

Nursery Techniques of Some Woody Plant in Bastar Forests Chhattisgarh



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Abstract

The present investigation was carried out during 2019 at Munjla forest nursery in Bhanpuri forest range (19°18'30 N latitude, 81°51'2 E longitude) of Bastar district, CG. The woody plants namely *Shorea robusta*, *Terminalia arjuna*, *Dalbergia sissoo*, *Pongamia pinnata*, *Gmelina arborea*; *Mangifera indica*, *Acacia nilotica*, *Syzygium cumini* and *Azadirachta indica* etc. was measured and information on the current nursery technique in Bastar region is known during study. Nursery practices such as seed sowing, planting, watering, weeding, transplanting, disease control, fungicides requirements are managed and maintained in each nursery bed. The observations on different characters viz. collar diameter, shoot height were recorded for individual plants.

It was found that, the mixture of soil, sand and FYM should be use for the successfully growth of root stocks in nursery. Some woody plants like *Gmelina arborea* should be establish with the application of Arbuscular Mycorrhizal fungi (AM fungi) particularly in saline soil. Selection of superior genotypically suitable trees such as *Madhuca indica* should be raised for the improvement of the woody tree in nursery. Seed sowing pre-treatment was significant effort on germination of *Dalbergia sissoo* (Roxb.). It should be adopt during the seed sowing at nursery. The present study is the suitable nursery techniques for the better growth of woody plants and their seedlings.

Keywords: Nursery, Woody, Seed, Shoot, Bed, Germination, Seedlings Etc.

Introduction

Woody plants are plants that survive for more than year and produces wood. Woody plants are usually either trees and shrubs. These are usually perennial plants. These grow in diameter every year as additional wood is made. Many households and communities depend on trees for the provision of goods and services that include fuel wood, edible fruits or herbal medicines and non-wood forest produces (NTFP). Trees also provide contribute disproportionately to ecosystem function including biomass and carbon storage. These plants have substantial value beyond their economic value. Much erosion frequently harvested products are edible fruits, firewood, and timber. The population of woody plant species and its future vigour is dependent on regeneration potential of tree species. The status of tree population and the persistence of existing species in future forest amount of different life phases of a species composition depend ample are on therefore, an even-handed population of adult, sapling and seedling of tree species is necessary for better functioning and maintenances. The future of each and every tree depends on the source of seed and the quality of the seedlings. the scattered information on the nursery techniques of 16 local tree species in reported by Bisht et al. (1998). Cultivation of important woody species with the goal of conserving them hampered by little, or no information on how such species can be propagated or their seedlings established. The experiments included sexual and vegetative propagation, as well as a seedling growth experiment (Nyamukuru et al, 2014). In some woody plant species are different to regenerate under in natural conditions. Some woody species are seed viability is also less because of which their regeneration capacity is low. The seedlings of these species are propagated and expanded by such techniques to be adopted in the nursery. Under nursery condition, the development of such species is managed by nursery techniques.

Plants maintain and expand their population over time by the processes or regeneration. Regeneration includes seed production and the maturation of seeds so that they are readily dispersed (Barnes et al.

1998). Propagation of such woody species in the nurseries is a means towards conserving their genetic stocks. Through the nurseries it is possible to make available planting material of these species for plantation with the large scale demand for quality forest plants and the poor availability of good quality seed, it has become imperative that forest nurseries should be managed professionally to produce the desirable quality of plants. Healthy plants that produce good demand for wood, fuel, fodder, fruits, non-wood forest produce and even decorative species are produced in the nursery. Trees species which are difficult propagation by seeds, those species are propagated by Vegetative propagation. Types of propagation are used for propagation of woody plant species by which germination of seeds has achieved good results. Therefore, the nursery technique of woody plants nine (09) species namely *Shorea robusta*, *Terminalia arjuna*, *Dalbergia sissoo*, *Pongamia pinnata*, *Gmelina arborea*; *Mangifera indica*, *Acacia catechu*, *Syzygium cumini* and *Azadirachta indica* etc. in the nursery were conducted to obtain information on the current nursery technique in Bastar region.

Materials And Methods

The study was carried out during 2019 at Munjla forest nursery in Bhanpuri forest range (19°18'30 N latitude, 81°51'2 E longitude) of Bastar district, CG. The woody plants namely *Shorea robusta*, *Terminalia arjuna*, *Dalbergia sissoo*, *Pongamia pinnata*, *Gmelina arborea*; *Mangifera indica*, *Acacia nilotica*, *Syzygium cumini* and

Table No. 01 Seedling height and collar diameter of woody plants at Munjla Nursery, Bhanpuri forest range, Bastar district, CG.

S.N.	Name of Woody plants		Seedling height (in cm)	Collar diameter (in cm)
	Local Name	Botanical Name		
1.	Sal	<i>Shorea robusta</i>	79	0.62
2.	Arjun	<i>Terminalia arjuna</i>	64	1.99
3.	Sissoo	<i>Dalbergia sissoo</i>	64.5	0.59
4.	Karanj	<i>Pongamia pinnata</i>	49	0.85
5.	Khamar	<i>Gmelina arborea</i>	91	1.90
6.	Mango	<i>Mangifera indica</i>	43	0.50
7.	Khair	<i>Acacia catechu</i>	48	0.66
8.	Jamun	<i>Syzygium cumini</i>	21	1.25
9.	Neem	<i>Azadirachta indica</i>	48.5	0.60

The observation on woody plants and their seedling height and collar diameter were presented in table 01. Similarly the average height and average collar diameter of selected woody species i.e. *Shorea robusta* (seedling height h 79 cm, & collar diameter 0.62 cm), *Terminalia arjuna* (seedling height 64 cm, & collar diameter 1.99 cm), *Dalbergia sissoo* (seedling height 64.5 cm, & collar diameter 0.59 cm), *Pongamia pinnata* (seedling height 49 cm, & collar diameter 0.85 cm), *Gmelina arborea* (seedling height 91 cm, & collar diameter 1.90 cm), *Mangifera indica* (seedling height 43 cm, & collar diameter 0.50 cm), *Acacia nilotica* (seedling height 48 cm, & collar diameter 0.66 cm), and *Azadirachta indica* (seedling height 48.5 cm, & collar diameter 0.60 cm) were recorded and presented in table 02.

The seedling growth of woody plant species were reported. The height of *Gmelina arborea*

Azadirachta indica etc. and their nursery techniques are observed during the study .the seeds of all species are collected from the plus trees of the Bastar forests, Chhattisgarh . Seeds were shown in nursery beds in a systematic order and the size of each nursery beds of such species is made 1meter wide and 10 meter long. The depth of the nursery bed is kept 10 -15 cm. Seedlings of all nine woody species and the young ones have to be taken care properly. The nursery practices such as seed sowing, planting, watering, weeding, transplanting, disease control, fungicides requirements are managed and maintained in each nursery bed. The observations on different characters viz. collar diameter, shoot height were recorded for individual plants during may 2019 – June 2019 in the munjla nursery site Bhanpuri forest range, Bastar district, CG.

Results and Discussion

The study is investigated under Nursery techniques which are currently being used for some woody plants raising. Seed collection and sowing, equipment for nursery, management of seedlings, seedling growth & germination percentage and diseases management etc were recorded at Munjla Nursery, Bhanpuri forest range. The data recorded on various characters are presented in table 1.

seedling was found maximum which is 91 cm followed by *Shorea robusta* (79 cm) while the minimum height of seedling was recorded on *Syzygium cumini* (21 cm) followed *Mangifera indica* (43 cm).

In nursery stage, the biofertilizer application and growing environment of *Gmelina arborea* (agro net shade and open field condition) was reported by the many researchers (Maharana et al. (2018), & Patil et al. (2018). Swamy et al, (2013) worked that the species *Gmelina arborea* Roxb.(Verbenaceae) is an economically and also medicinally important forest tree. It was found that the height growth was 91.00 cm in *Gmelina arborea* seedlings followed by the *Shorea robusta* seedlings (79 cm) in the Munjla nursery of study site. Whereas Maharana et al, (2018) was reported the growth parameter such as seedling height 156.83 cm and collar diameter which is 13.20 cm. with the application of biofertilizers (12

treatments) after 30 days old seedling. In our study we have observed the average collar diameter is only 0.15 cm in *Gmelina arborea* followed by *Terminalia arjuna* (0.15 cm). The seedling growth of the *Gmelina arborea* tree in the Munjla nursery were discussed with the similar result were reported by Patil et al, (2018). They reported that the seeds sown under (open field condition) show the higher germination percentage i.e. 12.35 % percent and seedling height is 5.91 cm and collar diameter was 0.094 cm. In our study average seedling height is 7.58 cm and 1.5 cm is average collar diameter is recorded in *Gmelina arborea* at Munjla nursery. The seedling growth of the *Pongamia pinnata* tree in the Munjla nursery were observed and the seedling height is 49 cm and collar diameter is 0.85 cm and the average height is 4.08 cm and average collar diameter is 0.07 cm followed by *Gmelina arborea* seedling height which is 91 cm. similar observed were also made by Divakara and Das (2011). They studies the variability and seed morphometric traits of the wild of *Pongamia pinnata* for the ascertaining the growth variability of the genotype population. Rout and Nayak (2015). Experimented that the vegetative propagation of Karanja (*Pongamia pinnata* L.Pierre) through stem cuttings showed maximum sprouting (100%),

Divakara and Das (2011) revealed that the maximum plant height was 151.1 cm and collar diameter was 3.1 cm of CPTs (Candidate plus tree) of *Pongamia pinnata*.

The growth of seedlings in Munjla nursery i.e. is presented in table (01). The analysis showed that *Terminalia arjuna* seedling height (64 cm) higher than the *Pongamia pinnata* seedling height (49 cm) and collar diameter (0.85 cm) in this study the total seedling height of *Terminalia arjuna* was 69 cm and total collar diameter was 1.99 cm which highest collar diameter among all seedling at Munjla nursery. The result regarding *Terminalia arjuna* seedling height & collar higher growth of study are compare with similar research study Kumar et. al. (2017) was observed the mean height of seedling of *Terminalia arjuna* tree (156.24 cm) and the mean collar diameter was highest than our study (1.18 cm) while is 1.99 cm in *Terminalia arjuna* seedlings. Significant variation were

Table No. 02 Average seedling height and average collar diameter of woody plants at Munjla Nursery, Bhanpuri forest range, Bastar district, CG

S.N.	Name of Woody plants		Average Seedling height (in cm)	Average Collar diameter (in cm)
	Local Name	Botanical Name		
1.	Sal	<i>Shorea robusta</i>	2.19	0.017
2.	Arjun	<i>Terminalia arjuna</i>	4.92	0.15
3.	Sissoo	<i>Dalbergia sissoo</i>	4.6	0.04
4.	Karanj	<i>Pongamia pinnata</i>	4.08	0.07
5.	Khamar	<i>Gmelina arborea</i>	7.58	0.15
6.	Mango	<i>Mangifera indica</i>	3.58	0.04
7.	Khair	<i>Acacia catechu</i>	4	0.05
8.	Jamun	<i>Syzygium cumini</i>	1.9	0.11
9.	Neem	<i>Azadirachta indica</i>	4.4	0.05

Conclusion and Suggestions

The current nursery techniques for seedling development of woody plants were investigated. The observation on woody plants and their growth parameter i.e. seed sowing, seedling height and collar

observed in seedling height and collar diameter growth due to woody tree species raised in Munjla nursery the seedling growth height of *Dalbergia sissoo* was recorded in the Munjla nursery that was 69.5 cm and collar diameter 0.59 cm followed by *Terminalia arjuna* seedlings. Dhillon et al, (2014). experimented that seed germination improves with scarification, gibberellic acid treatments and seasonal variations in Woody/ tree species viz. *Aegle marmelous*, *Madhuca indica*, *Michelia champaca* and *Terminalia chebula*.

The different nutrient treatment produced significant variation in collar diameter in alkaline and normal soils with the normal soil, iron treatment significantly enhanced the collar diameter which recorded 1.39 cm and the shoot length recorded from 43.50 cm to 110.1 cm in normal soils (Revathi et al. (2013). The seedling growth observed of *Syzygium cumini* tree in the Munjla nursery. The seedling height was 21 cm and collar diameter was 1.25 cm followed by *Dalbergia sissoo* seedlings.

The pre-sowing treatments of *Syzygium cumini* was observed that in KOH treatment seedling height 30.21 cm and in NaOH treatment observed seedling height 30.63 cm and the collar diameter in both treatments was observed similar which is 1.16 cm (Gaikwad & Borkar (2018). In both pre-sowing treatments observed the seedling height 30.21 cm (in KOH treatment) and 30.63 cm (in NaOH treatment) which is higher than our observed seedling height is 21 cm but the collar diameter 1.16 cm is less than our studies collar diameter which is 1.25 cm observed without pre-sowing treatment. The average height (cm) and average collar diameter was also recorded. The average height of *Gmelina arborea* seedling was found maximum of Munjla nursery (7.58 cm) while the minimum height of seedling was recorded on *Syzygium cumini* which is 1.9 cm followed by *Shorea robusta* (2.19 cm).

The result are in agree with the finding of Kumari et al. (2019) in *Mangifera indica*. The shoots and root length was consequently increased in *Gmelina* species. With the Arbuscular mycorrhizal inoculation in mycorrhizal *Gmelina* plants observed by Dudhane et. al. (2011).

diameter were recorded in Munjla nursery, Bhanpuri Forest Range . The height of *Gmelina arborea* seedling was found maximum which is 91 cm followed by *Shorea robusta* (79 cm) while the minimum height of seedling was recorded on *Syzygium cumini* (21 cm)

followed by *Mangifera indica* (43 cm) with the suitable growth hormones.

The seedling collar diameter of *Terminalia arjuna* was 1.99 cm which highest collar diameter among all seedling followed by *Gmelina arborea* (1.90 cm) while the minimum collar diameter was 0.50 cm observed on *Mangifera indica* followed by *Dalbergia sissoo* (0.59 cm) at nursery site. The average height of *Gmelina arborea* seedling was found maximum (7.58 cm) while the minimum average seedling height was recorded on *Syzygium cumini* which is 1.9 cm followed by *Shorea robusta*.

The average collar diameter of *Gmelina arborea* and *Terminalia arjuna* was found maximum of 0.15 cm while the minimum average collar diameter was recorded on *Shorea robusta* which is 0.017 cm followed by *Dalbergia sissoo* (0.04 cm). The seedling growth of *Pongamia pinnata* was found maximum seedling height 76.5 cm and collar diameter 1.89 cm which is highest among all seedlings followed by *Terminalia arjuna* (75.5 cm) while the minimum seedling height 14.3 cm and collar diameter 0.39 cm was found in *Syzygium cumini* followed by *Mangifera indica* (21.4 cm).

The seedling height of *Syzygium cumini* is less than 21 cm and collar diameter 1.25 cm during the observation. The average collar diameter of *Pongamia pinnata* was found maximum 0.14 cm and the minimum average collar diameter was observed on *Syzygium cumini* cm followed by *Terminalia arjuna* (0.04 cm).

The average seedling height of *Mangifera indica* 6.31 cm and average collar diameter 0.08 cm is higher than the average seedling height 3.58 cm and average collar diameter 0.04 cm in Munjla nursery. The present study we can understand the suitable nursery techniques for the better growth of seedling with the following suggestion.

The mixture of from soil, sand and FYM should be use for the successfully growth of root stocks in nursery. Some woody plants like *Gmelina arborea* should be establish with the application of Arbuscular Mycorrhizal fungi (AM fungi) particularly in saline soil. Selection of superior genotypically suitable trees such as *Madhuca indica* should be raised for the improvement of the woody tree in nursery. Seed sowing pre-treatment was significant effort on germination of *Dalbergia sissoo* (Roxb.). It should be adopt during the seed sowing at nursery. It was recommended by the Ikbal *et.al*, (2015) that different date of sowing and different seed pre-treatment significant effects on germination.

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