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Oral Communication Abstract – 1.01

BEYOND SINGLE GENES: RECEPTOR NETWORKS UNDERPIN PLANT IMMUNITY

KAMOUN S.

The Sainsbury Laboratory, University of East Anglia, Norwich Research Park, Norwich (United Kingdom) - Web: http://www.KamounLab.net - Twitter: @KamounLab

A fundamental concept in plant pathology is that most plants are actively resistant to most pathogens and pests. Plants fend off biotic foes primarily through immune receptors that detect invading pathogens to trigger a robust immune response. The conceptual basis of such interactions was elegantly articulated by Harold Flor, who back in 1942 proposed the hypothesis that single genes in plants and pathogens define the outcome of their interactions. Flor's gene-for-gene model turned out to be hugely insightful and influential—it has, ever since the mid-twentieth century, helped to guide applied and basic research on disease resistance. However, recent findings are taking the field far beyond this binary view of plant-pathogen interactions. Plants turned out to carry diverse repertoires of immune receptors that are interconnected in complex ways. The emerging paradigm is that dynamic webs of genetic and biochemical networks underpin early stages of plant-pathogen interactions. I will discuss our work on NLR networks and explore the implications of this systems view of plant-pathogen interactions. We have postulated that Flor's intuitive gene-for-gene model is superseded by the systems view that plant immune receptors form networks with complex topology. Current activities aim at decrypting the regulatory pathways that modulate receptor network wiring. Ultimately, an improved knowledge of plant immune systems would enable optimal deployment of immune receptors in agriculture.