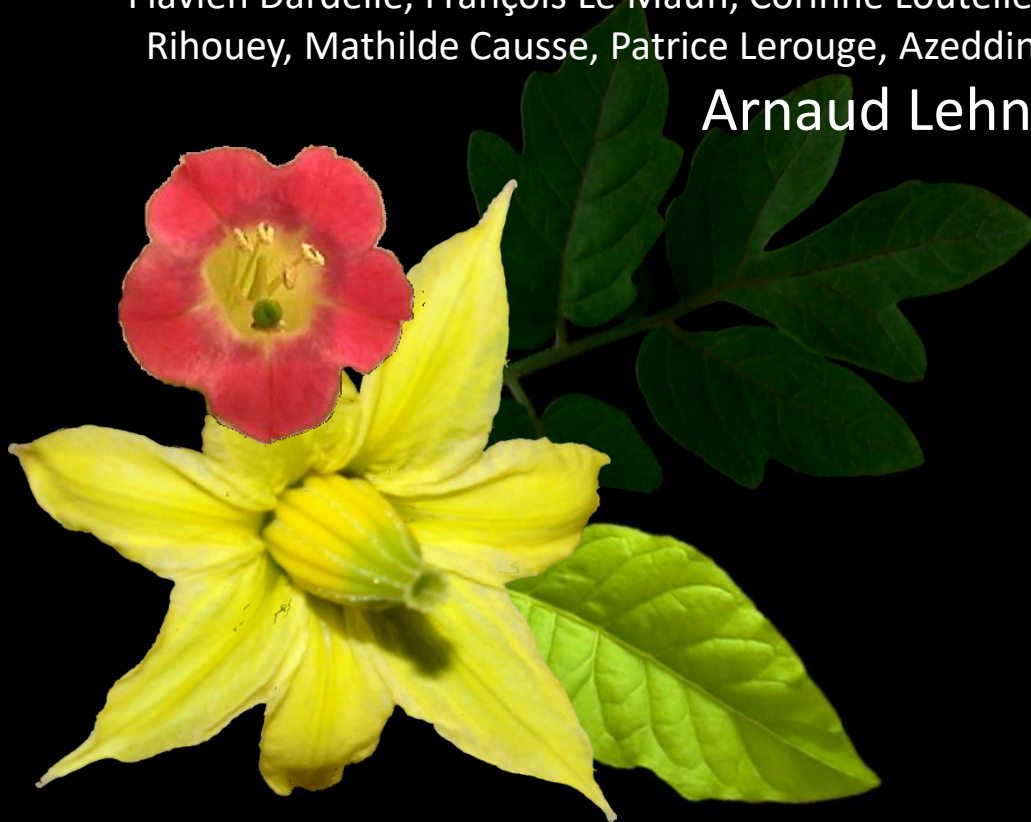


# Pollen tubes and vegetative organs have structurally divergent cell wall xyloglucan in Solanaceae species

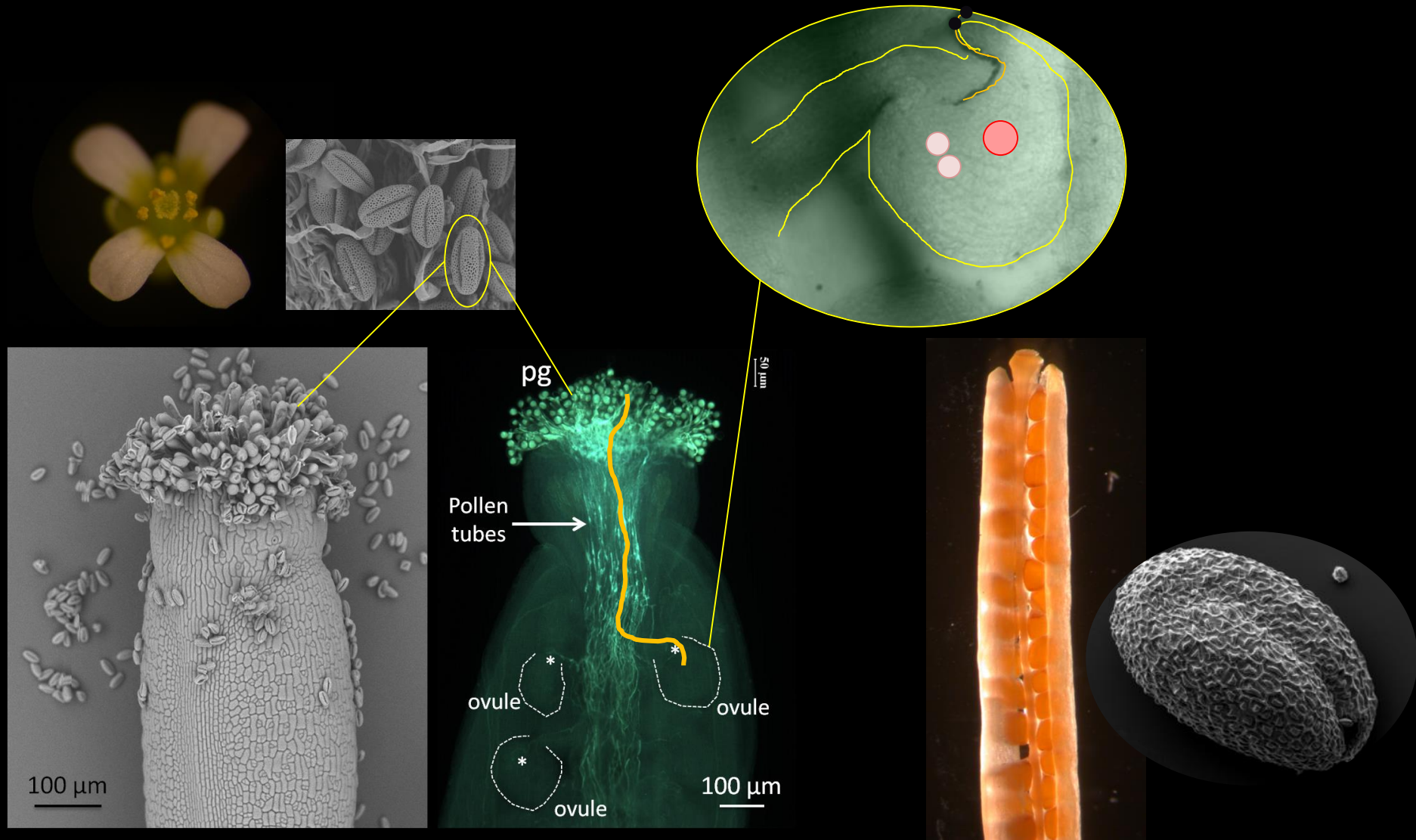
Flavien Dardelle, François Le Mauff, Corinne Loutelier-Bourhis, Muriel Bardor, Christophe Rihouey, Mathilde Cause, Patrice Lerouge, Azeddine Driouich, Jean-Claude Mollet and  
**Arnaud Lehner**



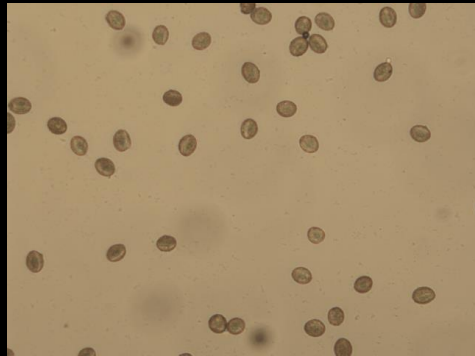
Glycobiologie et Matrice Extracellulaire Végétale,  
University of Rouen - France.  
<http://glycomev.univ-rouen.fr/>



# Pollen grain, pollen tube and seed production



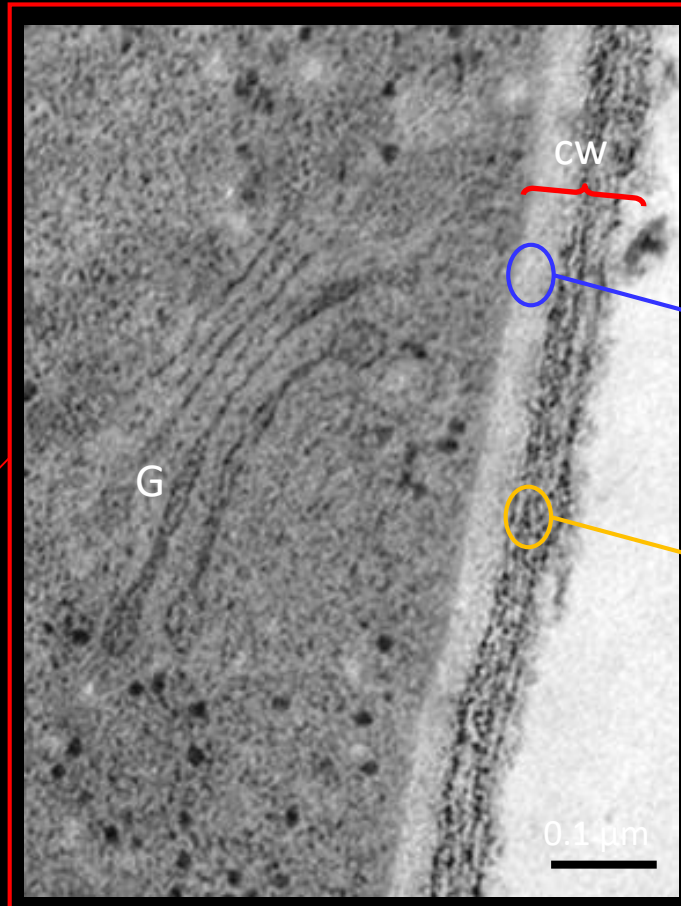
# The pollen tube :a model for understanding cell wall biosynthesis and remodelling?



The pollen tube has a fast and tip polarized growth



Transmission Electron Micrograph



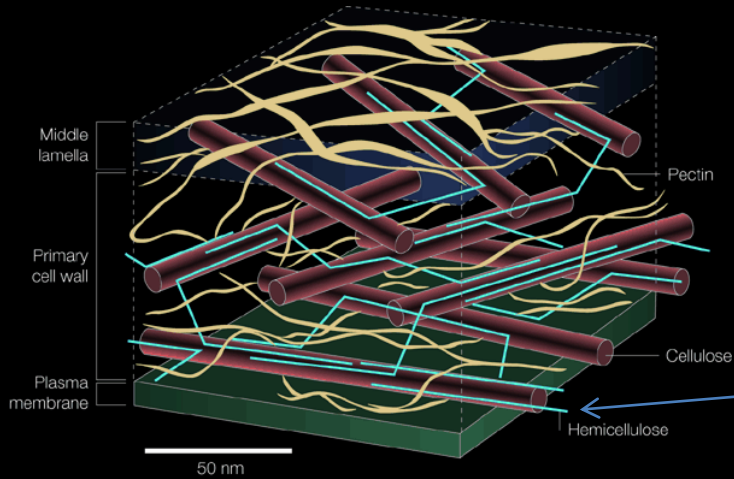
2 layers

Mostly callose and cellulose

Mostly Pectins and xyloglucan

Constant biosynthesis, secretion and remodelling of cell wall polymers during growth :  
Model to understand cell wall biosynthesis and remodelling

# The two classes of Xyloglucan



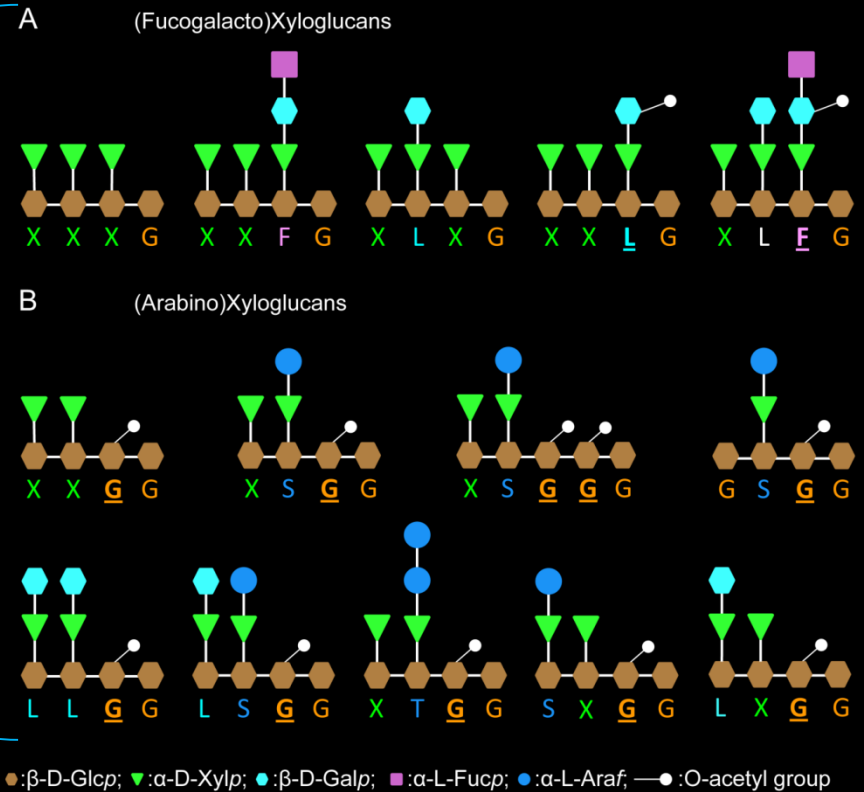
Nature Reviews | Molecular Cell Biology

Mainly made of Cellulose, pectin and hemicellulose

Most abundant hemicellulose in eudicotyledone: Xyloglucan

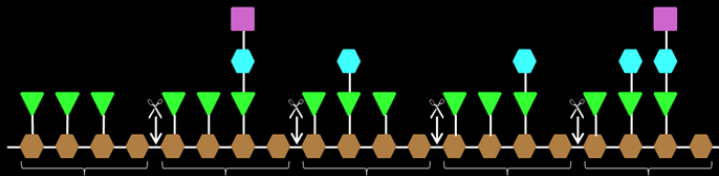
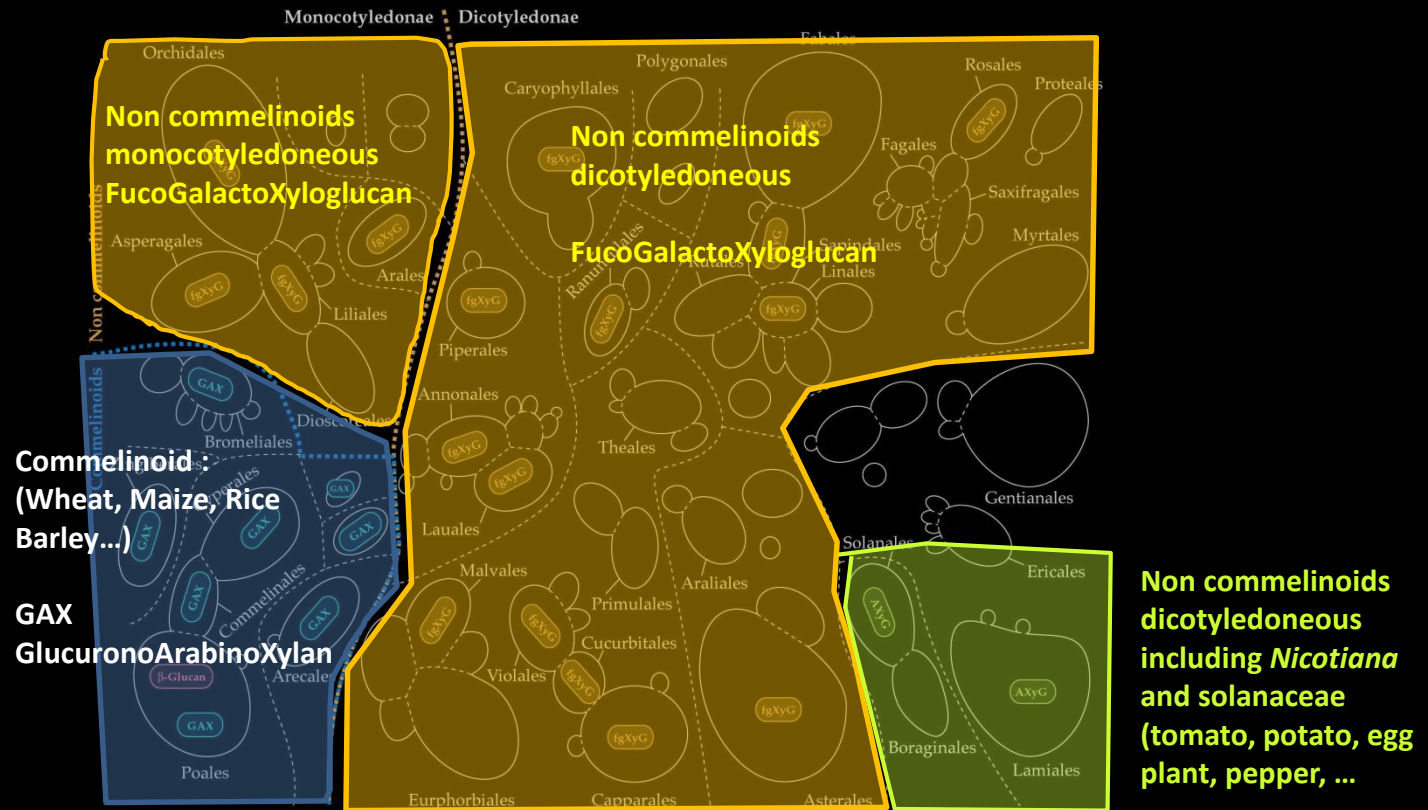
2 Structures of XyG:

Arabinoxyloglucan and the fucogalactoxyloglucan



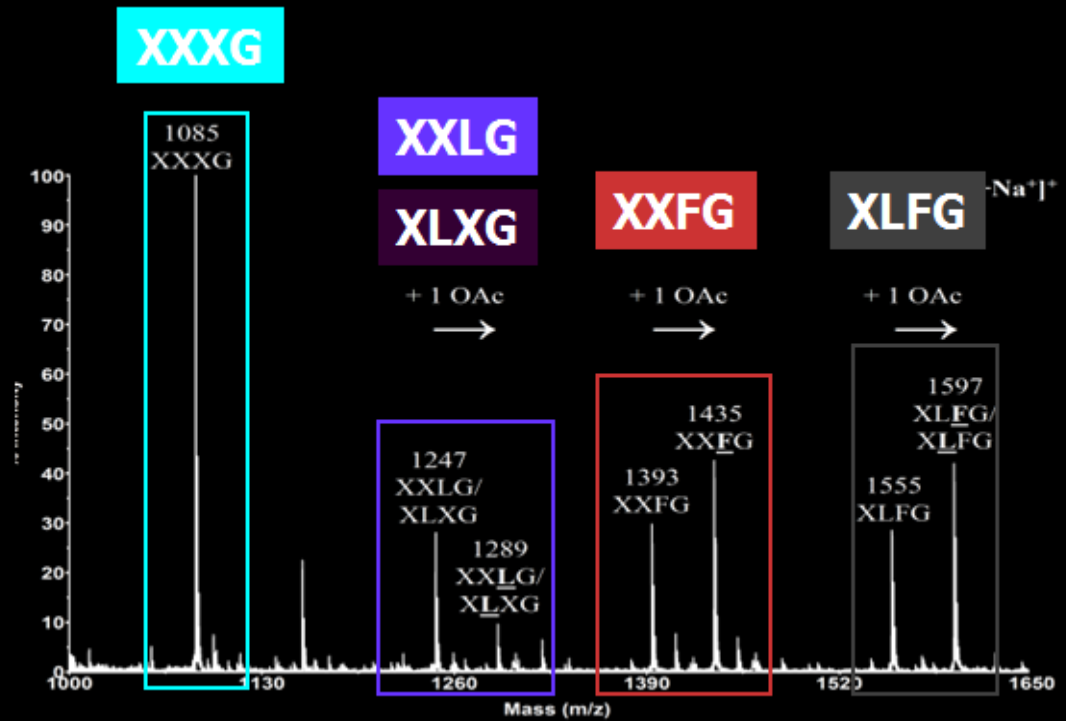
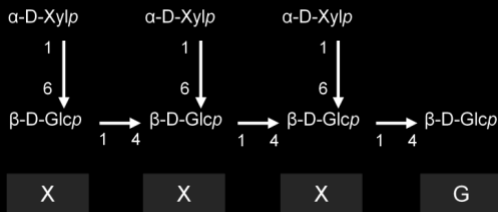
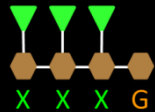


# Distribution of Fuco Galacto XyG and Arabino Xyloglucan among plant species



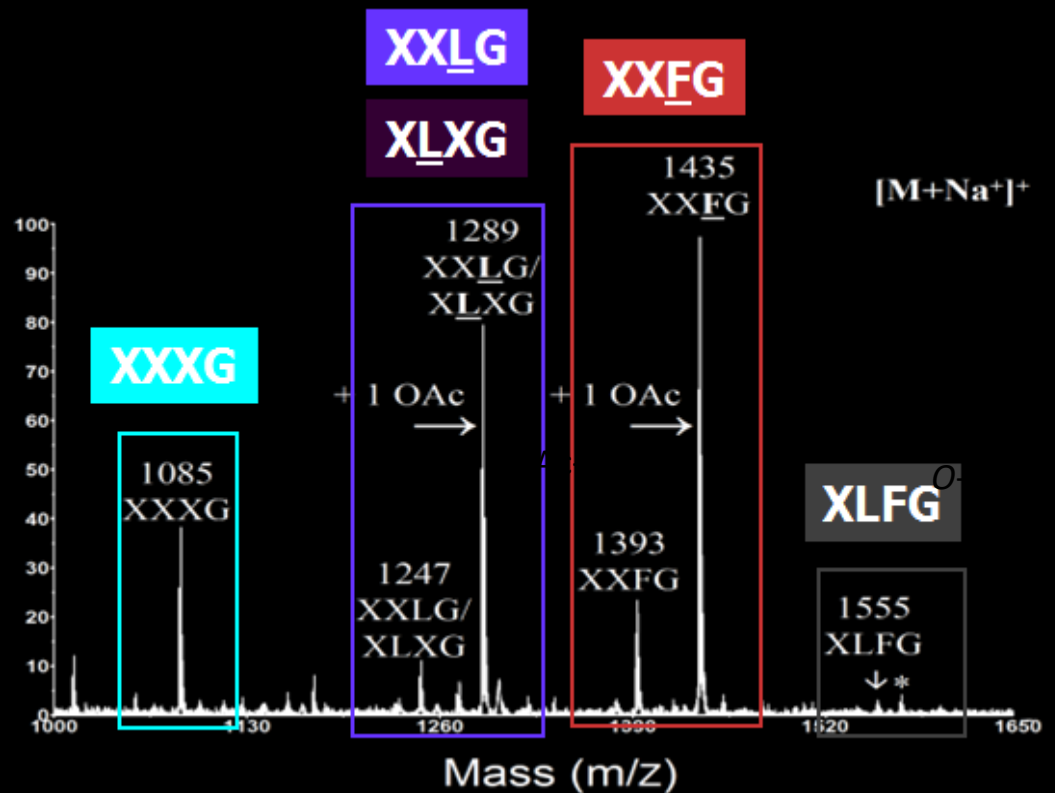
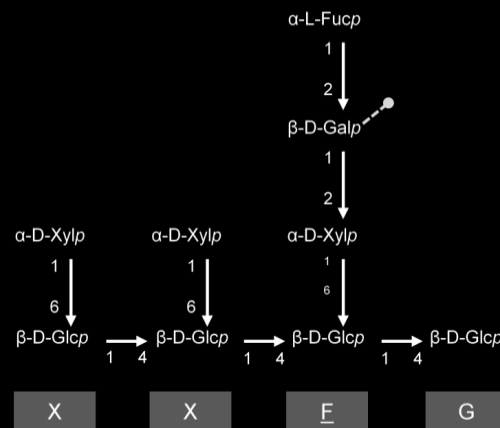
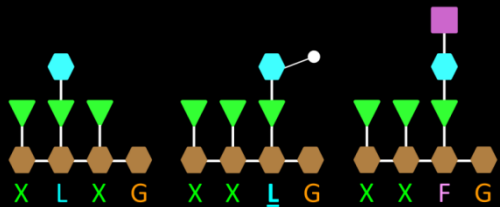
Fragment of Xyloglucan are released after endoglucanase treatment : Xyloglucan Investigation with MALDI-TOF MS

# The main motif of *Arabidopsis* leaf Xyloglucan is is XXXG



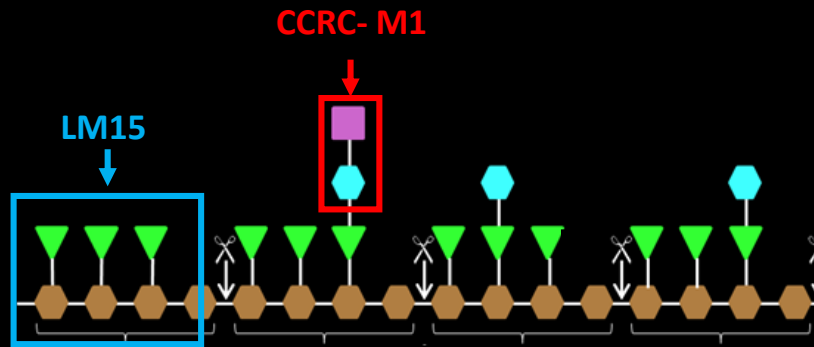
# The main motifs of *Arabidopsis* pollen tube xyloglucan are XXFG and XXLG/XLXG

Fucosylated motifs ~52%  
O-acetylated motifs ~65%



# Xyloglucan epitopes are detected all along the pollen tube

Specific MAbs recognize different fragments of XyG

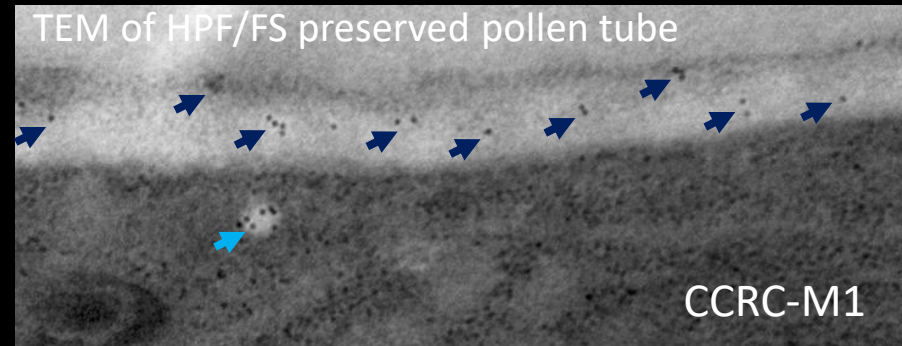


CCRC-M1

LM15

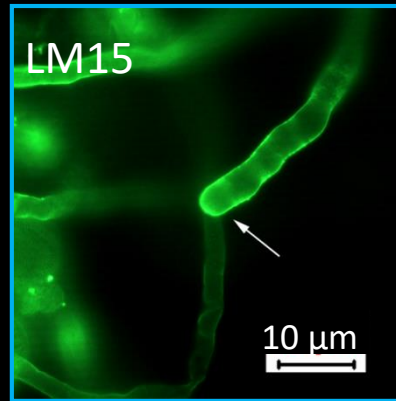
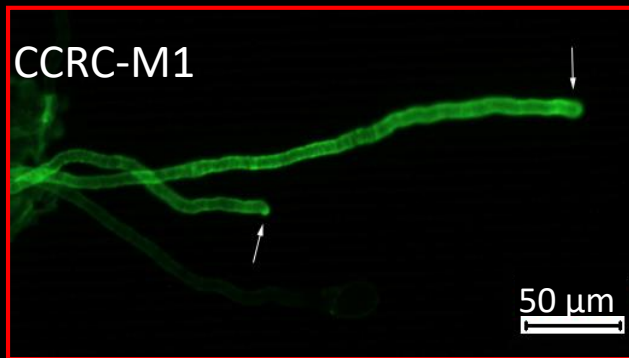
Puhlman et al. 1994 Plant Physiology

Marcus et al, 2008 BMC Plant Biology



The main motif is different between the vegetative and the reproductive tissue  
 In *Arabidopsis* pollen tube xyloglucan are highly fucosylated and highly acetylated

Fucosylated motifs ~52%  
 O-acetylated motifs ~65%



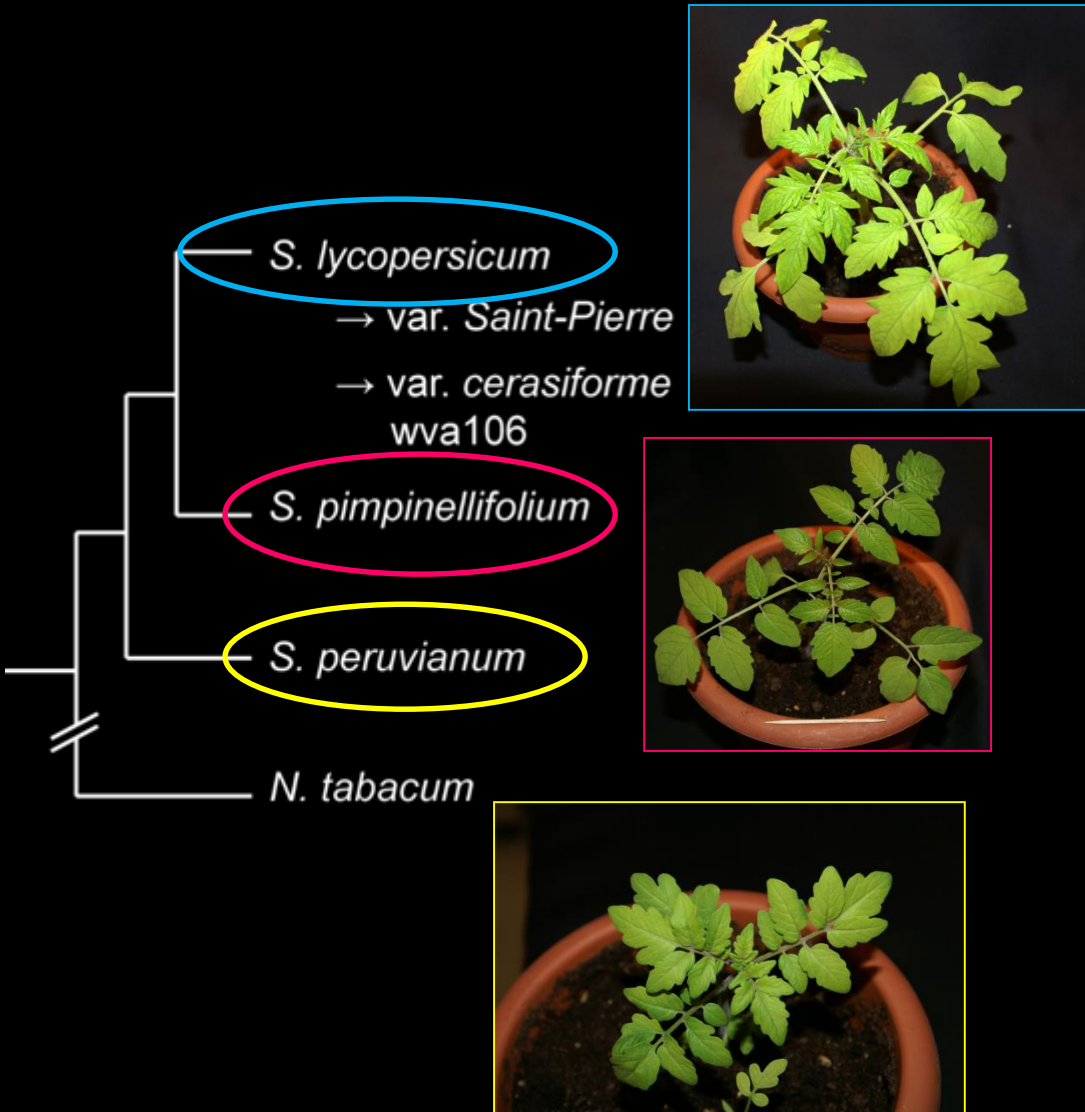




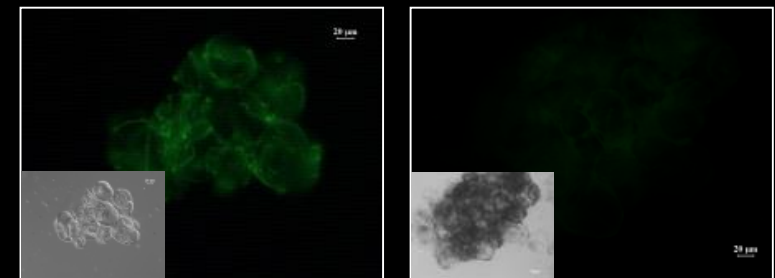


# Xyloglucan of tomato leaves is not Fucosylated

4 species were investigated : from the wild species to the domesticated species

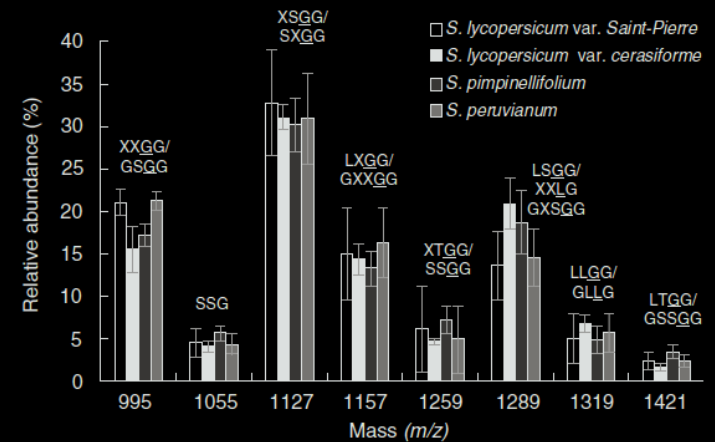


## *S. Lycopersicum* var. Dombito

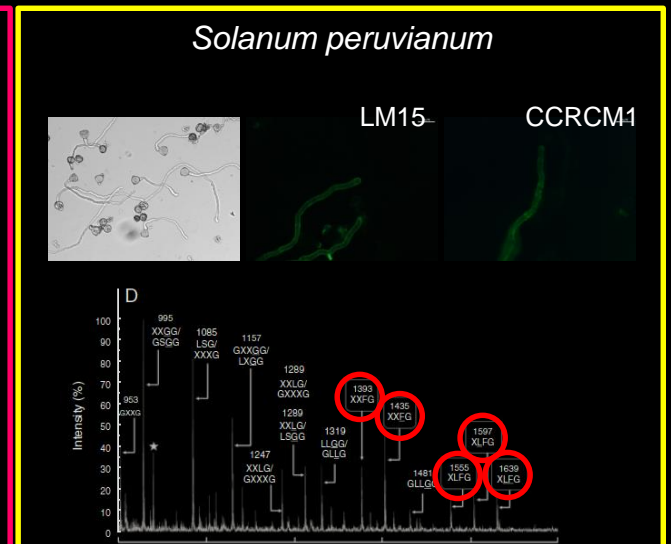
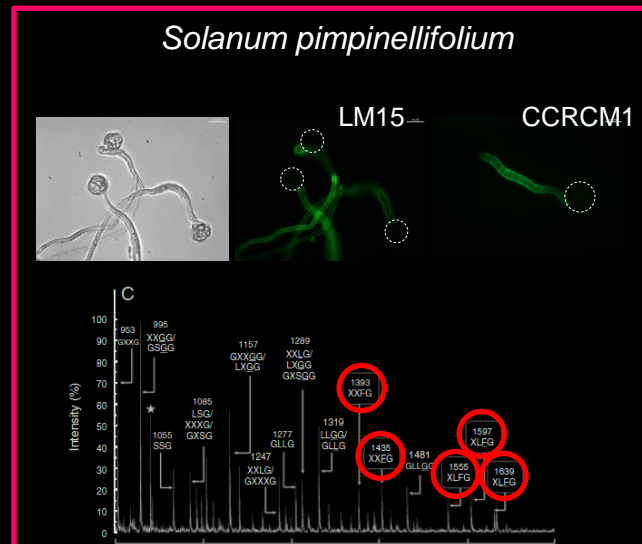
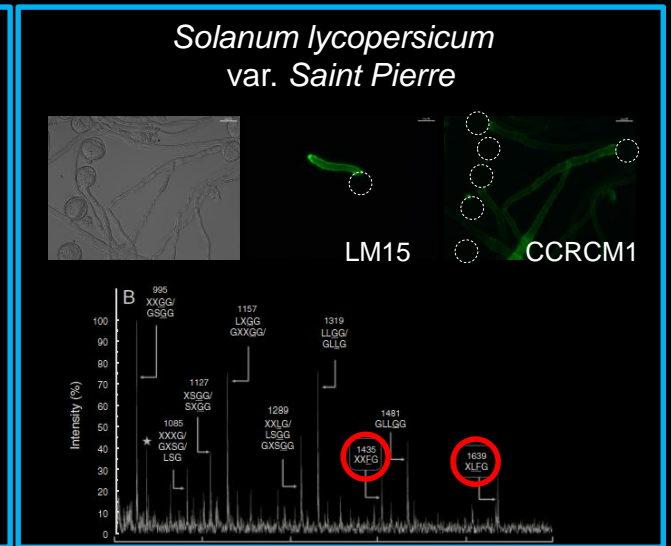
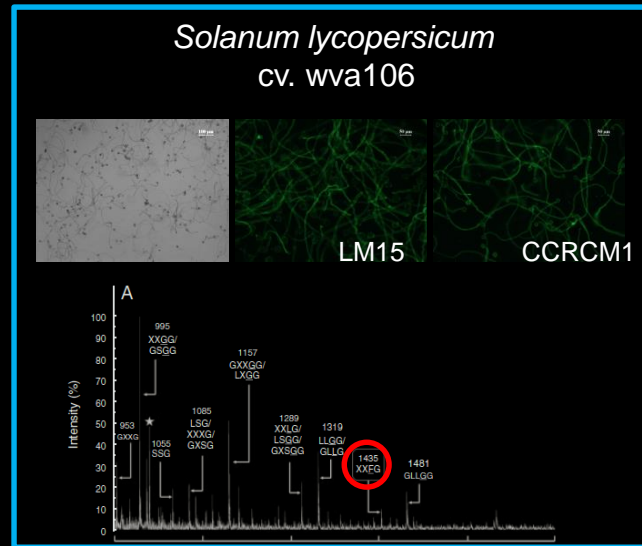
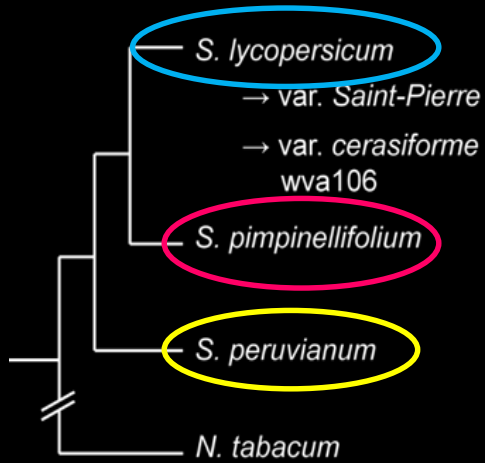


Unfucosylated (LM15)

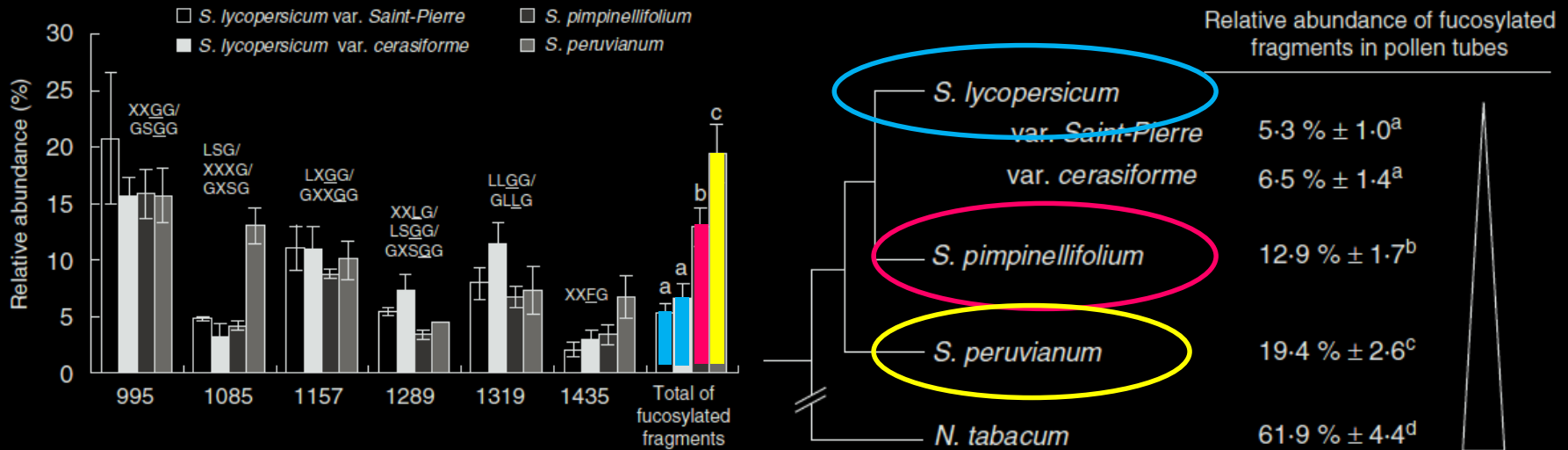
Fucosylated (CCRCM1)



# Xyloglucan of tomato pollen tubes is mostly Fucosylated



# Xyloglucan of Wild tomato species is more Fucosylated than the domesticated species



Why Solanaceae pollen tubes have kept fucosylated XyG?

Root hairs have also specific XyG also found in the tip growing moss  
*Physcomitrella patens*

it reinforces the  
idea that tip-polarized cells have specific cell wall structural  
properties adapted to their fast intrusive growth



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