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Eve Teyssier, Mathilde Ouradou, Sabine Grat, David Landry, Benoit Lefebvre, et al.. The *Marchantia paleacea* Myc-factors receptor LYR is not required for AM establishment. ICOM 12 - International Conference on Mycorrhiza, Aug 2024, Manchester, United Kingdom. hal-04705510

HAL Id: hal-04705510

<https://hal.science/hal-04705510v1>

Submitted on 23 Sep 2024

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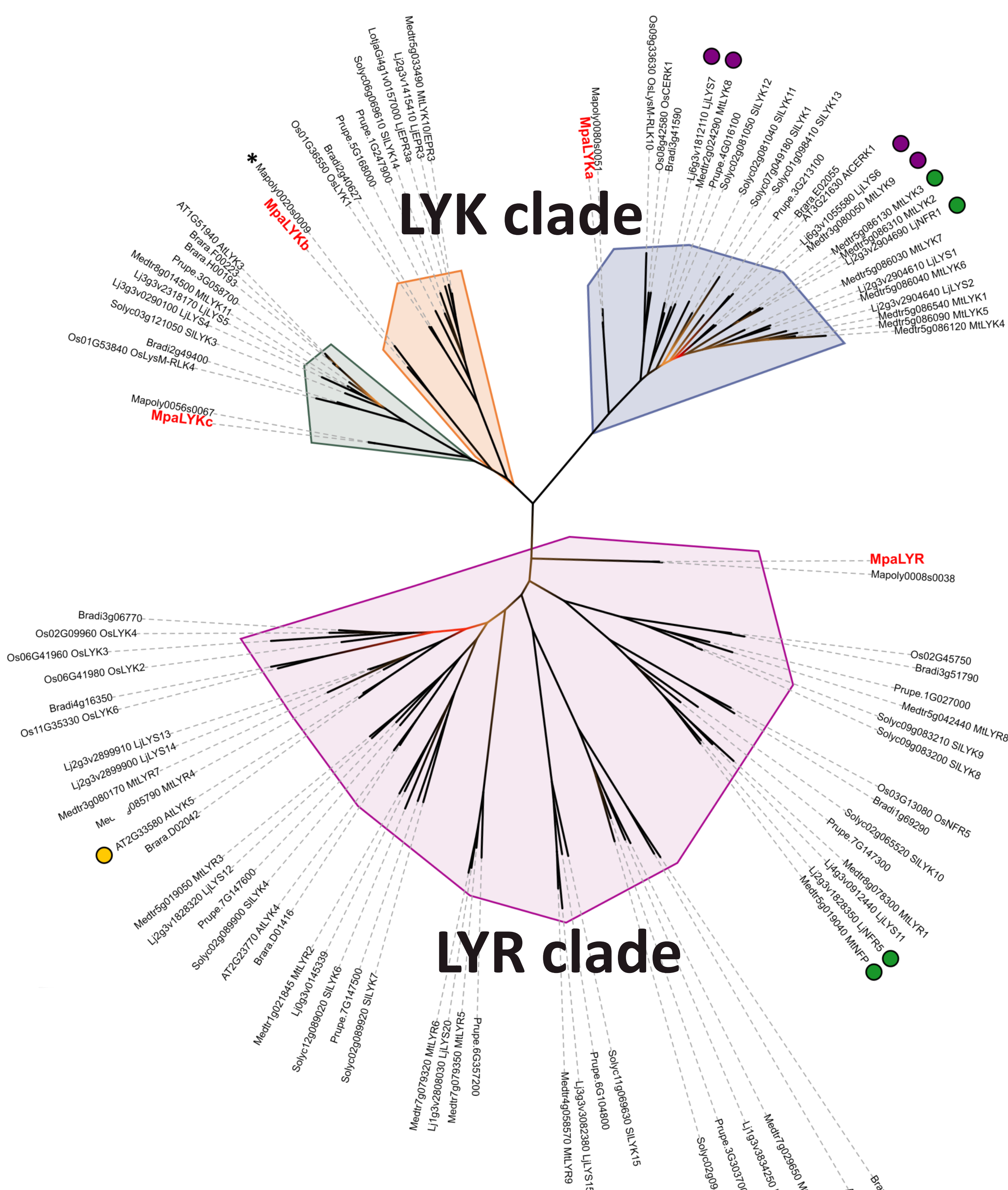
The *Marchantia paleacea* Myc-factors receptor LYR is not required for AM establishment.

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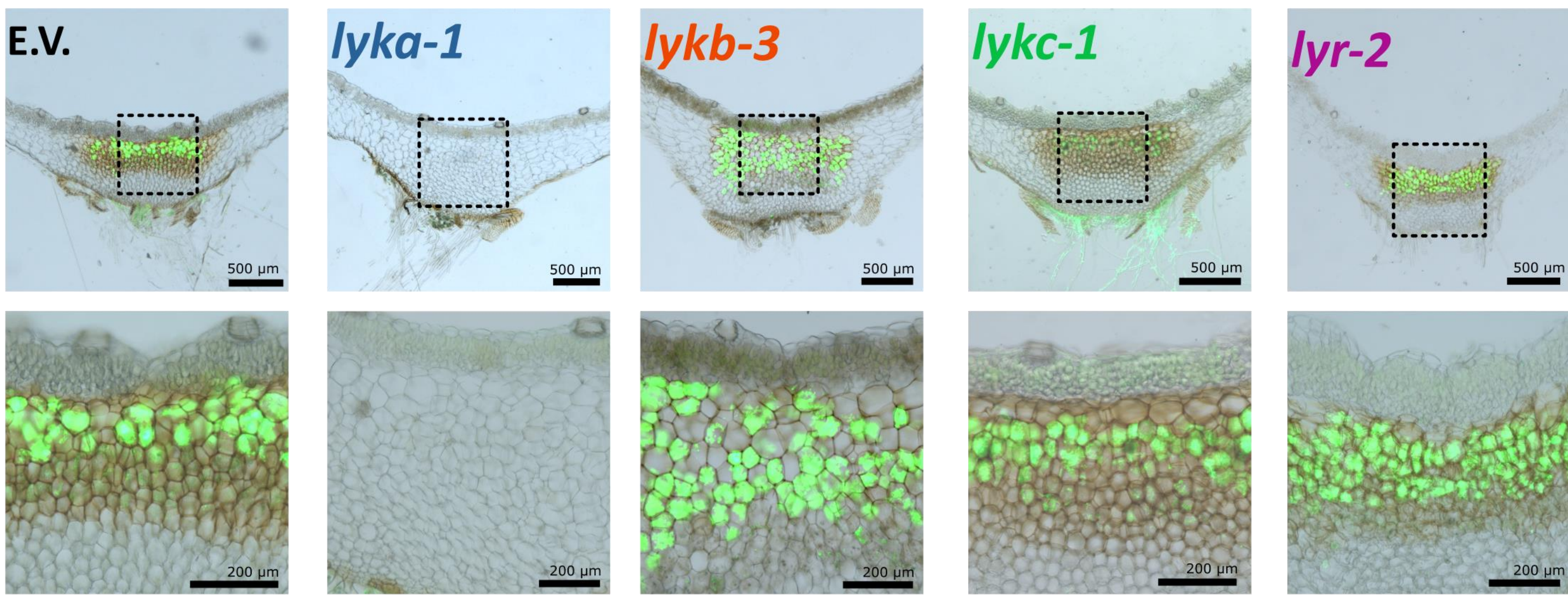
Context

Most land plants form a symbiosis with **arbuscular mycorrhizal fungi** (AM) to acquire water and phosphorus, while nitrogen-fixing symbiosis with rhizobia (NFS) is limited to legumes¹. Genetic studies on NFS have revealed the crucial roles of plasma membrane-anchored LysM Receptor-Like Kinases in perceiving microbial-derived molecules that are essential for establishing NFS². In contrast, single loss-of-function mutants of LysM-RLKs in angiosperms only have quantitative effects on AM establishment. Here, we conducted a systematic study of this gene family in the liverwort *Marchantia paleacea*, which has only **four LysM-RLKs** in its genome.

The AtCERK1 ortholog LYKa, but not the single LYR, is strictly required for AM establishment in *M. paleacea*



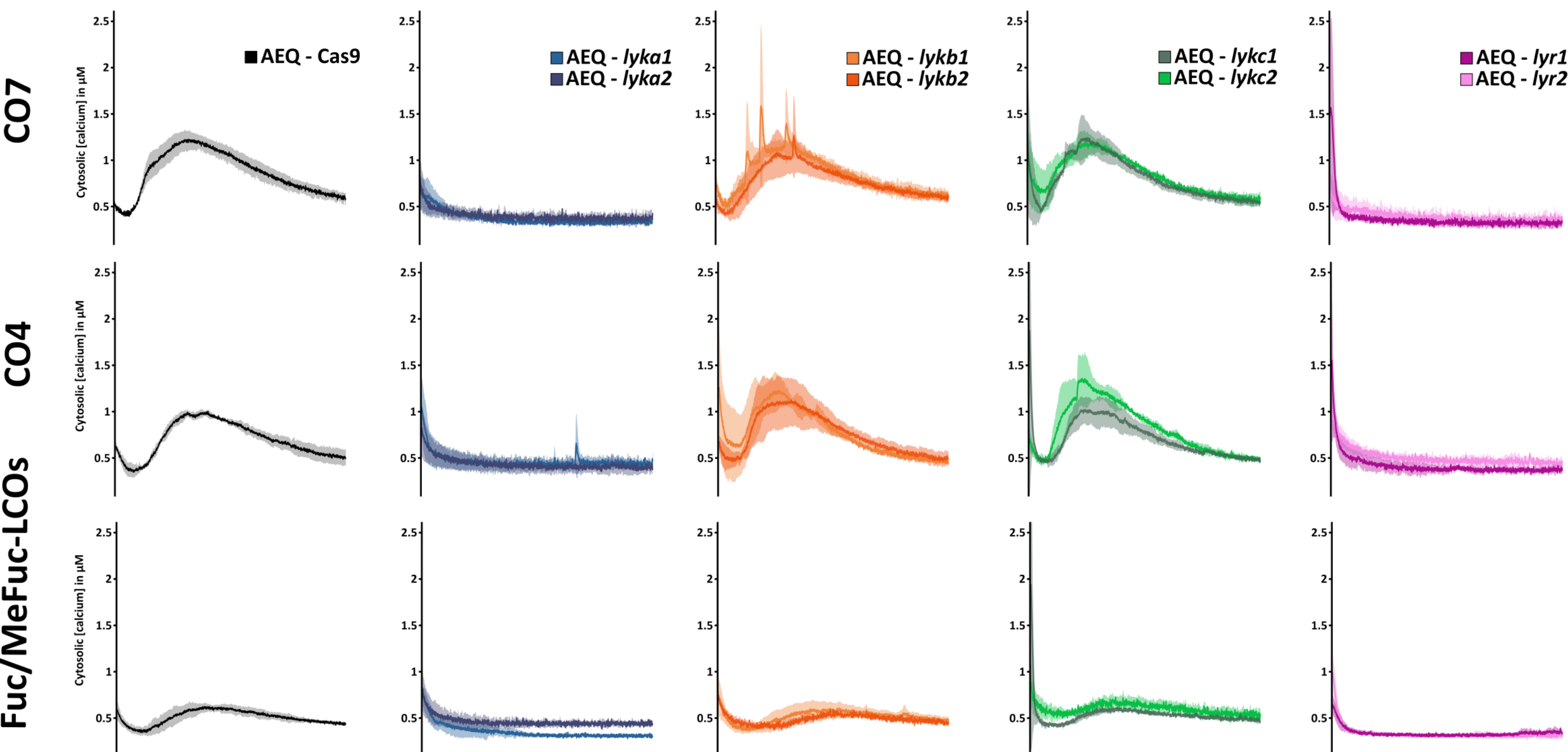
WGA Alexa-fluor staining



2 - AM phenotypes of single receptor mutants

Transversal sections of *M. paleacea* control (E.V.) or single *lysm-rlk* mutants six weeks after inoculation with *Rhizophagus irregularis*. Panels are overlays of bright fields and fluorescent images of wheat germ agglutinin (WGA) coupled to Alexa Fluor 488 to detect fungal structures. Dashed line-delimited insets are enlarged underneath the original images.

lyka and lyr lost responsiveness to MYC-factors

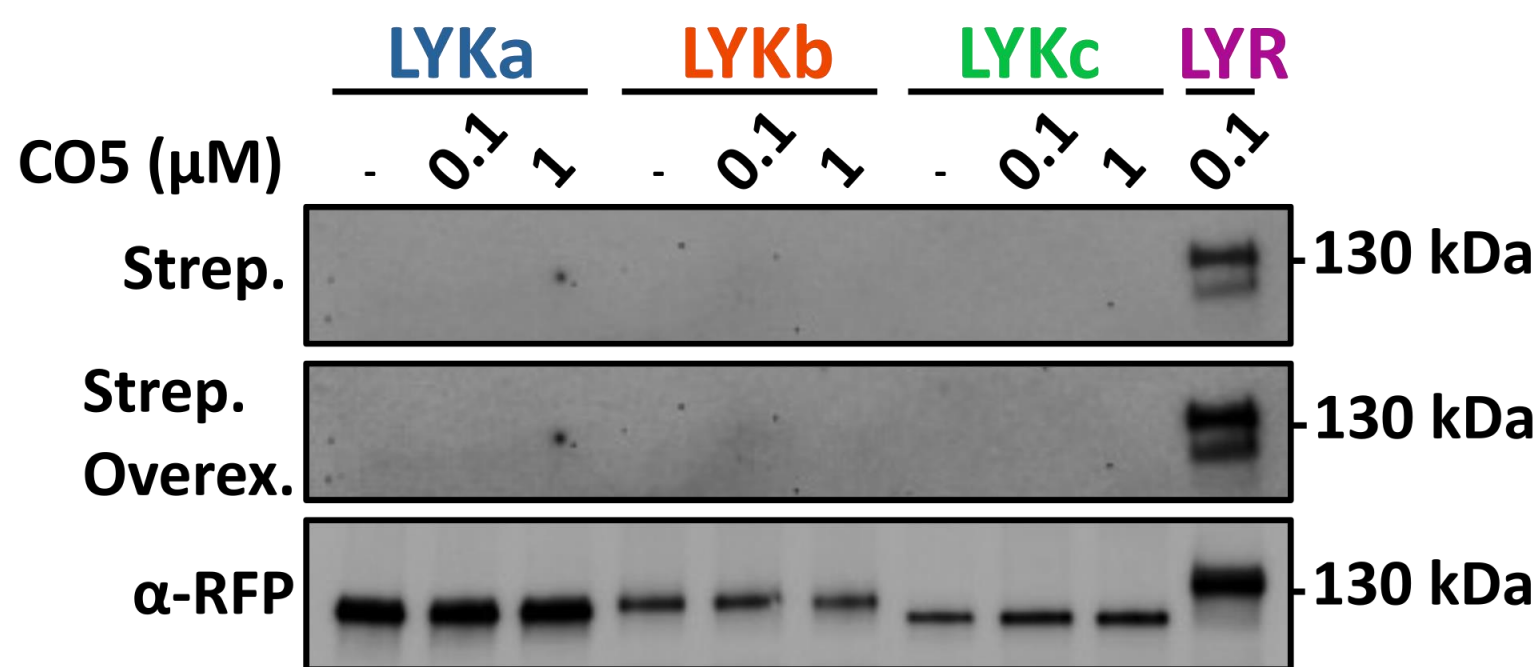


3 - Cytosolic calcium variation in receptor mutants

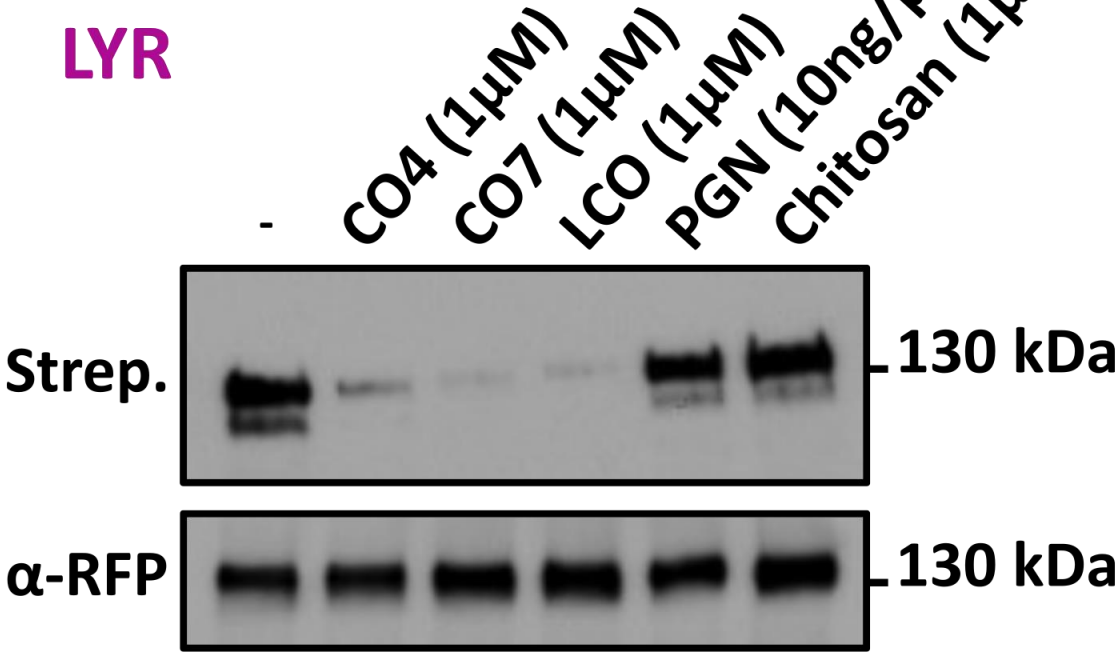
Control (AEQ-cas9) or aequorin-expressing single *lysm-rlk* mutants (as indicated) treated with 1μM chitoheptaose (CO7), 1μM chitotetraose (CO4) or 1μM LCOs. Each trace represents the mean (line) ± standard deviation (shading) from at least three replicates over a time course of 15 min.

LYR is the MYC-factors receptor

Binding



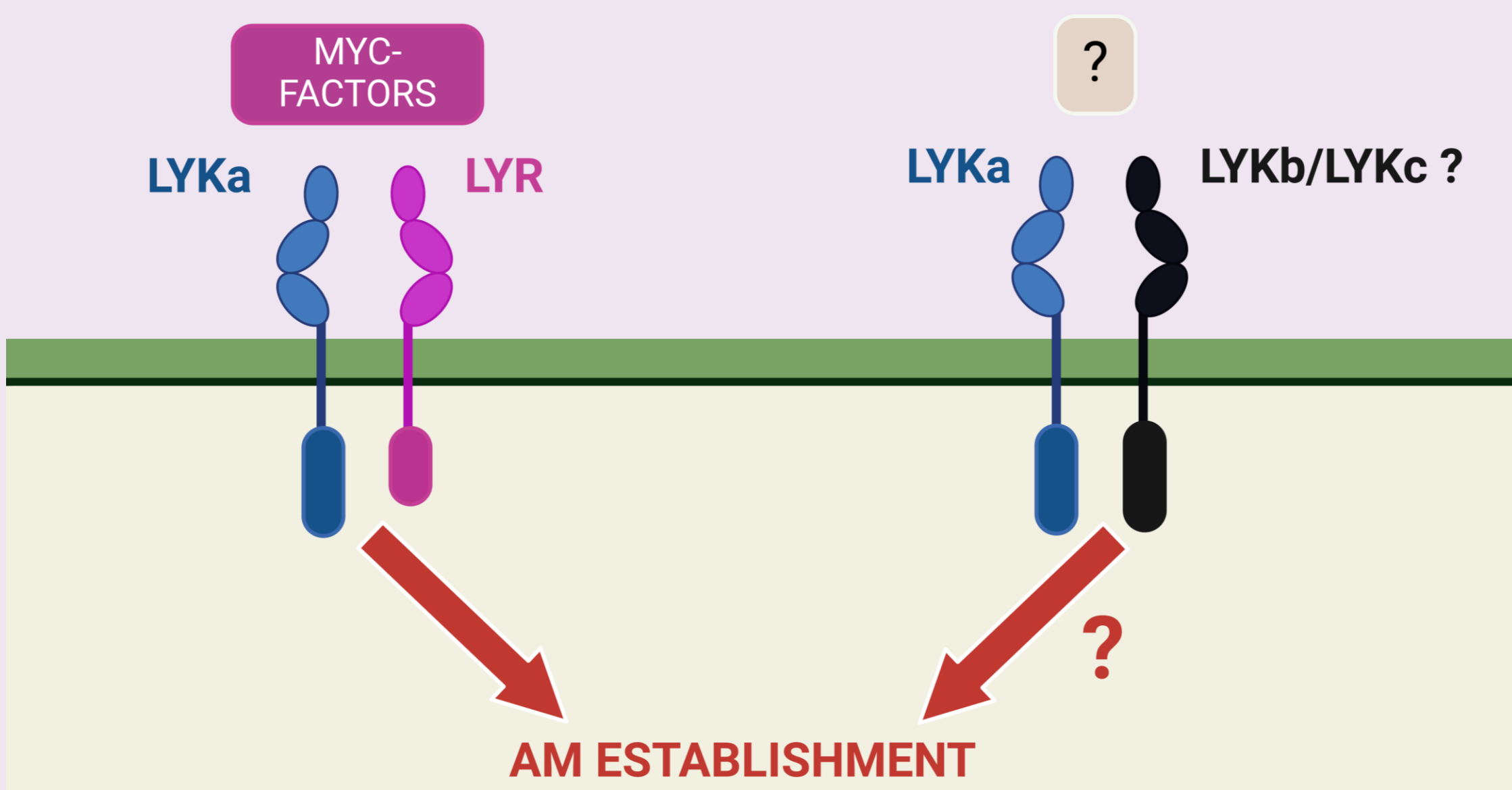
Competition



4 - Binding assays on LysM-RLK of *Marchantia paleacea*.

Binding affinity has been tested either with CO5/biotin on all 4 LysM-RLKs at low (0.1μM) and high (1μM) concentrations. Competition assays between 100nM CO5/biotin-bound LYR and unlabelled CO4, CO7, LCO, PGN or chitosan demonstrate the non-selectivity of LYR for CO4, CO7 and LCOs.

A model ?



References :
1. Oldroyd, G. E. D. (2013). Speak, friend, and enter: Signalling systems that promote beneficial symbiotic associations in plants. *Nature Reviews Microbiology*
2. Buendia, L., Girardin, A., Wang, T., Cottret, L., & Lefebvre, B. (2018). LysM receptor-like kinase and lysM receptor-like protein families: An update on phylogeny and functional characterization. In *Frontiers in Plant Science*