



1st ASEA PhD Days

Virtual meeting

1st - 2nd December, 2021 | 14:00-17:00 GMT+7



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Agricultural Genetics Institute

LMI-RICE 2



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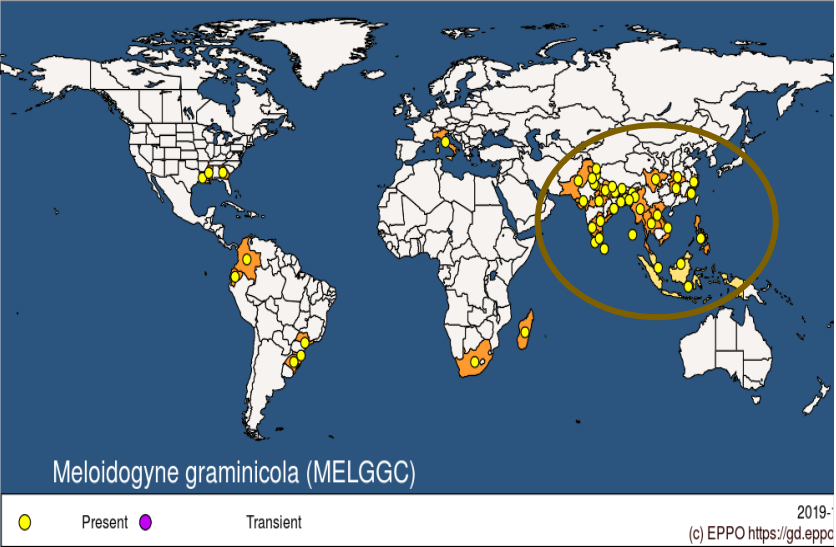
Histological and molecular analysis of the incompatible interaction between *Meloidogyne graminicola* and *Oryza sativa*

NGUYEN Thi Hue - PhD student

Supervisors: Dr. Stephane Bellafiore - IRD- France

Assoc. Prof. Ha Viet Cuong- VNUA- Vietnam

Meloidogyne graminicola- a significant economic impact pathogen



Banana



Tomato



Rice



Onion



Carrot



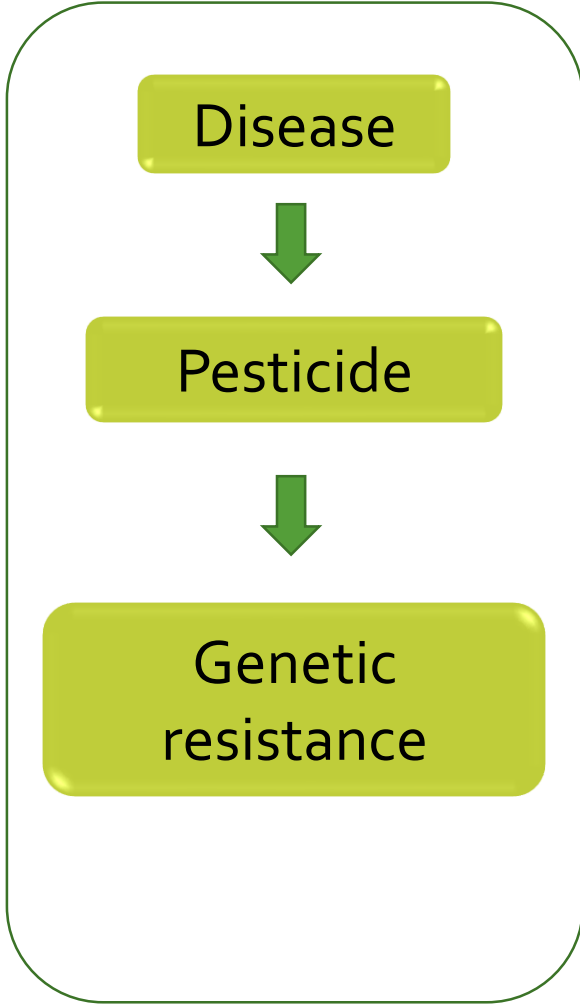
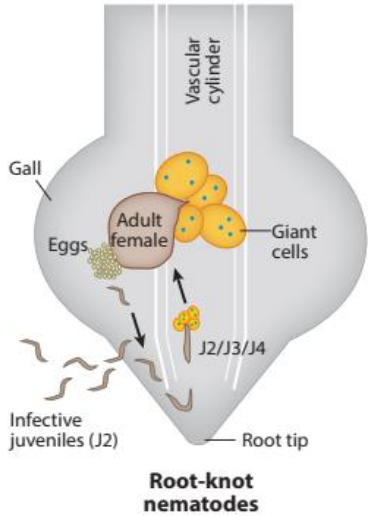
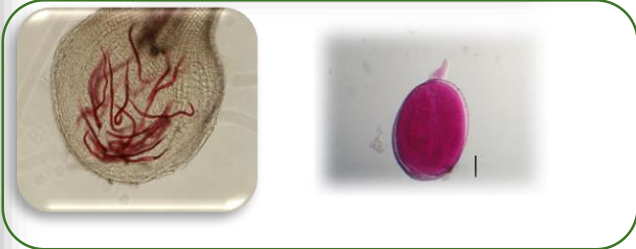
Rice weeds



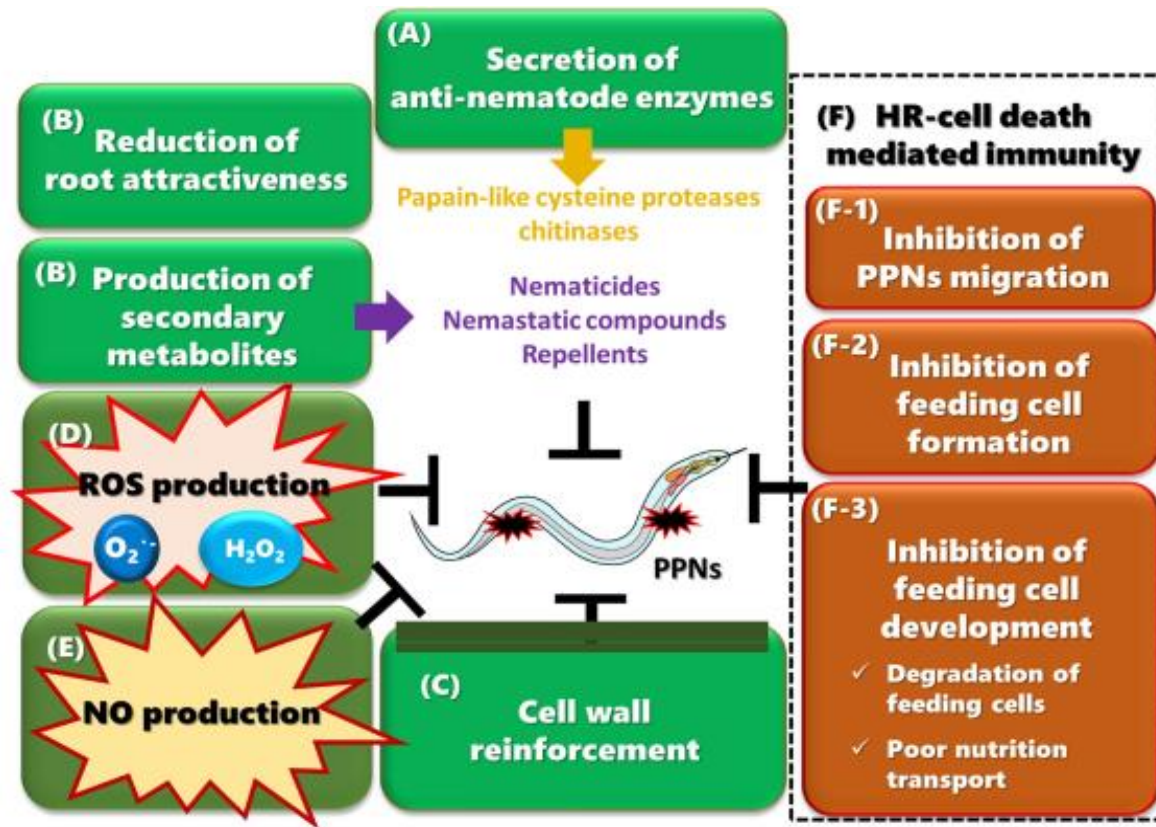
Meloidogyne graminicola- a threat pathogen to rice



Juvenile stage 2 Mg

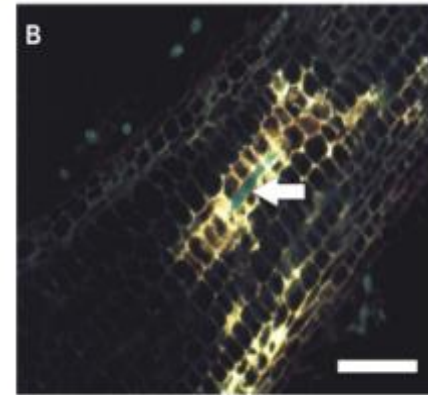


Rice resistance response act at several steps against *Mg*



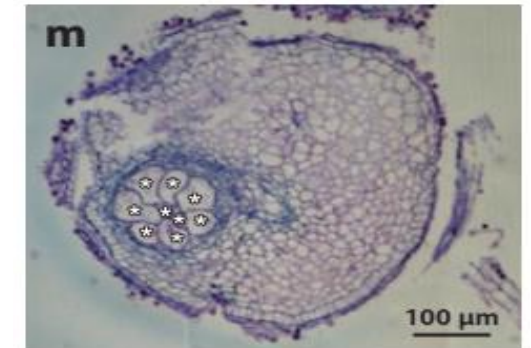
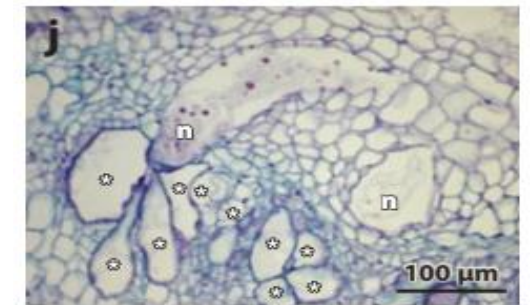
Sato et al., 2019 *Front. Plant Sci*

The HR-like reaction



Mantelin et al., 2016

Degeneration of feeding sites

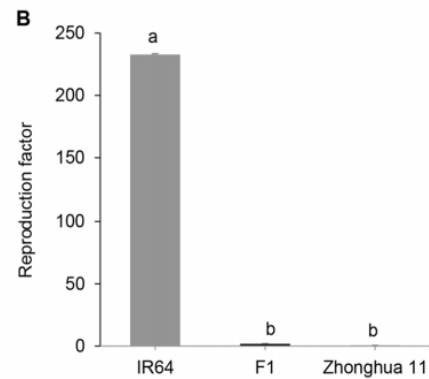
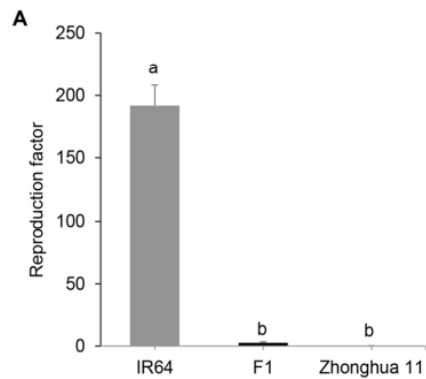
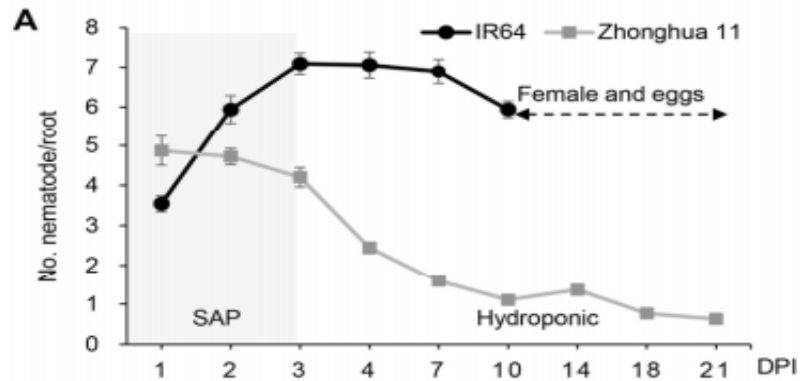


Kyndt et al., 2014

The HR-dependent reaction is often observed in the incompatible interaction

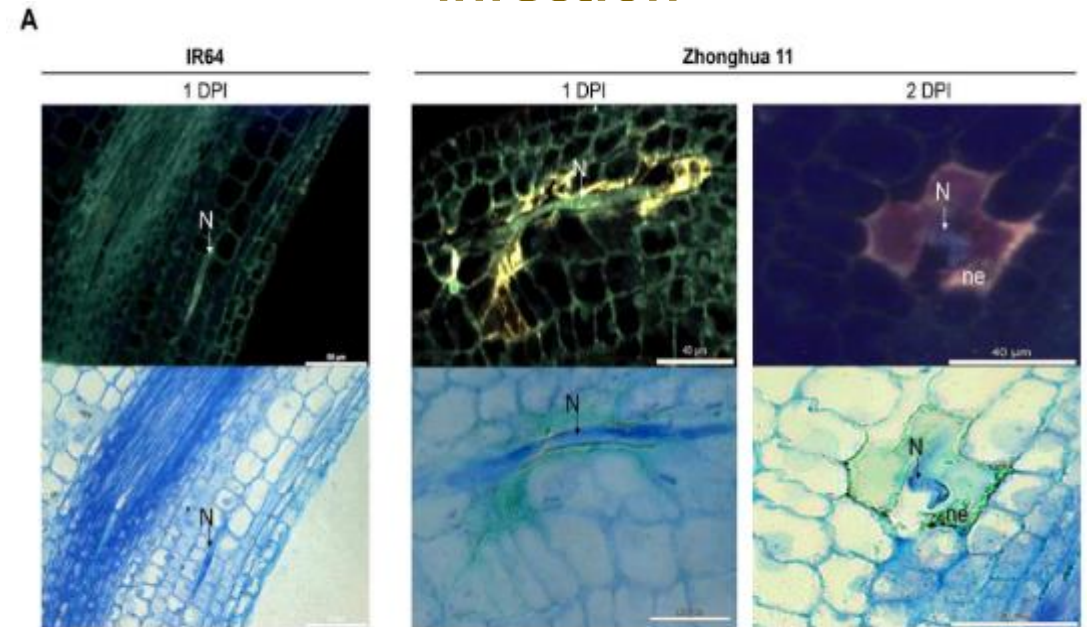
Zhonghua11- *O.sativa japonica* is resistance rice to *Mg*

The post-infection resistant mechanism



Rf in the Zhonghua11 and F1 was greatly reduced suggesting the dominant R gene in Zh11

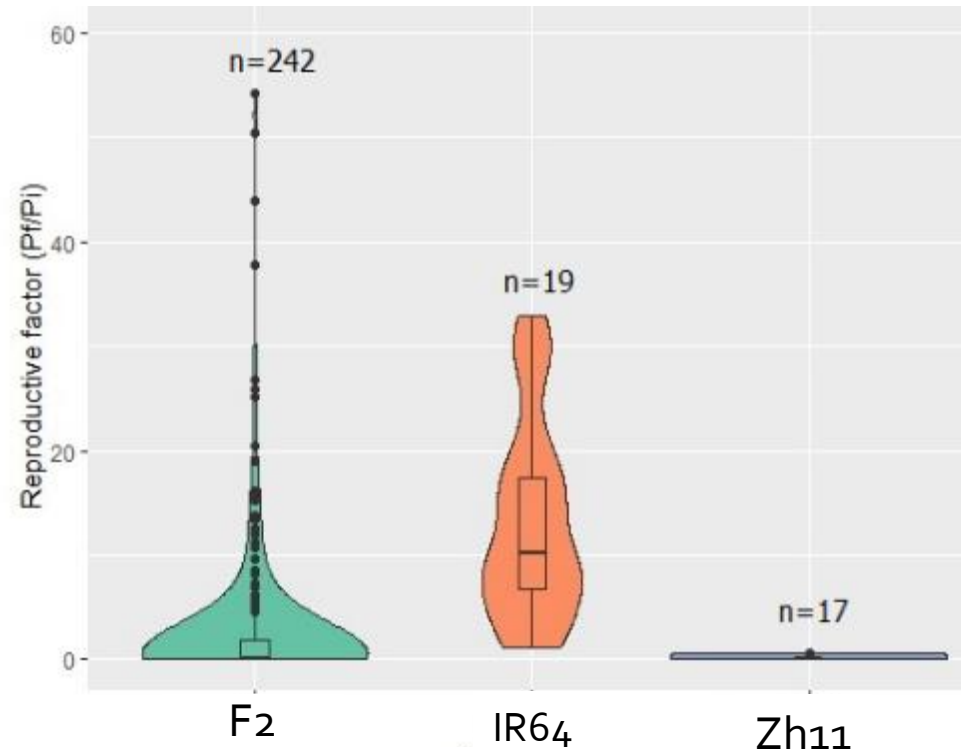
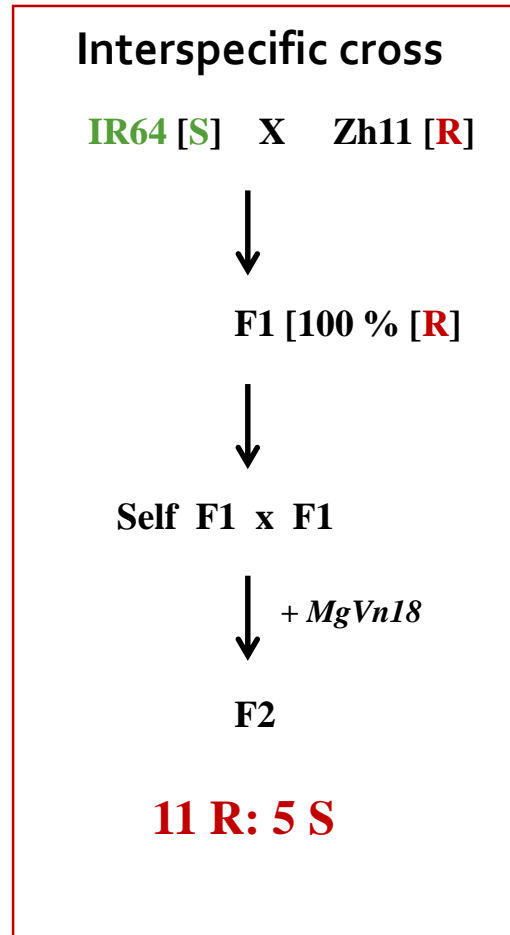
The HR-like reaction at early stage of infection



HR-like presence in the Zh11 var.
A Hallmark of R gene

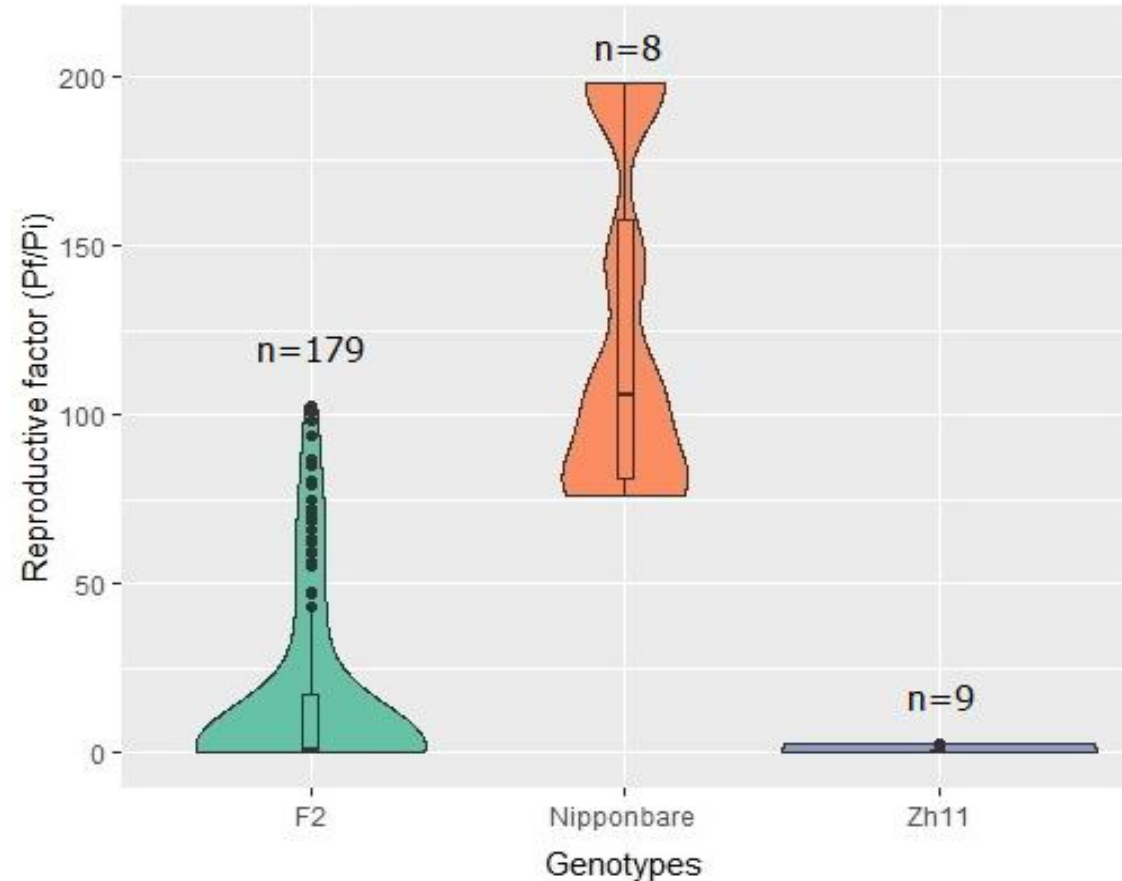
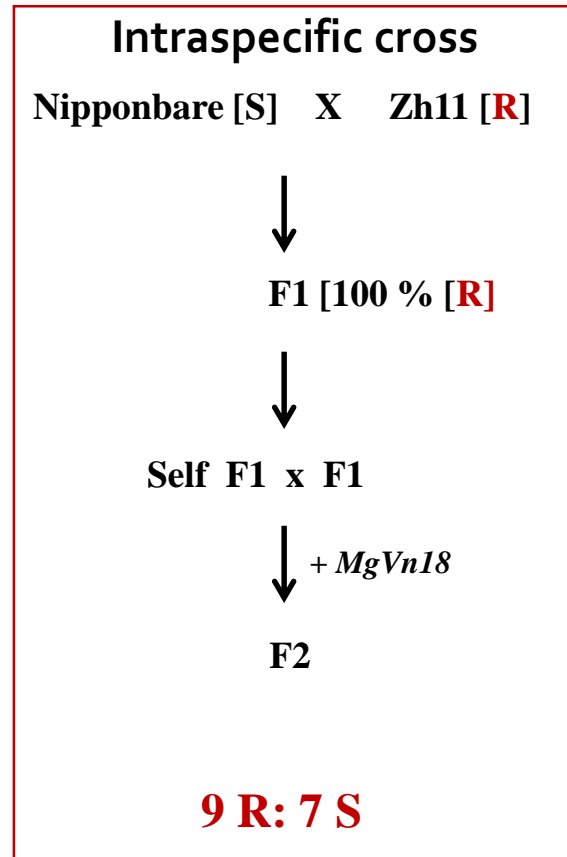
(Phan et al., 2017)

Genetic study: inheritance of resistant gene in Zh11



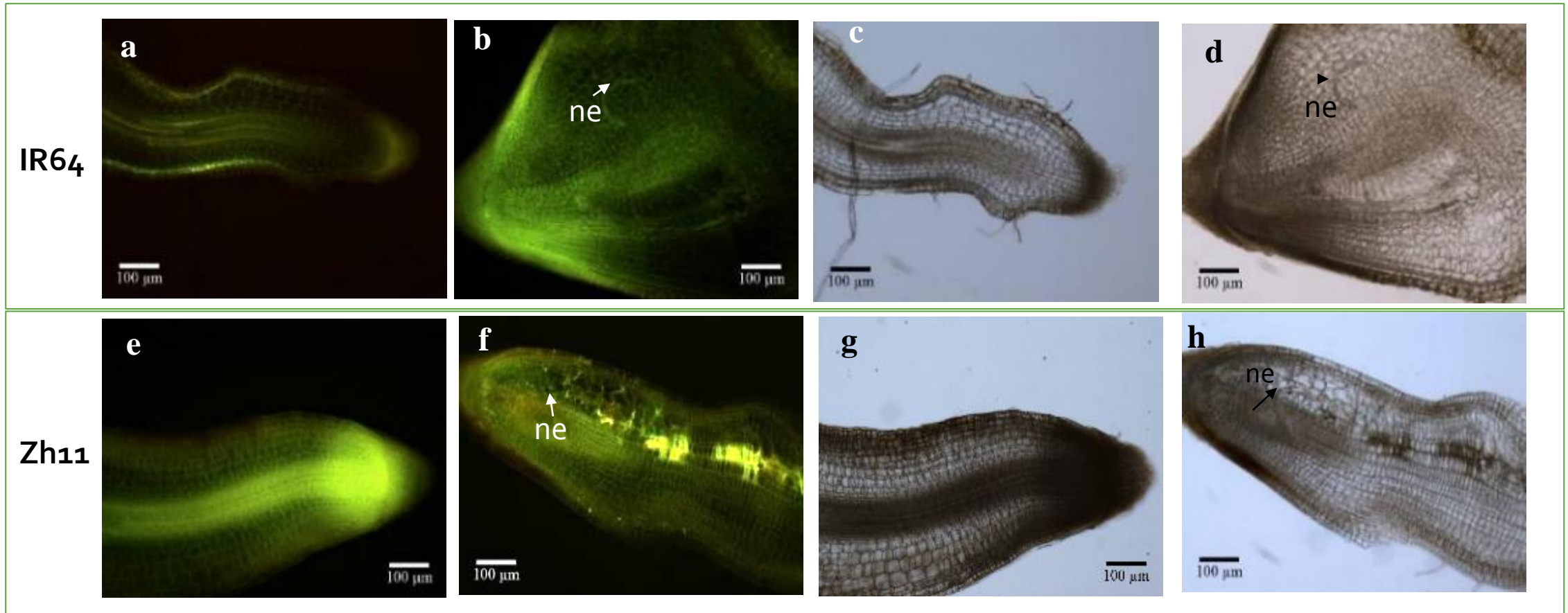
The two Resistant genes appears involve in the Zh11 resistance to *Mg*

Genetic study: inheritance of resistant gene in Zh11



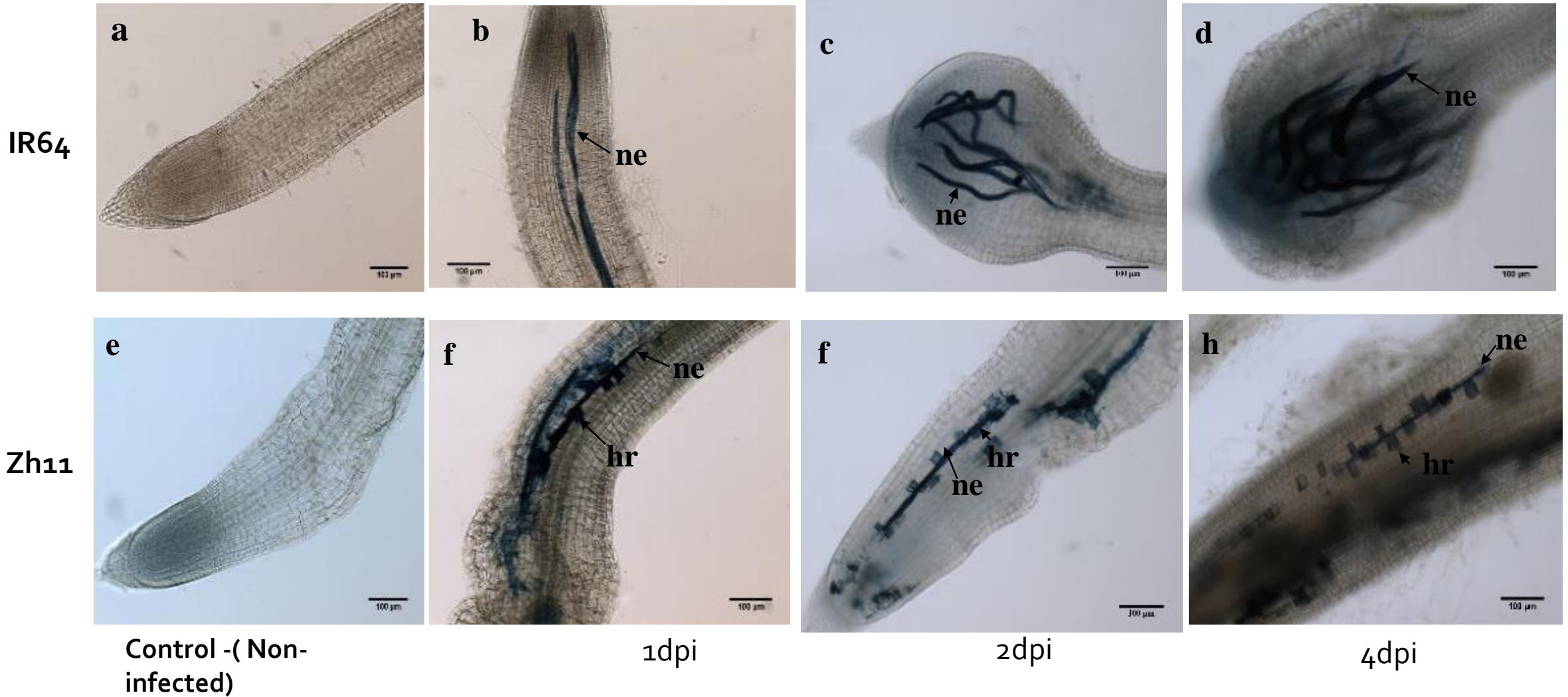
The two Resistant genes appears involve in the Zh11 resistance to *Mg*

Evidence of the ROS accumulation following *Mg* migration in resistant root

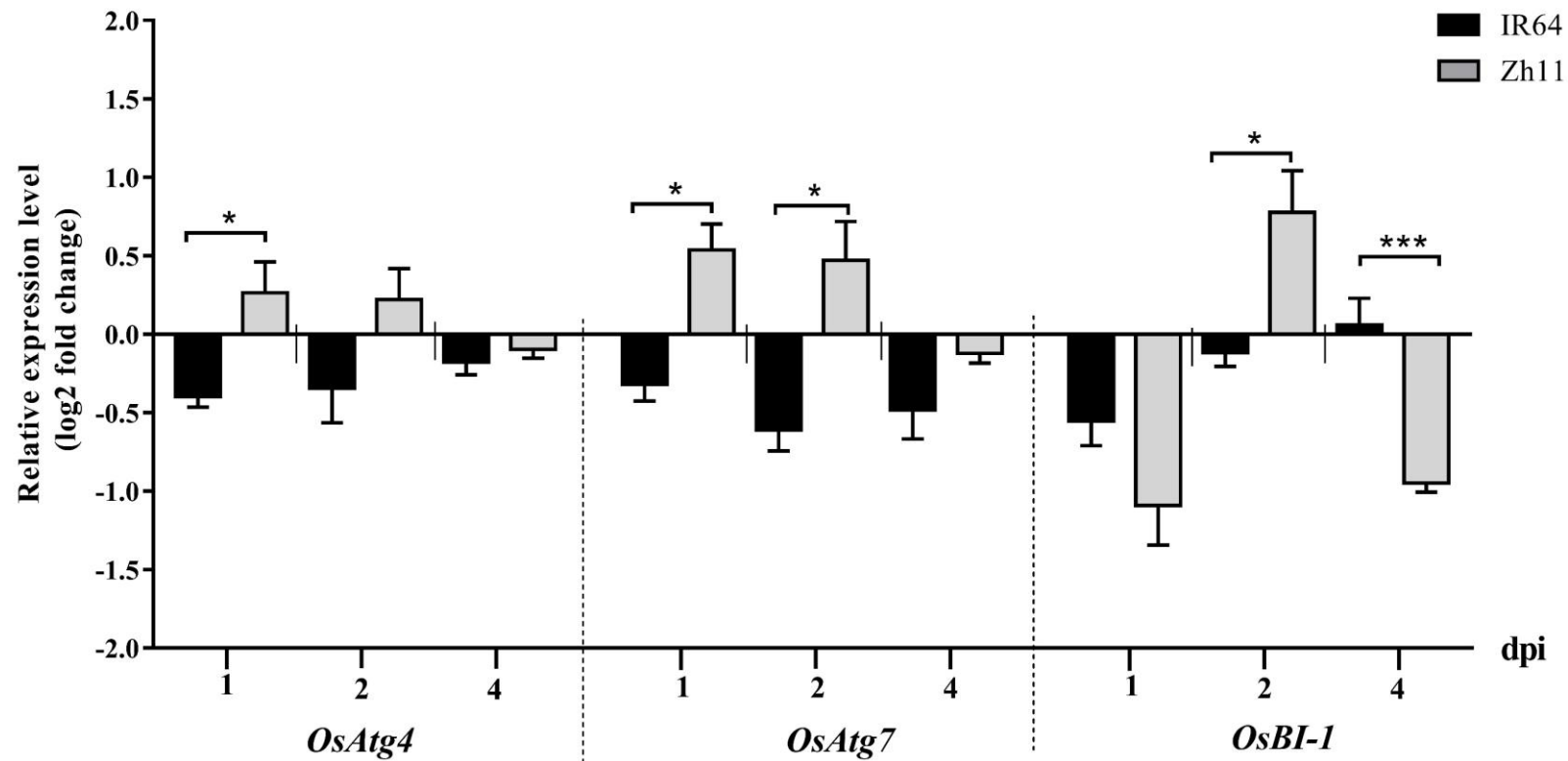


Longitudinal sections of Zh11 and IR64 root after infection by *Mg* after DAB staining observed under UV light or white light

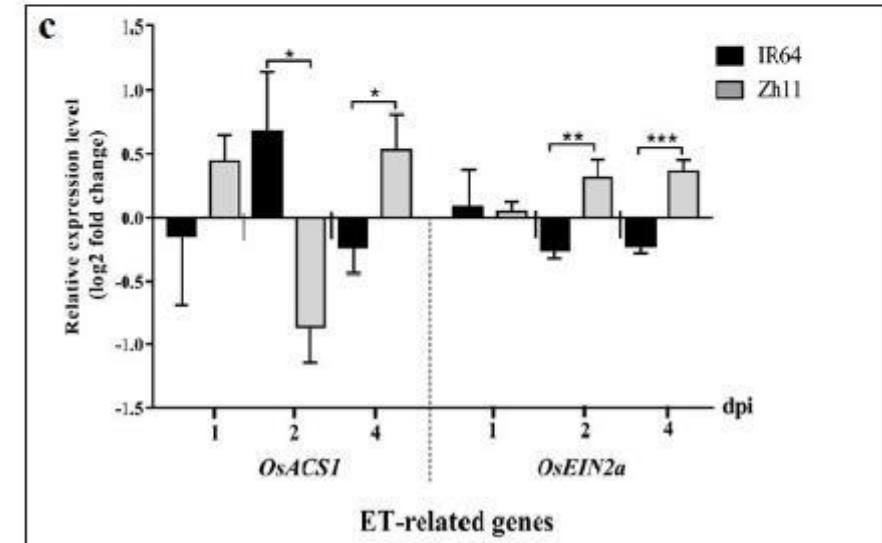
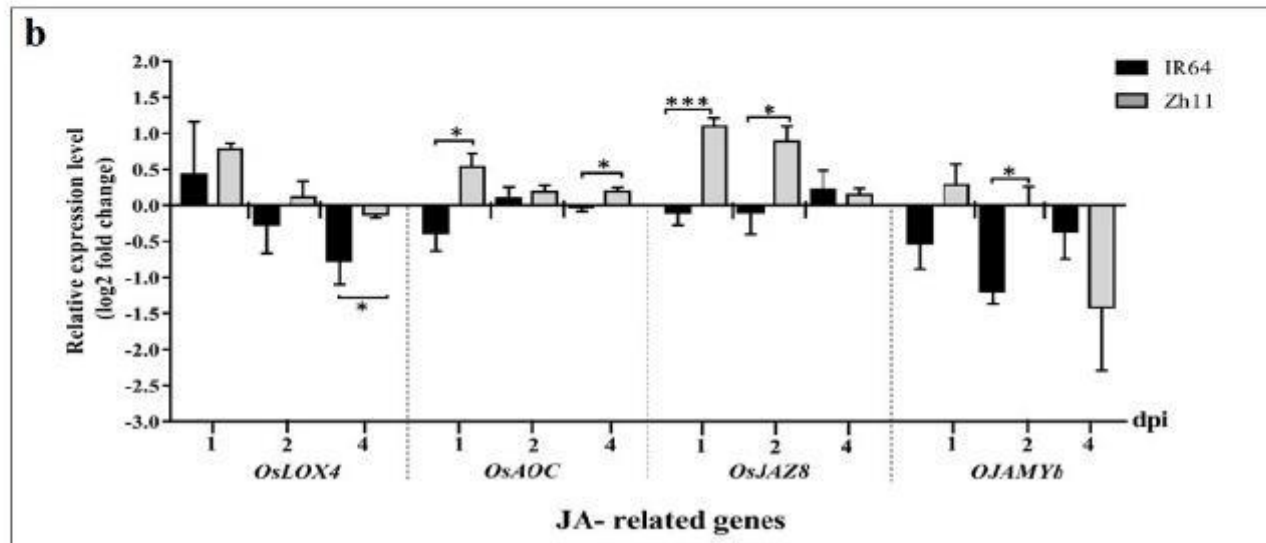
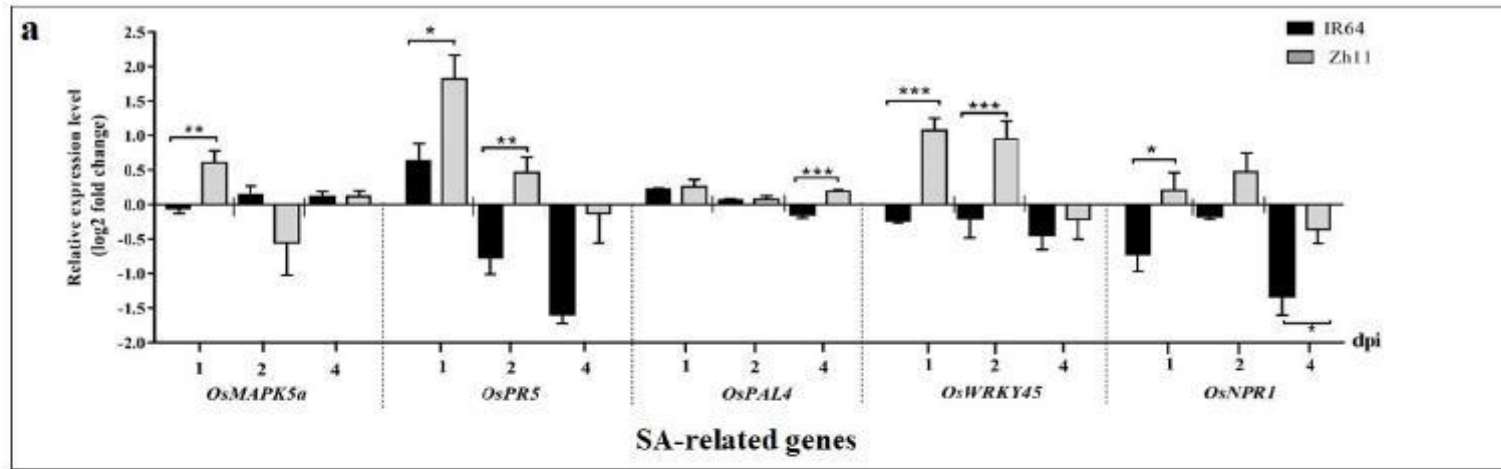
Cell death are observed along *Mg* migration in resistant variety



The involvement of autophagy expression to the Zh11 resistance



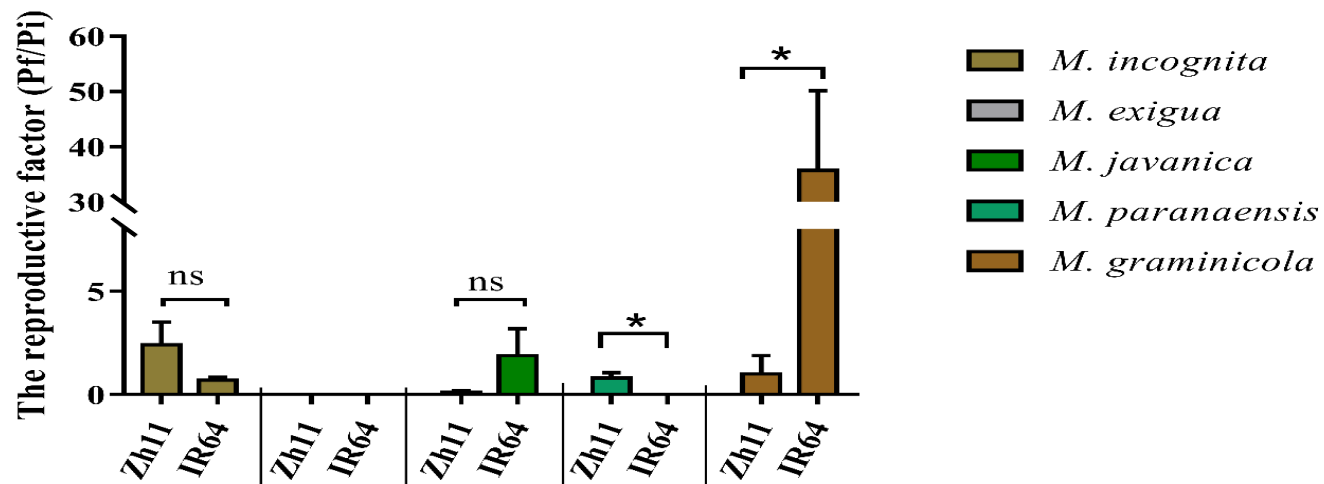
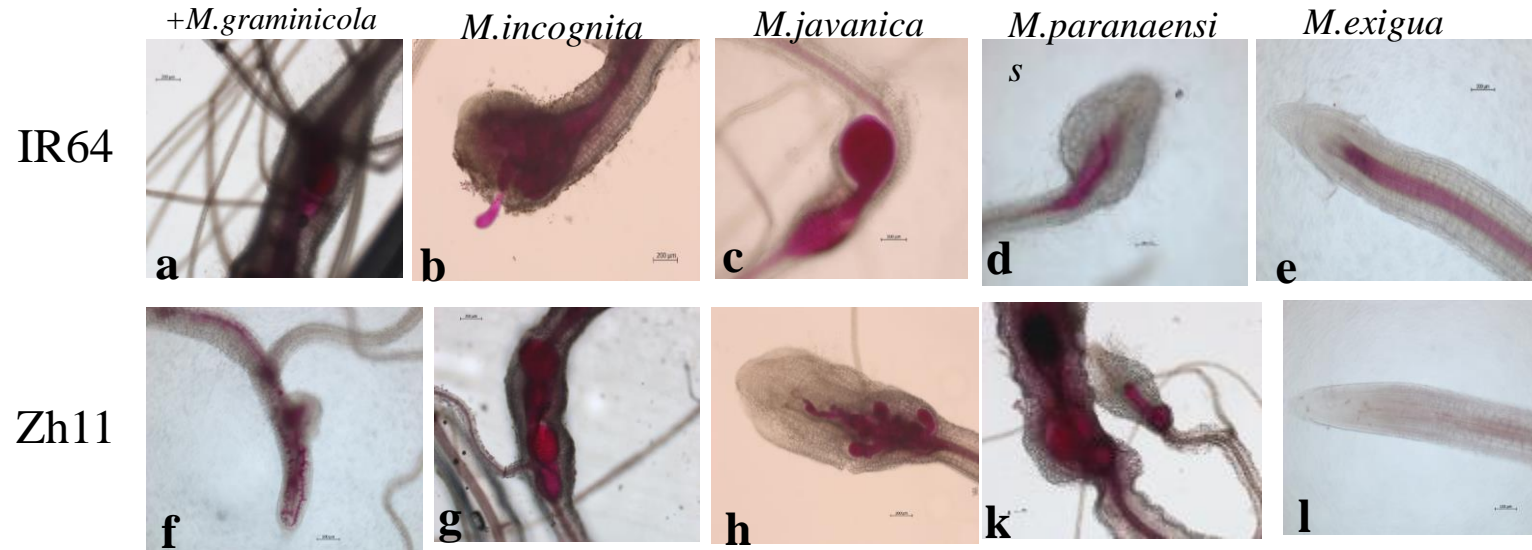
The complex involvement of phytohormones to Zh11 resistance



The spectra resistance of *Mg*



IRD



Summary

- There are **two dominant Resistant genes that unlinked and complementary** involved in the Zh11 resistance to *Mg*
- Defence response in Zh11 is **characterized by an HR**, with **autophagy that maybe involved in the HR-mediated cell death**
- The resistance in Zh11 is associated with **transcriptional reprogramming of defence-related genes at early stages of infection**, involving hormonal pathways.

Acknowledges



Dr. Stephane Bellafiore



Assoc. Prof. Ha Viet Cuong



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Thank you for your
listening!