

Hemp Genetics for the Irish Climate

Caroline Dowling and Jiaqi Shi
School of Biology and Environmental Science
University College Dublin

The Hemp Event: Annual Hemp Conference
Teagasc Ashtown Food Research Centre
8th April 2022



Cannabis research at UCD



Website: www.ucdflowerpower.org



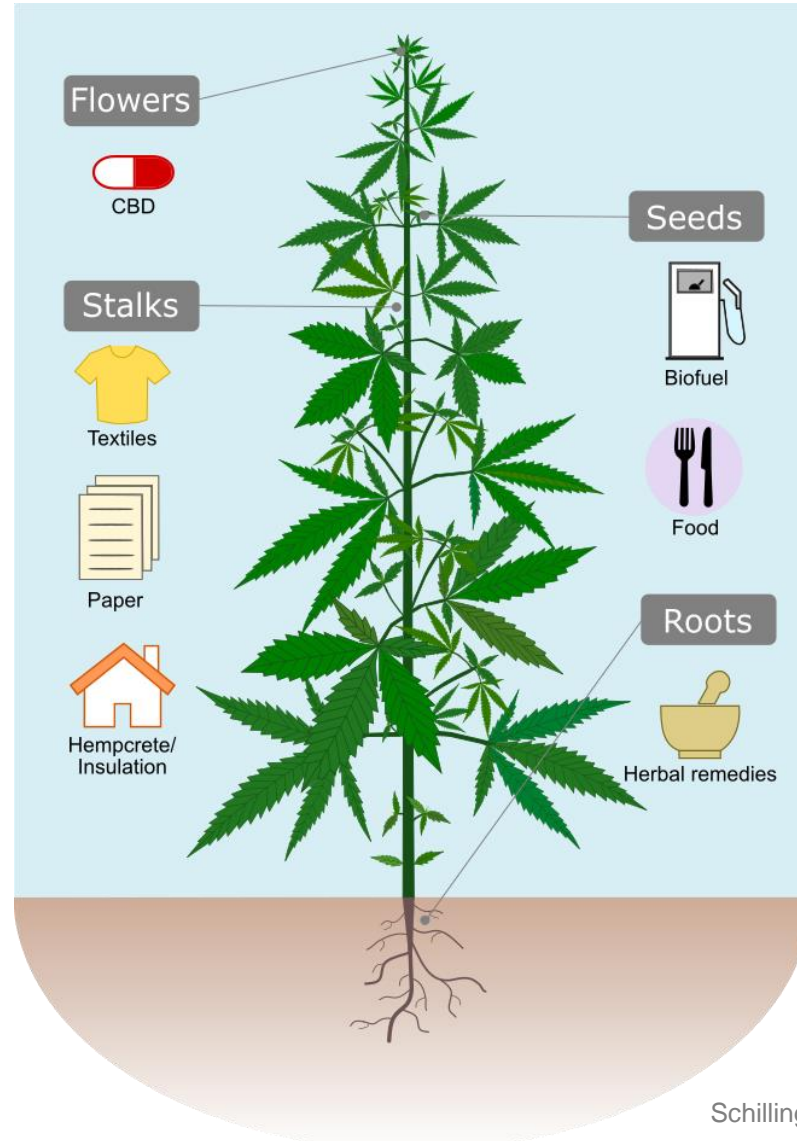
Cannabis research at UCD



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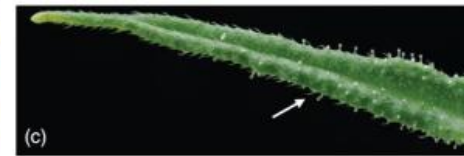
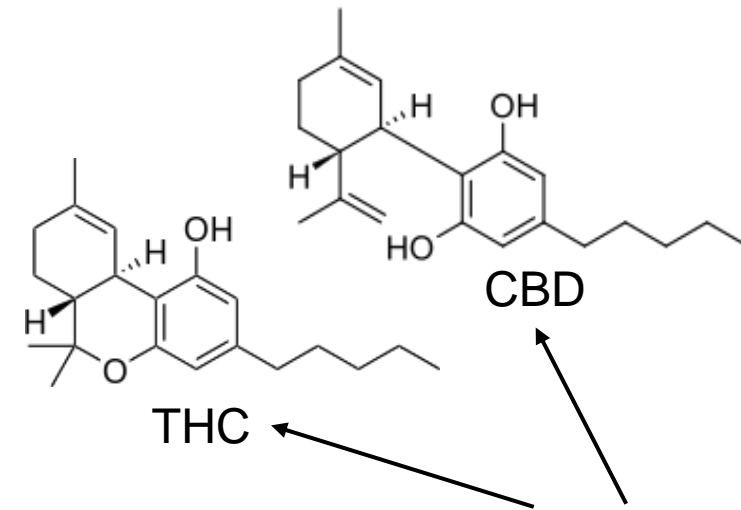


Hemp is a multi-purpose crop



Schilling, Dowling, Shi et al. (2020) *APRO*

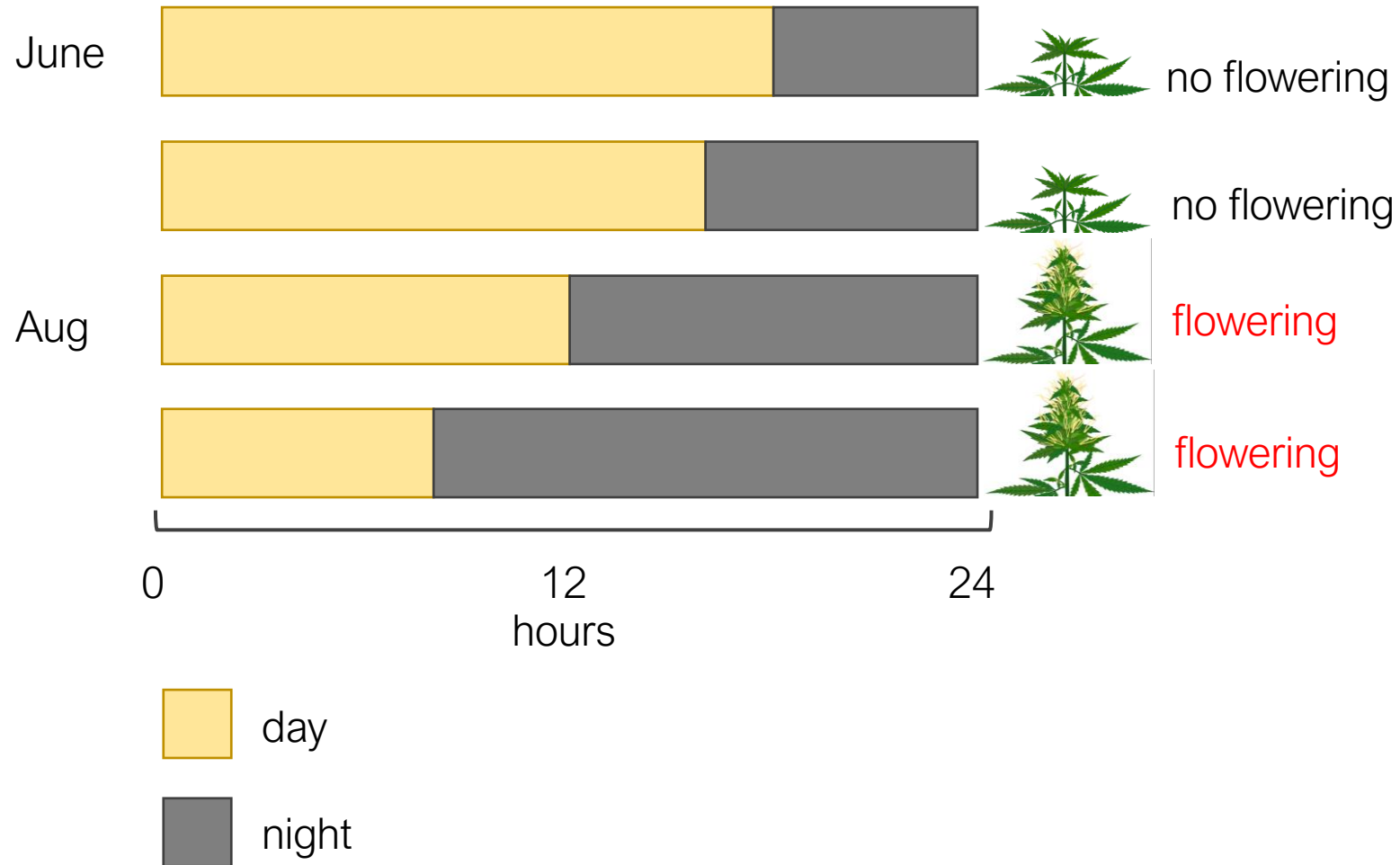
Cannabis is dioecious



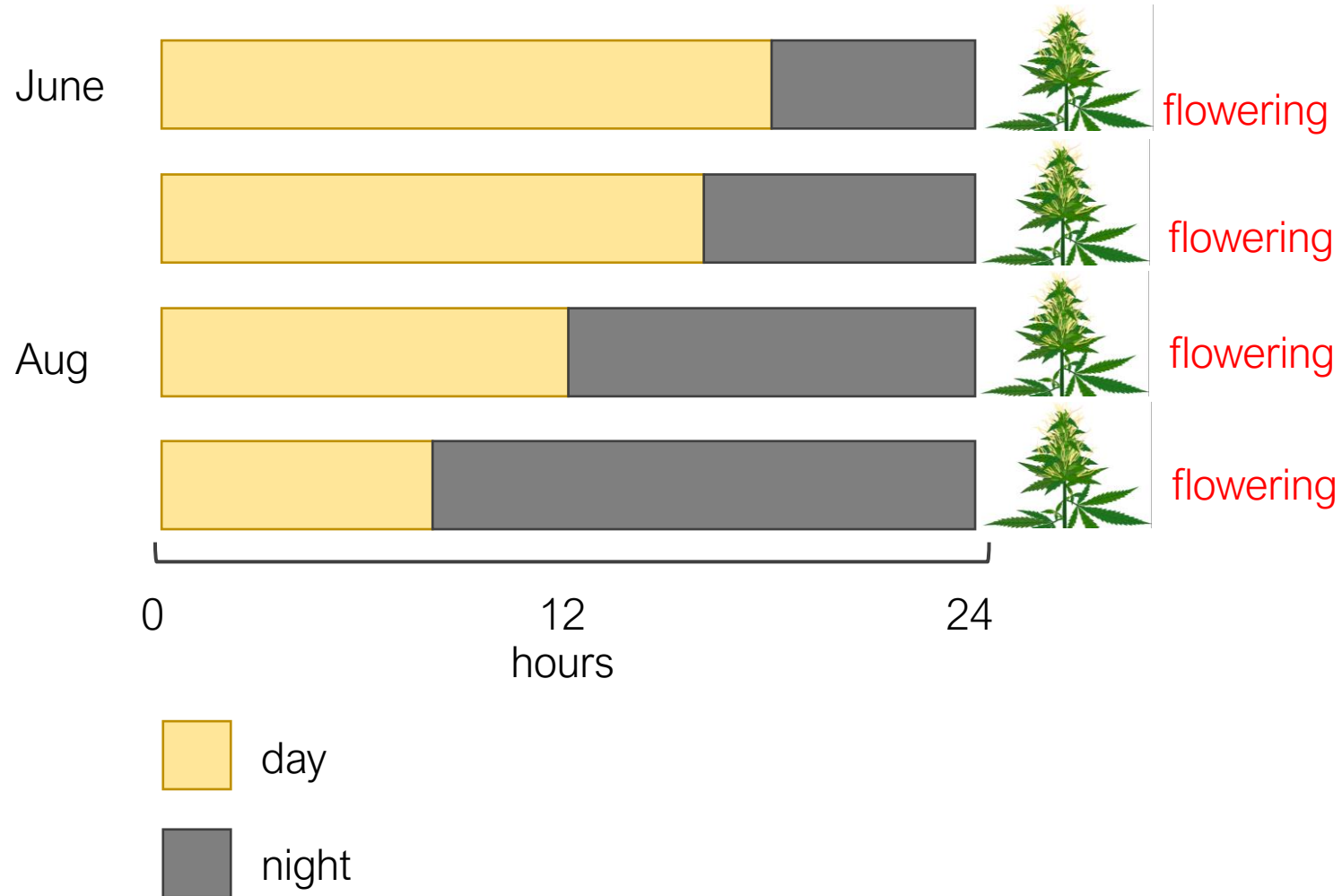
Cannabis is dioecious... but not always



Day neutral flowering



Day neutral flowering



e.g., FINOLA

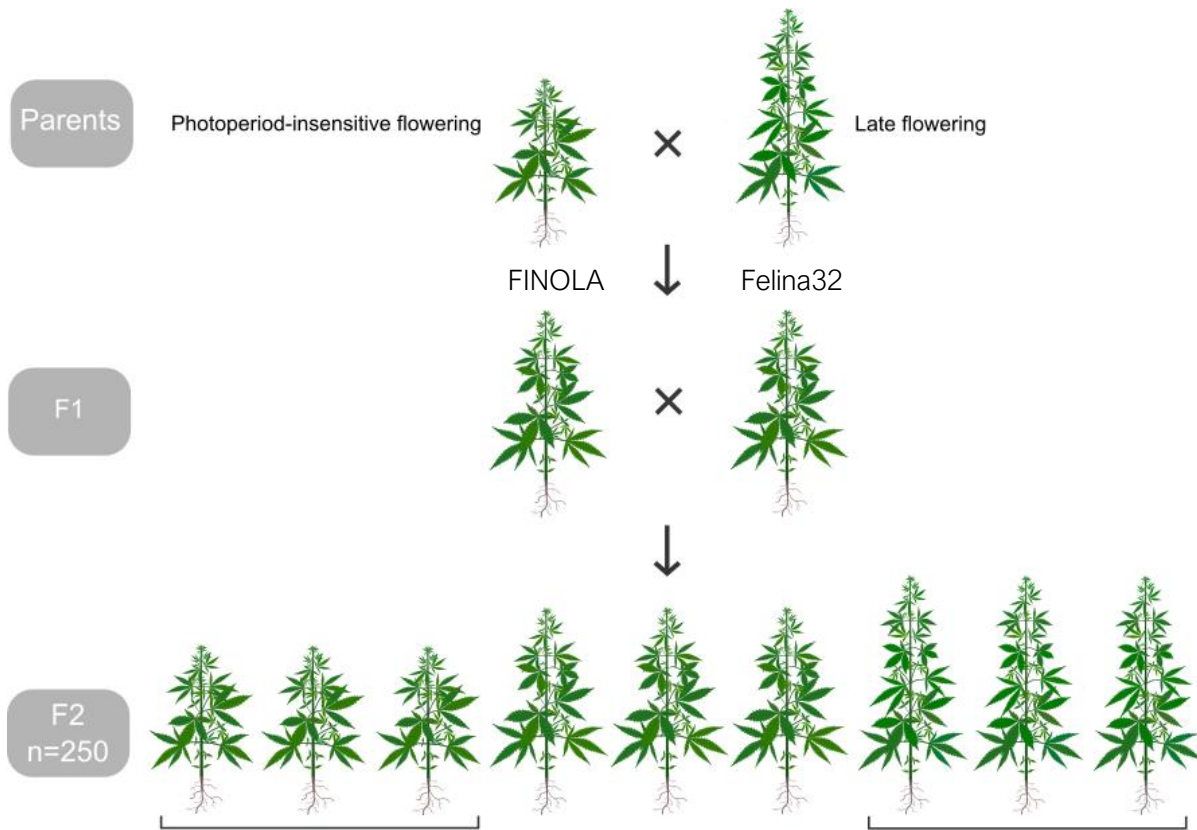


Flowering time: Figuring out FINOLA

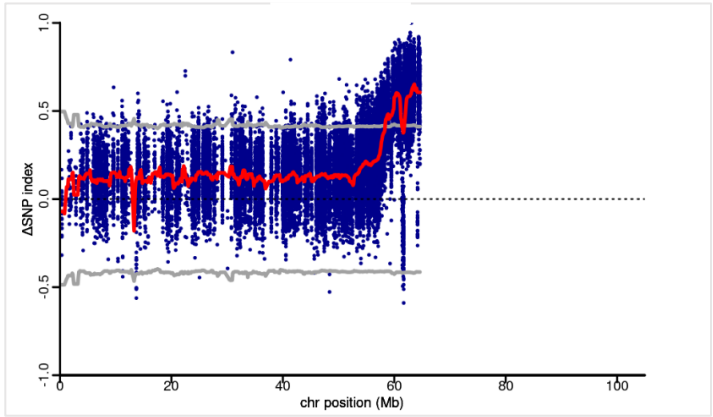
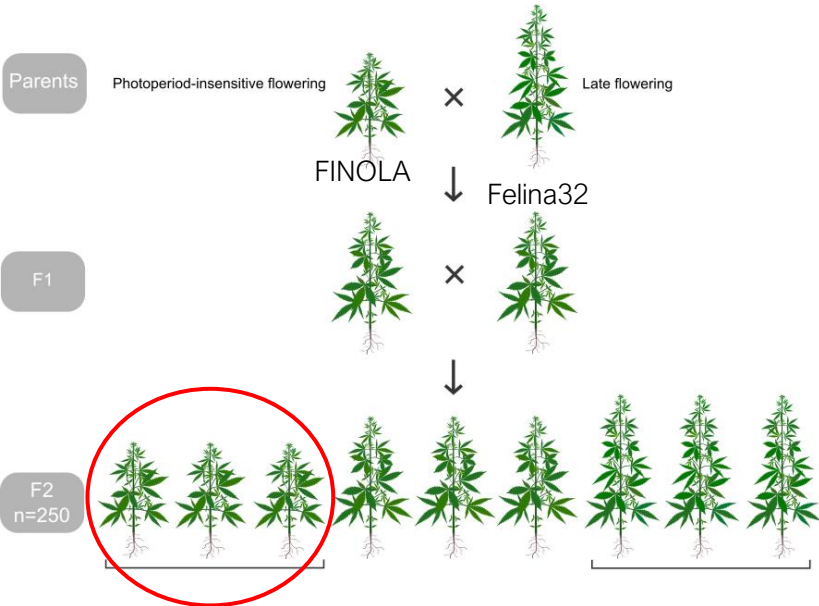


Caroline Dowling
PhD Student

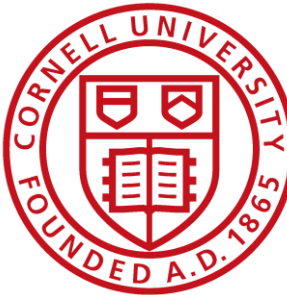
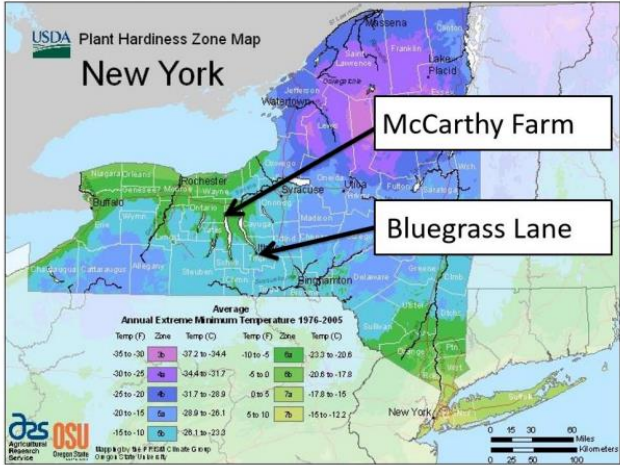
Figuring out FINOLA



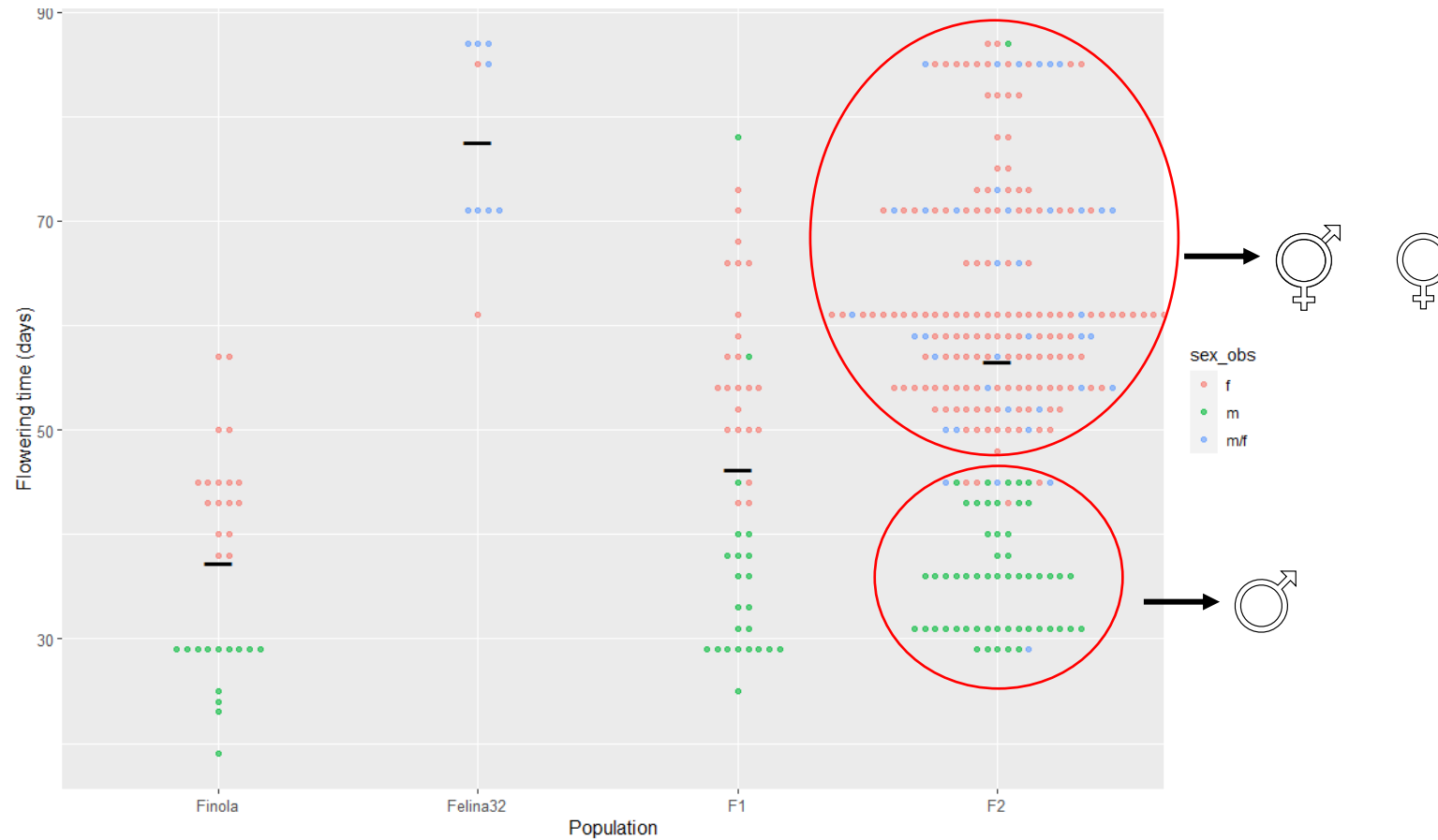
Figuring out FINOLA



George Stack (2020)



Males flower earlier than females



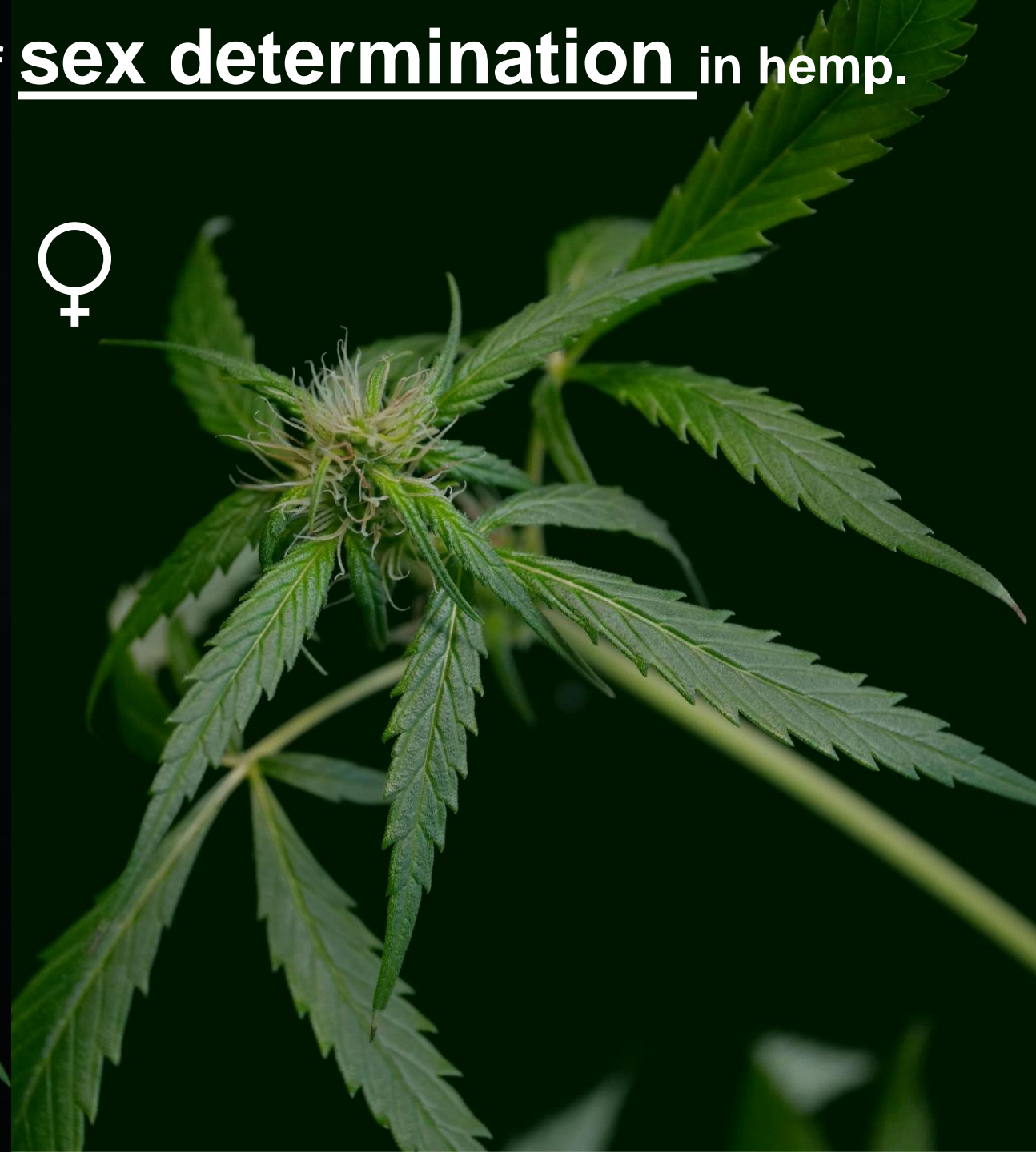


Sex determination



Jiaqi Shi
PhD Student

A developmental and genetic analysis of sex determination in hemp.



In the current market, male and female hemp have different “fate”.

♂

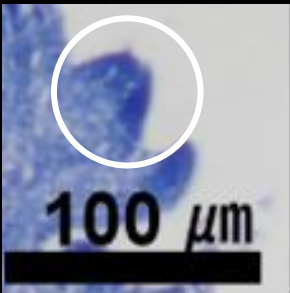


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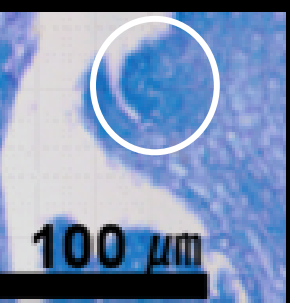
What's the morphological process and genetic mechanism of sex determination during hemp flower development ?

♂



Floral Meristem

♀



Floral Meristem



♂



A mature hemp male flower



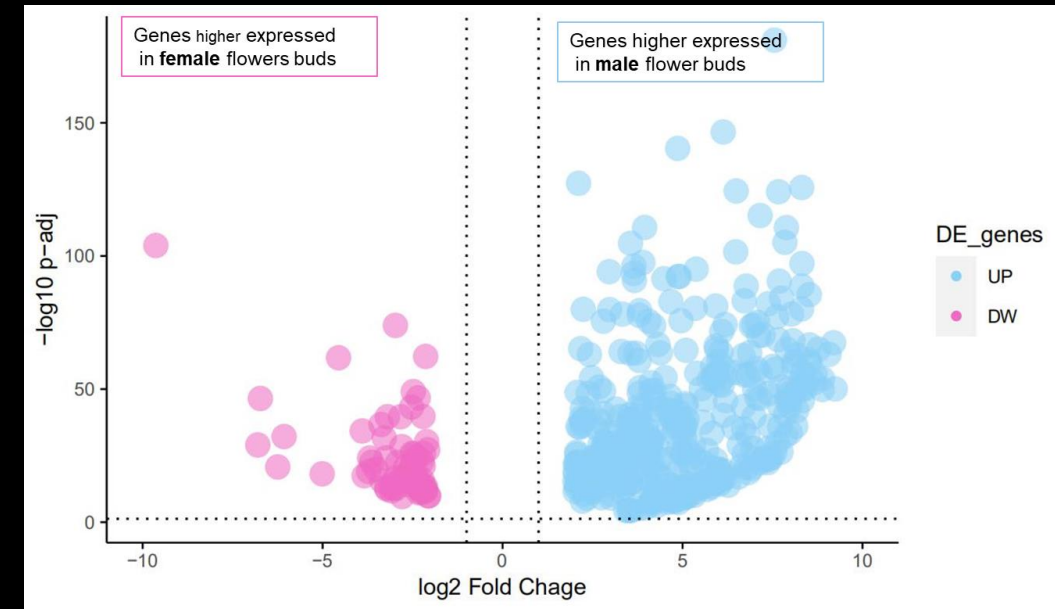
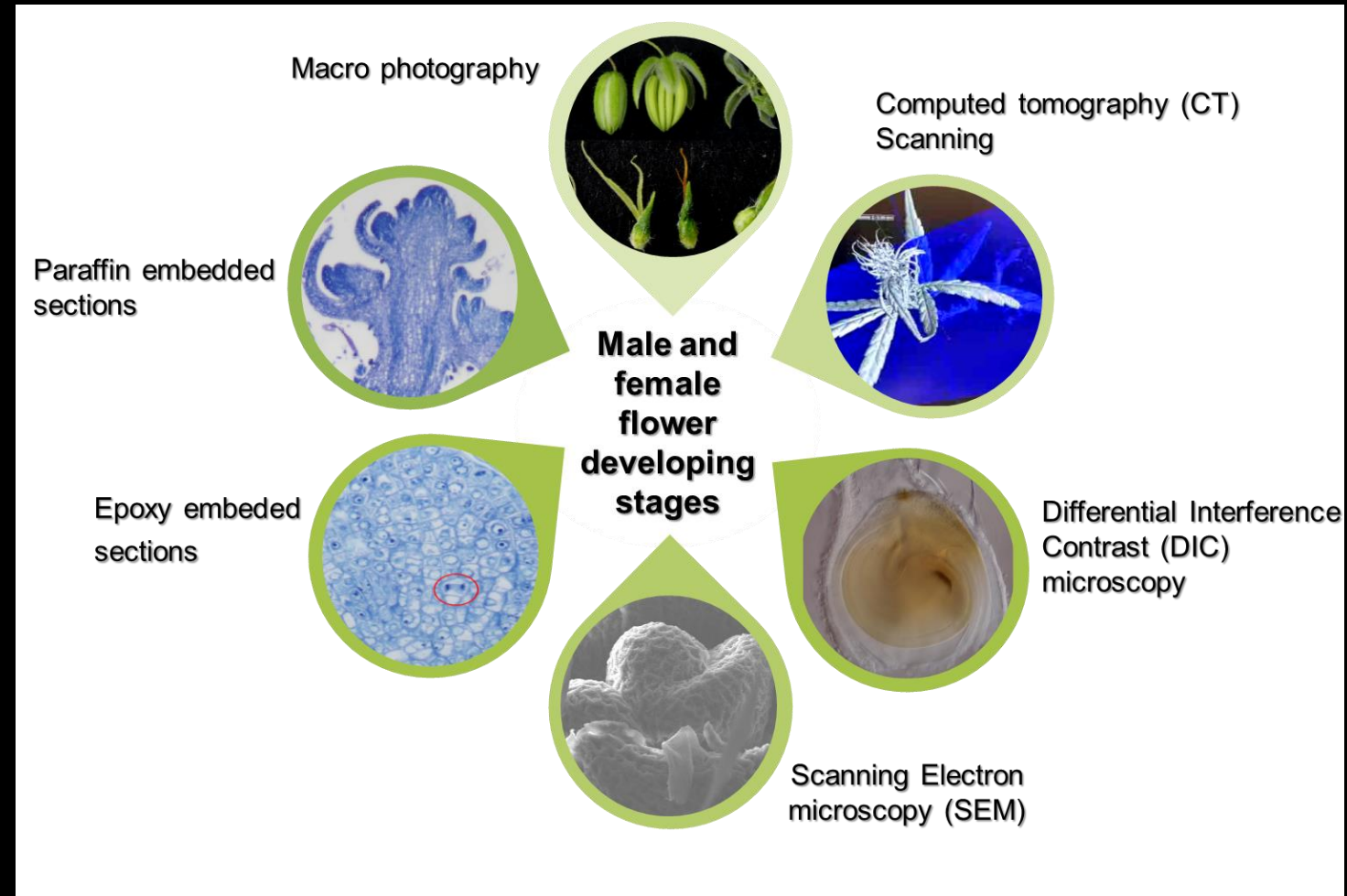
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A mature hemp female flower



What are our methods to find the sex determined genes in hemp?



RNASeq Analysis to find sex-related genes.

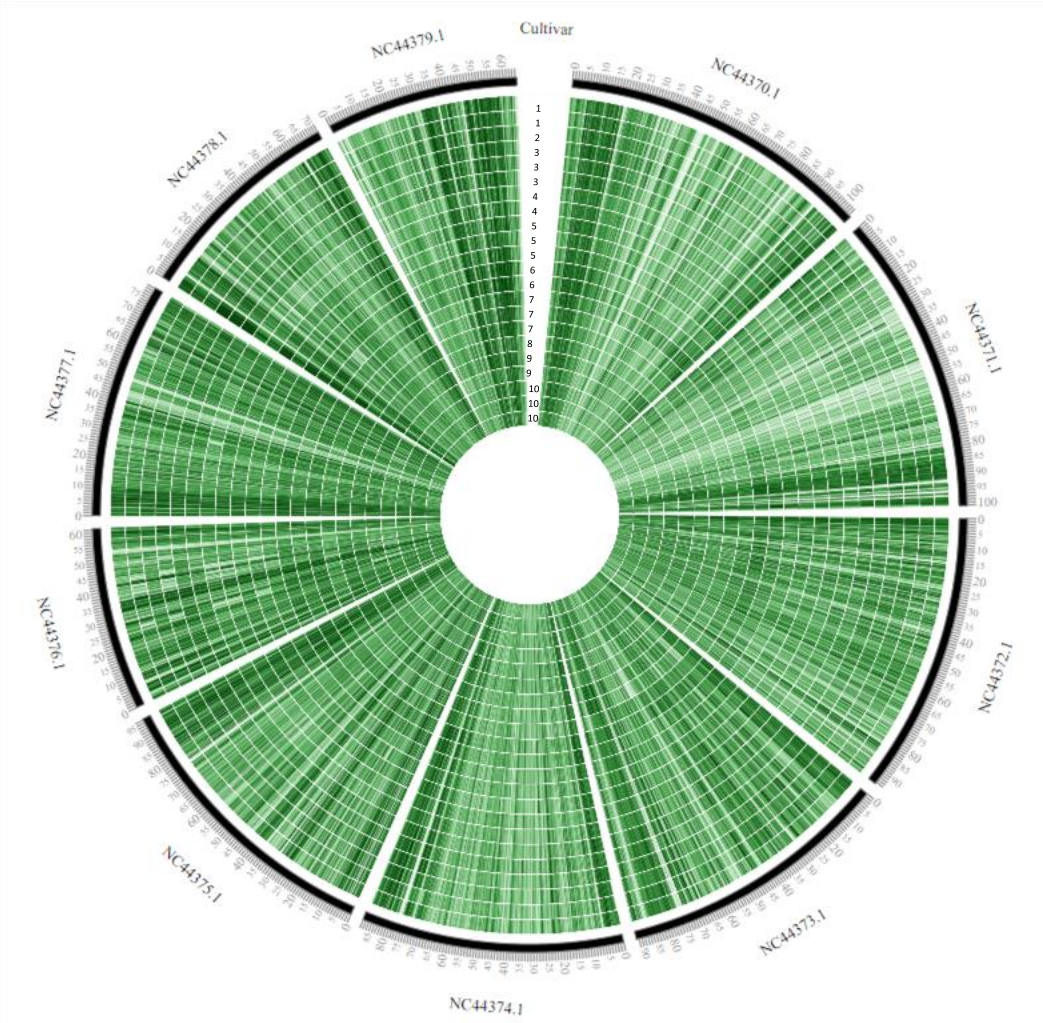
--Volcano plot of differentially expressed genes in male and female flower buds in the hemp Cultivar 'Zentisa' (Prentout et al., 2020). $P_{adj} < 0.0001$, $|\log_2(FC)| > 2$.

"What is the key?"

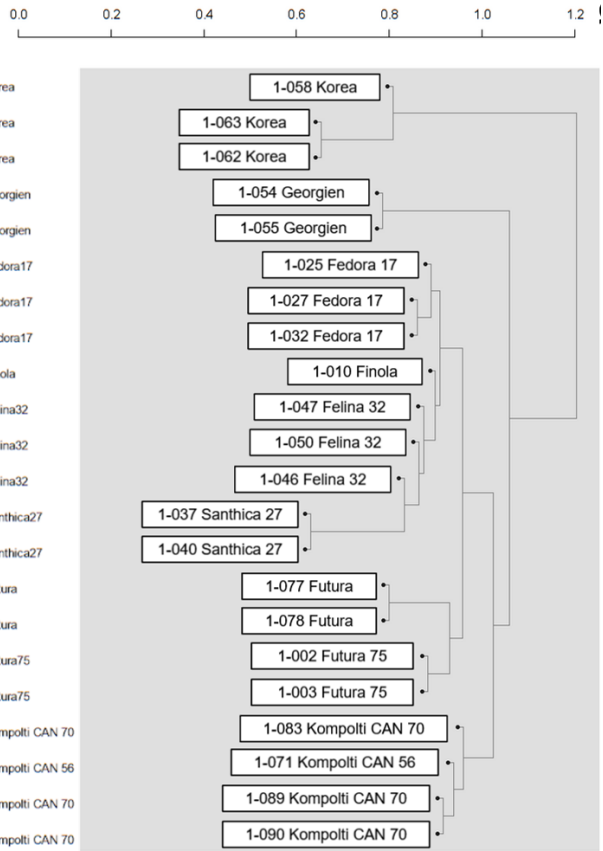
Morphological methods used to characterise male and female hemp flower development key stages.

"Where is the lock of sex determination?"

Genetic and phenotypic variability in hemp



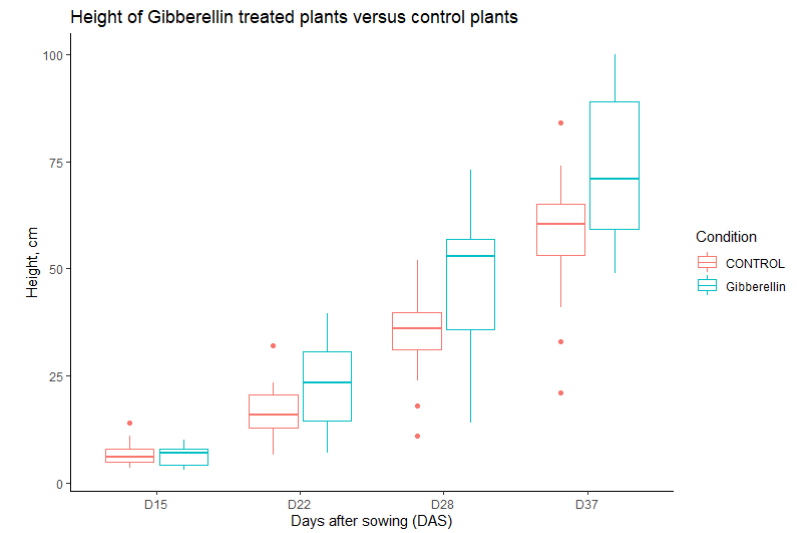
Nina Trubanová
PhD student



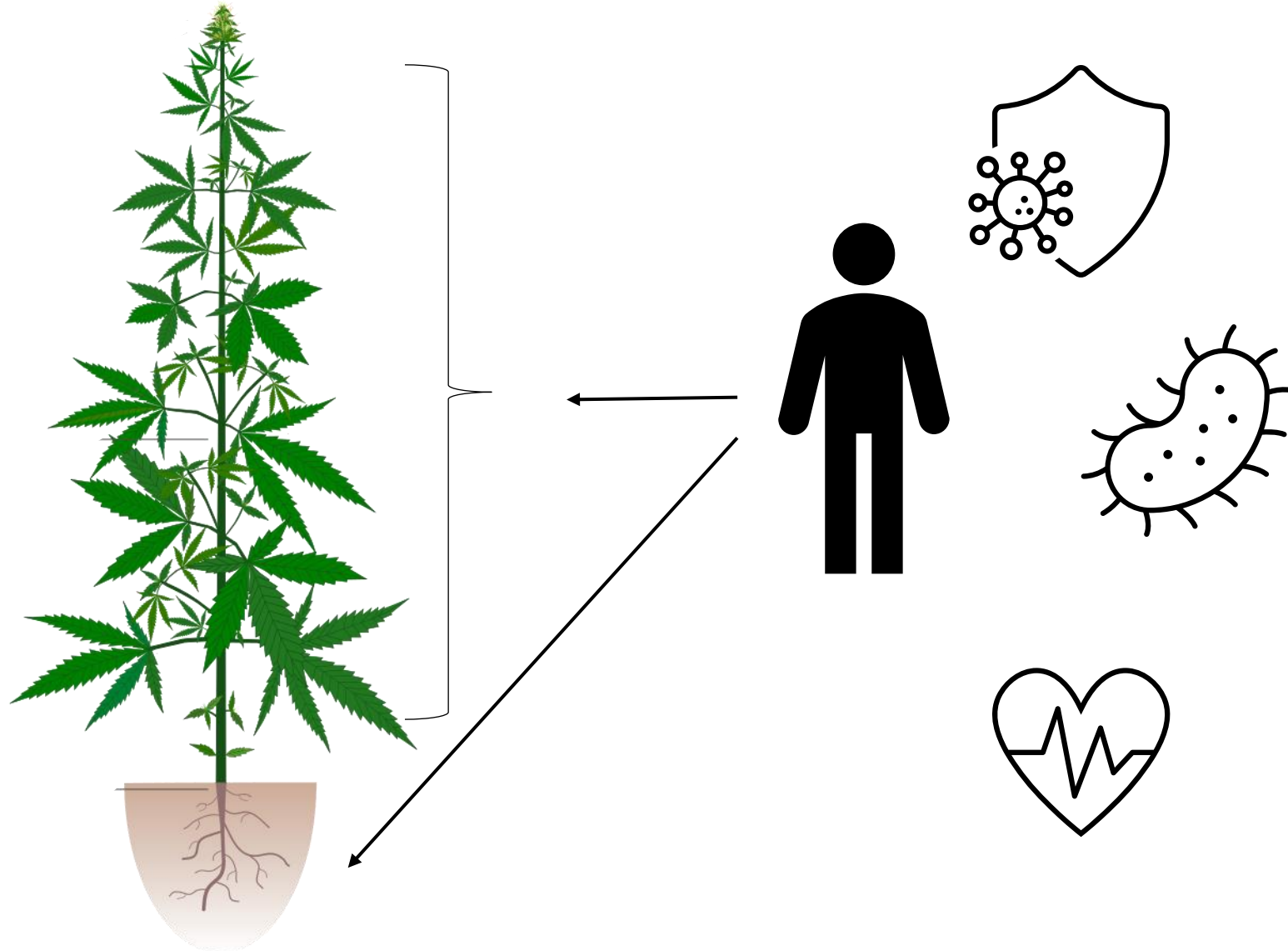
Plant growth regulators and height



Grace Pender
PhD student



ÉIREhemp



Susanne Schilling
Assistant Professor



**QUEEN'S
UNIVERSITY
BELFAST**



North-South Research Programme

A large greenhouse filled with rows of tall, green hemp plants. The plants are growing in white trays on the floor. The greenhouse has a high ceiling with a complex system of metal beams and hanging artificial lights. The windows are large, letting in natural light. The overall scene is a well-maintained indoor cultivation space.

Summary

We use various techniques to understand hemp genetics

Our outputs will contribute to creating new hemp cultivars

Eager to get in touch with farmers and industry to explore future project possibilities

Acknowledgements

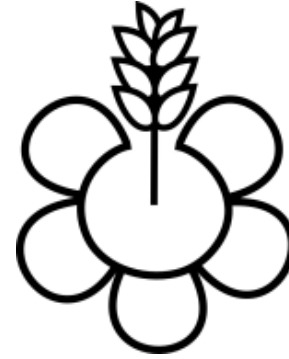
Support:

UCD Flower Power lab

School of Biology and Environmental Science

Rosemount Environmental Research Station

HempHub Strategic Priority Objective of UCD Earth Institute



Contact:

 **Twitter:** @CarolineD0wling @Jiaqi_Shih @UCDflowerpower

 **Email:** rainer.melzer@ucd.ie caroline.dowling.1@ucdconnect.ie

 **Lab website:** www.ucdflowerpower.org

Funding:

