

Thoughts for a new seed quality strategy, incorporating seed vigour and the microbiome

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Official seed tests determine seed quality, using standardised lab conditions with an early and final count of germinated seeds and counting the frequency of normal seedlings, while seed health is considered as the absence of seed borne pathogens. In the field however, the seed or seedling will encounter biotic and abiotic stresses, therefore emergence in the field is often less than germination in the lab. In the field seed vigour is important. To favour the development of more resilient cropping systems, we suggest to place more emphasis on seed vigour, because early emergence in the field has a strong effect on crop establishment and frequently also on costs for corrective measures and total yield. The ISTA handbook lists vigour tests, including the so-called controlled deterioration (CD) test, but only for a very limited number of crops.

In the frame of the European LIVESEED project^{1,2} we develop a new organic seed health strategy, which will also have advantages for other sustainable farming systems. The basic idea is that both seed vigour and the seed microbiome should be taken into account as elements that can aid the seed and seedling tolerance towards biotic and abiotic stresses. We showed that a CD treatment, inducing slight reduction in carrot seed vigour, increased the sensitivity to the damping-off causing pathogen *Alternaria radicina*.

Seeds are not sterile organisms, they contain a large amount of micro-organisms, collectively called the seed microbiome, that enable transfer of the microbiota from the mother plant to the next generation. Recent research has shown that the seed microbiome contains also organisms that can aid the seedling in its tolerance, sometimes even resistance, towards pathogens and abiotic stress. An overview of this will be presented, including how this can aid in a strategy towards more resilient cropping systems.

¹ www.liveseed.eu

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