BOOSTING COMMON BUNT MANAGEMENT IN EUROPE

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Common bunt, caused by the fungi *Tilletia caries* and *T. foetida*, is a disease in wheat and related cereals. Starting from just a few spores on the seed, the disease can develop in the crop and considerably reduce grain yield and especially quality. The disease is mainly seed-borne, although it can also persist in soils. Techniques that allow the management of common bunt in organic farming - including sound crop management, observation, seed analyses and seed treatments – are well identified. However, when these are not put into practice, occurrences of common bunt still regularly devastate organic wheat crops. The research and development presented here follows two objectives: Firstly, collecting techniques already available for bunt management and developing appropriate formats to disseminate them. Secondly, exploring new approaches to bunt management, ranging from novel seed treatments to more holistic approaches to plant health.

An inquiry into common bunt management was performed over 4 years in the LIVESEED project, putting emphasis on the exchange of knowledge between European countries and across disciplinary boundaries. Meetings and workshops among researchers and practitioners allowed both for the exchange of knowledge on existing techniques for bunt management and for the emergence of unanswered questions. Field and laboratory trials were conducted to test and fine-tune seed treatments. Empirical experience with common bunt was explored through qualitative interviews. Particular attention was placed on farmers' varieties, which pose specific constraints.

As first outcome, several formats were developed for disseminating the knowledge on the combination of multiple practices that reduce the risk of common bunt, including workshops, websites (English: ITAB, 2020; also available in French and Hungarian), videos and Practice Abstracts. Specific knowledge gaps (e.g. on how to properly treat

seeds with vinegar) or frequent practical shortcomings (e.g. thorough seed cleaning) were highlighted. We infer that reliable bunt management in organic farming requires specific knowledge on the disease cycle of the fungus, as well as practical and observation skills on behalf of practitioners.

As a second outcome, information on official thresholds for bunt spores in certified wheat seed in EU member states was retrieved, allowing for a comparison of national regulations. This also served as a basis for discussions on transparent, if not harmonized, rules for bunt management in organic wheat seed.

Thirdly, seed treatment examinations produced operational knowledge to optimize their application in organic agriculture. For instance, the effect of improper storage on the product CERALL, which is based on antagonistic microorganisms, was tested; as well as phytotoxic effects of different vinegar concentrations. Novel treatments, such as SonoSteam, Saponins and Laminarin were also investigated.

Unanswered questions for future research include: To what extent is bunt present in organic cropping systems without causing symptoms? What role does soil microbiota play in suppressing bunt? What types of plant defense mechanisms come into play? Are there allelopathic effects of previous or mixed crops in diversified crop rotation? Which farm-produced seed treatments may be efficient?

Further, findings on common bunt management will feed into a broader reflection on seed and plant health in organic systems.

References

ITAB (2020): Website on common bunt management in English, available at http://itab.asso.fr/activites/gc-eng-carie-gestion.php