

# Speaker Abstracts - Tuesday 4 December

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## Tollenaere

### **Multiple infections in rice from West Africa: mechanisms, epidemiological and evolutionary implications**

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Plant pathologists have long focused on the tight interaction between a pair of species 'one plant / one pathogen'. However, the recent concept of the 'pathobiome' proposes to define pathogenesis beyond a one-to-one interaction and instead integrating the pathogen within the whole biotic community of the host, including other pathogen species (i.e. co-infection or multiple infections) as well as non-pathogenic microbial species. This paradigm shift considers the effect of the within-host biotic community on infection outcome, epidemiology and evolutionary trajectories of plant pathogen populations. We apply the 'pathobiome' concept to the pathogen species causing major rice diseases in West Africa, in particular the Rice yellow mottle virus (RYMV) and bacterial leaf streak (BLS) due to the bacterium *Xanthomonas oryzae oryzicola* (Xoc). We showed that yellow mottle disease and BLS are frequently found in the same fields and co-infect naturally the same rice plants. Our experiments reveal that rice co-infected by RYMV and Xoc present more severe bacterial symptoms, while viral accumulation is reduced, compared to the mono-infected mock treatment. Our analyses finally suggest that RNA silencing mechanisms would likely be involved in such RYMV-Xoc within-plant interactions. We then extend our focus to other major rice diseases, with intensive pluri-annual field work and multi-pathogen detection. Associations between microbes (either positive or negative) in the field may be due to within-host interactions but this requires confirmation through experimental work. We believe the pathobiome approach applied to crop diseases will ultimately provide a wealth of new high-impact insight concerning plant diseases, providing valuable knowledge to allow for an eco-friendly increase of agricultural production.