

A conceptual framework to better understand the role of phytobiome on field crop establishment

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A conceptual framework to better understand the role of phytobiome in field crop establishment

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What is crop establishment?

The very initial phase of a crop cycle that involves the seed germination and seedling emergence (SGE) process

Sowing



Seed imbibition



Seed germination



Seedling emergence



Crop establishment



Why a special focus on crop establishment?

The most important and vulnerable phase of a crop cycle (Villalobos et al 2016).

A poor crop establishment has several direct and indirect consequences.

Lower competitiveness towards weeds (quantitative and qualitative yield losses), increased weed seed bank

You reap what you SOW !!!

Key factors affecting crop establishment



And cropping practices!

Affect crop establishment through alterations of the mechanistic factors

Defining factors affecting crop establishment





Seed intrinsic characteristics



Managing defining factors affecting crop establishment



The mother plant environment (soil & climate)



Limiting factors affecting crop establishment



Seedbed physical and chemical components



Managing limiting factors affecting crop establishment



Seedbed physical and chemical components



Reducing factors affecting crop establishment



Managing reducing factors affecting crop establishment



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How to address such a complex system?



A conceptual framework: putting the pieces of the puzzle together



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Conclusions

- The crop establishment phase is affected by a number of factors and their interactions,
- Studies on individual components affecting this phase are useful but not sufficient to understand the entire system,
- A holistic research approach is needed to address this complex system,
- The phytobiome research represents a good initiative to this objective which is also an occasion for interdisciplinary research and transnational collaboration.

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Thanks for your attention!