

ROLE OF ZINC IN HORTICULTURAL CROPS

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Out of sixteen essential plant nutrients required for plant growth. Seven are required in much smaller quantities and as such they are termed as micronutrients e.g., manganese, copper, zinc, molybdenum, boron, iron and chlorine. In micronutrients zinc is play a very important role in horticultural crops. The maximum agricultural multiple cropping with high yielding varieties of crop is one of the most important causes of removal of zinc from the soil. Now a days it become more important as regards to increase and conserve fertility and productivity of soil under deficiency of zinc, the growth of plant is hampered, the plants are subjected to attack by disease and the yield of the crops decrease accordingly. Zinc is very much essential for the growth, development and reproduction of the horticultural plant. Is it essential for the synthesis of tryptophan, which is precursor of IAA. Several physiological disorders have been reported produced by zinc deficiency in horticultural crops.

Source of zinc: Zinc found in soil in very small quantities and largely it results from concentration and addition from growing plant and added residue. Numbers of fertilizer was also good source of zinc.

Sr. No.	Name of fertilizer	Zinc	Solubility
1.	Zinc sulphate	23 and 35	Soluble
2.	Zinc chloride	45	Low soluble
3.	Zinc oxide	67-80	Very low soluble
4.	Zinc	14	Very low soluble
5.	Zinc phosphate	40.9	Soluble
6.	Basic zinc sulphate	50-55	Very low soluble
7.	Kirti zinc (Zinc sulphate)	21	Soluble
8.	Zinc-ammonia complex	10	Soluble

Function of zinc in horticultural plants: The specific role of Zn in growth and development of plants is not known. This nutrient is an important component of various enzymes like carbonic anhydrase, alcohol dehydrogenase, alkaline phosphates, carboxy petidase that are responsible for driving many metabolic reactions in all horticultural crops. Growth and development would stop if specific enzymes were not present in plant tissue.

– Zinc is essential for the synthesis of tryptophan, which is precursor of IAA.

– It has been found essential for carbon dioxide evolution and utilization, carbohydrate and phosphorus metabolism and synthesis of RNA and auxins.

– It has a positive role in photosynthesis and nitrogen metabolism.

– It is required for seed production and synthesis of chlorophyll.

Deficiency symptoms of zinc in horticultural crops:

The horticultural plants fail to develop normally when they are deficiency in Zn and certain characteristic deficiency symptoms will appear. The examples of Zn



deficiency are little leaf in mango, cashew, litchi, mottle leaf or frenching of citrus, rosette of apple, pecan, vines and stone fruits, yellow for walnut and bronzing of pecan.

– Fruit plants leaves becomes small and narrow distorted with interveinal chlorosis, which is recognized even in the shoots.

– Plants show rosetting and premature shedding.

– Leaves margins are distorted, become, twisted or wavy which later curl and look sickle shape.

– Shortening of internodes and stunted growth of plants and plants are severely dwarfed and bushy.

– Flowering, fruiting and maturity can be delayed and fruit size is greatly reduced.

Corrective measures of zinc deficiency: Several sources can supply Zn when needed. Zinc sulfate is usually used to supply the needed amount of Zn when dry fertilizer materials are used. This material can be either broadcast and incorporated before plantation or used in a starter fertilizer. It blends well with other dry fertilizer and organic materials.

The zinc deficiency may be corrected by application of zinc sulphate (10-30 kg/hectare) in soil before seed sowing and plantation of crops. Foliar spray (0.5% SO_4) coupled with half the content of lime is quite beneficial. In alkaline soil, it should be supplied with sulphate or ammonium sulphate. It is reported that the best time of zinc application is before of seed sowing and plantation of crop.

Physiological disorder in horticultural crops: Different physiological disorders are developing due to Zn deficiency in soil.

Rosette of apple: It is also called little leaf caused due to zinc deficiency. Yellow mottling of leaves, reduction in leaf size with rosette appearance and die back of the affected branches are important symptoms of physiological disorder.

Control measures:—Proper nutritional management in orchard by application of decomposed organic material.

- Foliar spray (0.5% SO_4) coupled with half the content of lime.

- Application of zinc sulphate (30-50 g/plant) with 25 kg compost and 1 kg neem in root zone.

Dwarfing in apple: Dwarfing of the shoot growth marks zinc deficiency and the internodes become progressively shorter. Leaves become small, narrow and may be accompanied by interveinal chloroses. Fruits are severely dwarfed.

Control measures:Foliar application of 1.3 kg ZnSO_4 + 670 g slaked lime in 450 liters water.

Frenching of citrus: Initially, yellow spots development between the veins. Leave become progressively smaller and develop chlorophyll at the basal and mid rib. In acute cases bushy appearance of trees.

Control measures:— Spray of 1.3 kg ZnSO_4 + 670 g slaked lime in 450 liters water is sufficient for 100 trees. It should be sprayed in February and again in October.

- Proper nutrient management with organic matter.

Interveinal chlorosis of grape: This nutritional disorder caused by iron, magnesium or zinc deficiency. Leaves show chlorosis or necrosis and become leathery.

Control measures:— Correct this disorder may be a spray of 0.2% solution of FeSO_4 + ZnSO_4 + MgSO_4

- Grape should not be grown on soils containing more than 0.3 per cent salts.

Little leaf of litchi: Leaves become small and narrow distorted with interveinal chlorosis. Bronzing of leaflets, small leaflets and small fruits are development due to zinc deficiency in plants.

Control measures:

- Foliar spray (0.5% SO_4) coupled with half the content of lime.

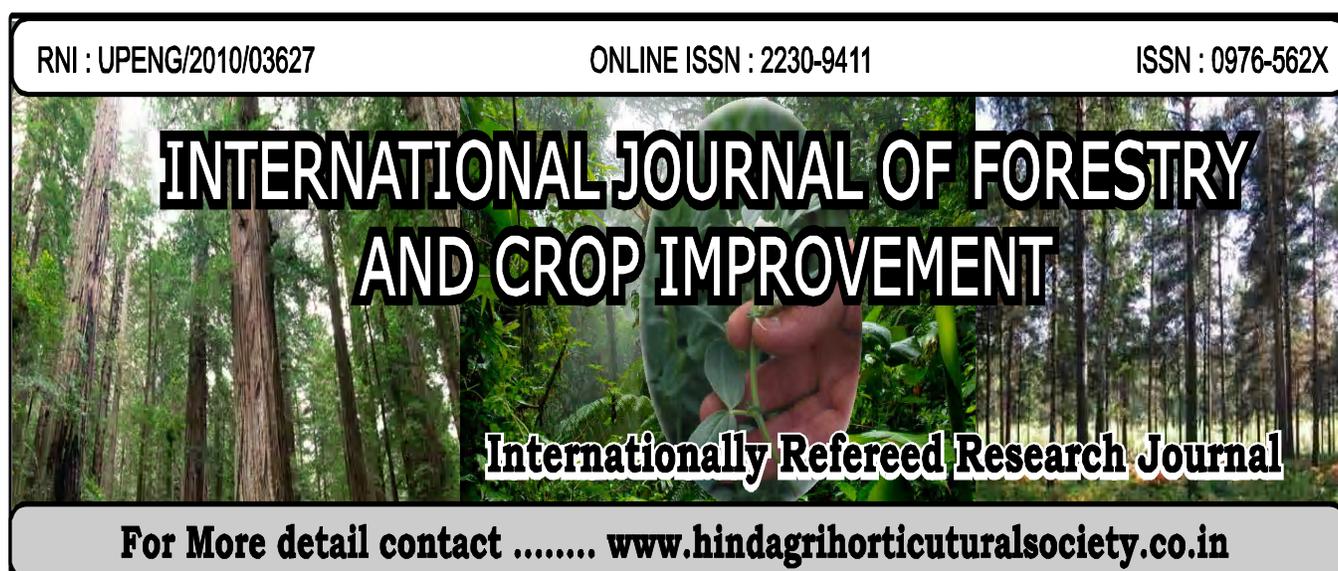
- Use of zinc sulphate with organic matter at time of planting.

Rosette in pecan-nut: This physiological disorder caused by deficiency of zinc. Formation of leaves bunch near the tips of branches. The leaves are rusty, narrowed, twisted and the growth of the branches is completely halted. In severe cases the shoots also show a die back from the tips.

Control measures:— Control rosette formation by appropriate application of zinc sulphate to the soil of the rate of 300 to 500g per tree a year to begin with organic matter.

- ZnSO_4 should be applied mixed with slaked limed in the proportion 1:05:: ZnSO_4 : Slaked lime.

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