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Multiplication and *Ex-situ* conservation of a red listed medicinal plant *Commiphora wightii* (Arnott) Bhandari in Herbal garden

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Abstract

Day by day due to overexploitation and by other several reasons like introduction of new species, Urbanization, Industrializations etc plants are facing problem for their existence in their natural habitat. In this scenario conservation become an urgent need for its protection as well as for proper multiplication in certain ecological areas.

Current study is a record for the propagation of *Commiphora wightii* (Arnott) Bhandari plant following their vegetative mode using stem cuttings. The plant is showing its efficiency in term of stem cutting propagation. Selected stem cuttings based on its maturation and of good health were oblique cut was done which perform better for its rapid multiplication. Above strategy was done in fifty poly bags filled with suitable soil, sand and manure mixture equally. Each one stem cutting was applied to develop in to new plant in poly bags separately. Experiment setup and other related records were discussed furthermore.

Keywords: *Commiphora wightii* (Arnott) Bhandari, Stem cutting, Plant multiplication, Herbal Garden.

Introduction

The plants are remarkable segment of nature participating a major role in formation of biodiversity. Development of plant population is affected and regulated by several factors associated with living and non-living groups referred as biotic and abiotic factors. Excluding these factors plant population also affected by the genetic structure of the individual plant species. Plant association made in the presence of favourable environmental conditions followed by the potential adaptability of the individuals of the plant species.

An association of varied plant populations forming a complex structure known as plant community. It is marked by the presence of a variety of the plant species. It is also a center for presence of many medicinal and aromatic plants. These are applied for treatment of certain disorders among the human beings.

Day by day due to excess utilization of the plant resources, deforestation, forest fire, population pressure on nature etc are a major reason for loss of species from certain ecosystem/ecological areas. Because of rich potential to treat many disorders the medicinal and aromatic plants are becoming not only useful but also need for proper protection.

Protection of the plant species against the changeable environment as well as diseases etc is determining factors for its presence and existence in nature.

Commiphora wightii (Arnott) Bhandari is an endangered/red listed medicinal plant. Due to excess utilization and other associated reasons are responsible for its gradual loss in natural habitat. The plant is xerophytic in nature need for less water than other plants. It is showing a wide capability to regenerate using their stem cuttings modes.

Rapid plant propagation made by growing the selected stem cuttings in suitable sites with proper management. The current study is based on the mass multiplication of *Commiphora wightii* (Arnott) Bhandari using their mature stem cuttings in the field and also in poly bags in Herbal garden aimed for its propagation as well for *ex-situ* conservation and for dissemination of the plant species different parts of the state as per need.

Atal *et al.*, in 1975^[3] found *Commiphora mukul*: Source of Guggal in Indian Systems of Medicine. Abdallah *et al.*, noticed Anti-bacterial activity of olegum resins of *Commiphora molmol* and *Boswellia papyrifera* against methicillin resistant *Staphylococcus aureus* (MRSA) in year 2009. Parsec and Pareek 2012^[12] recorded *Commiphora wightii* (Guggal) An Endangered Medicinal Plant of Rajasthan Needs Attention of Biotechnologists for Its Conservation. Patel *et al.*, 2009^[13] analyzed chemical Composition and Characteristics of

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Commiphora wightii (Arnott) Bhandari Seed Oil.

Samanta *et al.*, 2012 ^[15] studied on growth, photosynthetic competence and oleo-gum resin production of guggal (*Commiphora wightii*) across soil moisture and nitrogen gradient. Chandra *et al.*, 2001 ^[4] recorded rooting behavior of stem cuttings of *Commiphora wightii* (Indian bdellium). Arun *et al.*, Review on Guggulu kalpana in ayurveda in 2014 ^[2]. Goyal *et al.*, 2010 ^[6] Assessed *Commiphora wightii* (Arn.) Bhandari (Guggul) as potential source for antibacterial agent. Dixit and Rao 2000 ^[5] Observed distribution and habitat characteristics of Gugal (*Commiphora wightii*) in the arid region of Kachchh, Gujarat (India).

Ikram and Chahar 2013 ^[8] recorded medicinal Use of Endangered Plant *Commiphora Wightii*. Kumar 2013 ^[10] focused on distribution and abundance of *Commiphora wightii* (arn) bhandari, in the forest of north gujarat region (ngr), gujarat, india. Kumar *et al.*, 2006 ^[9] experimented on rooting potential of Indian bdellium (*Commiphora wightii*) cuttings taken from different shoot positions. Lal and Kasera 2012 ^[11] experimented on seed Germination Improve- ment in *Commiphora wightii* (Guggal) Through Potassium Nitrate Pre-treatment-a Critically Endangered Plant from the Indian Desert.

Howriny *et al.*, 2005 ^[7] found effect of *Commiphora opobalsamum* (L.) Engl. (Balessan) on experimental gastric ulcers and secretion in rats. Prakash *et al.*, 2001 ^[14] studied on multiplication of *Commiphora wightii* through an Air-Layering Technique in Indian Desert. Satyavati 1991 ^[16] found a promising hypolipidemic agent from gum guggul (*Commiphora wightii*). Singh *et al.*, 2013 ^[17] noticed on antifungal activity of *Commiphora wightii*, an important medicinal plant.

Soni *et al.*, 2013 ^[18] reviewed on *Commiphora myrrha*. Sudhakar *et al.*, 2001 studied on conservation Threat Assessment of *Commiphora wightii* (Arn.) Bhandari - an Economically Important Species. Yadav *et al.*, 1999 ^[23] studied on cultivation of Guggulu. Soni 2010 ^[21] focused on conservation of *Commiphora wightii* (Arn.) Bhandari: An Endangered Medicinal Shrub, through Propagation and Planting, and Education Awareness Pro- grams in the Aravaalli Hills of Rajasthan.

Tejovathi *et al.*, 2011 ^[20] experimented *in vitro* propagation of endangered medicinal plant- *Commiphora wightii*. Vineet 2008 ^[22] focused in situ conservation of *Commiphora wightii* a red -listed medicinal plant species of Rajasthan state, India. Final project report of IUCN. Yusuf *et al.*, 1999 ^[24] experimented on micropropagation of *Commiphora wightii* (Arn.) Bhandari—A threatened medicinal plant of semi-arid region.

Material and Methods

The plant *Commiphora wightii* (Arnott) Bhandari is a red listed and xerophytic in nature with potential capacity to regenerate itself using their vegetative parts like stem cuttings. Older mature plants are marked for gaining stem cutting for further propagation purpose. 10 – 15 cm long older stems were collected and oblique cut made individually for further use to obtain new individuals like their parental plants.

The study was carried out in Herbal garden at the University during September to April 2015 for its rapid propagation as

well as for *ex-situ* conservation. Stem cuttings selected and prepare to propagate in poly bags filled with manure, soil and soil mixture in equal amount. Fifty poly bags were used for developing the new plants of *Commiphora wightii* (Arnott) Bhandari individually. One - one stem cuttings were used in all the poly bags. Proper water, light etc were provided them to support the development of new buds/roots and to convert them as a new plant of *Commiphora wightii* (Arnott) Bhandari. Developed plants in separate poly bags were further shifted in selected sites of Herbal garden followed by proper water supply and fulfillment of their requirements time to time.

Views Related To Experiment**Starting of the experiment**



Morphological changes



Mature Plant of *Commiphora wightii* (Arnott) Bhandari



Plantation of new individuals of *Commiphora wightii* (Arnott) Bhandari



Result and Discussions

The plant *Commiphora wightii* (Arnott) Bhandari is a xerophytic with shrub nature belonging to family Burseraceae. It required less water in comparison of other mesophytic plants. Proper water removal from the field/cultivated areas as well as pruning needed for better growth and development.

Roots are well developed tap root, branched and deep in soil. Stems are branched, cylindrical, woody and spiny after maturation of the plant, smooth surface, gum produced by stem. Leaves are simple, petiolate, small, ovate, dentate margin, smooth surface. Flowers are small and in clusters.

The plant is currently facing problem for their existence. As it is a red listed Medicinal plant need for much protection as well as dissemination of varied parts of the country. This strategy will helpful for their further conservation. Older stem cuttings performed better for its rapid propagation in each one of the poly bags under favourable environmental condition. These are further found to be useful in dissemination of this plant in varied sites.

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