

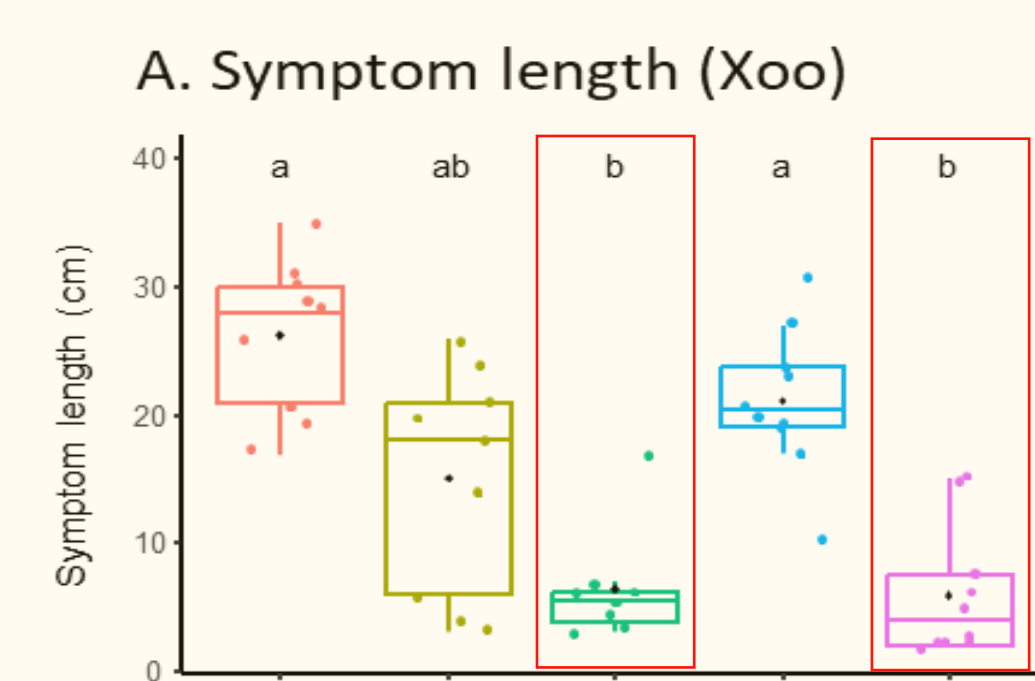
Harnessing phyllosphere bacteria as biocontrol agents: exploring *Methylobacterium* species diversity and capacities against rice phytopathogens

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- Plants live with complex microbial communities that colonise their roots, leaves, and seeds. These communities support the host's nutrition, growth and defence against pathogens, thereby enhancing plant physiology, development and resilience to abiotic and biotic stresses. These communities are now widely recognised as being essential for plant health (Berendsen et al., 2012; Vandenkoornhuyse et al., 2015).
- Our previous work in Cambodia, comparing the leaf microbiome between leaf-diseased and healthy rice, has led to the identification of strong signatures of *Methylobacterium* and *Methylobacterium* species in healthy rice (Oeum et al., 2024)



- We isolated a diversity of *Methylobacterium* species from rice inhabiting the same leaves, with contrasted biocontrol activities against a bacterial pathogen (Xoo).
- Research question:** can we select and mix specific strains as bioprotective Syncoms (synthetic communities) against various phytopathogens?

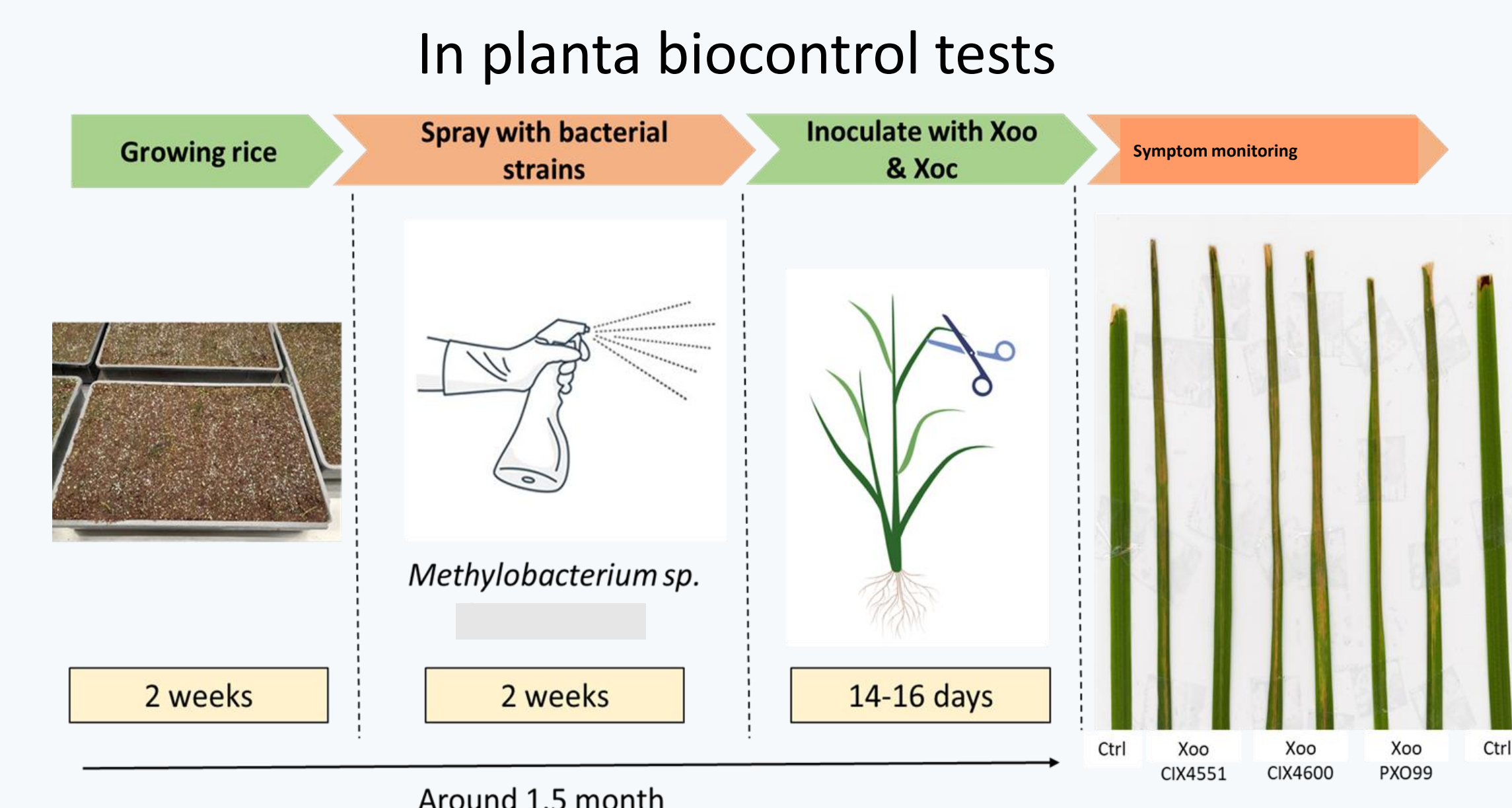
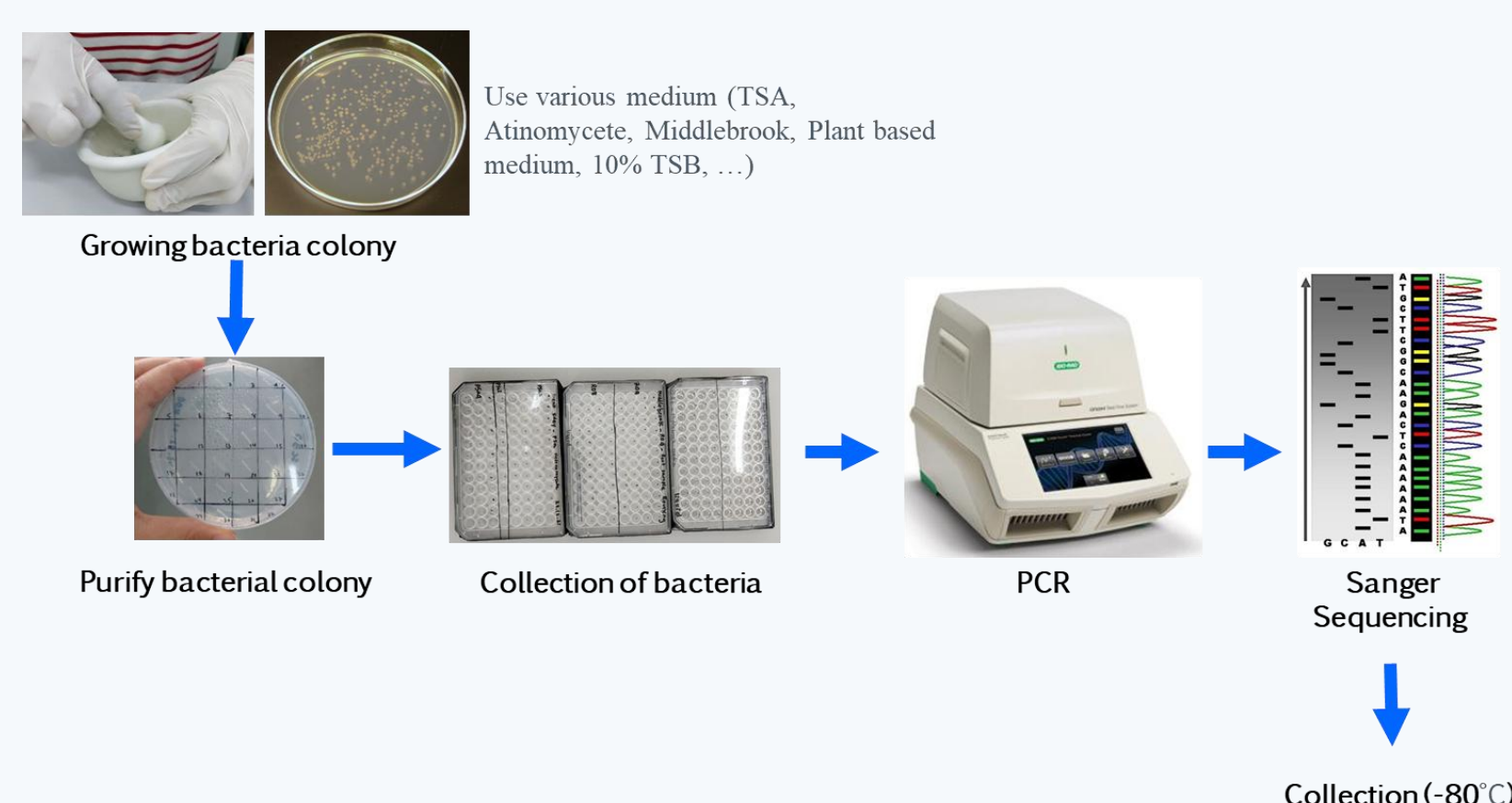


Impact of leaf-spraying inoculation *Methylobacterium* on symptom size induced by

Xanthomonas oryzae pv *oryzae* CIX4551

- The aim of this M1 research topic is to
 - better characterize the genetic diversity of *Methylobacterium* strains co-inhabiting the phyllosphere of rice and select compatible Syncoms.
 - Assess their potential cooperation/synergy to protect plants against bacterial and fungal phytopathogens.

- The work will start with the characterization of Cambodian strains already isolated (identification, test of biocontrol capacities in single and synthetic communities, in vitro and in planta).



- Results should enlighten on the role and biocontrol potential of *Methylobacterium* species against different rice pathosystems, to propose new biological nature-based solutions to reduce chemical pesticides in rice agronomic systems.

References cited:

- ✓ Berendsen et al, 2012 The rhizosphere microbiome and plant health. Trends Plant Sci
- ✓ Vandenkoornhuyse et al., 2015, The importance of the microbiome of the plant holobiont. New Phytol.
- ✓ Oeum et al., 2024. Comparison of plant microbiota in diseased and healthy rice reveals methylobacteria as health signatures with biocontrol capabilities Front. Plant Science.