



Non chemical seed treatment to prevent Common Wheat Bunt



Farmer's name

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Contact

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Name of the farm

ÖMKi Nonprofit Kft.



Country

Hungary



Description of the farm context

Medium-sized Hungarian arable farm of around 55 hectares, located in a cereal-producing region and mostly managed under organic farming principles. Winter wheat is a key crop, and the farm regularly faces the risk of common wheat bunt due to restrictions on chemical seed treatments.

Partner Organization



AdvisoryNetPEST

The **AdvisoryNetPEST** project aims to create a **network** and **upgrade advisory services** across the EU to increase the sharing of knowledge and the **adoption of innovative solutions to reduce the use and risks of pesticides** (RURP) in all **EU Member States**, enabling the agricultural sector to achieve the targets proposed by the Farm to Fork Strategy.



[AdvisoryNetPEST](#)



www.advisorynetpest.eu

The practices identified in this project are called 'Novel Approaches' and abbreviated as 'NA'

THE TECHNIQUE

Short Description:

To prevent fungal diseases such as common wheat bunt, different non chemical treatments such as vinegar treatment or mechanical treatment through brushing have been developed.

Crop Sector:

Arable crop - wheat

Targeted pest and diseases:

Common Wheat Bunt (*Tilletia caries*)

Objective of the NA:

Two non chemical wheat seed treatments against fungal diseases have been tested :

- Vinegar treatment – through acidic PH, germination of the fungus spores is reduced.
 - Seed brushing : using a special brushing equipment, regularly cleaned to avoid recontamination, fungus spores can be reduced.
- These methods need to be well implemented to maintain wheat germination

Level of practice adoption across the country:

1 2 3 4



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Expectations regarding RURP *

Applying non-chemical seed treatments, such as vinegar treatment or mechanical brushing, effectively reduces the fungal spore load on wheat seeds. By preventing early infection of common wheat bunt, the need for fungicides—particularly chemical seed treatments—is significantly reduced, supporting pesticide reduction goals. Common wheat bunt is a seed- and soil-borne disease that infects the plant at germination and early growth stages. Therefore, prevention at the seed stage is the critical intervention point.



Methods/strategy of application in the farm

Before sowing, wheat seed is treated either with diluted household vinegar (4–5% acetic acid) to inhibit fungal spore germination or mechanically brushed to remove spores from the seed surface. Treatments are applied uniformly using simple equipment. Brushes and machinery are cleaned between batches, and seeds are dried immediately to preserve germination capacity.



Figure 1: Infected wheat (left), and a healthy wheat (right)



Key success factors

Key success factors include precise application of vinegar treatment or mechanical brushing, strict hygiene of equipment to prevent recontamination, and the use of healthy, tested seed lots. Maintaining seed germination requires careful control of treatment intensity. Crop rotation, farmer commitment, and technical knowledge are essential for long-term success.



Improvements of the NA

The Novel Approach improves disease prevention by reducing fungal spore pressure on seeds without chemical pesticides. Compared to untreated seed, both methods lower bunt incidence and reduce quality losses. They offer organic farmers a practical, low-input alternative to chemical seed dressing while maintaining acceptable emergence and crop establishment.



Figure 2: Infected grains



Figure 3: wheat grains covered with *Tilletia caries* spores



Resources and skills needed to adopt the NA

Adoption requires basic technical skills, including correct preparation of vinegar solutions, handling of brushing equipment, and assessment of seed moisture and germination. Resources include household vinegar, mixing or rotating equipment, or access to seed-cleaning brushes. Farmer training and advisory support significantly enhance effective implementation.



Figure 4: Seeds being treated with vinegar solution in seed dressing drum

* RURP : Reduction of Use and Risks of Pesticides



Advice from the Advisor

Advisors should stress the importance of prevention, proper dosage, and equipment hygiene. Farmers need guidance on avoiding over-treatment, which may reduce germination. Advisors should also integrate seed treatment advice with crop rotation planning and field monitoring to ensure durable control of wheat bunt in organic systems.



Farmers Testimony

"Without chemical seed treatments, we had to find reliable alternatives. Vinegar treatment and seed brushing proved effective when applied carefully. We learned that cleanliness and correct dosage are crucial. These methods fit our organic system well and helped us reduce bunt problems without compromising crop emergence."



Social and Cultural Acceptance

Non-chemical seed treatments are widely accepted among organic farmers, as they rely on simple, transparent techniques and commonly available materials. Knowledge sharing through farmer groups, advisory services, and research institutions has improved trust in these methods, supporting their integration into everyday farming practice.



Policies and Regulatory Support

EU organic farming regulations prohibit chemical seed dressings, creating strong incentives for non-chemical solutions. Vinegar and mechanical treatments are permitted under organic standards. Research initiatives, projects and national advisory support help validate and disseminate these approaches, strengthening regulatory and institutional backing.



BENEFITS

This Novel Approach reduces pesticide use and associated environmental and health risks while maintaining wheat production under organic conditions. It helps prevent severe quality losses caused by wheat bunt, protects grain marketability, and lowers dependency on external inputs. The methods are affordable, adaptable, and empower farmers to manage seed health independently.



BOUNDARIES

The effectiveness of the approach depends strongly on correct execution. Incorrect vinegar concentration, excessive brushing, or poor hygiene can reduce germination or lead to reinfection. These methods are preventive and cannot eliminate severe infections in heavily contaminated seed lots. Adequate crop rotation and monitoring remain essential.

To go further on NA replication:

The Novel Approach can be replicated on other arable farms, particularly in organic and low-input systems. Successful replication requires clear protocols, farmer training, and access to basic equipment. Advisory services and demonstration trials can support uptake, especially in regions with similar climatic and regulatory conditions.

The NA is not exclusively for organic producers and farmers. Farmers with conventional practices can also adapt this practice, to move towards a more sustainable system.

Systemic Feasibility Analysis: Expert insights from Literature and Field Data

CRITERIUM	INDICATOR	INDICATOR SCORE	EVALUATION
Pesticide use reduction level	Reduction of the applied volume of pesticides	high reduction (>25%) moderate reduction (10-25%) low reduction (<10%) no reduction	😐
Effectiveness of controlling the target pest/diseases/weed	Percentage reduction of the target pest/weed infestation or of the damage caused by the target disease	high reduction (>60%) moderate reduction (30-60%) low reduction (<30%) no reduction	😐
Biodiversity	Impact on earthworms	--/-/0/+ / ++	😊
	Impact on non-target soil micro-organisms	--/-/0/+ / ++	😊
Water quality	Impact on pesticide losses to surface water (runoff)	--/-/0/+ / ++	😊
Working conditions	Knowledge requirements	high training level moderate training level low training level no training	😊
	Impact on working-time	less work	😊
Costs	Required level of investment	> EUR 100.000 EUR 50.000 - 100.000 EUR 10.000 - 50.000 < EUR 10.000	😊
Outputs	Impact on yields (produced volumes)	potential decrease	😞

Impact Highlights

The systemic feasibility analysis indicates that this novel, non-chemical approach to controlling common wheat bunt, using vinegar treatment or mechanical brushing, delivers consistent but moderate reductions in pesticide use and disease incidence. It requires only limited training, positively affects earthworms and non-target soil microorganisms, and can reduce overall labour needs.

However, effectiveness remains moderate compared to chemical seed treatments, and over-application may lower germination, create patchy crops, reduce yields, and increase vulnerability to other diseases. Investment costs, ranging from €10,000 to €50,000, may further constrain adoption, potentially affecting profit margins.

The approach is most suitable where conventional seed treatments are not feasible.

Evaluation:



Not Satisfying



Not Satisfying



Moderately Satisfying



Satisfying



Very Satisfying