Tissue specific expression of PvPGIP2 to improve wheat resistance against Fusarium graminearum

investigation, we focus on the effects of chemical priming and gamma-ray-mediated invigouration on the DNA damage response (DDR) activated during seed imbibition in *Medicago truncatula*. The expression profiles of key DDR genes are used as molecular indicators of the seed ability to preserve genome integrity and enhance quality.

P24.15
An *Arabidopsis* adenyl cyclase with a role in plant defense responses against a biotrophic fungus

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The second messengercyclic adenosine 3',5'-monophosphate (cAMP) is increasingly recognized as having many different roles in plant responses including cation transport via the modulation of cyclic nucleotide gated channels. However, in plants, adenyl cyclases (ACs), molecules that can catalyze the reaction from ATP to cAMP and pyrophosphate have remained elusive. In order to discover plant ACs, we have developed a rational search term based on conserved amino acid residues in catalytic centers of annotated AC-[R]X{5,20}[RKS]X[DE]X{9,11}[KR]X{1,3}[ED]. Here we report that one of the *A. thaliana* AC candidates (At3g14460) is a LRR and NB-ARC domain-containing disease resistance and defense response protein. This AC has catalytic activity *in vitro* as determined by mass spectrometry. To determine its biological role, two AC loss-of-function mutants were obtained from public collections of Arabidopsis T-DNA insertion lines and examined for responses to the biotrophic fungus *Hyaloperonospora parasitica (Hpa)*. Two isolates of *Hpa* have been used, Waco9 and Emoy2, that induce compatible and incompatible interactions, respectively, in Col-0. The pathophenotype of AC mutants was quantified and a role of cAMP in host defense reactions is proposed.

P24.16
Visualizing the relevance of bacterial blue- and red-light receptors during plant–pathogen interaction

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The foliar pathogen *Pseudomonas syringae* pv. *tomato* DC3000 (*Pst*) leads to consistent losses in tomato crops, urging to multiply investigations on the physiological bases for its infectiveness. As other *P. syringae* pathovars, *Pst* is equipped with photoreceptors for blue and red light, mimicking the photosensing ability of host plants. Recently, we have investigated *Pst* strains lacking the genes for a blue-light sensing protein (*Pst*LOV), for a bacteriophytochrome (*Pst*Bph1) or for hemeoxygenase-1. When grown in culturing medium, all deletion mutants presented a larger growth than wild-type (WT) *Pst* under all other light conditions, with the exception of blue light which, under our experimental conditions, completely suppressed the growth of the deletion mutants. Each of the knockout mutants shows stronger virulence towards the model plant *Arabidopsis thaliana* than *Pst*WT, as evidenced by macroscopic damages in the host tissues of infected leaves. These results underscore the importance of *Pst* photoreceptors in responding to environmental light inputs. Here we present also some preliminary data about the infectiveness of wild-type and mutated bacterial strains towards tomato plants.

P24.17
The HD-Zip II transcription factor HAT3 acts via recruitment of a chromatin remodelling complex

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Transcriptional repression mediated by the EAR motif is emerging as one of the principal mechanisms of plant gene regulation. The discovery that the EAR motif interacts with TPL together with the demonstration of genetic interaction between TPL and HDA19 support a model where EAR repressors, via recruitment of chromatin remodelling factors, facilitate epigenetic regulation of gene expression. Among the Arabidopsis transcription factors containing an EAR motif are the HD-Zip II proteins, involved in embryonic apical patterning, shoot apical meristem function and organ polarity. There are several evidence that the HD-Zip II proteins act as negative regulators of gene expression, and recent work demonstrated that HAT3/ATHB4 directly repress the expression of the *ATHB2* gene. The presence of the EAR motif in these proteins led to hypothesize a repression mechanism acting via TPL. Consistent with this hypothesis, it has bee recently demonstrated that HAT3 and TPL physically interact and that the HAT3 EAR motif is essential for this interaction. Molecular and phenotypic analysis will be presented to discuss the centrality of the HAT3/TPL complex to HAT3 function.

P24.18
Tissue-specific expression of PvPGIP2 to improve wheat resistance against *Fusarium graminearum*

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Fusarium Head Blight (FHB) is one of the most important wheat diseases caused by *Fusarium* spp.. The pathogen infects the spike at flowering time and causes severe yield losses and deterioration of grain quality due to the secretion of mycotoxins during infection. The understanding of the precise mode of pathogen entering and the subsequent floral tissue colonize is a crucial point to control FHB. Polygalacturonase inhibiting proteins (PGIPs) are cell wall proteins that inhibit the pectin-depolymerizing activity of polygalacturonases (PGs) secreted by pathogens. The constitutive expression of the bean PvPGIP2 limits FHB symptoms and reduces mycotoxin accumulation in wheat. To better understand which spike tissues plays a role in limiting *Fusarium* infection, we have produced transgenic wheat plants expressing PvPGIP2 in the endosperm or simultaneously in lemma, palea, anthers and rachis. This latter approach reduced FHB symptoms, whereas the expression of PvPGIP2 only in the endosperm did not affect FHB development, indicating that when the pathogen has reached the endosperm, inhibition of pathogen PGs ineffective to prevent fungal spread.

P24.19
Role of the *Arabidopsis* HD-Zip II transcription factors HAT3 and ATHB4 in flower development

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HD-Zip II transcription factors have a role in several plant developmental