BOOK REVIEWS

Towards some new works of science

Miško ir drėgmės sąveika [*Interaction between forest and moisture*] by Juozas Ruseckas., Kaunas: *Lututė*, 2002, 200 p., illus., abstr. Engl. (in Lithuanian)

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"*Interaction between forest and moisture*" by Juozas Ruseckas was issued at the Lithuanian Forest Research Institute at the beginning of 2002. The monograph is divided into 6 main chapters. On the ground of the investigations carried out at the Lithuanian Forest Research Institute and of the newest sources of the foreign literature the Author analyses regularities of the ground water forming in the forest, the influence of oxygen dissolved in ground water and soil moisture on the development of roots of trees and shrubs as well as on the restoration of the stand growth. The newest methods of determining soil moisture, which are used in West Europe, are discussed. The author also presented effective hydrological devices created at the Lithuanian Forest Research Institute such as hydraulic evaporator, self-recording compensator of ground water consumption and a new method of determining soil hydrological properties.

It has been determined that optimal moisture for the growth of different tree species comprises up to 70—120% of the field moisture content of soil (pF= 2.0-4.0). From all tree species spruce has the least interval of optimal moisture (70-100% FC, where FC is field water content of the soil). Pine and warty birch are in the intermediate position while the limits of optimal moisture comprise 67-102% and 65-101%, respectively. Black alder likes moisture most of all. The optimal moisture interval for this species makes up 72-120% FC. Due to the deviation from optimal norm in the direction of soil drying comprising about 20%, the growth of trees decreases about 16%. The author has noticed that in order to grow qualitative seedlings in particularly light soils, which are skeletonous and which weakly hold capillary moisture it is necessary to irrigate them in the conditions of Lithuania.

The author states that in dry years, which recur in Lithuania approximately twice per 100 years, the moisture of the upper 10-20 cm layers of the soil in maturing spruce stands of *Oxalis* type falls up to the level when trees start wilting or close to it. Since the root system of pine and deciduous stands is situated in deeper horizons the drying of the upper soil layers up to the wilting moisture occurs rarer than in spruce stands. Mixed spruce-deciduous stands and spruce-pine stands are desirable in a hydrological aspect. It has been classified, that due to surplus of moisture on swampy sites such as *sphagnosus, caricum-sphagnosus, ledum, caricum-calamagrostidosus* sites, coniferous undergrowth with admixture of birch forms, the density of which is not sufficient. The surplus of moisture is also injurious to oak regeneration on wet sites. However, on dry sites natural regeneration of forest and taking root of seedlings are frequently limited by insufficient soil moisture. The author has determined that because of droughts in May young trees suffer most in the forest districts of south and south-eastern Lithuania (Marcinkonys, Varėna, Valkininkai and Šalčininkai) where in May the deficiency of precipitation attains – 85-(-95) mm at the 3% probability level.

The author underlined that the depth of ground water crucially affects not only the distribution of tree roots in different depths of the soil, but also stand productivity in case soil fertility is the same. In the conditions of Lithuania the oak stands are most productive when ground water level is in the depth of 2 metres and more. Although the lower level of ground water is not restricted for the existence of oak stands, sudden and significant lowering of ground water adversely affects the growth of oak. In the conditions of Lithuania the spruce stands attain first site index in tophotopes "c" and "d" when ground water is in the depth of 60-120 cm and deeper. The pine forests in tophotope "b" are most productive when ground water is at 1.5 m depth. Along with the physical effect of ground water on stand growth, the influence of its chemical content is tangible. The author has noticed that sometimes good growth of pine forests in poor soils is conditioned by the ground water having flown from fertile sites, which is rich in nutrients and oxygen. It is noted that pressure water also rather often supplements slightly mineralized ground water of eutrophic swamps by nutrients and oxygen therefore, in some cases near the edge of mires in the valleys of rivers and on the slopes productive stands grow when ground water is high.

It has been found, that after clear cutting soil moisture is supplemented by 100-250 mm per year. Theoretical calculations have shown that at the be-

ginning of vegetation, in stands the level of ground water should rise only 3-7 cm. However, in nature a rise of ground water resulting from clear cutting was detected by far larger such as 7-30 cm at the beginning of vegetation and 40-60 cm in July-August. The author noted that in felled areas the flowing water is different due to changes in the structure of the upper soil layers affected by haulage. The nearer the felled area is to the water flowing zone, when trampling down of the soil is the same, the more significant the rising of ground water level induced by clear cutting. According to the theoretical calculations it has been determined, that in case the coefficients of the soil, say, decrease twice due to clear cuttings the water level in cutovers being 2000 m from the watershed will rise 7.3 times higher, than in these being 205 m from the watershed. It is attributed to the fact that the amount of water flowing through the upper horizons of water-bearing deposits is directly proportional to the distance of them from the watersheds. Since the zone of forests near the water streams is very sensitive to trampling down of the soil heavy machines should not be used in logging.

The author also places emphasis on the uppermost dependence of the efficiency of forest drainage on the bioecological conditions at the time of drainage. It is found to be highest in mesotrophic and eutrophic mires. Here the conditions of site improve by 3-4 site indexes. Because of a decrease and increase in trophity of the mire soils the efficiency of drainage diminishes. The author shows that the effect of drainage of very infertile oligotrophic mires as well as that of very fertile eutrophic mires is insignificant.

A new useful method of draining wet areas is presented in the monograph. Chapter "Protection of the environment in carrying out hydroamelioration" ended the book. In this chapter the author presented an original method of modeling parameters of undrained buffer zones of protected territories. The author dedicates his book to foresters, ecologists, environment protectors, hydrologists, and geographers, researchers engaged in the mentioned fields as well as to the postgraduate and graduate students of the corresponding specialties.

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