

## Cultivating Goma Yashi bael under high density: A boon for fruit growers

**Bael is an indigenous medicinal fruit tree, which is most suitable to grow in water scarce areas of the country. It possesses attributes for nutritional, health, economic and environmental security and different parts of tree (roots, stem, leaf, bark, flower and fruit) are loaded with minerals, vitamins, carbohydrates and different types of phytochemicals.**

**B**ASED on its potentiality, a field trial on high density planting (5 m × 5 m), accommodating 400 plants/ha, was initiated in 2007 to find out the efficacy of Goma Yashi, a commercial variety of bael, to maximize the yield per unit area. *Deshi* rootstock were sown directly on the field, and *in-situ* patch budding was performed from the scion shoots of single mother plant of Goma Yashi variety in 2008. Uniform cultural practices were performed in all the plants. Dynamics of yield and economics was computed right from second year of budding under rainfed semi-arid conditions. Net profit ₹ 187080.00 was computed @ ₹ 10/kg and ₹ 424160.00 @ ₹ 20/kg purely under rainfed conditions of western India during 10<sup>th</sup> year of orchard life.

### Striking Features of Bael variety Goma Yashi

Goma Yashi variety of bael was developed at Central Horticultural Experiment Station (ICAR-CIAH), Godhra, Gujarat and released by the ICAR-Central Institute for Arid Horticulture, Bikaner in the year 2010. It is dwarf, thornless, very thin shell thickness, less fibre, mucilage and seeds, appealing fruit pulp and fruit surface colour under rainfed semi-arid conditions. It is having dark green dense foliage, compact canopy and has ability to give economic yield in rainfall as low as 400 mm under rainfed semi-arid conditions. Because of dwarf stature, it has been recommended for high density planting

(5 m × 5 m) to maximize the productivity/unit area. It is highly suitable for *sharbet*, squash, candy and *murabba* making. It can be used as dessert owing to low fibre, seed and mucilage in fruit.

### Agro-climatic condition of experimental site

The experimental site is characterized by semi-arid hot climate. The actual annual water needed or potential evapotranspiration of the area ranges between 1,500 to 1,600 mm, whereas actual mean precipitation of 10 years was observed about 790 mm which varied from 300 mm to 910 mm in different years of experimentation. The mean monthly maximum temperature ranges from 26°C and 42°C in summer, while the minimum monthly temperature varies between 10°C and 26°C during winter. The soil type was clay-to-clay loam in texture with available N 151.00, P 7.53 and K 170.50 kg/ha, slightly alkaline (pH 7.90) in reaction while EC of the experiment soils was 0.13 dSm<sup>-1</sup>. The soil depths range from 0.70 to 0.90 meter, derived from mixed alluvial basalts, quartzite, granite, and having layers of limestone just below the soil depth.

### Fertilizer and manure application

Uniform cultural practices were done. 10 kg FYM, 25 g N, 50 g P and 50 g K were applied at the age of one year and these doses were increased every year up to the ten years in similar proportion. These doses were applied in July at a time and Zinc Sulphate was applied 100 g/tree during 6<sup>th</sup> year and 25 g were added in same proportion up to ten years for proper growth and development. Net profit ₹ 1,87,080.00 was computed @ ₹ 10/kg and ₹ 4,24,160.00 @ ₹ 20/kg during 10<sup>th</sup> year purely under rainfed conditions of western India. Plants were grown without irrigation. Owing to black cotton soil of experimental field, regular spading of tree basin was done properly to avoid the formation of rift in the basin soil to minimize the loss of soil moisture in the basin of tree.

### Physico-chemical characters

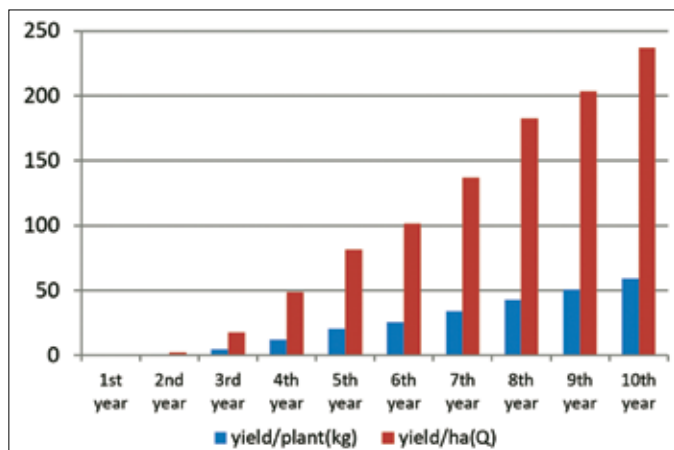
Fruit weight 1.00-1.62 kg, fruit size 13.00 cm × 12.50 cm, fruit girth 41-45 cm, shell thickness 0.15-0.16 cm, seed weight 25.37-27.50 g, fibre weight 40.24-51.20 g, shell weight 170-200 g, locules in cross section 13-15, pulp 72.00-75.25%, TSS pulp 35-390 b, TSS mucilage 41-430 b, acidity (0.29-0.31%) and vitamin C 19.00-22.00 mg / 100 g pulp. This variety matures during April and belongs to mid maturing group under semi-arid ecosystem.



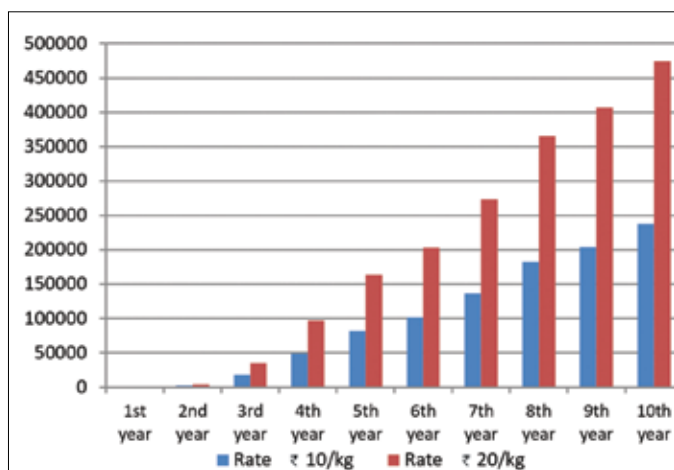
Eight year old tree: Goma Yashi

### Mulching

Under rainfed conditions, organic mulch (paddy straw) was applied in tree basin right from 1<sup>st</sup> year, 20 cm thick in basin and incorporated every year in tree basin in the month of September which not only reduces evaporation of moisture from soil surface, moderation in temperature, enhancement of microbial and earthworm population, improvement in soil fertility and control of weed growth but also imparts manifold positive effect on



Yield increment in Goma Yashi as age progressed under rainfed semi-arid conditions, CHES, Godhra



Gross income @ ₹ 10/kg and ₹ 20/kg



Packaging of fruit for marketing

plant growth and yield of quality fruits. Application of organic mulch over long period improved soil properties like pH, electrical conductivity, porosity and soil moisture holding capacity. Leaf litter of bael was also found effective to retain soil moisture and also improved the soil quality of the orchard.

### Results

Fruit setting started from 2<sup>nd</sup> year, but economic yield was harvested after 5<sup>th</sup> year of budding under rainfed semi-arid conditions. Results of study revealed that the fruit setting and fruit retention showed linear increase as the age of tree increased. However, after 8<sup>th</sup> year canopy management is required for proper aeration and light interception in the orchard. Bael tree respond to pruning well for which pruning at 25% of annual growth extension during May, when the plants were in leafless condition, was performed uniformly to all the tree during 9<sup>th</sup> and 10<sup>th</sup> year, which help in maintaining the proper canopy and improving the fruit quality. The yield per plant was recorded 0.57 kg (2<sup>nd</sup> year) to 59.27 kg (10<sup>th</sup> year) and yield per ha was recorded 2.28 q/ ha (2<sup>nd</sup> year) to 237.28 (10<sup>th</sup> year) under rainfed semi arid condition For calculating the economics, the total yield was calculated @ ₹10/kg and ₹ 20/kg to find out the gross income. Gross income @ ₹ 10/kg fruit was obtained ₹ 22 80.00 (2<sup>nd</sup> year) and ₹ 237080.00 (10<sup>th</sup> year) and selling rate @ ₹ 20/kg was computed ₹ 4560.00 (2<sup>nd</sup> year) and ₹ 474160.00 (10<sup>th</sup> year) under rainfed semi-arid conditions. Net profit ₹ 187080.00 was computed @ ₹ 10/kg and ₹ 42 4160.00 @ ₹ 20/kg purely under rainfed semi-arid conditions of western India.

### Conclusion

Based on the results of study, it may be inferred that the commercial exploitation of Goma Yashi variety of bael under high density (5 m x 5 m) is economically viable and feasible for doubling the income in the areas having less rainfall and suffering from abiotic stresses provided that all the essential agronomical and horticultural practices were applied properly and timely to cope up with stresses prevailing in rainfed dryland conditions.

For further interaction, please write to:

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