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RESEARCH ARTICLE

Macropropagation of Medicinal important Tree: *Stereospermum tetragonum* DC.

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Abstract

Unregulated amount of collection and trade of medicinal plants from the forests leads to the destruction of the plant species and *Stereospermum tetragonum* is under threat due to over-exploitation, there is a need for *ex-situ* Conservation of the species. *Stereospermum tetragonum* is usually propagated through seeds but has very poor rate of germination. Hence, an efficient, reproducible and systematic seed propagation technique using suitable treatment pre- treatments and sowing substrates has been standardized which can be helpful in its conservation strategy.

INTRODUCTION

Stereospermum tetragonum DC. (Bignoniaceae) is a medicinal plant that grows throughout tropical parts of Indian subcontinent, particularly in sandy soils of river beds in Northern India and other parts of Tamil Nadu. It is used in folk medical practices to treat diabetes mellitus.

In Ethno-medical practices the plant is also used as diuretic, anti-ulcer, anti-pyretic and its fruits cure migraine and bark is useful in the treatment of piles. It is used in the preparation of Chyavanprash (a popular Ayurvedic tonic), it is an ingredient of Dashamoola (Shukla S. 2009) and used in other Ayurvedic formulations such as Sahachardithailam and Dhanwantharamthailam (An excellent massage oils).It has antimicrobial, antiprotozoal and anti-inflammatory properties (Binutu et al. 1996).

Destructive harvesting practices have seriously reduced seed production and caused gradual erosion of its natural populations. Now this species is placed under the threatened category. The species is mainly propagated through seeds and collecting them becomes a laborious process as their pericarps are winged. Another difficulty it faces is poor germination rate and thus propagation through seeds in the wild is limited (Baul 2006). Hence, steps have to be taken to conserve this tree of great economic value by finding suitable methods for its large scale propagation and the present study was conducted to determine suitable planting substrate(s) and an effective pretreatment for germinating the seeds of *sterespermum tetragonum* while plant stand estimation and determination of seed requirement is done to establish a good plant stand in the field to ensure good crop yields.

Material and Method-

Collection of seeds-

The seeds of the plant were collected from FRLHT nursery (accession 1) and Assam (accession 2) and pre-treatments were done before sowing seeds.

Pre-treatment of the seeds-

There were 3 treatments including control and 3 replications for each treatment. For each replication 50 seeds were sown to explore the effect of pre-treatment on germination.
The pre-sowing treatments used were-

- Cow dung slurry
- Distilled water
- Control (Normal water)

The cow dung slurry is used for pre-treatment as it is a traditional method used by our ancestors.
It contains Nitrogen, Phosphorus, Carbon and other minerals which are helpful in shoot and root growth.
Distilled water was used to soak seeds because it requires water and oxygen to germinate. Due to endosmosis hydrolytic enzymes gets activated and seed germination was observed.

Seeds sowing substrate-

Three substrates were used for sowing seeds and to find out the better planting substrate for 50 seeds (2 replications of 25 seeds) in each substrate was carried out-

- Coco peat
- Coco peat+ Soil (3:1)
- Sand

Coco peat is used because it holds water and it has the ability to store and release nutrients to plants for extended period of time. It also has great oxygenation properties which is important for the development of healthy plants.

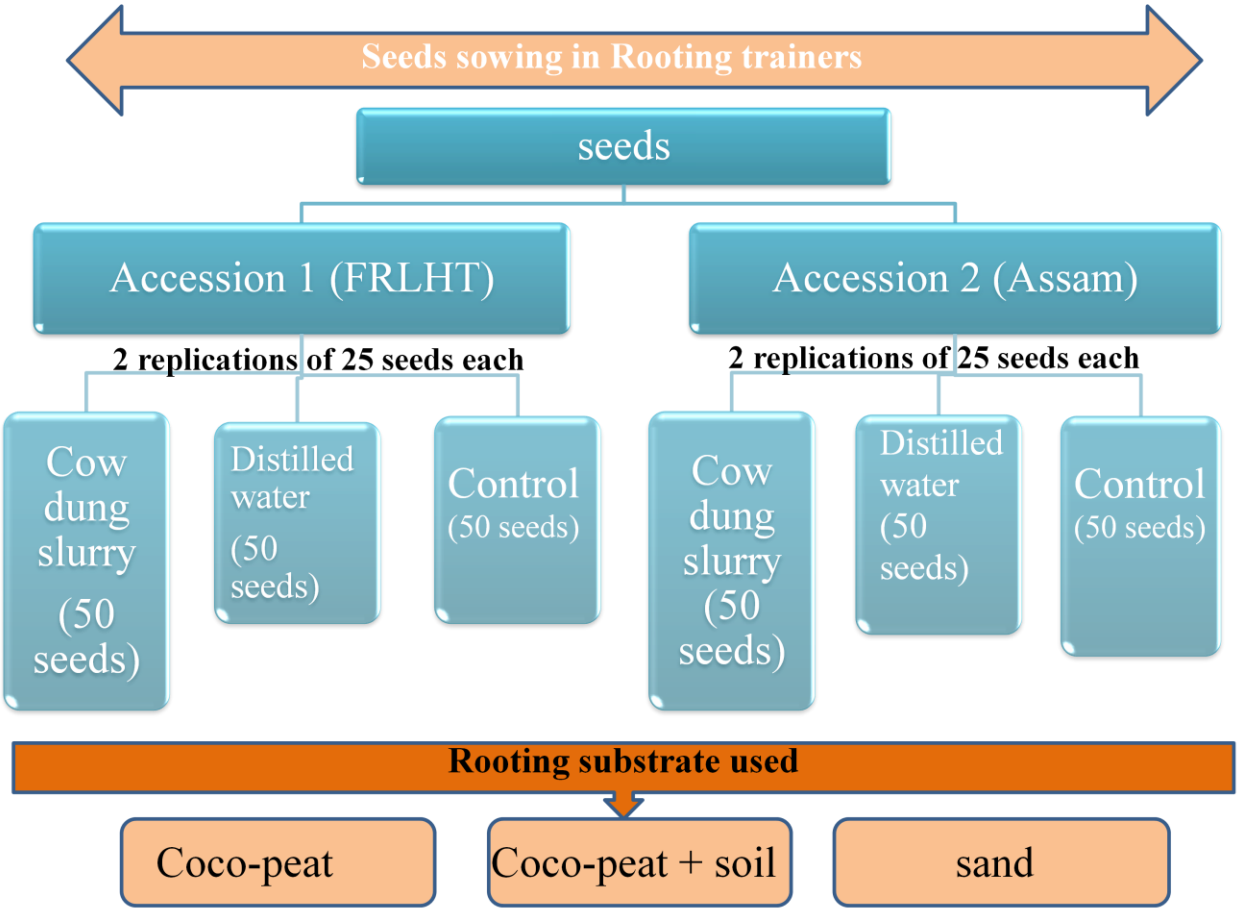
Sowing seeds –

Sowing of seeds in rooting trainers-

The trainers were filled with the rooting substrates (coco peat, coco peat+soil, sand), spread evenly in the trays, small holes were made for the seeds to put the seeds and seeds were covered with the substrate and seeds were watered using watering can.
Plants were watered every day and readings were taken out for growth of the plants.

Water testing-

Testing has been done for the water samples in which the seeds were soaked.



Mother plant of *Stereospermum tetragonum*, flower, pods.

Soaking of seeds of *Stereospermum tetragonum* in Distilled water, cow dung slurry and tap water.

Results –

Effect of different pre-treatments and sowing substrates-

Observations on seed germination experiments revealed that among the different planting substrates that were used (cocopeat, cocopeat+soil (3:1), sand), cocopeat gave the higher germination percentage(32%) of *S.tetragonum*.

The pre-treatments on seed germination were carried out and the test showed that the pre-treatment of distilled water was more effective as compare to other pre-treatments. Germination rate of seeds was highest in cocopeat as seed emergence occurred within 12 days and all seedlings took 15-18 days.

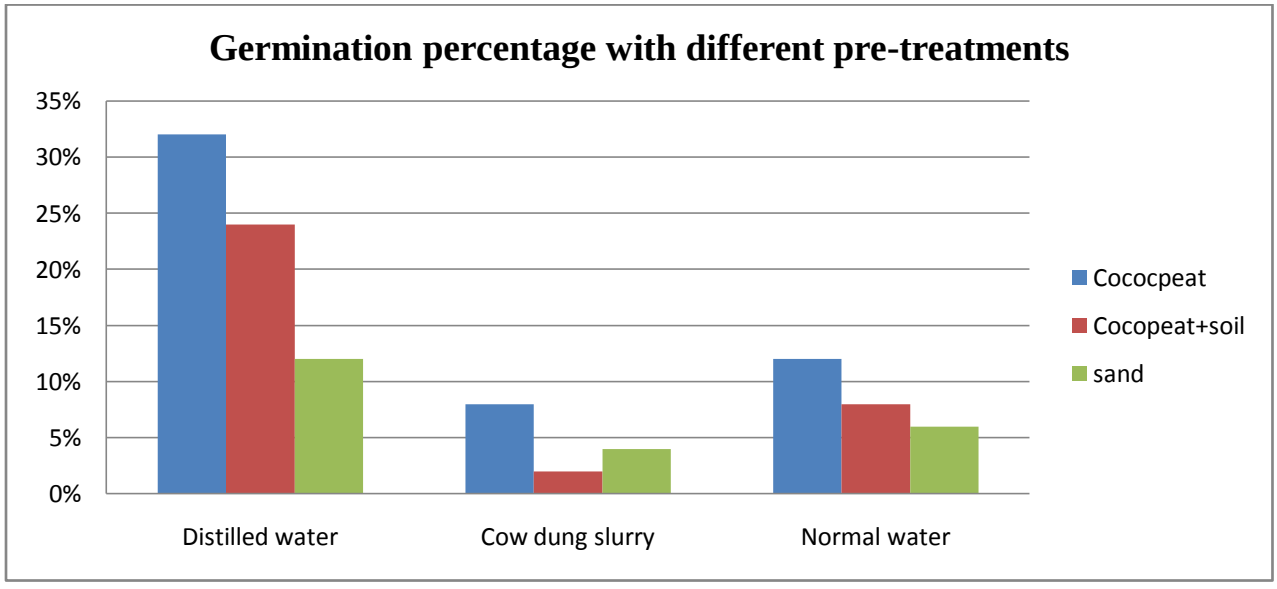


Table 2: Showing the difference in parameters present in distilled water and normal water.

parameters	Desirable limit as per IS:10500/2012	Permissible limit in absence of alternate source	Distilled water	Normal water
Chloride (as Cl),mg/l,Max	250	1000	19.99	347.89
Fluoride (as F) mg/l, Max	1.0	1.5	0.2	0.36
Magnesium (as Mg) mg/l, Max	30	100	0.97	58.33
Sulphate (as So4) mg/l,Max	200	400	<0.5	11.52
Calcium (as Ca),mg/l,Max	75	200	3.21	138.68
Total Alkalinity(CaCo3) mg/l, Max	200	600	13.6	286

Seeds sowing in tray

Seeds sowing in Rooting trays

Seedling in cocopeat

Seedlings of *Stereospermum tetragonum* in sand

Discussion-

Coco peat is a commonly used substrate in horticultural practices for growing seedlings.This substrate is beneficial for germinating seeds, as it is 100% organic with high water holding capacity, good aeration, has nutrient absorption qualities and is non-toxic. Improved growth of seedlings using coco peat has been reported in a number of species like *Stereospermum suaveolens* (Trivedi, Joshi, 2014),*Pterocarpus macrocarpus* and *Eucalyptus tereticornis* (Kumar, Marimuthu1997). The present work also showed coco peat as a suitable substrate for germination, as a maximum number of seedlings can be generated within few weeks. Similar observations were recorded for *Oroxylum indicum* (Trivedi, Joshi 2012) which had the highest percent of seed germination in coco peat.

S.tetragonum had maximum seed germination when soaked in distilled water, as similar for the seeds of *S. suaveolens* (Trivedi, Joshi,2014) and *Strychnous spinosa* since, the distilled water is having consistent content, it is free of chemicals and salt as per our distilled water testing results that would otherwise harm the germination as we have seen while the tap water contains certain minerals particularly calcium (Rehman, Harris& Bourne,1998),chlorine (Johnson, Stout, Brover & Carlton,1957), Fluoride (Chakrabarti & Patra,2013) , alkalinity (Patil, Apradh & Karadge,2012) and PH (Shoemaker & Carlson, 1957) are harmful for the seeds.

Conclusion-

Seed propagation using suitable pre-treatment and sowing substrate for *Stereospermum tetragonum* has been standardized which can be helpful in its conservation strategy.

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