

## Determination of the effect of alder use on soil respiration and microbial respiration on forest rehabilitation studies

Mehmet Küçük<sup>1,\*</sup>, Sinan Güner<sup>1</sup>, Aşkın Göktürk<sup>1</sup>, Ahmet Duman<sup>1</sup>

<sup>1</sup> Department of Forest Engineering, Artvin Çoruh University Forestry Faculty, Artvin, Turkey

\* Corresponding author: sinanguner@artvin.edu.tr

**Abstract:** In this study, we investigated that the effects of microbial respiration and soil respiration on the forest rehabilitation works. For this purpose, degraded beech forest area was selected in Arhavi, Artvin. These were prepared for Beech planting, black alder planting, beech + black alder planting and control (non plantation) fields after clear cutting studies. Soil samples were taken 24 trial sites in these areas. Carbon emission was determined by using soda lime method in the rehabilitation areas. In the same area, soil samples were taken for microbial respiration by using incubation method in the laboratory conditions. Soil respiration studies were conducted between November 2014 and October 2016 and 11 measurements and also microbial respiration were made 6 measurements on time. According to these measurement results, soil respiration has been found that  $1,52 \text{ g C d}^{-1} \text{ m}^{-2}$  in beech areas,  $1,47 \text{ g C d}^{-1} \text{ m}^{-2}$  black alder areas,  $1,67$  beech+black alder areas and  $1,54 \text{ g C d}^{-1} \text{ m}^{-2}$  control areas in first year. At the end of the second year, soil respiration was found as 1,43, 1,52, 1,40 and 1,53  $\text{g C d}^{-1} \text{ m}^{-2}$  respectively. As a result of the study, there is a linear relationship between temperature and soil moisture. The average soil moisture in the study area was higher in the first year compared to the second year, while the soil temperature was lower. However, as a result of the microbial respiration in the planting areas was higher than in the control areas. The average microbial respiration values in the first year were higher than those in the second year due to changes in soil moisture and temperature.

**Keywords:** Beech forest, Black alder, Soil respiration, Soil temperature, Artvin