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Growth and Development of Valuable Threatened climber species *Calamus tenuis* Roxb. in District Meerut, (U.P.) India

Dr. Yashwant Rai[1], Dr. A. K. Shukla[2]

Department of Botany, D.N. College Meerut, U.P. India

Abstract: ***Calamus tenuis is a highly valued species for the mankind and animals. These plant species threatened due to habitat destruction, urbanization, forest fire, environment changing and biotic factors. So now it is listed amongst threatened species in many forest areas in the country. Hence, there is an urgent need for conservation of this species. The present study was carried out in Jwala nagar district Meerut for the period May 2013 to April 2015. The matured, fruits were collected by Dr. Yashwant Rai from Katarnighat wildlife sanctuary district Bahraich, Uttar Pradesh, during the last week of April 2013. A total 100 seeds were sown in 5 cemented pots containing soil, manure 3 : 1 ratio. The germination starts ten days after sowing in the month of May. The total germination percentages were observed 85 % within 28 days during the end of May 2013 from date of sowing. Seedling growth parameters were recorded at June-July; August-September; October-November (2013) and study on field area August-September (2014), March-April (2015). Six months, (June to November 2013) old saplings were transplanted into the field areas of Meerut district. Final reading on plant height and girth size was recorded at March to April 2015 in field areas of Meerut district. The results indicate that the status of germination, seedlings growth and development of all stages fairly rapid. I had recorded June 2013 to April 2015 growth status of Calamus tenuis Mean 195.52 cm. in Meerut areas. It is concluded that the aim of the present study is to spread awareness towards the conservation and established of the threatened unique evergreen climber species Calamus tenuis in Meerut district. The study will be benefited to environment, forest management, pharmacology and mankind in those areas, where the plant is now not found. The present study focuses on the threatened species Calamus tenuis established in Meerut district.***

Keywords: *Calamus tenuis*, Threatened, Germination, Conservation, Meerut

1. 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 contributes 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. There is an urgent need to conserve plant species. Around 7,800 plant species are currently recorded as threatened with extinction at the global scale (Oldfield *et al*., 1998; Newton and Oldfield, 2008). However, information is lacking on the status and distribution of many suspected rare species of trees, and the true figure is likely to be much higher. Plants are of exceptional ecological importance, providing habitat flora wide range of other organisms. Many of these trees also benefit people, and are associated with social, economic or cultural values. Consequently, their continued decline or loss can have a major impact on human wellbeing. *Calamus tenuis* is indispensable to human which is an threatened evergreen species belongs to the family Arecaceae. *Calamus tenuis* is a vigorous, climbing prickly palm with slender stems girth size about 3-4 cm. that can be 100 metres or more long. *Calamus tenuis* used for making baskets, strong furniture, strong ropes, handicraft, weaving works, decoration etc. It is used locally and also exported. The plant also provides food and medicines for local use. The fruits when taken with warm milk help improve whooping cough. It has been cultivated experimentally in India and is also grown in Meerut. Yung shoot eaten by elephant in the forest. The unripe fruits are colour green and mature fruits colour light brown, fruit of pulp brown colour. Ripe fruits are edible, and source of food various mammals. 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.) *C. tenuis* species is not found in Meerut district. However, Meerut's 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 up to 42^0 to 44^0 Celsius range. Meerut has suitable agro climatic conditions and enough land available for taking up commercial plantation of *Calamus tenuis. Calamus tenuis* is perceived as very important climber species for poor pupils, forestry, and biodiversity and environment management. This species is important source of fodder for elephants and other animals in the forest areas. *Calamus tenuis* seeds are easily germinated, the rate of growth is fairly rapid at all stages. The present research work consisted in defining conservation and growth development the availability of the evergreen tree species *Calamus tenuis.* This climber species should be carried out, in order to ensure that future generations can benefit from it.

2. Material and Methods

The present study was carried out at B – 16, Jwala Nagar, Ambedkar Chook in District Meerut for the period May to November 2013 in pots and December 2013 to 30 April 2015 in field areas of District Meerut. The matured and healthy Fruits were collected from Katarniaghat Wildlife Sanctuary Bahraich district, Uttar Pradesh during the end of April 2013. Freshly collected seeds were pre-treated in fresh water for 48 hours and then outer scaly cover and fleshy pulpy layer is removed by rubbing with hands. The seeds so extracted are then washed in water, shade dried for few hours and stored in moist place for a short period or sown in the 5 cemented pots containing soil: manure ratio 3:1. Germination commenced ten days after sowing and total 85% germination was observed within 28 days in the month of May 2013 from date of sowing. Saplings growth parameters were recorded at two months intervals and after six months of old saplings were transplanted into various field areas in Meerut District. Final reading on stem length was recorded at March to April 2015 in field areas of Meerut district.

3. Results and Dicussion

The result showed that the total seeds germinate 85 % at the end of May 2013 within 28 days from date of sowing. Saplings height was recorded at June to November 2013, the shoot height Mean 12.46 cm at June - July; 29.43 cm. August - September; 52.43 cm. October - November. After six months, old saplings (52.43 cm.) were transplanted into the field areas of Meerut. The final reading growth status of soot length was recorded at March to April 2015 in field areas of Meerut district, shoot length Mean 195.52 cm. The plants shoot length 195.52 cm. at June 2013 to April 2015 after germination period. . Respectively growth of all stages of *Calamus tenuis* is fairly low in Meerut District. All results clear in the table 1,2 and figures 1 - 13. The study show correlation with the findings of K.Haridasan, Anupam Sarmah, S. N. Hegde, & L.R.Bhuyan 2002 growth rate of cane is very slow in first three years and requires 8-13 years to attain harvestable maturity. 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). 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). According to the Red list of Threatened Plants (UNEP, 1995), 19 species are already extinct and 1236 species are threatened. Of these, threatened 41 taxa are possibly extinct in the wild, 152 are endangered, 102 are vulnerable, 251 are rare, and 690 are indeterminate (D Ramprasad *et al*., 2012). As a consequence, many tree species are threatened and disappear more and more from their natural ecosystem. The study of the focus in the future various field such as conservation of threatened species, pharmacology, forest and ecosystem management.

Table 1: Seed Germination Percentage of Calamus Tenuis

MAY							
Days	4	8	12	16	20	24	28
Germination (%)	_	_	20	30	60	70	85

Table 2: Calamus Tenuis Growth Status at June 2013 to April 2015

Months	Plant Height Mean (cm.)
June – July	12.46 ± 0.37
August – September	29.43 ± 0.50
October-November (2013)	52.43 ± 1.11
February- March (2014)	97.6 ± 0.52
August-September (2014)	125.7 ± 0.2
March- April (2015)	195.52±0.25

Figure 1: Community of *Calamus tenuis* in Katarniaghat forest areas.

Figure 2: View of mature fruit, brown colour pulp and removing seed coat seeds

Figure 3: Seedlings of *Calamus tenuis*

Figure 4: View of Plumule and radical of calamus tenuis

Figure 5: One month seedlings stage of *Calamus tenuis* after germination

Figure 6: Six months old saplings of *calamus tenuis.*

Figure 7: Six month old sapling transplanted at Sanjay van Delhi road.

Figure 8: view of *calamus tenuis* growth status September 2014

Figure 9: View of calamus tenuis growth status April 2015.

Figure 10: View Length, stem of *Calamus tenuis* taken pic. Place katarniaghat forest area.

Figure 12: Raw material of *Calamus tenuis* sold in the local market

Figure 11: Very strong stem of *calamus tenuis*

Figure 13: View of various beautiful and strong products made by *Calamus tenuis*

4. Conclusion

It is concluded that the aim of the present study is to spread awareness towards establishment and conservation of endangered tree species *Calamus tenuis* 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 threatened valuable 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.

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