



Training in organic seed quality & health

Module 11: **General Introduction to Seed Quality and Health**

Unit 11.1: **Seed quality : what is it & why is it important ?**

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UK Research
and Innovation

Content

1. Components of seed quality
2. Physiological quality: why is it important
3. Seed microbiology: why is it important ?
4. Seed and plant health as a continuum

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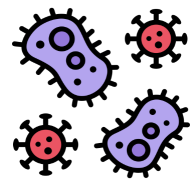


Seed quality components



Specific and varietal purity

Physiological



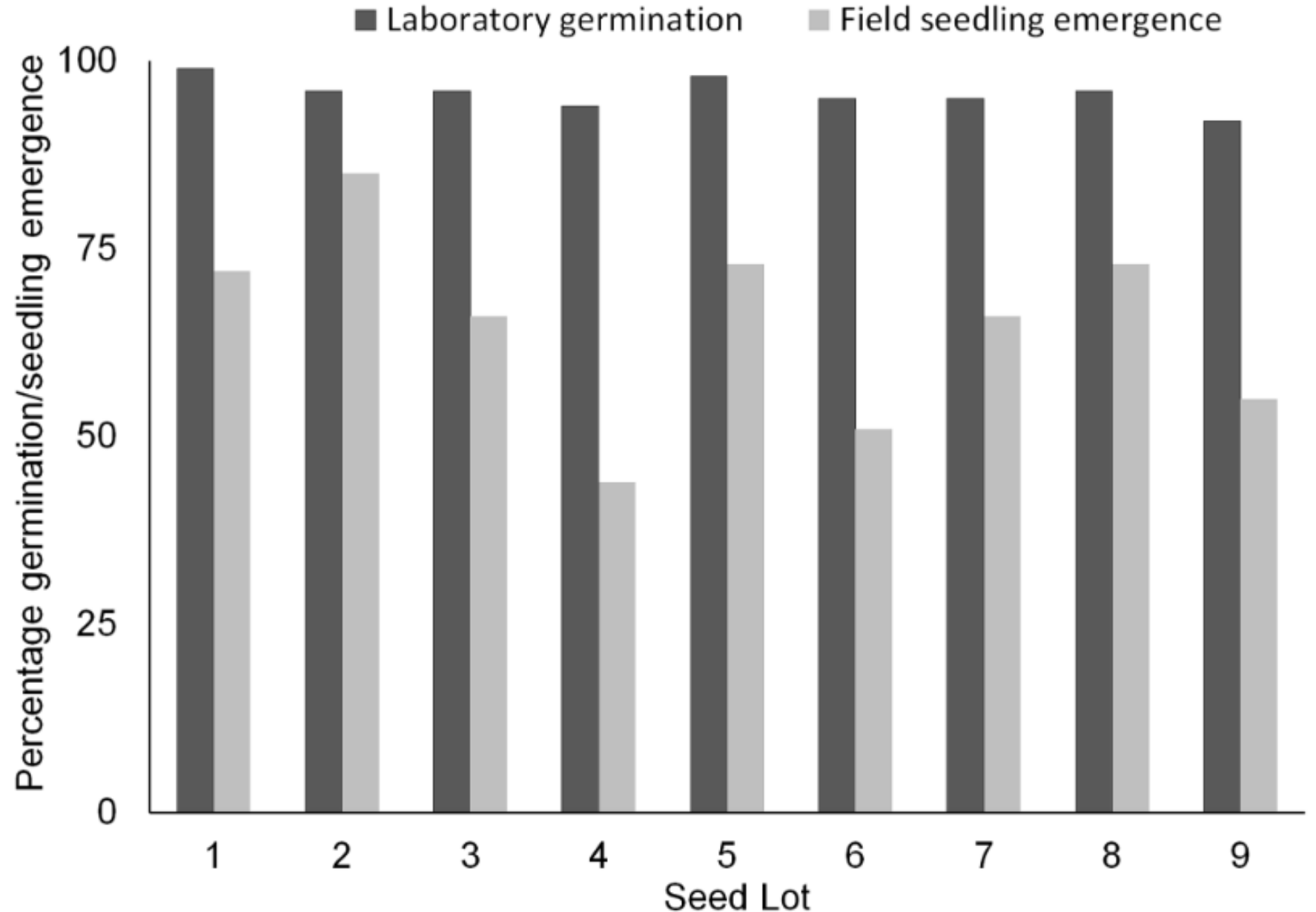
Microbiological

Summary

1. Components of seed quality
2. **Physiological quality: why it's important**
3. Seed microbiology: why it's important
4. Seed and plant health as a continuum



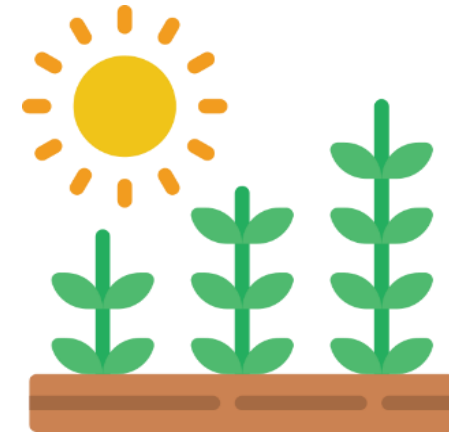
Physiological seed quality, an example with sugar beet



W.E. Finch-Savage, G.W. Bassel, Seed vigour and crop establishment: extending performance beyond adaptation, *Journal of Experimental Botany*, Volume 67, Issue 3, February 2016, Pages 567–591, <https://doi.org/10.1093/jxb/erv490>.



Seed emergence and vigour, driven by environmental factors

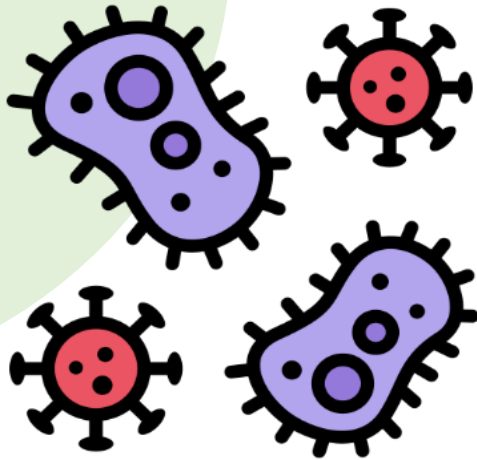


Inspired by a presentation by L. Rajjou (2024): <https://www.cultiver-proteger-autrement.fr/evenements/evenements-passes/replay-rcp24-quelles-semences-pour-une-agriculture-sans-pesticide>

Content

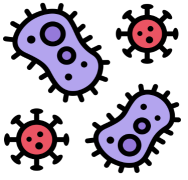
1. Components of seed quality
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We don't only propagate
the seeds themselves...



Seed as a
holobiont

Seed-transmitted
(potential) plant
pathogens



Beneficial effects of some seed-associated microbial species

- Active contribution to seed conservation
- Facilitating role in germination
- Stimulation of plant growth and immune system
- Protection against soil-borne diseases, especially in soils with poor soil life

Crop management system and carrot genotype affect endophyte composition and *Alternaria dauci* suppression

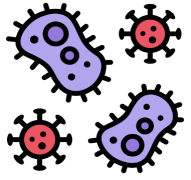
Abdelrazek S. et al. 2020. PLoS ONE 15(6):e0233783.
doi.org/10.1371/journal.pone.0233783



Tomato Seeds Preferably Transmit Plant Beneficial Endophytes

"Vertical transmission of PGPB represents a strategy to maintain plant beneficial bacteria over generations and has an impact for the design of seed treatments"

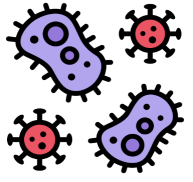
Bergne A. et al. 2018. Phytobiomes Journal Vol 2:183-193



Caution: Seed-transmitted pathogens



Photo: ephytia.inra.fr



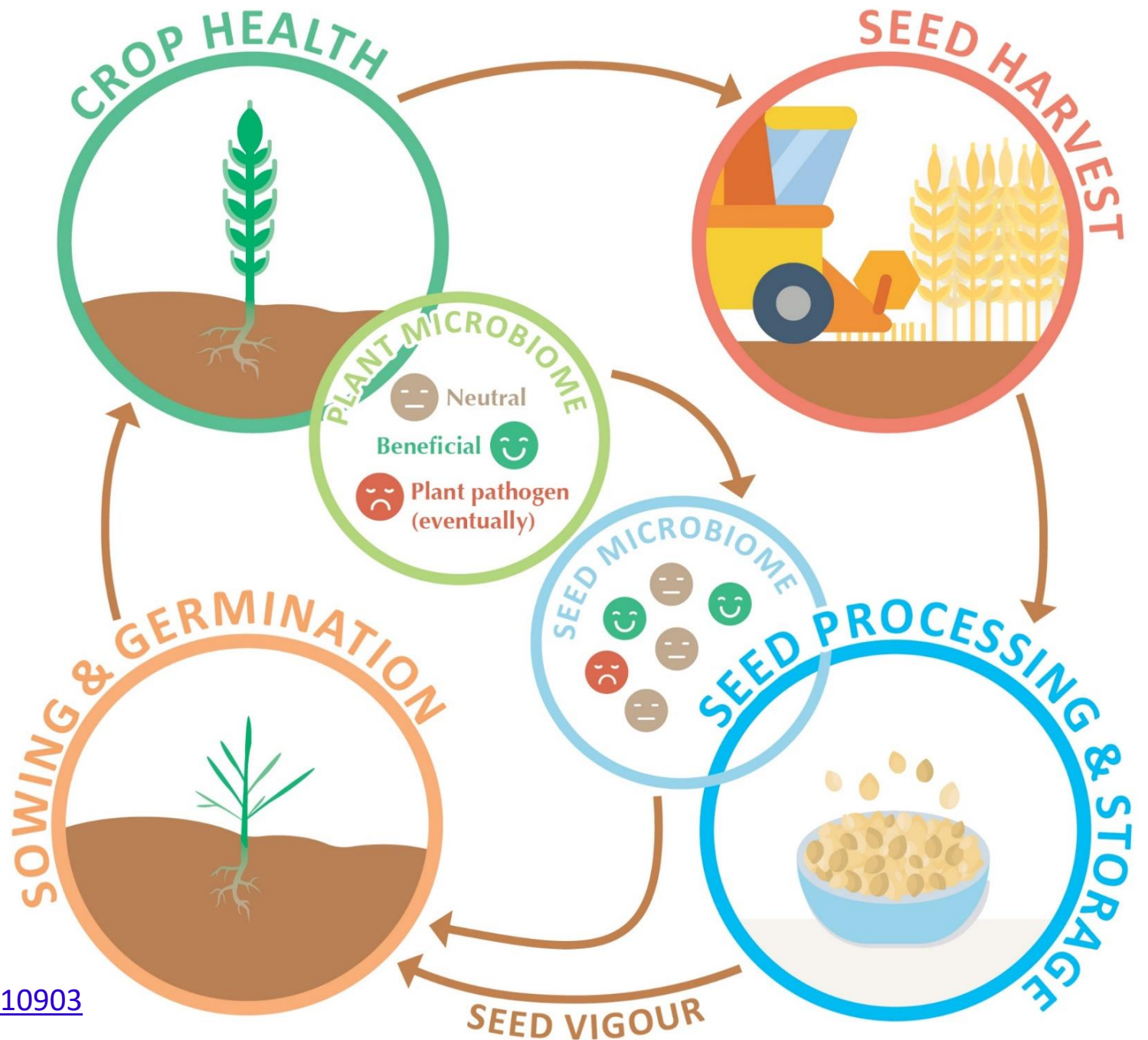
Caution: Seed-transmitted pathogens



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Seed & Plant health: a continuum



Klaedtke.; Rey; Groot. 2022. Designing a Seed Health Strategy for Organic Cropping Systems. *Sustainability* **2022**, *14*, 10903.



www.liveseed.com

<https://www.mdpi.com/2071-1050/14/17/10903>

Recap



1. The 3 main components of seed quality
 - **Specific and varietal purity**
 - **Physiological quality (germination)**
 - **Microbiological (seed health)**
2. The performance of seed is determined by environmental factors during seed propagation in the field, during seed handling and storage, and sowing conditions.
3. Seeds carry microbial communities and interact with them. Effects can be beneficial, neutral or pathogenic. Managing seed-transmitted pathogens is important in organic seed production.

Contributions



Scientific project management : Monika Messmer (FiBL-CH)

Project leader: Mariano Iossa (FiBL-EU)

Designer of training modules on the production of high-quality organic seed (modules 11 to 18) : Stephanie Klaedtke and Stéphanie Mothes (ITAB)

Authors of videos, questionnaires, exercices : **module 11** Stephanie Klaedtke (ITAB), **modules 12 et 13** Steven Groot (WUR & International Seed Academy), **module 14** Gaspard de Tournemire and Stephanie Klaedtke (ITAB), Jan Kodde (WUR) and Valentin Gfeller (FiBL-CH) **module 15** Jelena Baćanović-Šišić (Bingenheimer Saatgut AG) **module 16** Mária Megyeri **module 17** Györéné Kis Gyöngyi (ÖMKi) and Diego Guidotti (Aedit SRL) **module 18** Maike Bender and Carl Vollenweider (Dottenfelderhof)

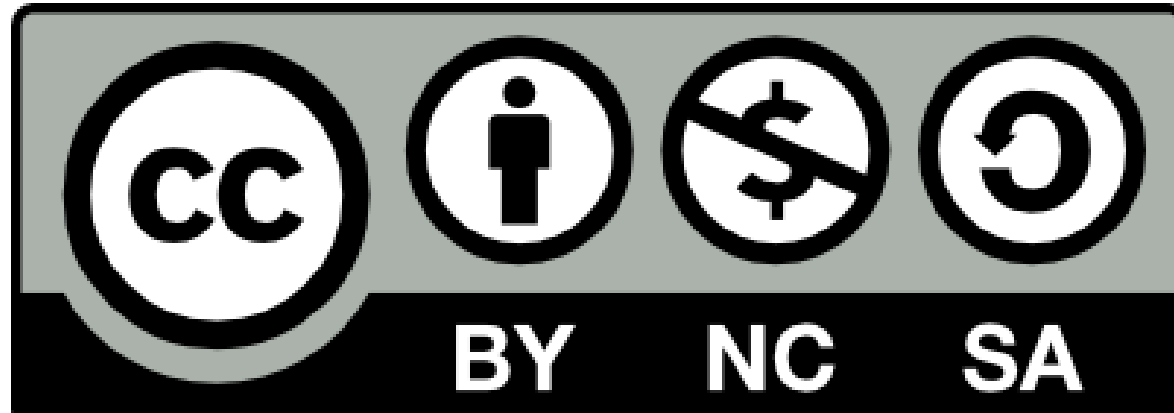
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E-learning modules on the production of high-quality organic seed

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