

特願2008-012159

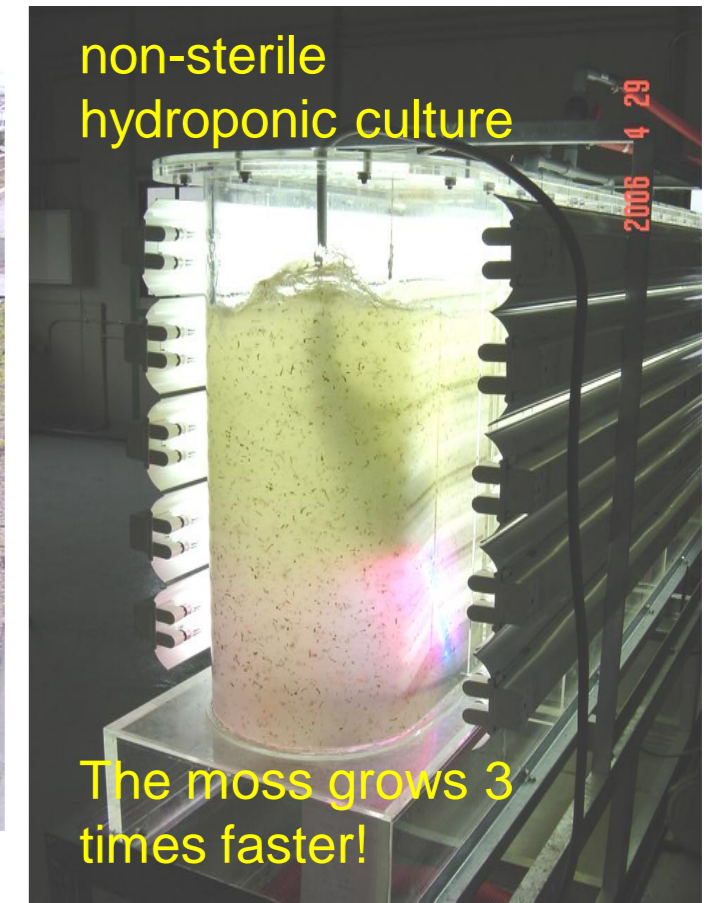
In big cities, **roof-greening is compulsory** for new buildings to deal with urban **heat island** problem. In some cases, **lightweight and maintenance-free green roofs** are desired. It is estimated that in 2011 there will be **demands for roof-greening of 360 billion yen**.

*Racomitrium canescens* is:  
Lightweight  
Evergreen  
Highly desiccation-tolerant  
Applicable for roof- and wall-greening.

However:  
High cost  
Slow growth  
Low production level

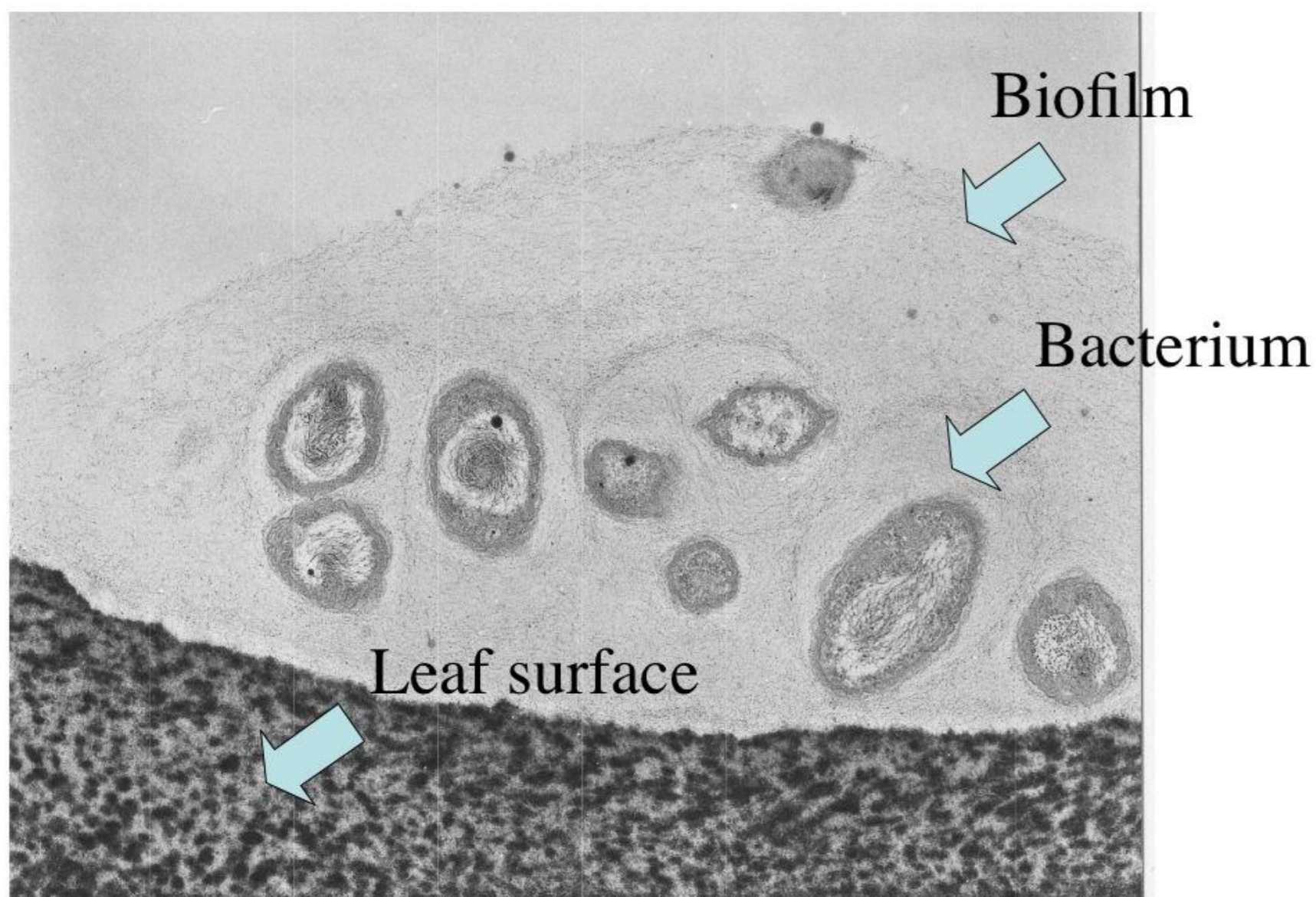
Can bacteria promote the plant's growth?

*Racomitrium canescens*

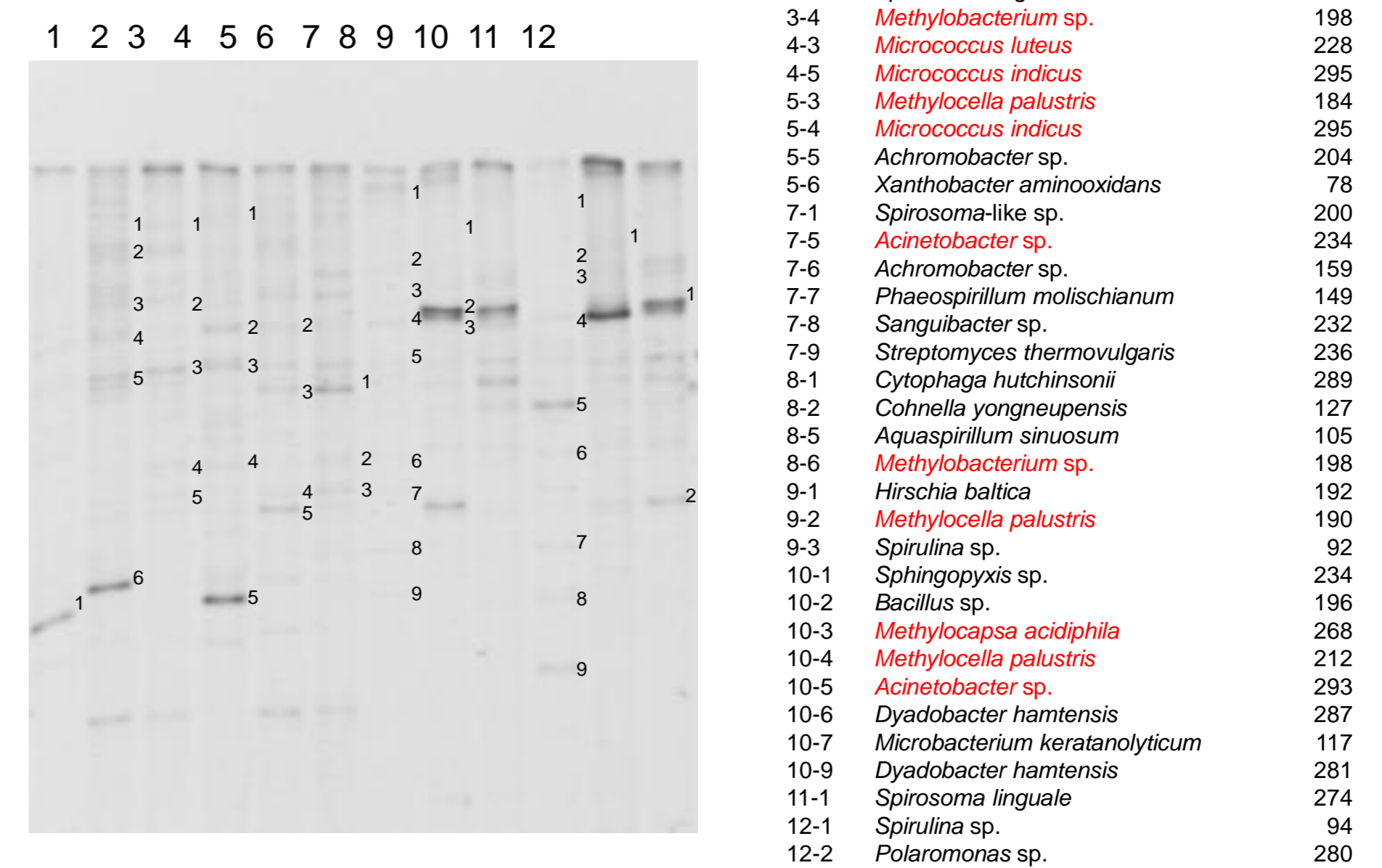


Our objective is to identify, characterize, and use bacteria to further promote the plant's growth.

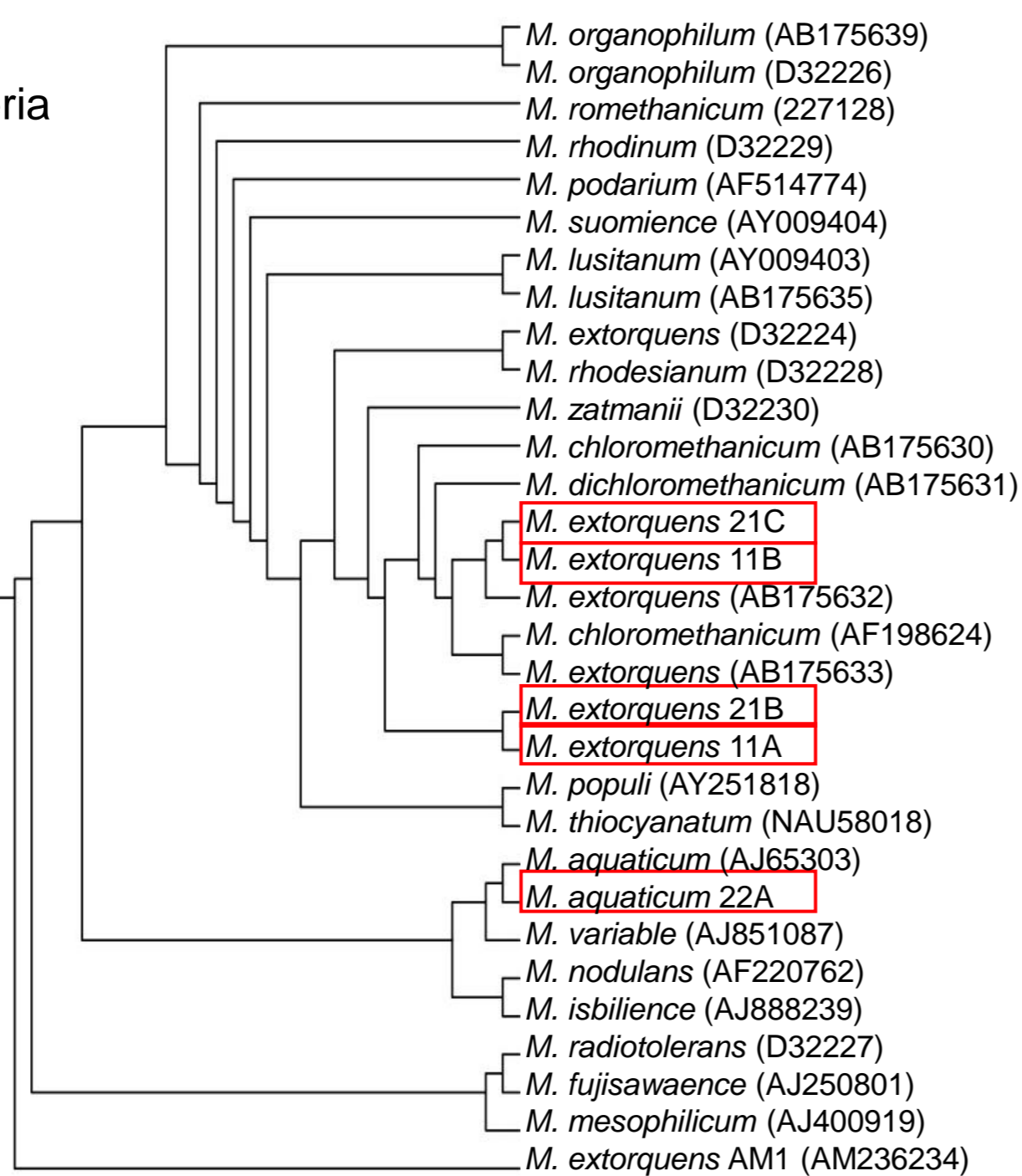
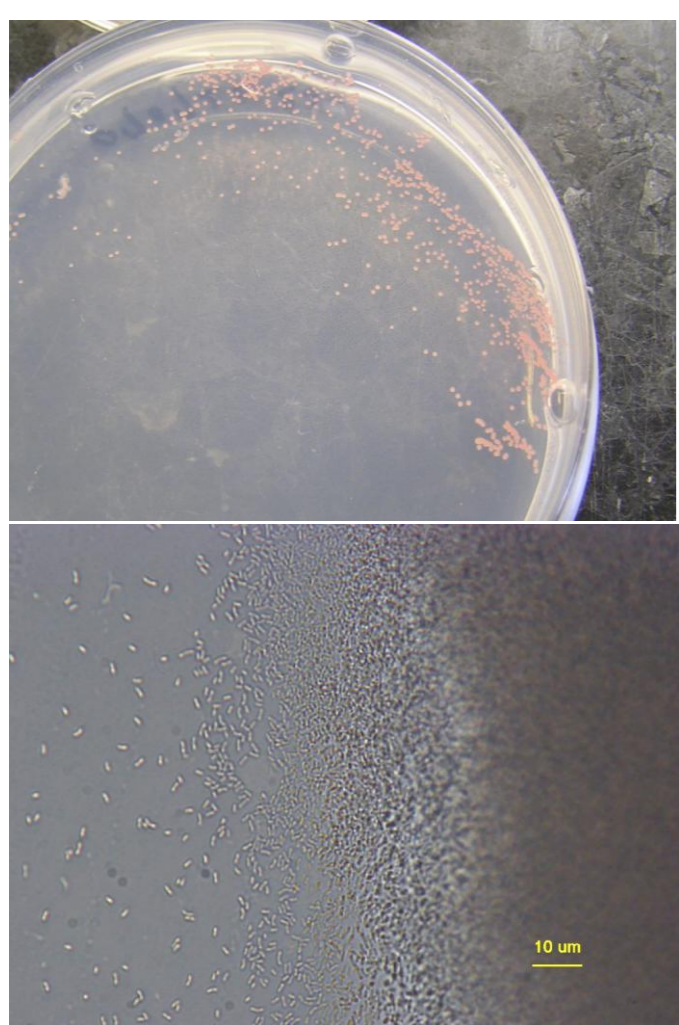
Bacterial biofilm on a leaf



DGGE analysis of non-sterile hydroponic culture samples revealed predomination of **methylotrophs**

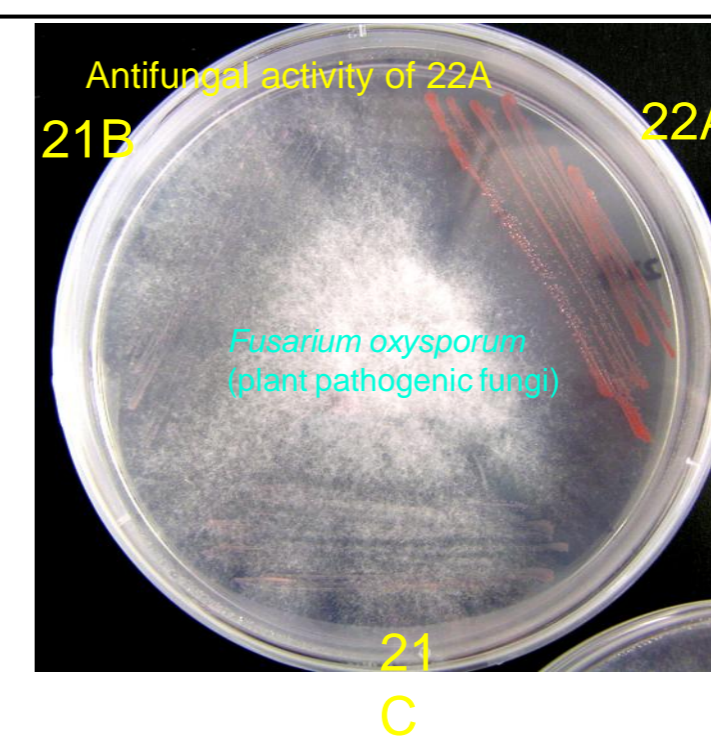


Phylogenetic location of the isolates within *Methylobacteria* (16SrDNA)

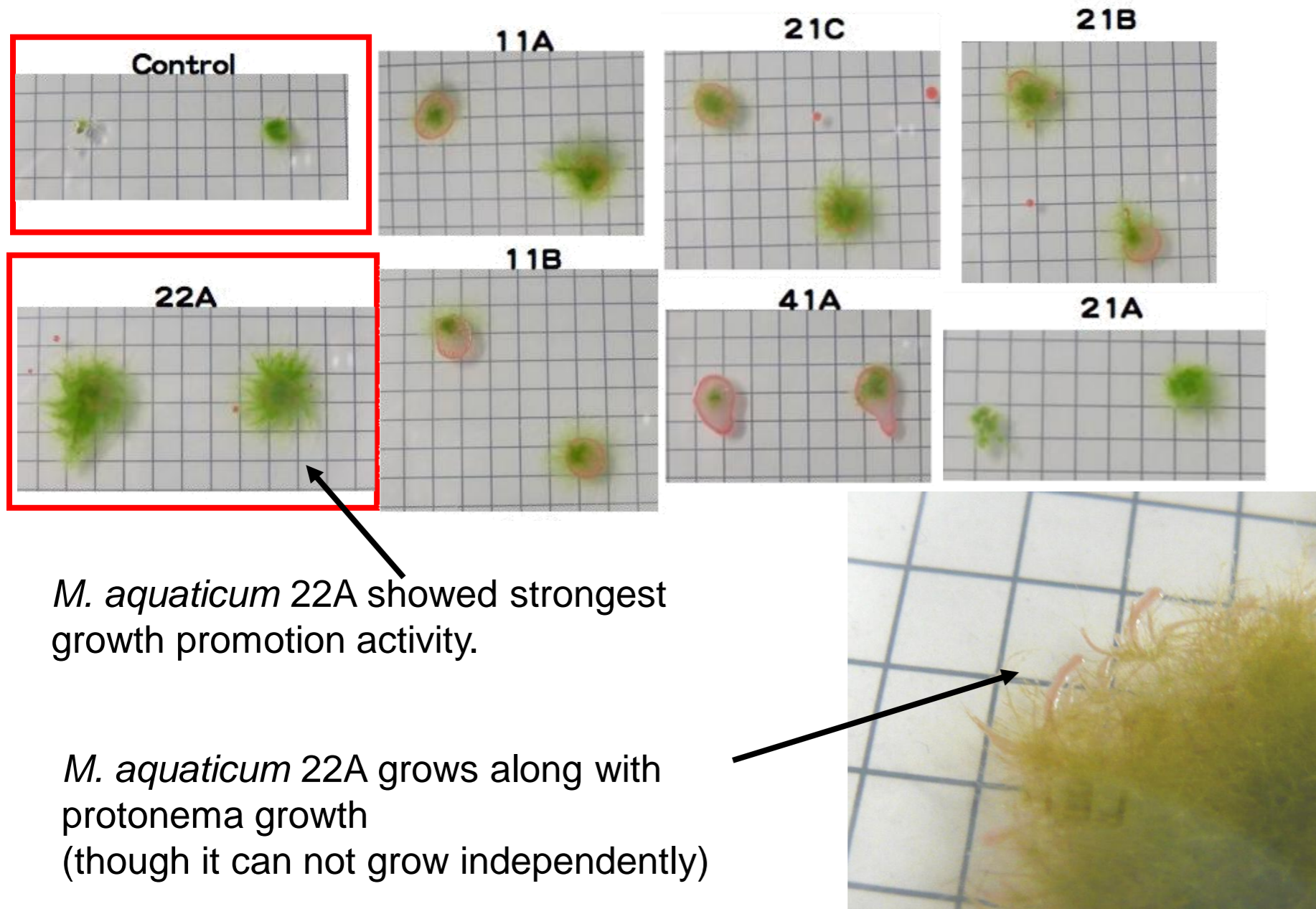


Characterization of methylotrophs from *R. canescens* hydroponic culture

Isolates name	11A	11B	21B	21C	22A
Identification (16S)	<i>Methylobacterium extorquens</i>		<i>M. aquaticum</i>		
N-free medium	○	○	○	○	○
Siderophore production	○	○	○	×	×
Auxin production	○	○	○	○	○
Calcium phosphate solubilization	○	○	○	×	×
HCN production	○	○	○	○	◎



Effect of the isolates on protonema (*R. canescens*) growth



Summary

1. The hydroponic culture samples of *Racomitrium canescens* is predominated by Methylotrophs.
2. The methylotrophic isolates were identified as *Methylobacterium* species.
3. The isolates promoted the growth of the moss.
4. These methylotrophic bacteria can be applied to promote the moss growth.