

# Accepted Manuscript

Research papers

Canopy storage capacity and wettability of leaves and needles: the effect of water temperature changes

Anna Klamerus-Iwan, Ewa Błońska

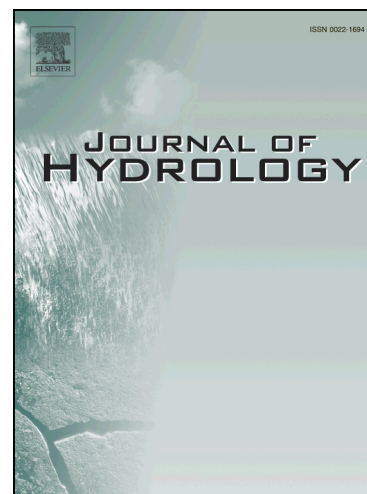
PII: S0022-1694(18)30108-2  
DOI: <https://doi.org/10.1016/j.jhydrol.2018.02.032>  
Reference: HYDROL 22581

To appear in: *Journal of Hydrology*

Received Date: 15 November 2017  
Revised Date: 11 February 2018  
Accepted Date: 12 February 2018

Please cite this article as: Klamerus-Iwan, A., Błońska, E., Canopy storage capacity and wettability of leaves and needles: the effect of water temperature changes, *Journal of Hydrology* (2018), doi: <https://doi.org/10.1016/j.jhydrol.2018.02.032>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



CANOPY STORAGE CAPACITY AND WETTABILITY OF LEAVES AND NEEDLES:  
THE EFFECT OF WATER TEMPERATURE CHANGES

Anna Klamerus-Iwan - University of Agriculture in Krakow, Faculty of Forestry, Department of Forest Engineering; Al. 29 Listopada 46,31-425 Kraków, Poland; tel: +48 12 662 53 56; fax: +48 12 411 97 15; e-mail: a.klamerus-iwan@ur.krakow.pl<mailto:a.klamerus-iwan@ur.krakow.pl>

Ewa Błowska - University of Agriculture in Krakow, Faculty of Forestry, Department of Forest Soil Science, Al. 29 Listopada 46, Krakow 31-425, Poland

**Abstract**

The canopy storage capacity ( $S$ ) is a major component of the surface water balance. We analysed the relationship between the tree canopy water storage capacity and leaf wettability under changing simulated rainfall temperature. We estimated the effect of the rain temperature change on the canopy storage capacity and contact angle of leaf and needle surfaces based on two scenarios. Six dominant forest trees were analysed: English oak (*Quercus robur* L.), common beech (*Fagus sylvatica* L.), small-leaved lime (*Tilia cordata* Mill), silver fir (*Abies alba*), Scots pine (*Pinus sylvestris* L.), and Norway spruce (*Picea abies* L.). Twigs of these species were collected from Krynica Zdrój, that is, the Experimental Forestry unit of the University of Agriculture in Cracow (southern Poland). Experimental analyses (simulations of precipitation) were performed in a laboratory under controlled conditions. The canopy storage capacity and leaf wettability classification were determined at 12 water temperatures and a practical calculator to compute changes of  $S$  and contact angles of droplets was developed. Among all species, an increase of the rainfall temperature by  $0.7^{\circ}\text{C}$  decreases the contact angle between leaf and needle surfaces by  $2.41^{\circ}$  and increases the canopy storage capacity by  $0.74\text{g g}^{-1}$ ; an increase of the rain temperature by  $2.7^{\circ}\text{C}$  decreases the contact angle by  $9.29^{\circ}$  and increases the canopy storage capacity by  $2.85\text{g g}^{-1}$ . A decreased contact angle between a water droplet and leaf surface indicates increased

Download English Version:

<https://daneshyari.com/en/article/8894917>

Download Persian Version:

<https://daneshyari.com/article/8894917>

[Daneshyari.com](https://daneshyari.com)