

# Value For Cultivation and Use (VCU) Protocol

## For Selection of Potato Varieties Suited for Organic Farming in LATVIA

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# Boosting organic seed and plant breeding across Europe 2017 - 2021

A stylized illustration of a seedling with a black outline, a brown seed, and two green leaves, positioned to the left of the main text.

Improving **approaches**  
for **variety** and **population**  
**testing** for the organic sector

Variety testing &  
organisational  
models

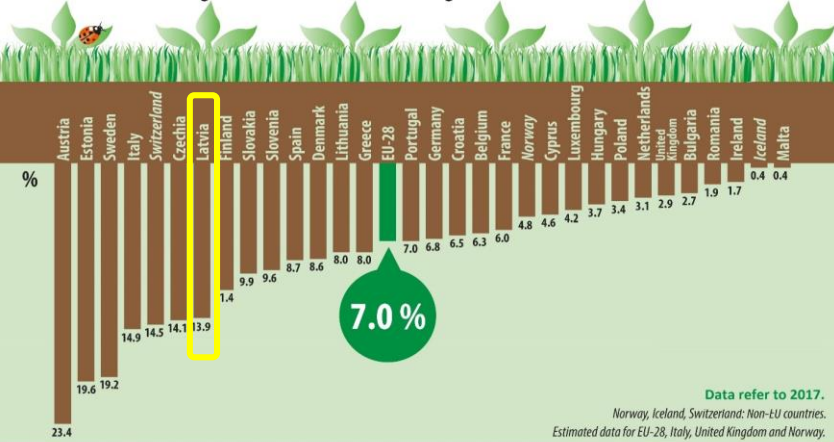
Protocols (DUS,  
**VCU**) for organic  
varieties  
registration



# Organizing farming— fast growing sector in Europe

## Organic farming area

Share of total organic area in total utilised agricultural area (UAA)



Data refer to 2017.

Norway, Iceland, Switzerland: Non-EU countries.

Estimated data for EU-28, Italy, United Kingdom and Norway.

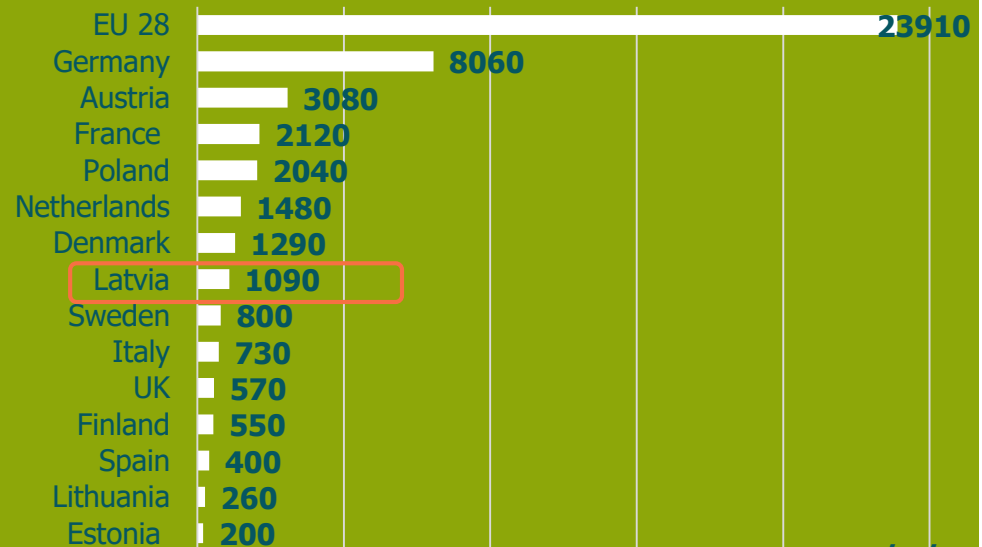
[ec.europa.eu/eurostat](http://ec.europa.eu/eurostat)

*EU organic area  
increased by 70 % in the  
last ten years since 2009  
[ec.europa.eu](http://ec.europa.eu) (eurostat)*

In Europe **organic potato production** –  
relatively small segment  
of the market

*(1.5 % from areas under potato)*

## Area under organic potatoes (>200 ha), 2013




*eurostat*



# Why organic varieties

 **Organic farming should use organic inputs**(European Regulation 834/2007 (Art 4))

 Vegetative propagating material and seed used in organic agriculture should also be organic (Regulation EC 889/2008 Art. 45)

Organic farming requires crop varieties :


- **coping with multiple biotic and abiotic stresses**
- **adopted to specific environments**
- **meet requirements for organic food processing**



# Why organic trials

Information from conventional variety trials are not sufficient for the organic sector as

varieties are not performing the same under organic or conventional management



**Specific variety trials under organic conditions are necessary**



# Organic VCU tests ?

Functioning **organic VCU** can promote **selection** specifically **for organic conditions**

# Case studies across the Europe (since 2018)

The aim - **evaluation of different models of organic variety trials and organic VCUs** in different European countries to further provide:

- *ideas for new organizational models for organic variety trials*
- **guideline for improved protocol for organic ‘Value for Cultivation and Use’ (VCU) testing**

**The new organic regulation** introduces the concept of “**Organic varieties**”

(EU 2018/848 Art. 3(19), Rec. 39)

and plans a **7-year** temporary **experiment** (starting in 2021)

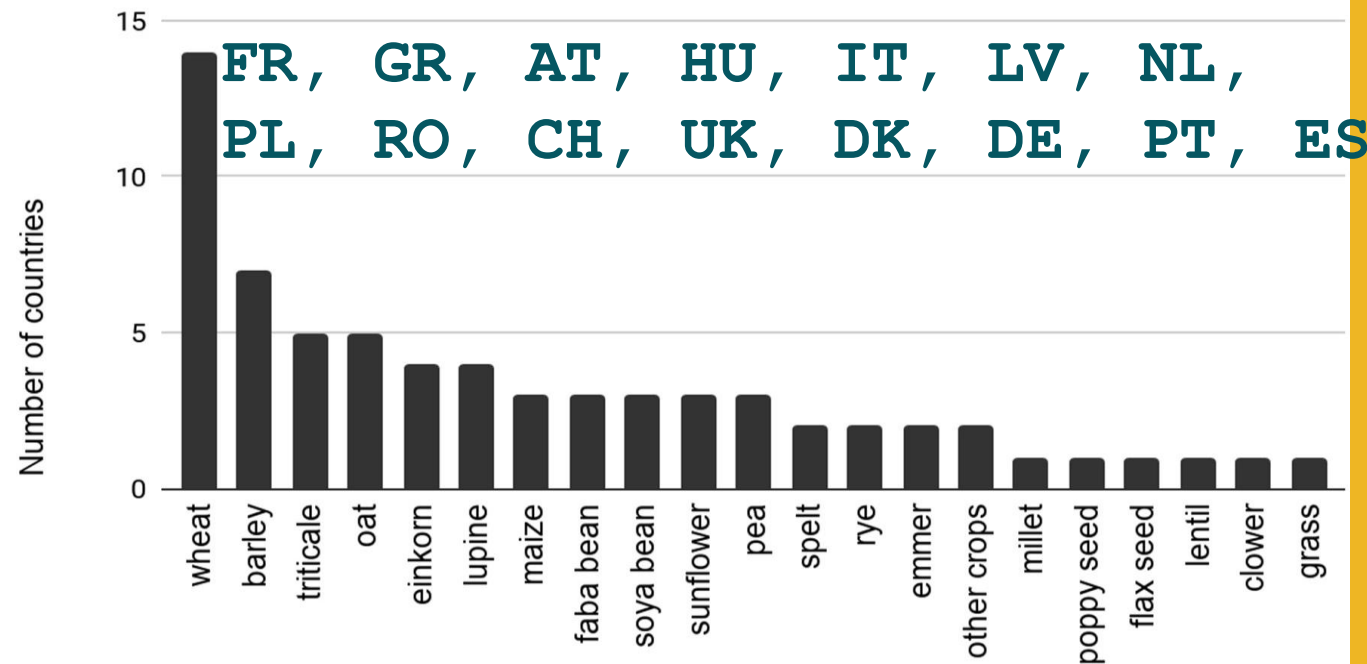
LIVESEED will contribute to:

- **propose inputs for the legislators**
- **get institutions prepared to participate to this temporary experiment**

# Status Quo in Europe

## Organic variety trials (post registration)

ARABLE CROPS UNDER ORGANIC VARIETY TRIALS in 15 EU countries





Countries that have an official **recommendation list** of varieties for organic farmers are:  
**France**  
**(cereals),**  
**Italy,**  
**Switzerland,**  
**Germany**

*“Overview on the current organizational models for cultivar testing for Organic Agriculture over some EU countries (by Tina Kovacs and Tove-Mariegaard Pedersen)”*



# Status Quo in Europe

## Organic VCU trials in Europe (pre-registration)

Country	Organic	Suppl. organic
<b>Germany</b>	x (wheat, barley, oat)	
<b>Austria</b>	x (winter wheat)	x (several crops) 
<b>Denmark</b>	x (winter wheat, spring barley)	
<b>France</b>		x (winter wheat, for soybean 2 organic locations)
<b>Latvia</b>		<b>x (several crops)</b> 
<b>Switzerland</b>		One organic location (winter wheat, spelt)

*“Overview on the current organizational models for cultivar testing for Organic Agriculture over some EU countries (by Tina Kovacs and Tove-Mariegaard Pedersen)”*



# Status Quo in Latvia

**2003 – 2006**  
trials aimed to  
**developing organic**  
**VCU testing in Latvia**  
*(funded by the Ministry of*  
*Agriculture)*

**All locally bred cultivars**  
of cereals, **potatoes**, pea  
and grasses in the plant  
variety catalogue (PVC) were  
**tested**

Since then

**VCU trials under**  
**organic**  
**conditions**  
**possible**



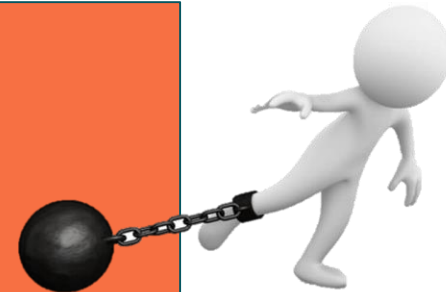
**Well performing**  
**varieties marked**  
**with «Bio» in**  
**national PVC** (in 2019 –  
**7 potato varieties)**

No varieties tested since 2006



# Status Quo in Latvia

varieties need **to be tested in both conventional and organic VCU** → double price for registration



The same check varieties for conventional and organic VCU tests



The same traits for conventional and organic.....



# VCU protocol for potatoes in LATVIA



2 year trials. Varieties are compared to check (standard) varieties of the corresponding maturity group

## Defined point scale (1 – 9 points)

*Traits with values expressed as % of the corresponding check variety*

**Marketable tuber yield**  
**45-55 DAE** depending on maturity class

**Final tuber yield**

**Final yield of marketable tubers**

*Traits having defined points depending of estimated %*

**Starch content** (for medium late and late varieties)

**Leaf area damaged by *Phytophthora infestans***

**Leaf area damaged by *Altenaria solani***

**Tubers infected by dry rot**

**Tubers infected by soft rots**

**Tubers infected by *Phytophthora infestans***



# Experiment (2018) material and methods

## Growing conditions:

Soil -sod podzolic. Loamy sand

pH<sub>KCl</sub> 6.1

Humus content 2.5%

Pre-crops – winter rye (2017),  
white clover (2016)

P<sub>2</sub>O<sub>5</sub> 145 mg kg<sup>-1</sup>

K<sub>2</sub>O 81 mg kg<sup>-1</sup>

Deep tillage

Planting by hand

Ridging – 5 times

4 replications

25m<sup>2</sup> plots

10 varieties  
and breeding  
clones (incl. 3  
check varieties)

2018	
var	value
601 Brasia	1.10
602 Prelma	1.10
603 Imanta	1.10
604 Rigonda	1.10
605 Jogla	1.10
606 Kuras	1.10
607 Vineta	1.10
608 Laura	1.10
609 Monta	1.10
610 S 04065-2	1.10
611 S 04065-2	1.10
612 S 04065-2	1.10
613 S 04065-2	1.10
614 S 04065-2	1.10
615 S 04065-2	1.10
616 S 04065-2	1.10
617 S 04065-2	1.10
618 S 04065-2	1.10
619 S 04065-2	1.10
620 S 04065-2	1.10



# Experiment (2018) material and methods

## Traits assessed:

- Final tuber yield,  $\text{t ha}^{-1}$
- Final yield of marketable tubers,  $\text{t ha}^{-1}$
- Starch content, %
- Leaf area damaged by *Phytophthora infestans*, %
- Tubers infected by *rots*, %



# Experiment (2018) results

Maturity group	Early	Mid-early	Late
Standard variety	Monta (26)	Prelma (33)	Brasla (37)
Tested varieties	<b>Rigonda (30)</b>	Laura (18)	<b>Jogla (43)</b>
	Vineta (18)		Imanta (28)
	S 04065-2 (14)		<b>Kuras (48)</b>

**When tested varieties compared to mean values of all check varieties, similar results obtained**





# Experiment (2018) results

Well performing varieties exceeded check variety in such important traits as

- **total yield,**
- **yield of marketable tubers,**
- **leaf area damaged by**  
*Phytophthora infestans*





# Specific traits for organic potato ??

Fast canopy development

Efficient nutrient uptake

Early tuber set

Resistance to *Ph.i*

....

**How these  
could be  
included in  
VCU protocol?**



**Do we need  
organic VCU  
tests?**






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