disease and salt tolerance, unbalanced NPK fertilizer application and extension of horticulture to marginal land. To get high quality fruits and yields, micronutrient deficiencies have to be detected before visual symptoms are expressed.

Type of disorder

1. **ABSOLUTE DEFICIENCY**- Deficiency due to the absence of a particular element or low availability in the soil
2. **INDUCED DEFICIENCY**-Nutrient deficiency due to other factors which limit the availability or the uptake or translocation of nutrients.

Plant Nutrient Deficiency Terminology

Burning: severe localized yellowing; scorched appearance.

Chlorosis: general yellowing of the plant tissue; lack of chlorophyll.

Generalized: symptoms not limited to one area of a plant, but rather spread over the entire plant.

Immobile nutrient: not able to be moved from one part of the plant to another.

Interveinal Chlorosis: yellowing between leaf veins, yet veins remain green.

Localized: symptoms limited to one leaf or one section of the leaf or plant.

Mobile nutrient: able to be moved from one plant part to another.

Mottling: spotted, irregular, inconsistent pattern.

Necrosis: death of plant tissue; tissue browns and dies.

Stunting: decreased growth; shorter height of the affected plants.

Deficiency symptoms

Deficiency symptoms seen on different plant part like leaves, shoots, roots, fruits, seeds and whole plant.

Symptoms on older leaves: N (lower leaves yellow, stunted growth and late flowering), P (lower dark green leaves, stalk small, abundant anthocyanin pigments), K (Interveinal chlorosis, necrotic spots small or absent), Mg (lower leaves chlorotic, large necrotic spots, severe defoliation) and Zn (leaves thicker and leathery and small (little leaf).

Symptoms on younger leaves: Ca (young leaves hooked, dieback at margins and tips), B (leaves twisted, dieback from base), Cu (young leaves wilted, stem tips weak and no chlorosis), Mo (small necrotic spots present), Fe (veins green) and S (veins chlorotic).

Disorder

Aonla-Internal fruit necrosis: B deficiency

Symptoms:

- Browning of inner most part of the mesocarpic tissues, Corky & gummy spots on fruit, Francis & Banarasi susceptible, Chakaiya, NA-6,7 free from necrosis.
- **Control:** 3 sprays of borax @ 0.6% fortnightly interval from sep.- oct.

Citrus- Rind splitting: Deficiency of K and Ca

Symptoms:

- Splitting may be radial or transverse, More severe in thin rind mandarins.
- **Control:** use K fertilizer and calcium to minimize fruit splitting.

Citrus- Leaf mottling or Frenching: Zn deficiency Also known as 'foliocollosis'

Symptoms:

- Initial stage- parts adjoining mid rib & veins remain green, Severity- chlorotic, small, narrow, pointed leaves.

Control: foliar spray of Zinc sulphate @ 0.5%

Citrus- Exanthema or dieback: Cu deficiency

Symptom:

- Wilting of terminal shoots followed by death of leaves, dieback starts from twigs and gum pockets develop on fruit.

Control: 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.

Citrus- Albedo breakdown or creasing: Multinutrients

Symptoms:

- Irregular grooves & furrows in the rind, the innermost spongy white layer of the rind sometimes separates from the outer surface of the fruit segments.
- More on shaded side of fruit, seen in naval oranges

Control: preharvest spray of Ca

Avocado- leaf burn: sodium or chloride accumulation

Symptoms:

- Chloride/ tip burn- scorch start at the tips then down the blade or margin, sodium scorch- necrotic or scorched spots near the margin leaf and leaf burn is more in south direction of plant than north direction.

Control: Irrigation of orchard with rainwater that stored in tanks. Rainwater contains almost no chloride.

Grape- blossom or calyx end rot: Ca deficiency

Symptoms:

- Black sunken spot at the blossom end of the berries. Spreads with watersoaked regions on berry.
- **Control:** spray of 1% calcium nitrate at the time of berry development

Grape- Interveinal chlorosis: Mg, Zn, or Fe deficiency

Symptoms:

- The leaves turn yellow and the entire shoot become yellow to yellowish green area in between the veins become yellowish.
- Control: Two spraying of 0.2% ferrous sulphate one before bloom and second after fruit set.

Grape- Bunch stem necrosis: Ca deficiency

Symptoms:

- Dead areas appear on the stems of panicles
- drying of clusters beyond the dead area

Control: fertilization with Ca

Grape- Bud, flower and berry drop: N deficiency

Symptoms: Also called 'Coulure' Accompanied by 'shatter' stage, Flower bud drop before fruit set and Panicles dry.

Control: proper C/N ratio should be maintained by the use of balance fertilizer

Grape- Hen and chicken disorder: Boron deficiency

Symptoms:

- Many shot berries surround a bold berry, shot berries reduced in size but of normal shape.

Control: foliar spray of 0.2% boric acid a week before bloom and another at full bloom

Grape- Millerandage or shot berries: B deficiency

Symptoms:

- Berries of grape bunch are not uniform in size some berries are full size others remain small and seedless. Shot berries are small, spherical or oblate & seedless, major problem in Beautyseedless & Perlette.

Control: application of Borax 0.6% before flowering.

Grape- Water berries and pink berries: excess N

Symptoms:

- Affected berries become watery, soft & lack normal sugar, colour & flower.

- Some berry are become pink colour at random.

Control: application of K fertilizer during berries growth period & Ca sprays after berry softening

Litchi- fruit cracking: Ca or B deficiency

Symptoms: Symptoms seen final stage of fruit development. Skin become hard & inelastic and thin skin- less prone to cracking.

Control: foliar spray with Calcium nitrate 0.5-1% and borax 0.4-0.8% during fruit growth

Pomegranate- fruit cracking: B and Ca deficiency

Symptoms:

- Longitudinal cracking where crack starts at stylar end.

Control: spray 0.8% borax

Mango- soft nose: Ca deficiency

Also called 'tip pulp', 'insidious fruit rot' and 'yeasty fruit rot'

Symptoms:

- Breakdown of flesh towards apex before ripening, bitter in taste
1st observed in Florida in Mulgoa

Mango- Leaf scorching: K deficiency & chloride toxicity

Symptoms:

- Scorching of old leaves at tip or margin, common in saline or brackish soils
- Foliage give burnt look

Control: use K_2SO_4 instead of MOP.

Internal necrosis: B deficiency

Symptoms:

- Browning of pulp
- Gummy substance exudate from fruit

Control: foliar spray with 0.5% Borax at marble stage.

Black tip: CO₂ and SO₂ gases

Symptoms:

- Small etiolated area at distal end which turn black

Control: 0.6% borax or 0.8% caustic soda twice march- April

Conclusion

- ❖ Widespread nutrient deficiencies and deteriorating soil health are causes of low nutrient use efficiency, productivity and profitability.
- ❖ Adoption of site-specific balanced and integrated nutrient management involving major, secondary and micro nutrient, organic manures, biofertilizer and amendments.
- ❖ Utilizing all indigenously available nutrient sources to reduce dependence on imports.
- ❖ Developing new efficient fertilizer products / approaches.
- ❖ Effective soil testing service to back up precise fertilizer use.
- ❖ Creating awareness amongst farmer on benefits of balanced fertilization.

