

TRANSPIRATION  
MECHANISM OF CAPILLARY TRANSPORT  
IN THE XYLEM OF PLANTS

*K.I. Ludanov*

National Technical University of Ukraine  
“Kyiv Polytechnical Institute”  
(14, *Politechnichna Str.*, Kyiv 03056, Ukraine)

S u m m a r y

The capillary transport of the aqueous solution of mineral salts in the xylem of plants owing to the transpiration process has been considered. By analyzing the balance of driving forces (capillary forces, gravity forces, and viscous friction), a differential equation describing the liquid flow in the xylem consisting of capillaries with varying cross-sections is derived and integrated. The profile of a vertical capillary with varying cross-section for the maximum water flow is calculated. On the basis of the formula obtained for the minimum capillary cross-section and the Thomson law for the vapor pressure over the concave meniscus of leaf stoma, an expression is obtained for the dependence of the maximum capillary length on the humidity of the atmospheric air.