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## Reduced complexity, RCO: A leaf sculptor within the *Brassicaceae* family

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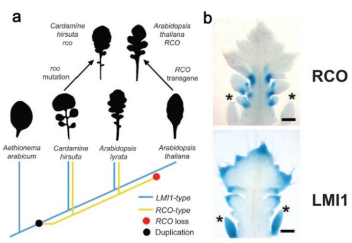


We are currently experiencing unprecedented climate change, which is a serious threat to our natural resources and food security at a time of rapid population increase. The sustainable food security requires a constant increase of genetic potential in crops. In order to increase the genetic potential of crops, exploring the genetic resources beyond major crops is a necessity. Leaf size and shape have an important effect on physiological processes such as photosynthesis and transpiration and thus on plant biomass. Therefore how morphological diversity of plant leaves is regulated constitutes an important branch of plant biology. In order to understand the genetic basis of morphological diversity in leaves, we have introduced a new model system *C. hirsuta*, which has dissected leaves with distinct leaflets, and it is a close relative of *A. thaliana*, which has simple leaves. Using comparative genetic approaches we discovered that a tandem duplication of the Late Meristem Identity 1 *(LMI1)* gene has given rise to two new copies in *C. hirsuta*. Diversification of the regulatory elements and coding sequence in one of the copies led to emergence of a novel transcription factor called reduced complexity, *RCO*. The *RCO* gene was lost in *A. thaliana*, contributing to leaf simplification in this species. In contrast to *LMI1*, which is expressed in the margins of leaflets, *RCO* is expressed at the base of leaflets and promotes leaflet formation through local growth regulation, at least in part by reprogramming the local phyto-hormone homeostasis. *RCO* expression is limited to leaves and its function is independent of shoot apical meristem development. Our data demonstrated that *RCO* is capable of improving photosynthetic efficiency, suggesting its contribution to adaptive evolution of leaf morphology. *RCO* studies could provide a basis for improvement of photosynthetic efficiency in crops.

### Biography

Mohsen Hajheidari has obtained his Master's degree in Plant Breeding at the University of Razi, Iran. Before undertaking his PhD in the group of Csaba Koncz in the Department of Plant Developmental Biology at the Max Planck Institute for Plant Breeding Research (MPIPZ), he was a Scientific Member at the Agricultural Biotechnology Research Institute of Iran. He has completed his PhD in Genetics in 2010 at the University of Cologne as an International Max Planck Research School (IMPRS) student. Following a Postdoctoral study in the group of Csaba Koncz, he joined the group of Miltos Tsiantis in the Department of Comparative Development and Genetics in 2013. He is currently using comparative genetic approaches to uncover the genetic bases of leaf morphological complexity in plants. His goal is to combine evolutionary and computational approaches with comparative genetics and molecular physiology to further decipher plant-environment interaction.

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