

## High Density Planting in Horticultural Crops

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India is the largest producer of fruits in the world. The average productivity of fruits in India is, however, low as compared to many developed countries. Presently, the continuing decline in the availability of cultivable land, rising energy and land costs together with the mounting demand of horticultural produce, has given thrust to the concept of high-density planting (HDP) of horticultural crops.



High-density planting (HDP) is a game-changer for horticultural crops, enabling farmers to achieve higher productivity per unit area, both in short-duration and perennial crops. HDP system is normally understood as a system in which a higher number of plants are accommodated within a unit area in comparison to the conventional planting density. High density planting in fruit trees was first introduced in the case of apples in Europe during the 1960, with the development of Malling and Malling-Merton rootstocks. This innovative approach involves planting multiple trees close together, typically 1.5 to 2 meters apart, to maximize land use and boost yields.

### Benefits of High-Density Planting

- **Increased Productivity:** By planting more trees in a smaller area, farmers can enjoy higher yields and better returns on investment.
- **Improved Resource Utilization:** HDP makes efficient use of water, fertilizers, and pesticides, reducing waste and environmental impact.
- **Enhanced Crop Quality:** With more trees competing for resources, farmers can select and harvest only the best produce, improving overall quality.
- HDP increases in bearing surface per unit land area and facilitates better utilization of solar radiation.
- It induces precocity.
- Low cost per unit production.
- Enables mechanization in fruit crops.

### Key Techniques for Successful High-Density Planting

1. **Size-controlling rootstock:** Grafting fruit trees onto dwarf or semi-dwarf rootstock to control tree size and promote healthy growth.
2. **Pruning and training:** Regular pruning and training to maintain tree shape, promote air circulation, and encourage fruiting.
3. **Paired row planting:** Planting trees in paired rows to increase plant population and reduce spacing
4. Dwarf scion varieties.

5. Suitable crop management practices.
6. Use of bioregulators.

### Present status of HDP in some fruit crops

1. **Mango:** - Amrapali variety being distinctly dwarf has been recommended by IARI to be grown at 2.5×2.5m spacing and accommodating 1600 plants/hac. Yielded up to 22 t/hac.
2. **Dashehari** mango at 2.5× 3 m (1,333plants/ha) can also be raised under HDP.
3. Successful HDP (666plants/ha) plantations of different commercial varieties namely Kears, Alphonso, Tommy Atkins, etc has been demonstrated.
4. **Banana:** - HDP is gaining popularity Dwarf Cavendish and Robusta are fit to be planted under HDP at planting distance of 1.2×1.2m (6,944plants/ha)
5. **Papaya:** - variety Pusa Dwarf, Pusa Nanha, Ranchi male possible to grow under HDP concept having planting distance 1.25×1.25m (6400plants/ha) for Pusa Nanha variety.
6. **Pineapple:** - Kew and Queen cultivar are found highly suitable for HDP using double row method of planting suckers or slips spaced at 25 to 30cm in rows at 45 to 60 cm with a spacing of 90 to 105cm between the beds. (63000plants/ha)
7. **Kinnow:** - A novel concept of HDP in Kinnow was developed by raising Kinnow mandarin on Troyer Citrange rootstock at a planting distance of 2×2m (2500plants/ha) in square system of planting.

By adopting high-density planting techniques, farmers can revolutionize their horticultural practices, increase productivity, and contribute to a more sustainable food system.

### References

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