teagasc
Agriculture and Food Development Authority

IRISH FARMERS JOURNAL

CROP TRIALS EVENT

Teagasc Oak Park
Open Day 2021
30th June & 1st July

www.teagasc.ie

Foreword

Teagasc 2021 Crop Trials Event
Welcome to today's Crop Trials event, which we hope provides you with a welcome opportunity to witness first-hand several aspects of our applied and strategic research programme. While we have had to reduce the size and scope of the event in line with public health measures, through the tour you will hear on-going research related to spring barley, winter wheat, beans, oilseed rape & rye from KT and research staff.

Content includes developing IPM strategies to control BYDV, disease control in spring barley and winter wheat, oilseed rape and rye management, use of liquid N for cereals, establishment systems for beans and field pea, insights from the ASSAP programme as well as grassweed identification and important machinery hygiene actions. The latest spring barley and winter wheat varieties will also be demonstrated by the DAFM variety testing team.

The stakeholder led Crops 2030 strategy published last year was clear in its statement that the future sustainability of the sector is dependent on the need to develop high value markets, while exploiting the authenticity and provenance of Irish material to underpin domestic/export markets. As we expand our programme through national/international partnerships, you will find in Part II of this booklet additional insight into ongoing research being completed across the department.

While attendee numbers have been limited for this year's event we are delighted to be able to host the Farmers Journal live event on the evening of June 30th, which gives an opportunity for all to see the trials and hear research and KT staff discuss the primary issues affecting the tillage sector. Streamed across multiple platforms, this will provide an opportunity for live engagement through an interactive Q&A forum.

In the centre of this booklet you will find a map of the circuit, which has an approximate walking time of 3hr, including stops. At all times, we ask that you adhere to the public health measures in place and the directions of Teagasc staff who are present to assist and ensure a safe and enjoyable day for all.

Hosting the Open day requires significant work and planning, which has been further complicated due to COVID. I therefore wish to thank all Oak Park staff for their commitment and effort in preparing the site, boards and facilities across the campus. In addition, I wish to acknowledge the Teagasc tillage stakeholder group for their support and input to ensure the relevance of our research programme to the industry at large.

Our priority for this event is to maximise socially responsible engagement and research demonstration with attendees and I hope your time here in Oak Park is enjoyable, safe and productive in supporting your business interests. We look forward to inviting you back to a more normal event in 2023.

Dr. Ewen Mullins
Head of Crops Research
Teagasc, Oak Park

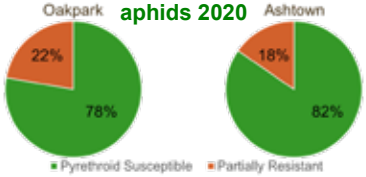
Part I

Boards presented in Crops Trials Event

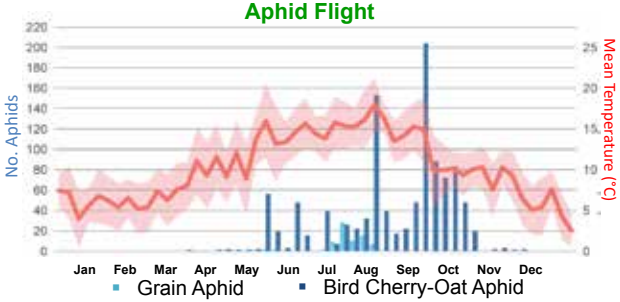
Aphid monitoring to support BYDV control

- Understanding impact of climate on aphid movement key for BYDV control
- Knock-down resistance (kdr) in Grain Aphids confers pyrethroid resistance

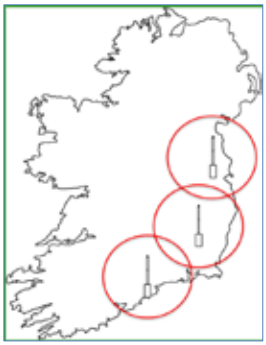
***Knock down resistance (kdr)* in migrating grain aphids 2020**



Aphid Flight



Suction Tower Locations



Sampling radius of up to 80km per tower

Impact

- Link aphid migration to forecast (>15C; strong winds and rain negatively affect aphid flight)
- Prevalence of partial insecticide resistance in migrating aphids
- Investigate impact of different migrating aphid species on BYDV spread

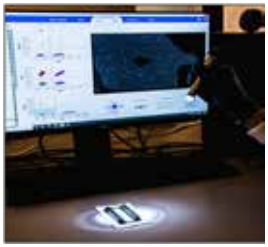
WALSH SCHOLARS

Notes:

Accurate BYDV detection

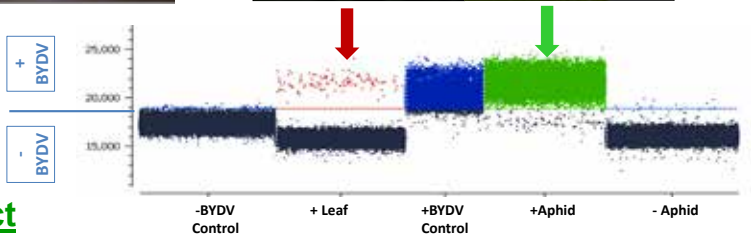
Why is it important?

- Virus levels vary from field-to-field and across seasons
- Previous systems could only detect if BYDV present/absent in infected tissues
- Critical to be able to quantify BYDV load in both aphids / asymptomatic plants
- Support 'decision-to-spray' actions as part of IPM of BYDV



How it works

- Exact quantification of virus levels in leaf and aphid samples possible with ddPCR



Impact

- ddPCR will quantify BYDV load in aphids and a/symptomatic plants
- Virus threshold levels will inform future IPM based spray decisions

WALSH SCHOLARS

Contact details: Louise.McNamara@Teagasc.ie

Notes:

Spring barley disease control

Rhynchosporium

Net Blotch

Fungicide timings?

- Late tillering – protect tillers
- GS49 (awns peeping) – protect green leaf
- Loss of up to 0.4 t/ha if left until GS59 (ear fully out)

What to use?

- Use mix of actives
- 50% rate of each sufficient
- Azole + SDHI/strobilurin
- Add Folpet for additional Ramularia control

Ramularia

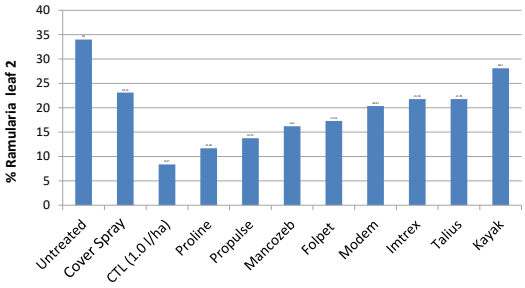
Mildew

Notes:

Managing ramularia

- **Varietal resistance** – don't rely on this
- **Agronomic practises** – don't stress the crop….in the Irish climate??
- **Nutrition** – provide adequate nutrition to minimise stress on the crop
- **Fungicides** – to protect the upper canopy

Spring barley 2019 – full rates compared



In absence of CTL careful development of fungicide programme for Ramularia control required

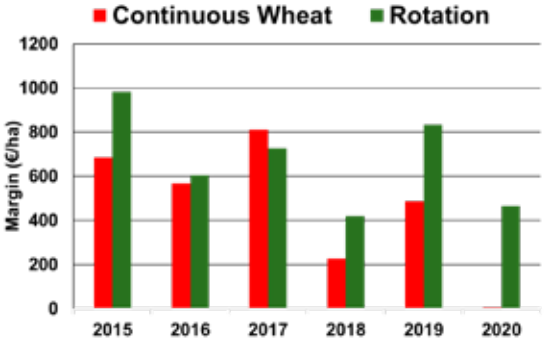
Notes:

Why break crops?

Rotations and break crops

- **Yield increase:** after breaks for disease, crop nutrition etc. **+19%** (Knockbeg).
- **Crop diversity:** gives weed control advantages and herbicide options.
- **Improved work distribution:** labour / machinery.
- **More profitable!**

Knockbeg: Rotation vs continuous wheat



- WOSR, WW, WO, WW, WB
- Performance varied form year to year
- Average benefit: **€208 / ha** for rotation (mean all crops) vs continuous wheat

Notes:

OSR: Growth management

Approaches

- **Traditional: Fixed N rate**
  - Based on previous crop only
  - 225kg N: 1/3 and 2/3 split applications
- **Canopy Management**
  - Based on post-winter crop green area, soil N and predicted yield
  - Adding N, and timing application, to build canopy for optimum pod number
  - Mainly based on UK research

Questions

- Are the UK assumptions appropriate?
- Do our climate and soils impact on them?
- Which is better and how do we manage:
  - Early sown, large biomass crops?
  - Later sown, smaller biomass crops?

Notes:

OSR – Growth management

What we did:

- A range of N strategies - canopy management (CM), fixed and zero
- Three biomass levels (sow dates: Mid-Aug, End-Aug, Mid-Sept)
- Defoliated and not (simulating bird damage)
- N content, canopy and yield measurements

What we found:

- Canopy management principals are largely valid
- Climate and soils have potential for ~50kg/ha
- Scope to be more precise with N, but need estimates of:
  - Soil N
  - Yield potential
- Sowing date impact only if poor establishment conditions
- Defoliation had small effect

Results snapshot:

	2019		2020	
	N (kg/ha)	**Yield** (t/ha)	**N** (kg/ha)	**Yield** (t/ha)
System				
Fixed	225	**4.6**	225	**4.7**
CM 4.5	209	**4.3**	216	**4.7**
CM 3.5	149	**4.5**	156	**4.6**
Irish CM	-	-	132	**5.0**

Notes:

1. *Irish CM assumes extra 50kg/ha of soil N becomes available*
2. *Data from un-defoliated treatments and mean of 3 sow dates*
3. *These responses are site and season specific on medium textured soils.*

Notes:

Wheat disease control

Management of wheat diseases critical to achieving potential yields

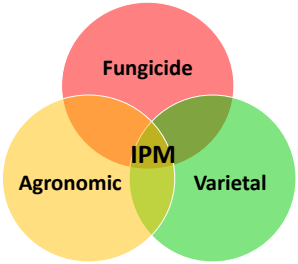

Septoria tritici blotch


Eyespot


Yellow Rust


Fusarium Head Blight


Powdery Mildew



Utilise all components of crop production

Integrated Pest Management

- **Crop Selection** – •Prevent / limit potential disease establishment
- **Variety selection** – •Know disease resistance strengths and weakness
- **Crop Agronomy** – •Match agronomy to disease pressures / risks (e.g. delayed sowing)

Notes:

Yellow rust & septoria control

Septoria tritici blotch (STB)

- Disease thrives during wet weather
- Typically most damaging disease of Irish wheat crops
- Long latent period can mask asymptomatic disease
- Fungicide resistance increasing and impacting control – anti-resistance strategies essential
- Fungicide timing (final leaf 3 & flag leaf) essential to maximise control

Yellow Rust

- Increasingly problematic in Irish wheat crops
- Cool & damp conditions favour disease development
- Varietal resistance most effective control measure
- Early identification and control essential to successful management of disease
- Careful selection of active fungicides extremely important

Varietal selection is critical for STB and Yellow Rust control

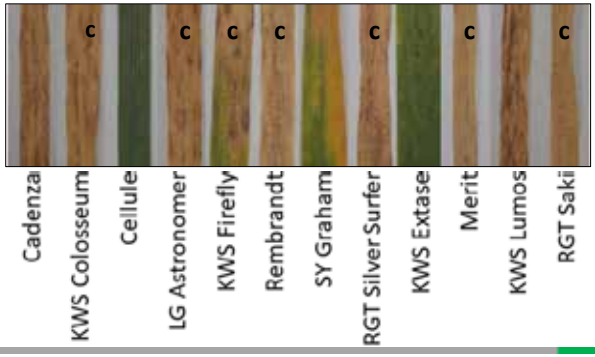
Notes:

Monitoring *Z. tritici* virulence

Managing and maintaining varietal resistance increasingly vital for successful disease control

RGT Saki in 2020

- Septoria resistance can be based on minor or major sources of genetic resistance
- Major resistance subject to breakdown as *Z. tritici* can evolve virulence
- In 2019 and 2020 Irish *Z. tritici* evolved virulence to breakdown Cellule- and Cougar-based major resistance



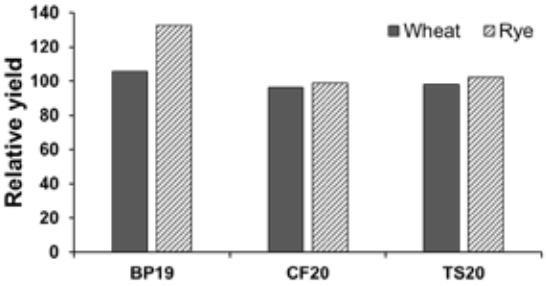
- Illustration indicates virulence to Cougar resistance, detected in Irish *Z. tritici* population in 2020.
- Result indicates reduced potential of several varieties bred from Cougar (C) to resist septoria

Notes:

Winter rye management

Advantages

- High yield potential
- Good disease resistance
- Good nutrient efficiency
- Good drought tolerance
- Spread workload
- High straw yield



Challenges

- Tall crop – lodging needs to be managed
- Limited market
- Limited pesticide approvals
- Ergot - Low risk in modern hybrids
- Slug damage
- Limited agronomy research

An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

Agronomy research on rye is part funded by DAFM Stimulus project DABBING-CAP project no :2019R563

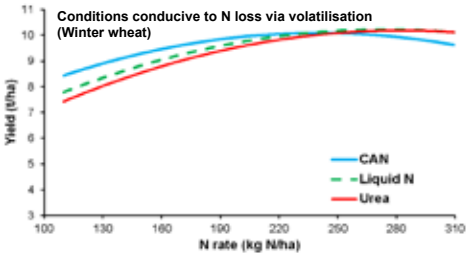
Notes:

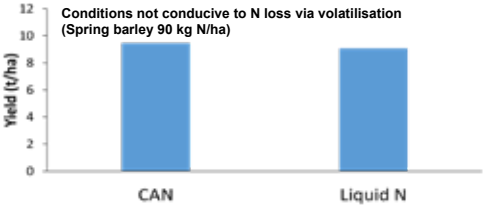
Liquid N for cereals

Liquid N = Urea Ammonium Nitrate (UAN)

Advantages

- Evenness of application,
  - Wide tramlines
  - Less than favourable conditions e.g. windy
- Potentially less overlaps / ins and outs
- Small cost per kg N advantage ?





Liquid N is as efficient as CAN in the absence of volatilisation

Drawbacks

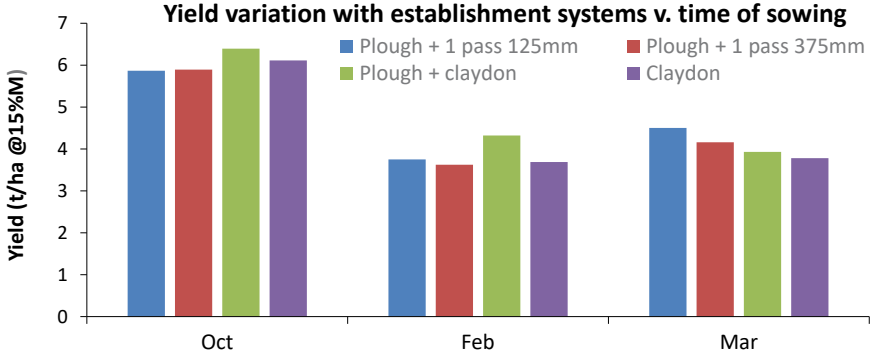
- Urea N can be lost as ammonia
- Can be minimised by including urease inhibitor
- Potential for crop scorch
- On farm storage may be required
- Corrosion

Notes:

Establishment systems for faba beans

Approach

- Evaluate the impact of cultivation systems on faba bean yield
- 3 seasons x 2 fields (Carlow, Dublin)
- Treatments: Plough + 1 pass (125mm), plough +1 pass (375mm), plough + Claydon, Claydon into stubble
- Sowing dates: October, February, March



Future impact:

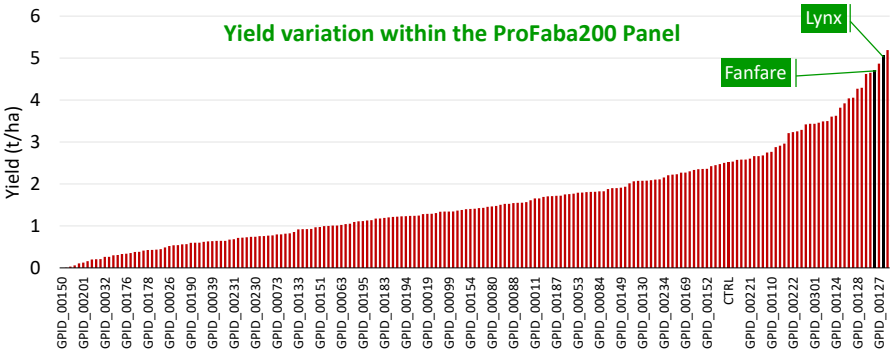
- Yield comparable with conventional & reduced tillage
- Regardless of the cultivation system used, winter sowing presents higher yield potential

Contact details: Sheila.Alves@Teagasc.ie

Notes:

Identifying resistance to chocolate spot in faba beans

- Chocolate spot is the major disease of Irish faba bean crops
- Current varieties lack durable resistance
- EU project (ProFaba) evaluating 200 varieties in Ireland, Spain, France, Germany, Denmark
- Rapid screen to identify resistance to chocolate spot among high yielding lines in ProFaba collection (see below) being developed



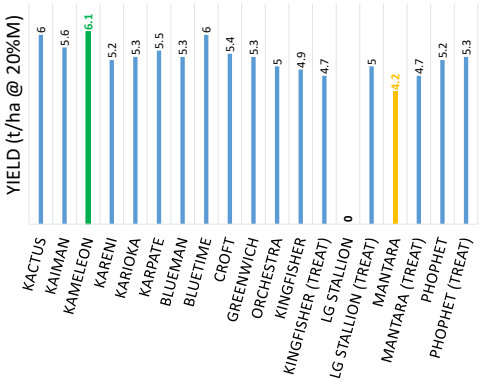
Notes:

Potential of field pea as an alternative protein crop

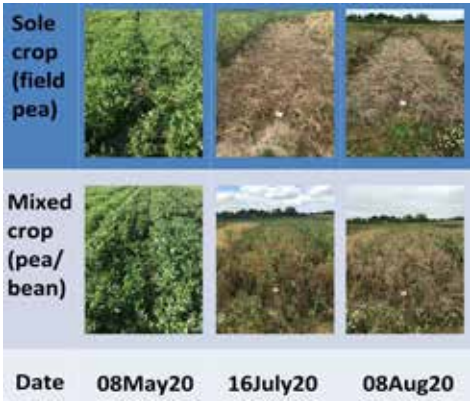
Field peas:
- Pea is a high value alternative protein crop
- Good yield potential but no RL for peas
- Lodging issues a brake on expansion

Approach:
- Varietal trials of winter and spring field peas underway
- Mixed crop systems (peas/beans) for increased pea stand

Yield potential of spring field pea varieties



Potential of mixed cropping field pea/faba bean (winter)



Future impact:
- High yielding spring material confirmed
- Mixed pea/bean cropping has potential to reduce lodging. Further trials underway

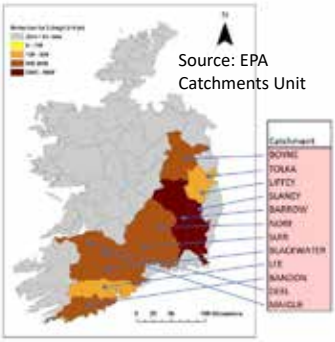
Contact details:
Sheila.Alves@Teagasc.ie

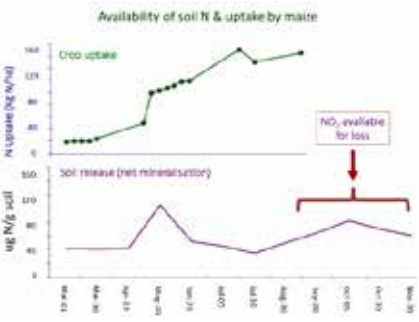
Notes:

Nitrogen Loss to Water

Water Framework Directive - WFD

- Nitrates review - open for comment
- Increasing N trend since 2013
  - Drinking water max limit 11.3 mg/l N
  - Estuarine standard below 2.6 mg/l N
- Source of N - 85% from Agriculture
- Soil type, moisture content & N applied
  - South and East of the country at risk





Tillage systems can leak N

- Slaney & Barrow have highest N loads
  - 27% & 28% tillage
- N loss to water 15 to 65 kg / ha
- Catch Crops, N Efficiency & Excess N
- Big variation year to year - weather
- “Critical Source Areas” & PIP maps

Notes:

Tillage vs. Grassland

Castledockrell - Barley

- Fertiliser N – 140kg/ha
- Organic N - 38 kg N / ha
- 66% tillage
- Free draining soil, slate
- 1020 mm annual rainfall

Timoleague - Dairy

- Fertiliser N – 250kg/ha
- Organic N – 170 kg N+
- 85% grassland
- Free draining soil, sandstone
- 1120mm annual rainfall

Higher N load going on & Lower N in the stream ???

Farming for Water Quality

AGRICULTURAL CATCHMENTS PROGRAMME

Notes:

Herbicide-resistant wild oats

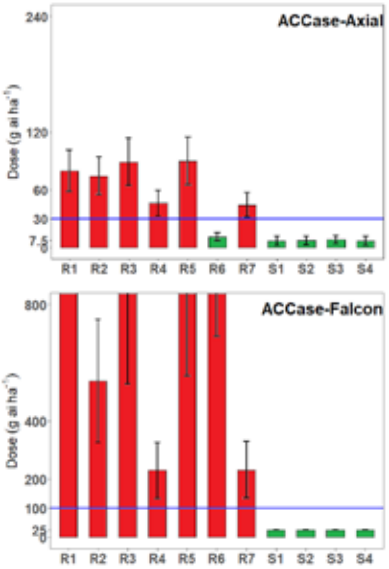
Sensitivity screen

- 12 of 102 populations resistant to one of the ACCase group (DEN, FOP or DIM)
- Low or moderate levels of resistance to DEN (e.g. Axial)
- High levels of resistance to FOP (e.g. Falcon)
- Cross-resistance within field

Solutions

- No ALS resistance to date
- Use ALS herbicides with cultural control; *Integrated Weed Management* (IWM), to avoid resistance

Effective dose rate required to kill 90% of the treated plants for resistant (red) and susceptible (green) populations to:



***Blue line denotes label rate**

Ireland's European Structural and Investment Funds Programmes 2014-2020
Co-funded by the Irish Government and the European Union
An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine
The European Agricultural Fund for Rural Development: Europe investing in rural areas

Notes:

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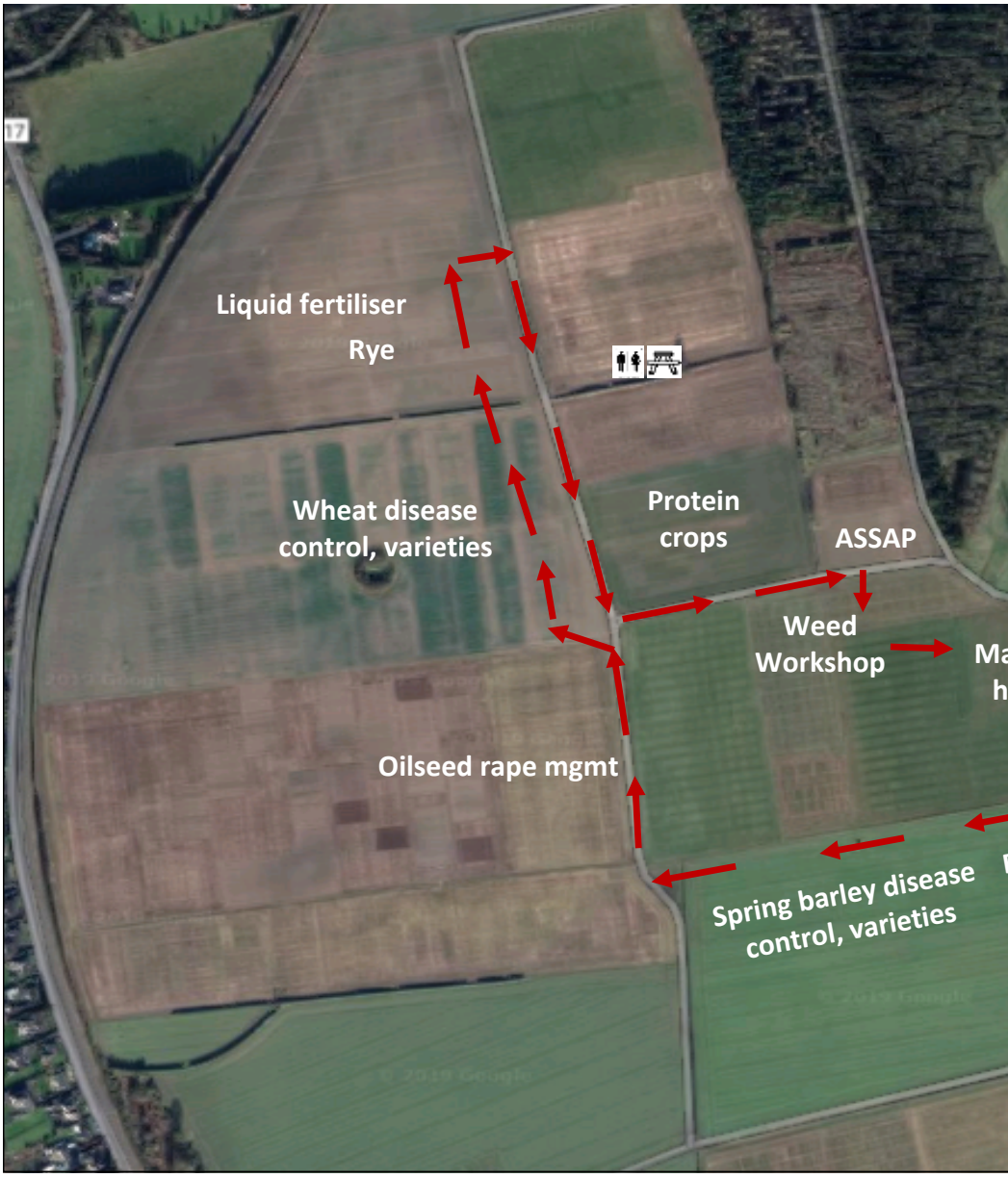

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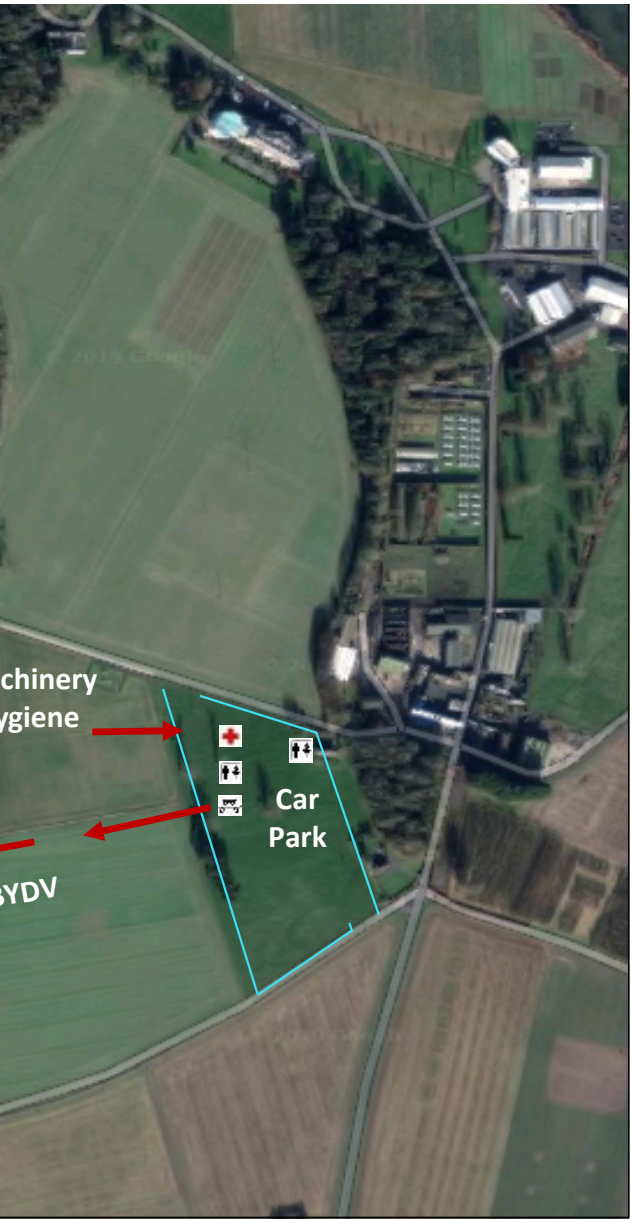


Coronavirus
COVID-19
Public Health
Advice

Coronavirus COVID-19

Stay safe. Protect each other.

Wash
your hands well and often to avoid contamination.

Cover
your mouth and nose with a tissue or sleeve when coughing or sneezing and discard used tissue safely

Distance
yourself at least 2 metres (6 feet) away from other people, especially those who might be unwell

#holdfirm

For more information
www.gov.ie/health-covid-19
www.hse.ie

Herbicide-resistant black-grass

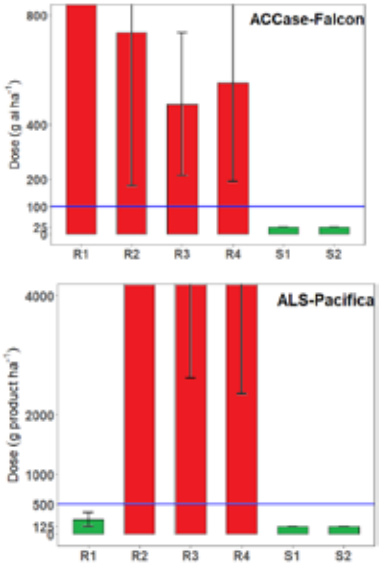
Sensitivity screen

- 8 of 18 populations resistant
- Resistance (multiple) to both ALS and ACCase herbicides found in 5 populations
- Cross-resistance to ACCase-only herbicides found in 3 populations

Solutions

- For ACCase-only resistant populations, use ALS and IWM.
- For multiple-resistant populations, cultural IWM, including grass/leys, for a minimum of 5 years needed to eliminate seedbank

Effective dose rate required to kill 90% of the treated plants for resistant (red) and susceptible (green) populations to:



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The European Agricultural Fund for Rural Development: Europe investing in rural areas

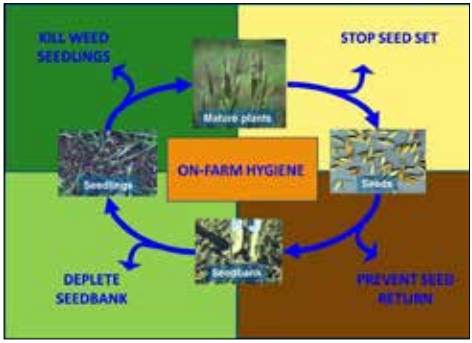
Notes:

Integrated strategies for managing grass weeds

The Past

The Future

Implementation



Cultural Control Options	
Diverse Rotations	Increased seed rates
Cultivations	Rogueing
Stale seedbeds	Whole cropping
Cover crops	Crop destruction
Competitive crops	On-farm hygiene
Delayed drilling dates	Machinery hygiene

Notes:

Integrated weed management (IWM) Strategies for blackgrass control

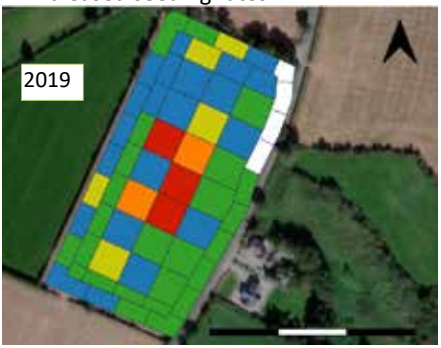
ECT Focus Farm Waterford

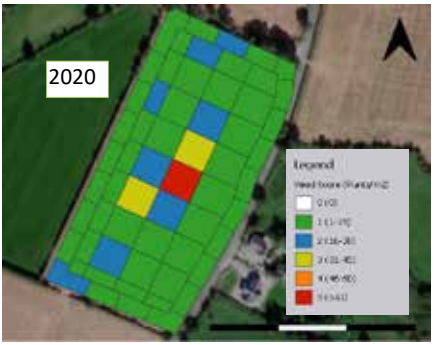
- Blackgrass 1st appeared in 2012
- By 2017 winter cropping had become unviable
- Blackgrass population on the farm – **RESISTANT** to both ALS and ACCase chemistry

IWM Strategy used on the farm for last 3 years

- Stale seedbeds
- Spring Cropping
- Increased seeding rates

- Good on-farm Hygiene has confined Blackgrass to this area





Blackgrass plant counts	2019	2020
Range (plants/m2)	0 - 142	1 - 107
Average (plants/m2)	21	11
Average reduction	-	**52%**

Problem still exists and will influence all decisions for at least next 5 years

Notes:

Stop grass weed spread

Machine cleaning: Why?

- To stop the introduction and spread of problematic weeds. One black-grass plant = 6000 viable seeds.
- To keep crop production viable – key IWM measure

Which machines and when?

- All in crop contact: baler, combine, rake, tractors, trailers etc.
- Whether owned, contractor or other.
- When moving from any farm or suspect area on own farm

Resources

- Long handled brushes, leaf blower, compressed air and long lance, torch, all openings accessible safely.
- PPE and face mask. Safe working practice.
- Knowledge re safe cleaning routine for specific machine
- All involved aware of the need for cleaning – critical.

Known black-grass: Don't harvest or bale!

- Destroy, ensile or hand rogue and **half-day** combine clean!

Notes: _____

Cleaning practice

All machines

- Before season start: clean, no oil leaks and guards in place.
- Run power-driven machines before and after each cleaning.
- Clean before leaving field and quickly again after moving.

Balers

- Eject part-bale before cleaning and leaving field.
- Use leaf blower / brush to clean all areas including pick-up, bale chamber, chassis, knotter/netter and under guards.
- Check tractor underbody.
- Note field/position where first bale is made for later checking.

Combines

- Clean header thoroughly and run complete machine while varying/opening all fan and sieve adjustments.
- Clean all external surfaces and all accessible internal areas.
- Open all elevator covers and run combine (no bystanders).
- Following move, quick clean and run combine (stationary)
- Note field and pathway of first work on farm for later checking.

Notes:

Part II

Snapshot of additional research currently underway

Fungicide sensitivity of Irish *Pyrenopeziza brassicae* populations

Background:

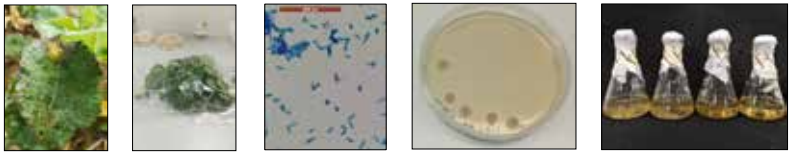
- Light leaf spot caused by *P. brassicae* is a major disease of Irish oilseed rape crops
- Limited information known on Irish populations

Approach:

- Detailed surveys of Irish population conducted during 2019 and 2020
- Fungicide sensitivity and population analysis completed

Outputs to date:

- Irish population remains sensitive to SDHI and QoI fungicides
- Varying levels of resistance detected to azole fungicides with key alterations detected



>500 isolates of *P. brassicae* isolated from Irish OSR crops in 2019 and 2020

Future impact:

- Detailed population analysis ongoing to determine genetic structure of Irish population
- Molecular assays being developed to rapidly screen future populations

Contact:

- Diana Bucur, CELUP email: diana.bucur@teagasc.ie

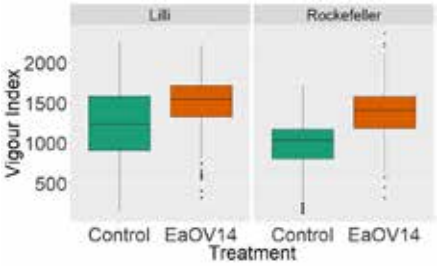
Biostimulants for sustainable wheat production

Background:

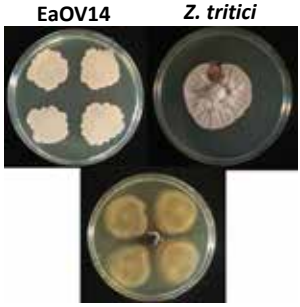
- The loss of chemical efficacy and increased EU legislation around PPP use is challenging the sustainability of crops such as wheat to offset losses against *Zymoseptoria tritici*
- Studies indicate that the soil-borne bacterium *Ensifer adhaerens* has the capacity to release nutrients (e.g. Fe, Si, Al via soil mineralisation) and has antifungal properties

Outputs:

- Treating seed with *Ensifer adhaerens* OV14 improves wheat seedlings vigour index by an average of 23% (cv. Lilli) and 40% (cv. Rockefeller) compared to untreated seed



- When co-cultivated under *in-vitro* conditions, *Ensifer adhaerens* OV14 shows the ability to inhibit *Z. tritici* growth by up to 80%



EaOV14 + *Z. tritici*

Future Impacts:

- Studying more crop species of high importance in Ireland will contribute to fully characterise *Ensifer adhaerens* OV14 as a new biostimulant agent able to decrese chemical fungicides and fertilizers input

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Potential of distilling wheat

Background:

- Significant imports of maize to produce whiskey
- Wheat is used in whiskey production abroad
- Can Irish wheat be used in Irish distilleries?

Approach:

- Integrated approach
- Agronomy work examining suitability of distilling varieties and identifying suitable fertiliser strategies
- Lab-scale analysis of suitability of wheat (and other grains) for use in Irish distilleries
- Engagement with drinks sector to highlight results and ensure work is relevant to industry

Outputs to date: The project is in its first year

Future impact:

- Management guidelines for the production of distilling wheat
- Laboratory capability for testing new varieties for their suitability for Irish distilling

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This research is funded by DAFM Stimulus project DABBING-CAP project no :2019R563

Leguminous cover crops

Background:

- Cover crops accumulate soil N overwinter
- Non-leguminous cover crops generally provide little N to subsequent cereal
- Leguminous cover crops can fix atmospheric N
- Can leguminous cover crops supply significant amounts of N to the cereal?

Approach:

- Grow a range of leguminous cover crops (vetches, peas, lentil, clovers)
- Sow spring barley after incorporation of the cover crops
- Apply a range of fertiliser N levels to barley
- Compare yield (and protein) with and without leguminous cover crop

Outputs to date: Data on spring barley grain yield and protein content with and without leguminous cover crop

Future impact: Guidance on use of leguminous cover crops in spring cereal systems

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WALSH SCHOLARS

Generating practical advice for leatherjacket control

Background:

Leatherjackets (LJ) are the larvae of the cranefly, & are major agricultural pests in grassland and cereals.

Key chemical control (chlorpyrifos) prohibited by the EU in 2019 – what next?

Surveyed farm sites 2018-2021

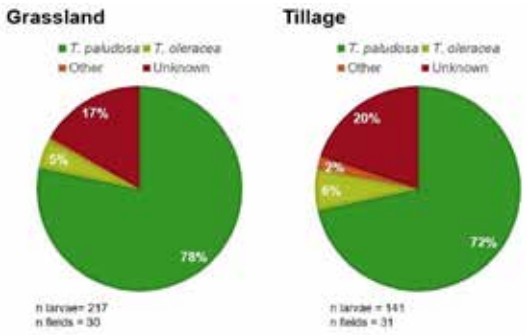
Outputs:

- Survey of 123 fields to identify main species completed
- Identified key factors that hinder larval development
- 2018/19 grassland survey suggested a correlation between pH, P, Mg and LJ density
- Profiling soil microbes to identify species with potential to supress larvae

Future Impact:

- Identify risk factors (soil characteristics, microbial communities associated with high LJ densities)
- Enhance understanding of LJ biology to allow development of targeted control approaches

Species ID results 2018/2019



*2018/2019 Irish samples

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WALSH SCHOLARSHIPS PROGRAMME
SRUC

Unlocking the aphid genome

Background:

- The grain aphid is a major agricultural pest of cereals and vector of BYDV
- A clone with partial resistance to insecticides has emerged in recent years
- The genome is like a roadmap with the information needed to build and maintain an organism. Until now, the sequence of DNA units making up the aphid genome was unknown; hindering our understanding of the molecular mechanisms of insecticide resistance

Outputs:

- We have produced the first ever assembly of the grain aphid's genome and identified the sequence of its over 400 million units of DNA
- We have also identified and characterised over 31,000 genes in the grain aphid genome

Future Impacts:

- The genome of a clone with partial resistance to insecticides will facilitate research into molecular mechanisms of insecticide resistance, and facilitate development of improved diagnostic tools

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WALSH SCHOLARS

White Clover Genomics

Background:

- White clover can contribute to both the economic and environmental sustainability of pastoral based production systems
- Opportunities exist to accelerate genetic gain in white clover breeding using technologies such as genomic selection

Outputs:

- We have established DNA profiles on breeding populations
- We have used these DNA profiles with field evaluations and developed promising genomic prediction models for seasonal forage yield

Future Impacts:

- It is expected that we can accelerated development of white clover cultivars with improved forage yield using the models developed at Oak Park
- Genomic selection will accelerate genetic gain for key traits and help increase on-farm profitability through reduced inputs and increased productivity

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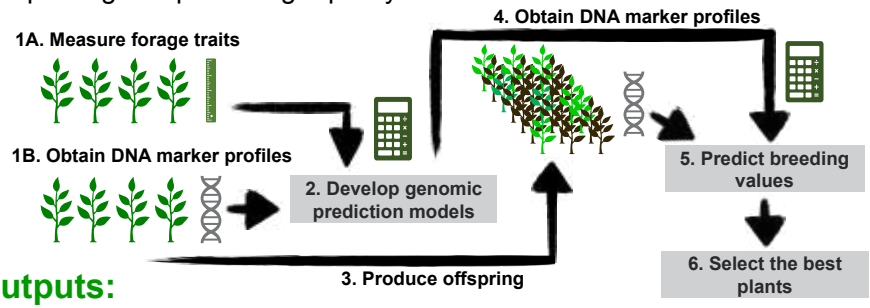
WALSH SCHOLARS

Improving pasture digestibility

Background:

- While there have been clear gains in breeding for dry matter yield, improvement in forage digestibility has lagged behind
- Genomic Selection (GS) has the potential to greatly contribute to improving complex forage quality traits



Outputs:

- We have developed promising genomic prediction models for forage quality parameters such as digestibility

Future Impacts:

- GS can enable a selection cycle to be completed in a single year (compared to seven with field evaluations), enable more plants be evaluated, and improve accuracy of selection
- Improving forage digestibility will lead to increased animal performance

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VistaMilk
An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

Optimal faba beans management

Background

- Yield instability remains a primary factor challenging greater faba bean uptake
- Large scale trials were completed to identify optimal management practises to maximise yield potential

Parameter	Optimal practise/conditions to support yield
Sowing window	Winter beans: October Spring Beans: Mid-February to mid-March
Seed rate	Winter beans: < 30 seeds m^{-2} Spring beans: 40 seeds m^{-2}
Soil nutrition	6 < pH < 7 P-fertilisation in low P index soils can increase yield up to 40%
Cultivation system	Conventional and reduced tillage systems give comparable yields
Disease control	Chocolate spot (major), downy mildew, rust Application: 2x from flowering. No additional benefit of 3rd application based on trials at Oak Park/Kildalton. Further trials planned at additional locations
Pests	Evidence of leaf notching needs to be addressed with insecticide application to minimise impact of pea & bean weevil
Dry spells	Early sowing will render a crop less susceptible to dry spells between May-July
Harvest	Mid September to October (small % of green stems remaining) Aim for < 20% moisture content

Future impact : Adoption of measures will minimise yield instability and support economic returns

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U-Protein: adding value to protein crops

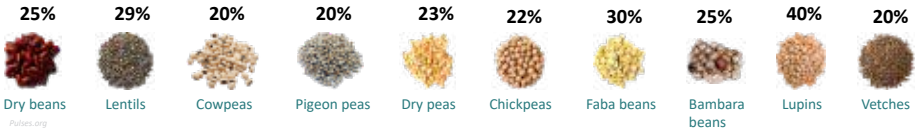
Background:

- Goal of U-Protein is to unlock the added value potential of protein crops
- Expand the alternative use and circularity potential of crops via novel post-harvest processing / formulation

Approach:

- Evaluate protein crops with potential under Irish conditions to deliver high protein content
- Tailor the grain amino acid profile via agronomy measures to support high value protein processing be that for food/animal feed outputs

Protein content



Outputs:

- Project commenced earlier this year and initial results will be presented at 2022 Tillage Conference

Future impact:

- Identify alternative crops for future rotations that deliver high value feedstock for food/feed processing

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U-PROTEIN
WALSH SCHOLARSHIPS PROGRAMME
An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

Barley Against Rynchosporium Disease

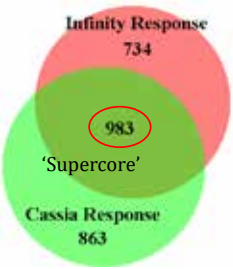
Background:

- Rhynchosporium is a major barley disease, reducing tiller survival and yield
- Sequencing technology allows us to examine the genetic response of different barley cultivars to Rhynchosporium
- This allows us to identify genes linked with varietal resistance or contributing to susceptibility, which can be important targets for breeding programmes

Outputs:

- Barley responds diversely to different Rhynchosporium strains
- Barley varieties Cassia and Infinity have an overlapping 'supercore' set of 983 genes that are activated in response to infection
- We have identified a core number of genes that promote susceptibility to Rhynchosporium

Barley Variety	Resistance rating	Number of Core response genes
KWS Cassia	4	1846
KWS Infinity	7	1717



Rhynchosporium infection on var Cassia

Future Impacts:

Understanding the genetics behind infection will allow us to identify genes associated with resistance, which will be targets for the breeding of barley varieties with more durable resistance.

WALSH SCHOLARS

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Notes:

Notes:

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