

Thursday, 23rd March 2023
CET 16:00 - 17:00
IBL 1.05.31

An IBL seminar under the theme of **Disease & Development**
& supported by the Graduate School of **Experimental Plant Sciences (EPS)**

Dr. Chih-hang Wu  @AdamWu9527

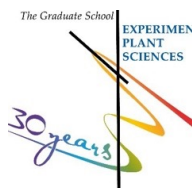
Institute of Plant and Microbial Biology (IPMB), Academia Sinica (中研院植微所), Taipei, Taiwan

Lineage-specific diversification and conservation of a plant immune receptor network

Plants have evolved complex immune systems comprising nucleotide-binding domains and leucine-rich repeat-containing (NLR) proteins to fend off invading pathogens. The NRC (NLR required for cell death) family is a group of helper NLRs that forms a complex genetic network with multiple sensor NLRs to confer resistance against various pathogens of solanaceous plants. The NRC-dependent sensor NLRs and NRC helper NLRs fall into a well-supported phylogenetic superclade named the NRC superclade. *However, our knowledge about the evolutionary dynamics and function of the NRC network beyond solanaceous plants remains limited.* To understand how the NRC network evolved, we performed phylogenomic analyses comparing the NLR receptors identified from Caryophyllales and Asterids lineages. We found that the NRC superclade emerged in some but not all Caryophyllales, whereas all Asterids species analysed contain NRC superclade members. Interestingly, the NRC superclade showed extensive lineage-specific expansion patterns in Lamiids but not Campanulids. In Campanulids, the NRC superclade expanded to an average of 10% of the total 'NLRome', in which each analysed Campanulids species contains 1 to 3 NRC helper NLRs. Comparative analysis suggested that the helper NLRs in the NRC network of Campanulids likely remain interchangeable among different species. In Lamiids, the NRC superclade expanded to more than 35% of the total NLRome and generally contained more NRC helper NLRs. Strikingly, three-quarters of the NLRs in the genomes of *Ipomoea* spp. are in the NRC superclade. Extensive phylogenomic analysis using *Ipomoea triloba* and tomato suggested that the NRC networks of these two species share very little conservation, and most of the helper NLRs are less likely to be interchangeable. Our results **highlight the unique evolutionary patterns of the NRC network in Asterids and may provide information for transferring disease resistance across distantly related plant lineages in the future.**



**Universiteit
Leiden**



Seminar Series for **Plant Stress Biology (PSB)**, Leiden
Groups of Dr. **Salma Balazadeh** & Dr. **Pingtao Ding**