

Abstract:

Nocturnal stomatal opening is a phenomenon characteristic for CAM plants due to the primary fixation of CO₂. However, quite a few studies describe the non-zero nocturnal stomatal conductivity in a number of plants with C₃ and C₄ metabolism, which were expected to close the stomata completely during the night. The question is, why this behaviour occurs in plants with C₃ and C₄ metabolism when their photosynthesis does not occur at night and the need for plant cooling is reduced or absent.

The aim of this Thesis is to summarize the current knowledge about night-time transpiration of C₃ and C₄ plants and discuss available hypotheses about the importance and function of the night-time transpiration. The first part of the Thesis summarizes the possible physiological functions of nocturnal stomatal opening. The second part is focused on a more detailed description of selected hypotheses of increase in nutrient uptake, drought response and photosynthesis priming. The last part introduces important factors that may contribute to the regulation of nocturnal transpiration and stomatal conductivity.

Although the possible importance of night-time transpiration is intensely discussed, comprehensive research on the function of the nighttime transpiration is not yet available. However, a review of available studies shows that the nocturnal stomatal conductivity will not have only one function, but that its significance is complex, and thus, it will have potentially several functions at the same time.

Keywords:

night-time transpiration, nocturnal stomatal conductivity, photosynthesis priming, nutrient uptake, drought response