NORBARAG
Nordic Baltic Resistance Action Group

17th NORBARAG meeting
Norway
Digital session, March 6th, 2026

NIBIO
NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

About NORBARAG

"**NORBARAG** is a Nordic Baltic collaboration about pesticide resistance research and pesticide efficacy evaluation. The network include representatives of research institutes in Denmark, Estonia, Finland, Latvia, Lithuania, Norway and Sweden and of the agrochemical companies operating in the Nordic-Baltic region.

Objectives

- to provide a forum for information exchange between people actively involved in research into pesticide resistance and efficacy evaluation of pesticides
- to ensure that cases of resistance in the Nordic-Baltic region is verified and listed
- to discuss strategies to avoid resistance and to manage resistant populations
- to define research needs, discuss test methodologies and agree on standards
- to promote collaboration on resistance screening and other research topics related to pesticide resistance
- to promote awareness on pesticide resistance issues e.g. by producing educational material
- to maintain contacts to similar groups in other countries

NORBARAG is independent but maintains contacts to HRAC, FRAC and IRAC which only have representation from the agrochemical industry."

https://projects.au.dk/norbarag/about-norbarag

Contacts for the 2026 meeting

Pentti Ruuttunen
LUKE, Finland
Chair of NORBARAG

Alexander Menegat
SLU, Sweden
Herbicide sub-group

Katie A. G. Nielsen
NIBIO, Norway
Fungicide sub-group

Dorte Højland Castberg
AGROLAB, Denmark
Insecticide sub-group

NORBARAG
Nordic Baltic Resistance Action Group

Program:

09:00 Welcome to digital session

09:05 Short summaries from the previous day's presentations in the herbicide and fungicide sub-groups

10:00 Break

10:30 Illegal Plant Protection Products A Hidden Threat to the Spread of Pathogen Resistance - Zita Varanavičienė (CropLife Lithuania)

10:45 Review of the withdrawal of TFA-yielding pesticides in Denmark and ongoing focus in EU - Emilie F. Jakobsen (CropLife Denmark)

11:30 Questions/discussion

12:00 End of digital session

NORBARAG
Nordic Baltic Resistance Action Group

Fungicide sub-group summary

Fungicide sensitivity of main cereal pathogens in 2025

Andreas Mehl

Sensitivity Update 2025 – part 1

Septoria leaf blotch

DMIs

- homogeneous sensitivity across the Baltics with lower mEC_{50}s in **LT** compared to 2024, but still too high mEC_{50}s in some samples from DK, sensitivities in SE & NO comparably stable

SDHIs

- 29% `soft´ mutants (30% in the Baltics, 45% in SE, 23% in DK, and 20% in NO), but increase of `bad´ mutants (RF >30): 50% in the Baltics, 10% in SE, 13% in DK, and 10% in NO
- further sensitivity decrease in most European countries, but not in AT, **DK**, NL & **NO**

Brown Rust

DMIs

- unchanged favorable sensitivity across Europe, including populations from **DK** and **SE**, being at the level of 2004

SDHIs

- still no relevant impact of potentially present C-I87F mutants on Bixafen sensitivity, as EC_{50} range data remains comparably unchanged with those from 2005

Sensitivity Update 2025 – part 2

Yellow Rust

DMIs

- ➢ 2025 European sensitivity range of yellow rust populations in-line with those being observed during the past years

SDHIs

- ➢ homogeneous Bixafen mEC_{50} values across Europe ► relevant impact on C-I85V seems to be unlikely

Dwarf Rust

DMIs

- ➢ no sensitivity change with very homogenous sensitivity distribution across Europe, similar to 2014

SDHIs

- ➢ still no relevant impact of potentially present C-I87F mutants on Bixafen sensitivity, as EC_{50} range data remains unchanged in comparison with those from 2018

Sensitivity Update 2025 – part 3

Summary: sensitivity of cereal rust species

- according to FRAC, all types of cereal rust are considered low-risk pathogens, a classification that does not exclude certain sensitivity shifts
- multi-year sensitivity monitoring studies demonstrate very stable and sufficiently high sensitivity for rust-active azoles such as prothioconazole, with even a slight increase in sensitivity observed in the most recent studies in 2024 and 2025
- strobilurins have shown unchanged sensitivity since their market introduction - mutations have not been detected in brown rust and yellow rust so far (Intron prevents G143A)
- SDHIs: the mutation C-I87F has been spreading in brown rust for about 3 years, known as C-I86F in soybean rust for 10 years, and since 2024 the mutation C-I85V in yellow rust: according to FRAC, especially in brown rust with `*variable resistance factors depending on the compound*´

► the sensitivity of most SDHI active ingredients is not or only slightly reduced, while other SDHIs show significantly increased resistance factors (RFs)

cereal rust can still be effectively controlled with DMIs, QoIs & SDHIs, however, for SDHIs with known higher RFs, robust application rates of the mixing partners are more important today

Sensitivity Update 2025 – part 4

Net Blotch

DMIs

- still mostly good to acceptable sensitivity in AT, CZ, DE, **DK**, **EE**, **FI**, HU, IT, **LV**, **LT**, **SE** & UA, while in BE, FR, NL and particularly in IE & the UK party strong shifting observed ► further studies are ongoing

SDHIs

- widespread resistance across Europe and no change in 2025 compared to 2024, however, few sites without relevant mutants (**DK**, **EE**)
- highest country mEC_{50}s in FR > **LT** > NL > UK, lowest in **EE** < HU < AT < **DK**

SEPTORIA RESISTANCE SPREADING ACROSS EUROPE

Danish and Swedish resistance monitoring: Septoria exhibits slightly decreasing sensitivity towards flouxapyroxad, but field effects are still largely unaffected. Net blotch sensitivity shifted for about 50% of the isolates in 2022 and this less sensitive part of the population has been increasing each year.

Eurowheat overview: Azole sensitivity and field effects are decreasing across Europe probably caused by increasingly complex haplotypes carrying CYP51 mutation S524T (on top of several others), present now in close to100% of isolates tested in the UK and Ireland.

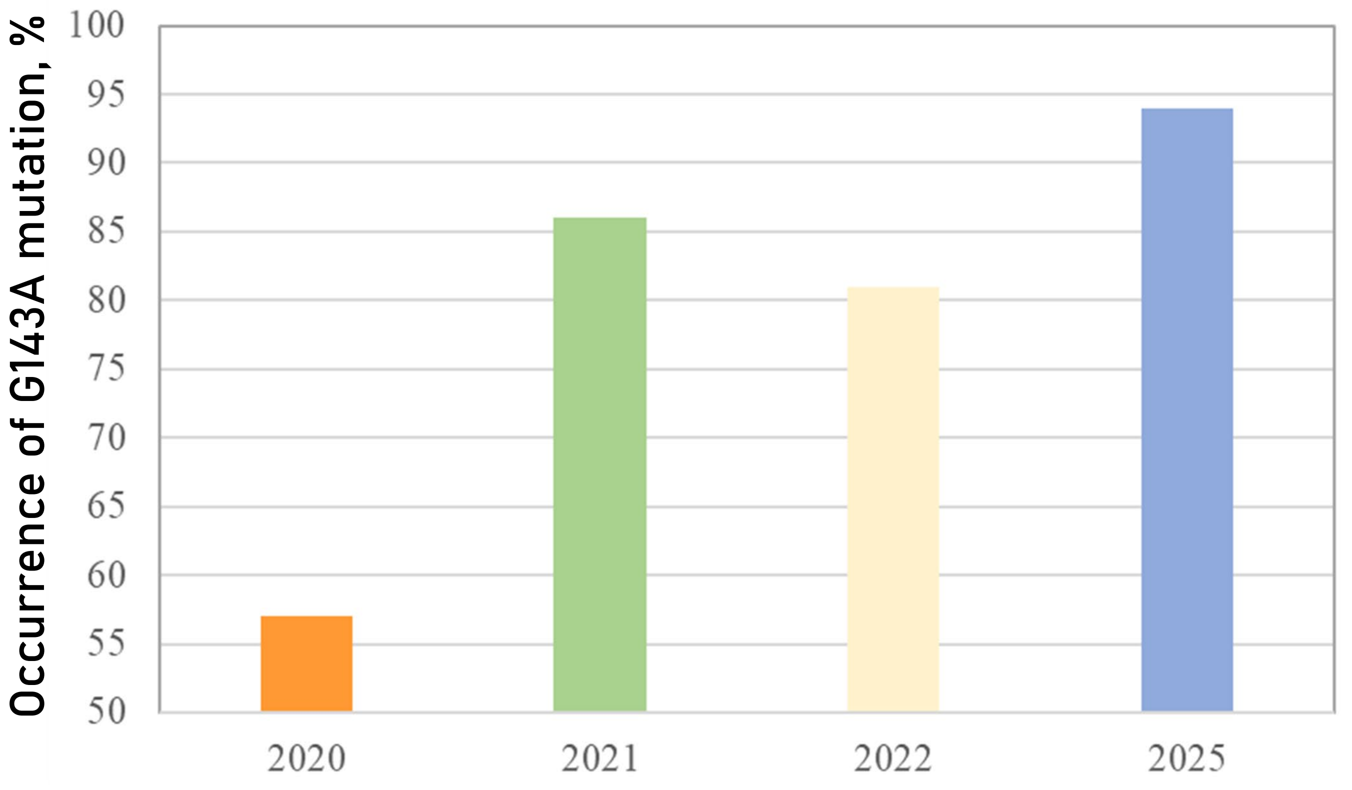
A Danish perspective: The main products used to control Septoria, Balaya and Propulse, are banned from next year and very few alternatives remain, which all have low to moderate effects. Combinations of alternative chemistries like sulphur, orange oil, potassium phosphonate, folpet and laminarin show promising effects. While their effects are still moderate, they could be useful in an anti-resistance strategy.

Pathogen sensitivity evaluation in Lithuania, summary

- Efficacy of fungicides remained stable controlling leaf blights and *Microdochium* spp. caused diseases in winter wheat.
- *Zymoseptoria tritici*: EC_{50} values of benzovindiflupyr, fluxapyroxad, prothioconazole and mefentrifluconazole fluctuated over the years, but no clear resistance trend was observed.
- *Pyrenophora tritici-repentis*: EC_{50} values increased for azoxystrobin and pyraclostrobin (2023–2025), suggesting potential reduced sensitivity to QoI fungicides.
- *Microdochium* spp.: Triazoles showed slightly higher EC_{50} values, while fluxapyroxad, sedaxane, and fludioxonil remained highly effective (2023–2024).

Latvia University of Life Sciences and Technologies

LBTU Faculty of Agriculture and Food Technology



Occurrence of G143A mutation in *Pyrenophora tritici-repentis* during various sampling years

In Latvia, the prevalence of the G143A mutation in the *Pyrenophora tritici-repentis* population has reached 80–95% in recent years, which should be considered when planning tan spot control strategies.

METK Centre of Estonian Rural Research and Knowledge

Fungicide Resistance Monitoring in Estonian Wheat

Temporal Trends and Future Automation with PestSpace

Liis Andresen, Riinu Kiiker, Regina Pütsepp, Kersti Lilleväli, Lee Põllumaa, Pille Sooväli, and Andres Mäe

- *Zymoseptoria tritici* isolates from Estonian winter wheat show **increased tolerance** against **DMIs (3- to 5-fold) & SDHI-s (>10-fold)** when compared to the start of the study.
- Target site mutations are driving this evolution, but **additional factors** are **emerging**.
- The monitoring workflow can be significantly improved by adapting methods from the **PestSpace** project.

Interreg Baltic Sea Region

Co-funded by the European Union

RESILIENT ECONOMIES AND COMMUNITIES

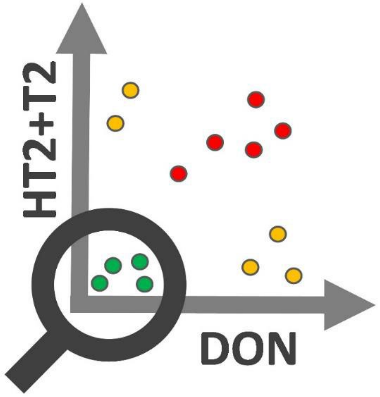
PestSpace

https://interreg-baltic.eu/project/pestspace/

NORBARAG2026 | March 6, 2026

NIBIO

Summary slide, Ingerd Skow Hofgaard, NIBIO, Norway:



Fungicide treatment may differently impact the various Fusarium species/mycotoxins occurring in an oat field

- e.g. Proline/prothioconazole may reduce DON-levels but not HT2+T2-levels in oat

Fusarium management should target reducing both DON-producing fungi as well as other relevant mycotoxin-producing fungi to ensure food and feed safety

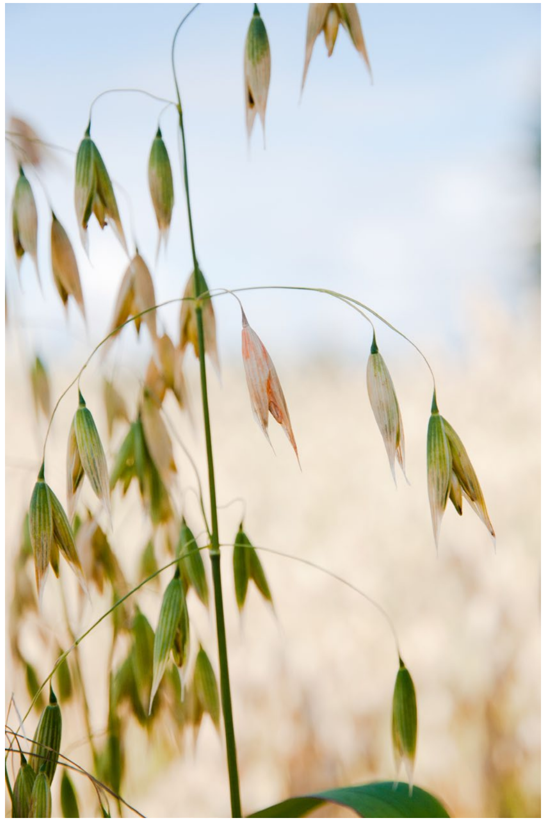


Photo: Jafar Razzaghian, NIBIO

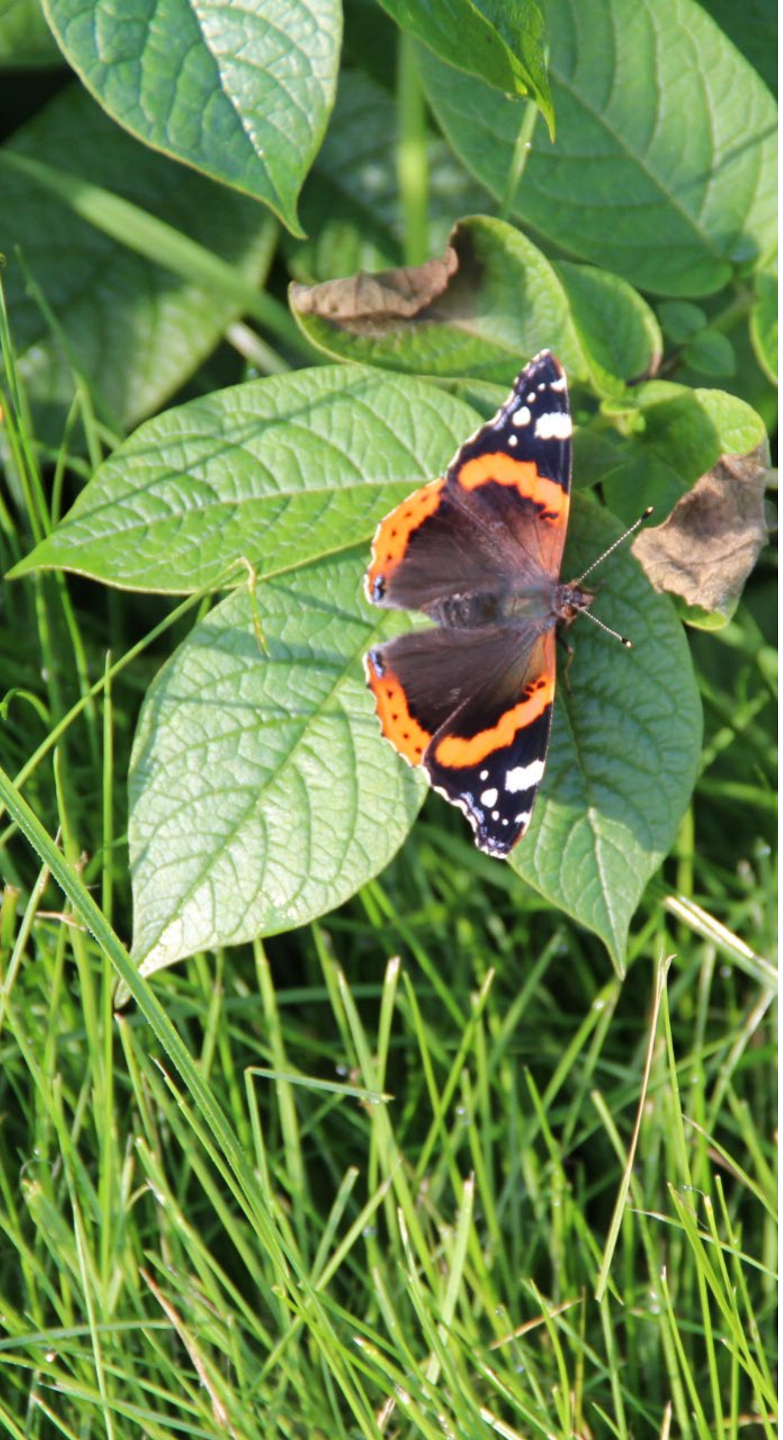
Investigating fungicide resistance in Norwegian populations of *Phytophthora infestans* and *Alternaria solani*

Eline Seim, May Bente Brurberg, Håvard Eikemo, Vinh Hong Le & Arne Hermansen

NORBARAG meeting 5th – 6th March 2026

Summary:

- The NoBlight project, led by NIBIO, aims to reduce pesticide input by 20 % by 2030, and by 50% in 2035
- WP1: Current status of foliage diseases and pathogen characterisation
  - includes phenotypic characterisation of late- and early blight with respect to fungicide resistance and investigation of the genetic background for pesticide resistance
- Microplate assays are used to investigate fungicide sensitivity of Norwegian late blight isolates
- A real-time PCR detection test is being developed for the rapid detection of a mutation associated with mandipropamid resistance in late blight



Phytophthora infestans population and fungicide resistance in Denmark

Isaac Kwesi Abuley, Jens G. Hansen, Aarhus Universitet

- Genotypes of *P. infestans* in Denmark & Europe
- Fungicide resistance status
- Where do we see the mutations and some genotypes (EU43)

NORBARAG 2026, 5-6 March

AARHUS UNIVERSITY

EuroBlight
A potato late blight network for Europe

Miljøministeriet
Miljøstyrelsen

ICROFS
Internationalt Center for Forskning i Økologisk Jordbrug og Fødevaresystemer

Ministry of Food, Agriculture and Fisheries of Denmark
gudp

IPMorama

Conclusion

- The EU43 population has declined significantly to below 5% in the Danish population
- The Danish Population wis currently characterized by “Others”
- Except EU43 and mandipropamid, all tested isolates were sensitive to all fungicides in Denmark
- The mutation causing resistance to CAAS was strongly linked to fungicide application strategy
  - Solo revus always selected for this mutation, whereas alternation or mixtures did not
- We found very few an isolate of EU46 in 2023, but it did not appear again in the subsequent years
- Few EU41 isolates were found in Denmark, but they localized (All in a trial site)
- Note that clones (e.g., EU43) are mostly generated from trials, so rethink trial designs and treatments tested to minimize the generation and spread of NOTORIOUS CLONES
- At the European level, the E36 remains the dominant clonal/genotype in Europe currently

Virulence patterns of EU43 and “other” *Phytophthora infestans* lineages on potato clones with differential late blight resistance genes.

Bicko S. Juma, Kim H. Hebelstrup, and Isaac K. Abuley

Department of Agroecology

Aarhus University, Denmark

Conclusions

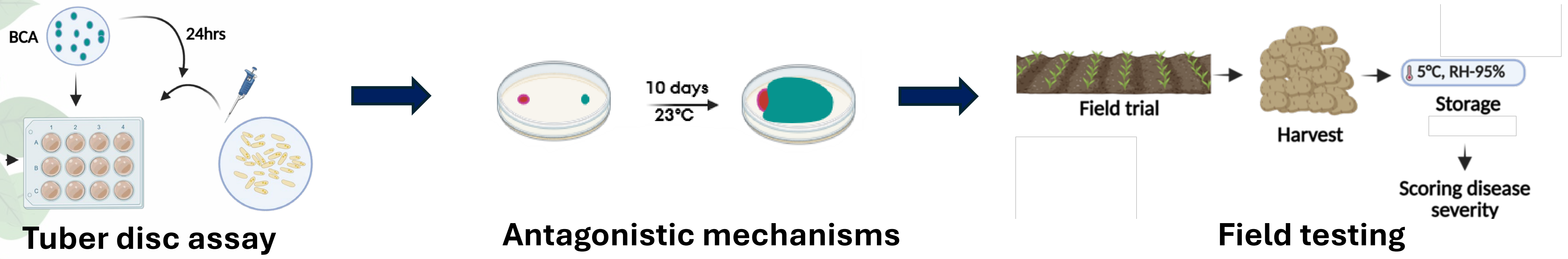
- ✓ Single *Rpi* genes differ markedly in robustness to contemporary *P. infestans* genotypes.
- ✓ EU43 shows worrying virulence on some *Rpi* lines.
- ✓ *Rpi-vnt1.1, Rpi-blb2, R9a,* and *S. americanum* sources should be prioritized in breeding.
- ✓ Strategic gene deployment and monitoring are essential for durable late blight control.

Trichoderma spp. as a biocontrol strategy for black dot suppression in potatoes.

Apsara Indhu Gopan, Sabine Ravnskov, Isaac Kwesi Abuley

Identify and optimize biocontrol agents for the effective management of black dot in potatoes

METHOD



RESULTS

- Trianum and Asperello - 72% reduction in severity on petriplate and tuber disc assay.
- *Trichoderma* inhibit *C. coccodes* through multiple inhibitory mechanisms
- The biocontrol activity of *Trichoderma* was consistent at diffferent temperatures but maximum at higher temperatures
- Field - Trianum and Asperello -maximum efficacy when the tubers were stored with soil.

Summary monitoring of major cereal pathogens (BASF)

NORBARAG
Nordic Baltic Resistance Action Group

- **Septoria leaf blotch**
  - SDHI: stable, some tendency to higher frequency of adaptation over Europe. Mutations with moderate effects dominating. Performance impact, SDHIs continue to contribute to disease control
  - DMIs: Sensitivity towards mefentrifluconazole stable since market introduction. Low correlation of sensitivities of prothioconazole and mefentrifluconazole. High MFA field efficacy recommends inclusion of MFA in disease control

- **Brown rust**
  - SDHI: Frequency of C-I87F increased in last seasons. Fluxapyroxad efficacy not significantly affected.
  - DMIs: High efficacy, only weak adaptation mechanisms detected. Stable situation over decades.
  - QoI: No QoI adaptation, pyraclostrobin with high efficacy

- **Net blotch**
  - SDHI: Resistance with „stronger“ mutations - significantly reducing field performance
  - QoI: Resistance mechanism is F129L, populations with high frequency of F129L very good controlled by pyraclostrobin

- **Ramularia leaf spot**
  - SDHI: Adaptation mainly by moderate mutation C-N87S, SDHI still contribute to disease control
  - DMI: Adaptation by mutations in cyp51. Mefentrifluconazole still with high efficacy against all genotypes

All studies done by EpiLogic (SEPTTR; PUCCRT), Agrotest fyto (RAMUCC), IDENTXX, BASF (Molecularbiology)

NORBARAG

Nordic Baltic Resistance Action Group

Herbicide sub-group summary

Country report Sweden 2026

- Swedish Board of Agriculture able to finance 50 samples on black grass and 20 other species
- Most of the samples – on call from advisers or farmers
- **Black grass 2025** – 36 samples have been tested from fields with suspected resistance, mainly from the South of Sweden
- 50 % of the samples showed multi resistance against Grp 1+2
- 30 % of the samples efficiancy below 95 % for clethodim
- 15 samples will be further investigated at Aarhus university

- First case, **fat-hen**, Chenopodium album, ALS-herbicide imazamox.

Centre of Estonian
Rural Research
and Knowledge

Herbicide resistance situation in Estonia in 2026 Silvia Pihu

- ***Stellaria media* – ALS resistance widespread** in Estonia
- **One ALS resistant population** found in Estonia: *Galium aparine, Chenopodium album, Apera spica-venti*
- **More research needed on** probably resistant or less susceptible populations: *Avena fatua, Amaranthus retroflexus, Elymus repens, Fallopia convolvulus, Poa annua, Tripleurospermum inodorum, Veronica persica*
- **Susceptible up to now:** *Centaurea cyanus, Echinochloa crus-gallii*

O. Auškalnienė (Institute of Agriculture LAMMC) : Herbicide resistance situation in Lithuania:

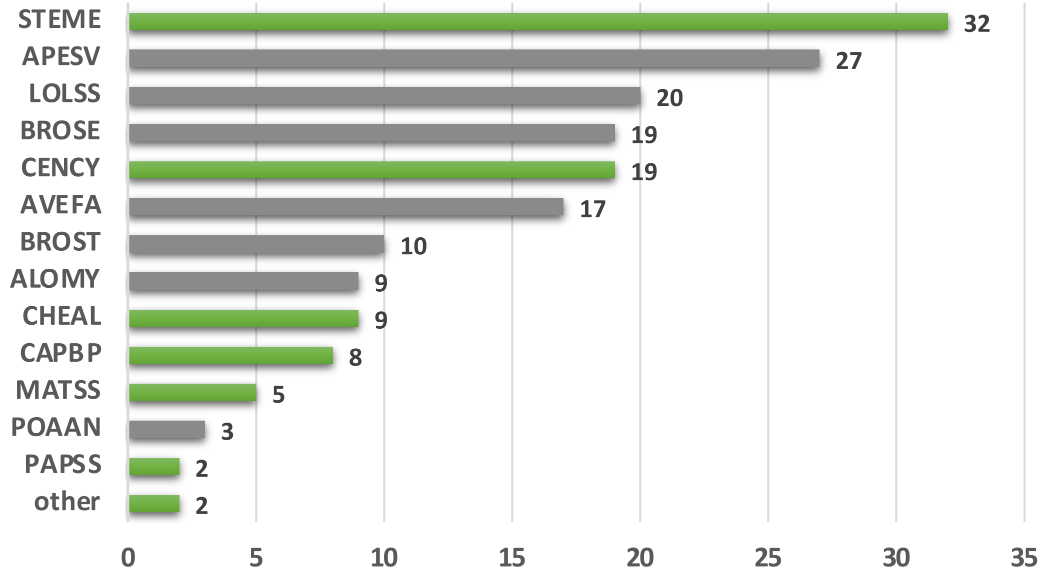
- Rapid spread of *Alopecurus myosuroides* (ALOMY) in winter wheat fields;
- Continues decline in the efficacy of ALS inhibitors against *Apera spica venti* and other monocots;
- Over the period of 2021 – 2025 95 samples of Alopecurus myosuroides and Apera spica venti was investigated:
  - From 15 ALOMY samples 13 resistant to ALS and ACC;
  - Investigated 80 APESV samples: resistant 23 to ALS, 3 to ACC and 49 to ALS and ACC;
- Resistance problem are growing; we can feel it practical in the fields of winter wheat;
- Only chemical control could not solve a problem with monocots (especially ALOMY) in winter wheat.

HERBICIDE RESISTANCE SITUATION IN LATVIA: farmer's survey results & upcoming project

Zane Erdmane (Leader of Weed Research Group at LAAPC)

A significant knowledge gap exists: while crop protection companies conduct internal resistance testing, a comprehensive national overview remains unavailable to key stakeholders, including growers, advisors, and researchers, consequently, **the project Risk Assessment of Pest Resistance to Plant Protection Products** supported by Ministry of Agriculture of Republic of Latvia **will start in Spring 2026.**

Dominant weed species with reduced efficacy by region



Weed species with suspected resistance by farmers in Latvia

- **60% of respondents have observed reduced herbicide efficacy in their fields due to resistance.**
- Resistance awareness and testing is currently driven by large-scale farms.
- **Respondents identified 13 weed species (including 7 grass weeds) with suspected resistance.**
- **In-depth farmer interviews** to collect information on cropping practices and field history **are planned.**
- **Target: 50-70 samples per year** for herbicide resistance screening (including genetic analysis and greenhouse experiments).
- **Actionable outcomes for farmers: tailored management recommendations adjusted to different levels of farming intensity**.
- Project objectives also include research on insecticide and fungicide resistance.

Introduction to the Project MotResistens (2026-2027):

Towards a Monitoring Plan for Herbicide Resistance in Norwegian Agriculture

- Main goal: To establish the scientific and operational foundation supporting a herbicide resistance monitoring plan in Norway, aligned with international standards and adapted to national needs.

Funding: Landbruksdirektoratet Eanandoallodirektoráhtta; Forskningsmidlene for jordbruk og matindustri

Project participants: NIBIO; NLR

Reference group: Aarhus University; JKI

Zahra Bitarafan, zahra.bitarafan@nibio.no
17th NORBARAG meeting, Oslo, March 5th 2026

NIBIO

INVESTIGATION OF POTENTIAL GLYPHOSATE RESISTANCE FOR SELECTED WEED SPECIES IN HIGH-RISK CROPPING SYSTEMS
- can we detect decrease glyphosate susceptibility in DK?

Funded by the levy fund for plant production in Denmark Planteafgiftsfonden


Alopecurus myosuroides


Lolium multiflorum

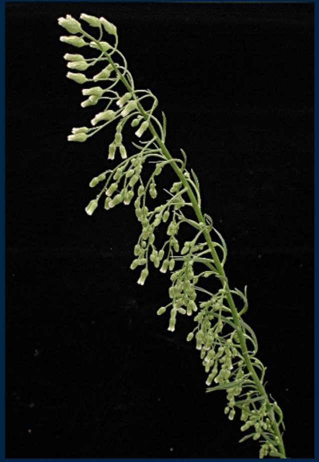

Poa annua


Echinochloa crus-galli


Stellaria media


Tripleurospermum inodorum


Elymus repens


Conyza canadenensis

Seed sampling in no-till fields and perennial tree crops in Denmark
Comparison with samples from other Nordic and Baltic countries with different glyphosate use patterns

Summary (Paul Neve)

- Target site resistance (TSR) and non-target site resistance (NTSR) co-occur.
- NTSR is the most common (and most important?) resistance mechanism in major grass weeds (*Alopecurus* and *Lolium*).
- NTSR related genes already present in historical, susceptible blackgrass populations.
- NTSR is polygenic – evidence for 100s to 1000s of genes under selection.
- NTSR confers cross-resistance – sometimes to newly introduced herbicides.
- There is evidence for reduced glyphosate sensitivity in some UK blackgrass populations (this is not resistance – it is an early warning.)

NORBARAG 2026 - Why dose matters: sustaining glyphosate and herbicide efficacy

Dr. Alberto Collavo – Bayer AG

Herbicide resistance landscape in Europe

• Resistance is widespread, especially in **ACCase and ALS inhibitors**, affecting key grass weeds (*Alopecurus myosuroides, Apera spica-venti, Lolium* species).

• Broadleaf resistance is also increasing but can still be managed with diverse MoAs and pre-emergence tools.

Glyphosate: current status & risks

• Glyphosate resistance remains **limited but rising**, with most cases in **perennial crops**, some emerging in arable systems (*Lolium* spp.).

• Repeated low-dose applications and improper timing **accelerate resistance evolution**, selecting both TSR and NTSR mechanisms.

Mechanisms of resistance

• Target-site mutations (e.g., Pro106) and **EPSPS gene amplification** are key drivers.

• Reduced translocation and vacuolar sequestration also contribute in some species.

Key stewardship principles

• Apply **adequate doses**, at the **right weed size** and under **optimal conditions**.

• Avoid treating survivors; integrate **cultural practices** and **diverse MoAs**.

• Monitor fields, maintain records and react early to suspected resistance.

Take-home message

Maintaining glyphosate efficacy requires **right rate applications** for the weed growth stage, good agronomy, integrated weed management and strict stewardship—especially as new resistance cases continue to emerge.

EcoGAP:
Contributions of ecosystem services delivered by agroecological practices to narrow gaps in yield and resource use efficiency

Darwin T. Hickman, Department of Crop Production Ecology, SLU
Darwin.hickman@slu.se

A new project across the Netherlands, Sweden, and France; SLU's work will use weeds to ask questions about how yield interacts with nutrient inputs and management intensity.

Can we compensate for a loss of treatment intensity through ecological mechanisms?

Centre National d'Agroécologie – Carbone Fertile · VEGEPOLYS VALLEY – CULTIVONS L'AUDACE VÉGÉTALE · INRAE · WAGENINGEN UNIVERSITY & RESEARCH · SLU

NORBARAG
Nordic Baltic Resistance Action Group

Speakers:

Illegal Plant Protection Products - A Hidden Threat to the Spread of Pathogen Resistance - Zita Varanavičienė (CropLife Lithuania)

Review of the withdrawal of TFA-yielding pesticides in Denmark and ongoing focus in EU - Emilie F. Jakobsen (CropLife Denmark)

Illegal Plant Protection Products – a Hiden Threat to the Spread of Pathogen Resistance

Zita Varanavičienė

06-03-2026

CropLife LITHUANIA

Factors effecting development of resistance driven by illegal products :

1. Unknown composition of illegal PPP
2. Not sufficient action against pathogens
3. Hobby farmers “contribution”

CropLife LITHUANIA

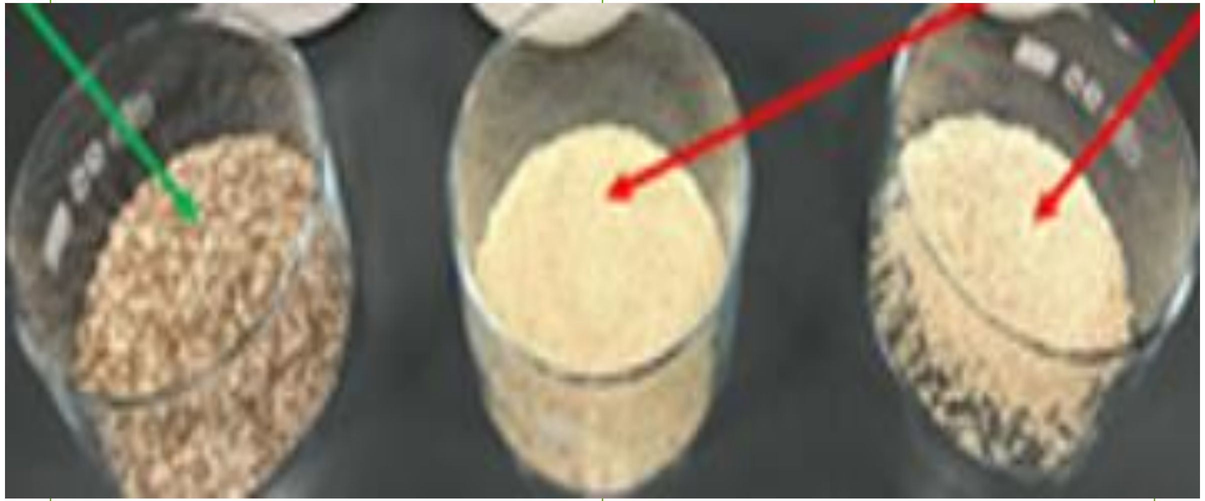
„parallel trade“

Reg. 1107/2009 art 52 :

a) Same producer or under license

b) Identical composition: a.s, synergists

c) Identical co-formulants, package



CropLife LITHUANIA

2. Not sufficient action against pathogens/ undefined dose rate

CropLife
LITHUANIA

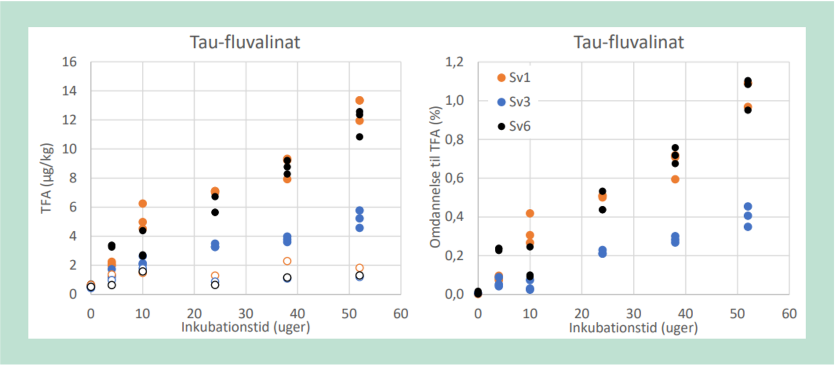
3. Hobby farmers „contribution"

CropLife
LITHUANIA

Review of the withdrawal of potential TFA-yielding pesticides in Denmark and ongoing focus in EU

CropLife DANMARK

- Plant protection products approved in Denmark are approved under specific national requirements: Persistency, DT_{50} < 180 days and limit value for all metabolites (also non-relevant) of 0.1 µg/L
- In the Danish mass screening of contaminants in groundwater in 2021, TFA was detected in 219/247 analyzed groundwater intakes, all below the drinking water limit value of 9 µg/L, however TFA is considered as a metabolite that could come from pesticides containing a C-CF_3-group and as such there was a reason for concern.
- In 2024, an independent study, TriFluPest, (2024) from the Geological Survey of Denmark and Greenland (GEUS) showed formation of TFA from 7 active substances and based on the persistency cut-off, the study led to a national withdrawal of 33 products in the summer of 2025. Withdrawal was based on a maximum of 6+9 months phase-out
- The TriFluPest study a simply laboratory degradation study not made according to regulatory guidelines. EFSA will need to deliver a validated method by mid-2027
- A **preliminary** Impact assessment was financed by CropLife Danmark and the Farming Union, April 2024 to show the effect of a full ban of all C-CF_3-products with an estimated 420 million EUR yield loss
- CropLife Danmark advocated against a national process for the products and pushed for an EU renewal process (art. 21), based on the lack of alternatives in production in DK



	TFA-dannelse (% af tilsat moderstof)			
	Sv1	Sv3	Sv6	Geometrisk middel
Fluopyram	7,9±0,3	3,3±0,2	10,7±0,5	6,5
Fluazinam	6,5±0,2	5,3±0,2	6,0±0,4	6,0
Diflufenican	2,9±0,8	2,4±0,1	5,2±1,1	3,3
Fluazifop-p-butyl	3,0±0,0	3,1±0,0	5,3±0,0	3,7
Trifluralin	1,7±0,0	1,1±0,1	2,2±0,1	1,6
Mefentrifluconazol	2,6±0,2	0,8±0,0	3,3±0,1	1,9
tau-Fluvalinat	1,0±0,1	0,4±0,1	1,0±0,1	0,7

***Overall conclusion in TriFluPest** (2024): Persistent and potential leaching of <**0,01 µg/l – 1,68 µg/l** depending on AS, use and soil type**

The study was **not done according to regulatory guidelines (OECD 307)*

Active substances withdrawn in Denmark

- Diflufenican
- Flonicamid
- Fluopyram
- Fluazinam
- Mefentrifluconazol
- Tau-fluvalinat

Active substances in DK awaiting EU-process (Art. 21)

- Lambda-cyhalothrin
- Pyroxsulam
- Tefluthrin
- Oxathiopiprolin
- Picolinafen

Emilie Jakobsen,
Technical advisor,
CropLife Danmark

Review of the withdrawal of potential TFA-yielding pesticides in Denmark and ongoing focus in EU

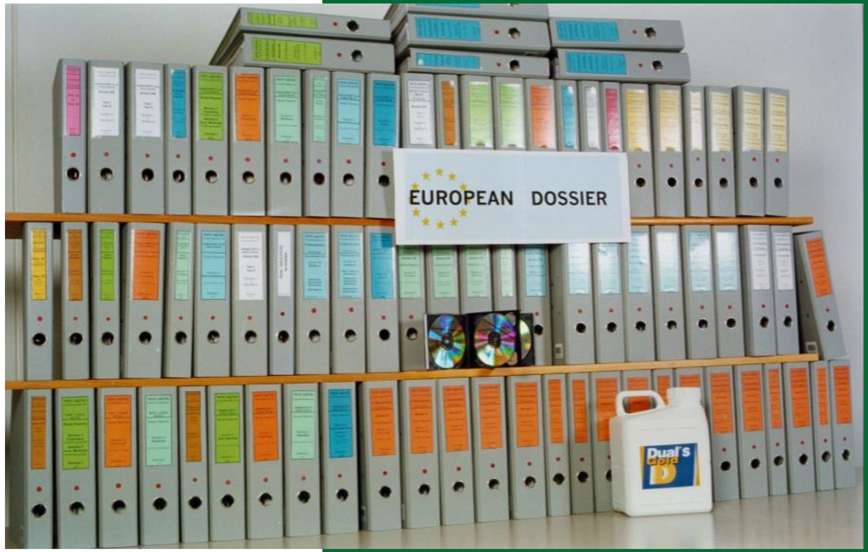
CropLife DANMARK

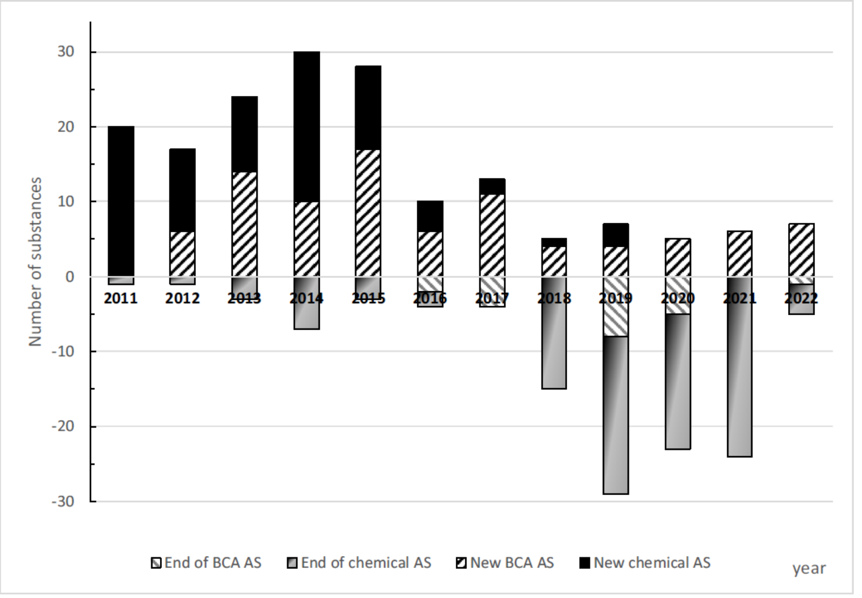
Ongoing focus in Denmark

- Taskforces established by the Ministry of Environment to consider alternative products or technologies to replace the withdrawn products and ensure agricultural production in Denmark. Main challenges are the national requirements for approvals for PPPs and a tax on insecticides
- Government election on March 24, where groundwater parks are widely discussed in relation to a ban of use of pesticides and fertilizers in vulnerable groundwater forming areas
- Upcoming negotiations of the National Action Plan 2027-2031 for reduction of use and impact of pesticides

Ongoing focus in EU

- EFSA to deliver a toxicological reference value for TFA (**mid-2026**) and a validated degradation method (**mid-2027**)
- Sweden, Norway and the Netherlands have started a national process looking at potential TFA-yielding pesticides and will deliver conclusions by April 2028
- Food and Feed-omnibus is under negotiations with simplified approvals proposed for biological pesticides, as well as extended phase-out periods (3 years) for products that have no alternatives
- The balance of active substances in EU show that approx. 50% of PPPs are not reapproved in EU, and since 2019 – 0 new conventional approvals and 12 new biological approvals
- With the Northern Zone accounting for approx. 5% of the industry market, and an estimated cost of 2 billion DKK and +12 years to market a new active substance, this will largely impact resistance development in DK and in the future - across EU (2019)





Vol.:(0123456789)1 3 https://doi.org/10.1007/s11356-022-24057-7

NORBARAG
Nordic Baltic Resistance Action Group

New contacts

Pentti Ruuttunen
LUKE, Finland
Chair of NORBARAG

Zane Erdmane
LAAPC, Latvia
Herbicide sub-group

Katie A. G. Nielsen
NIBIO, Norway
Fungicide sub-group

Alex Schwartz
AgroLab, Denmark
Insecticide sub-group

NORBARAG
Nordic Baltic Resistance Action Group

Next year…

18th NORBARAG meeting
Sweden, 2027