Proceedings of the LXV SIGA Annual Congress
Piacenza, 6/9 September, 2022
ISBN: **978-88-944843-3-5**

Poster Communication Abstract – 5.44

KEY GENES INVOLVED IN CUTICLE DEPOSITION AS TARGET TO MANIPULATE LEAF PERMEABILITY AND INCREASE PLANT ADAPTATION TO ENVIRONMENTAL CUES

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maize, cuticle, drought resistance, GL15, juvenile and adult phase

Unfavourable rainfall distribution is among the consequences of climate change that threaten crop production and demand better adaptation strategies, such as reduced leaf transpiration. The cuticle, a hydrophobic layer covering plant epidermal cells, has an important role in limiting leaf water loss, gas exchange and conferring protection against environmental stress.

In maize, the biochemical and structural properties of the cuticle are among the leaf epidermal traits that are subjected to deep changes during the transition from the juvenile to the adult vegetative phase. One of the genes involved in phase transition is the APETALA transcription factor *glossy15* (*gl15*). Previous studies indicated that *gl15* mutants exhibit an early juvenile-to-adult-phase transition, accompanied by a precocious transition to the reproductive phase, and a precocious glossy leaf phenotype that is peculiar to adult leaves undergoing normal development.

We have also shown that the gl*15* gene is co-express with the MYB transcription factor *fused leaves1* (*fdl1)*, another key regulator of cuticle deposition in maize juvenile leaves, and that the transcript levels of the two genes are reciprocally influenced. It is thus conceivable that both GL15 and FDL1 activities are required to maintain the juvenile features of the cuticle in the first four-five leaves and to regulate the shift to the adult cuticle in later leaves. To test this hypothesis, we have generated F2 progenies segregating for *fdl1-1* and *gl15-S* mutants and data on their phenotypic analysis will be presented.

We have also characterized in detail the effect of these regulatory genes

on the cuticle-mediated leaf permeability and identified which cuticle composition has better properties for reducing water loss. Our results suggest that the genetic manipulation of key factors can improve cuticle capacity to reduce leaf permeability, thus contributing to the final goal of improving crop adaptation to water scarcity conditions.