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Growth and Development of Medicinal Endangered Tree Species *Aphanamixis polystachya* (Wall.) Parker in District Meerut, (U.P.) India

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Abstract

Aphanamixis polystachya is a highly valued species for the mankind. The tree is distributed some parts of India but now it is endangered species in many areas in the country. Hence, there is an urgent need for conservation of this evergreen tree. The present study was carried out in District Meerut for the period May 2013 to June 2014. The matured, seeds were collected by Dr. Yashwant Rai from Indira Gandhi Botanical Garden Raebareli District, Uttar Pradesh during the end of April 2013. A total 100 seeds were sown in 5 cemented pots containing soil, manure 3 : 1 ratio. The germination starts seven days after sowing in the month of May. The total germination percentages were observed 95 % within 21 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 March-April; May-June (2014). 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 June 2014 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 June 2014 growth status of A. polystachya Mean 115.46 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 endangered unique evergreen tree species A. polystachya in Meerut district. The study will be benefited to environment, forest management, pharmacognosy and mankind in those areas, where the plant is now not found. The present study focuses on the endangered tree species A. polystachya established in Meerut district.

Keywords: *Aphanamixis polystachya, Endangered, Germination, Conservation, Meerut*

Introduction

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. The trees play a fundamental role in maintaining the basic ecosystem functions and the quality of life on earth. In South India, *A. polystachya* is commonly found in the lower Ghats and occasional in upper Western Ghats (Saldana and Nicolson 1976). *A. polystachya* tree is indispensable to human. *A. polystaycha* is a endangered evergreen tree species belongs to the family Meliaceae. It is commonly known as Pithraj. It is big sized tree grows up to 35 feet's in height. Fruits globular, smooth, yellow when ripe, seeds with scarlet. The seed has rich oil content in future source for biodiesel. The plant possesses antitumor, antimicrobial, hepato protective, insecticidal, depressant properties (Hossain et al. 2009). The plant parts such as stem, leaves, seeds, barks and roots are used in herbal medicine. The bark is strong astringent and is used in diseases of the liver, enlarged spleen, tumours and abdominal complaints. The plant produce amooranin. It useful in breast cancer, colon cancer and leukaemia Leaves are used as fodder for cattle & deer. The tree very important role for various fields such as stabilization; Commercial planting; Erosion control: Large roadside tree; environment management; Shade tree; Specimen tree; urban greening; Wild grafting (Orwa *et al*., 2009). 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.) *A. polystachya* tree 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. *A. polystachya* is perceived as very important tree species for local populations, forestry, biodiversity and environment management. *A. polystachya* can play an important role in the biodiversity conservation of the forests. *A. polystachya* is easily germination by seeds, the rate of growth is fairly rapid at all stages. The tree is found some parts of India but it is not found many parts of country. Hence, there is an urgent need for conserving endangered tree species which is required in Meerut and many other adjacent Districts. The present research work consisted in defining conservation and growth development the availability of the evergreen tree species *A. polystachya.* This tree species should be carried out, in order to ensure that future generations can benefit from it.

Materials 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 20 June 2014 in field areas of District Meerut. The matured and healthy seeds were collected from Indira Gandhi botanical Garden Raebareli District, Uttar Pradesh during the end of April 2013. The total 100 seeds were sown in 5 cemented pots containing soil: manure ratio 3:1. Germination commenced seven days after sowing and total 95% germination was observed within 21 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 fields of urban and rural areas in Meerut District. Final reading on plant height and girth size was recorded at March to June 2014 in field areas of Meerut district.

Results and Discussion

The result showed that the total seeds germinate 95 % at the end of May 2013 within 21 days from date of sowing. Saplings height was recorded at June to November 2013, the shoot height Mean 15.26 cm at June - July; 33.1 cm. August - September; 56.96 cm. October - November. After six months, old saplings (56.96 cm.) were transplanted into the field areas of Meerut. The final reading growth status of plant, height and girth size was recorded at March to June 2014 in Meerut district, plant shoot height Mean 115.46 cm., and girth size Mean 5.13 cm. Respectively growth of all stages of *A. polystachya* is fairly rapid in Meerut District. The plants were growing 115.46 cm. at June 2013 to June 2014 after germination period. All results clear in the table 1,2 and figures 1 - 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). 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 fields such as conservation of threatened tree species, adaptation tree species, pharmacology, forest and environment management.

Table 1 Seed Germination Percentage of aphanamixis polystachya

May							
Days	3	6	9	12	15	18	21
Germination (%)	_	_	20	30	65	75	95

Table 2 The plant height, AND girth size at June 2013 to June 2014 after germination period

Months	Plant Height Mean (cm.)	Girth Size Mean (cm.)
June - July	15.26 ± 0.37	
August - September	33.1 ± 0.1	
October-November (2013)	56.96 ± 0.15	
March - April (2014)	90.26 ± 0.15	
May - June (2014)	115.46 ± 0.80	5.13 ± 0.15

Fig. 1 Matured fruits bearing on *A. polystachya*

Fig. 2 Seeds were collected by Yashwant Rai

Fig. 3 View of germinate seeds of *A. polystachya*

Fig. 4 View of germinate seedling of *A. polystachya*

Fig. 5 Seedlings of *A. polystachya* in the pot

Fig. 6 Growth status of sapling *A. polystachya* at June-November 2013 (six months)

Fig. 7 Six months old sapling transplanted in Meerut District

Fig.8 Growth and dev. status of *A. polystachya* at June 2013 to June 2014 in Meerut

Fig. 9 Conservation and awareness' programme for *A. polystachya* evergreen tree

Conclusion

It is concluded that the aim of the present study is to spread awareness towards establishment and conservation of endangered tree species *A. polystachya* 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 endangered 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.

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