MoClo 4 Phanero

Production of MoClo (Molecular Cloning) vectors for the genetic transformation of Phanerochaete chrysosporium

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Summary

Context —
The lack of reverse genetic tools hampers research progresses on basidiomycetes, and particularly on white-rot fungi. This technological lock particularly impairs molecular investigations in forestry and wood science, as key fungi that sustain forest ecosystems functioning or threaten wood industry belong to basidiomycete phyla. The UMR IAM has recently circumvented this issue by genetically transforming the white-rot fungus *Phanerochaete chrysosporium*, using MoClo (Molecular Cloning) vectors and agrobacterium-mediated transformation. This breakthrough achievement establishes a proof-of-concept that the combination of custom-designed binary vectors with agro-transformation allows to generate stable transgenic lines in basidiomycetes.

Objectives —
The 'MoClo 4 Phanero' project proposes to build on this recent success, by developing a complete collection of vectors that could be valorized as a kit for the basidiomycete community (similarly to the recent Moclo toolkits made available to other research communities studying plants, bacteria, or ascomycetes).

Expected results and impacts —

For the UMR IAM, this collection of vectors and their use will fast-forward the reverse genetics investigation of *P. chrysosporium*, and will notably help capitalizing on the previous genetic forward projects that have revealed numerous gene candidates that may mediate fungal resistance to toxic wood extractives. If successful, this project will serve as a launchpad for initiating ambitious projects to tackle the genetic basis of fungal-mediated wood decay. Finally, the collection of modular elements (MoClo toolkit) can be disseminated within the scientific community.