Indian J. Pl. Genet. Resources 9(2): 299-302, 1996

**Short Communication**

# GENETIC DIVERSITY OF KHIRNI (*MANILKARA HEXANDRA* (ROXB.) DUBARD) IN CENTRAL AND SOUTH-WEST INDIA

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**Key words :** Genetic diversity, Khirni, *Manilkara hexandra*, India

Khirni (*Manilkara hexandra* (Roxb.) Dubard) is the native to South Asia and adapted to dry evergreen forests of North-Central India and Deccan plateau (Stewart and Brandis, 1972). It is a minor fruit adapted to arid and semi-arid conditions of Tropics. The tree is medium large to tall with spreading crown and straight massive bole, bear avoid or ellipsoid shape berry (Annon, 1962). In Gujarat and adjoining area, flower occurs in two seasons *viz.*, July-August and October-November. However only October-November flower set fruits which mature during April-May when other fresh fruits are not available in the market. In North India flowers occur during February-March and fruits ripe during June-July. The fruit is small in size contain one to three seeds, and sweet in taste. It is ideal for plantation in semi-arid to arid region and in marginal soil (sandy and laterite). It is also used as commercial root-stock for Sapota (*Manilkara achras*) all over in Sapota growing areas (Singh *et al.*, 1963; Mukhopadhaya 1986; Singh, 1969). It also produces good quality timber. It is a minor fruit and little work has been done for its improvement. Hence, an exploration was undertaken to sample genotypes ideal for fruit production, donors parent and also suitable as root stock for Sapota.

An exploration for collection of Khirni germplasm was undertaken in parts of Gujarat and Maharashtra in collaboration with Project Co-ordinator (Tropical fruits), IIHR, Bangalore; Department of Horticulture, PKV Akola, Maharashtra and Horticultural Experiment Station, (GAU) Gandevi, Gujarat during fruit ripening season (April-May, 1993). The area covered includes *in-situ* plantation on the bank of Tapti river in district Bharuch, Gujarat and

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*ex situ* plantation in district Akola, Nagpur and Bhandara in Maharashtra, located between 73.0° to 79.6° E longitude and 20.8° to 21.7° N latitude. The random sampling method to collect gene pool from a population and biased sampling methods to collect particular genotype based on the known traits were adopted (Sinha, 1981). However, the emphasis was given for biased sampling accomodating maximum variability from minimum number of accessions. Ten ripe fruits were collected from each genotype and observations on fruit morphological traits were recorded.

Thirteen genotypes exhibiting wide range of variability in tree canopy development, fruit morphological characteristics, pulp characteristics and quality of the fruits were studied. In general, the *in-situ* plantation of Gujarat were highly vigorous with thicker trunk girth, tall growing, wide spread crown in comparison to *ex situ* plantations of Maharashtra.

The tree canopy, development was highly variable from dwarf (40' tall) to highly tall (> 100') in height and in spread from low growth to highly spreading. Similarly variability was observed in plant morphological characteristics *viz.*, trunk girth, foliage characteristics, pulp colour and quality of the fruits. High variability was also observed in fruit morphological characteristics and quality of pulp (Table 1). The fruit length varied from 1.48

**Table 1. Values, range, mean and standard error for eight quantitative characteristics in *Khirni***

| NIC Number | Fruit length | Fruit circum-ference | No. of seeds per fruit | Seed wt. per fruit | Pulp wt. per fruit | Pulp/ seed ratio | TSS | Fruit average weight |
|---|---|---|---|---|---|---|---|---|
| 19915 | 2.08 | 5.26 | 1.28 | 0.85 | 10.76 | 9.00 | 23.40 | 10.00 |
| 19916 | 2.22 | 3.80 | 1.44 | 0.92 | 10.08 | 10.96 | 24.8 | 11.00 |
| 19917 | 1.74 | 2.80 | 1.36 | 0.70 | 4.50 | 6.43 | 22.20 | 5.20 |
| 19918 | 2.08 | 3.32 | 1.50 | 0.92 | 7.18 | 7.80 | 26.80 | 8.10 |
| 19919 | 2.08 | 4.28 | 1.72 | 0.60 | 6.80 | 11.33 | 25.0 | 7.40 |
| 19920 | 2.10 | 4.45 | 1.60 | 0.80 | 8.20 | 10.25 | 24.6 | 9.00 |
| 19921 | 1.48 | 4.00 | 1.80 | 0.62 | 5.38 | 8.68 | 23.4 | 6.00 |
| 19924 | 1.84 | 2.92 | 1.42 | 0.66 | 5.24 | 7.94 | 21.5 | 5.90 |
| 19925 | 2.06 | 3.60 | 1.50 | 0.82 | 7.18 | 8.76 | 22.0 | 8.00 |
| 19930 | 2.18 | 4.40 | 1.00 | 0.60 | 8.66 | 14.43 | 25.8 | 9.26 |
| 19931 | 2.16 | 4.10 | 1.34 | 0.70 | 8.25 | 11.78 | 24.0 | 8.95 |
| 19932 | 2.10 | 3.32 | 1.60 | 0.80 | 6.30 | 7.88 | 21.5 | 7.10 |
| 19933 | 1.90 | 3.40 | 1.50 | 0.85 | 6.05 | 7.12 | 21.00 | 6.90 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Range | 1.48 | 2.82 | 1.00 | 0.60 | 4.50 | 6.43 | 21.00 | 5.20 |
| | 2.22 | 5.26 | 1.80 | 0.92 | 10.75 | 14.43 | 26.80 | 11.00 |
| Mean | 2.00 | 3.74 | 1.47 | 0.76 | 7.27 | 9.41 | 23.54 | 7.91 |
| SE ± | 0.06 | 0.22 | 0.06 | 0.03 | 0.52 | 0.62 | 0.51 | 0.48 |

cm (NIC-19921) to 2.22 cm (NIC-19916); circumference from 2.80 cm (NIC-19917) to 5.26 cm (NIC-19915), average number of seeds per fruit from 1.0 (NIC-19930) to 1.80 (NIC-19921), seed weight per fruit from 0.60g (NIC-19930) to 0.92g (NIC-19916 & 19918) pulp weight per fruit from 4.05g (NIC-19917) to 10.08g (NIC-19916) pulp seed ratio from 6.43 (NIC 19917) to 14.43 (NIC-19930), TSS (brix) from 21.00 (NIC-19933) to 26.80 (NIC 19918) and average fruit weight from 5.20 g (NIC-19917) to 11.00 (NIC-19916).

### Promising Germplasm

**NIC-19916** : This genotype is located in village Balot, (Jogaria), Distt. Baruch, Gujarat on the river bank of Tapati. It has highly vigorous growth, height 70′, trunk girth 11′, crown spread > 80′ leaves longer and broader. The sandy soil and arid climate was observed to be highly favourable for its vigorous growth and heavy bearing.

**NIC-19920** : It is situated on the river bank of Tapati in village balot (Jagaria) District Baruch, Gujarat. Tree medium tall, medium spreading and drooping habit. It bears fruit light orange to golden orange, highly sweet, less latex, better taste and aroma.

**NIC-19930** : It was identified from *ex situ* plantation in. Pawni forest range in Bhandara district of Maharashtra. It has crown medium in height and spread, trunk girth medium, drooping growth, bears fruits highly sweet, very less latex, highly soft pulp, seed medium size and brown.

## ACKNOWLEDGMENTS

Authors express their sincere thanks to Dr. K.P.S. Chandel, Director and Dr. M.N. Koppar, Head, Plant Exploration and Collection Division, NBPGR, New Delhi, for encouragement and providing facilities during the exploration.

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