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The new insights on the study of biomechanics of aquatic plants

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ABSTRACT

During the presentation I will describe recent achievements of the team which have been realizing the project *Field experimental investigation of hydrodynamics of water flow-vegetation-sediment interactions at the scale of individual aquatic plants*. The biomechanical properties (i.e. force, stress, strain, Young's modulus, flexural rigidity, flexural modulus) of stems of different aquatic plant species (e.g. *Potamogeton pectinatus L.*, *Potamogeton crispus L.*) commonly growing in Polish rivers were investigated within the project tasks. Tension and three-point bending tests were conducted in dry and wet conditions using a Bench Top Testing Machine. It is suggested that hydrophytes are characterized by very fast drying and the shrinkage of shoot structure due to a loss of water, which affect the turgor pressure responsible for the stiffness of shoots. The proposed method of testing samples in wet conditions shows significant differences between values obtained from those tests and the outcomes received from tests in dry conditions. Using of water during measurements of biomechanical characteristics influences the final results. The changes at both conditions in bending tests may be observed in values of flexural rigidity and flexural modulus. The tension tests results confirm the rightness of conducting biomechanical measurements of aquatic plants in wet conditions. In addition, the seasonal changes in biomechanical properties of *Elodea canadensis Michx.* were investigated. The differences during plants' life cycle show the importance of accounting for those characteristics in future studies of flow-biota interactions occurring in vegetated channels.