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STUDIES OF THE GROWTH AND CONSERVATION OF RARE TREE SPECIES *MICHELIA CHAMPACA* LINN. IN DISTRICTS, MEERUT AND BULANDSHAHR, (U.P.) INDIA

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ABSTRACT

Michelia champaca is valuable evergreen tree species for forestry and mankind. Mostly Michelia champaca is found in Temples. The fragrance of its golden flowers purifies the environment, which is a fast growing tree species. Hence, there is an urgent need for conservation of this tree species. The present study was carried out in Districts Meerut and Bulandshahr from May 2019 to 3 August 2021. The mature, dried and healthy seeds of Michelia champaca were collected from Puri Orissa. Seeds were sown in pots containing mixture of soil: manure 3:1 ratio. The germination started seven days after sowing in the month of May. The total germination percentages were observed 95 % within 21 days during summer month. Michelia champaca 12 months old saplings prepared and distributed to the areas of Meerut and Bulandshahr. The results indicate that the status of germination, saplings growth and development of all stages of Michelia champaca is fairly significant. I had recorded 3 years growth of Michelia champaca tree species height Mean 295.4 cm. in I.P. College, Bulandshahr, Jwala nagar and Ganga nagar Meerut. It is concluded that the aim of the present study is to spread awareness towards the conservation of the rare beautiful tree species Michelia champaca in Meerut and Bulandshahr districts. The study benefited to environment and silviculture in those areas, where the species is now not found

KEYWORDS: *Michelia Champaca, 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. *Michelia champaca* known as golden champaca is belonging to the family of Magnoliaceae. Its native to tropical and subtropical South and Southeast Asia (Indomalaya), including southern *Michelia champaca* is a tree species with glossy leaves and yellow or orange flowers. It has commercial value from almost every parts of the plant especially the flower. The flower has a number of other cosmetic, medicinal and

economic uses. Fresh flowers can be taken as natural fragrant and also can be extracted into perfumes and medicinal products such as cure for coughs and rheumatism Armiyanti *et. al.*, (2010). Some cosmetic products such as Joy, J'adore and Dior contain *Michelia champaca* fragrant extracts in their ingredient composition (Warren,1998). Commonly, *Michelia champaca* is propagated by means of seed and vegetative pathways via layering. However,seed propagation is time consuming (5 weeks to 4 months to germinate) and generally low percentage in germination and quick lost of viability (Zabala, 1990). On the other hand, vegetative propagation through layering does not produce large number materials for large scale planting within short period of time. The difficulties of *Michelia champaca* propagation through conventional technique cause researchers to try to look for the alternative to solve the problems. Meanwhile, the expansion in Champaca industry has led to an increasing demand for plant. It is therefore, the *in vitro* system or tissue culture technique which is the suitable approach that can be employed in plant propagation of *M. champaca* (Noraishah *et al.*, 2009; Armiyanti, 2009). *In-vitro* propagation either through organogenesis or somatic embryogenesis has become an important and popular method to reproduce crops (Kozai et al., 1997) which are difficult to propagate conventionally (Rugini and Guitierrez-Pesce, 2003). 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.) *Michelia champaca* 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 12^0 and minimum 3^0 to 4^0 Celsius. Summers can be quite hot with temperatures rising upto 40^0 to 44^0 Celsius range. *Michelia champaca* is perceived as very important tree species for local populations and environment management. *Michelia champaca* can play an important role in the biodiversity conservation of the forests. *Michelia champaca* is easily raised from seed, the rate of growth is fairly rapid in all stages. 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 *Michelia champaca.*

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 2019 to 3 August 2021.On the development and conservation of *Michelia champaca* we studied in pots and polybags from May 2019 to June 2020 and did it in July2020 to 2021at field areas of Ganga nagar, Jwala nagar Meerut and botanical garden of I.P. college Bulandshahr. The mature and healthy seeds were collected by Dr. Yashwant rai from Puri, Orissa in the month of 13 January 2019. 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 *Michelia champaca* have been out from the pots, polybags and transplanted in various areas of Meerut and Bulandshahr Districts. Final reading of Champaca height and girth size was recorded at the age of 3 years from date of seed sown.

RESULTS

Observation on daily seed germination was counted upto 21 days from the date of sowing. We recorded that germination of *Michelia champaca* was excellent in the month 11 May 2019 to 30 May2019, which was 95 percent. We recorded each year's growth status of *Michelia champaca*. Third year had height Mean of *Michelia champaca* 295.4 cm. and girth size

Mean13.22cm. The result shows that the total seeds germinated 95% in the month of May within 21 days. Saplings height was recorded at September 2019 in pots and polybags shoot height Mean 25.78 cm., After transplanted at field areas of Meerut and bulandshahr districts growth status height mean 160 cm, girth size mean 6.64 cm in September 2020. The final reading growth status of plant, height and girth size was recorded at 3 August 2021 in Jwala nagar, Ganga nagar Meerut and botanical garden I.P. college Bulandshahr plant shoot height Mean 295.4 cm, and girth size Mean 13.22 cm. respectively growth of all stages of *Mechelia champaca* is fairly significant in Meerut and Bulandshahr districts. All stages clear in table 1-2 and pictures 1 to 9. 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 genetic materials collected from four provenances/populations and 27 mother trees. Average survival of the young champaca planted at the plot was 82.1% at 12 months old, the highest survival was found at Lahat provenance (90.6%). The highes initial growth and those the best performance of champaca plants was shown by Lahat provenance as well. Soil properties at the conservation plot are optimal to support plant growth and are relatively uniform among the blocks, so it might not give a significant different effect to the champaca growth (Murniati* and Dona Octavia ,2013). 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). 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 *Michelia champaca* conservation in Meerut and Bulandshahr districts.

CONCLUSIONS

It is concluded that the aim of the present study is to spread awareness towards conservation of rare tree *Michelia champaca* and environmental 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 Michelia Champaca

May 2019							
Days	3	6	9	12	15	18	21
Germination (%)	_	_	20	40	60	80	95

Table 2: The Plant Height AND Girth Size at 2019-21 Years

Years	Plant Height (cm)	Girth Size (cm)
September 2019	25.78±0.13	1.76±0.16
September 2020	160±0.8	6.64 ± 0.27
3 August 2021	295.4±0.0.3	13.22 ± 0.25

Figure 1: Flowers of Michelia Champaca.

Figure 2: Fruit Bunch of Michelia Champaca.

Figure 3: View of Seeds of Michelia Champaca Collected by Dr. Yashwant Rai.

Figure 4: Germination and Growth Stages of Michelia Champaca in Pot.

Figure 5: View of Growth Status in Polybags of Michelia Champaca at September 2019.

Figure 6: View of Three Years Old Growth Stage of Michelia Champaca at Meerut.

Figure 7: Ex-Situ Conservation of Michelia Champaca at Jwala Meerut.

Figure 8: View of Three Years Old Growth Stage of Michelia Champaca at Bulandshahr.

Figure 9: Ex-Situ Conservation of Michelia Champaca at Meerut.

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