

Growth and Development of an Endangered Medicinal Tree *Adenanthera pavonina* Linn. In District Meerut (U.P.), India

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ABSTRACT : The present study was carried out in District Meerut for the period May 2013 to May 2014. *Adenanthera pavonina* is highly valued tree species for the people, soils management and forestry. Hence, there is an urgent need for conservation of this plant. The mature, dried and healthy seeds of *Adenanthera pavonina* were collected from Aurobindo Ghosh Ashram, District vadodara, Gujarat. A total of 100 seeds were sown in 4 cemented pots containing 3:1 soil: manure ratio. Germination starts six days after sowing. In the month of May 95% germination was observed within 21 days. After six months, old saplings were planted into the fields of urban and rural areas of District Meerut. The results indicate that the status of germination and development of all the stages of *Adenanthera pavonina* is fairly rapid. I had recorded one year growth of *Adenanthera pavonina* tree species about one Meter in Meerut areas. It is concluded that the aim of the present study is to spread awareness towards the conservation and establish of the endangered medicinal tree species *Adenanthera pavonina* in Meerut district. The study benefited to environment and forest management in those areas, where the plant is now not found.

KEY WORDS: - *Adenanthera pavonina*, Endangered, Conservation

I. 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. The trees play a fundamental role in maintaining the basic ecosystem functions and the quality of life on earth. *Adenanthera pavonina*, height about 33 meters tree species belongs to member of Leguminosae. The tree Common Name Coral-wood, Peacock flower fence, Red bead tree, Saga tree and red sandal wood. Its Native India and Southern China. The tree with a spreading crown and compound leaves. Flowers are small, yellowish and arranged densely on an unbranched drooping inflorescence. The tree is important role to fix nitrogen and thus helps rejuvenate soils. The tree leaves are used as green manure and fodder. The tree is all parts useful for human beings. A decoction of leaves is used to treat gout and rheumatism. Pulverized wood mixed with water is taken orally for migraines and headaches; and dysentery, diarrhoea and tonsillitis are treated with a bark and leaf decoction. The attractive seeds are used as beads in jewellery, leis and rosaries. The ground seeds produce oil that is used as industrial lubricant. Physico-chemical study of *Adenanthera pavonina* seed oil growing in Democratic Republic of Congo (Opota *et al.*, 2013). The hard reddish wood is used in carpentry for making cabinets. A red dye is obtained from the wood. Its wood is hard and has a red-coloured heartwood and a light-grey sapwood making it useful for constructing decorative wood products (Benthall, 1946; Clark and Thaman 1993). *A. pavonina* is also known as a “food tree”, because its seeds are often eaten by people. 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). The *A. pavoniana* 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^o and minimum 3^o to 4^o Celsius. Summers can be quite hot with temperatures rising upto 40^o to 42^o Celsius range. *Adenanthera pavonina* is perceived as very important for local populations and environment management. Urban and rural vegetation are playing important role in various sustainable environment management policies. Public gardens, avenue arboretum and terrace gardens are the natural habitats with countable potential to conserve medicinal

tree species. *A. pavonina* can play an important role in the biodiversity of the forests. 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 tree species *Adenanthera pavonina*.

SYNONYMS: *Adenanthera gersenii* Scheff., *Adenanthera polita* Miq., and *Corallaria parvifolia* Rumph.

II. 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. The matured dried and healthy seeds of *Adenanthera pavonina* were collected from Aurobindo Ghosh Ashram, District Vadodara, Gujarat, in the month of January 2013. The total 100 seeds were sown in 4 cemented pots containing 3:1 soil: manure ratio. Germination commenced six days after sown, and 95% germination was observed within 21 days in the month of May 2013. 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 the age of 12 months (April, May 2014) from the date of sowing.

III. RESULTS

The result shows that the total seeds germinated 95% in the month of May within 21 days. The seedlings height observed June to November 2013 in pots. The shoot height Mean 13.98 cm in June, July; 45.06 cm August, September; 64.92 cm October, November. After six months, old saplings (64.92 cm.) were transplanted into the fields of urban and rural areas of district Meerut. Final growth status of plant height and girth size was observed April to May 2014 at fields. Showed significantly plant shoot height Mean 99.96 cm. and one year girth size Mean 4.08 cm. respectively growth of all stages of *Adenanthera pavonina* is fairly rapid in rural and urban areas of Meerut District. The plants were grown about one meter per year. This endangered species is establishment at present time in Meerut areas. Germination and seedling establishment are two very critical phase in the life history of 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). 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 *A.pavonina* eastblished in Meerut district. This tree species having medicinal and ecological value , so future generations can benefit from it.

IV. CONCLUSION

It is concluded that the aim of the present study is to spread awareness towards conservation of endangered medicinal tree species *Adenanthera pavonina* 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 endangered *Adenanthera pavonina* 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 ADENANTHERA PAVONINA

MAY							
Days	3	6	9	12	15	18	21
Germination (%)	–	–	20	50	70	80	95

TABLE 2.
THE PLANT SHOOT, AND GIRTH SIZE AT ONE YEAR FROM THE DATE OF SOWING.

Months	Plant Height (Cm)	Girth Size (Cm)
June, July	13.98±0.76	
August, September	45.06±0.95	
October, November (2013)	64.92±0.25	
April, May (2014)	99.96±0.59	4.08 ± 0.08 (1 year)



1

Fig 1. Seeds of Adenanthera pavonina collected by Yashwant



2

Fig 2. Germinate seeds of A. pavonina dated 17.05.13



3

Fig 3. Growth status of seedlings A. pavonina dated 25.06.13



4

Fig 4. A.pavonina growth status dated 28.07.13



5

Fig 5. A.pavonina growth status dated 27.09.13



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Fig 6. A. pavonina growth status dated 27.11.13



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Fig 7. A.pavonina plantation in Meerut area dated 30.11.13



8

Fig 8. A. pavonina growth status in field dated 01.05.14

REFERENCES

- [1] Burkill I. H. (1966), A Dictionary of the Economic products of the Malay Peninsula, 2nd ed., vol. 1, ADH. 218.
- [2] FAO. (2010). Global forest resources assessment, 2010– Main report. FAO Forestry Paper 163. Rome, Italy. Government of Malaysia and Singapore, Kuala Lumpur, Malaysia.
- [3] Gomez-Pompa A and Vazquez- Yanes C (1974) Studies on the secondary succession of tropical lowlands; The life cycle of secondary species; proc. 1st int. Congr. Ecol., The Hague, pp.336-342
- [4] Hansen, M.C., Stehman, S.V. and Potapov, P.V. (2010). Quantification of global forest cover loss. Proceedings of the National Academy of Sciences USA, 107, 8650-8655. International US.
- [5] Harper J L and White J (1974) The demography of plants; A. Rev. Ecol pp. 419-463
- [6] Kramer, A., Hird, A., Shaw, K., Dosman, M. and Mims, R.(2011). Conserving North America's threatened plants: Progress report on Target 8 of the Global Strategy for Plant Conservation. Botanic Gardens Conservation.
- [7] Opota Onya D, Senga Kitumbe P., Covaci A., Cimanga Kanyanga R.(2013) Physico-chemical study of *Adenanthera pavonina* seed oil growing in Democratic Republic of Congo. International Journal of PharmTech Research CODEN (USA): IJPRIF, ISSN : 0974-4304 Vol 5, No.4, pp 1870-1881.
- [8] Ramakrishnan P S (1972) individual adaptations and significance in population dynamics; in Biology of land plants pp. 344-355.
- [9] Sara Oldfield and Adrian C. Newton (2013) Integrated conservation of tree species by botanic gardens: a reference manual.
- [10] Shobha N. Ral (1990) Status and Cultivation of Sandalwood in India USDA Forest Service Gen. Tech. Rep. PSW-122.
- [11] Soejono (2012) Composition of Trees Grown Surrounding Water Springs at Two Areas in Purwosari Pasuruan, East Java the journal of tropical life science vol. 2, no. 2, pp. 110 – 118.
- [12] UNEP (2009) Vital forest graphics. FAO, UNEP, UNFF. UNEP GRID Arendal, Norway.