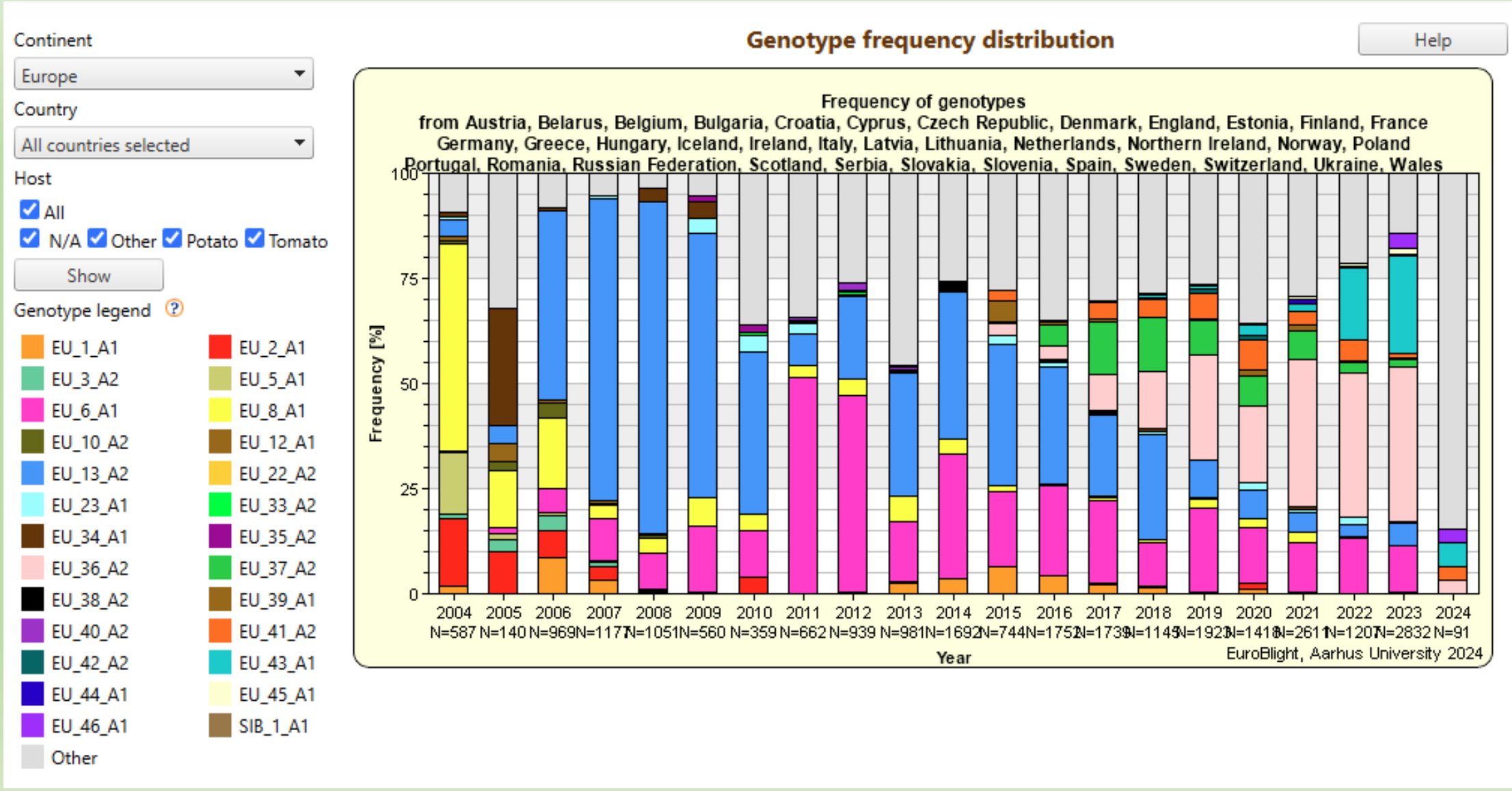
# Farming with resistant Strains ?

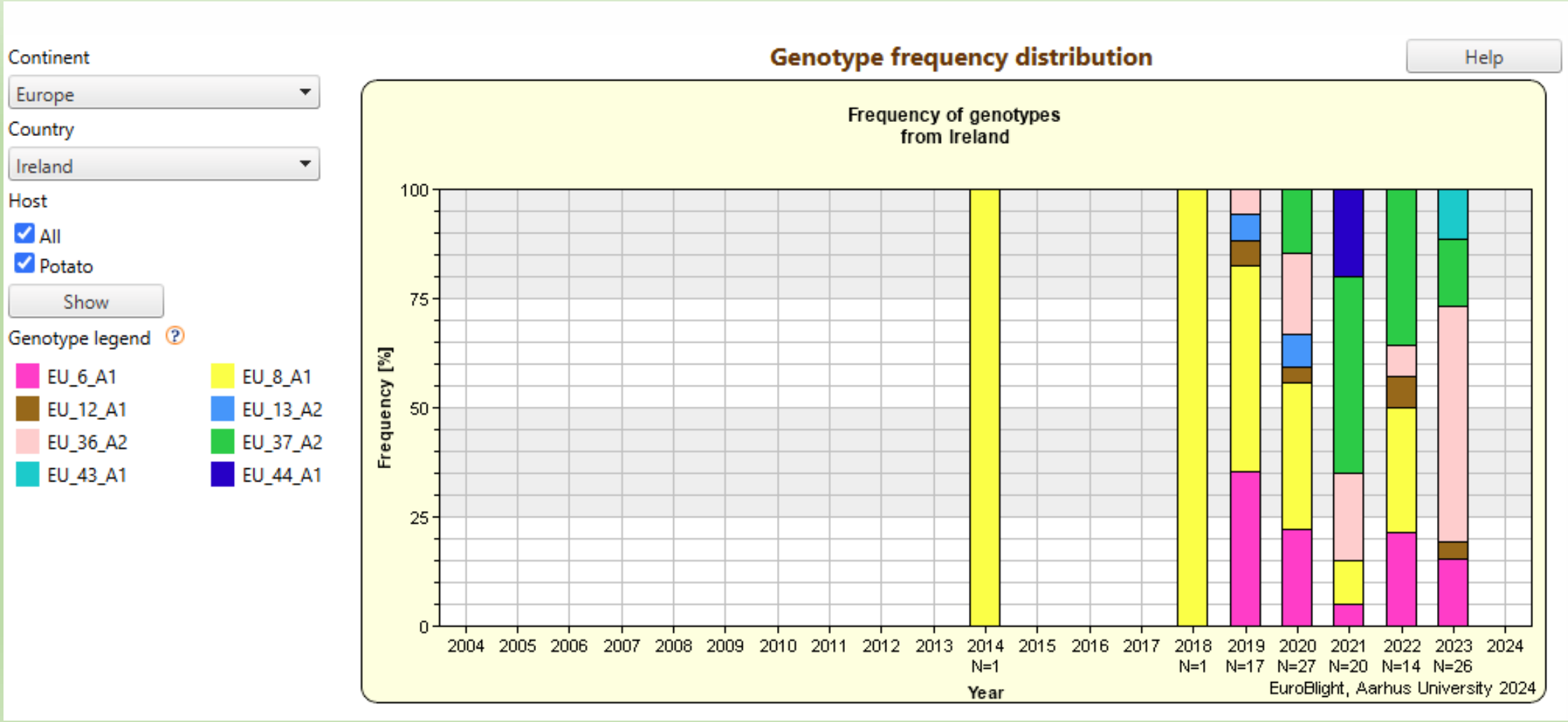

NUFFIELD IRELAND

Always growing O'Shea farms

# EU Strains


Continent
Europe
Country
All countries selected
Host
All
N/A
Other
Potato
Tomato
Show
Genotype legend
EU_1_A1
EU_2_A1
EU_3_A2
EU_5_A1
EU_6_A1
EU_8_A1
EU_10_A2
EU_12_A1
EU_13_A2
EU_22_A2
EU_23_A1
EU_33_A2
EU_34_A1
EU_35_A2
EU_36_A2
EU_37_A2
EU_38_A2
EU_39_A1
EU_40_A2
EU_41_A2
EU_42_A2
EU_43_A1
EU_44_A1
EU_45_A1
EU_46_A1
SIB_1_A1
Other
Genotype frequency distribution
Help
Frequency of genotypes
from Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, England, Estonia, Finland, France
Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Netherlands, Northern Ireland, Norway, Poland
Portugal, Romania, Russian Federation, Scotland, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, Wales
Frequency [%]
100
75
50
25
0
2004 N=587
2005 N=140
2006 N=969
2007 N=1177
2008 N=1051
2009 N=560
2010 N=359
2011 N=662
2012 N=939
2013 N=981
2014 N=1692
2015 N=744
2016 N=1752
2017 N=1739
2018 N=1145
2019 N=1923
2020 N=1418
2021 N=2611
2022 N=1207
2023 N=2832
2024 N=91
Year
EuroBlight, Aarhus University 2024

# Ireland


Continent
Europe
Country
Ireland
Host
All
Potato
Show
Genotype legend
EU_6_A1
EU_8_A1
EU_12_A1
EU_13_A2
EU_36_A2
EU_37_A2
EU_43_A1
EU_44_A1
Genotype frequency distribution
Help
Frequency of genotypes
from Ireland
Frequency [%]
100
75
50
25
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
N=1
2015
2016
2017
2018
N=1
2019
N=17
2020
N=27
2021
N=20
2022
N=14
2023
N=26
2024
Year
EuroBlight, Aarhus University 2024

# Chemistry

| Product (Dose rate [litre or kg/ha]) | Leaf blight | Tuber blight | New growth | Stem blight | Protec-tant | Curative | Anti sporulant | Rain-fastness | Mobility | Year |
|---|---|---|---|---|---|---|---|---|---|---|
| copper | | | | ● | ●◖ | 0 | 0 | ● | C | 1900 |
| dithiocarbamates (2.0)[1] | 2.0 | 0.0 | | ● | ●● | 0 | 0 | ●◖ | C | 1961 |
| chlorothalonil | | | | ◖ | ●● | 0 | 0 | ●●◖ | C | 1964 |
| cyazofamid (0.5) | 3.8 | 3.8 | ●● | ● | ●●● | 0 | 0 | ●●● | C | 2001 |
| fluazinam (0.4) | 2.9 | | | ● | ●●● | 0 | 0 | ●●◖ | C | 1992 |
| zoxamide + mancozeb (1.8) | 2.8 | | | ●[5] | ●●● | 0 | 0 | ●●◖ | C + C | 2001 |
| amisulbrom + mancozeb (0.5+2.0) | 4.5 | 3.7 | | ● | ●●◖ | 0 | ? | ●●● | C + C | 2007 |
| ametoctradin + mancozeb (2.5) | 3.7 | | ?[8] | ?[8] | ●●◖ | 0 | 0 | ●●● | C + C | 2011 |
| fluazinam + azoxystrobin (0.5) | 3.6 | | | | | | | | C + C | 2016 |
| famoxadone + cymoxanil | | | | ●◖ | ●● | ●● | ● | ●●◖ | C + T | 1996 |
| (zoxamide + mancozeb) + cymoxanil (1.8+0.2) | 3.4 | | | | | | | | C + T | 2001 |
| mandipropamid (0.6) | 4.0 | | ●● | ●◖ | ●●● | ●[6] | ●◖ | ●●● | C/T | 2005 |
| mandipropamid + difenoconazole (0.6) | 4.0 | | ●● | ●◖ | ●●● | ●[6] | ●◖ | ●●● | C/T + C | 2005 |
| benthiavalicarb (0.5) | 4.2 | | | | | | | | T | 2018 |
| benthiavalicarb + mancozeb (2.0) | 3.7 | | | ●◖[5] | ●●● | ●◖ | ● | ●●◖ | T + C | 2003 |
| cymoxanil + metiram | | | | ●◖ | ●● | ●● | ● | ●● | T + C | 1976 |
| cymoxanil + copper | | | | ●◖ | ●● | ●● | ● | ●● | T + C | 1976 |
| cymoxanil + mancozeb | | | | ●◖ | ●● | ●● | ● | ●● | T + C | 1976 |
| dimethomorph + mancozeb (2.4) | 3.0 | | | ●◖ | ●●◖ | ● | ●● | ●●◖ | T + C | 1988 |
| dimethomorph + fluazinam (1.0) | 3.7 | 3.3 | ● | ● | ●●◖ | ● | ●● | ●●◖ | T + C | 2012 |
| fenamidone + mancozeb (1.5) | 2.6 | | | ●◖[5] | ●●◖ | 0 | ●◖[5] | ●● | T + C | 1998 |
| (zoxamide + cymoxanil) + fluazinam (0.45+0.4) | 4.0 | | | | | | | | C/T + C | 2013 |
| (zoxamide + dimethomorph) + fluazinam (1.0+0.4) | 4.2 | | | | | | | | C/T + C | 2015 |
| mandipropamid + cymoxanil (0.6) | 4.4 | | ●● | ●◖ | ●●● | ●● | ●◖ | ●●● | C/T + T | 2013 |
| (pyraclostrobin + dimethomorph) + adjuvant (2.5+1.0) | 4.0[7] | | | | | | | | C/T + T | 2012 |
| benalaxyl-M + mancozeb[2] | 3.0 | | ●● | ●● | ●●◖ | ●●◖ | ●●◖ | ●●● | S + C | 1981 |
| metalaxyl-M + mancozeb[2] | | | ●● | ●● | ●●◖ | ●●◖ | ●●◖ | ●●● | S + C | 1977 |
| metalaxyl-M + fluazinam[2] | | | ●● | ●● | ●●◖ | ●●◖ | ●●◖ | ●●● | S + C | |
| propamocarb + cymoxanil + cyazofamid ((2.0)+0.5) | | 4.6 | | | | | | | S + T + C | 2012 |
| propamocarb + cymoxanil (2.0) | | | | | ●◖ | ●●◖[9] | ●●◖ | | S + T | 2011 |
| propamocarb-HCl + fenamidone (2.0) | 2.5 | | ●◖ | ●● | ●●◖ | ●● | ●● | ●●● | S + T | 1998 |
| propamocarb-HCl + fluopicolide (1.6) | 3.8 | 3.9 | ●● | ●● | ●●● | ●● | ●●◖ | ●●◖ | S + C/T | 2006 |
| oxathiapiprolin (0.15) | | | ●●◖ | ●●◖ | ●●● | ●● | ●●◖ | ●●● | S | 2017 |
| oxathiapiprolin + famoxadone (0.5) | 4.9 | 4.1 | ●●◖ | ●●◖ | ●●● | ●● | ●●◖ | ●●● | S + C | 2018 |
| oxathiapiprolin + amisulbrom (0.15+0.3) | 4.9 | | | | | | | | S + C | 2018 |
| oxathiapiprolin + benthiavalicarb (0.4) | 4.9[7] | 3.4 | ●●◖ | ●●◖ | ●●● | ●● | ●●◖ | ●●● | S + T | 2019 |

| Product (Dose rate [litre or kg/ha]) | Leaf blight | Tuber blight | New growth | Stem blight | Protec-tant | Curative | Anti sporulant | Rain-fastness | Mobility | FRAC code | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| copper | | | | ● | ●◖ | 0 | 0 | ● | C | M 01 | |
| cyazofamid (0.5) | 3.8 | 3.8 | ●● | ● | ●●● | 0 | 0 | ●●● | C | 21 | 2001 |
| fluazinam (0.4) | 2.9 | | | ● | ●●● | 0 | 0 | ●●◖ | C | 29 | 1992 |
| fluazinam + azoxystrobin (0.5) | 3.6 | | | | | | | | C + C | 29 + 11 | 2016 |
| mandipropamid (0.6) | 4.0 | | ●● | ●◖ | ●●● | ●[6] | ●◖ | ●●● | C/T | 40 | 2005 |
| mandipropamid + difenoconazole (0.6) | 4.0 | | ●● | ●◖ | ●●● | ●[6] | ●◖ | ●●● | C/T + C | 40 + 3 | 2005 |
| benthiavalicarb (0.5) | 4.2 | | | | | | | | T | 40 | 2018 |
| cymoxanil + metiram | | | | ●◖ | ●● | ●● | ● | ●● | T + C | 27 + M 03 | 1976 |
| cymoxanil + copper | | | | ●◖ | ●● | ●● | ● | ●● | T + C | 27 + M 01 | 1976 |
| dimethomorph + fluazinam (1.0) | 3.7 | 3.3 | ● | ● | ●●◖ | ● | ●● | ●●◖ | T + C | 40 + 29 | 2012 |
| (zoxamide + cymoxanil) + fluazinam (0.45+0.4) | 4.0 | | | | | | | | C + T + C | 22 + 27 + 29 | 2013 |
| (zoxamide + dimethomorph) + fluazinam (1.0+0.4) | 4.2 | | | | | | | | C + T + C | 22 + 40 + 29 | 2015 |
| mandipropamid + cymoxanil (0.6) | 4.4 | | ●● | ●◖ | ●●● | ●● | ●◖ | ●●● | C/T + T | 40 + 27 | 2013 |
| (pyraclostrobin + dimethomorph) + adjuvant (2.5+1.0) | 4.0[7] | | | | | | | | C + T + T | 11 + 40 | 2012 |
| metalaxyl-M + fluazinam[2] | | | ●● | ●● | ●●◖ | ●●◖ | ●●◖ | ●●● | S + C | 4 + 29 | |
| propamocarb + cymoxanil + cyazofamid ((2.0)+0.5) | | 4.6 | | | | | | | S + T + C | 28 + 27 + 21 | 2012 |
| propamocarb + cymoxanil (2.0) | | | | | ●◖ | ●●◖[9] | ●●◖ | | S + T | 28 + 27 | 2011 |
| propamocarb-HCl + fluopicolide (1.6) | 3.8 | 3.9 | ●● | ●● | ●●● | ●● | ●●◖ | ●●◖ | S + C/T | 28 + 43 | 2006 |
| oxathiapiprolin (0.15) | | | ●●◖ | ●●◖ | ●●● | ●● | ●●◖ | ●●● | S | 49 | 2017 |
| oxathiapiprolin + amisulbrom (0.15+0.3) | 4.9 | | | | | | | | S + C | 49 + 21 | 2018 |
| oxathiapiprolin + amisulbrom (0.25) | 4.9 | 3.9 | ●●◖ | ●●◖ | ●●● | ●● | ●●◖ | ●●● | S + C | 49 + 21 | 2022 |
| oxathiapiprolin + benthiavalicarb (0.4) | 4.9 | 3.4 | ●●◖ | ●●◖ | ●●● | ●● | ●●◖ | ●●● | S + T | 49 + 40 | 2019 |

# 2024

- EU 43 and EU 37
- No Manncozeb
- CAA & OXTP & Fluazinam resistance
- Robust program

O'SheaFarms

**Blight Fungicides: 2024**

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E-MAIL: tmurray@osheafarms.ie

| | |
|---|---|
| T 1 | Proxanil (04639) 2.5 lt/ha in 200 litres water/ha |
| | **7 days later** |
| T 2 | Revus pcs (05154) 0.6 lt/ha + Enervin pcs (05995) 1.2 lt/ha in 220 litres water/ha |
| | **7 days later** |
| T 3 | Infinito pcs (04309) 1.6 lt/ha in 200 litres water/ha |
| | + 5 kg/ha of Metaldehyde slug pellets (e.g of products Axcela, Gusto) |
| | **7 days later** |
| T 4 | Zorvec Entecta (06766) 0.25 lt/ha + Sipcam (04494) 0.24kg/ha in 220 litres water/ha |
| | **7 days later** |
| T 5 | Infinito pcs (04309) 1.6 lt/ha in 220 litres water/ha |
| | + 5 kg/ha of Metaldehyde slug pellets (e.g of products Axcela, Gusto |
| | **7 days later** |
| T 6 | Revus pcs (05154) 0.6 lt/ha + Shirlan (0493) 0.4 lt/ha in 220 litres water/ha |
| | **7 days later** |
| T 7 | Ranman pcs (04497) 0.5 lt/ha + Proxanil (04639) 2.5 lt/ha in 220 litres water/ha |
| | **7 days later** |
| T 8 | Zorvec Entecta (06766) 0.25 lt/ha + Sipcam (04494) 0.24kg/ha in 220 litres water/ha |
| | **7 days later** |
| T 9 | Infinito pcs (04309) 1.6 lt/ha in 220 litres water/ha |
| | **7 days later** |
| T 10 | Ranman pcs (04497) 0.5 lt/ha + Shirlan (0493) 0.4 lt/ha in 220 litres water/ha |
| | + 5 kg/ha of Metaldehyde slug pellets (e.g of products Axcela, Gusto) |
| | **7 days later** |
| T 11 | Zorvec Entecta (06766) 0.25 lt/ha + Sipcam (04494) 0.24kg/ha in 220 litres water/ha |
| | **7 days later** |
| T 12 | Ranman pcs (04497) 0.5 lt/ha + Enervin pcs (05995) 1.2 lt/ha in 220 litres water/ha |
| | + 5 kg/ha of Metaldehyde slug pellets (e.g of products Axcela, Gusto) |
| | **7 days later** |
| T 13 | Revus pcs (05154) 0.6 lt/ha + Proxanil (04639) 2.5 lt/ha in 220 litres water/ha |
| | **7 days later** |
| T 14 | Ranman pcs (04497) 0.5 lt/ha + Enervin pcs (05995) 1.2 lt/ha in 220 litres water/ha |
| | **7 days later** |
| T15 | Infinito pcs (04309) 1.6 lt/ha in 220 litres water/ha |
| | **7 days later** |
| T16 | Ranman pcs (04497) 0.5 lt/ha + Proxanil (04639) 2.5 lt/ha in 220 litres water/ha |
| | Increase water rates from 200 l/ha to 220 l/ha from full crop canopy. |

# 2024 in practice

- Late planting
- Staggered planting dates
- Workload on sprayers
- Southeast “spraying days limited”
- Hutton period 28 times on Sencrop

- FTA samples (15)
- Only one sample EU43
- All others were EU 36A2 EU 6A1

# Stewardship

- We are getting blight regardless of the strain
- Water volume
- Nozzle selection
- Timings
- Rates
- Rainfastness
- Coverage
- Operators
- Dumps
- Volunteers
- Products

| Product (Dose rate [litre or kg/ha]) | Leaf blight | Tuber blight | New growth | Stem blight | Protec-tant | Curative | Anti sporulant | Rain-fastness | Mobility | FRAC code | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| copper | | | | ● | ◐ | 0 | 0 | ● | C | M 01 | |
| cyazofamid (0.5) | 3.8 | 3.8 | ●● | ● | ●●● | 0 | 0 | ●●● | C | 21 | 2001 |
| fluazinam (0.4) | 2.9 | | | ● | ●●● | 0 | 0 | ●●◐ | C | 29 | 1992 |
| fluazinam + azoxystrobin (0.5) | 3.6 | | | | | | | | C + C | 29 + 11 | 2016 |
| mandipropamid (0.6) | 4.0 | | ●● | ●◐ | ●●● | ●[6] | ●◐ | ●●● | C/T | 40 | 2005 |
| mandipropamid + difenoconazole (0.6) | 4.0 | | ●● | ●◐ | ●●● | ●[6] | ●◐ | ●●● | C/T + C | 40 + 3 | 2005 |
| benthiavalicarb (0.5) | 4.2 | | | | | | | | T | 40 | 2018 |
| cymoxanil + metiram | | | | ●◐ | ●● | ●● | ● | ●● | T + C | 27 + M 03 | 1976 |
| cymoxanil + copper | | | | ●◐ | ●● | ●● | ● | ●● | T + C | 27 + M 01 | 1976 |
| dimethomorph + fluazinam (1.0) | 3.7 | 3.3 | ● | ● | ●●◐ | ● | ●● | ●●◐ | T + C | 40 + 29 | 2012 |
| (zoxamide + cymoxanil) + fluazinam (0.45+0.4) | 4.0 | | | | | | | | C + T + C | 22 + 27 + 29 | 2013 |
| (zoxamide + dimethomorph) + fluazinam (1.0+0.4) | 4.2 | | | | | | | | C + T + C | 22 + 40 + 29 | 2015 |
| mandipropamid + cymoxanil (0.6) | 4.4 | | ●● | ●◐ | ●●● | ●● | ●◐ | ●●● | C/T + T | 40 + 27 | 2013 |
| (pyraclostrobin + dimethomorph) + adjuvant (2.5+1.0) | 4.0[7] | | | | | | | | C + T + T | 11 + 40 | 2012 |
| metalaxyl-M + fluazinam[2] | | | ●● | ●● | ●●◐ | ●●◐ | ●●◐ | ●●● | S + C | 4 + 29 | |
| propamocarb + cymoxanil + cyazofamid ((2.0)+0.5) | | 4.6 | | | | | | | S + T + C | 28 + 27 + 21 | 2012 |
| propamocarb + cymoxanil (2.0) | | | | | ◐ | ●●◐ [9] | ●●◐ | | S + T | 28 + 27 | 2011 |
| propamocarb-HCl + fluopicolide (1.6) | 3.8 | 3.9 | ●● | ●● | ●●● | ●● | ●●◐ | ●●◐ | S + C/T | 28 + 43 | 2006 |
| oxathiapiprolin (0.15) | | | ●●◐ | ●●◐ | ●●● | ●● | ●●◐ | ●●● | S | 49 | 2017 |
| oxathiapiprolin + amisulbrom (0.15+0.3) | 4.9 | | | | | | | | S + C | 49 + 21 | 2018 |
| oxathiapiprolin + amisulbrom (0.25) | 4.9 | 3.9 | ●●◐ | ●●◐ | ●●● | ●● | ●●◐ | ●●● | S + C | 49 + 21 | 2022 |
| oxathiapiprolin + benthiavalicarb (0.4) | 4.9 | 3.4 | ●●◐ | ●●◐ | ●●● | ●● | ●●◐ | ●●● | S + T | 49 + 40 | 2019 |

# *Conclusion*

- IPM
- FTA testing and in the near future field testing
- Need to know what we have
- Weather forecasting
- Seed
- New products ??
- Protect the products we have !!!!