



Soil Erosion Protection Potential of Young Paulownia Plantation

Avgusta Stepchich and Christo Djodjov

INSTITUTE OF SOIL SCIENCE "NIKOLA POUCHKAROV", soil erosion, Bulgaria

Soil erosion is removal of soil and rock particles by water, wind, ice and gravity. It is widely recognized as a global soil threat. Soils impacted by different forms of erosion cover large areas around the world. While landscape, soil and climate conditions trigger soil erosion processes, the vegetation cover reduces the soil erosion risk. About 60 % of the area of agricultural land in Bulgaria is under erosion risk, which necessitates implementation of series of measures for soil erosion control.

The aim of this study is to determine the erosion protection potential and the loss of soil nutrients of young Paulownia plantation. Field experiments have been set up under unirrigated conditions at the experimental field for soil erosion studies of the N. Poushkarov Institute of Soil Science, Agrotechnology and Plant Protection near Suhodol. The local soils are Chromic Luvisols, moderately eroded. The altitude is 750 m and the slope gradient is 80. The experiment consists of four field plots for soil erosion studies, three of which planted with Paulownia Bellissima and a reference one with bare soil. The plants have been planted at a distance of 2 m between adjacent rows and 1 m between each two plants within the row. The size of each field plot is 32 m² (4 m width and 8 m length). The plots are equipped with containers for collecting the surface runoff caused by erosive rainfall events. Biometrics, including the root-striking of the plants, their growth in height, foliage cover (projection) and stem diameter, was studied from May 13th to October 21st.

The data reported cover the results from the studies during the first vegetation period after planting in the Spring of 2013. During the year four erosive rainfalls were observed with a total amount of 79.2 mm, resulting to a total amount of soil loss of 772 kg/ha from a planted plot and 551 kg/ha from bare soil. The total surface runoff is 156.7 m³/ha from planted plot and 153.1 m³/ha from bare soil. The total losses of N-NO₃⁻ are 0.994 kg/ha from planted plots and 0.718 kg/ha from bare soils and the losses of N-NH₄⁺ are respectively 0.042 and 0.117 kg/ha. The results from biometrics showed that 58 % of the plants were found to have stricken roots; an average growth of 0.3 m and a mean increase in the number of leaves with 3 were recorded.

The results reported here show that the losses of soil and nutrients from the field plots planted with Paulownia Bellissima are about 40 % higher than these from the plot with bare soil. This discouraging result needs further experimental and theoretical analyses. The research throughout the following years will give further information about the soil erosion protection potential of young Paulownia plantation.