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Regeneration complexities of *Pinus gerardiana* in dry temperate forests of Indian Himalaya

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Abstract

Pinus gerardiana is often considered an important species because of its influence on the ecological processes and economic dependence of tribal people in Himalayan dry temperate forest. With large number of biotic and abiotic factor affecting *P. gerardiana* in Himalayan dry temperate forest, there is a crucial need to understand the regeneration dynamics of this tree species. This research was conducted in mature *P. gerardiana* forests of Kinnaur District, Himachal Pradesh, India, to understand regeneration processes in the species. *P. gerardiana* regeneration success is lower than the requirement of sustainable forest, but varies widely among sites in the temperate forest Himalayas. Results suggest that in different forests regeneration success that are influenced by collection of seed (nut) by tribal people, grazing and browsing, soil sand and nutrient content. Regeneration varied with Sites and it was observed that site with more *P. Gerardiana* regeneration have less biotic interference, soil sand and litter depth, but more soil nutrient availability. This research elucidates associations between successful *P. gerardiana* regeneration and site factors such as soil nutrient availability. More forest surveys are required to understand the conditions necessary for successful *P. gerardiana*.