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The importance of potassium in forest growth



Potassium is generally not considered in ecological studies of forest growth. Based on this, a group of researchers at the CREAF in the UAB has studied the role of this element in the growth of 2836 forests parcels in Catalonia. Thus, these researchers have highlighted the importance of potassium for such ecological studies and improved knowledge of the factors that had influenced the content of these different elements, nitrogen and phosphorus plus potassium, in leaves and wood of trees. They also concluded that potassium content in trees is determined by environmental factors.

Most plant nutrient studies focus on nitrogen (N) and phosphorus (P), and potassium (K) has often been neglected. We studied the relationships between the allocation of K and the allocation of carbon (C), N, and P to different plant organs in response to climatic gradients in 2836 Catalonian forest plots. We paid especial attention to the total content of K and its ratios among plant organs (leaves and wood tissues) rather than the concentrations and their ratios. The results demonstrate that relative to N and P, trees allocate K in different proportions to photosynthetic

and non photosynthetic organs in response to climatic conditions, growth and style of life. Furthermore, the results also indicate that different types of forests (evergreen, deciduous or coniferous) respond differently to climatic gradients. We show that allocation of K is strongly related to the availability of water and that the uptake of K is more related to the uptake of water than the uptake of N and P. Allocation of K is related to both the response of plants to drought and to plant growth.

We show that K plays a key role in the response of plants to seasonal climate changes. Moreover, differences in composition and plasticity involving K contents can underlie the long-term adaptation of trees to different ecological styles of life and climatic conditions. We conclude that K should be more frequently and deeply considered in ecological studies of terrestrial plants where it has been often neglected. Finally, the results also demonstrate that the use of K content in these ecological studies accounts better for productivity and the real allocation of nutrients than the use of just foliar K concentration. Our results improve our knowledge of the factors controlling the elemental content and element ratios of tree leaves and wood and also highlight the need to consider K (and not just N and P) in studying the relationships between the changes in plant elemental composition and environmental changes..

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References

"Stoichiometry of potassium is largely determined by water availability and growth in Catalonian forests"

Jordi Sardans, Josep Peñuelas, Marta Coll, Jordi Vayreda and Albert Rivas-Ubach. Functional Ecology 2012.

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