

Integrated nutrient management in mango

Mango, the 'King of Fruits' (*Mangifera indica* L) is one of the most significant fruits produced in the tropics and sub-tropics of the globe. In mango, many problems are associated with fruit set, yield and quality due to inadequate nutrient management. Macronutrients as well as micronutrients are found equally essential for plant growth and development. Micronutrients play key role in enzymatic activities, assimilates synthesis and hormone synthesis. Their acute deficiencies some time, poses problems. Bio-fertilizers are used in live formulation for mobilization and availability of nutrients particularly by their biological activity which helps in beneficial soil microorganism built up, thereby improving soil health. The use of organic manures, bio-fertilizers, micronutrients and recommended dose of fertilizers in mango orchard helps to enhance fruit production. This article highlights the details about integrated nutrient management in mango.

Planting of new orchard

Planting of desirable mango grafts is to be done in previously dug (in May month), exposed and filled (mixture of top fertile soil, 10-20 kg well decomposed compost and 2 kg single super phosphate) pits of 1 m × 1 m × 1m size. Planting of grafts is to be generally done with a ball of earth at the time of onset of monsoon in moderately rainy areas and on the cessation of rains in the heavy rainfall areas. In conventional method, mango plants are normally planted 8-10 m apart. Whereas, in high density planting (HDP) system, plants are planted at 5 m × 5 m. HDP orchards requires regular pruning and canopy management to keep the orchard manageable and for better light interception inside the plants. Planting is to be done preferably at the evening, watered immediately and staked. The graft union point should be 20 cm above the soil surface to prevent entry of disease carrying organisms into the graft union. In newly planted mango orchard, legume, pulses, vegetables, groundnut and sunhemp crops can be sown as intercrops and green manuring crops, initially. Protective irrigations are to be

given to the orchard as per need, age of plant and agro-climatic conditions. Basin should be mulched with organic mulch in summer.

Nutrient management for newly planted mango orchard

In newly established mango orchard, application of *Azotobacter* 50 g + Phosphorus Solubilising Bacteria (PSB) 50 g along with 3 kg vermicompost per plant enhances the plant growth and development. It is to be applied 1 ft away from main trunk making 15-20 cm deep ring at sufficient soil moisture level and trench should be covered with soil.

Integrated nutrient management for fully grown mango orchard

Fertilisers should be applied based on soil test. The dose of manures and fertilizer depends upon the soil health and nutrients content so it may be changed as per soil test region to region. In general, a dose of recommended fertilizers (RDF) to be applied when nutrient content of



Newly planted and staked mango graft



Black gram in mango orchard



Method of *Azotobacter* and PSB enriched vermicompost application to young mango trees





Method of RDF (A) and organic manure, (B) application to mango orchard

soil (kg/ha) is medium. When, nutrient content of soil is extremely low then 50% more recommended dose of fertilizers (RDF) should be applied. When, nutrient content of soil is low then 25% more dose of RDF should be applied. At extremely high soil nutrient content, 50% less dose of RDF should be applied and at high soil nutrient content condition, 25% less dose of RDF is to be applied per year. In general, 1500: 500: 1000 g NPK + 40-50 kg organic manure per plant is to be applied. Well rotten FYM, half dose of nitrogen and full dose of phosphorus and potassium are to be applied in the form of urea, single super phosphate/ DAP and muriate of potash at the time of onset of monsoon as basal dose. Remaining half dose of nitrogen can be applied at flowering. Manures and fertilizers are to be applied at sufficient soil moisture level 1-1.5 m away from main trunk making 15-20 cm deep trench ring and trench should be covered with soil. Under high density planting (HDP) system (three year old plants), 300 g (120 g, 75 g, 60 g, 45 g after harvest, at pre-flowering, fruit set, fruit development, respectively):150 g (60 g, 60 g, 30 g after harvest, at pre-flowering, fruit set, respectively):300 g (75 g, 60 g, 75 g, 90 g after harvest, at pre-flowering, fruit set, fruit development, respectively) NPK per plant is to be applied.

Application of *Azotobacter* 5 ml and Phosphorus Solubilising Bacteria (PSB) 5 ml dissolved in 1 L of water and mixing with well decomposed organic manure per plant at the time of onset of monsoon and at the time of flowering stage gives more fruit yield and saves 15% of recommended dose of nitrogen and phosphorus fertilizers. Bio-fertilizers should not be applied with chemical fertilizers and pesticides. Bio-fertilizers can be procured from SAUs, ICAR Institutes, KVKs and authentic sources.

Particular micronutrients, acute deficiencies some time poses enzymatic activities, assimilates synthesis and hormonal coordination problems in plant. Among the various micronutrients, zinc is important for the formation and activity of chlorophyll and in the functioning of several enzymes. It is an important constituent of Tryptophan, a precursor of auxin (growth hormone). Iron is necessary for many enzymatic activities and as a catalyst for the chlorophyll, protein synthesis and regulates the respiration. Boron aids production of sugar and carbohydrates (CHOs). It is also important for sugar transportation. Boron deficiency affects pollination and development of viable seeds which in turn affects the normal fruit development. It is required for pollen germination, pollen tube growth, sugar synthesis and sugar



Method of organic manure enrichment with bio-fertilizers (*Azotobacter* and PSB)



Method of *Azotobacter* and PSB application through organic manure to mango orchard at KVK, Sardarkrushinagar Dantiwada Agricultural University, Sabarkantha, Gujarat



Recommended WSF and micronutrient grade spraying in mango orchard



Fruiting in properly treated Kesar mango at KVK, Sardarkrushinagar Dantiwada Agricultural University, Sabarkantha, Gujarat

accumulation. Boron deficiency also causes fruit cracking. If soils are deficient in micronutrients as well as when plant shows deficiency symptoms, particular micronutrient is to be applied to rectify the problem. If soil is calcareous use micronutrient grade- I (Zn 5%, Fe 2%, Mn 1%, Cu 0.5% and B 1%) @ 50 g incubated with 10 kg FYM per tree after fruit harvest. Apart from major nutrient application through soil, recommended water soluble fertilizers (WSF) and micronutrients can be sprayed based on deficiency symptoms as per scientist's advice. When plant shows deficiency symptoms of particular micronutrients then particular recommended micronutrients can be sprayed.

Foliar application of 13:0:45 @ 1% at pea stage, marble stage and egg size fruit stage is recommended to enhance mango fruit yield. Spraying of NAA @ 20 ppm at pea stage and at marble stage helps in preventing fruit drop. Though NAA is compatible with most pesticides, individual application will give good result.

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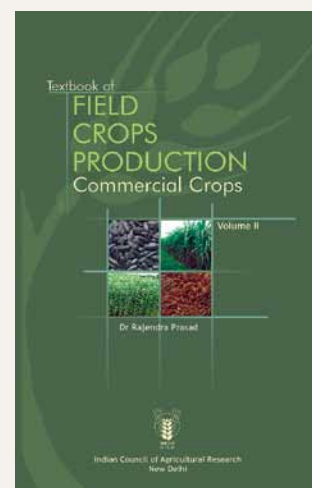
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