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Photo: Adrià López Baucells



# Book of ABSTRACTS

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Frontiers in E3

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**TL 2** - Evolutionary processes that shape biodiversity and adaptation to environmental changes

### Short Talk

#### **Novel insights on the population genetic structure of the Coffee Leaf Rust pathogen *Hemileia vastatrix***

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The devastating disease Coffee Leaf Rust, caused by the fungal pathogen *Hemileia vastatrix* (Hv), has been the major constraint to global coffee production. Only recently the evolutionary history of this pathogen began to be dissected. For the first time the species was found to be structured into three divergent genetic lineages with marked host tropism (C1 and C2 infecting diploid coffee species; and C3 infecting tetraploid coffee species) (Silva *et al.*, 2018). However, no significant structuring was found within the C3 lineage, the most widespread and epidemiological relevant Hv group. In this study, we extended the investigation to a worldwide scale sampling for obtaining a deeper insight on the dynamics and adaptive patterns of Hv populations. By using a RAD-sequencing approach we obtained a set of 13804 SNPs across 99 isolates of *H. vastatrix* from 23 geographical regions, different pathotypes and different coffee hosts. Phylogenetic analyses corroborated the existence of the previous Hv groups (C1 – C3), but furthermore showed a well-supported structuring within C3, with three main lineages (I, II, III). This pattern seems to reflect Hv geographical origin associated to the historical distribution and exchange of coffee materials. Signals of selection were detected in 75 SNP loci, which seem to have a very strong contribution in shaping Hv genetic structure. Furthermore, Single and Multi-SNP association analyses detected 46 SNPs (BF0.99) and 67 SNPs (PIP0.99) associated with the different C3 genetic lineages, respectively. Our study provides a higher-resolution perspective on the evolutionary history of *H. vastatrix*, revealing for the first time a clear structuring within rusts infecting tetraploid coffee hosts, which seems to follow an adaptive pattern, with coffee host as a major selective pressure.