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## **THE STUDY OF BIODIVERSITY TO UNDERSTAND EVOLUTION AND TO IMPROVE SUSTAINABILITY**

### **Italian research group finds important regulators of plant growth**

A study published in the journal "New Phytologist" (<https://doi.org/10.1111/nph.16643>) has identified new factors essential for the regulation of photosynthesis, the process by which plants produce biomass from carbon dioxide present in the atmosphere, by water and mineral nutrients from the soil and energy supplied by the sun. The study was carried out by a group of young researchers from the Department of Biology of the University of Padua coordinated by Prof. **Tomas Morosinotto** in collaboration with Dr. **Alessandro Alboresi**, Mattia Storti, Marco Mellon e Anna Segalla.

The global food demand is constantly growing due to the demographic increase in a context of climate change and there is a major need of selecting new varieties with improved phenotypic traits, such as a larger biomass productivity, better seed quality or higher resistance to environmental stresses. To address this problem, agronomists and geneticists often focus on cultivated plants or on a few reference model species. But what can be done to identify all those resistance mechanisms and all those growth regulators that have been lost during the various stages of evolution and selection of the agricultural species we use today? In this context, the study of biodiversity could work as a huge living bank containing additional genes and molecular strategies that plants adopt to respond to the surrounding environment, obtaining fundamental information to improve the productivity of cultivated plants.

For this reason, the team of Prof. **Tomas Morosinotto** is interested in the study of mosses. This group of organisms are useful for their simple body structure, the ease of genetic studies but especially for their evolutionary position. In fact, mosses are non-vascular plants and their study allows us to identify which adaptations the plants undertook during the colonization of the emerged lands, a process that began about 500 million years ago.

To isolate the essential components of the regulation of photosynthesis, Prof. **Tomas Morosinotto** and colleagues have used molecular biology and plant physiology methods, applying them precisely to small moss plants. *"This research shows the importance of studying the fundamental processes of biology in as many organisms as possible. This will allow a better understanding of the evolutionary history of plants, but also provide valuable information on for the challenges that our society will face in the next future"* says Dr. **Alessandro Alboresi**, researcher at the Department of Biology.

The results presented in this paper demonstrate that the mechanisms modulating electron transport during photosynthesis are essential to protect cells in any light regime and without them there is no functional photosynthesis.

Nevertheless, some of these regulatory pathways (such as the one mediated by FLV proteins) were lost during evolution and are not found in cultivated plants. "*Our study in mosses shows how important FLVs are for the growth of plants and opens up the real possibility that they can be exploited to increase plant productivity*" explains Prof. **Tomas Morosinotto**, coordinator of the study.

**Link:** <https://nph.onlinelibrary.wiley.com/doi/full/10.1111/nph.16643>

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**Tomas Morosinotto**



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