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## RESEARCH ARTICLE

### PDKV PRATAP: A NEW HIGH-YIELDING WOOD APPLE VARIETY FOR MAHARASHTRA

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#### ABSTRACT

PDKV Pratap, is woodapple variety, developed at Department of Fruit Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra. This genotype is selection from seedling in origin plant population conserve at department and developed through selection and released specially for Maharashtra conditions. It is precocious and regular bearer, having semi dwarf to medium growing habit and spreading type with drooping branches. It start flowering from February, peak flowering in March and fruit mature in the month of October. It is high yielder with more number of fruits/tree i.e. 347, having bigger size about 489 g and high pulp content about 66 %. Plant and fruits are completely free from any disease and pest. The variety is also recommended for hot and dry onditions.

#### INTRODUCTION

Wood Apple, *Feronia limonia* Swingle or *Limonia acidissima* (L.), is an underutilized dry land fruit crop and also known by vernacular names like kaitha, kainth bel, katha phal, kothbel and monkey fruits. It belongs to citrus family Rutaceae. The original home of wood apple is mainly South India and Sri Lanka. It prefers dry hot condition at flowering and fruit setting stage.

The tree is tolerant to both drought and waterlogging condition. The mature fruit have creamy-brownish, sticky, resinous, astringent, acidic-sweet pulp. The fruit pulp has pleasant aroma and seed scattered throughout fruit. The fruit and plant parts (leaf, stem, bark, fruit and seed) have good medicinal and curative values. It is widely distributed from tropical to sub tropical growing countries like India, Pakistan, Sri Lanka and Southeast Asia (Bakshi *et al.* 2001). In India, it is abundantly found in forest regions of arid and semi-arid conditions include Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Madhya Pradesh and the western Himalayas. It is one of the very hardy trees found. Keeping above facts in view, selection from seedling origin plantation at Main garden from 64 plant population of which screening of 22 good genotypes of regular bearer out of which nine promising genotypes selected for data analysis for yield and quality parameters and after evaluation, variety PDKV Pratap was developed for hot and dry areas of the country specially for Maharashtra state.

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**Salient features of PDKV Pratap:** It was developed through selection method. This selection was collected from Vidharbhas district of Maharashtra in 2005 and established through soft wood insitu grafting under field condition. The selected genotype was evaluated under field conditions for 8 years (2015-2022) at Department of Fruit Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra. The selection performed well in respect of growth, flowering and fruiting, yield and fruit quality attributes as well as fruit shelf-life. It was identified as variety at institute level in 2022. It has Semi dwarf to medium growth habit, starts flowering in the month of February, full bloom in march, regular bearer, fruit mature in the month of October and ripens in November to late January. It has 489.00 g average fruit weight, 66.27% fruit pulp, 3.30% acidity and 14.45° Brix T.S.S., the average fruit yield per plant was recorded 347 kg . It can be used as table purpose as well as in value added products, owing to rich in TSS, high pulp percentage with remarkable pectin and protein content.

**Plant growth behavior:** It is medium-dwarf tree having spreading growth habit with drooping branches. The plant height, stem girth and plant spread were recorded 157 cm, 11.3 m and 6.8 m during 15th years of plant age. The trunk is cylindrical with a symmetrical crown of foliage. The plant bark is thick rough blackish colour with crevices. The number of primary branches is 4 and secondary branches is about 20. PDKV Pratap starts flowering in 3-4th year after planting while seedling plant takes up to 8-9 years for first flowering. The flowers are born in small, loose, terminal or lateral panicles which contain 13-25 flowers per panicle. The flower panicle contains both staminate and hermaphrodite. Flower color varies from greenish to yellow in colour. Flowering start

in 1st week of february, the peak period of flowering takes place in march month.

**Maturity, ripening and yield:** The fruits shows silver-white color with rough skin at full maturity whereas ripe fruits gives strong pleasant aroma. Fruits attain maximum size in month of October then more or less stationary phase until the fruits are harvested *i.e.* mature in about 8 months. It is drought hardy and capable to give economic yield during aberrant agro-climate condition. Fruits are generally ready to harvest after 225-240 days of fruit setting (November). Plant and fruits are completely free from any disease and pest. It gives high yield (170.23 kg) under hot and dry conditions.

**Fruit quality:** This selection has very good fruit quality and fruit taste. The fruit physio-chemical attributes in term of fruit weight (489.27 g), fruit size (210.82 x 193.04 mm), pulp (66.27%), shell weight (127.33 g), seed weight (8.14g), TSS (14.45<sup>0</sup> Brix), acidity (3.30 %), total sugar (2.08%), reducing sugars (1.23%), fruit pectin (1.76%) exhibited better comparable value than check. The fruit shape is round and fruit color is greenish-white. Pulp color is light brown to dark brown. The fruits of this selection are bigger in size. The fruit may be used as table purpose and for value added products like pickles, RTS, chutney, chocolate and bar.



Available germplasm of woodapple



3 Year old grafted plant



Fruit bearing in PDKV Pratap



Harvested fruit of PDKV Pratap



Transverse section of mature fruit



Ripe fruit pulp with shell

#### Striking features of PDKV Pratap (Wood Apple)

- It is regular and precocious bearer.
- Bigger size of fruits - Average fruit weight : 489 g
- More number of fruits/tree (347).
- Higher pulp content – 66.27%
- It is highly suitable for making of various value added products like pickles, RTS, jelly and bar etc.

#### Production Technology

**Soil and climate:** The wood apple can be grown in wide range of soils. For high yield potential and good plant growth, sandy loam or deep loam with 7-7.5 pH and well drained soils are needed. It is adapted to a wide range of ecological conditions, reflecting its wide geographical distribution from tropical and subtropical to arid and semi-arid regions. It is highly suitable for semi-arid and arid ecosystem. (Yadav & Singh, 2021)



#### Grafted plants

**Plant propagation:** Wood-apple is generally propagated by seed. Although seeds do not have any dormancy and can be sown in lines 25 mm apart at a spacing of 10-15 cm in seedbed immediately after extraction. Vegetative propagation by grafting and budding is also possible. In wood apple, in situ soft wood grafting gives more than 80% success under semi-arid condition. Therefore it is advised to propagate wood apple tree by in-situ soft wood grafting under rainfed semi-arid condition for better success and survival.

**Planting:** The pits of 90cm x 90cm x 90cm are usually dug out during summer months. Well-decomposed organic matter is mixed with soil and pits are filled. Planting is done during the raining season when the soil in the pits has already settled. The plants should be irrigated immediately after planting. It can be planted at the distance of 8m x 6m for high productivity. Initial plant growth is slow in arid region.

**Manuring:** As such, no manuring schedule is followed for wood-apple cultivation, nor there is any experimental report to be adapted to apply fertilizer. But, from a general practice followed by the growers, it has been found that wood-apple plants respond to manure application. In the above context, it is reported that application of 20-40 kg of FYM per tree per year, depending age of the plants, in the beginning of monsoon, helps in improving the number, size and quality on the of fruits.

**Irrigation:** Wood-apple is normally a rainfed crop and as such no irrigation schedule is followed to cultivate the fruit tree. Irrigation for a few weeks at the beginning during planting is essential, if there is no rain. Subsequently, one or two irrigation during drier months between November to March will facilitate better canopy development in prebearing stage. Once the tree start flowering, one irrigation after fruit set and a second irrigation during fruit development, particularly during the second phase of development, will help better size and more retentions of fruits.

**Training and pruning:** Generally, wood apple is not trained, but at initial growth stage of plant, grafted plant are vulnerable to lanky and uneven spreading in growth habits. Hence, initial two to three year training and pruning is essentially required for proper framework. The wood apple generally not require pruning, but it is essential to remove dry, dead and cross branches during December-January.

**Harvesting:** Fruits should be harvested when the rind color becomes pale and hollow sound appears on tapping. Fruits are generally handpicked and collected in crates or in gunny bag without any injury. Seed plants take longer time to come to bearing than the grafted or budded plants.

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