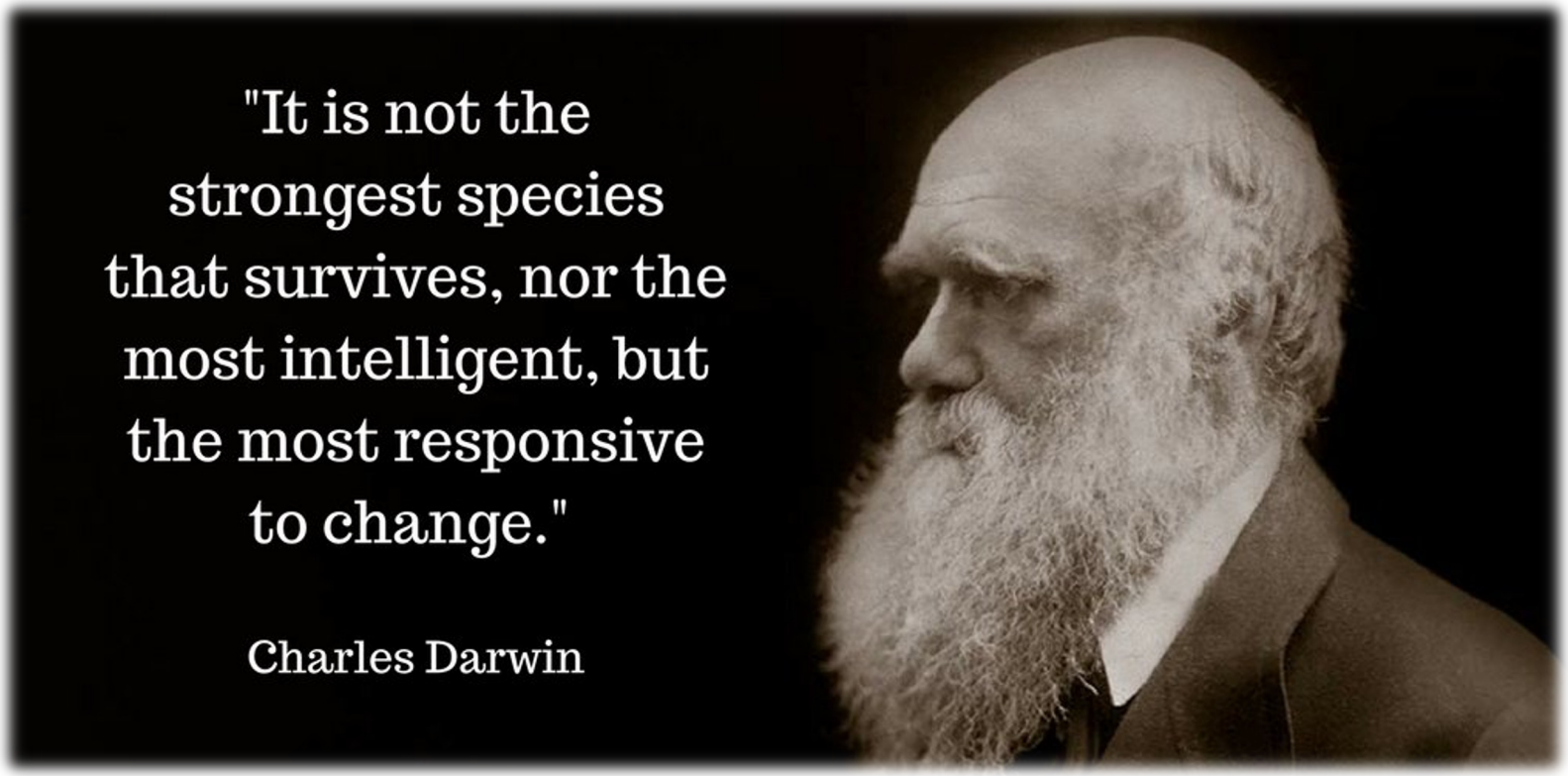
CASS III Program Delivery and Management

Phase II/Periode 5 - Project Meeting 2024

Zürich, 9th April 2024

with contributions from Catherine Espinosa (AgOne),
Christian Rogers (ENSA), and Wolfgang Zierer (CASS)

CASS III – Changes are coming



Microsoft Teams

Cathy working on CASS video

2024-04-04 22:12 UTC

Recorded by
Catherine Espinoza

Organized by
Catherine Espinoza

CASS III Program Structure

TECHNICAL MODULES

ENGINEERING MODULES

TM1-6

MANAGEMENT
CONSTRUCTS
TRANSFORMATION
FIELD TESTING
PHENOTYPING
DATABASE

EM1

OPTIMIZING
ASSIMILATE
ALLOCATION TO
STORAGE ROOTS

EM2

INCREASING SINK
STRENGTH
BY OPTIMIZING
XYLEM
PARENCHYMA CELL
FORMATION IN
STORAGE ROOTS

EM3

INCREASING SINK
STRENGTH
BY OPTIMIZING
METABOLIC FLUX IN
STORAGE ROOTS

CASS III Team Contributions

EM1_OPTIMIZING ASSIMILATE ALLOCATION TO STORAGE ROOTS

EM1.1
Manipulating shoot architecture

Lead:
Uwe Sonnewald
(FAU)

EM1.2
Limiting lateral transport losses through active phloem (re-)loading

Lead:
Ekkehard Neuhaus
(RPTU)

EM1.3
Transport and allocation modelling

Lead:
Lee Sweetlove
(OU)

EM2_INCREASING SINK STRENGTH: XYLEM PARENCHYMA

EM2.1
Manipulation of cytokinin/ thermospermine metabolism or signaling

Lead:
Yjrö Helariutta
(HU)

EM2.2
Manipulation of down-stream factors involved in xylem parenchyma cell formation

Lead:
Ari Pekka Mähönen
(HU)

EM3_INCREASING SINK STRENGTH: METABOLIC FLUX

EM3.1
Optimization of sucrolytic cleavage and glycolosis

Lead:
Alistair Fernie
(MPI-MPP)

EM3.2
Optimization of starch-precursor delivery to amyloplasts

Lead:
Wolfgang Zierer
(FAU)

EM3.3
Starch granule initiation and growth

Lead:
Sam Zeeman
(ETH)

EM3.4
Model-based predictions

Lead:
Lee Sweetlove
(OU)

CASS III Team Contributions

Technical Modules

TM1
Project management and central services

Lead:
Uwe Sonnewald
(FAU)

TM2.1
Cassava routine transformation

Lead:
Simon Bull
(ETH)

TM2.2
Chemical and genetic boosters

Lead:
Christian Lamm
(FAU)

TM2.3
Transformation of farmer-preferred genotypes

Lead:
Ihuoma Okwuonu
(NRCRI)

TM3.1
Testing of identified promoter candidates

Lead:
Wolfgang Zierer
(FAU)

TM3.2
Single cell/nuclei sequencing

Lead:
Ari-Pekka Mähönen
(HU)

TM4.1
NCHU field testing

Lead:
Wilhelm Gruissem
(NCHU)

TM4.2
IITA field testing / crossing

Lead:
Ismail Rabbi
(NCHU)

TM5
Cassava plant and field phenotyping

Lead:
Onno Muller
(FZJ)

TM6
Research data management

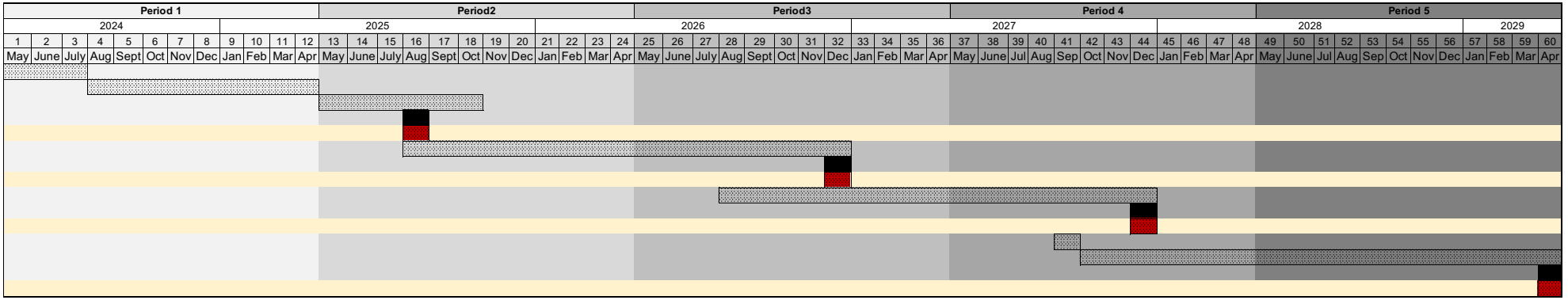
Objective Lead:
Lukas Mueller
(BTI)

All objective leads (EM & TM) have reporting duties!

CASS III Work Plan

EM1_Optimizing assimilate allocation to storage roots
EM1.1_Manipulating shoot architecture
Objective Lead: Uwe Sonnewald (FAU)

Task	Institution	Activities	Metrics/No-Go	Duration/Deadline
Task 1	FAU	Cloning of GA2ox and DELLA expression vectors	Expand to see metrics	3 months
Task 2	ETH/FAU	Transformation cassava model genotype	Isolation of at least 30 plant lines with PCR valdiated T-DNA insertion	9 months
Task 3	FAU	Line selection and greenhouse analysis	Expand to see metrics	6 months
M1	FAU	Greenhouse-testing concluded (Milestone)	Plant height reduced by 10 to 30%	09.01.25
Go/No-Go	FAU	Concept viable or improvements possible	Verified transgene expression, yet no reduction in plant axis height	09.01.25
Task 4	NCHU/FAU/FZJ	First confined field-testing in Taiwan	Expand to see metrics	17 months
M2	NCHU	First CFT concluded (Milestone)	≥10% increase in storage root yield	01.01.27
Go/No-Go	FAU	Concept viable under field conditions, or improvements possible	Verified transgene expression, yet no shift in harvest index and no increase in total storage root yield	01.01.27
Task 5	NCHU/FAU/FZJ	Second confined field-testing in Taiwan	Expand to see metrics	17 months
M3	NCHU	Second CFT concluded (Milestone)	≥10% increase in storage root yield	01.01.28
Go/No-Go	FAU	Concept viable under field conditions, or improvements possible	Verified transgene expression, yet no shift in harvest index and no increase in total storage root yield	01.01.28
Task 6	ETH/FAU/NCRI	Transformation of additional cassava genotypes concluded	Isolation of at least 30 plant lines with PCR valdiated T-DNA insertion	10.01.27
Task 7	IITA/NCRI/FAU	First confined field-testing in Nigeria	Expand to see metrics	19 months
M4	IITA/NRCRI	First confined field trial in Nigeria concluded (Milestone)	≥10% increase in storage root yield	05.01.29
Go/No-Go	FAU	Concept transferable to other genotypes, or improvements possible	Verified transgene expression, yet no shift in harvest index and no increase in total storage root yield	05.01.29



- The current work plan is outlined in the CASS III GANTT chart
- The work plan is not set in stone but changes need to be reasoned and agreed upon (with FAU and AgOne)
- Quaterly reporting against the current workplan (or simplified version)

Communication and Meetings

- Regular reporting promotes information flow to GatesAgOne, but also within CASS
- Quarterly reports to FAU to monitor progress based on proposed timelines
- FAU and Gates Ag One Quarterly meetings
- IP Committee meetings (+X) held on demand.
- Regular meetings between Cathy, Uwe, and Wolfgang
- CASS annual meeting facilitates exchange, scientific presentations, and discussion of challenges

1. Quarterly Reports to FAU

2. Annual Financial Reports

3. CASS Annual Meeting

Meetings and Reports

QUARTERLY

ALL OBJECTIVE LEADS

Module leaders report to FAU

No more than 2 hours work for objective leads per quarter

CASS MANAGEMENT OFFICE

Quarterly Report submitted to Gates Ag One

FAU + Gates Ag One

CASS Quarterly Meeting

ANNUALLY

CASS Annual Meeting

Annual Financial Reporting

+

Annual Scientific Report

CASS Management Office

Uwe Sonnewald

CASS Program Leader

Wolfgang Zierer

CASS Program Manager

Catherine Espinoza

Gates Ag One Technical Program Lead, Bill & Melinda Gates Agricultural Innovations

Christian Rogers

Cambridge Discovery Year 1 - program management support.

Iris Hammer

CASS Finance Manager

CASS Data Manager (TBH)

Supports data transfer to central platforms

Facilitates data transfers.

Assists with data provision for IP and CFT applications.

Impact Manager (TBH)

Monitors progress across program areas.

Represents CASS team in IP committee.

Handles communication with the public.

Reporting Framework

A quarterly reporting system requires three actions and should take no more than 2 hours per team, per quarter.

Objective leaders provide two scores for each task:

% Complete

Progress Score

Objective Leader answers three questions:

1. Progress Update

2. Challenges and Mitigations

3. Next Steps in the Action Plan

Objective Leader provides links to Cassavabase or other relevant data resources

New key data made available

Shared with Gates Ag One Team

- Template documents will be made available facilitating reporting across the project each quarter
- Edited into a report each quarter by FAU Management office team
- Communication from CASS team members on project progress will be achieved throughout the year

Reporting Framework

No more than 2 hours reporting work for Module Leaders per quarter

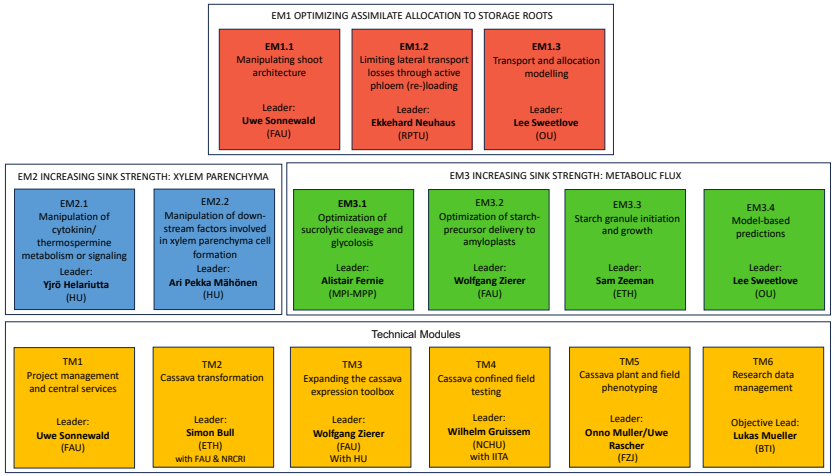
1. **Percent Complete:** indicates towards our objective
2. **Progress Scores**: Scored 0.1 – 1.0, Green (on track for target date), orange (risks identified), red (problem)

    - 0.9: Excellent progress with delivery assured by the target date.
    - 0.7: On track and likely to deliver by the target date.
    - 0.5: Lower than anticipated progress with some challenges or delays.
    - 0.3: Low progress with significant challenges or delays.
    - 0.1: Very low progress or no progress at all.

3. **Justification Statements**

    Progress Update: A brief update on the progress made toward each objective. This includes key accomplishments and milestones achieved during the quarter.
    Challenges and Mitigations: The challenges or obstacles encountered during the quarter that affected progress. We explain the steps taken or strategies implemented to mitigate these challenges and minimize their impact on the project.
    Next Steps in the Action Plan: Provides an outline of the planned activities or next steps that will be undertaken in the upcoming quarter to continue progress toward the objective. It include specific tasks, milestones, or experiments that will be conducted.

Reporting system similar to ENSA



Excel

Objective leaders provide two scores for each task:

% Complete

Progress Score

Word

Objective Leader answers three questions:

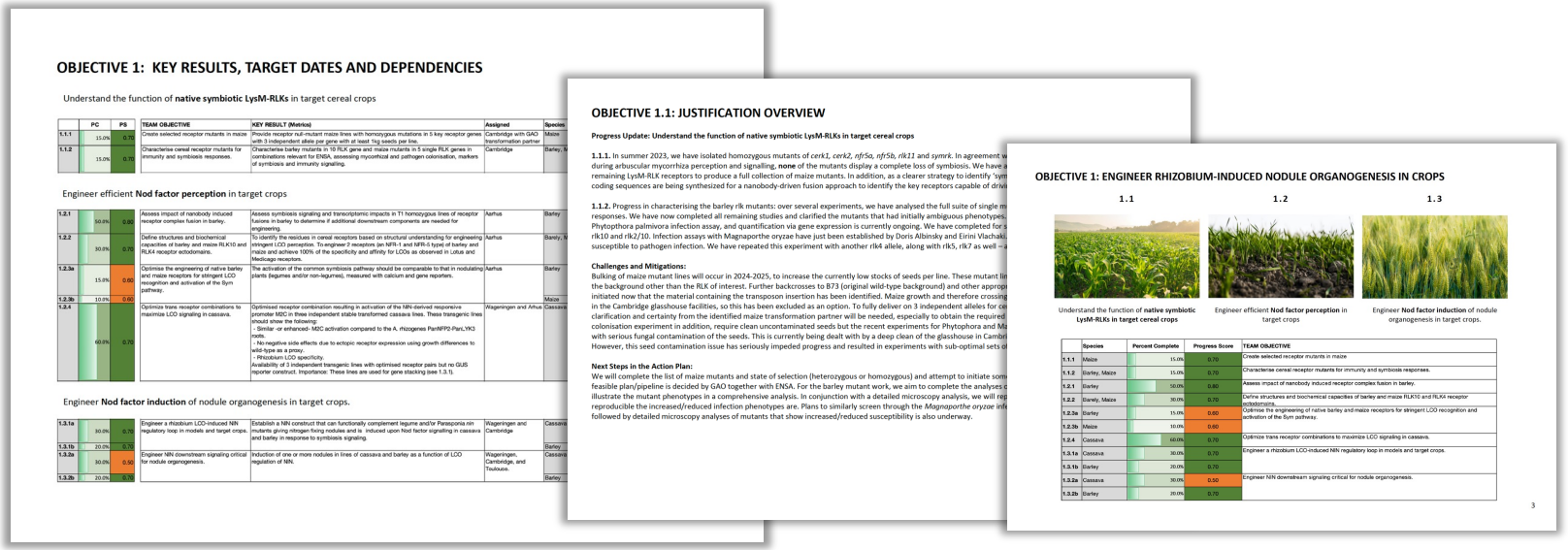
1. Progress Update
2. Challenges and Mitigations
3. Next Steps in the Action Plan

CassavaBase Links

Objective Leader provides links to Cassavabase or other relevant data resources

New key data made available

Shared with Gates Ag One Team



OBJECTIVE 1: KEY RESULTS, TARGET DATES AND DEPENDENCIES

Understand the function of **native symbiotic LysM-RLKs** in target cereal crops

Engineer efficient **Nod factor perception** in target crops

Engineer **Nod factor induction** of nodule organogenesis in target crops.

OBJECTIVE 1.1: JUSTIFICATION OVERVIEW

Progress Update: Understand the function of native symbiotic LysM-RLKs in target cereal crops

Challenges and Mitigations:

Next Steps in the Action Plan:

OBJECTIVE 1: ENGINEER RHIZOBIUM-INDUCED NODULE ORGANOGENESIS IN CROPS

1.1 1.2 1.3

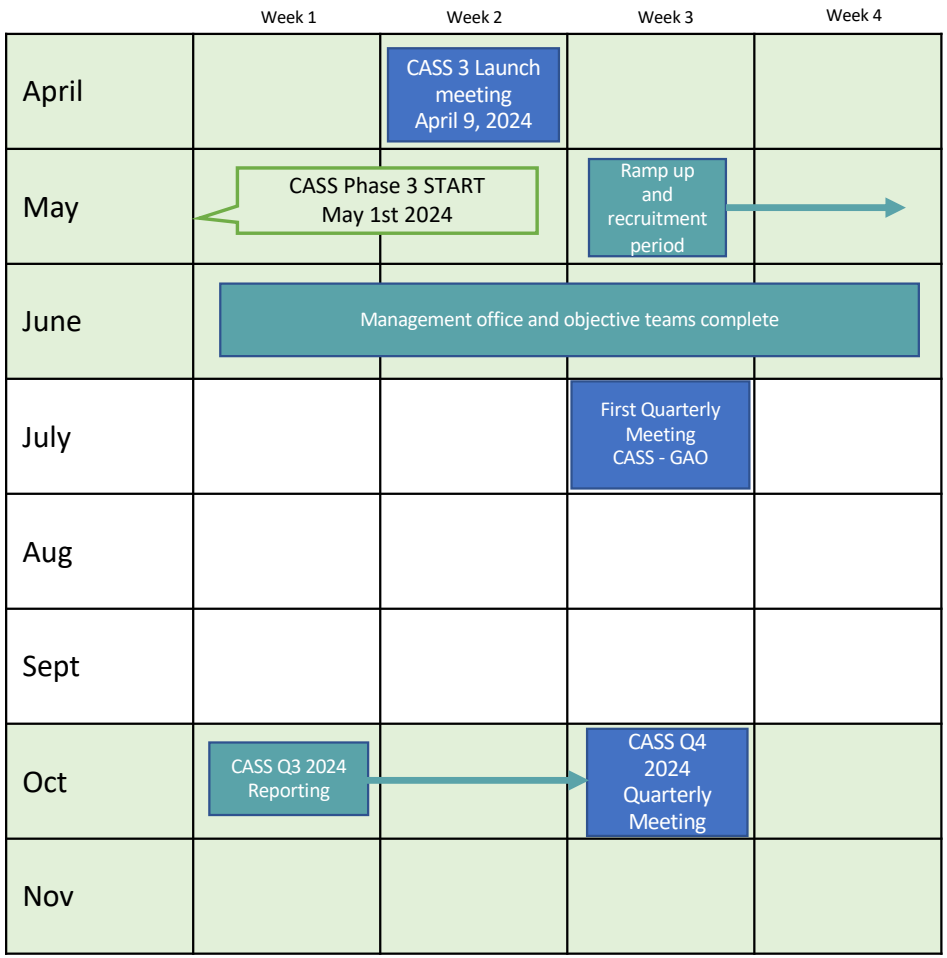
Understand the function of **native symbiotic LysM-RLKs in target cereal crops**

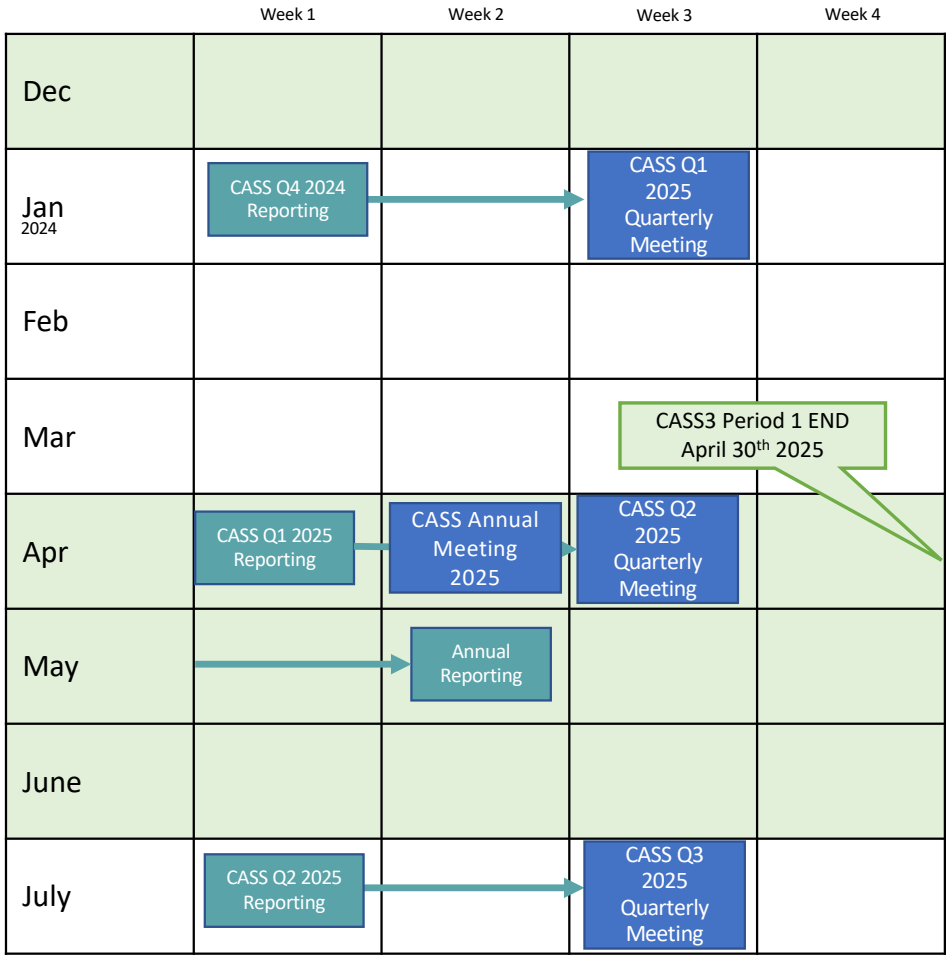
Engineer efficient **Nod factor perception** in target crops

Engineer **Nod factor induction** of nodule organogenesis in target crops.

Quartely report created by FAU

Time schedule





Thank you!

Questions? Comments?

Q2 2024 - Critical activities to move forward

FAU ←→ EM1/EM2/EM3/TM3

Cloning | **Transformation**

May 2024 – July 2024 | Aug 2024 – April 2025

OU ←→ RPTU/MPI/FZJ/ETH

Modeling data generation

Should be concluded October 24 / April 25

Discussion session

IITA ←→ RPTU

IITA CFT / Crossing activities

Plants should be growing at IITA next month /
Open IP issue for *AKT2*

Discussion session

BTI ←→ Users

Database user training

HU

Single cell / Single nuclei RNA-Seq