



**HAL**  
open science

## Genome-wide analysis of *Corynespora cassiicola* putative effectors involved in the CLF disease of rubber tree.

David Lopez, Philippe Label, Boris Fumanal, Sébastien Ribeiro, Annegret Kohler, R. Ohm, J. Spatafora, I. Grigoriev, Francis Martin, Valérie Pujade-Renaud

### ► To cite this version:

David Lopez, Philippe Label, Boris Fumanal, Sébastien Ribeiro, Annegret Kohler, et al.. Genome-wide analysis of *Corynespora cassiicola* putative effectors involved in the CLF disease of rubber tree.. 12th EFPP-10th SFP conference: Deepen Knowledge in Plant Pathology for Innovative Agro-Ecology, May 2017, Dunkerque, France. hal-01603196

**HAL Id: hal-01603196**

**<https://hal.science/hal-01603196>**

Submitted on 5 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - ShareAlike 4.0 International License

# Genome-Wide Analysis of *Corynespora cassiicola* Leaf Fall Disease Putative Effectors

D. Lopez<sup>1</sup>, P. Label<sup>1</sup>, B. Fumanal<sup>1</sup>, S. Ribeiro<sup>1</sup>, A. Kohler<sup>2</sup>, R. Ohm<sup>3</sup>, J. Spatafora<sup>4</sup>, I. Grigoriev<sup>3</sup>, F. Martin<sup>2</sup> and V. Pujade-Renaud<sup>5</sup>

<sup>1</sup>UMR 547 PIAF, UCA/INRA, F-63000 Clermont-Ferrand, France

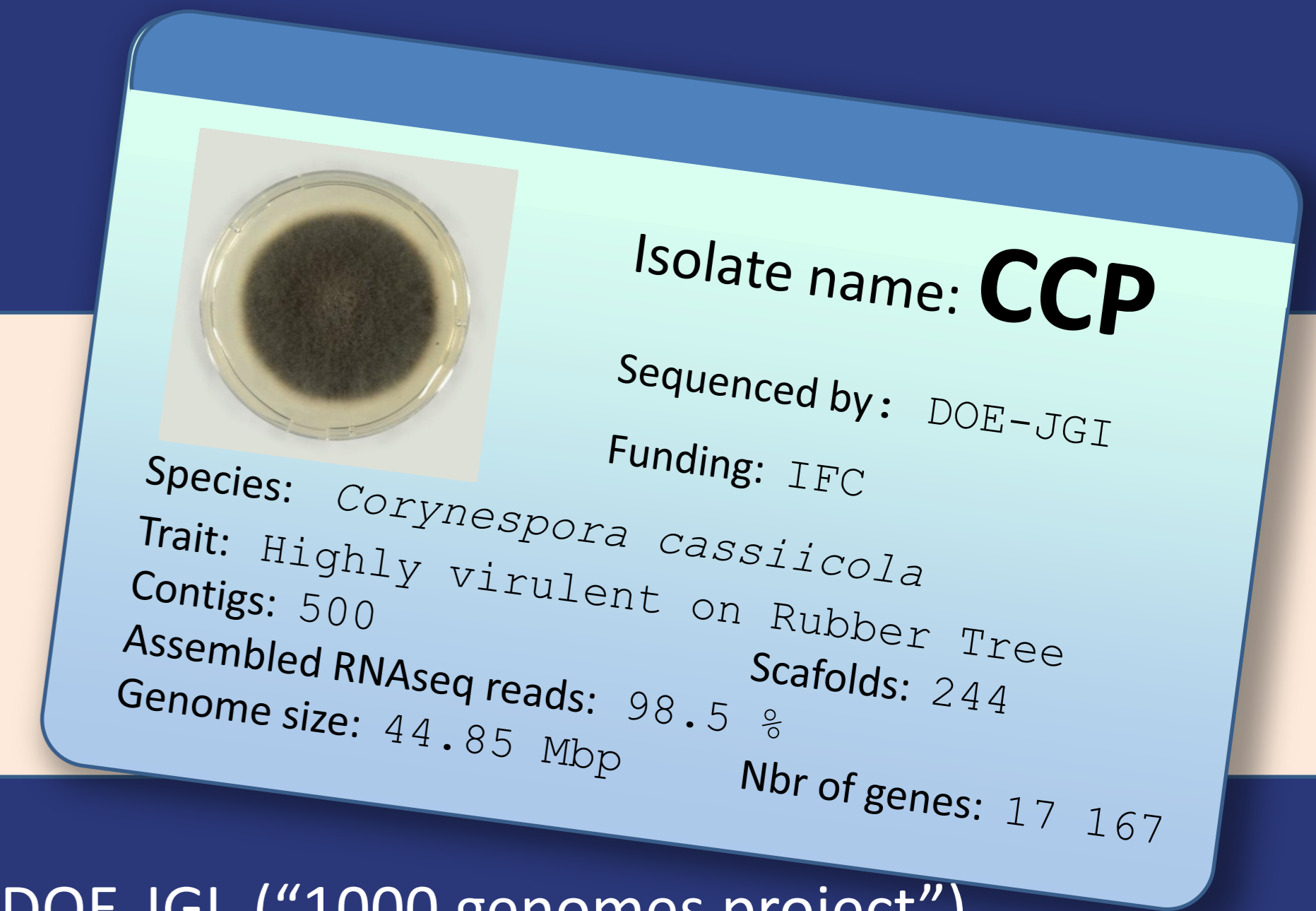
<sup>4</sup>Oregon State Univ., Corvallis, Oregon 97331, USA

<sup>2</sup>UMR IAM, INRA/Univ. de Lorraine, 54280 Champenoux, France

<sup>5</sup>UMR-AGAP, CIRAD/INRA, F-63000 Clermont-Ferrand, France

<sup>3</sup>US DOE-JGI, Walnut Creek, California, 94598, USA

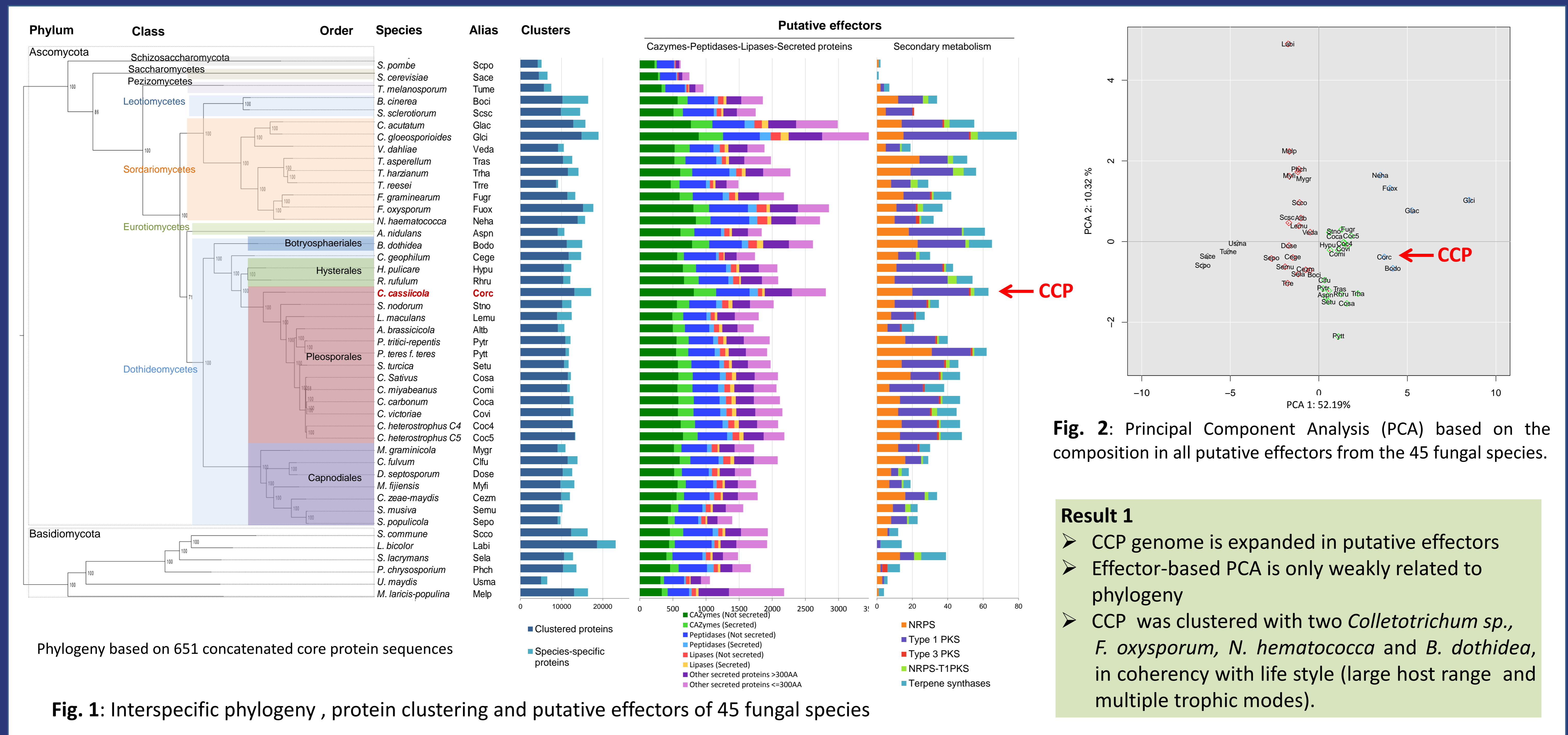
valerie.pujade-renaud@cirad.fr



## Background:

*Corynespora cassiicola* is an Ascomycete fungus (Pleosporales order) with a large host range and diverse life styles<sup>1</sup>. In rubber tree, it is responsible for the *Corynespora* Leaf Fall (CLF) disease which causes massive defoliation on susceptible cultivars, thus impairing natural rubber production<sup>2-6</sup>. Genomic and transcriptomic analyses were conducted in order to identify all potential effectors involved in CLF.

## 1. Interspecies analysis of all putative effectors. Genomes sequences by DOE-JGI ("1000 genomes project")

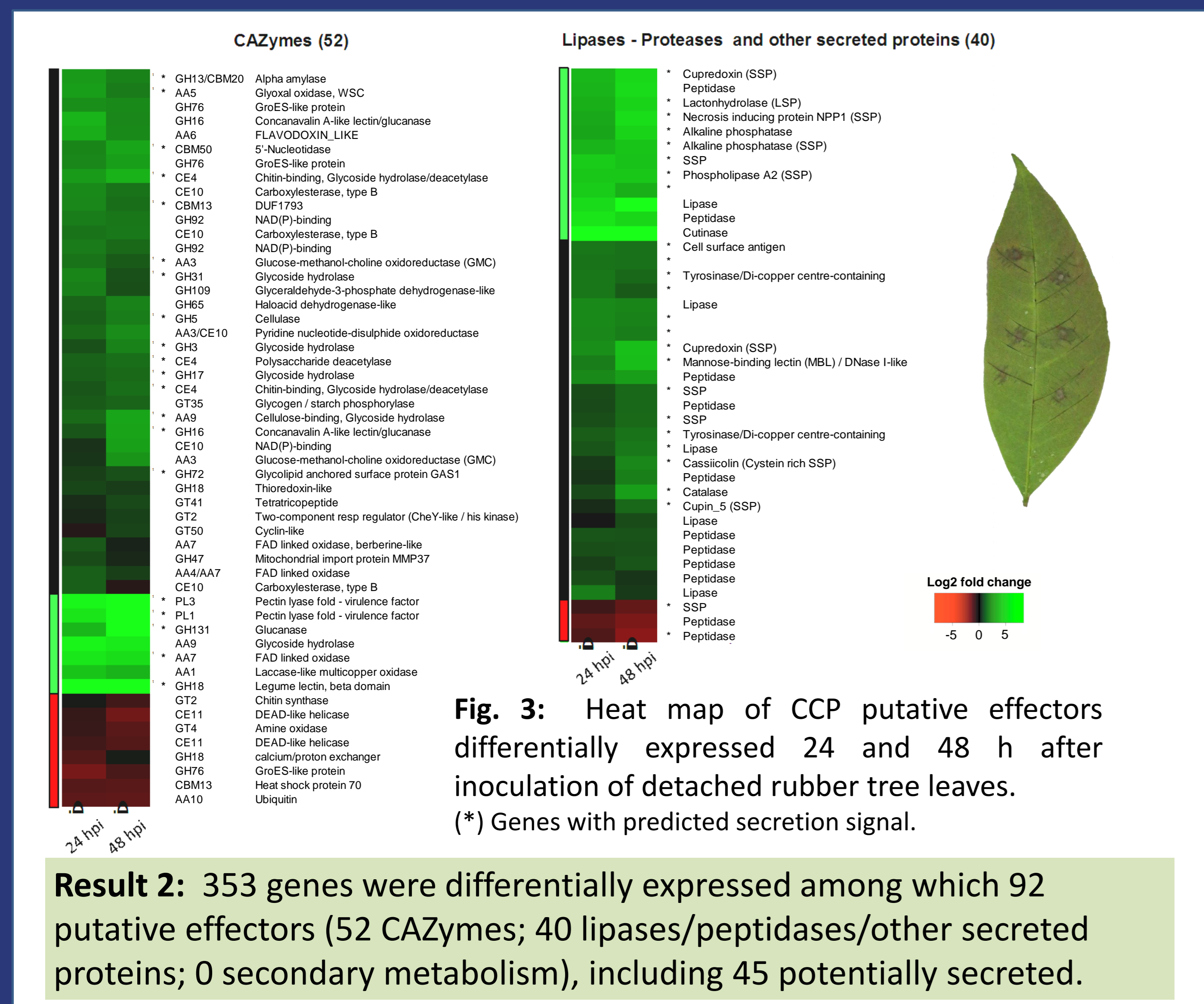


**Fig. 2:** Principal Component Analysis (PCA) based on the composition in all putative effectors from the 45 fungal species.

### Result 1

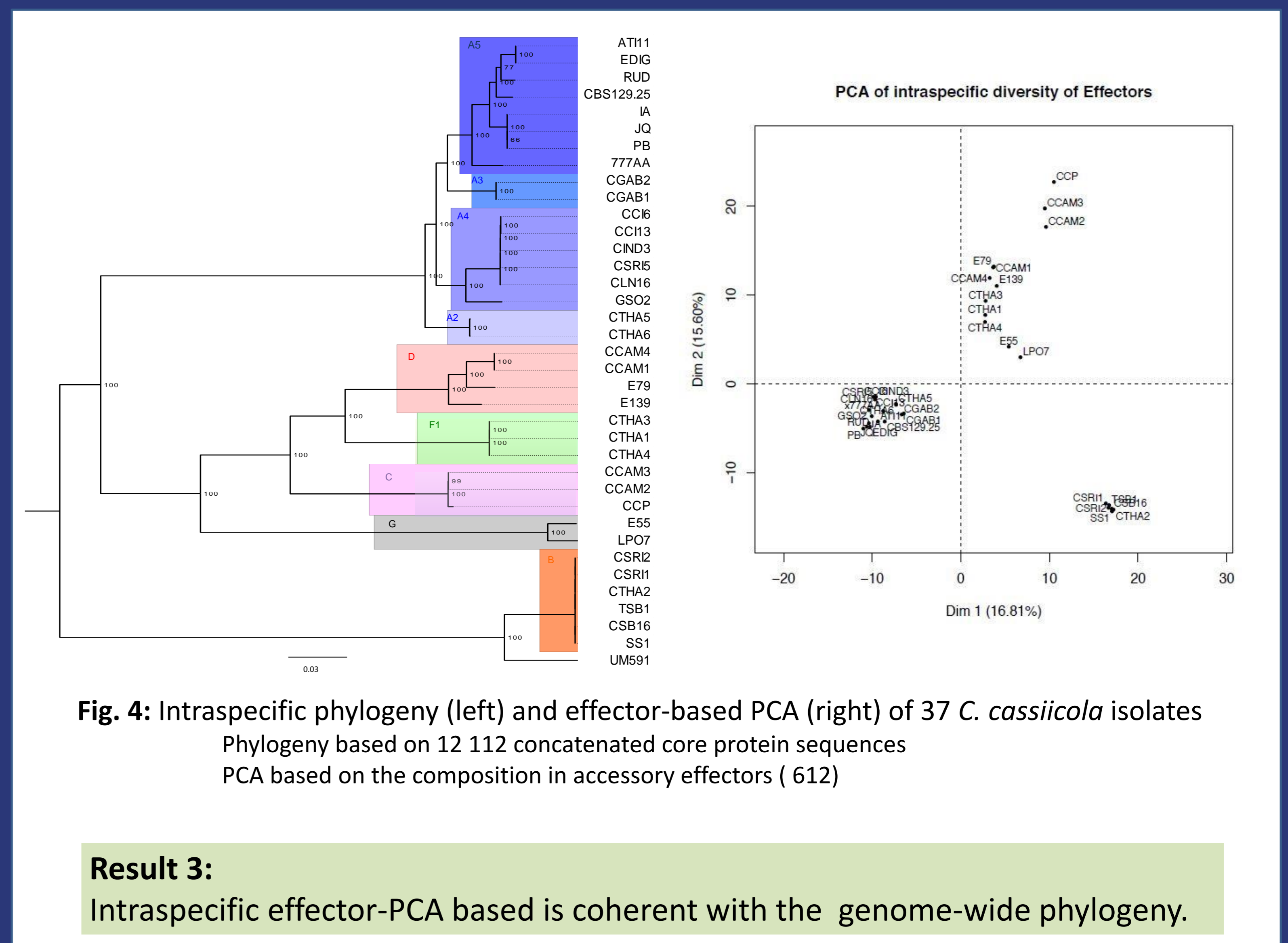
- CCP genome is expanded in putative effectors
- Effector-based PCA is only weakly related to phylogeny
- CCP was clustered with two *Colletotrichum sp.*, *F. oxysporum*, *N. hematococca* and *B. dothidea*, in coherency with life style (large host range and multiple trophic modes).

## 2. RNAseq of CCP compatible interaction with rubber tree



**Result 2:** 353 genes were differentially expressed among which 92 putative effectors (52 CAZymes; 40 lipases/peptidases/other secreted proteins; 0 secondary metabolism), including 45 potentially secreted.

## 3. Intraspecific comparative genomics



### Result 3:

Intraspecific effector-PCA based is coherent with the genome-wide phylogeny.

## Conclusion:

- We have identified *C. cassiicola* (CCP) putative effectors, and more specifically those modulated during its compatible interaction with rubber tree.
- Our comparison of all effectors in phylogenetically diverse *C. cassiicola* isolates will help understanding virulence mechanisms and may provide tools for effector-based selection of more tolerant cultivars<sup>7</sup>.

## References:

1. SCHOCH, CL (2009), Studies in Mycology;64(1):1-15
2. BRETON, F. (2000), J Rubber Res. ;3(2):115-28
3. BARTHE, P. (2007), J Mol. Biol. ;367(1):89-101
4. DE LAMOTTE, F. (2007), J Chrom.B. ;849(1-2):357-62
5. DÉON, M. (2012), Plant Science. 2012;185-186:227-37
6. DÉON, M. (2014), Fungal Biology. ;118(1):32-47
7. TRAN, D.M. (2016), PLoS ONE;11(10)

