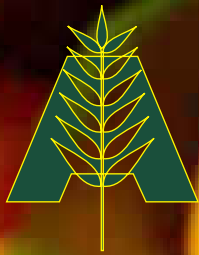


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The Ultimate Agri Business Magazine

Sweet Orange

Marigold

Potted Plants

Vegetable Pear



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Thar Anant

Lycopene rich heat tolerant variety of tomato

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The tomato variety Thar Anant was developed through induced mutation followed by selection of desired phenotypic traits in the induced populations in the year 2019-20. The mutant having superior phenotypic traits was identified and homogenized based on the horticultural attributes and performance. It is having deep red fruit colour rich in lycopene content (7.9 mg/100 g) with medium acidity (0.42 %) and high flesh thickness (0.85 cm) under semi-arid condition of western India. It has high vigorous growth with dark green dense foliage. The mutant has bigger size of inflorescence length (16.3 cm) and distinguished by indeterminate plant habit, fruit size, fruit color and yield potential over the parent. It is highly tolerant to heat and drought stress with high yield potential. The fruit weight about 120-130 g with attractive deep red colour fruits of round shape. The yield varied between 4.2 - 4.9 kg/plant under semi-arid conditions. The fruit mature in 70-80 days after transplanting and comes under medium maturity type. It is moderately resistance to ToLCV disease. The variety is highly suitable for table, processing and export purposes.

Production Technology

Nursery management: In order to get healthy seedlings for planting, the raising of seedling in the nursery is highly essential. The seedlings were raised in bed, raised bed, plug tray approaches



sowing in spreading or line sowing methods. Trays having hole size of 4.0 x 4.5 cm are optimum to raise the seedlings. The fully sterilized potting mixture is used for raising the seedlings. Needed protection measure to control seed borne pathogens is ensured by treating captan 2g/kg seeds. Two seeds are sown each tray and thinned out one seedlings at true leaf stage. Over irrigation is harmful and facilitates for root diseases, single watering in morning (winter, rainy season) and two watering (summer) is ideal. 5-10 ml water/spray liquid is sufficient for each seedling and four five leaf stage seedlings (4 weeks) are ideal for transplanting.

Field preparation: The field

selected for planting must be leveled, ploughed 3-4 times until soil is in fine tilth and weed free condition. Flat bed or ridge methods are followed depending upon the soil, water availability and crop season. The ridges and furrows are formed depends upon the planting system either single row or paired row. Wide spaced ridges (1.0 m wide) are formed for paired row system of planting. Seedlings are planted at 90 cm between rows and 90 cm between plants in evening hours so the seedlings are not wilted due to sunshine.

Nutrient management: The crop yield is decided by the selection of variety and its nutrient use efficiency. Balanced and efficient

use of fertilizer increases the productivity. The soil must have adequate organic C content, if not ensured with application of organic matter so as to attain C/N ratio of 25-30:1 with water holding capacity of 50-60% to ensure high nutrient use by the crop. The nitrate of N fertilizer is not absorbed by the plant and leaches out in rain water. Similarly, phosphate is also not completely dissolve in the water and absorbs by the plant and washed out in rain water. Nitrogen efficiency is declines without applying P and K in the soil. Hence balanced nutrient application is must. N is required for vegetative growth and fruit set, P is needed for fruit production and K is crucial for fruit set and fruit development. Hence split application of N and K is advocated at 30, 60 and 90 days after transplanting. It is found that 3.3 kg N, 0.4 kg P and 4.2 kg K is uptake by the plant to produce 100 quintal fruit yield in tomato. Hence, 132-16-128 kg NPK is required to obtain 400 quintal fruit yield, which vary depending upon the soil nutrient status and nutrient uptake per cent.

Nutrient deficiency: The unbalanced application of fertilizer and existing soil nutrient status are the root cause of deficiency which reflects on yield. The K deficient plant ripens unevenly; fruits are yellowish, blotchy and are thin fleshed. Ca deficient plants exhibit blossom end rot disorder which occurs due to low translocation of Ca to the cells of the blossom end of flower causing dry rot on the bottom of enlarging fruit. The Mg deficient plant shows chlorosis in older leaves having veins of green and yellowish intermittent areas. It occurs in acid soil, having more K and sandy soil. Application of dolomite and limestone rectify the problem. In calcareous soil, Fe,

Mn, Zn and boron deficiency prevails which causes chlorosis in young leaves or terminal shoots. Soil with more P interferes in Fe absorption. It can be controlled by spraying of Fe EDTA 0.05% (or) Manganese sulphate 0.3-0.5%, or Zn sulfate 0.2-0.3%, and boric acid or borax 0.1-0.2% depending upon the elemental deficiency.

Seed sowing and transplanting:

The healthy seeds are sown in second week of June on raised beds for rainy season and early winter crop and, in first week of December on flat bed for late spring crop. The seedlings will be ready for transplanting within 3-4 weeks of sowing (4-5 leaf stage). Seedlings are withheld irrigation 3-4 days before uprooting from the nursery and transplanted immediately in the main field. The healthy, vigorous and disease free seedlings are selected for transplanting and the evening hours is highly preferable. Care

must be taken during transplanting to ensure not damaging of root system and the seedlings are in vertical position. Seedlings are transplanted at 90 cm between rows and 90 cm between plants.

Irrigation: Irrigation schedule is vary from place to place, in few areas the first irrigation is given after transplanting, where in other areas, it is given before transplanting. The life saving irrigation is advocated at 3rd day of transplanting and subsequent irrigation is done 7 days interval during summer or depending on soil moisture levels for other season. Over watering is also harmful for seedlings, and irrigation is ensured during winter season so as to maintain soil temperature above freezing. Imbalanced irrigation enhances fruit cracking problem. In paired row planting, drip irrigation is also possible due to which 30-40 % water can be saved.



Intercultural operations: Weeds compete with tomato for water and nutrients as the plants are shallow rooted and required adequate level for high yield. Hence, the weed free condition in the main field must be ensured. 3-4 weeding are adequate, after the first weeding (30 days after transplanting) the seedlings are earthed up. Two more weeding are required. Before transplanting, the pre emergence herbicide basalin 2 litre is mixed with 600-700 litre of water is sprayed in 1.0 ha for effective control of weeds.

Mulching: In order to ensure suitable micro climate to the root zone, mulching is advocated which create barrier to the moisture loss and alter temperature by few degree, suppress the weed growth. The fruit damage caused by direct soil contact is avoided and the high quality marketable produce can be harvested. Black polythene sheets are used as mulch, which is durable for enhance few degree temperature during winter season.

Training: Tomato plants required training in indeterminate growth types. The plants are given support by bamboo stick (1.0 1.5 m length) or the seedlings are tied with jute threads and facilitated to grow vertically. The disease incidence gets reduced, the insect finds no hiding places, fruits don't get direct contact with soil, spray fluid covers all the plant canopy are the advantages of training. The need based clipping or pinching is advocated.

Harvesting and yield: Tomato fruits are harvested at different stages for different purposes. The fruits ripens at about 25-50 per cent are harvested for long distance market. The 75 per cent ripened fruits are plucked for local



markets. The 100 per cent ripened fruits are collected for seed extraction purposes. Even the unripe, matured fruits are harvested and sold in the market for the consumers prefer acidity. Average yield under normal conditions was found 4.7 kg/plant and yielding 52-55 t/ha in a soil applied with 100:50:30 kg NPK/ha at a spacing of 90cm between rows and 90cm between plants.

Grading: The fruits are cleaned after harvesting and graded according to the colour, size, shape etc.

Pest and disease management

Fruit borer (*Helicoverpa armigera*): It is a polyphagus insect which attacks many commercial crops. The adult male insects are yellowish and females are reddish brown in color. The larvae period is about 15-25 days, which feed on the leaf surface and young floral buds. The larvae make circular holes on the fruit surface and feed by thrusting their heads inside. The holes are always surrounded by fecal pellets. The completely eaten hallow fruits falls down and the partially eaten fruits become deformed. It can be controlled by erecting nylon net barriers, growing cucurbits in crop rotation, keeping pheromone traps to

attract male adults and killing, raising marigold as trap crop (15:1) at every 15 rows of tomato with 1 row marigold, introduction of egg and larvae parasitoids effectively controls the insects.

Army worm (*Spodoptera litura*):

The gray color of larvae feed on the leaf surface and caused skelitilisation. The mature larva feeds on the whole leaf and leaving the main veins alone. It doesn't bore the immature or mature fruits. It can be controlled by erecting nylon net barriers, growing cucurbits in crop rotation, keeping pheromone traps to attract male adults and killing, raising castor as trap crop to attract the egg laying female adult moths.

Tomato Leaf curl virus (TLCV):

It is a serious disease found to attack tomato especially during summer crops. It is transmitted by whitefly. The affected plants shows interveinal chlorosis, curled leaves, shrunken terminal leaves with lower intermodal distances.

Tomato spotted wilt virus:

It is also a major viral disease of tomato. The leaves shows bronzing symptom followed by development of spots on leaves surface and finally plant shows wilting. ●