A Mutant of Arabidopsis That Lacks Activation—Commentary

Somerville CR, Portis AR Jr, Ogren WL (1982) A mutant of *Arabidopsis thaliana* which lacks activation of RuBP carboxylase *in vivo*. Plant Physiol **70:** 381–387

I would like to nominate the above article for the classics collection. It demonstrated the power of the ethyl methyl sulfonate Arabidopsis (*Arabidopsis thaliana*) mutant screen, which had been designed to discover photorespiratory mutants, to unearth unexpected novel results. In this instance, the discovery of Rubisco activase came at a time when we thought we knew about all the enzymes involved in C_3 photosynthesis. A historic perspective on this discovery is given by Portis and Parry (2007). At the time this article was published, I was trying to correlate in vivo and in vitro activity of Rubisco and to correlate measured Rubisco activation states with those predicted by a kinetic model of Rubisco by Farquhar (1979). Using in vitro measurements of ribulose 1,5-bisphosphate (RuBP) binding constants, the model predicted Rubisco would not be catalytically competent in vivo because RuBP would bind tightly to inactive Rubisco sites. We therefore hypothesized that RuBP could not bind as tightly in vivo as had been observed in vitro but we had no explanation why (von Caemmerer and Edmondson, 1986). The subsequent discoveries that Rubisco activase released RuBP and other tight binding inhibitors from Rubisco sites were groundbreaking to the understanding of Rubisco activity in vivo (Portis et al., 1986). Research on Rubisco activase, how it interacts with Rubisco, and its role in high temperature photosynthesis are important current research endeavors demonstrating the importance of the initial discovery.

LITERATURE CITED

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www.plantphysiol.org/cgi/doi/10.1104/pp.110.160440