

MOISTURE CONTENT VARIABILITY IN DRAINED FEN SOIL

Gnatowski T., Szatyłowicz J., Szejba D., Oleszczuk R., Brandyk T.

Soil moisture is very important variable, which integrates all components of water and the surface energy balances. Furthermore, it is highly variable in space and time. An understanding of the soil moisture content and its variability is very important for hydrological studies in organic soils which actual condition and preservation depends on water related processes.

The solid phase of organic soils is made of plant fibres, humus and mineral matter as well as amorphous substances. Organic matter is one of the main constituents of soil affecting the soil's hydrophilicity or hydrophobicity, and thus it affects the soil's behaviour during drying or wetting. The soil hydrophobicity (water repellence) can influence on actual soil moisture patterns and its variability.

The objectives of this study were to characterise the variability of soil moisture content over short distance in drained fen soil and to evaluate of soil water repellency.

The variation in soil water content was studied at Otoczne experimental site located within Kuwasy drainage-subirrigation system in the Biebrza River Valley. The soil of experimental site is classified as peat-moorsh soil. The moorsh layer is underlying by medium decomposed sedge and sedge-reed peat layers. The site is used as an extensive meadow. Volumetric water content was determined by sampling the soil profile at different depths using steel cylinders (volume 100 cm³ and height 5 cm). Fifty-one samples were taken from each of the following depths: 5-10, 15-20, 25-30, 35-40 and 45-50 cm, at close intervals along transects of 300 cm length. The wet soil samples were weighted, dried for 24 hours at 105°C, and weighted again in order to determine soil water content and dry bulk density. The soil was sampled at six different dates during the vegetation period in 2004. The severity of water repellency was determined using the water drop penetration time test. The measurements were done immediately after the taking of wet weight of the samples. Three drops of distilled water from a standard medicine dropper were placed on the surface of soil sample, and the time required to penetrate into soil was recorded.

The analysis of the soil moisture measurements shows that the coefficient of variation (CV) of the soil water content for five depths in the six trenches varied between 1.75% and 9.44%. Water repellency measured by water drop penetration time test in considered peat-moorsh soil is extremely depended on soil water content.