THE FOREST LAND RECLAMATION AFTER LIGNITE OPEN PIT MINING IN THE SOUTH OF UKRAINE

Oleksandr Masyuk[1] **and Mykola Kharytonov**[2]
[1]*Oles Honchar Dnipro National University", Dnipro, Ukraine; almas63636@gmail.com*
[2]*Dnipropetrovsk State Agrarian and Economics University, Ukraine*

Lignite mining in Kropyvnytsky region has been performed in the last few decades in Alexandria district in the watershed of the two rivers (Ingulets and Beska). Semenovske - Golodkywske mine is the pit associated with the open extraction of brown coal. Rocks located above the coal layer are carried to the earth's surface during the process of brown coal mining. These rocks are represented by loess-like loam, red-brown, quartz, glauconitic sands, kaolin and carbonaceous clays. The main method of restoring disturbed lands is the forestry reclamation. Standing timber is represented by pine, sucker, acacia, oak plantations, which are pure and mixed stand. They were formed due to the artificial cultivation of these trees.

The aim of study is to assess the state of the forest plantation of acacia (*Robinia pseudoacacia* L.) cultivated in different site-specific conditions which arose after the extraction of lignite and the technical stage of reclamation. 15 sample sites (SS) in Alexandria forestry reserve were formed. Sample area differed by age (5–25 years), stand composition (pure and mixed), the composition of the rocks. Rocks differed in texture – loess-like loam (LLL), clay (C) sandy (S), the condition of moisture and topographic features. The survey was carried out in accordance with the requirements of forest trees taxation. Great variety, depending on landscape conditions, was observed in the studied plantations of acacia. The impact of anthropogenic factors is observed throughout the section and appears in technogenic relief formation, re-formation of dumps, rocks removal to the Earth surface. Elevation alternates with depressions. This leads to a variety of land cover in fertility and moisture. Techno sols are represented by loamy sediments, which are admixtures of clay, sand and lignite. The range of technosol moisture provision varies from moist to wet condition. The height of the stand in such conditions were, respectively, 11–12 m, diameter 12–14 cm, wood stock 83–96 m^3/ha, density is 0.8, the taxation index is I–Ia. The average growth for the year was 3.32- 3.84 m^3. Acacia plantations aged 11 – 13 years is a significant part of the plots. The forest stand reaches a height of 6 m and diameter of 8 cm at this age. The variation of cover density is ranging from 0.75 to 0.85. This leads to differentiation of stocks of wood 25–28 m^3/ha and the fluctuation of the average growth of 1.92 to 2.55 m^3. Eight-year-old stands differed among the lowest taxonomic indicators: height – 3 m, diameter 4 cm, the supply of wood – 6 m^3/ha, density - 0.7, the average increase of 0.75 m^3 per year The stand has a third index taxation. Thus, in the initial stages of development (10 years) pure stands of acacia have a third index taxation. Improvement of the taxation indices to the first level occurs with age. The average growth reaches its maximum at the age of 20-25 years – 3.84 – 4.15 m^3, and the current (in 15–20 years) – 7.8–9,5 m^3. Mixed stands are represented by such combinations: pine and acacia – 47 %, maple and acacia – 33 %, poplar and acacia – 20 %. Planting with the composition of 6 acacia and 4 pine stand were formed in loamy sediments. Index taxation locust at 11 years of age – 2, timber reserves and 12 m^3/ha, density was 0.7. Locust had a height of 4 m, diameter – 6 cm, pine (*Pinus sylvestris* L.) is 3 and 4, respectively. Ten years worth of planting of acacia and poplar forest had the third degree index. The average height of acacia was 4 m, diameter – 6 cm, poplar (*Populus deltoides* Marsh.) 5 and 8, respectively. Ten-year planting consisting of seven acacia and three maple trees had the third taxonomic index. Thus, it can be noted that pure plantations of acacia on the reclaimed mine lands had higher rates of height, diameter and productivity.

Processes of self-regulation and restoration of fertility strongly inhibited biological development of reclaimed lands in the early stages. This significantly reduces the resistance of acacia stand, both the pure and the mixed. The increase in forest plantation parameters from the 3rd to the 1st valuation index occurs with age. Increasing the density from 0.6–0.75 to 0.85–0.9 is one of the ways of improving the productivity of acacia stand. This can provide an increase in timber resources by 30–35 %.

Key words: Lignite Mining, Forest Land Reclamation, *Robinia pseudoacacia* L.