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"Development on the margin"

Carbon Stock Changes through Different Areas of Gaps in a Mixed Beech — Hornbeam Stand of Northern Iran

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Abstract

All natural forests store C in phytomass, forest floor and soils. The capacity of natural forests to sequester CO_2 and store C emitted as a waste product of our industrial activities. Forest soil is important in sequestering atmospheric CO_2 and emitting trace gases that are active and enhance the greenhouse effect. The present study aimed to examine the impacts of small (85.12 m^2), medium (325.21 m^2), large (512.11 m^2) and very large (723.85 m^2) gaps on soil carbon accumulation in a mixed beech - hornbeam stand of northern Iran. Soil samples were taken from 0–15, 15–30 and 30–45 cm depths and gap centre, edge and closed canopy positions. Some of soil physico - chemical characters were measured in the laboratory. The following formula was used to calculate the carbon accumulation (g/m^2) at different depths of mineral soil as Cc (g/m^2) = 10000 $\times C(\%) \times Bd(g/cm^3) \times e(cm).WheretheCc(g/m^2)$ is the carbon sequestration at the mineral layer, C (%) is the carbon concentration, the Bd is the bulk density (g/m^3) and e is also the thickness of the mineral layers (cm). Carbon accumulation showed significantly increasing trend from small gaps to very large gaps. This trend is mainly caused by litter's decomposition rate. It was found that gap position had a profound effect on carbon stock as the most values observed in gap centre. According to the results, soil upper layers devoted in more carbon accumulation compare to deeper soils. Our results suggest that windthrow should be considered as an effective factor on soil dynamics that are tied to forest ecology. This is significant for evaluating forest management policies and practices with respect to impacts on soil and also for the use of soils as indicators of forest ecosystems.

Keywords: Gap area, gap position, soil characters , windthrow

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