



III Foro Internacional en Cambio Climático:
"Impacto en la agricultura del Perú" INIA-
MINAGRI



CBGP
CENTRO DE BIOTECNOLOGÍA
Y GENÓMICA DE PLANTAS
UPM-INIA



**EXCELENCIA
SEVERO
OCHOA**

A novel role for auxin in balancing plant growth and abiotic stress responses

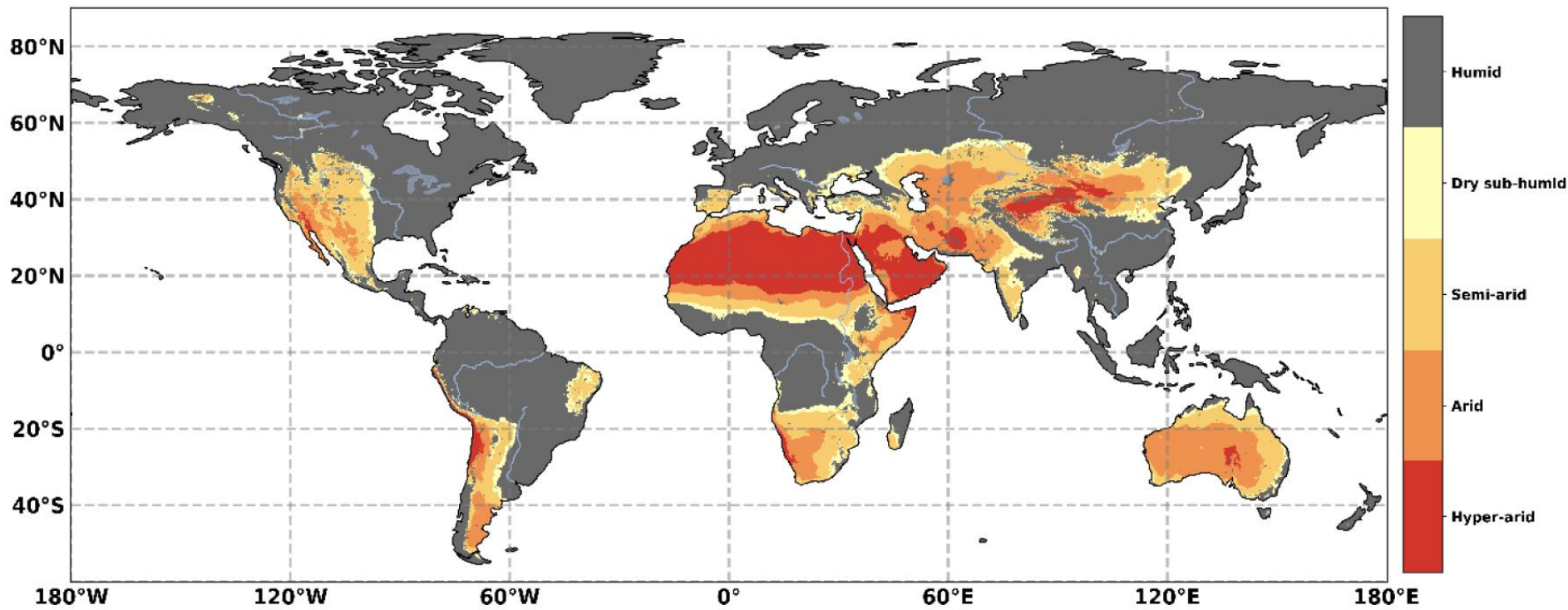
Stephan Pollmann

Embalse de Entrepeñas,
Guadalajara, 2017
Foto: El País



Abiotic factors

Biotic factors



IPCC Special Report
Climate Change and Land
August 2019

Climate Change Effects:

- Accelerated desertification
- Increased drought stress
- Increased soil salinity through irrigation

Reduced agricultural productivity

Col-0



Control

Drought
stress

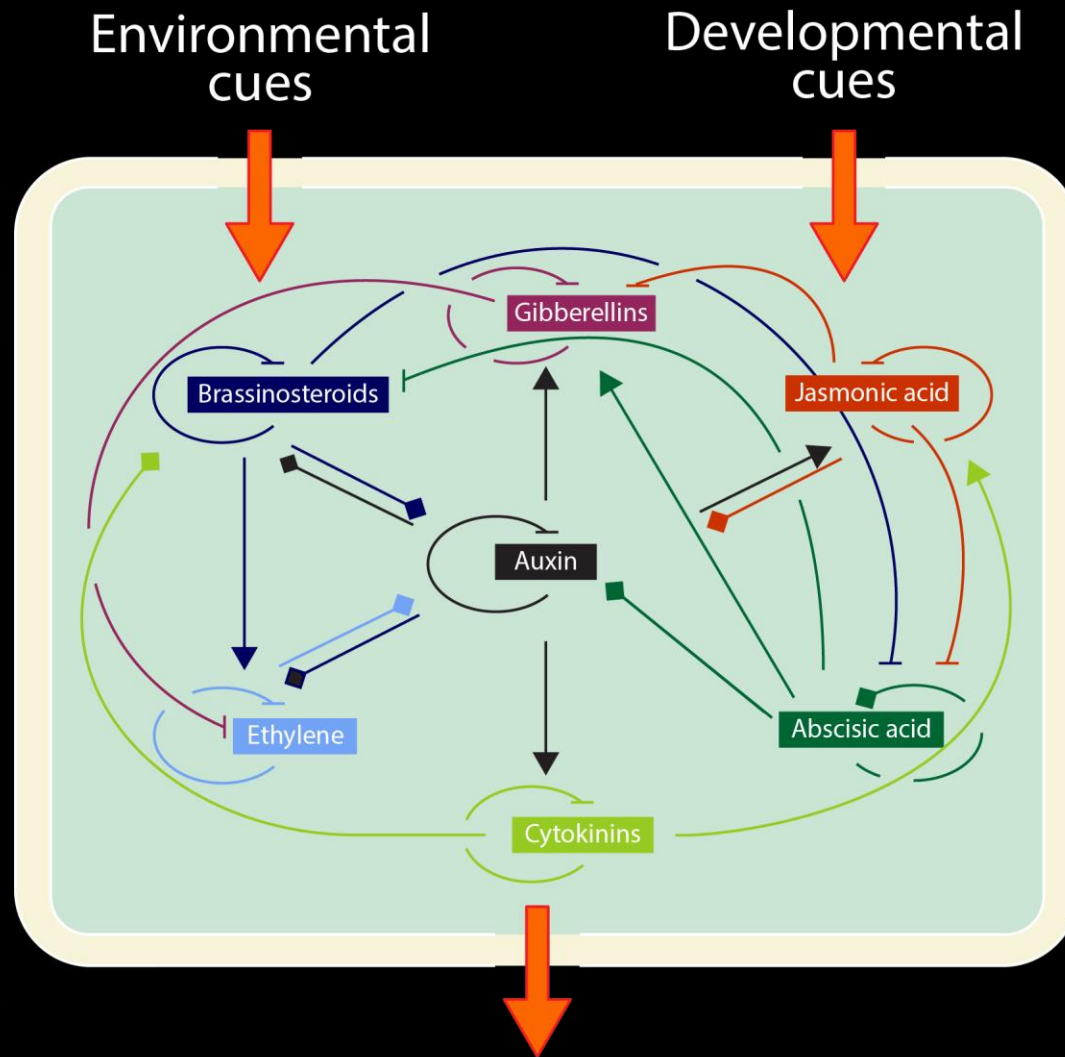
Salt
stress

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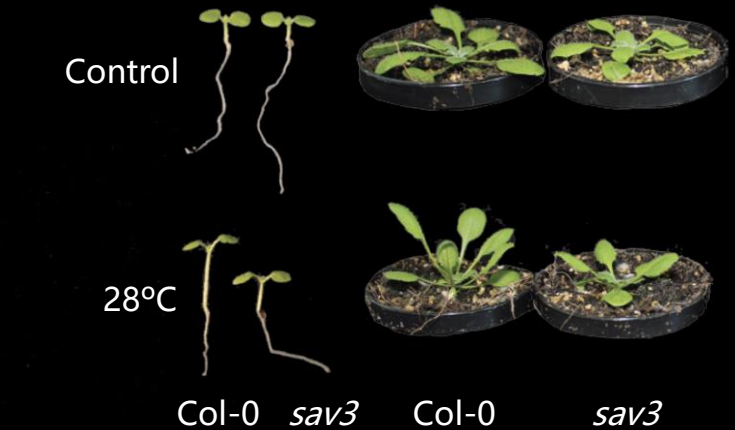
El Ejido, Almeria, Spain
The Vegetable Garden of Europe

A sophisticated network of plant hormone crosstalk conditions adequate physiological responses



Auxin is a major growth regulator in plants

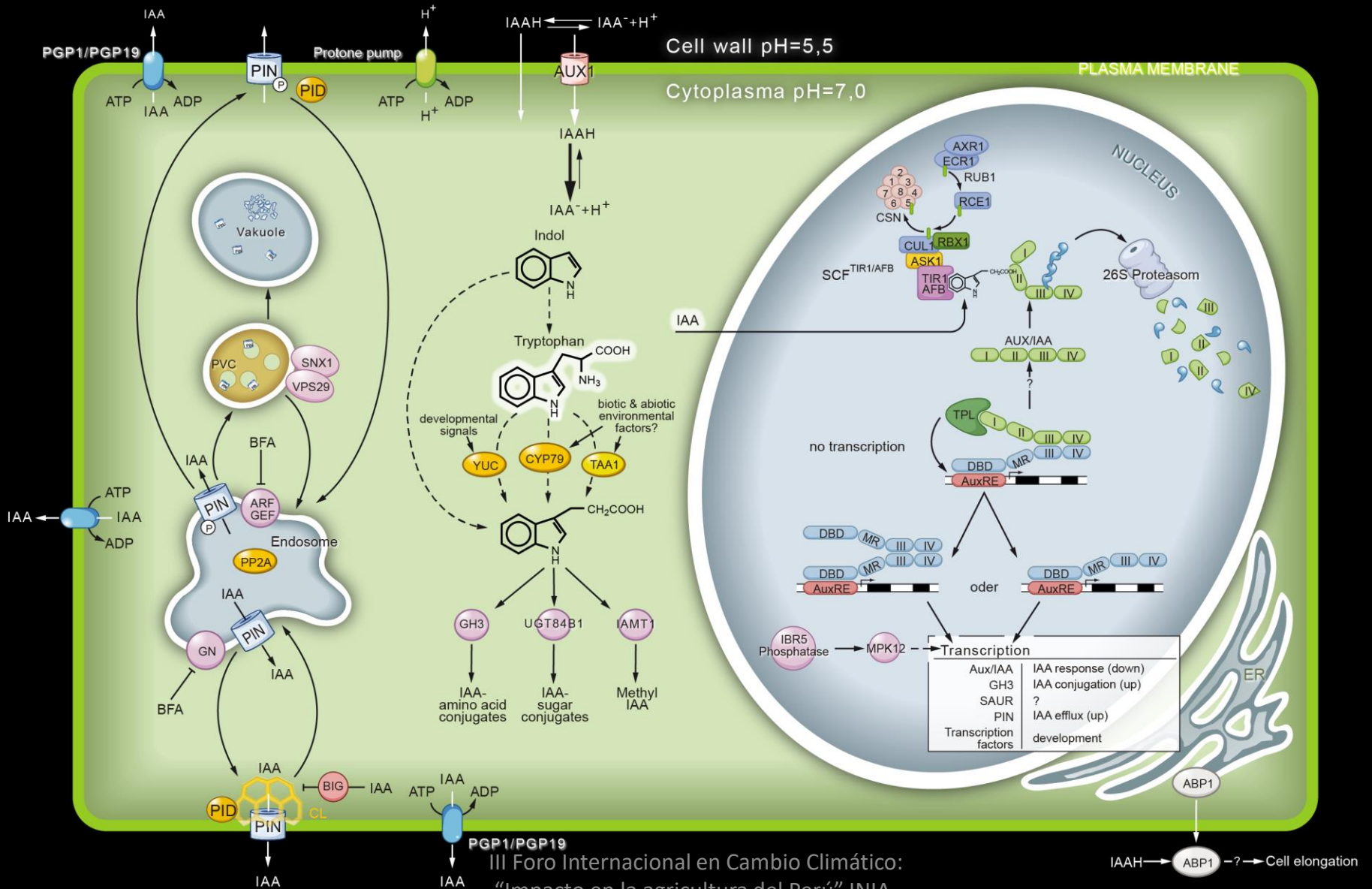
Wild type



axr2-1



Processes affecting cellular auxin homeostasis



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adapted from Weijers & Friml 2009 *Cell*

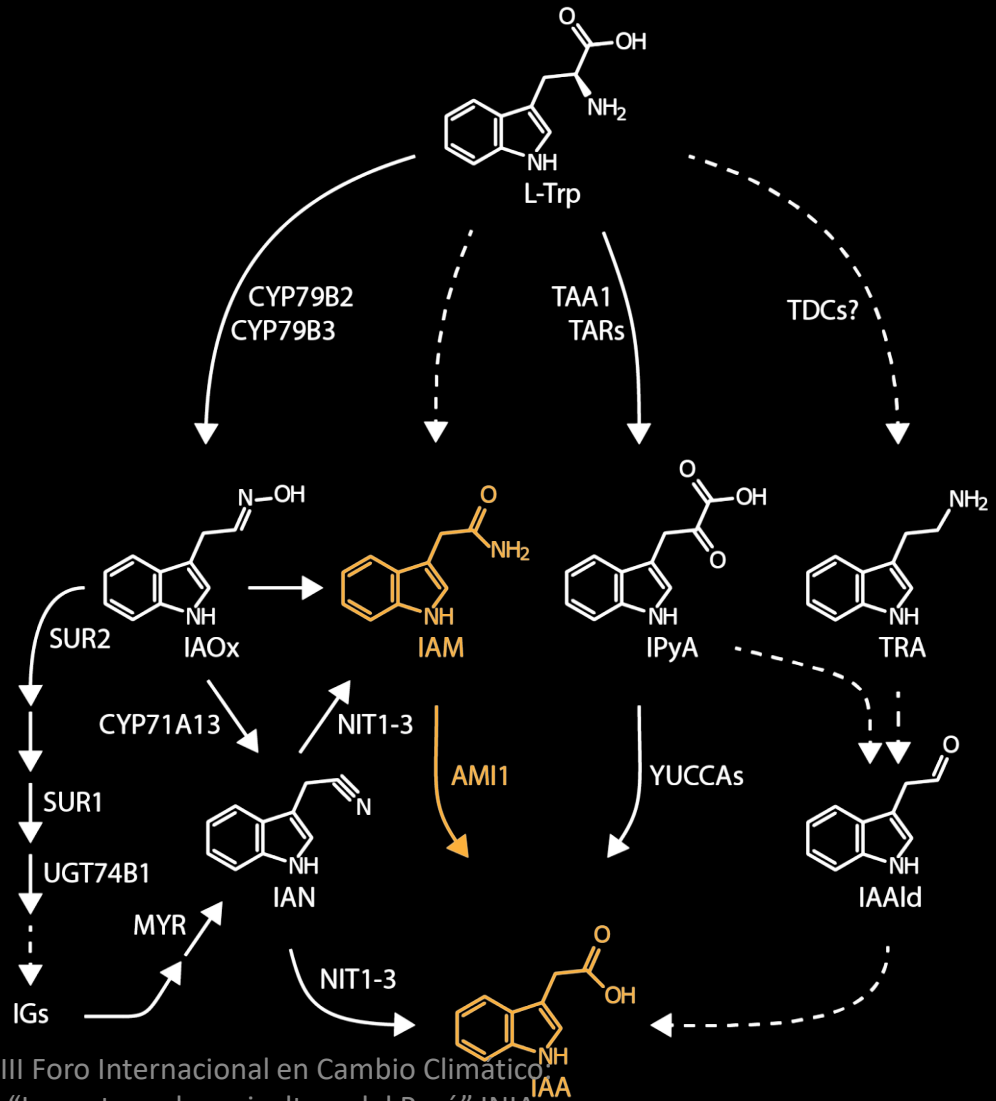
The current picture of auxin biosynthesis in plants



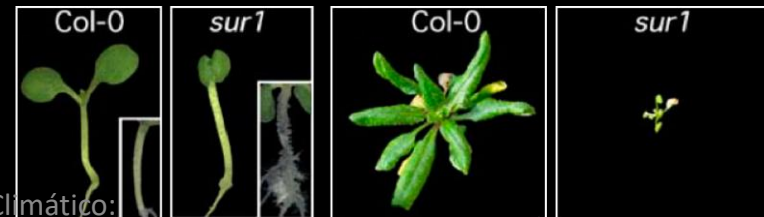
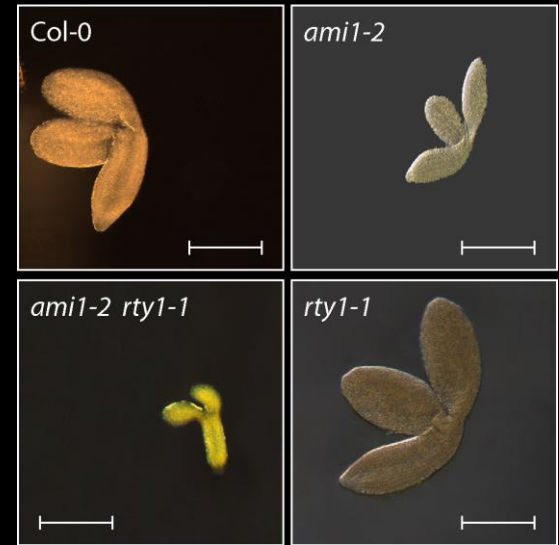
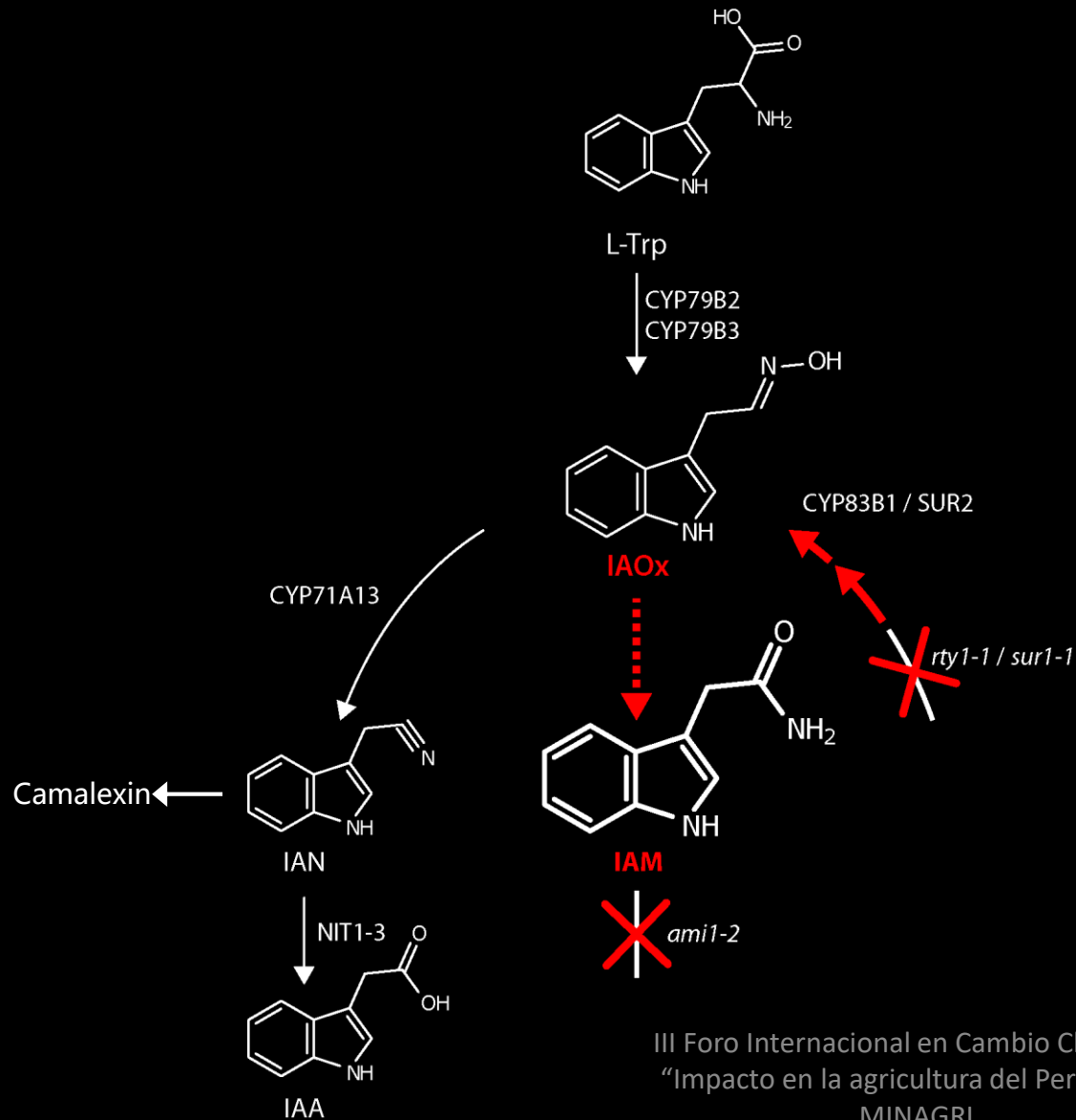
Frits W. Went
(1903-1990)



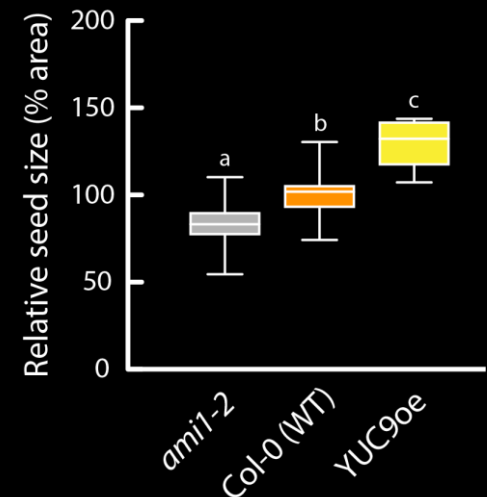
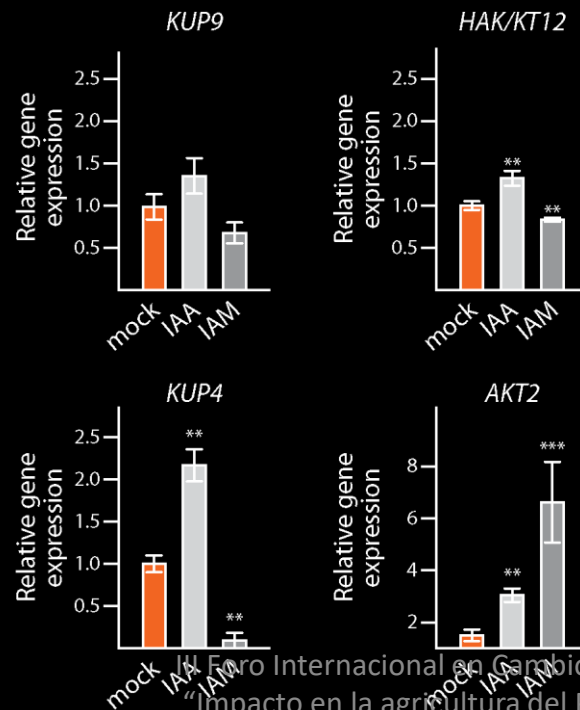
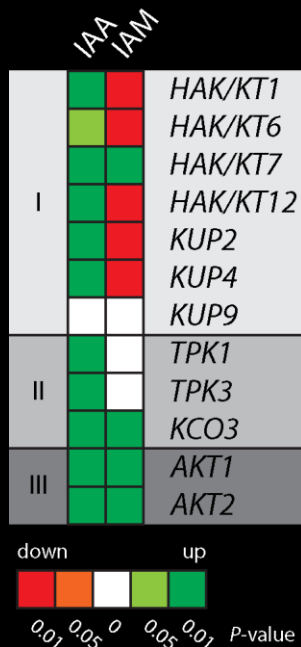
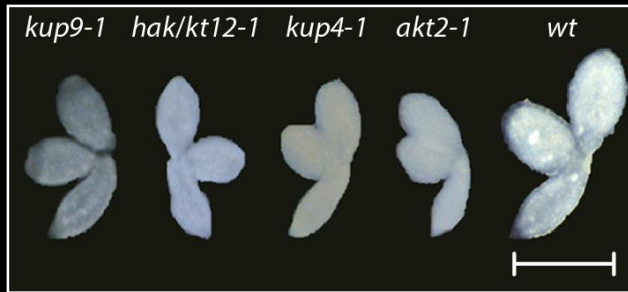
Kenneth V. Thimann
(1904-1997)



Indole-3-acetaldoxime (IAOx) is a metabolic key branching point from which several independent pathways emerge

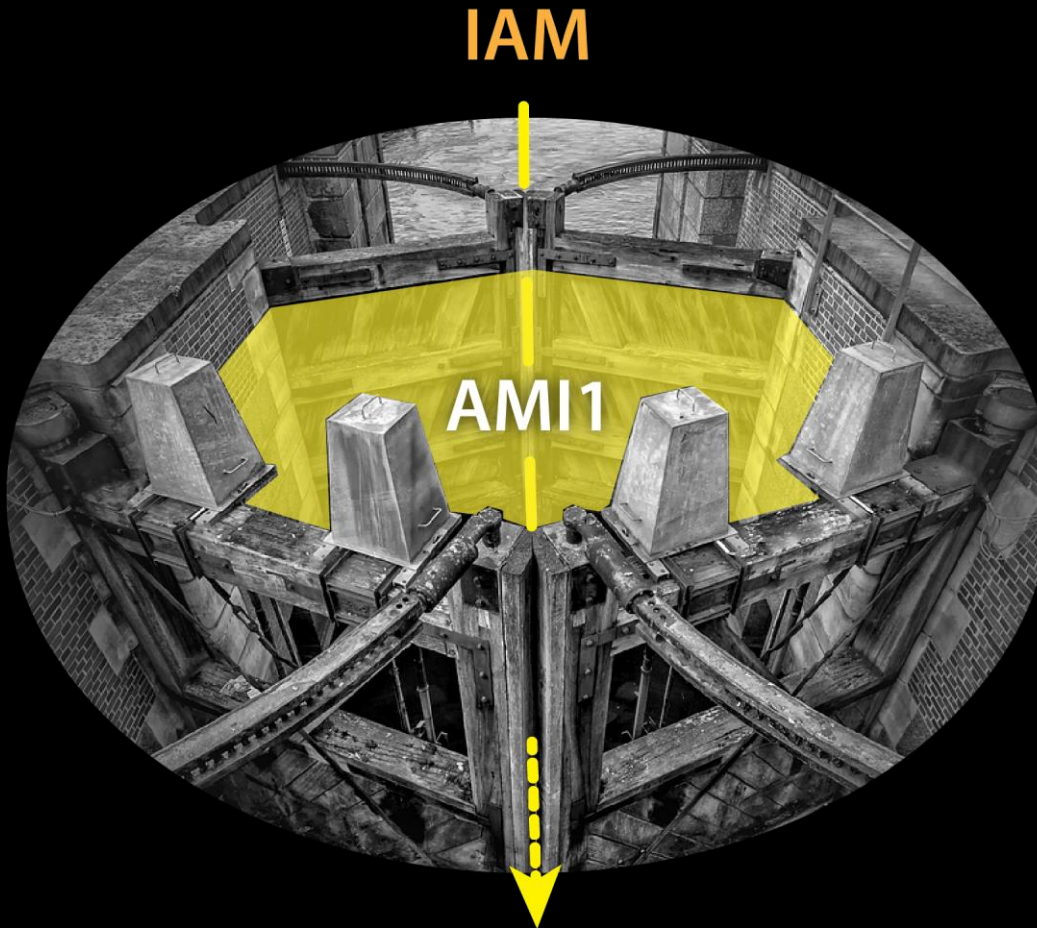


The IAM to IAA ratio is a determinant of seed growth through the control of a number of K⁺ channels



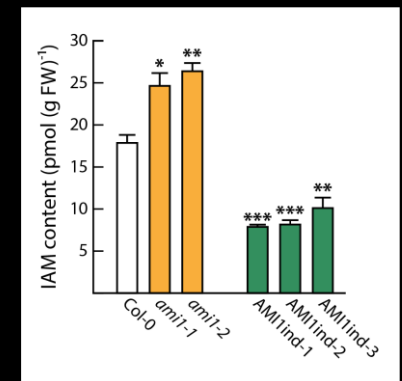
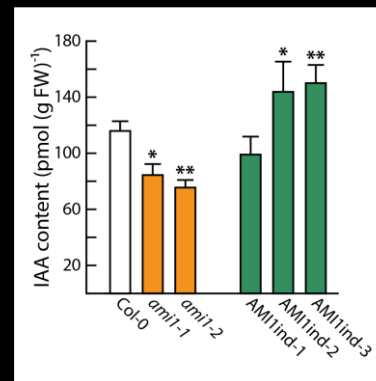
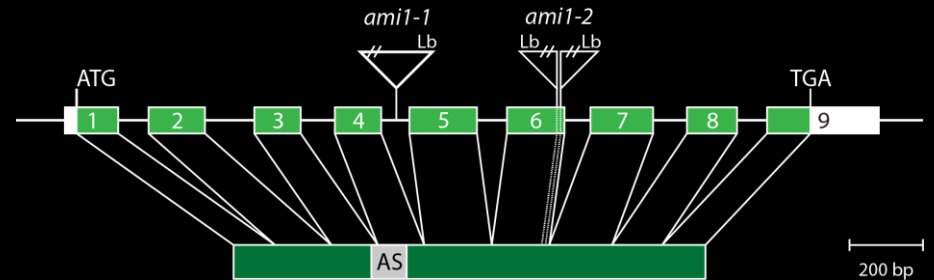
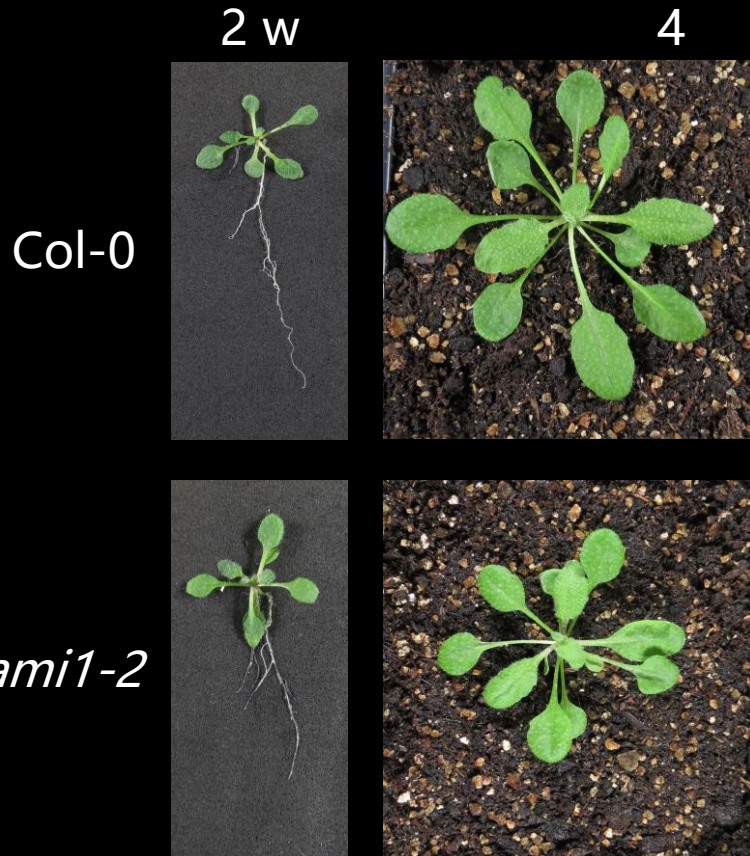
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AMI1 likely acts as a gatekeeper controlling the IAM pool



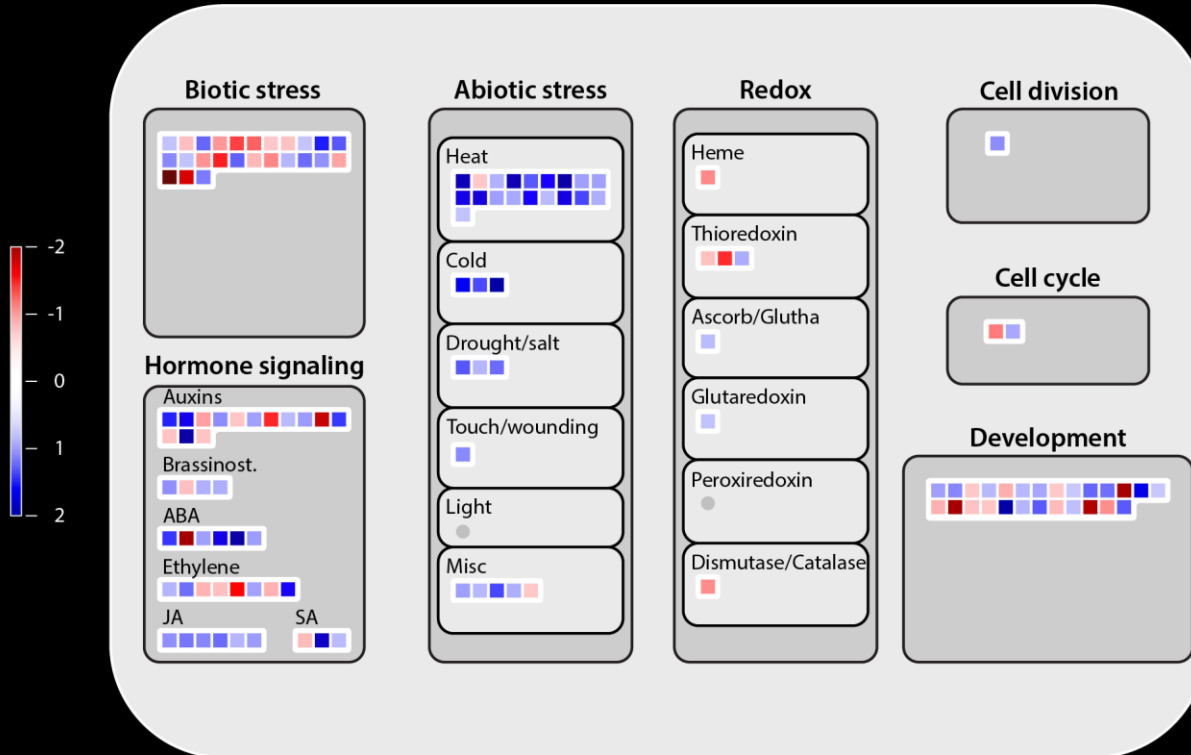
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ami1 mutants are impaired in the conversion of IAM into IAA

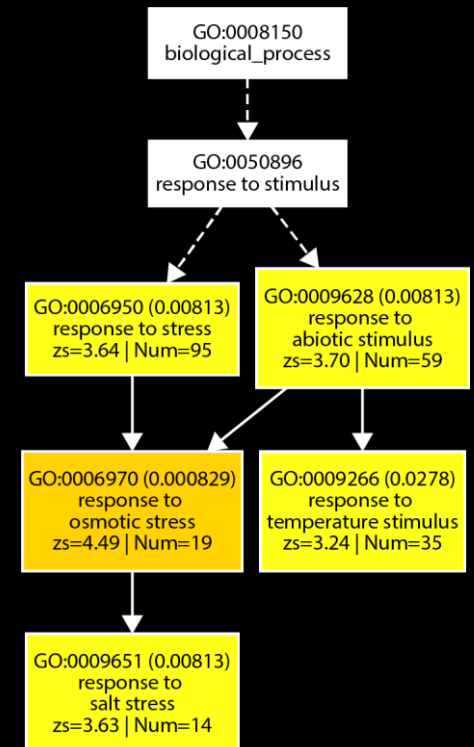


Transcriptomics analyses of *ami1* disclosed perturbations in stress responses

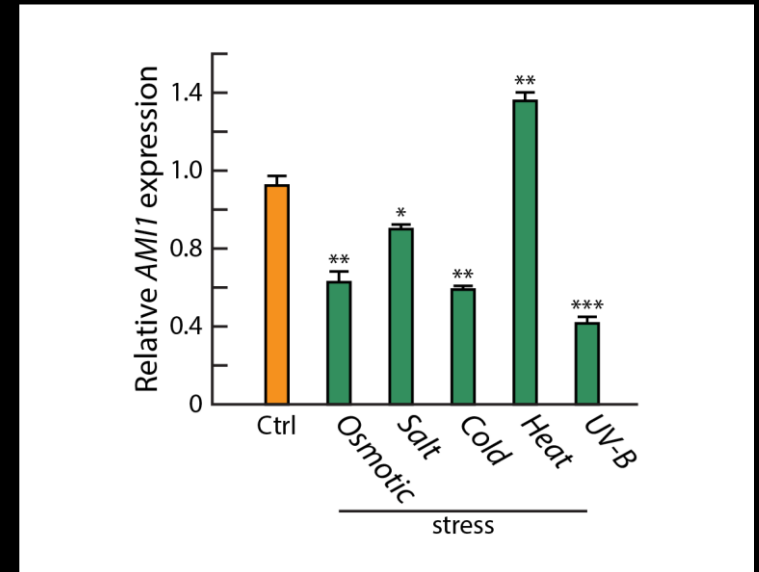
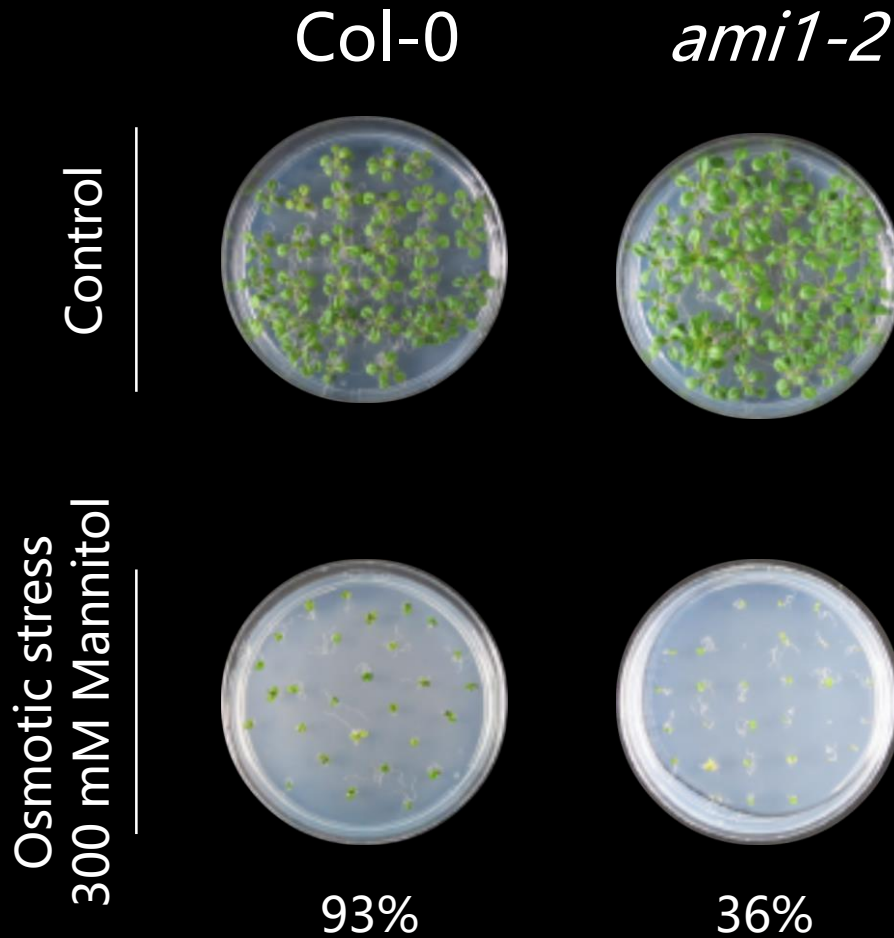
MapMan



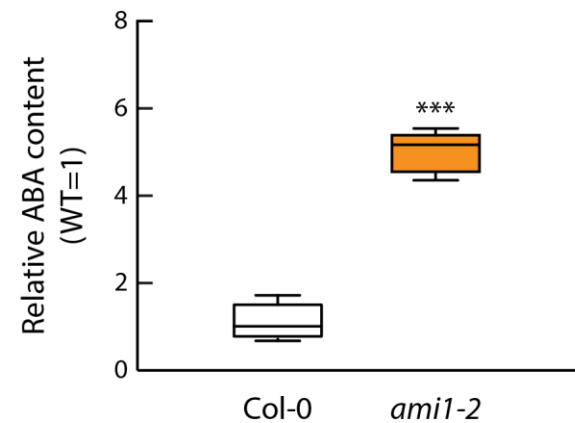
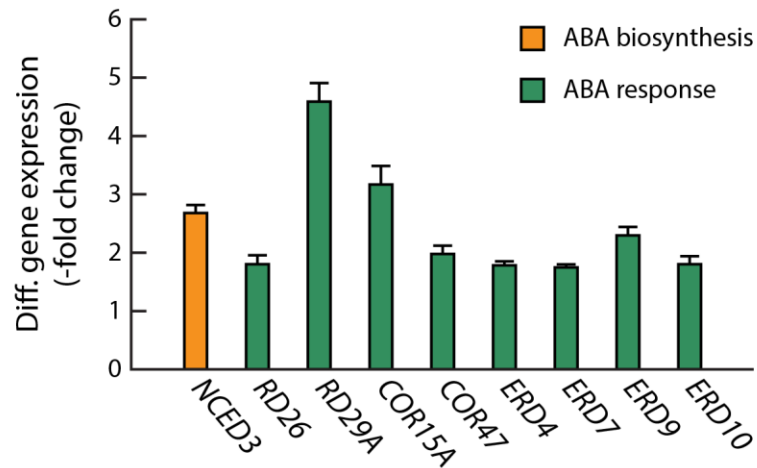
Parametric Analysis of Gene Enrichment



ami1-2 mutants display compromised osmotic stress tolerance



IAA and ABA are connected through the activity of AMI1



Transcriptional responses triggered by IAM

AP2/ERF



bHLH



bZIP



C2H2



HB



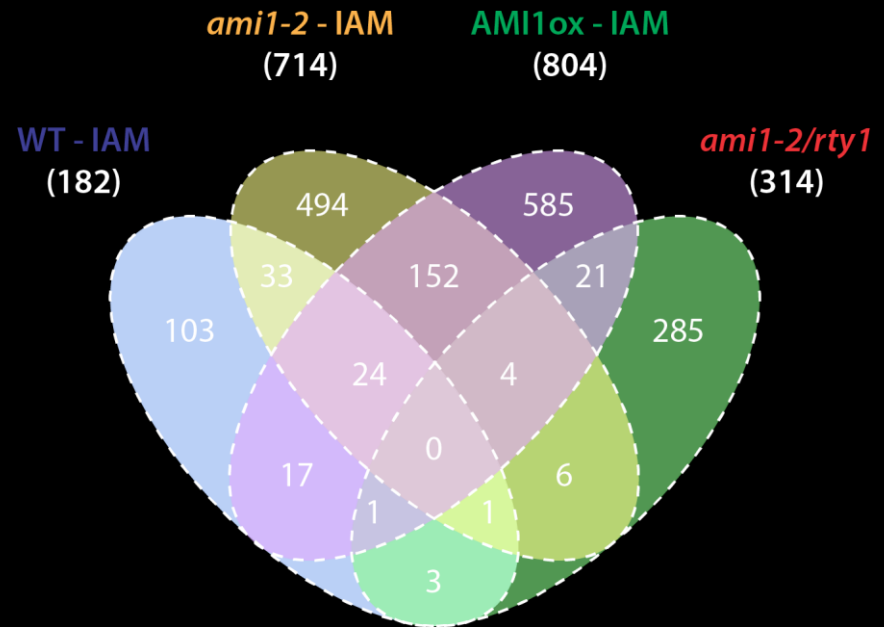
MYB



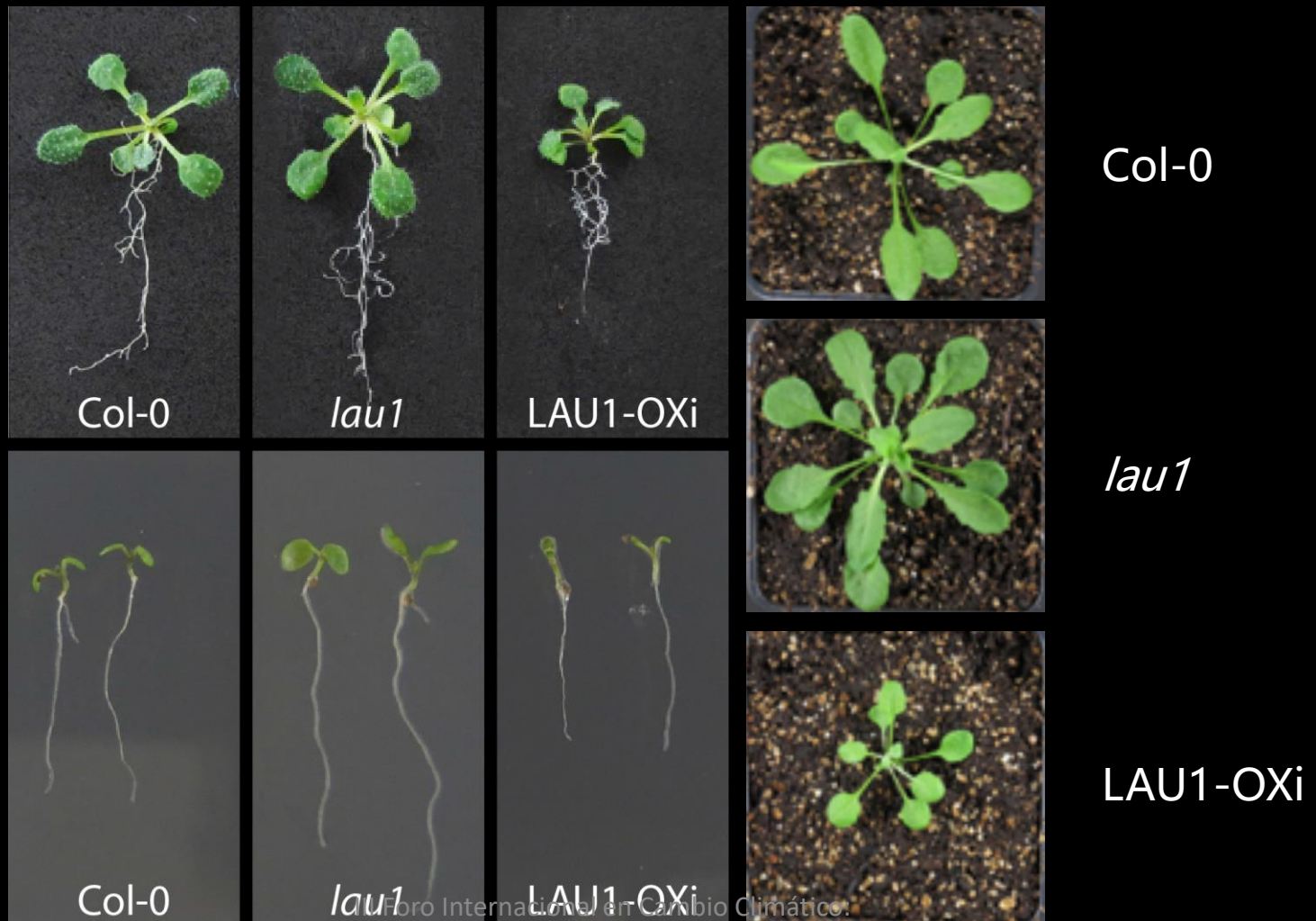
Trihelix



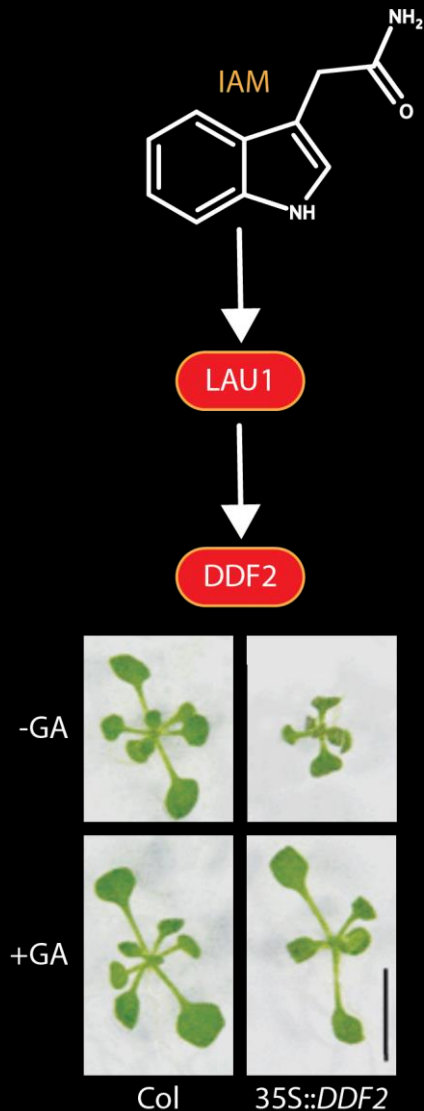
WRKY



LAUCH1 acts as a negative plant growth regulator downstream of AML1

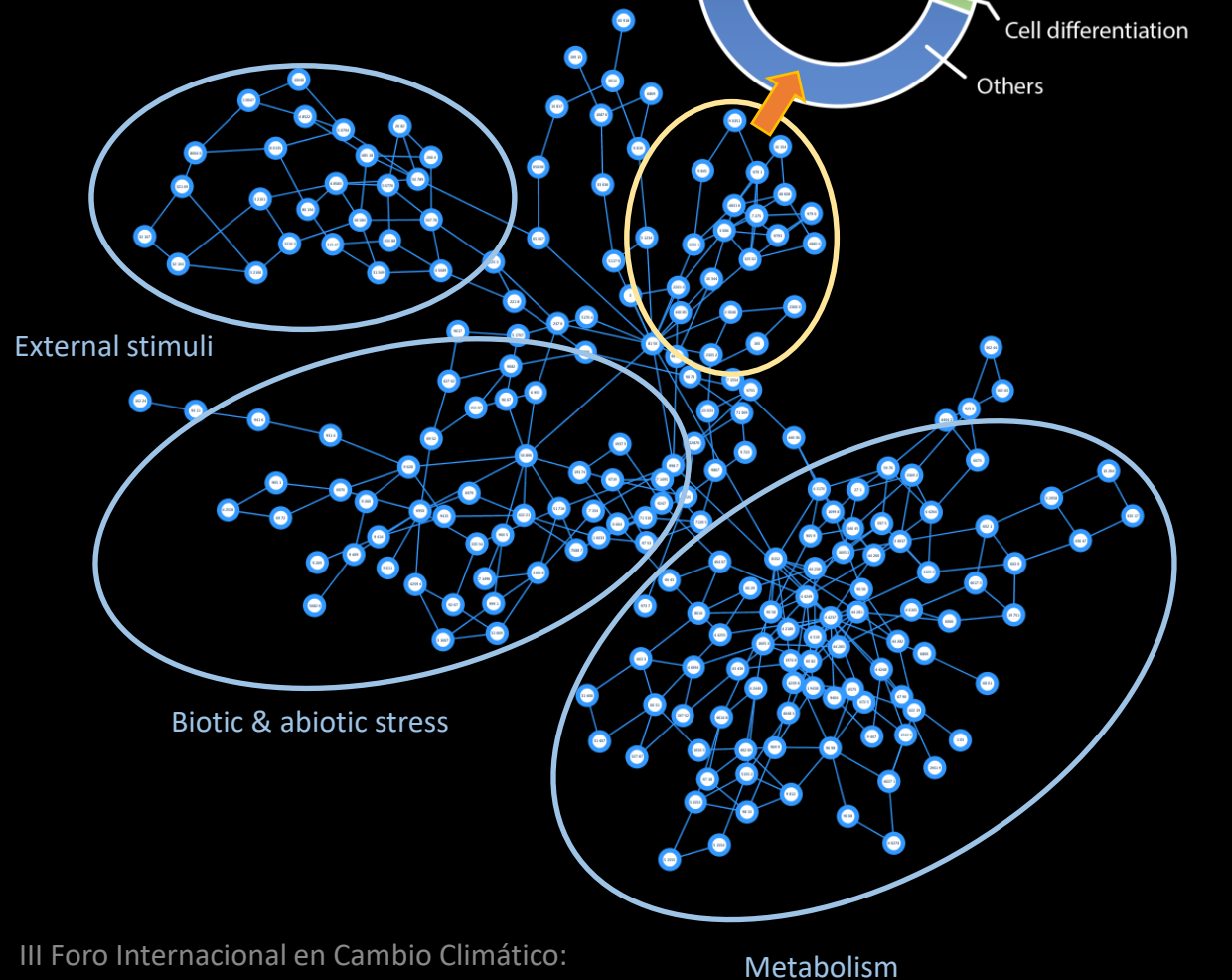


LAUCH1 relays to the AP2-transcription factor DDF2 to control plant growth



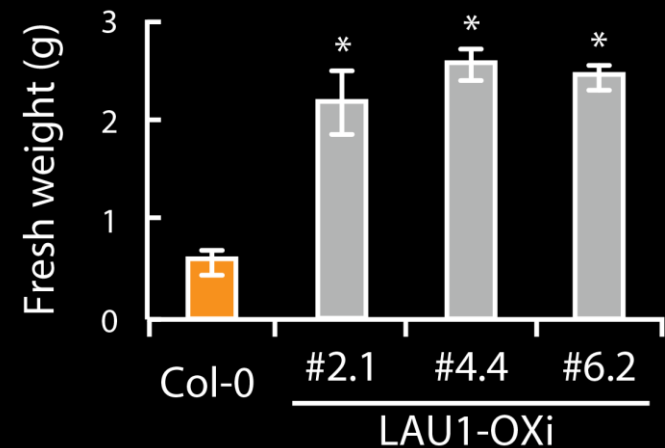
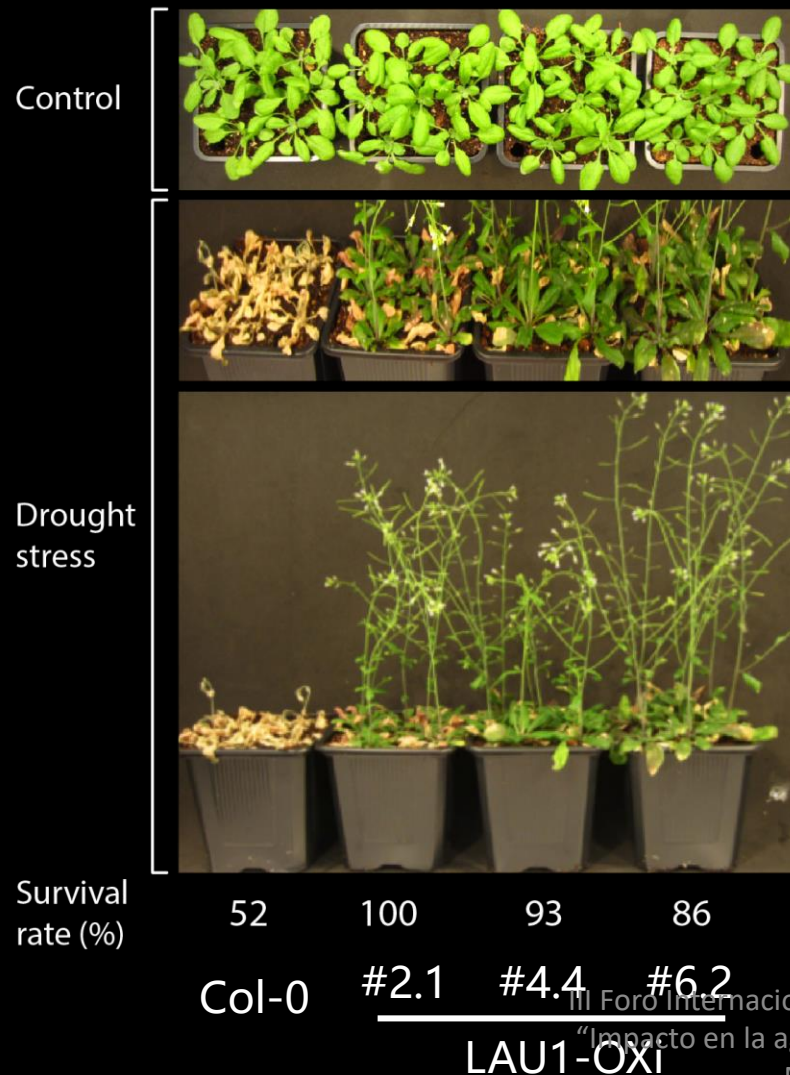
Magome et al. 2004 *Plant J.*

BiNGO - LAU1-OX_i

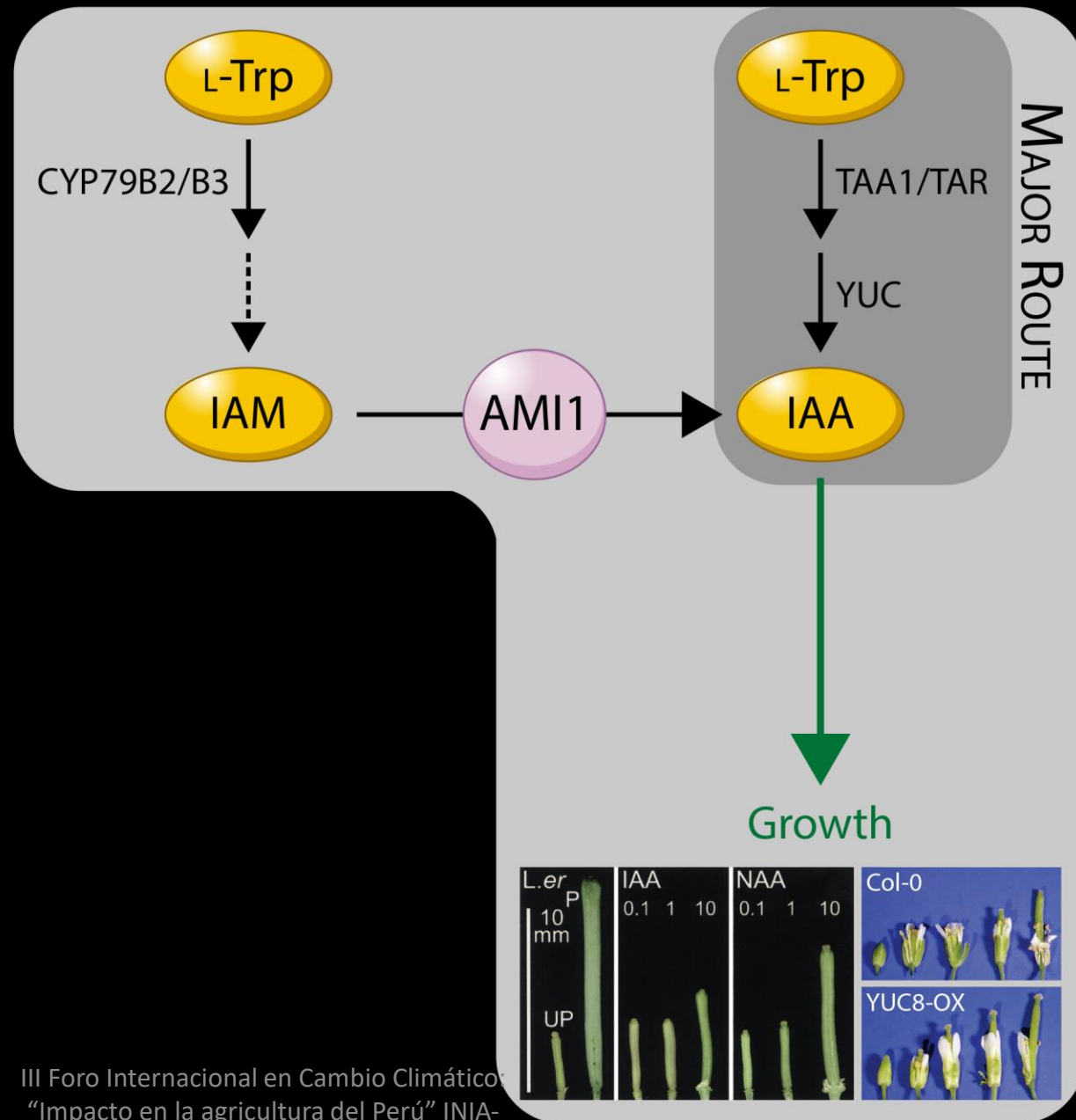


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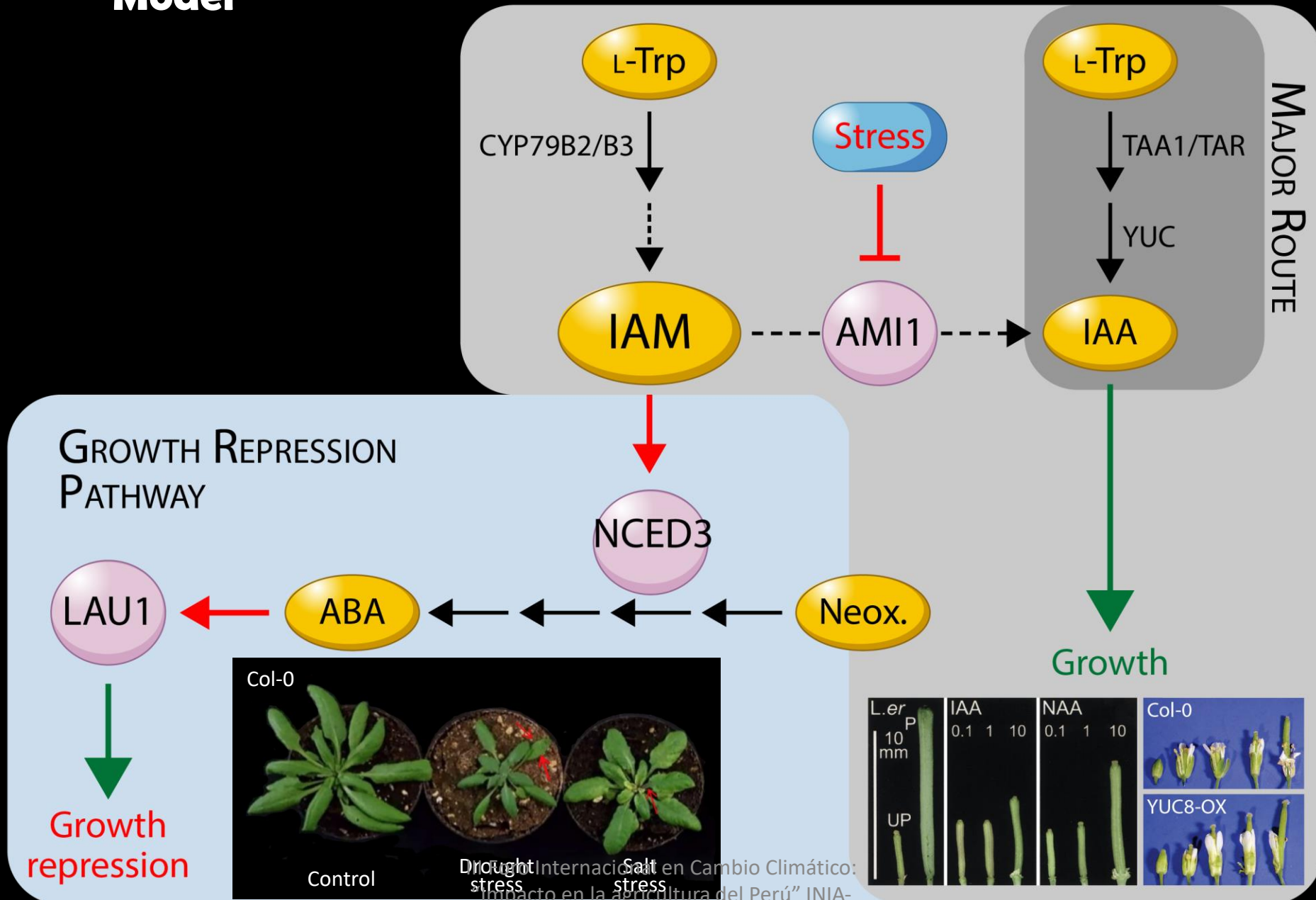
Induced expression of LAUCH1 confers increased drought resistance



Model



Model



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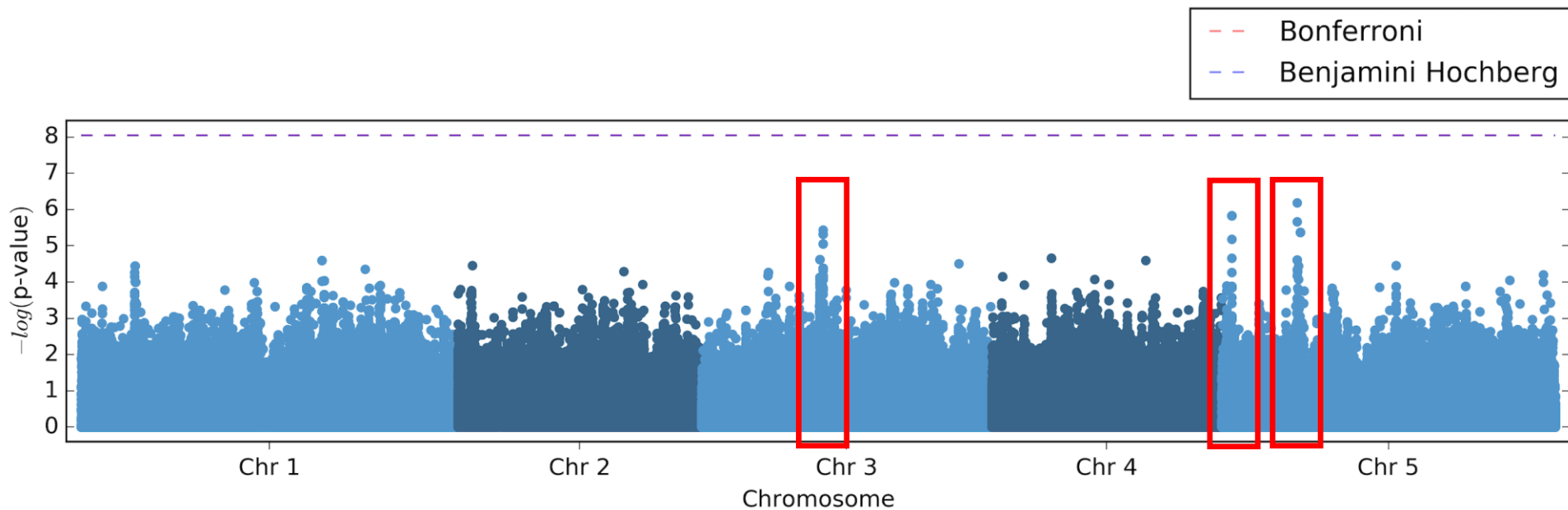
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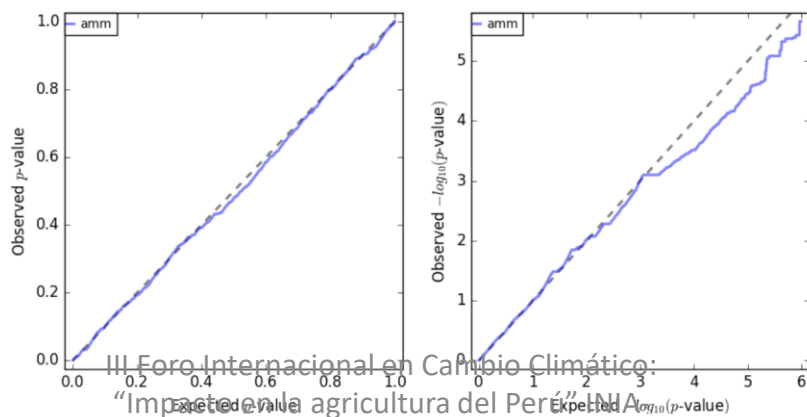
Programa Internacional de Cambio Climático
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POLITÉCNICA



QQ-Plots



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