

Growth and Development of Rare Tree Species *Sterculia Foetida* Linn. in District Meerut, (U.P.) India

Yashwant Rai

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

Abstract: *Sterculia foetida* is highly valued tree species for the humans, soils management and forestry. The tree is distributed some parts of India but now it is rare species in many areas in the country. Hence, there is an urgent need for conservation of this tree species. The present study was carried out in District Meerut for the period May 2013 to May 2014. The matured and healthy seeds of *Sterculia foetida* were collected from Indira Gandhi Botanical Garden District Rae Bareli, Uttar Pradesh. A total 100 seeds were sown in 10 cemented pots containing 3:1 soil: manure ratio. The germination starts seven days after sowing in the month of May. The total germination percentages were observed 70 % within 21 days during the end of May 2013. Seedling growth parameters were recorded at two months intervals. After six months, old saplings were transplanted into the fields of urban and rural areas of District Meerut. The results indicate that the status of germination, saplings growth and development of all stages of *Sterculia foetida* is fairly rapid. I had recorded one year growth of *Sterculia foetida* tree species mean 145.44 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 rare unique tree species *Sterculia foetida* in Meerut district. The study benefited to environment and forest management in those areas, where the plant is now not found. The present study of the scope in the future various fields such as conservation of rare tree species, adaptation tree species and environment management.

Keywords: *Sterculia foetida*, Rare, 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 developments 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. The trees play a fundamental role in maintaining the basic ecosystem functions and the quality of life on earth. *S. foetida* is a tropical tree species belongs to the family Sterculiaceae which is also called as „Java-Olive or wild almond tree. In India it is known as Jangli badam in Hindi and Bengali. *S. foetida* is a large, straight, deciduous tree growing to about 42 m in height and 1.5 - 2 m in girth, with the branches arranged in whorls and spreading horizontally. Mature seeds are black, 2.0-2.3 cm. long, average dried seed weight is 3 g. The seed have a pleasant taste and are sometimes eaten. Edible oil called sterculia oil is present in the testa as well as the kernel. The total oil content is about 34 % (Ram Rastogi P and Mehrotra BN 1993; Kirtikar KR and Basu BD 1999). The oil from seeds have uses in traditional medicine; oil as an illuminate; fiber obtain from the bark used as cord; pulpwood; timber yields gum used in bookbinding; fire wood and charcoal. Fruit contain peanut like oily kernels which is are edible and more or less laxative when eaten raw. Kernel sometime used to adulterate cacao. The tree very important role for various fields such as Backyard

planting; Boundary marker; Coastal protection/ stabilization; Commercial planting; Erosion control: Large roadside tree; environment management; Shade tree; Specimen tree; urban greening; Wild grafting (Orwa *et al.*, 2009). Nutritional studies have proven one quarter of the seed to be oil with a high percentage of proteins (Burkill, 1966). 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.) *S. foetida* tree species 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° and minimum 3° to 4° Celsius. Summers can be quite hot with temperatures rising up to 40° to 42° Celsius range. *S. foetida* is perceived as very important tree species for local populations, forestry, biodiversity and environment management. *S. foetida* can play an important role in the biodiversity conservation of the forests. *S. foetida* is easily raised from seed; the rate of growth is fairly rapid in early stages and forming long tap roots. 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 rare 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 tree species *S. foetida*. This tree 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 Chowk in District Meerut for the period May to November 2013 in pots and December 2013 to 20 May 2014

in field areas of District Meerut. The matured and healthy seeds were collected from Indira Gandhi Botanical Garden, District Rae Bareli, Uttar Pradesh during the mid April 2013. The total 100 seeds were sown in 10 cemented pots containing soil: manure ratio 3:1. Germination commenced seven days after sowing and total 70% germination was observed within 21 days in the month of May. 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 twelve months (April, May 2014) from date of germination period.

3. Results

The result shows that the total seeds germinated 70 % at the end of May 2013 within 21 days. Saplings height was recorded at June to November 2013, the shoot height Mean 20.5 cm at June, July; 78.46 cm. August, September; 99.96 cm. October, November. After six months, old saplings (99.96 cm.) were transplanted into the fields of urban and rural areas of district Meerut. The final reading growth status of plant, height and girth size was recorded at April to 20 May 2014 (from date of germination period) areas of Meerut, plant shoot height Mean 145.44 cm., and one year girth size Mean 7.2 cm. Respectively growth of all stages of *Sterculia foetida* is fairly rapid in rural and urban areas of Meerut District. All stages clear in the table and figures. The plants were growing 145.44 cm. at one year. 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 ecosystems. The present study focuses on the endangered tree species *S. foetida* established in Meerut district.

Table 1: Seed Germination Percentage of *Sterculia Foetida*

Days	May						
	3	6	9	12	15	18	21
Germination (%)	-	-	20	30	45	60	70

Table 2: The Plant Height, And Girth Size at One Year from Date of Sowing

Months	Plant Height (Cm)	Girth Size (Cm)
June, July	20.5±0.47	
August, September	78.46±0.33	
October, November (2013)	99.96±0.59	
April, May (2014)	145.44±0.39	7.2 ± 0.0.23 (1 year)



Figure 1: Mature seeds pod bearing on *S. Foetida*



Figure 2: Mature seeds collected by Yashwant Rai



Figure 3: View of germination stage, close view of germinate seed



Figure 4: View of germinate seedling



Figure 5: Development of seedling *S.foetida* during first stage



Figure 6: Growth status of *S. foetida* at June, July



Figure 7: Six month old sapling transplanted at urban area of Mrt.



Figure 8: Six month old sapling of *S.foetida* transplanted at rural area of Mrt



Figure 9: Growth and Development Status at 12 Months, Rural Area Mrt.

4. Conclusion

It is concluded that the aim of the present study is to spread awareness towards establishment and conservation of rare tree *S. foetida* 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.

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Author Profile

Dr. Yashwant Rai, Asst. Lecturer (Department of Botany D.N. College Meerut) & President (Green Planet Welfare U.P. India). M. Sc. (Botany) From D. N. College Meerut, M. Phil. & Ph.D. (Botany) From C.C.S. University Meerut.