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The Exquisite *Neolamarckia cadamba* (Kadam) Tree: A Valuable Natural Resource with Untapped Potential

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INTRODUCTION

Agroforestry is a sustainable land and crop management system in India that aims to increase yields by growing arable crops, animals, and woody forestry crops on the same land unit. It includes conventional and contemporary land-use arrangements, creating jobs and value addition for rural and urban residents. Agroforestry systems have a great potential for sequestering carbon, they may act as a carbon sink and mitigate the negative effects of climate change on the planet., agroforestry in India has the potential to sequester 0.25 to 19.14 Mg C ha^{-1} yr^{-1}.

Neolamarckia cadamba, also known as "Bur flower tree" or Kadam, is an indigenous Indonesian plant preferred for forest plantations due to its quick growth and straight stands. Its wood is valuable in forestry industries like matchsticks, plywood, furniture, pulp, paper, and boards, and is extensively planted in privately owned forest lands.

Climate and Soil requirements

Neolamarckia cadamba is a tropical plant that thrives in warm, muggy weather, thriving in various soil types and pH ranges. It can grow in poor soils and is resistant to drought. Light is crucial for survival, and it can survive temperature variations of 3°C to 15.5°C. It requires 1500-5000mm annual rainfall and an altitude of 300-800 meters above sea level.

Physiology

Neolamarckia cadamba is a large tree with a cylindrical bole and broad crown, growing up to 45 meters in height. Its branches are layered and have deep grey bark. The tree produces tiny, orange flowers and fruit with 7,000 seeds. The wood is strong and light weight, with white heartwood with a yellow tint and a straight grain. It lacks a pronounced flavor or aroma. The tree's wood properties are not easily identifiable apart from sapwood.

Fig. Block Plantation of 3-year-old *Neolamarckia cadamba* at different spacing's at RLBCAU, Jhansi

Propagation and Planting

Neolamarckia cadamba can be propagated by both seed and vegetative cuttings

Seed propagation: Pick the seeds out of ripe fruit and wash them to get rid of any dirt. Either directly into the ground or in seed trays loaded with a well-draining seed compost, the seeds can be sown. Maintain moisture in the seedbed and cover the seeds with a thin layer of soil or compost. It usually takes two to four weeks for germination.

Vegetative propagation: Harvest healthy, mature tree stem cuttings, then remove the leaves from the lower portion of the cutting. Plant the cutting in a rooting medium that drains properly, like sand mixed with peat moss. To keep the rooting media moist, put the cutting in a warm, humid area and spray it frequently. It usually takes 4–8 weeks to root.

Planting

When planting, pick a spot with well-drained soil that gets full sun to light shade. Create a little bigger hole than the root ball and fill it with soil that has been combined with organic materials. After planting, water the free well to maintain a continuously moist soil. Throughout the growing season, fertilise the tree with a balanced fertiliser. It is noteworthy that *Neolamarckia cadamba* exhibits invasive traits in certain areas, thus prior to planting, make sure there are no constraints or laws in place.

Uses and benefits of *Neolamarckia cadamba*

Agroforestry: The tree is frequently utilised in agroforestry systems because it can increase soil fertility and give crops shade.

Reforestation: The tree's rapid growth and ability to aid in the restoration of deteriorated areas make it useful for reforestation.

Timber : The wood of the tree is an important resource for building, furniture, flooring, rafters, shafts, crates, boxes, teachests.

Erosion control: On slopes and riverbanks, *Neolamarckia cadamba* can be utilised to reduce erosion.

Fuelwood: The tree is a valuable source of energy for rural communities because of its high yield of charcoal and fuelwood.

Wildlife habitat: Many different kinds of species can find food and refuge under the tree.

Cultural significance: Many indigenous tribes of Southeast Asia find cultural value in the tree, and they employ it for ceremonial and ritualistic purposes.

Medicinal properties: In Ayurvedic and conventional medical systems, cadamba has long been used as a medication. Fever, diarrhoea, and skin disorders can all be treated using various portions of the tree, such as the bark, leaves, and roots. Cadamba's bioactive components, including phytochemicals like quinovic acid, cadambagenic acid, sitosterol, cadamine, and cadambine, are increasingly being explored for potential medicinal applications.

Potential problems and solutions

Like any other plant, *Neolamarckia cadamba* can be affected by a variety of problems. Some of the most common issues include:

i. **Leaf spot:** This is a fungal disease that results in brown or black spots on the leaves. It is often caused by high humidity and poor air circulation. To prevent leaf spot, make sure the tree is planted in a location with good air circulation and avoid overhead watering.

ii. **Stem cankers:** This is a fungal or bacterial disease that causes raised, sunken, or discolored areas on the stem. To prevent stem cankers, make sure the tree is planted in well-drained soil and avoid wounding the stem.

iii. **Termites:** Termites can infest the tree and cause damage to the wood. To prevent termite infestations, make sure the tree is planted in well-drained soil, and treat the soil around the tree with a termite-repellent.

iv. **Invasive:** *Neolamarckia cadamba* is considered invasive in some regions, it can spread aggressively and outcompete native species. It's important to check for any restrictions or regulations before plariting it and to prevent it from spreading in the wild.

v. **Other problems:** other common problems include caterpillars, mealybugs, and scale insects.

In order to effectively manage these issues, it's critical to keep an eye out for any indications of disease or infestation on the tree and to take prompt action. Often, the problem can be effectively controlled by simply removing and destroying the affected parts of the tree; in other situations, chemical treatments may be required. It's also a good idea to seek advice and direction from a local horticulturist or expert for advice specific to your area.

Conclusion and resources for further information

Originating in Southeast Asia, *Neolamarckia cadamba* is a rapidly growing tree. It is prized for its lumber, medicinal qualities, and capacity to enhance soil fertility and manage erosion in addition to its lovely blooms and foliage. When growing *Neolamarckia cadamba*, the tree needs frequent fertilisation, full sun to partial shade, well-drained soil, and regular watering. Both seeds and vegetative cuttings can be used to propagate it. The tree is useful and beneficial in many ways, but it's regarded as invasive in some areas, so before planting it, make sure you know about any limits or rules and stop it from spreading in the wild.

For further information, you can consult the following resources:

a) Forest Research Institute Malaysia, which provides detailed information on the biology. ecology, and management of *Neolamarckia cadamba*.

b) International Journal of Agriculture and Biology, which has many scientific articles on the tree.

c) The National Tree Seed Centre, which provides information on the collection, storage,
d) and germination of *Neolamarckia cadamba* soods.
e) Local experts or horticulturists, who can provide specific recommendations and guidance for growing the tree in your area.
f) Extension Service in your area, that can provide information on how to grow and care for Neolamarckia cadamba, as well as information on any potential problems and solutions.

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