

Center for Smart Agriculture Applied Hi-Tech Horticulture



Module 2: Innovative Technologies in Hi-Tech Horticulture **Session 16:** High density planting in fruit crops



INTRODUCTION

High Density Planting means to increase the plant per unit area for increase the production of fruit crops.





ADVANTAGES

≻To overcome low productivity.

To reduce gestation period for early returns.Higher yield

≻Higher economic return.

Easy canopy management

≻Convenient farm mechanization.

≻Efficient utilization of inputs-seeds, plants, manures, fertilizers, chemicals, pesticides, tools and labours etc. and resources-soil, water, solar radiation etc.

≻Easily manageable



DIFFERENT TYPES HDP

Semi-intensive: 500-1000 trees/ha

Intensive : 1000-10000 tree/ha

Super-intensive/ Meadow orcharding: 2000-100000 trees/ha



Planting System



Square system

堂	Ť
순	축
坣	茔
춘	堂

Single hedgerow 5



Rectangle system



Double hedgerow



Categories of high density Low (less than 250 plants/ha)

Moderate (250-500 plants/ha)

High (500-1250 plants/ha)

Super HDP (20000 plant/ ha) (In apple plant)

Ultra high density (70000 plants/ha) (In guava and apple plant)



Key of successful in high density planting

≻Use of size controlling rootstocks

≻Use of spur type scions

Training and pruning methods to induce dwarfing and spreading habits of tree





Components of HDP

≻Use of dwarf scion varieties

≻Use dwarf root stock

≻Need proper training and pruning

≻Use of plant growth regulators

➤ Suitable crop management practice



Suitable Rootstocks

Apple: Dwarfing/Semi dwarf: M9, M26, M4, M7, MM106 Ultra dwarf: M27

Mango: Vellaikolumban

Guava: Pusa Srijan, *Psidium* friedrichsthalianum



Apple rootstock (MM 106)





Suitable dwarfing scion cultivars

Apple: Red spur, Star Crimson spur, Well spur, Oregon, spur, Silver spur, Red chief and Hardi spur

Papaya: Pusa Nanha

Banana: dwarf Cavendish

Mango: Amrapalli, Dashehari

Sapota: PKM 1, PKM 2





Suitable training sysytem

Spindle bush Dwarf pyramid Cordon Espalier Tatura-trellis







High Density planting in Apple

Standard plantation on standard apple rootstock (MM-106) at 5 x 5m-400 plants/ ha.

➢Non spur type varieties on dwarf rootstock M-9 at 2 x 2 m: 2500 plants/ ha

Spur apple cultivar on standard rootstock MM-111 at 4 x 4m and semi dwarf MM-106 and M-7 at 3 x 3m accommodate: 1111 plants/ ha

Hedge row planting system (Single and double) in apple



Apple orchard



High Density Planting in Mango

Amrapali- 2.5 x 2.5m-1600 plants per ha-2.5 times more yield but 5 x 5 m spacing in south India

Dashehari- 3.0 x 2.5 m-1333 plants per ha

Meadow orchard: 3 x 2m accommodates 674 plants per acre







High Density Planting in Banana

BANANA	
Robusta	4400 plants/ ha (1.5m x 1.5m
Dwarf Cavendish	4400 plants/ ha (1.5 x 1.5m)
Ney Poovan	5120 plants/ ha (Triangle methods-1.5m x 1.5m) 16 % more plant







Medow orcharding in Guava

>Modern method of high density planting developed by (CISH, Lucknow) Shift of perception of farmers from production to productivity ➤Judicious canopy management Varieties for scion Allahabad Safeda, Sardar, Lalit, Shweta, Allahabad Surkha, CISH G 5 and CISH G 6 ▶ Planting is done at 2.0 m (row to row) x 1.0 m (plant to plant)







High Density Planting in Pineapple

➢ Pineapple is grown traditionally at low density (15,000 to 20,000 plants/ha)

Variety for HDP: Kew and Queen
 Planting system: Double row system

Planting distance: 25-30cm plant to plant 45-60cm row to row 90-105cm bed to bed
 Plant numbers: (63,000 plants/ha)

Kew cultivars may achieved with a population of 63700 by following 22.5x60x75cm (Plant x Row x Trench) spacing



HDP in Pineapple







Constraints in High density Planting

≻High initial investment

➤Lack of special production technology and extension for farmer level.

Lack of promising dwarf rootstock in mango, cherry peach and sapota.
Avoidance in cultivation of intercropping.

➢Need more professional as compare conventional methods



THANK YOU