Supporting Chemical Innovation for Sustainable Agriculture by Investing in Soil Health

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Syngenta Crop Protection

Classification: PUBLIC

Sustainablility in crop protection: R&D commitments

- Input reduction & substitution
- Residue reduction
- Biodiversity protection
- Grower economics
- Soil health preservation

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Soil Health Definition

Soil health

Definition: **Capacity to sustain biological productivity, maintain environmental quality, and promote plant/animal health** (Doran & Parkin, 1994)

- Influences: **genetics** of biological constituents, **environment** conditions, soil **use**
- Soil health takes **years** of good management to improve and must take the whole system into account

Take home message: Soil health is a long-term, large-scale phenomenon that requires systems-level management

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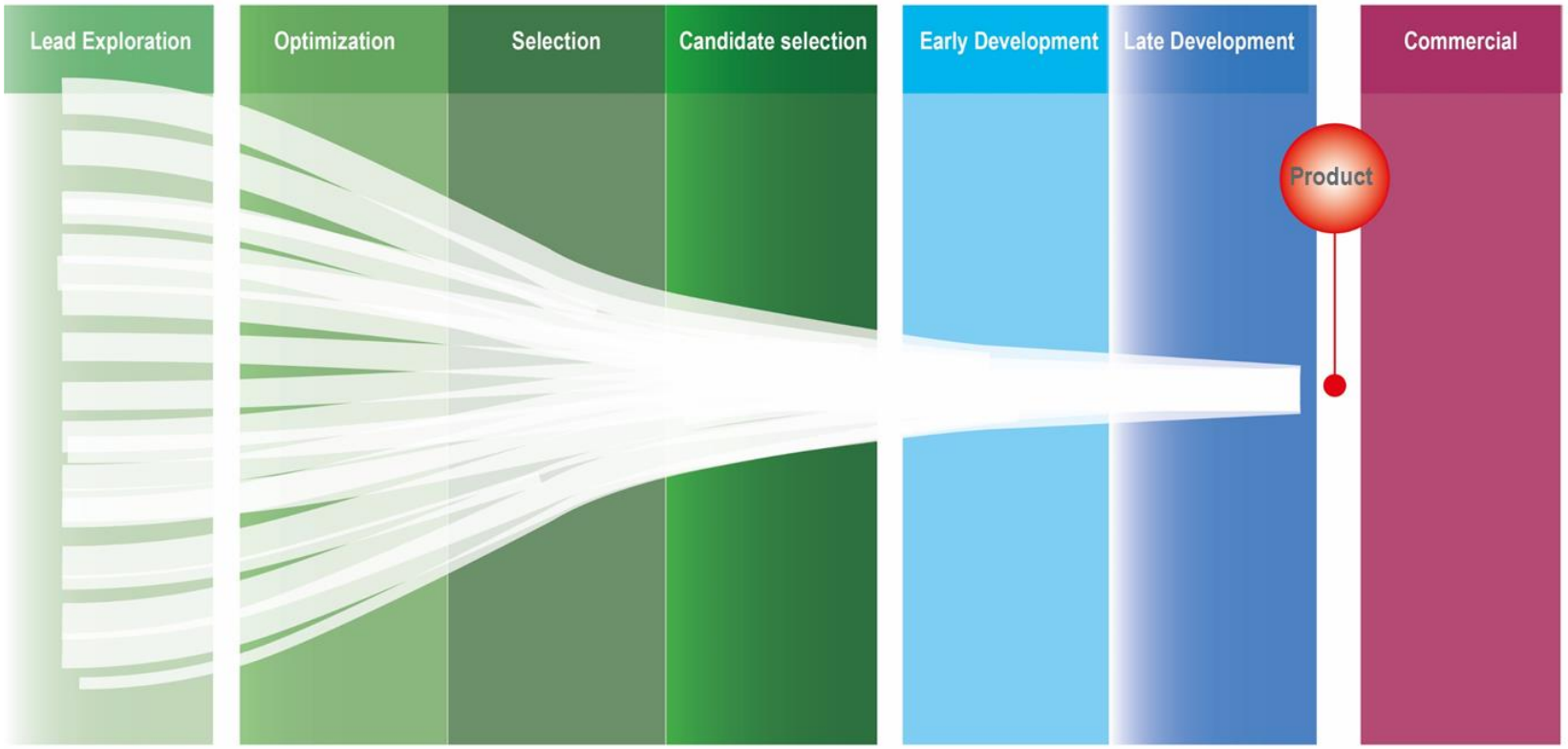
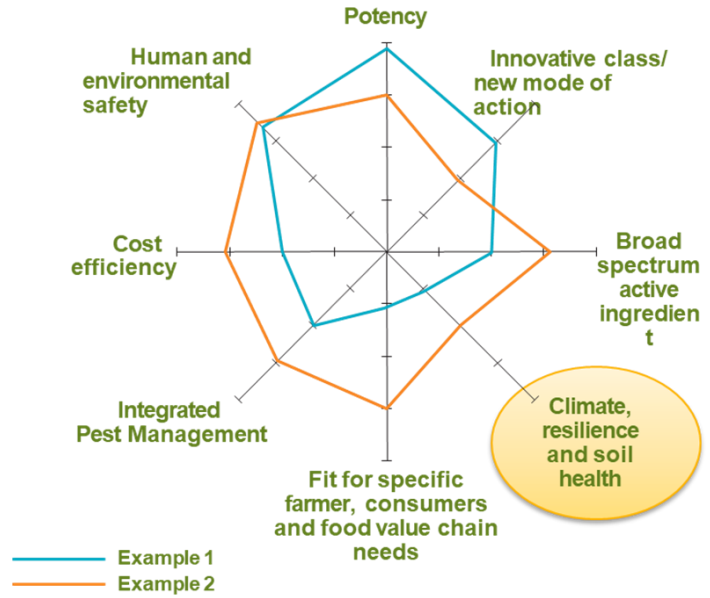
Invention and optimization process in crop protection R&D



Innovation & optimization guided by multiple criteria

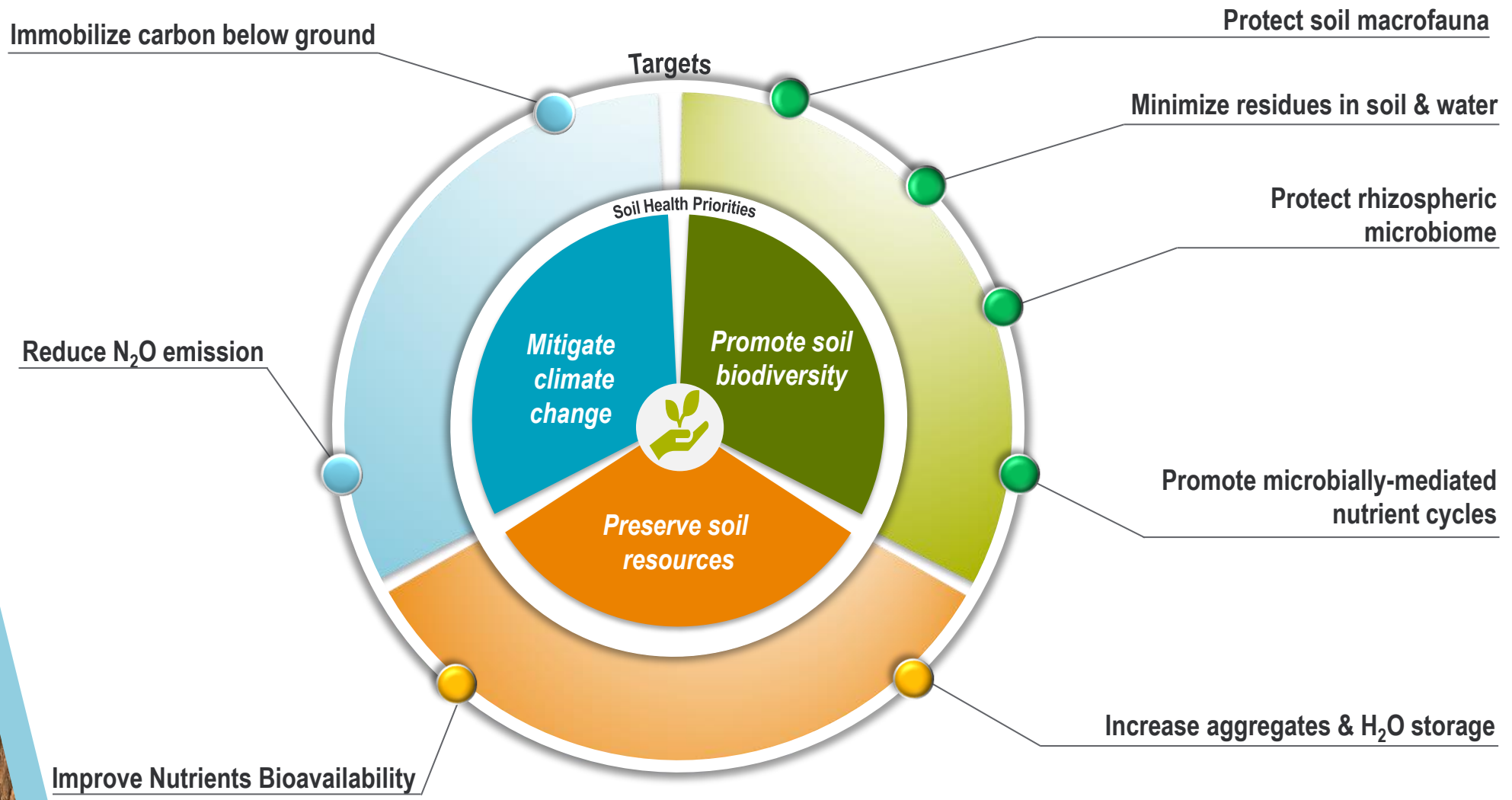


Devising “benign by design” small molecules

Source: Syngenta

Classification: public

Targets for The Soil Health Priorities



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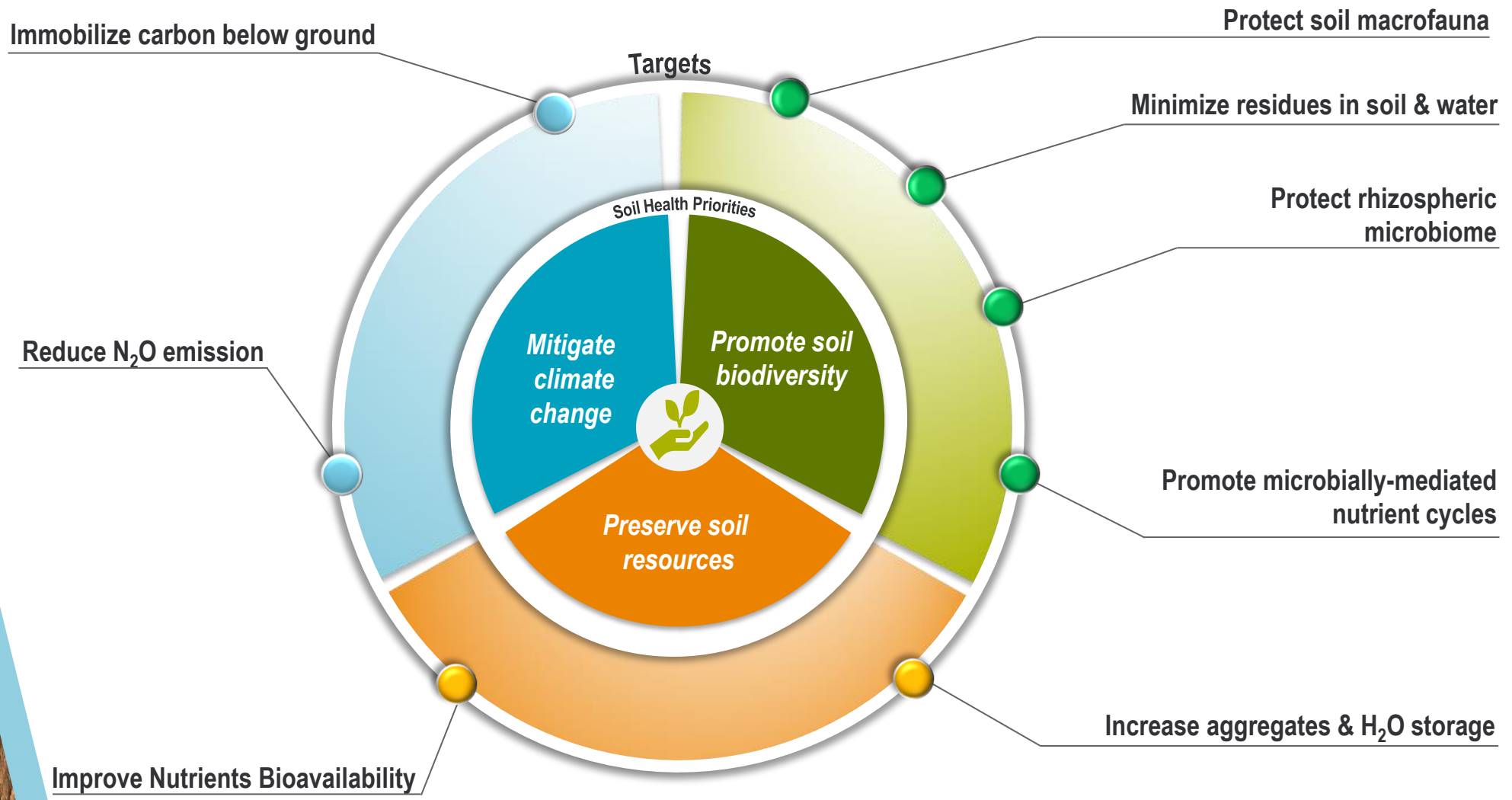
Targets for The Soil Health Priorities



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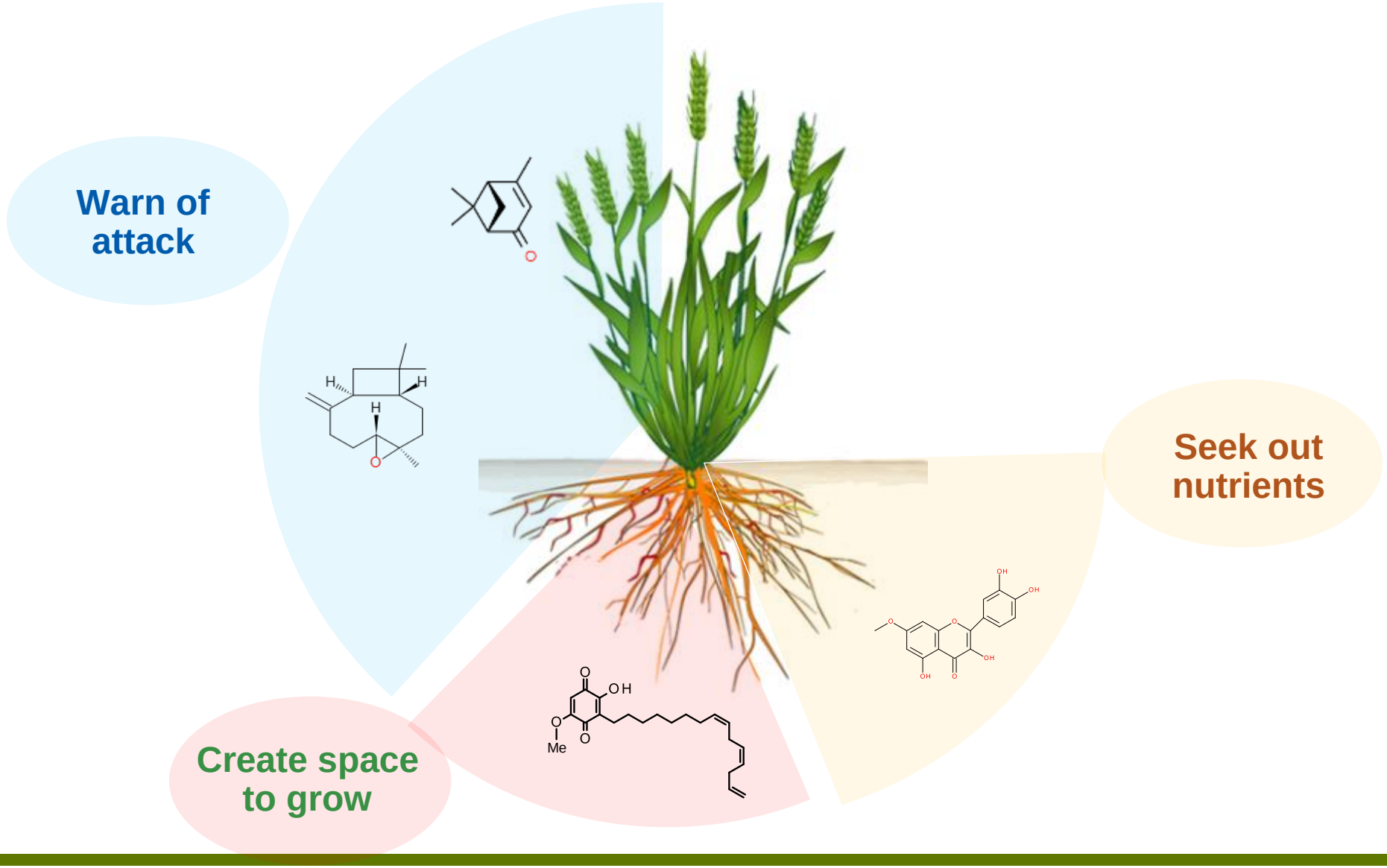
Plants speak Chemistry



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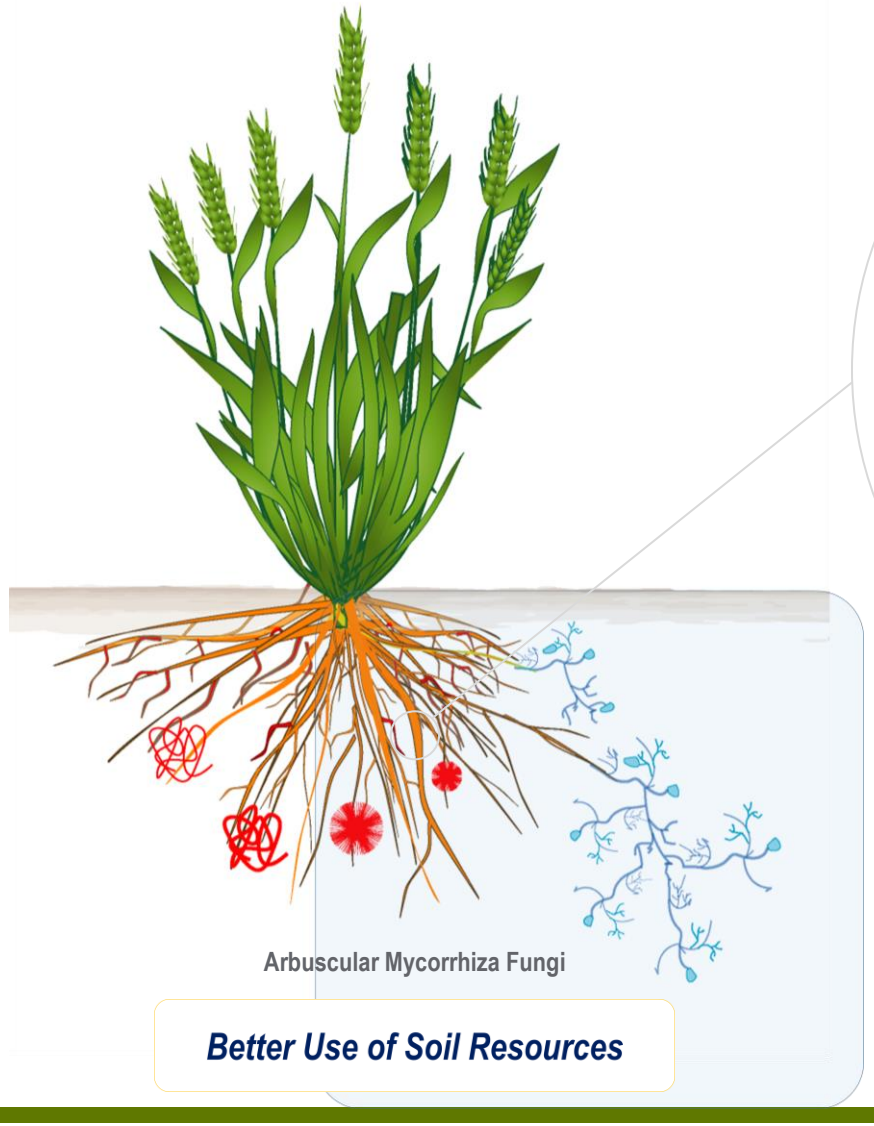
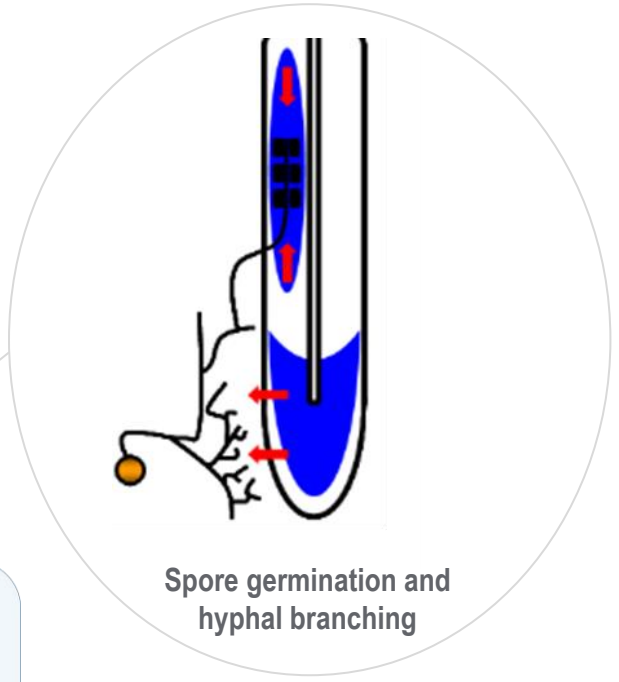
New Strigolactones derivatives induce Hyphal Branching in Mycorrhiza



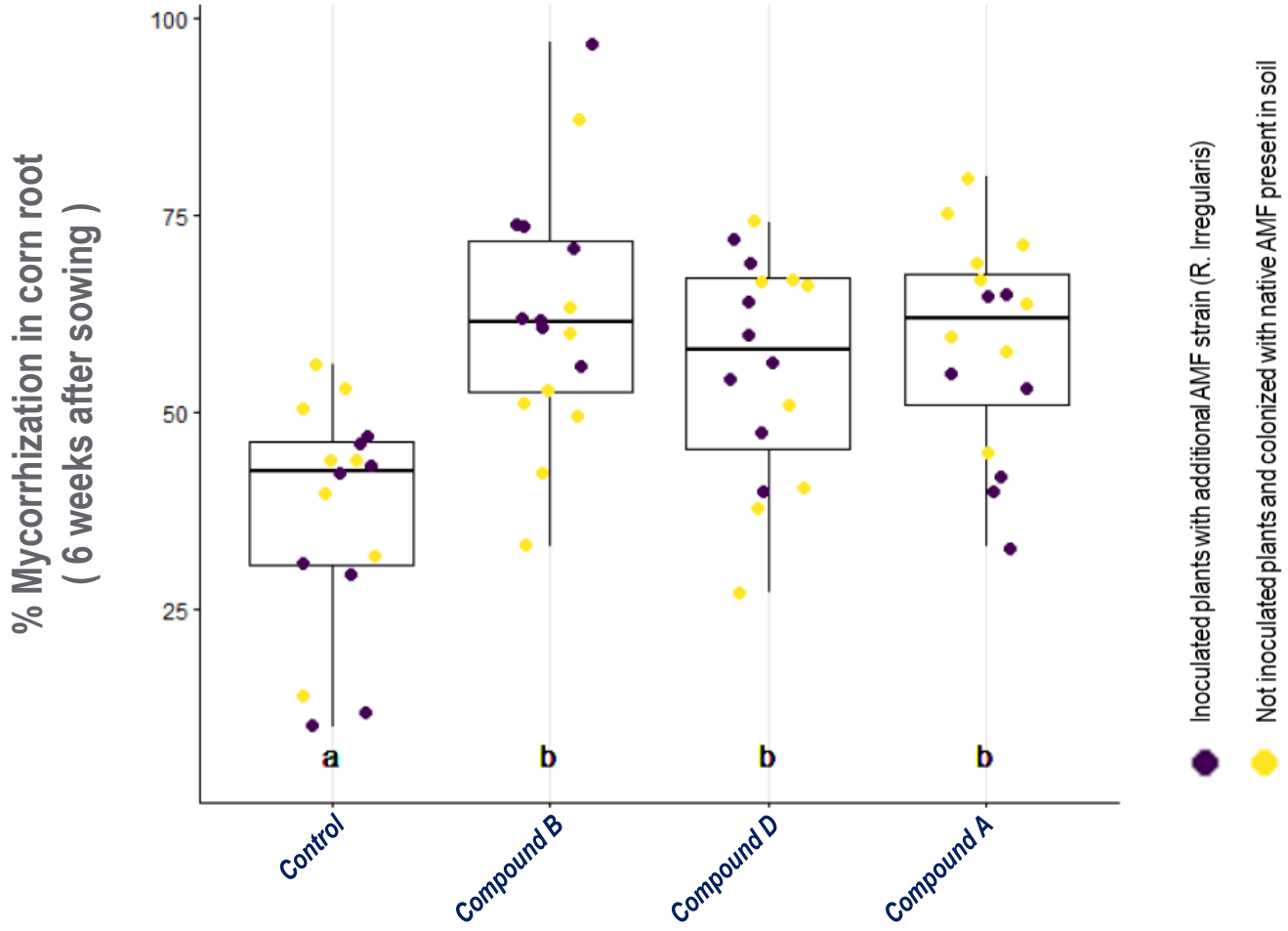


Better Use of Soil Resources

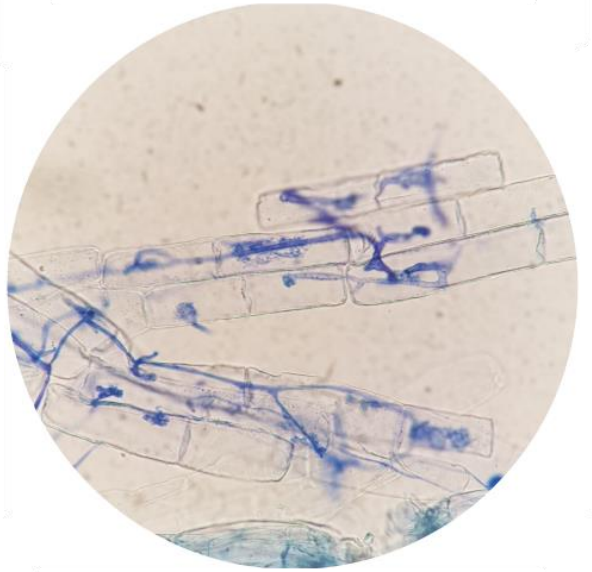
Classification: public

Holistic approach to unveil chemicals x microbial x crop interaction

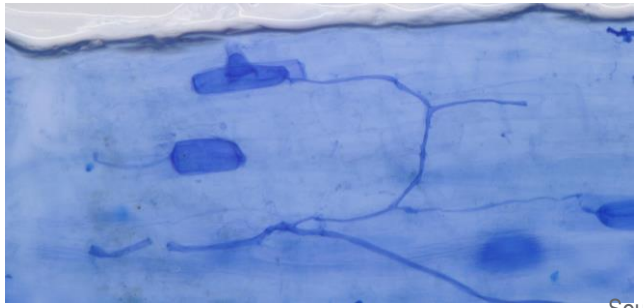
Use of synthetic rhizospheric signals promoted up to 20% mycorrhization in corn under greenhouse conditions



Arbuscular formation in corn roots



Vesicules in corn roots



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Conclusive remarks

- Chemical innovation supported a century of exceptional developments in agriculture
- More resilient and sustainable agriculture is urgently needed, imperative to promote soil health
- Devising “benign by design” small molecules promoting soil health holds high innovation potential
- Pursuing a holistic approach to identify most promising areas
- Public-private collaborations to unlock new inventions
- Need to broaden applicability of most promising innovative solutions

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