

Transforming Timber Plantations: Advancing Biodiversity and Sustainable Wood Production with Mixed-Stand Silviculture

Andres Susaeta *

Department of Forestry and Wildlife, Stanford University, Stanford, USA

DESCRIPTION

The administration of *Araucaria angustifolia* (Bertol.) Kuntze plantations, a severely endangered species, presents a chance to lessen the loss of regional biodiversity, support the production of wood, and support the preservation of the Atlantic forest. In unevenly aged mixed plantations, monospecific stands can be converted by interplanting timber species that need canopy protection. The founding of Vell and *Cabralea canjerana*. Mart in an unevenly aged mixed stand with early competition beneath the shade of *A. angustifolia*. The establishment of seedlings was successful five years after planting: 75% of the plants survived and reached a height of nine meters. The Diameter at Breast Height (DBH) increment of *A. angustifolia* was greater in mixed plots than in pure plots. Within a 5-meter radius, up to two *A. angustifolia* neighbors showed the maximum *C. canjerana* growth. In three additional *A. angustifolia* stands of varying ages, the introduction of *C. canjerana* proved to be effective. This data suggests that it is feasible to transform even-aged stands of *A. angustifolia* into mixed stands that are unevenly aged, with advantageous outcomes for both species. In this approach, it is possible to establish a valuable native timber species outside of a rainforest, even if it needs canopy protection during its early years.

Worldwide demand for timber products is rising, and silvicultural systems and forest restoration are required to provide a number of goals (food, water, and CO₂ sequestration). In order to create plantations with greater ecological and economic resilience, new forest stands for timber should be built as stable combinations where species do not compete with one another. As a complementing forest habitat for wild species, mixed forest silviculture appears to be a feasible solution to address the needs for wood production and conservation while also advancing restoration goals. Furthermore, mixed plantings with native species offer a chance to lessen the loss of biodiversity in the area and support the preservation of endangered species. The majority of plantations used to produce

timber worldwide are even-aged monospecific stands. Only heliophilous species may be utilized if they are transformed to even-aged mixed stands, in which case all species must be able to withstand full light upon planting. Nonetheless, valuable species that need canopy protection (i.e., species that do not withstand frosts, intense radiation, or high evaporative atmospheric demand) can be planted if they are transformed into uneven-aged mixed plantations. These environmental needs are linked to the physiological traits of every species, including their ability to withstand temperature stress, adapt to reduced water availability, and tolerate shade. Big trees can reduce abiotic stress and thereby promote the establishment of shade-tolerant species, even though they can also limit the amount of light available to shade-intolerant species

CONCLUSION

The likelihood of survival is increased by reducing environmental stress in the early post-planting stages, primarily in the first two years. Then, in mixed-stands, the interactions that arise between plants of different species can influence their development and mortality in a favorable or negative way, leading to either competition or facilitation. *C. canjerana* seedlings are shielded from the environment during their establishment by the canopies of *A. angustifolia* plantations. However, as more trees are introduced to the stand, competition between species inhibits the growth of *A. angustifolia*. Then, mixed stands with uneven ages could offer a fair chance to generate important timber species that are being taken out of native rainforests. The Gymnosperm species that gives the *Araucaria* Humid Forest its name is *Araucaria angustifolia* (Bertol.) Kuntze; it is classified as a critically endangered (CR) species on the IUCN Red List of Threatened Species. The over-extraction of trees from the original forests for their superior timber, as well as the growth of agricultural and urban areas, were the main causes of its population decline.

Correspondence to: Andres Susaeta, Department of Forestry and Wildlife, Stanford University, Stanford, USA, E-mail: andres.susaeta52@oregonstate.edu

Received: 29-Jan-2024, Manuscript No. JFOR-24-30185; **Editor assigned:** 01-Feb-2024, PreQC No. JFOR-24-30185 (PQ); **Reviewed:** 15-Feb-2024, QC No. JFOR-24-30185; **Revised:** 22-Feb-2024, Manuscript No. JFOR-24-30185 (R); **Published:** 29-Feb-2024, DOI: 10.35248/2168-9776.24.13.493.

Citation: Susaeta A (2024) Enhancing Ecosystem Services: Short Rotation Forestry and Coppice for Sustainable Biomass Production. J For Res. 13:493.

Copyright: © 2024 Susaeta A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.