

Preliminary results of litter decomposition and litterfall rates in Eldivan Mountain in Turkey

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Abstract: Chemical, physical and biological breakdown of the falling litter from its organic state to inorganic compounds is called decomposition. In forest ecosystems, knowledge of the amount of litterfall and decomposition presents very important information about the ecosystem functions such as primary production, carbon and nutrient cycles, as well as important processes including global climate change. In forest ecosystems, litterfall constitutes the majority of the source of the organic layer and the humic materials both above and below ground. By this way, vast amounts of organic material and energy go into the soil annually. Depending on chemical composition of organic material, nutrients are formed by means of decomposition and this process affects the soil biota. Litterfall amount is affected by climate, precipitation, vegetation period, growth capacity, water holding capacity, plant composition, and actual evaporation, while tree growth and net primary production are affected by litterfall. Litterfall and leaf litter decomposition are important ecosystem processes that rarely have been quantified for conifer forests in Turkey. That is why this study was aimed to measure amount of litterfall and decomposition in different development ages of black pine (*Pinus nigra* Arnold) forest (40°34'41" - 40°20'38" N latitude and 33°36'00" - 33°25'10" E longitude) in Eldivan Mountain where is a part of semiarid region of Central Anatolia. In this area mean annual temperature is close to 10 °C and mean annual precipitation is about 500 mm. There were three different age classes and 4 sampling area on each age classes. Nine litter traps were placed on each sampling area and totally 108 litter traps were placed in this study area. Litterfall was collected from all litter traps bimonthly for one year and the amount of litter fall was estimated for 1 m² where the knowledge of 0.113 m² area of litter traps were used. All collected litter samples were carried to the laboratory, air dried, weighed and sorted into six fractions (needle, twigs, male cone and cone, bark, lichen and a rest fraction). Pine needles were then sealed into fiberglass bags with 1 mm mesh size and a surface area of 0.02 m² (10 cm x 20 cm). 216 litterbags containing 5 g air-dried leaf litter for each site were prepared and placed randomly at three different locations in different development ages of black pine forest. Three litterbags containing decomposed litter were randomly collected at bimonthly interval and then transported to laboratory. The litterbags were opened and the litter materials were air dried initially, brushed to remove adhering soil particles, and finally dried at 75 °C for 48 hours and weighed. According the preliminary results of this study the most litterfall was occurred in young age class black pine forest and that was approximately 70-75% more than those in middle and old age classes were. In all age classes more than 90% of litterfall was accumulated by needles and the rest was a mixture of bark, male cone, twig and cone. Additionally it has been estimated that 40-50% of needles were decomposed according the first year analyses of needle decomposition.

Keywords: Litterfall, Litter decomposition, Black pine, Eldivan Mountain