



# Studies of the Growth and Conservation Status of Rare Nutritional fruit Tree Species *Manilkara hexandra* in Districts, Meerut and Bulandshahr (U.P.) India

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## ABSTRACT

*Manilkara hexandra* tree is critical for the environment and human beings, so there is an pressing need to conservation this tree species. it is local of India, located within the forests of Madhya Pradesh, Gujarat and Rajasthan. its fruit fit to be eaten and nutritional. its useful wooden, latex and bark and contributes huge livelihood aid to nearby inhabitants. the existing observe become accomplished in Districts Meerut and Bulandshahr from may 2018 to September 2022. The mature, dried and healthful seeds of *Manilkara hexandra* had been accumulated from Meerut. Seeds had been sown in pots containing aggregate of soil : manure 3:1 ratio. The germination started out seven days after sowing inside the month of May. the entire germination possibilities were found 95 % inside 21 days during summer time month. *Manilkara hexandra* plant 365 days old saplings plantation and dispensed to the regions of districts Meerut and Bulandshahr. The status of *Manilkara hexandra* saplings increase and improvement of all stages. I had recorded four years growth of *Manilkara hexandra* tree species height 362.78 cm in I P college, Lalita Prasad Saraswati Balika Vidya Mandir and Mohan Kuti Ashram Bulandshahr. it concluded at the intention of the existing observe is to unfold cognizance towards the conservation of the uncommon beautiful tree species *Manilkara hexandra* in Meerut and Bulandshahr districts. The goal of *Manilkara hexandra* plantation that benefited to surroundings and humans of those areas, in which the species is rare and no longer observed.

**Key Words:** - *Manilkara hexandra*, Nutritional, Rare, Conservation, Meerut, Bulandshahr.

## INTRODUCTION

The widespread loss and degradation of native forests is now recognised as a global environmental crisis. From 2000-2005, global forest area declined by around 20 million ha/yr (Hansen *et al.*, 2010), with undisturbed primary forest declining by an estimated 4.2 million hectares (or 0.4%) annually (FAO, 2010). The loss and degradation of forest ecosystems resulting from human activity are major causes of global biodiversity loss (UNEP, 2009; Vié *et al.*, 2009). Clearance of forest for agriculture, mining, urban and industrial development all contribute to the loss of forests and tree species in the wild. Management activities within forests, including burning, logging and overgrazing also impact on forest structure, functions and processes and can additionally contribute to the loss of tree species. Trees play a fundamental role in maintaining the basic ecosystem functions and the quality of life on earth. *Manilkara hexandra* (Roxb.) Dubard belongs to family Sapotaceae. It is commonly called as Rayan/ Khirni. The plant is an evergreen tree, native of Central India and Deccan peninsular. The fruit is edible; the seed is used as cooking oil by the natives. The Koli tribe uses the decoction of the bark in diarrhea for children. The stem bark is also recommended for fever, jaundice, helminthiasis, flatulence, stomach disorder etc (Kirtikar and Basu, 2001). Khirni (*Manilkara hexandra* Roxb.) is an economically multipurpose tree of the family Sapotaceae (Singh *et al.*, 2015; S). The tree is medium size, evergreen with spreading growth habit. It bears oval, sweet edible fruit with one or more seeds. It is commercially used as a rootstock for vegetative propagation of sapota in different parts of the country. The fruit is good source of iron, sugars, minerals, protein and carbohydrate etc. Fresh fruits produced in these areas are sold locally by the rural people at very cheap rate (Lata *et al.*, 2019). Tribal people collect the fruits and sell to local traders Rs 20 to 30/- per kg. A record of the literature show extracts and metabolites from this plant having pharmacological properties such as anti-inflammatory, antiulcer, alexipharmic, anthelmintic, antibacterial, and free radical scavenging activity. (Amandeep Kaur and Dr. Naresh Singh Gill., 2021) During the survey, sizable variability in morphological characters and high

socio-economic potential of Khirni was recorded. (S.K. Malik *et al.*, 2012) One-fourth of the plant species listed by the U.S. Endangered Species Act include reintroduction as a component of their recovery plan (Kramer *et al.*, 2011.) *Manilkara hexandra* tree species rare for Meerut and Bulandshahr districts. However, Meerut and Bulandshahr soil is more fertile and has a warm subtropical climate and becomes very cold and dries in winters from December to mid February while it is dry and hot in summers from April to June. During extreme winters, the maximum temperature is around 12° and minimum 3° to 4° Celsius. Summers can be quite hot with temperatures rising upto 40° to 46° Celsius range. It is perceived as very important tree species for local populations and environment management. It's important role for biodiversity conservation and forests ecosystem. It is easily raised from seeds, the rate of germination and growth status is fairly rapid in all stages. Considering the usefulness of khirni hence, there is an urgent need for conserve rare tree species which is required in Meerut and Bulandshahr and many other adjacent Districts. The present research work consisted in defining conservation and growth development the availability of the tree species *Manilkara hexandra*.

## MATERIAL AND METHODS

The present study was carried out at B – 16, Jwala Nagar, Ambedkar Chowk in District Meerut and I.P college District Bulandshahr for the period 11 May 2018 to 30 September 2022. On the development and conservation of *Manilkara hexandra* we studied in pots and polybags from May 2019 to June 2020 and did it in July 2020 to 2022 at field areas of I.P.(P.G.) college, Lalita Prasad Saraswati Balika Vidya Mandir and Mohan Kuti Ashram Bulandshahr and Meerut areas. The mature and healthy seeds were collected by Dr. Yashwant rai from Boundary road Meerut in the month of May 2018. The seeds were sown in cemented pots containing 3:1 soil manure ratio. Germination commenced seven days after sown and total 95% germination was observed within 21 days in the month of May 2019. Saplings growth parameters were recorded at Meerut. The 12 months old saplings of *Manilkara hexandra* have been out from the pots, polybags and transplanted in various areas of Meerut and Bulandshahr Districts. Final reading of *Manilkara hexandra* height and girth size was recorded at the age of 4 years from date of seed sown.

**GERMINATION % = (GERMINATED SEEDS / TOTAL SEEDS) X 100**

$$\text{GROWTH RATE} = (S_2 - S_1) / T$$

Where,  $S_1$  is the first measurement,  $S_2$  is the second measurement and T is time period.

## RESULTS

Observation on daily seed germination was counted upto 21 days from the date of sowing. We recorded that germination of *Manilkara hexandra* was excellent in the month from 11 May 2018 to 30 May 2018, which was 95 percent. We recorded each year's growth status of *Manilkara hexandra*. Forth years had height Mean of *manilkara hexandra* 362.78 c.m. and girth size Mean 15.22cm. The result shows that the total seeds germinated 95% in the month of May 2018 within 21 days. Saplings height was recorded at September 2019 in pots and polybags shoot height Mean 20.06 c.m., After transplanted at field areas of Meerut and Bulandshahr districts growth status in the year September 2020, height mean 200.6 cm, Girth size mean 6.66 cm, in the year September 2021, height mean 300.53 c.m., girth size mean 11.53 c.m. The final reading growth status of plant, height and girth size was recorded at 30 September 2022 in I.P. (P.G.) college Bulandshahr, plant height Mean 362.78 cm, and girth size Mean 15.22 cm. respectively growth of all stages of *Manilkara hexandra* is fairly significant in Meerut and Bulandshahr districts. All stages clear in table 1-2 and pictures 1 to 10. Germination and seedling establishment are two very critical phase in the life history of tree species (Ramakirshnan 1972, Gomez - Pompa & Vezques-Yanes 1974, Harper & White 1974). The heights initial growth and those the best performance of champaca plants was shown by Lahat provenance as well. It is mainly propagated by seeds. It is drought hardy and slow growing species. It has no improved varieties (Panchal G.P. *et al.*, 2014). This species has been dying out since several years from the area due to the die-back situation and poor natural regeneration (Perera, 2007). The study of phenological patterns is important from the point of view of the conservation of tree genetic resources (Kikim & Yadava, 2001). Composition of Trees Grown Surrounding Water Springs at Two Areas in Purwosari Pasuruan, East Java (Soejono., 2012). Status and Cultivation of Sandalwood in India USDA Forest service (Shobha N. Ral., 1990). The slow growth rate of khirni seedlings is also a disadvantage in its instant and mass multiplication. (Rai *et al.*, 2018 For those of us associated with arboreta and botanical gardens, we are in a position to address the challenge of saving the world's threatened tree species. We need to do more than just include them in the plant collections of our gardens. Effective tree conservation may require a finessed combination of different kinds of ex situ and in situ actions, ecological restoration and plant reintroduction, and socio-economic and regulatory considerations to truly secure them from threat Sara Oldfield and Adrian C. Newton (2013). As a consequence, many tree species are threatened and disappear more and more from their natural ecosystems. The present study focuses on the rare tree species *Manilkara hexandra* conservation in Meerut and Bulandshahr districts.

## CONCLUSION

It is concluded that the aim of the present study is to spread awareness towards conservation of rare tree *Manilkara hexandra* and environment and forest management in those areas where the plant is now rarely found. This research work will also prove to be of immense usefulness for the conservation of rare tree species in the forest. Since this plant is beneficial for humans in many ways, therefore it is required that wide propagation and conservation of this plant should be carried out, in order to ensure that future generations can benefit from it.

TABLE – 1  
SEED GERMINATION PERCENTAGE OF MANILKARA HEXANDRA

MAY 2018							
Days	3	6	9	12	15	18	21
Germination (%)	–	–	20	40	60	80	95

TABLE 2.

THE PLANT HEIGHT AND GIRTH SIZE AT 2019-2022 YEARS .

years	Plant Height (cm)	Girth Size cm)
September 2019	20.6±0.26	1.36±0.20
September 2020	200.6±0.26	6.66 ± 0.32
September 2021	300.53±0.35	11.53 ± 0.35
September 2022	362.78±1.35	15.22 ± 0.26





Fig 1. View of Mature fruits of *Manilkara hexandra* collected by Dr. Yashwant Rai



Fig 2. Germination stages of *Manilkara hexandra*



Fig 3. Germination and seedlings stages of *Manilkara hexandra*



Fig 4. Germination and seedlings stages of *Manilkara hexandra*



Fig 5. Seedlings stages of *Manilkara hexandra* in the pots



Fig 5. Ex-situ conservation of *Manilkara hexandra* in I.P. college Bulandshahr



Fig 7. Growth status of *Manilkara hexandra* in I.P. College Bulandshahr September2022



Fig 8. Growth status of *Manilkara hexandra* in I.P. College Bulandshahr September2022



Fig 9. Girth size of *Manilkara hexandra* in I.P. College Bulandshahr September2022



Fig 10. Girth size of *Manilkara hexandra* in I.P. College Bulandshahr September2022

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