The use of endophytic bacteria for enhanced crop production

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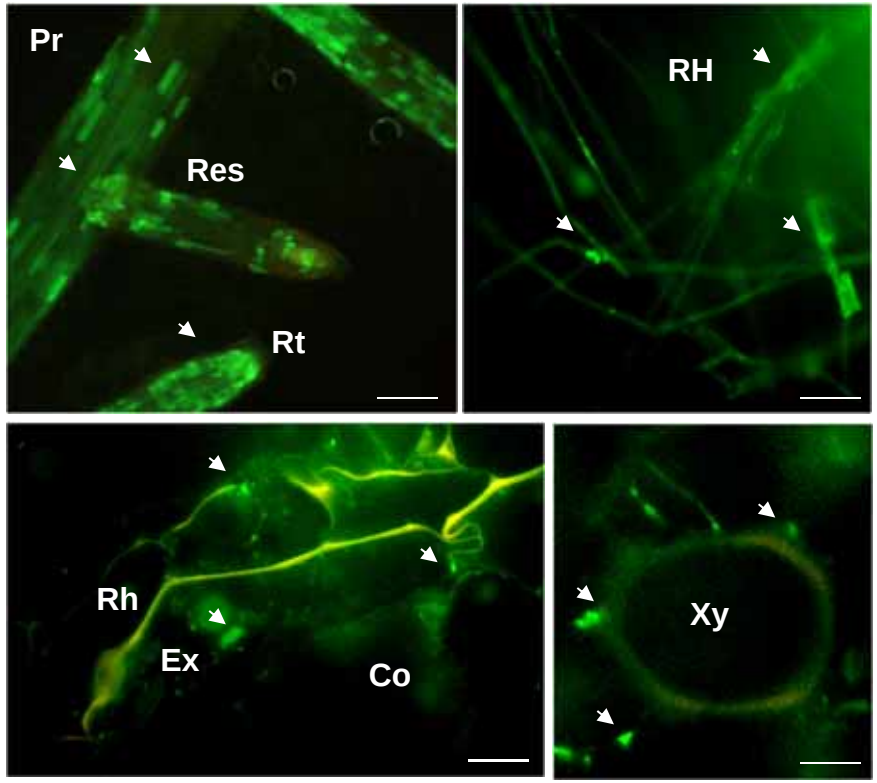
- Austria's largest non-university research center
- Mission: Applied R&D supporting industries
- 5 Departments
  - Health & Environment
  - Safety & Security
  - Energy
  - Mobility
  - Foresight Policy Development

Endophytes

Microorganisms, bacteria or fungi, that colonize tissue of living plants without harming their host.

Root surfaces

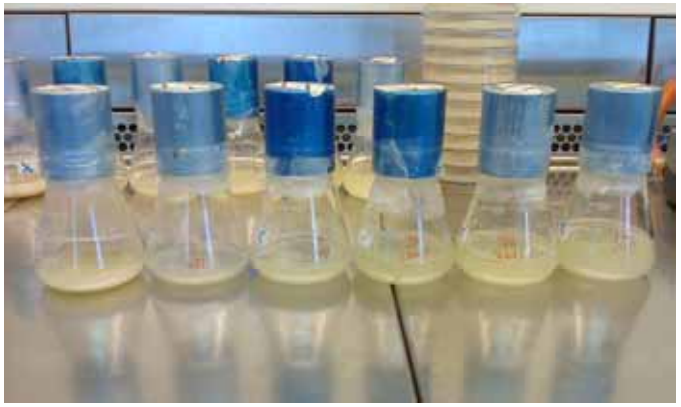
Endorhiza

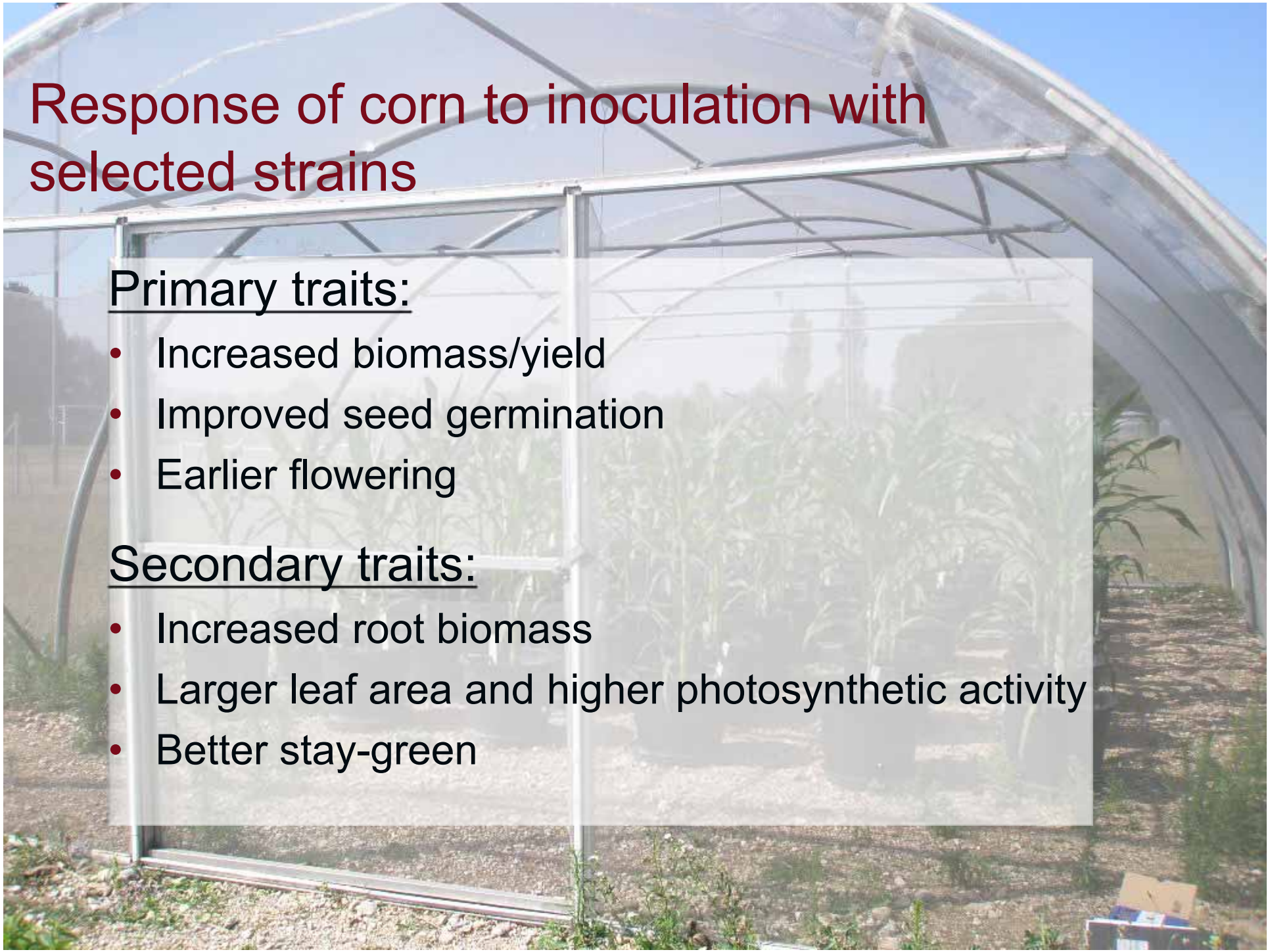


Mitter et al., submitted
Photo credit: Stephane Compant; AIT;

Response of corn to inoculation with endophytic strains

- Roots, seeds
- ACC deaminase
- IAA production
- P-solubilization
- direct interaction with plants
- colonization





Response of corn to inoculation with selected strains

Primary traits:

- Increased biomass/yield
- Improved seed germination
- Earlier flowering

Secondary traits:

- Increased root biomass
- Larger leaf area and higher photosynthetic activity
- Better stay-green

Effects of endophytes on corn seed germination

Cultivar	Treatment	Time to 50% germination (in days)	Mean emergence time	Final germination rate [%]
Cultivar 1	Control	5	7	**79**
	Inoculation	5	7	**90**
Cultivar 2	Control	5	7	**79**
	Inoculation	5	7	**92**

inoculated control

Effect on cob fresh weight (a) and plant dry biomass (b) in two different corn cultivars

Cob fresh weight [g]

	Control	Spray at flowering	Seed inoculation	Spray + Seed inoculation
Cultivar 1	211	236	259	267
Cultivar 2	214	254	294	306

Plant dry biomass [g]

	Control	Spray at flowering	Seed inoculation	Spray + Seed inoculation
Cultivar 1	141	148	176	178
Cultivar 2	181	191	237	215

Seed inoculated **Control**

Earlier flowering

Days to start female flowering*

	Control	Seed inoculation
Maize variety 1	64	54
Maize variety 2	70	63

* Male flowering started 2-3 days earlier than female flowering in all treatments

Seed inoculated **Control**

Thank you!

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