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Recovery and Conservation of *Araucaria* Forest in Brazil through Plantation's Establishment: A Genetic Point of View

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Abstract

The *Araucaria* forest is a particular ecosystem formed by an admixture of two distinct vegetations: the tropical afro-Brazilian and the temperate austro-Brazilian floras. This peculiar forest is part of the Atlantic forest domain, one of the most endangered Brazilian biomes. The dominant species in this ecosystem is the Brazilian pine (*Araucaria angustifolia*), an ecologically and economically important species in southern Brazilian highlands. Their highly nutritive seeds are appreciated by humans and animals, comprising the most important source of food during the winter in the araucaria forests. Besides, the commercialisation of these seeds constitutes a significant source of income to an undetermined number of small farmers. Although covering around 200,000 km² of the southern states of Brazil at the beginning of the 20th century, the intensive exploitation process reduced its area to about 3% of the original forest. Brazilian pine remnants hold abundant genetic diversity. However, the protection of the species in a genetic view depends on the conservation of extant populations, promotion of connectivity among them and support of natural regeneration. Recently, it has been suggested that establishment of plantations facilitates forest regeneration in grassland faster than natural succession, encouraging its use in recuperating degraded areas.

In this study, molecular markers were used to explore patterns of changes in the original genetic structure of plantations by comparing patterns of genetic structure between plantations and natural populations of Brazilian pine. Signatures of artificial selection favouring gene(s) possibly related with plant growth through selection of seedlings used in the plantations' establishment and the maintenance of plus-trees in the stand were detected. Besides, the results suggest that remnants of Brazilian pine preserve potential to supply plant material with sufficient genetic diversity for the species conservation through plantations. Hence, establishment of plantations may considerably assist the conservation of araucaria forest in southern Brazil. Additionally, the incorporation of local knowledge and skills, as well as the rational exploitation of secondary forest products and agroforestry by local people will likely increase the success of reforestation enterprises.

Keywords: Brazilian pine, genetic resources, planted forest, species recovery