# The Integrated pest management knowledge exchange network

*Create connections to advance IPM*

**IPM NET Kick-off Meeting**

16th February 2024

**Speaker: David Felce**

Farmer and Retired Technical Advisor for Agrii

| | | |
|---|---|---|
| 09:30-10:00 | **Arrival and Refreshments** | |
| 10:00-10:05 | Welcome and Housekeeping | Dr Sarah Kendall |
| 10:05-10:30 | Motivations and Considerations for IPM | David Felce, Midloe Grange Farm |
| 10:30 – 11:00 | IPM – How to address the challenges | Dr Neil Paveley |
| 11:00 – 11:50 | Breakout session 1 – IPM in practice : Interactive discussion | Ella Bradfield |
| 11:50- 12:20 | **Break and Refreshments** | |
| 12:20 – 13:05 | Collecting observation data and results from the Defra Pest and Disease survey. | Dr Ellie Dearlove, Dr Isabelle Sims and Dr Duncan Coston |
| 13:05 – 13:50 | **Lunch** | |
| 13:50 – 14:20 | Bringing Novel Approaches onto farm. Sharing examples of IPM case studies and how knowledge exchange networks can evolve IPM strategies. | Andrew Christie (JHI) |
| 14:20- 15:00 | Breakout session 2 – Ideas Lab<br>Interactive discussion on IPM innovation | Dr Ellie Dearlove |
| 15:00 -15:20 | Wrap up and close | Dr Mark Ramsden |

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IPM NET

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# IPM – How to address the challenges

## Dr Neil Paveley

ADAS | Department for Environment Food & Rural Affairs

Visit https://adas.co.uk/ipmnet
Or email IPMNET@adas.co.uk

IPM NET

# The Integrated pest management knowledge exchange network

*Create connections to advance IPM*

# IPM – How to address the challenges?

Neil Paveley, ADAS

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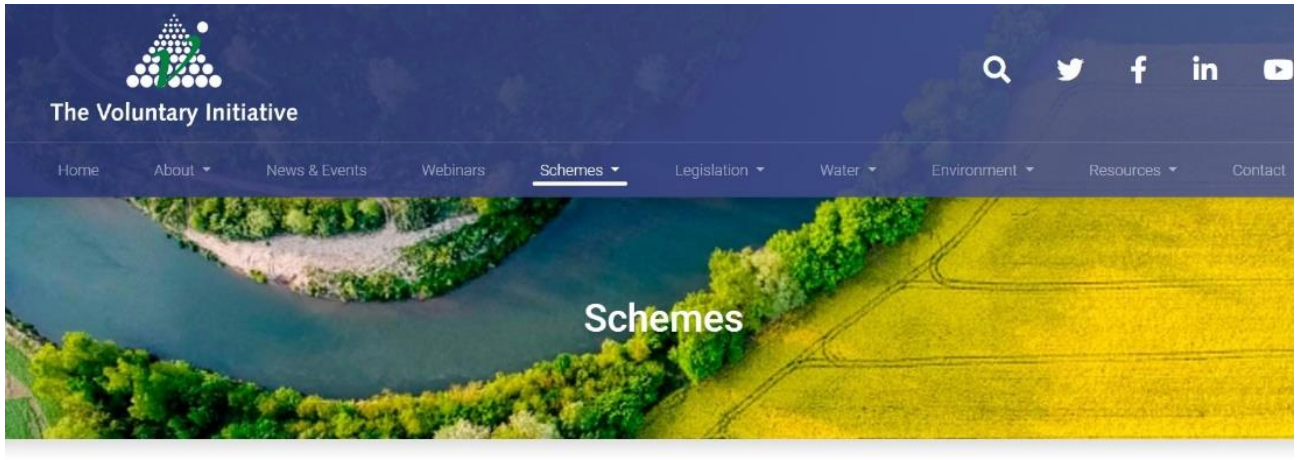



## The VI Integrated Pest Management (IPM) Hub; gateway to the IPM Plans, IPM Tool and other IPM resources

As part of the Sustainable Use Directive, the UK government must show that UK growers are using integrated pest management practices.

Professional Plant Protection Product users must consider the principles of IPM when considering management of pests, weeds and diseases. For several years, the VI has been encouraging farmers/growers to complete an IPM plan which considers an IPM-based approach to sustainable farming. This is an annual requirement of specific crop assurance

## Best arable farming practice survey

- *Please answer the questions as accurately as you can. Good data is needed to provide reliable advice back to farmers and advisors.*
- *Please note that the term 'pests' relates to diseases, weeds and invertebrate pests (insects and molluscs). Similarly, 'pesticides' refers to fungicides, herbicides, insecticides and molluscicides.*
- *Please read question instructions carefully as the type of response required may vary from question to question.*
- *Please complete the survey in full.*

1. **How familiar are you with Integrated Pest Management (IPM)?** *Please tick one answer only.*

   ☐ Not at all familiar (if this answer, please move direct to Question 3.)
   ☐ Somewhat unfamiliar
   ☐ Moderately familiar
   ☐ Familiar
   ☐ Very familiar

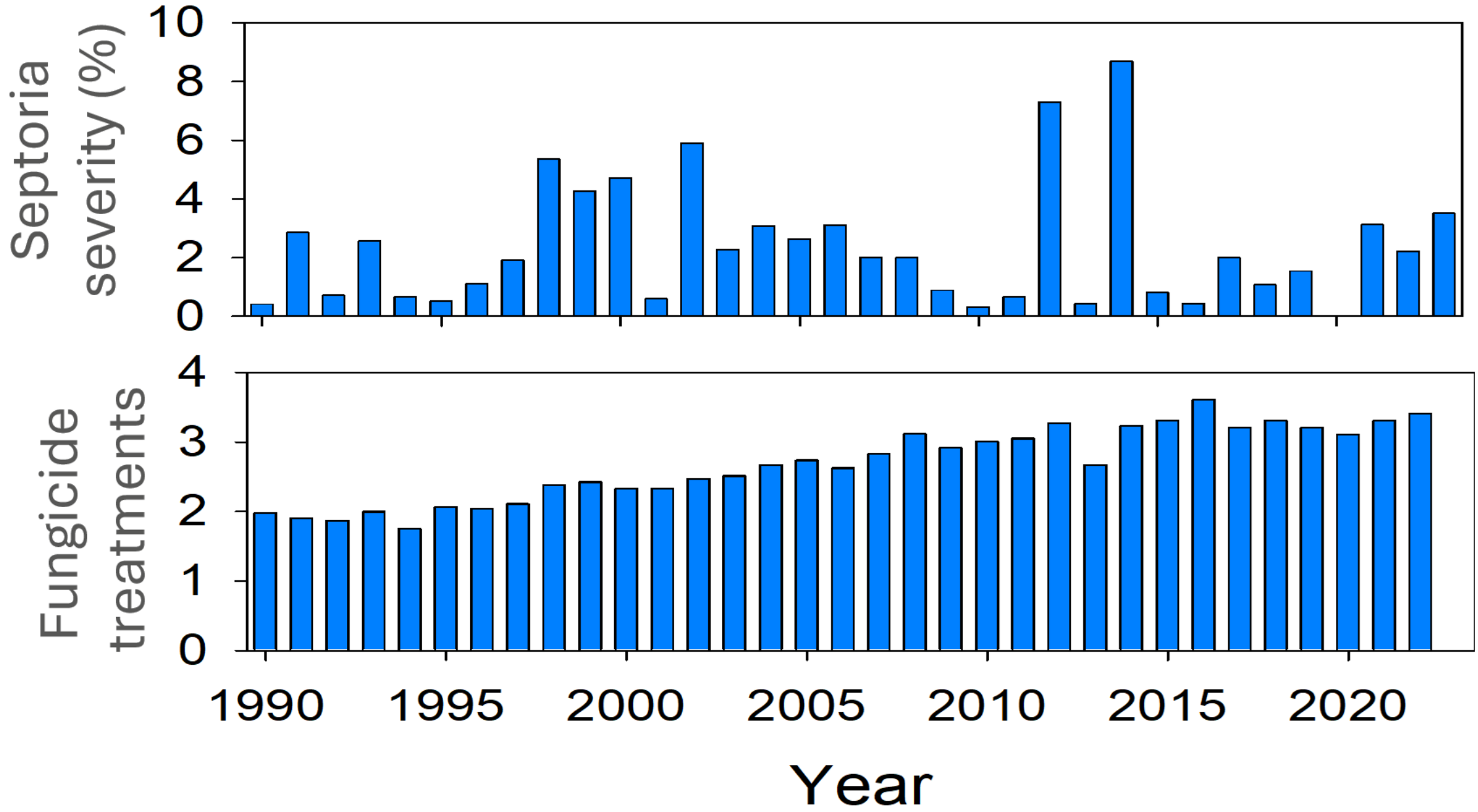
2. **Which of the following factors do you consider to be important components of IPM?** *Please tick one box in every row.*

| | Very unimportant | Not important | Neither important or unimportant | Fairly Important | Very important |
|---|---|---|---|---|---|
| Preventative measures (hygiene practices such as cleaning equipment, sourcing clean seed etc.) | | | | | |
| Biological control methods (growing competitive crops, beetle banks etc.) | | | | | |
| Cultural control methods (altering drilling dates to reduce disease, increasing seeding rate to control weeds, rotating crops etc.) | | | | | |
| Monitoring and surveillance of insect pest, weed and disease levels (crop walking, reacting to high disease/pest pressure alerts etc.) | | | | | |
| Minimum use of pesticides | | | | | |

3. **What proportion of your land is in continuous cereal production i.e. growing cereals on the same land for 5 or more consecutive years without growing a break crop (e.g. oilseed rape, beans, peas, grass)?** *Please circle the relevant proportion below.*

| None | 1 – 25% | 26 – 50% | 51 – 75% | 76 – 100% |
|---|---|---|---|---|

4. **Why do you practice continuous cereal production?** *More than one answer may be provided.*




Defra pest and disease survey, winter wheat

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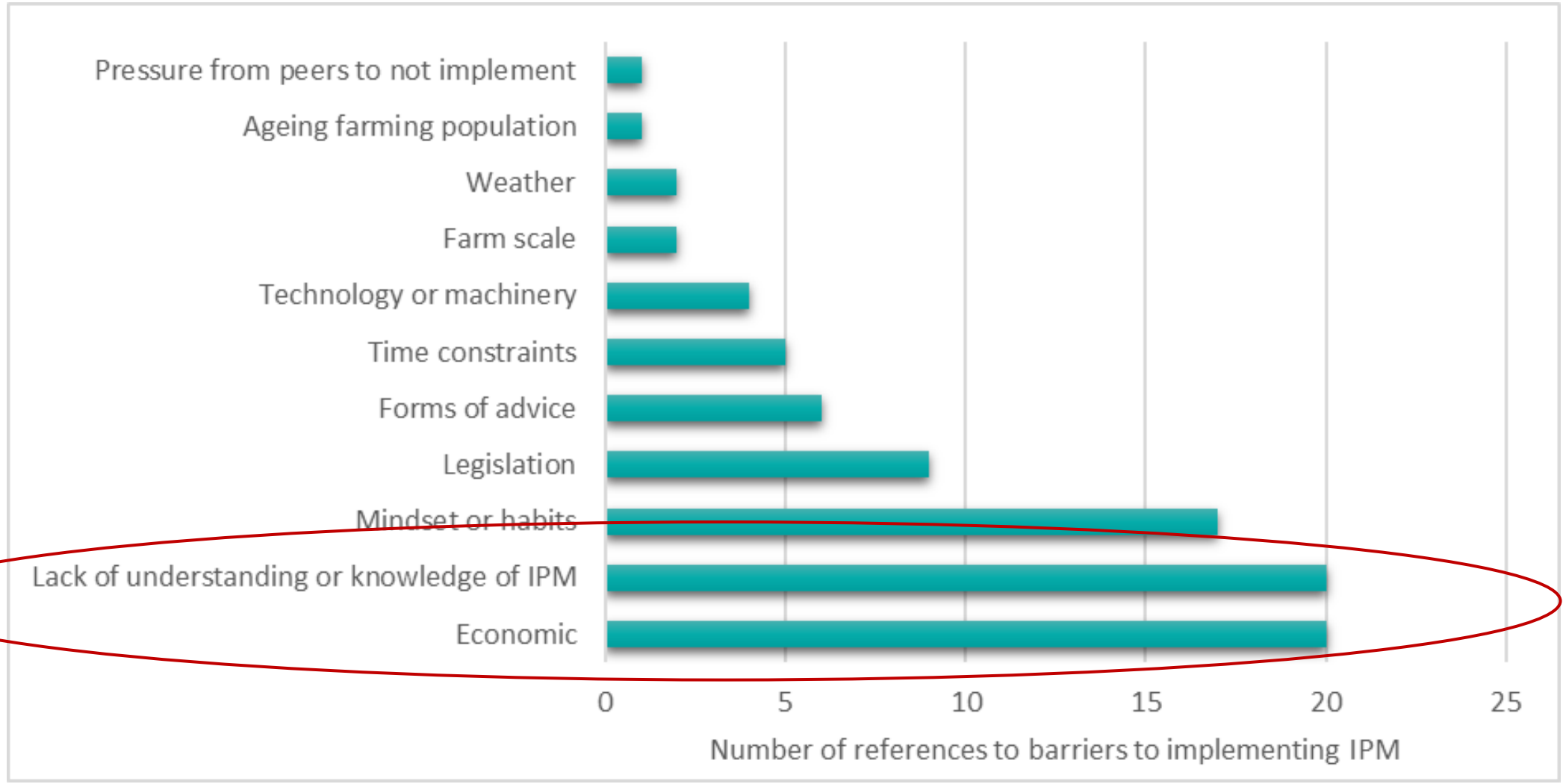
# Barriers to implementing more IPM practices




Walker et al. (2021). Final report: IPM SFI test and trial (Defra project 253)


December 2021

AHDB CEREALS & OILSEEDS

**Research Review No. 98**

Enabling the uptake of integrated pest management (IPM) in UK arable rotations

(a review of the evidence)

Jonathan Blake[1], Sarah Cook[2], Kevin Godfrey[1], Lynn Tatnell[2],

Sacha White[2], Frances Pickering[1] and Paul Wright[1].

[1]ADAS Rosemaund, Preston Wynne, Herefordshire HR1 3PG

[2] ADAS Boxworth, Boxworth, Cambridgeshire CB23 4NN

573 sources from global literature reviewed and interpreted for UK:

- 4 crops: wheat, barley, oilseed rape and potatoes
- 40 IPM control measures
- 80 weeds (grouped), pests and diseases
- 642 control measure by pest combinations which could be relevant for IPM

**www.ahdb.org.uk/ipm-review**

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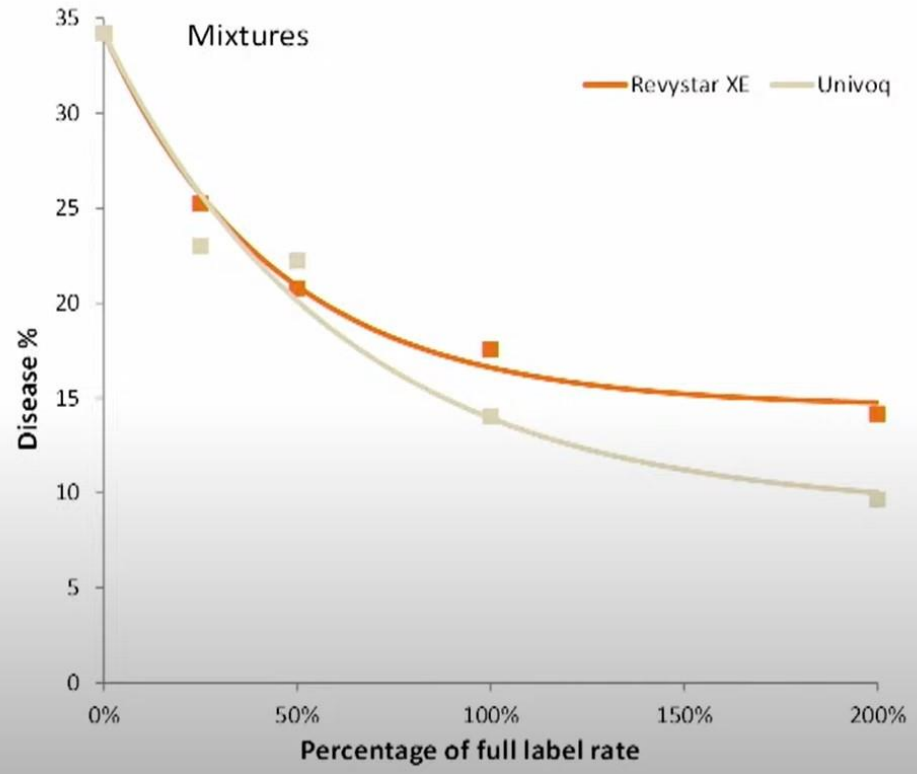
IPM NET

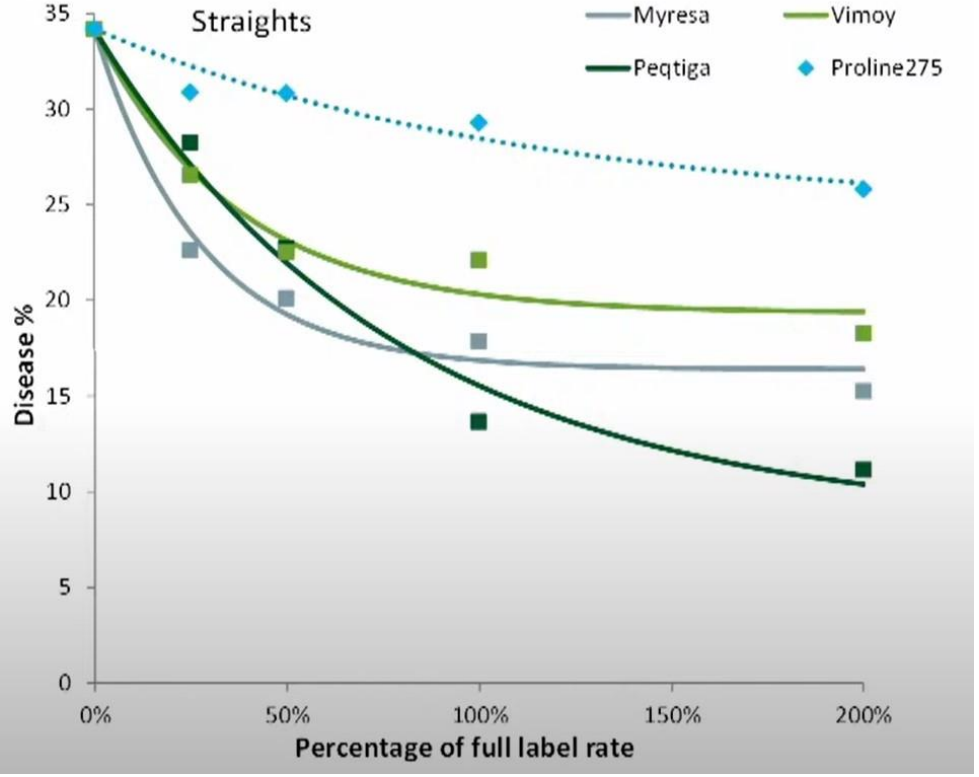
**Specific pest** → **Specific pesticide** → **Effective control**

Agronomy Conference 2023

AHDB

# Septoria eradicant overyear 2021-23 (7 trials)

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# Which control methods to combine?

**Specific pest** → **Rotation**
**Cultivation**
**Genetics**
**Agronomy**
**Biocontrol**
**+ Treat with pesticide according to need** →

**Effective control of the pest**

- Which control methods worked?
- Would less have worked?

**And effects on:**

- Other pests (+ve or –ve)
- Evolution of resistance/virulence
- Economics (+ve or –ve)
- Environment (+ve or –ve)

## Replicated plots

Pros: Multiple direct treatment comparisons

Known statistical confidence in results

Cons: Research infrastructure cost

## Tramline trials

Pros: Low cost trials that farmers or researchers can do

Large scale comparisons

Cons: One treatment comparison

Many trials needed to compare treatments

## Field observations

Pros: Farmer/agronomist engagement

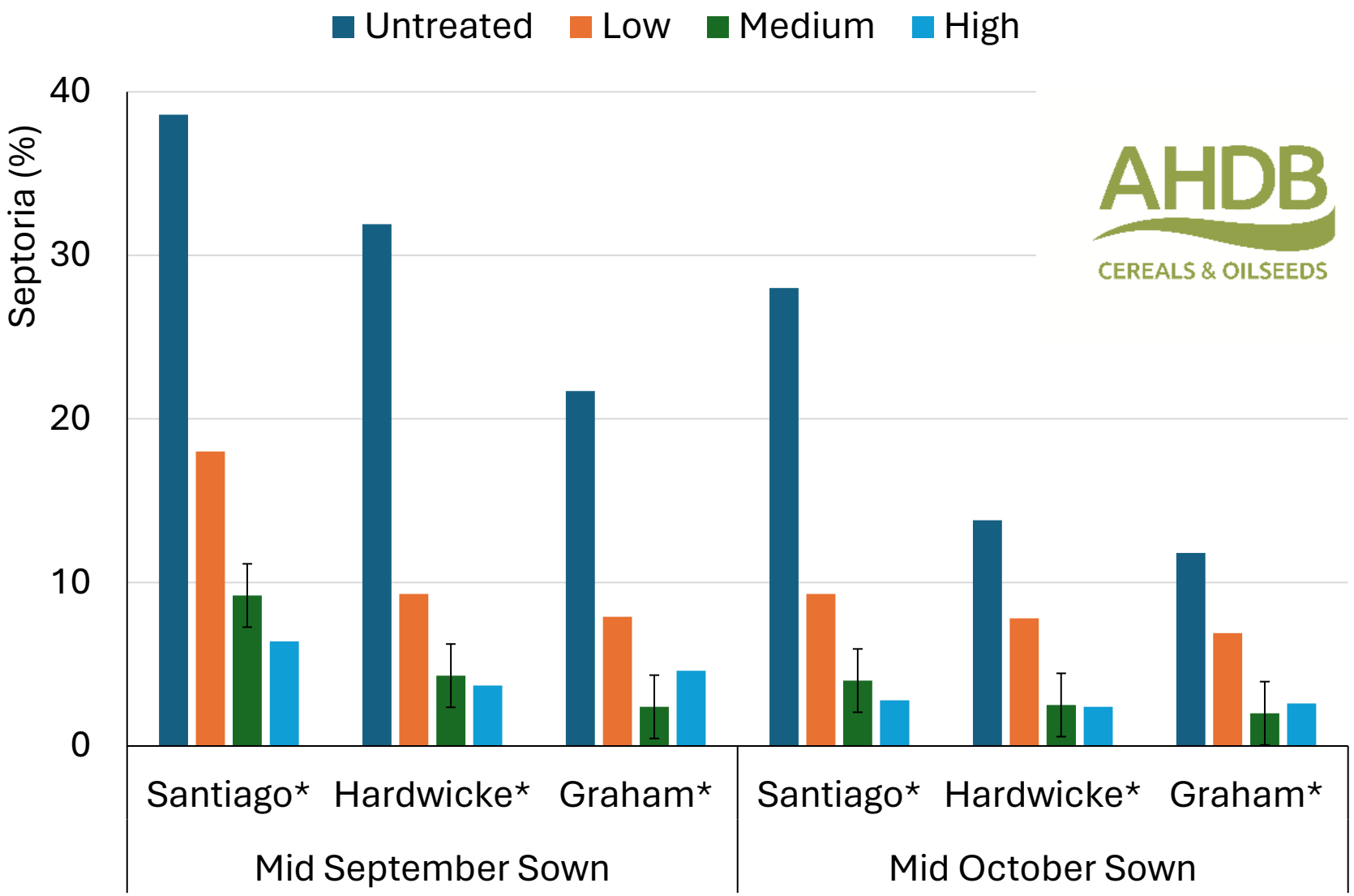
Wide range of agronomy and environments

Data across seasons

Cons: Each field is one combination of factors/variables

Disentangling effects needs many observations

# Septoria - mean of 4 trials (2019)




Morgan et al. (2021)
AHDB Research Report
PR634

Error bar shows LSD for variety x fungicide interaction. * JB Diego, Costello and Bennington used in Ireland

# The yield enhancement network

**Rotation**
**Cultivation**
**Genetics**
**Agronomy**

→

**Yield**

- Which input combinations work in particular environments?

# How YENs work

FarmPEP

About People

The Knowledge Excha

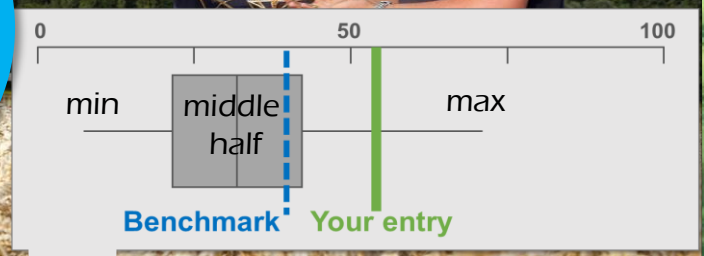
Knowledge

Growth Guides

ahdb.org.uk

Metrics

Benchmarking & Reporting




Sharing & developing ideas

Ideas

Tests


FIGs: F Innovation Groups

& Field Labs Multi-site Testing

# What information to share?

Experience (consensus):

- What worked?

Data:

- IPM Control measures
- Crop inputs
- Levels of invertebrate pests, weeds and diseases
- Crop outputs (yield, quality)

Data:

- IPM Control measures
- Crop inputs
- Levels of invertebrate pests, weeds and diseases
- Crop outputs (yield, quality)

# OILSEED RAPE - DISEASES

## Use in current cropping season

| Control measures selected | Risk<br>Significant | Moderate | Slight |
|---|---|---|---|
| Control volunteers & weeds | Sclerotinia StemRot | Clubroot | |
| Decision support (incl. thresholds) | Phoma Stem Canker, Sclerotinia StemRot | Light Leaf Spot | |
| Field history, Rotation & break crops | Phoma Stem Canker, Sclerotinia StemRot, Verticillium Stem Stripe | Clubroot, Light Leaf Spot | |
| Good Drainage | | Clubroot | |
| Hygiene and prevention | Verticillium Stem Stripe | Clubroot | |
| Lime | | Clubroot | |
| Primary cultivations / Crop residue burial | Phoma Stem Canker, Sclerotinia StemRot | Light Leaf Spot | |
| Select low-risk locations | Sclerotinia StemRot, Verticillium Stem Stripe | Clubroot | |
| Sowing Date | Phoma Stem Canker | Clubroot, Light Leaf Spot | |
| Spatial Separation | Phoma Stem Canker | Clubroot, Light Leaf Spot | |

## Intend to use in future seasons

| Control measures selected | Risk<br>Significant | Moderate | Slight |
|---|---|---|---|

Data:

- IPM Control measures
- Crop inputs
- Levels of invertebrate pests, weeds and diseases
- Crop outputs (yield, quality)


11 September 2023

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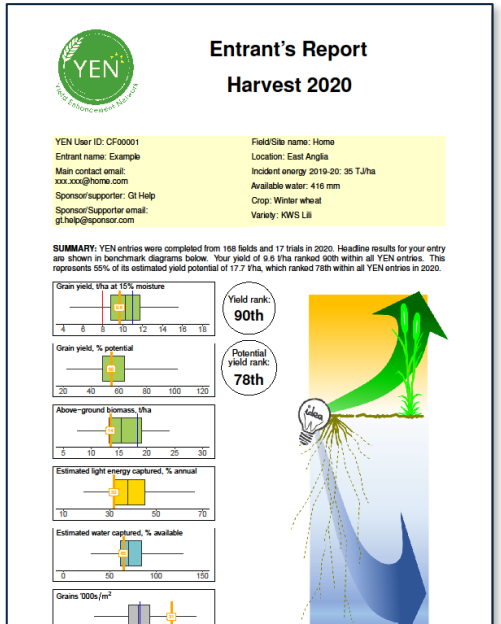
# What will IPM NET produce?

- Shared experience – what works?
- Data analysis – what works?
- Individual benchmarking



Entrant's Report

Harvest 2020

YEN User ID: CF00001
Entrant name: Example
Main contact email: xxx.xxx@home.com
Sponsor/supporter: Gt Help
Sponsor/Supporter email: gt.help@sponsor.com

Field/Site name: Home
Location: East Anglia
Incident energy 2019-20: 35 TJ/ha
Available water: 416 mm
Crop: Winter wheat
Variety: KWS Lili

**SUMMARY:** YEN entries were completed from 168 fields and 17 trials in 2020. Headline results for your entry are shown in benchmark diagrams below. Your yield of 9.6 t/ha ranked 90th within all YEN entries. This represents 55% of its estimated yield potential of 17.7 t/ha, which ranked 78th within all YEN entries in 2020.

Grain yield, t/ha at 15% moisture

Grain yield, % potential

Above-ground biomass, t/ha

Estimated light energy captured, % annual

Estimated water captured, % available

Grains '000s/m²

Yield rank: 90th

Potential yield rank: 78th

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*Understanding pest pressure as a network*

# Collecting observation data and results from the Defra Pest and Disease survey

Dr Ellie Dearlove & Dr Isabelle Sims

Visit https://adas.co.uk/ipmnet
Or email IPMNET@adas.co.uk

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# The Integrated pest management knowledge exchange network

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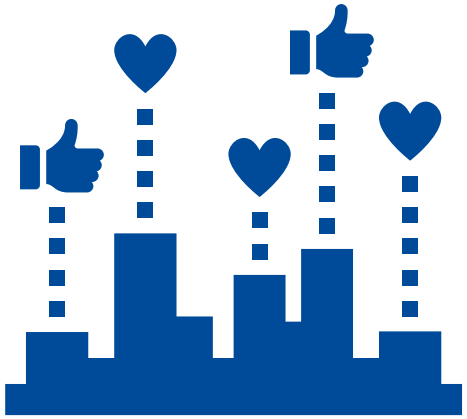
**Aim of IPM NET**: To better understand the effectiveness of IPM approaches on farm yield, profitability and sustainability.

Access to tools and knowledge


Collect and analyse IPM data



Share information and experience

# IPM NET – Pilot Concept

As a member:

- Receive a personalised IPM NET member report.
- Have access to an annual review of the dataset.
- Take part in discussion workshops on farm- and field-specific ideas to enhance IPM practices.
- BASIS and NRoSO points will be available as part of the pilot.
- Membership and conference attendance will be free of charge for IPM NET pilot members in the 2024/25 season.

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# IPM NET – Collecting agronomic data

- Field location
- Area of field
- Cultivar & sowing date
- Previous cropping (4 years)
- Field cultivations
- Seed dressing used & whether seed was farm saved or certified
- All pre and post emergence pesticide inputs:
  - Product, Dose, and Application date and/or crop growth stage

*Same as Defra Pest and Disease survey, plus some additional detail*

*Plus…*

- Data relating to relevant SFI actions
- Observations (growth stages, photos, pest infestation comments)
- Self-assessment Pest and Disease survey data
- Yield (quantity and quality)

# IPM NET – Collecting agronomic data

| Amount of field affected | Severity of infestation |
|---|---|
| 0% | None |
| <10% | Low – little impact on yield/quality |
| 10-25% | Moderate – some impact on yield/quality |
| 25-50% | High – significant yield loss or reduced quality |
| >50% | Very High – total crop loss |

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# Defra Survey of Crop Pests and Diseases (CH0225)

- Annual survey since 1970s (previously coordinated by Fera)
  - Winter Wheat and Winter Oilseed Rape
  - England and Wales
  - Stratification to ensure representation
  - All diseases surveyed
  - Pests such as aphids, CSFB
  - Blackgrass, lodging
  - Crop pesticide inputs and agronomic details


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# DSCPD: Project aim

- Deliver pest and disease information essential to establishing consensus across key stakeholder groups
  - Inform agricultural community
  - Pest and disease risk forecasting
  - Breeding priorities
  - Impact of pesticide legislation changes
  - Support research projects with long and short-term datasets
  - Support Defra's policy objectives
- Observes changes, trends and impacts in the "real world"


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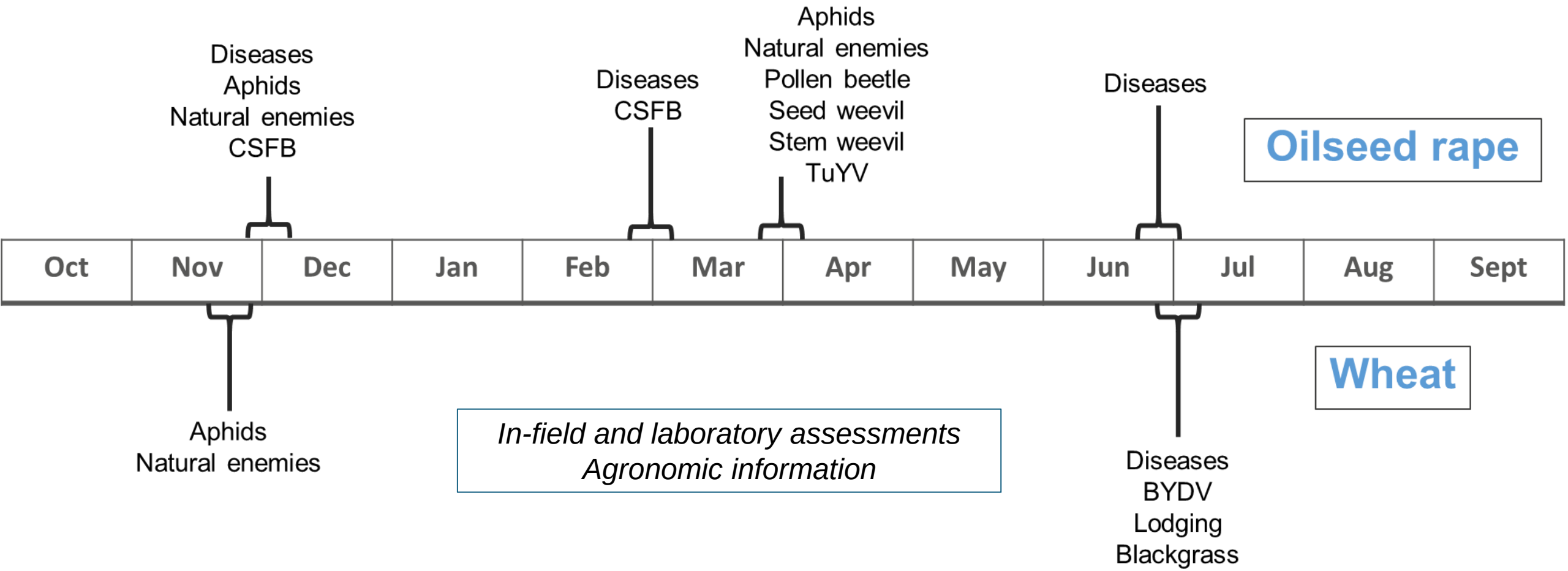
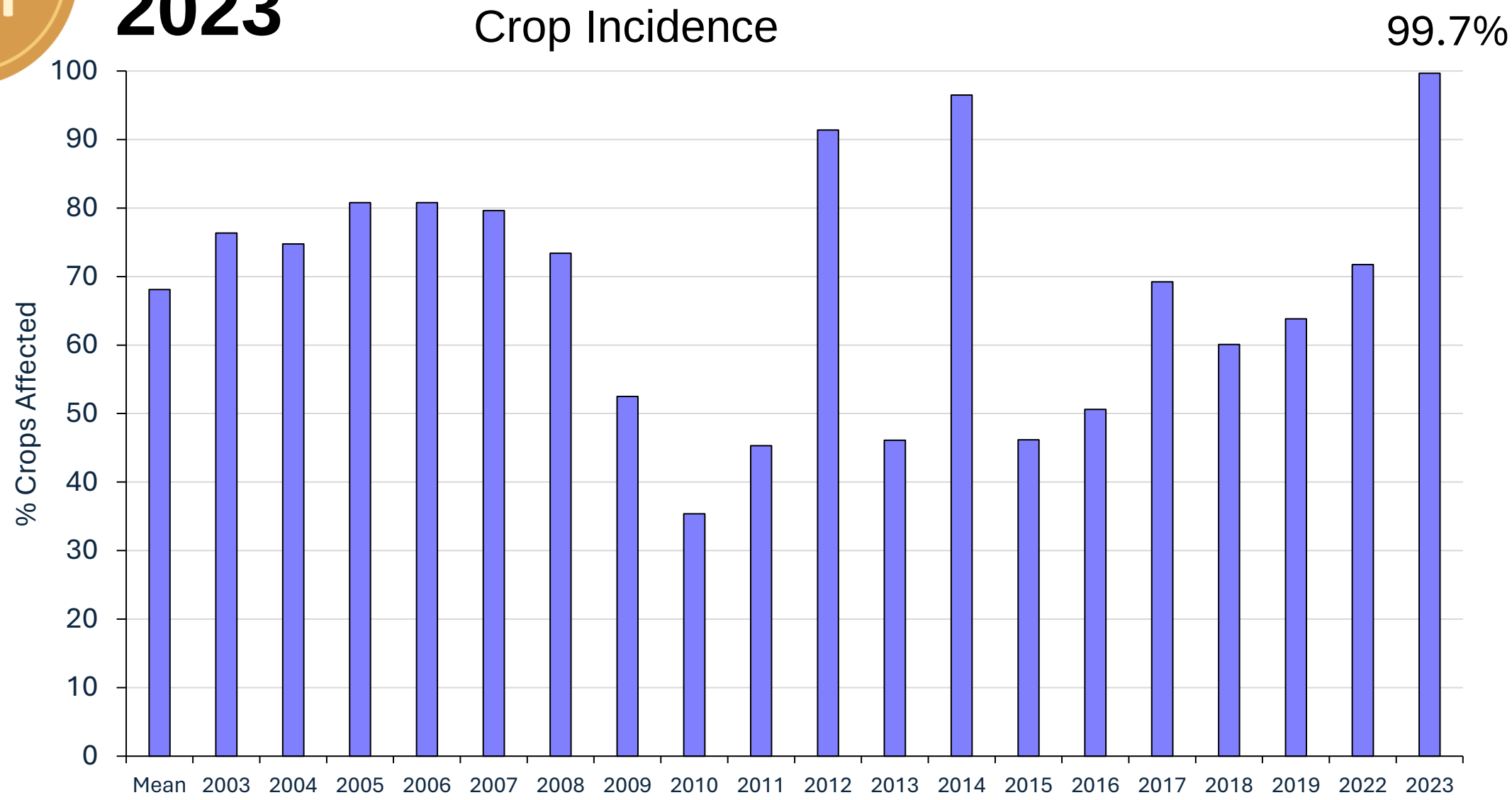
# DSCPD: Assessments



# DSCPD: Septoria leaf blotch, summer 2023

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# DSCPD: Septoria leaf blotch, summer 2023

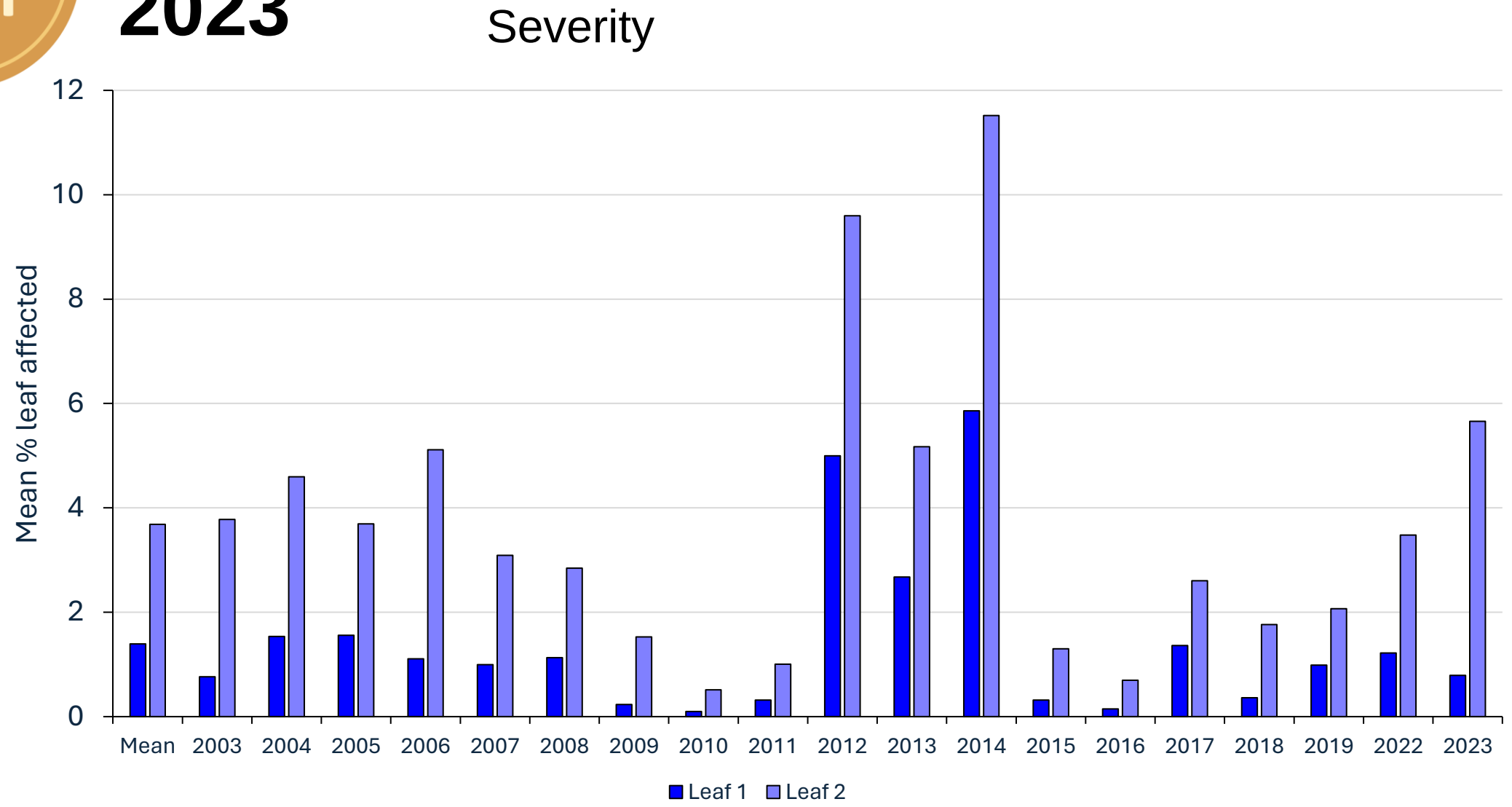


Image: AHDB

# DSCPD: Septoria leaf blotch, summer 2023

Regional crop incidence and severity

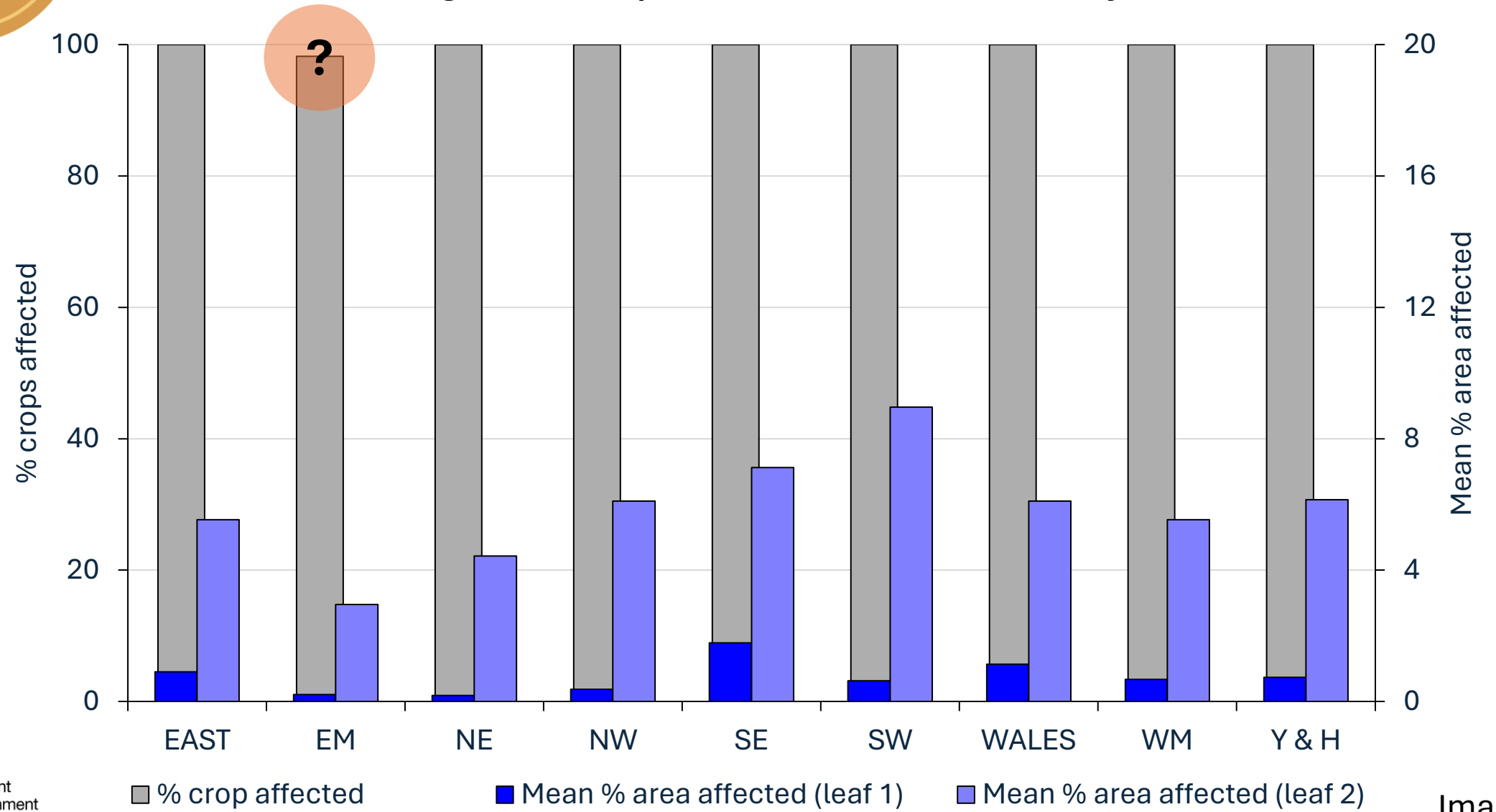


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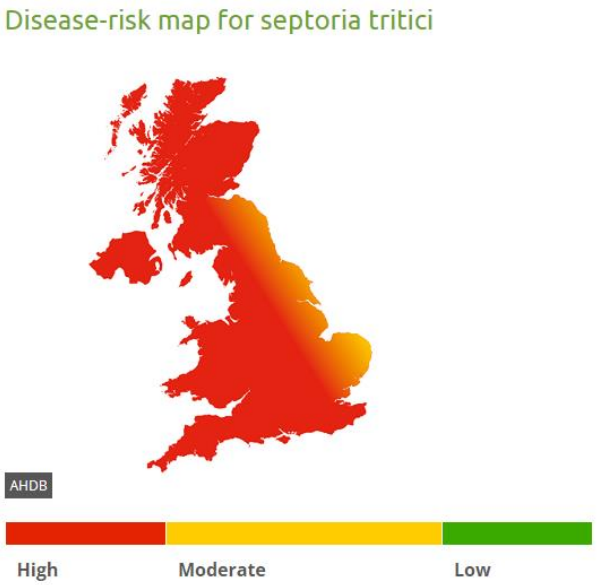
Image: AHDB

# Assessing Septoria leaf blotch

- Symptoms:
  - Elongated, oval lesions restricted by leaf veins and surrounded by leaf yellowing or death
  - Pycnidia - Characteristic, small, black fruiting bodies in mature lesions

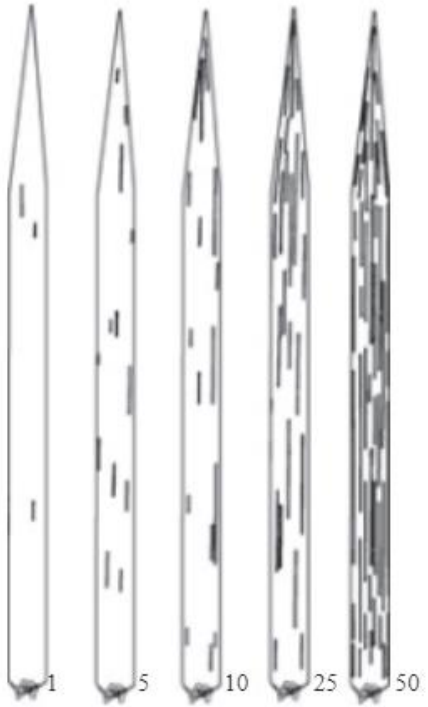


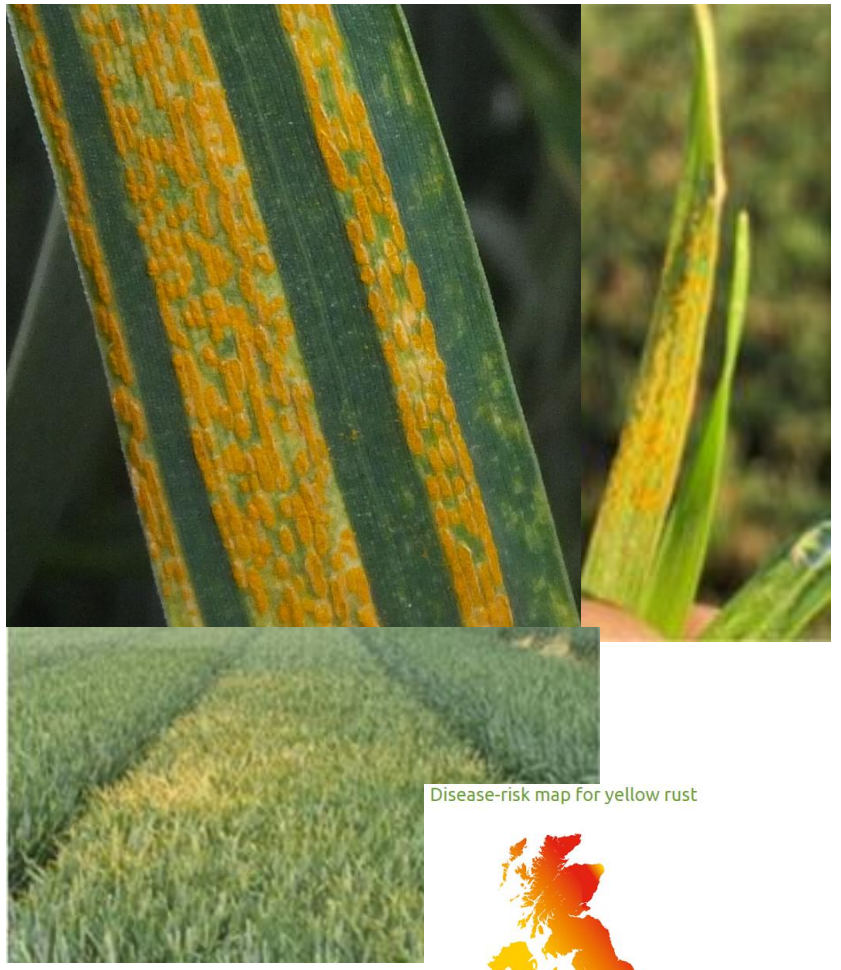
# Assessing Septoria leaf blotch

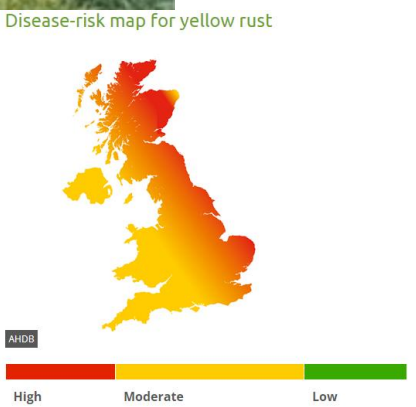
- Assess plants at growth stage 73-75 (early-medium milk) (usually late June-early July)
- 25 representative tillers from 25 random points from across the whole field
- Leaves: assess each disease as a percentage of the leaf area and estimate the remaining green leaf area

# Assessing Yellow rust

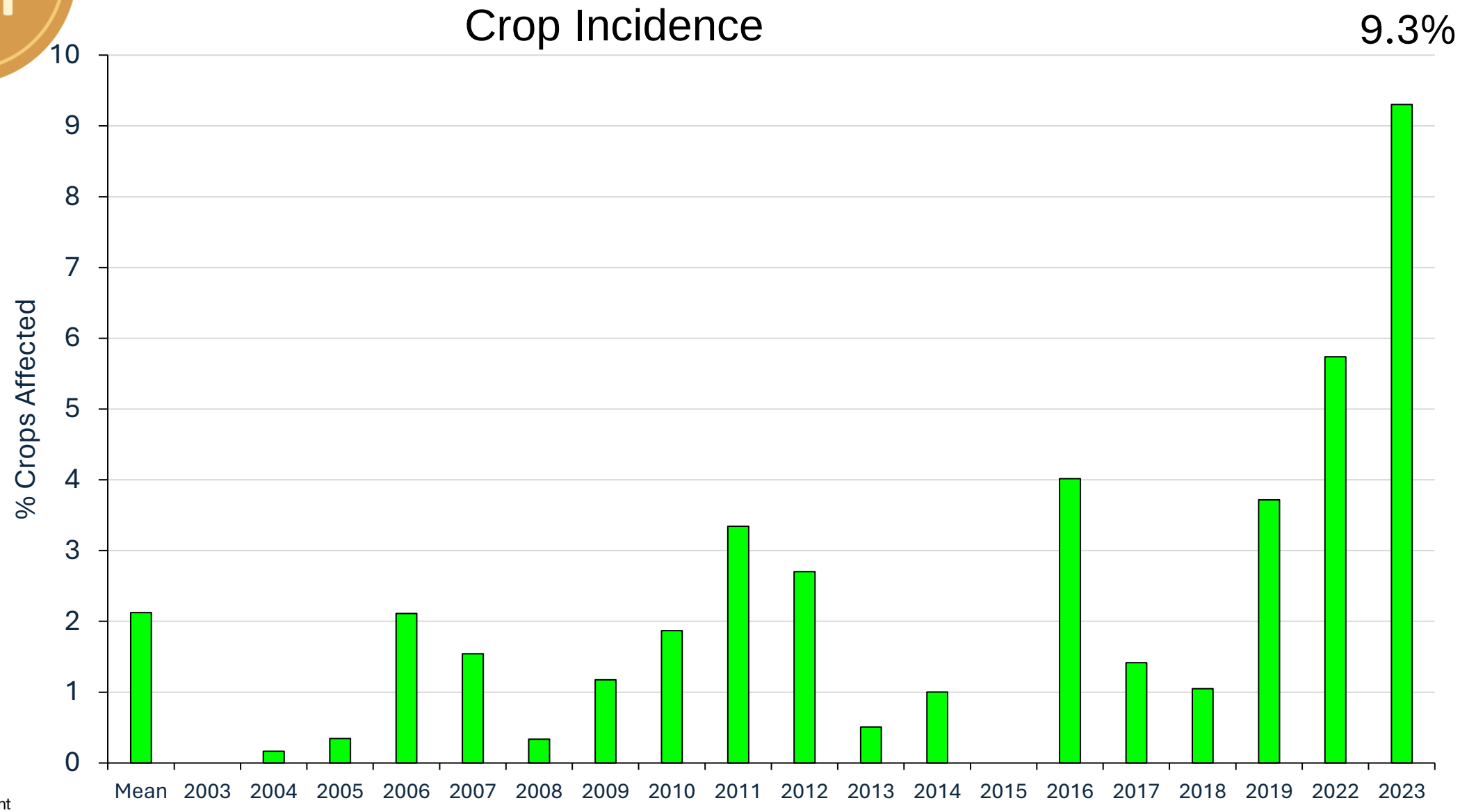
- Tends to spread through a crop from a single point (foci)
- Cold winters and hot summer temperatures reduce severity
- Sporadic in the UK, mainly occurs in East & coastal areas
- Symptoms:
  - Parallel rows of yellow-orange pustules on leaves





# DSCPD: Yellow rust, summer 2023

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# DSCPD: Yellow rust, summer 2023

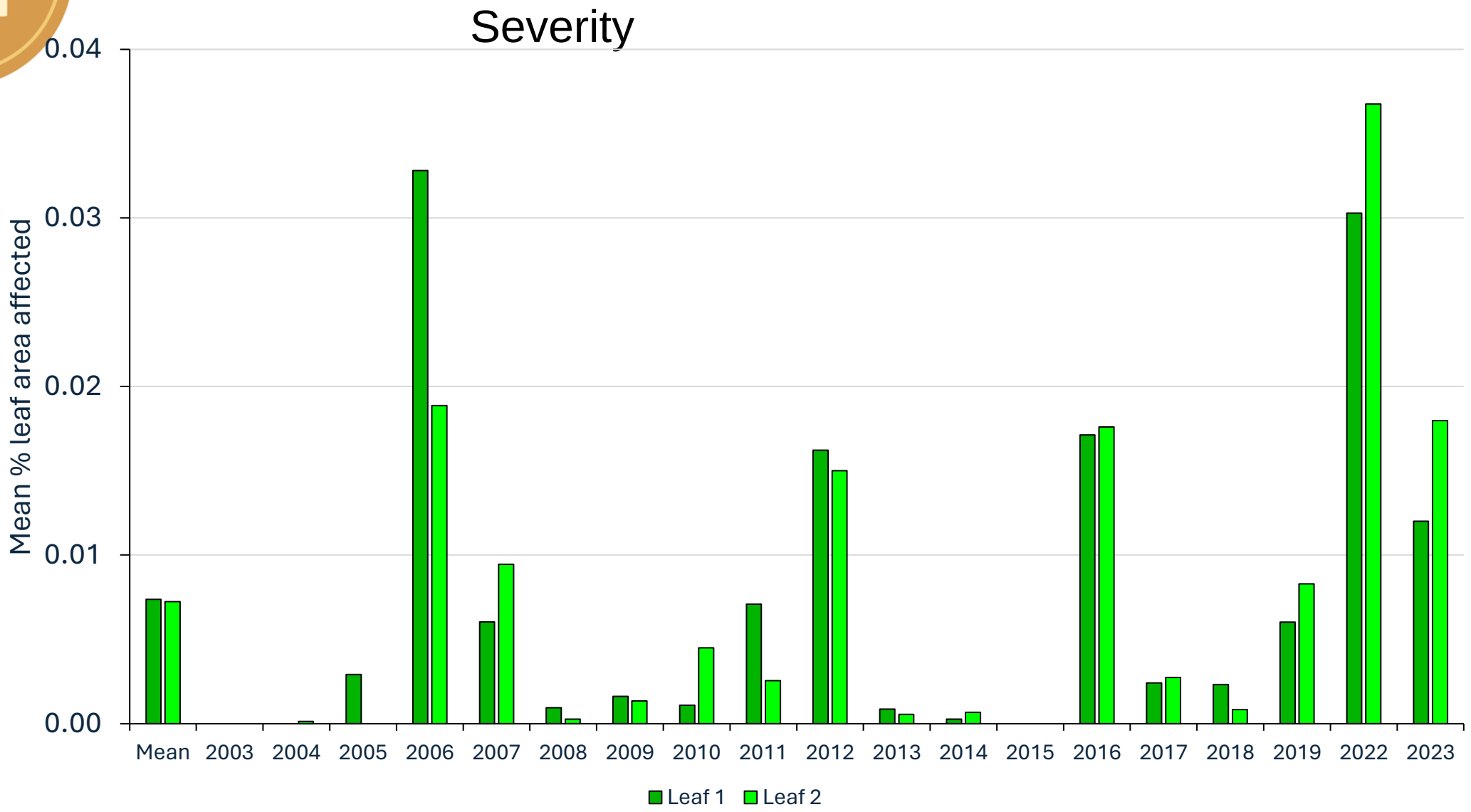


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Image: AHDB

# DSCPD: Yellow rust, summer 2023

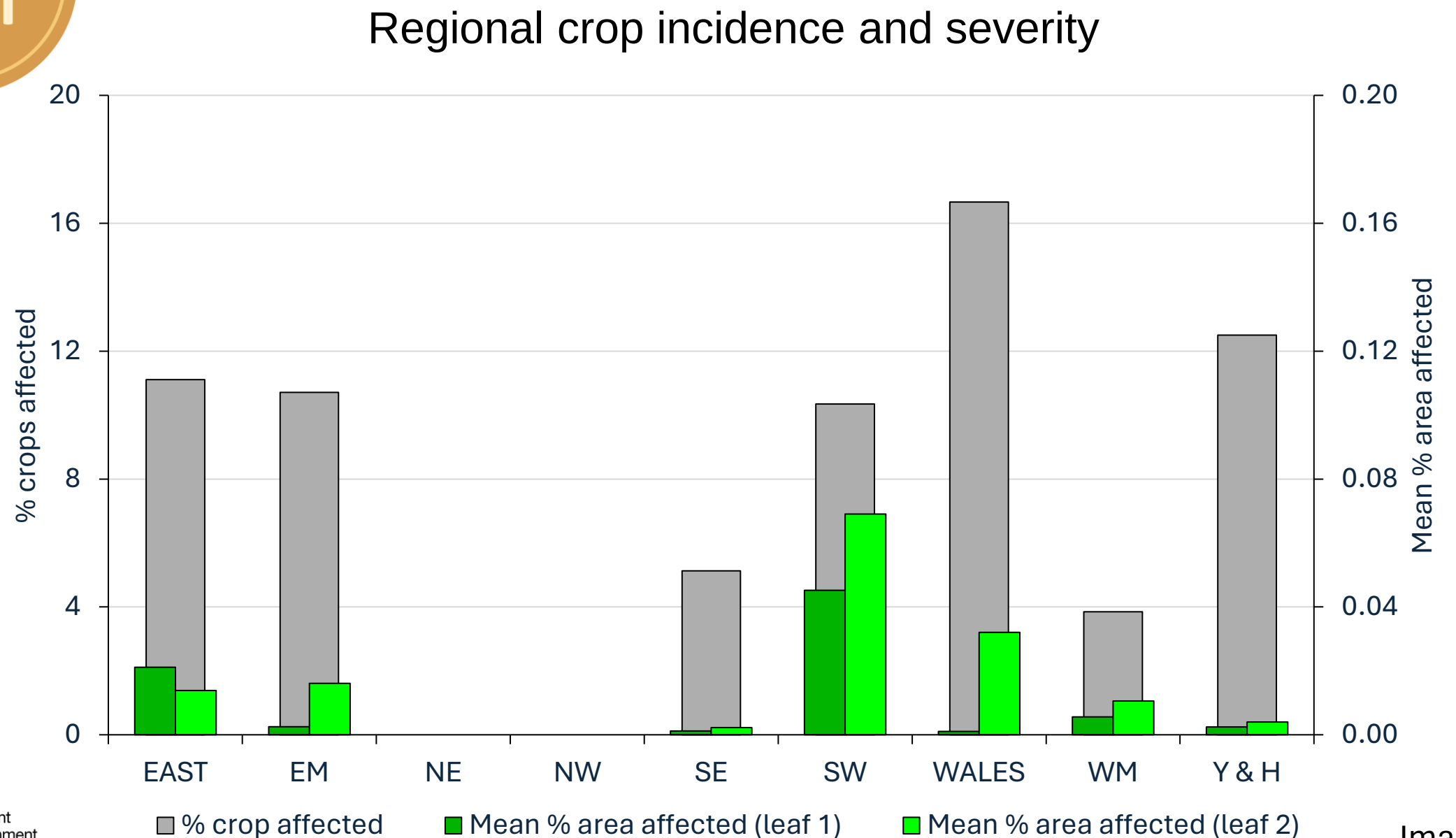


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Image: AHDB

# Where to find more information?


www.pestanddiseasesurvey.co.uk


@DefraSurvey

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Wheat Disease | OSR Disease | Wheat Pest | OSR Pest

**Select the Disease**
Septoria Tritici Severity (%)

**Select the Plant Part**
All

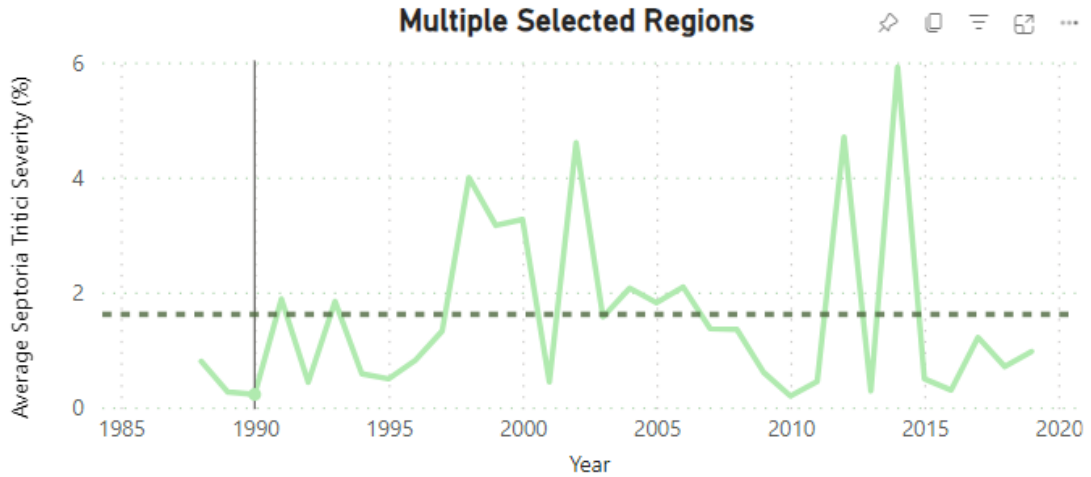
**Select the Sow Date**
All

**Select the Variety**
All

**Select the Cultivation**
All

**Select the Region**

Clear all filters



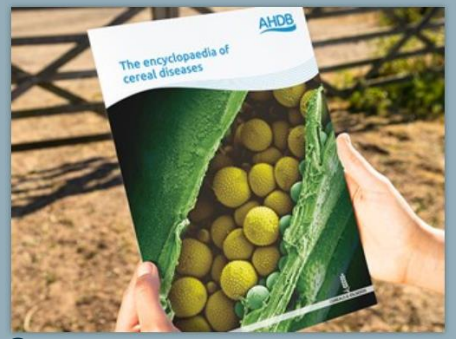

| Survey Year | Average | Farm Count |
|---|---|---|
| 2010 | 0.20 | 891 |
| 1990 | 0.22 | 1219 |
| 1989 | 0.26 | 1120 |
| 2013 | 0.29 | 888 |
| 2016 | 0.30 | 750 |
| 1992 | 0.44 | 1372 |
| 2001 | 0.44 | 1271 |
| 2011 | 0.45 | 898 |
| 2015 | 0.49 | 900 |
| 1995 | 0.49 | 1354 |
| 1994 | 0.58 | 1356 |
| 2009 | 0.61 | 897 |
| 2018 | 0.71 | 726 |
| 1988 | 0.80 | 1200 |

# Where to find more information?

## Encyclopaedia of cereal diseases

*This definitive guide to cereal diseases in the UK contains full colour photgraphs for identification plus information on hosts, symptoms and life cycles.*

Download resource

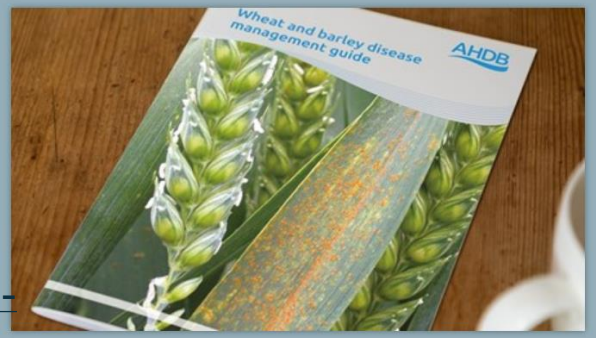



https://ahdb.org.uk/knowledge-library/encyclopaedia-of-cereal-diseases

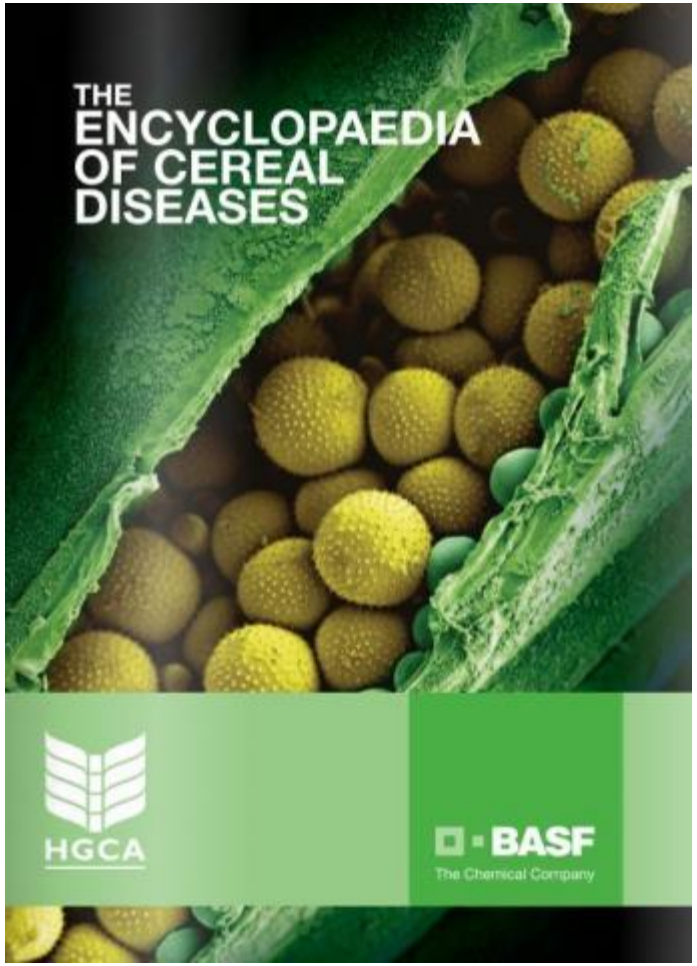
## Integrated pest management (IPM) of cereal diseases

*Our guidance covers major and minor diseases that affect wheat, barley, oats, rye and triticale.*

Download resource




https://ahdb.org.uk/knowledge-library/integrated-pest-management-ipm-of-cereal-diseases




https://www.agricentre.basf.co.uk/Documents/marketing_pages_files/cereal_fungicides_files/BASF_Disease_Encyclopedia.pdf?1678717861314

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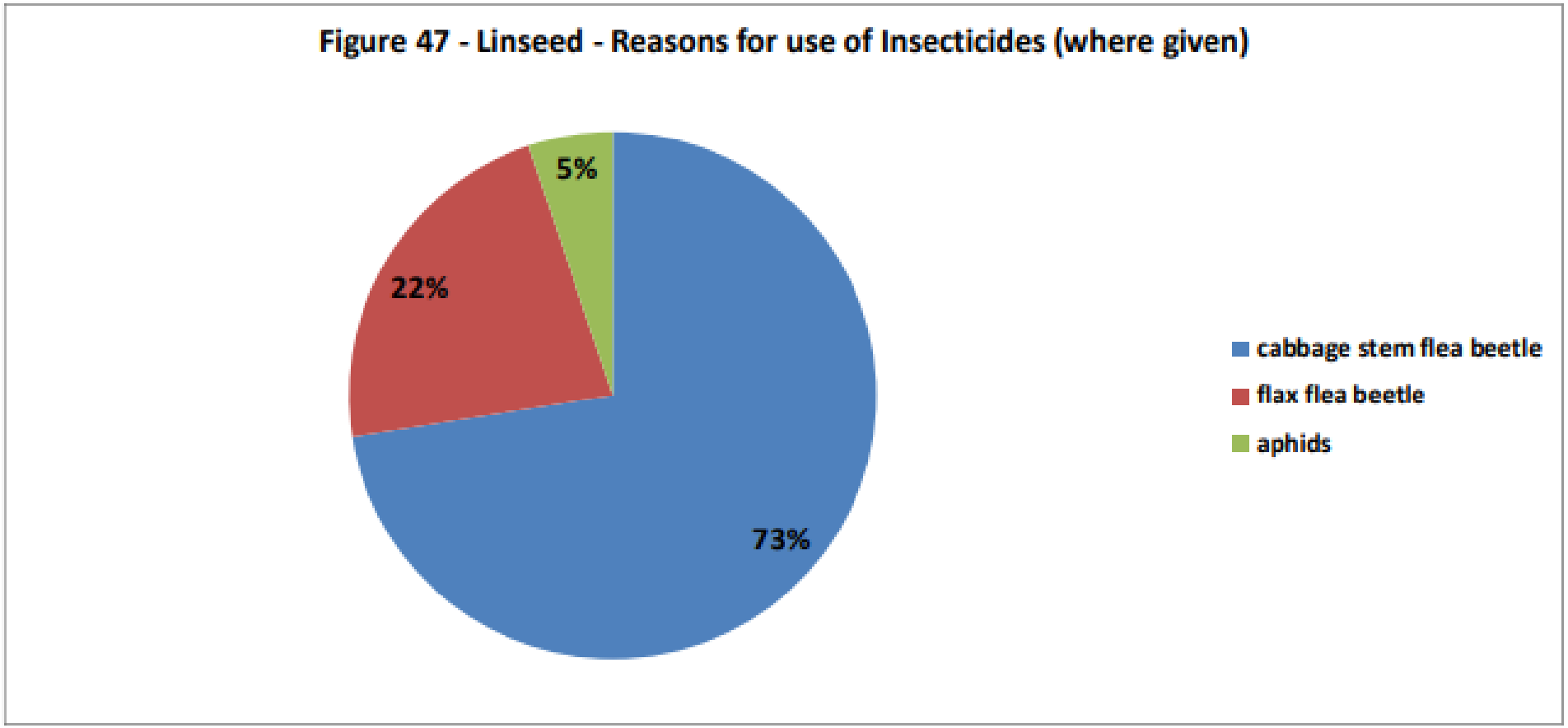
# The importance of knowing your enemy and comparing data between farms and years.

Dr Duncan J Coston

23 February 2024

www.adas.uk

# Know your enemy



# Know your enemy - This is not the flea beetle you are looking for….

UK Beetles

Images from Ukbeetles.co.uk

# Know your enemy - Flea beetles are a diverse group of insects

- Flax flea beetle (*Aphthona euphorbiae*) feed on linseed and can be found from March to October
- *Longitarsus parvulus* also known to feed on linseed
- Wheat flea beetle (*Neocrepidodera ferruginae*) is known to feed on cereals although not considered a major pest in the UK
- *Psylliodes* (~15 species in the UK and ~200 globally) with *P. chrysocephala* (CSFB) and *P. luteolus* (Wessex flea beetle) being the main pest species
- *Phyllotreta* (~30 species in the UK and ~300 globally) more of a nuisance than a pest in OSR
    - Turnip flea beetle (*Phyllotreta nigripes*)
    - Large striped flea beetle (*Phyllotreta nemorum*)
    - Cabbage flea beetle (*Phyllotreta Cruciferae*)
    - But there are more *Phyllotreta* species including *P. undulata, P. atra, P. consobrina, P. aerae, and P. diademata*

# Know your enemy – Which is which?

1

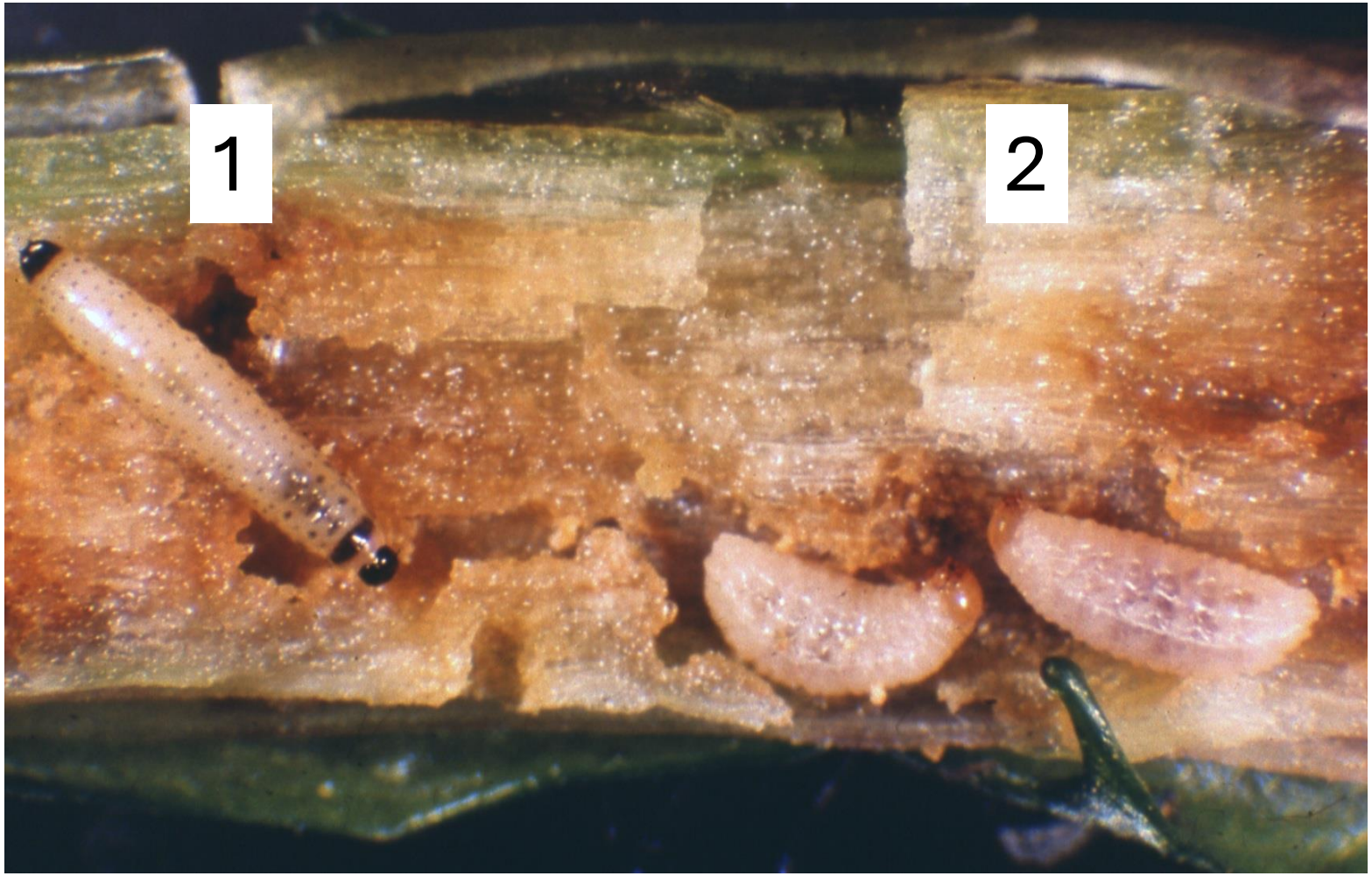
Copyright: Dave Hubble

2

3


Copyright: Roger Key

# Know your enemy – Which larvae is which?



# Between field or year comparisons: How, where and what?

- Representative sample from a field
    - Standardised field walks (e.g. “W” pattern, fixed sample points, set number of tramlines etc…)
    - Assessments at set crop growth stages or dates
    - Same number of samples take

- How do we reduce assessor variation?

# Between field or year comparisons: Variability between assessors

- ~~Assess with the same person every time~~
- Use a broad categories for assessments (e.g. 10-20%. 20-30%)
- Development of image analysis and machine learning…
- Where can we reduce subjective nature of assessment?

# Between field or year comparisons: reduce subjective nature of assessment

## Assessing CSFB larval pressure in OSR

Method 1 – plant dissection

Method 2 - Passive

# Between field or year comparisons

- The more we can remove human variation/ error the better our data gets.
- The more representative the assessment of a whole field the more we get out of the data.
- If the data can be future proofed – what we assess today will be comparable to the same assessment data in 50 years time.
- The more we control variation, the easier it is to compare, analyse and understand the bigger picture.
- The better the data the better the confidence.

# IPMWORKS

## IPM in action using tramline trials


**Andrew Christie**

Agronomist & Agri-Tech Specialist

The James Hutton Institute - Dundee

andrew.christie@hutton.ac.uk

**31 partners**
**16 countries**

**22 new ‘hubs’**


**Demonstrating IPM good practice**

IPM works

The James Hutton Institute

# OVERALL AIM & REGIONAL CONTEXT

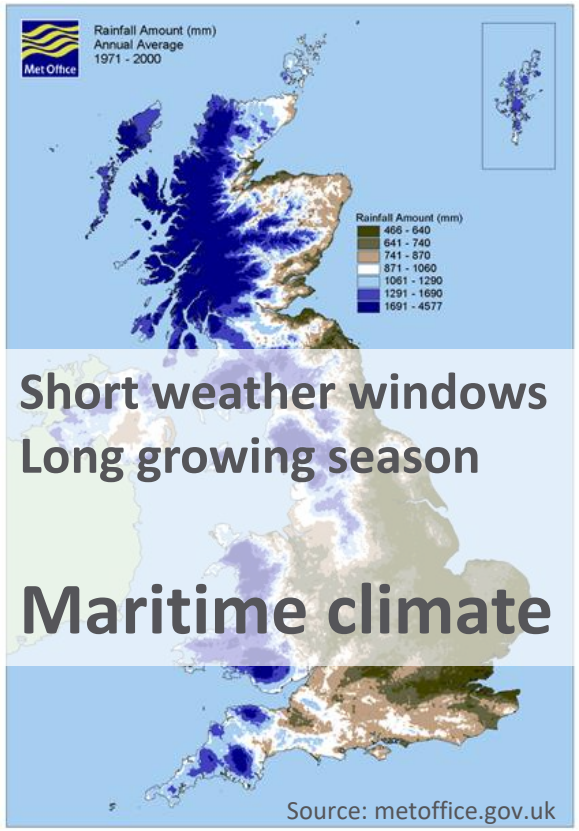
The James Hutton Institute

## IPMWORKS OBJECTIVE

Promote IPM adoption to reach a -50% of pesticide use of European agriculture by 2035!

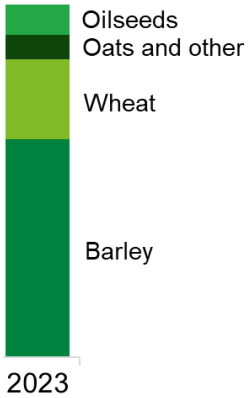
IPM works

## EAST OF SCOTLAND HUB




INTERNATIONAL BARLEY HUB

Total cereals and oilseed: 477,000 ha




Source: gov.scot

**Malting Barley dominates crop area**

**Limited Market Options**

# EAST OF SCOTLAND ARABLE HUB

The James Hutton Institute

**To address challenges in our context, investigate:**

- **NEW/ALTERNATIVE TECHNIQUES**
- **PRACTICES TO REDUCE INPUTS & MAINTAIN OUTPUTS**
- **WITH FOCUS ON FARM ECONOMICS**

Sharing techniques and experiences to broaden knowledge base for members

# EAST OF SCOTLAND ARABLE HUB

The James Hutton Institute

## ON-FARM MEETINGS


## CROSS VISITS

## DEMONSTRATION EVENTS


# COMMUNICATING IPM CHALLENGES + SUCCESSES


Source: leaf.eco

Discussion and debate on IPM linking together several techniques

Considered as a holistic approach

Can we assess performance of individual aspects of the system?

# IN-FIELD COMPARISONS

- On farm trials
- Farm standard versus new technique

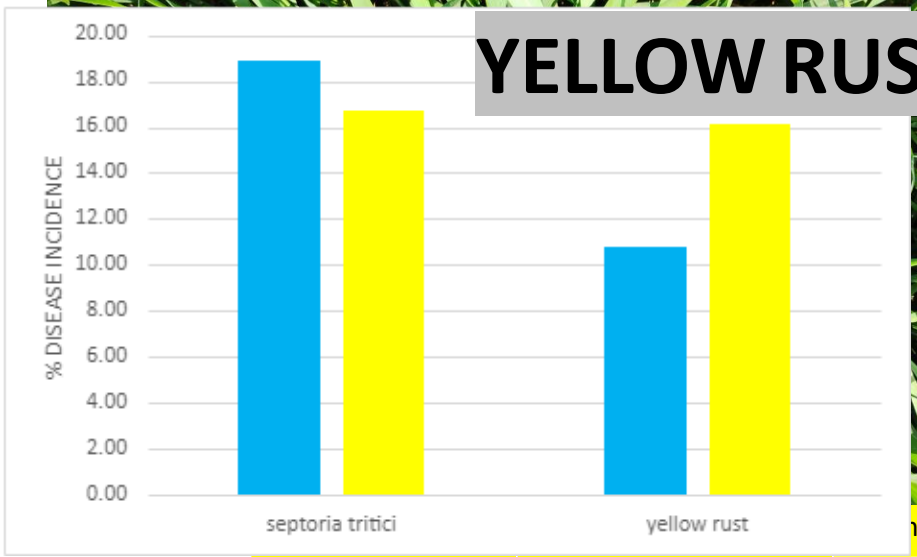
Facilitates demonstrations and provides resources to test new ideas that may not have been available otherwise

# IN-FIELD COMPARISONS EXAMPLES - WW

FULL FUNGICIDE vs ALTERNATIVE 'BIOFORTIFICATION'

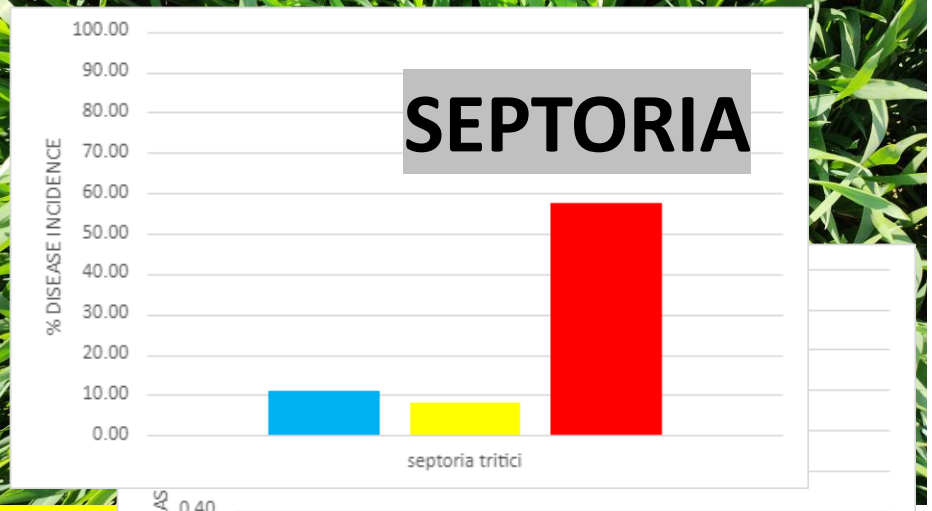
## DISEASE INCIDENCE

### YEAR 1 – GS65

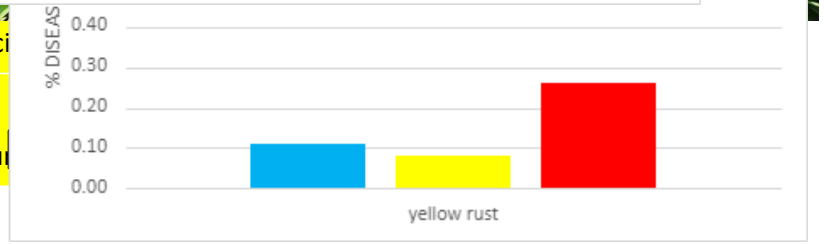



YELLOW RUST

### YEAR 2 – GS69




SEPTORIA



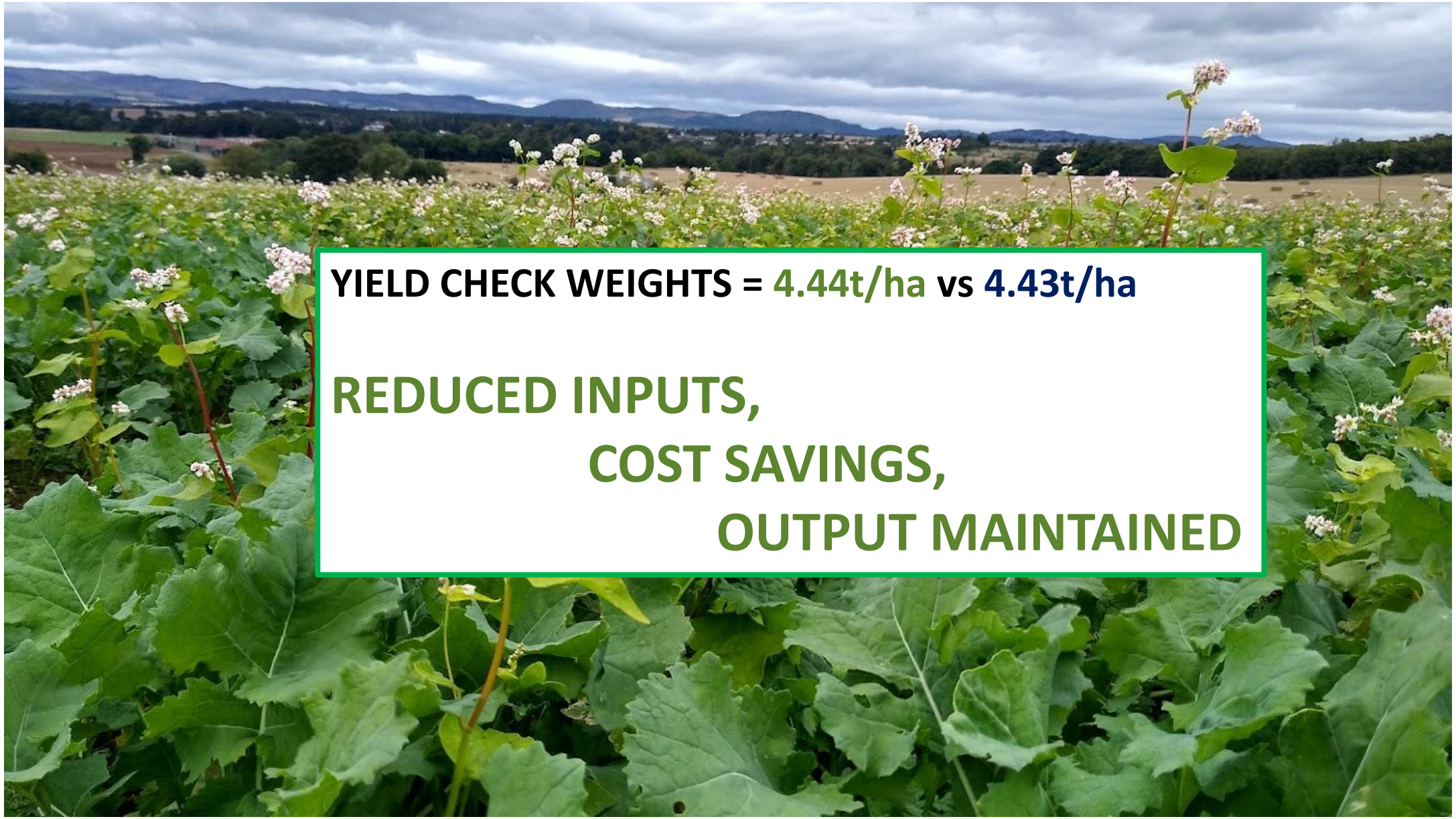

FULL FUNGICIDE

BIOFORTIFICATION

UNTREATED

COMPARABLE CONTROL AT

# IN-FIELD COMPARISONS EXAMPLES - WOSR

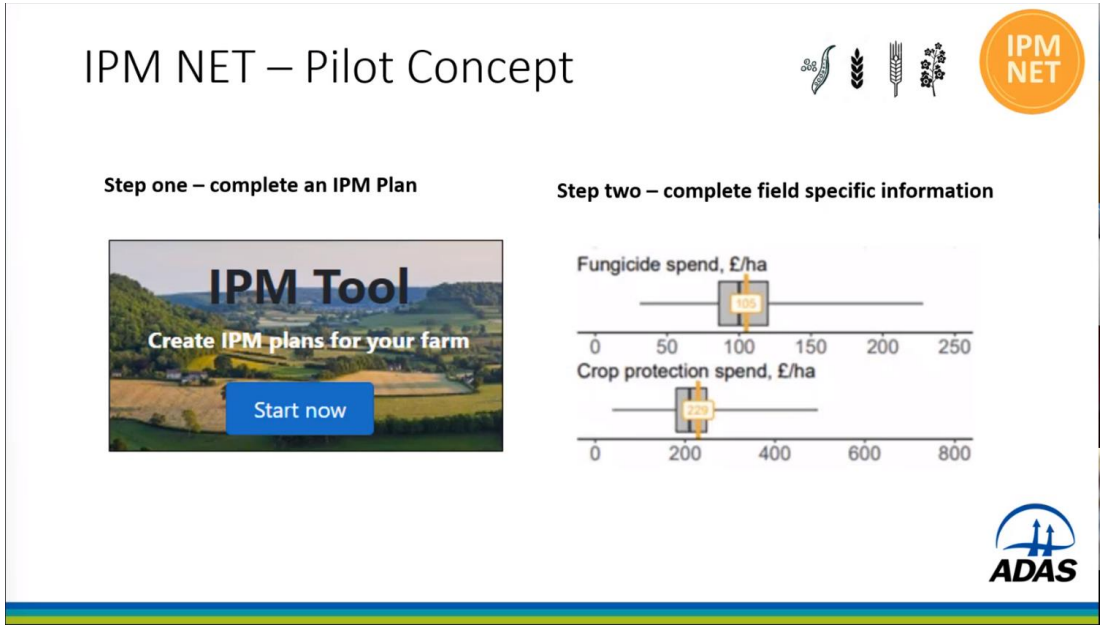


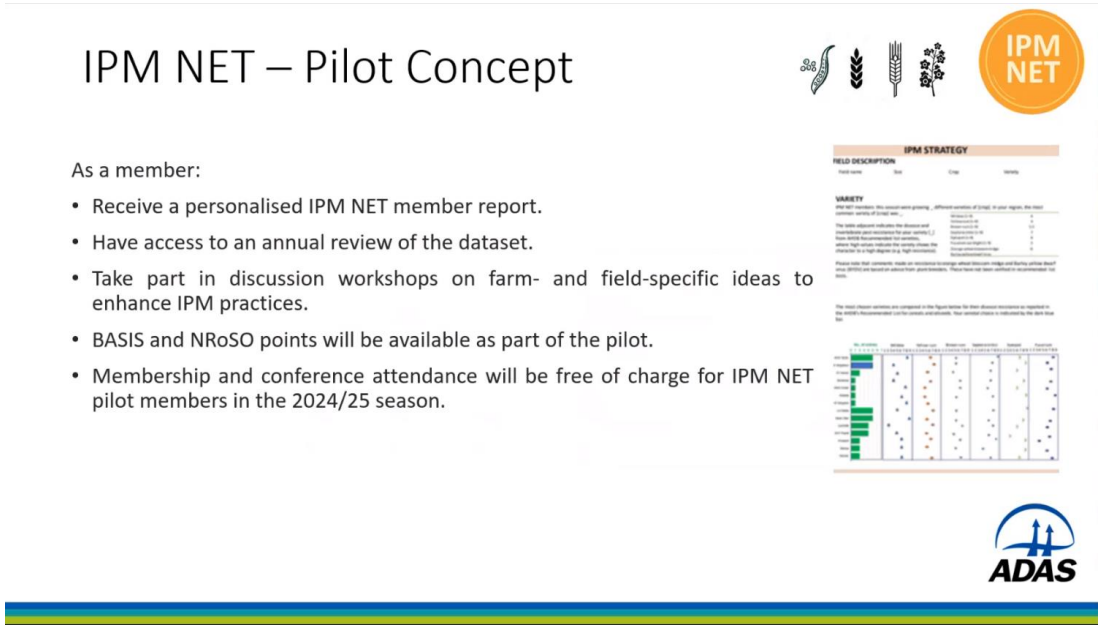
# LINK TO FUTURE - IPMNET

## Barley, Wheat focus

## Pilot year (linked to SFI, similar measures proposed in Scotland)

Agricultural Reform List of Measures (ruralpayments.org)



# IPMWORKS

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The James Hutton Institute

The Integrated pest management knowledge exchange network

*Create connections to advance IPM*

# IPM NET – Next steps

# Dr Mark Ramsden

Visit https://adas.co.uk/ipmnet
Or email IPMNET@adas.co.uk

ADAS | Department for Environment Food & Rural Affairs

# The Integrated pest management knowledge exchange network

*Create connections to advance IPM*

## Supporting farmer or advisors wanting to share IPM experience

- ✓ Benchmark your IPM approach, providing data on field(s), crop observations & agronomy.
- ✓ Links to relevant resources to advance your IPM strategy.
- ✓ Join the IPM NET annual end of season conference to discuss IPM NET results.
- ✓ Earn BASIS and NRoSO CPD points.

## Join the Pilot year for free

Visit https://adas.co.uk/ipmnet
Or email IPMNET@adas.co.uk

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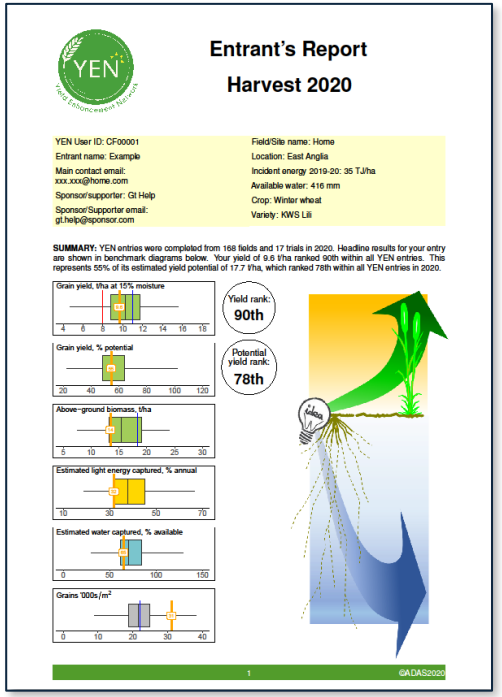
# What will IPM NET produce?

Shared experience – what works?

Data analysis – what works?

Individual benchmarking

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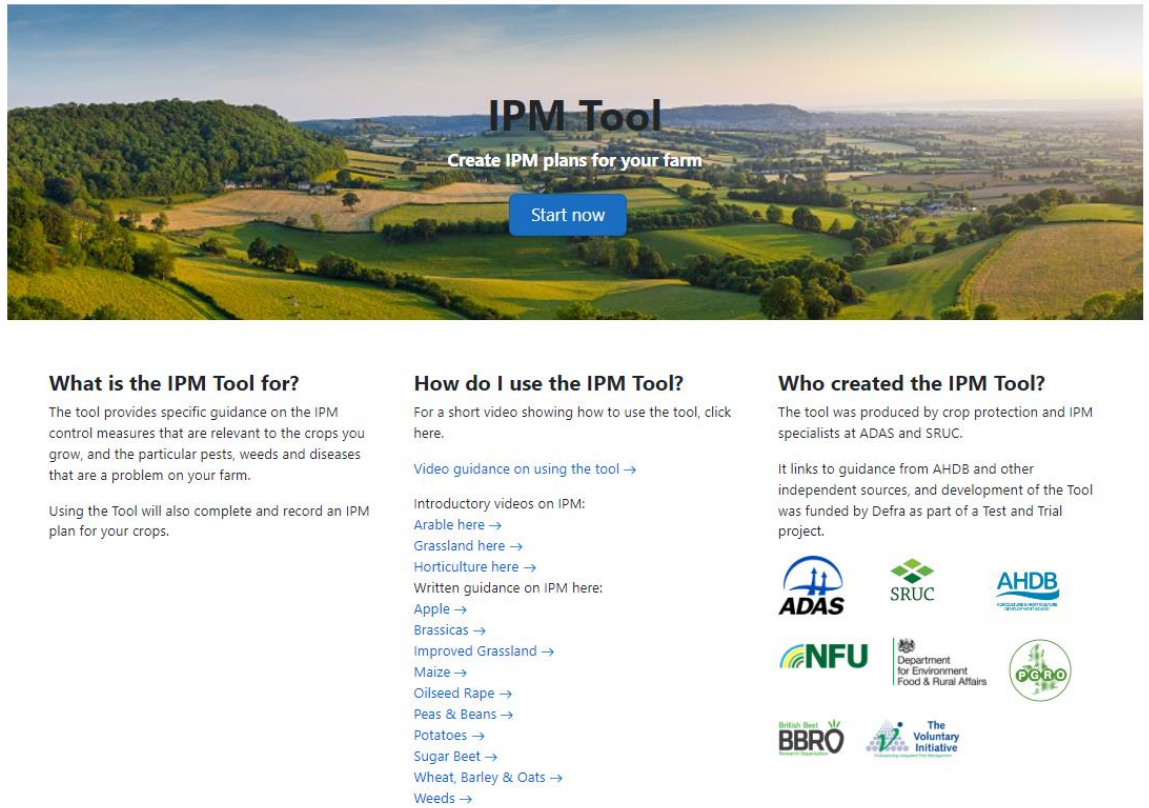
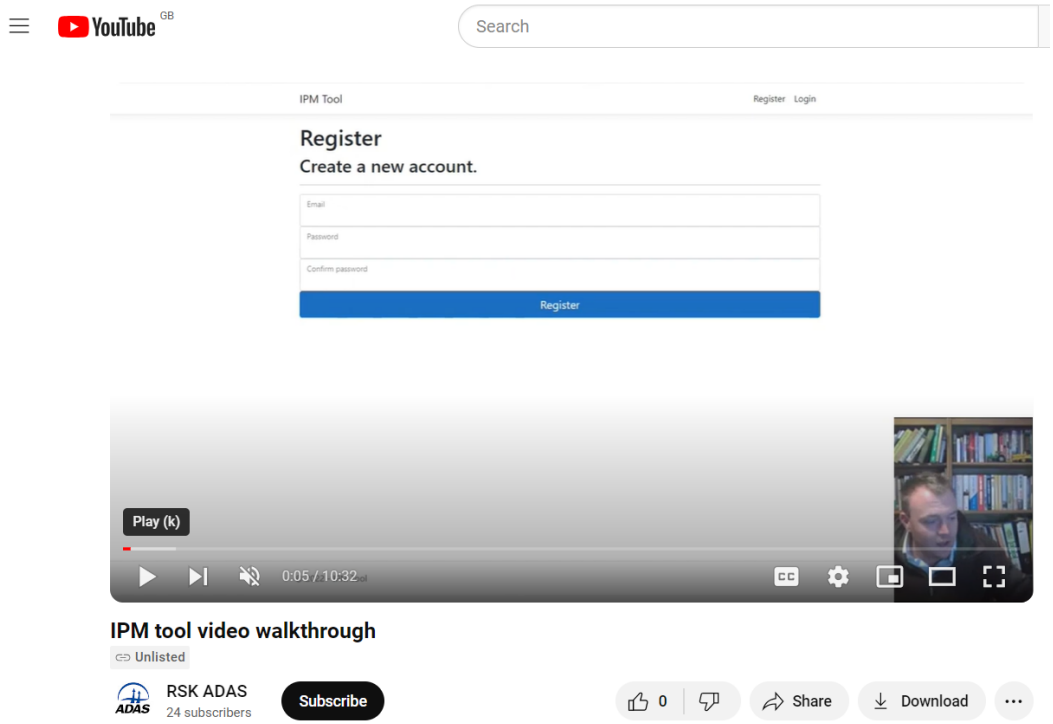
# The Integrated pest management knowledge exchange network

*Create connections to advance IPM*

## What will farmers and advisors need to provide?

IPM Plan

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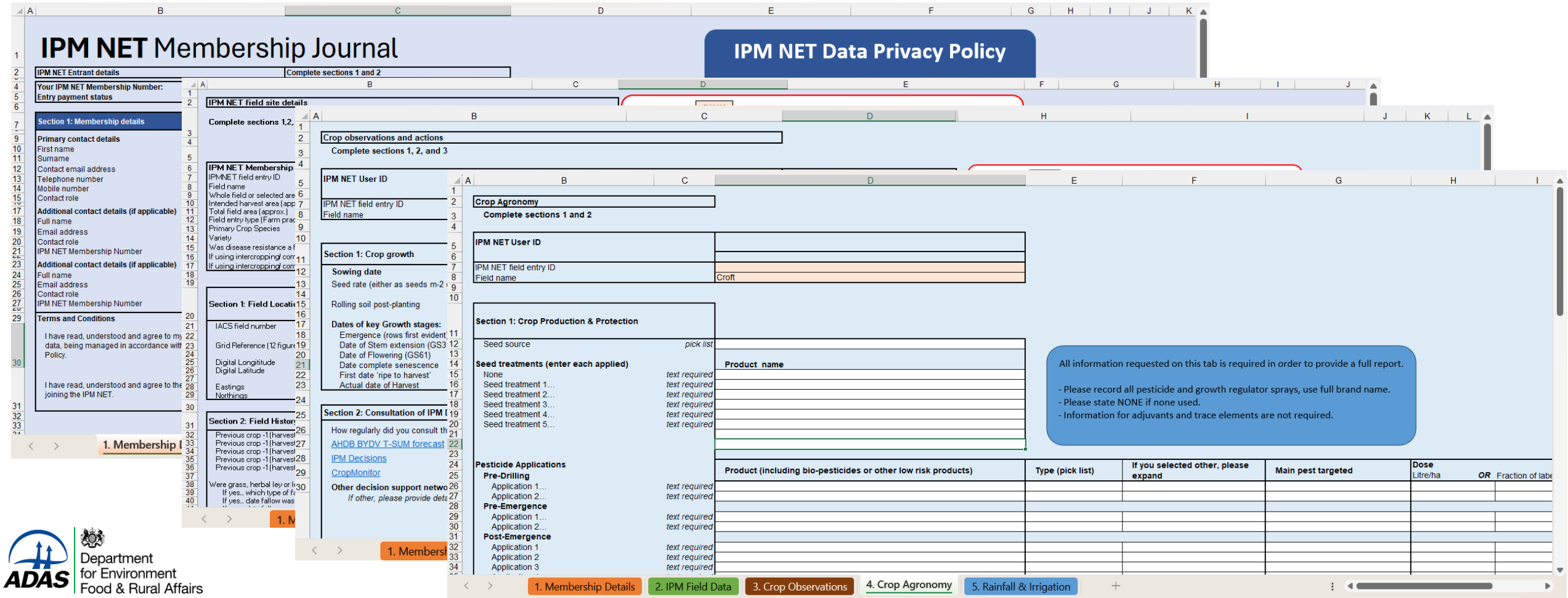
# The Integrated pest management knowledge exchange network

*Create connections to advance IPM*

## What will farmers and advisors need to provide?

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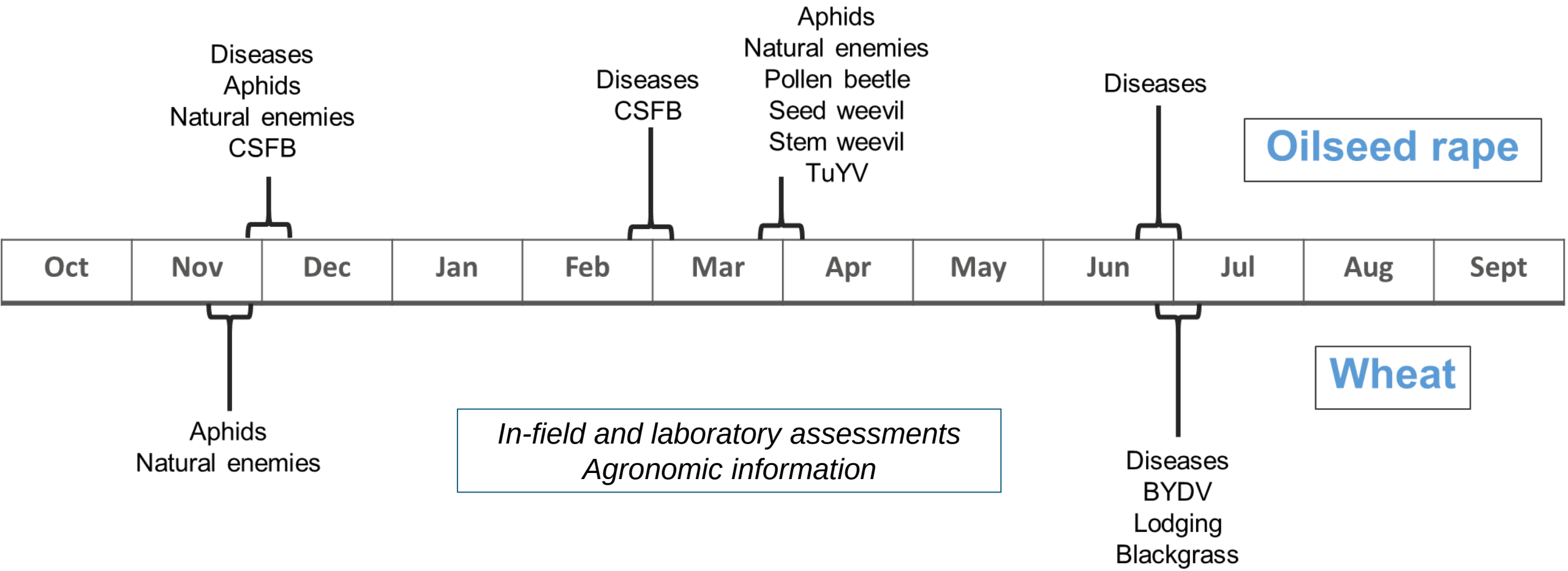
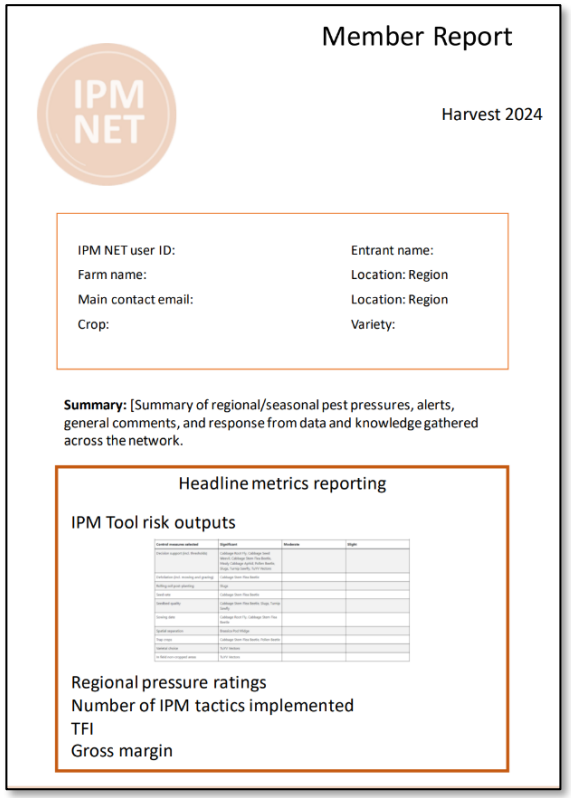
# DSCPD: Assessments



# The Integrated pest management knowledge exchange network

*Create connections to advance IPM*

## What will farmers and advisors receive back?


Member Report

Harvest 2024

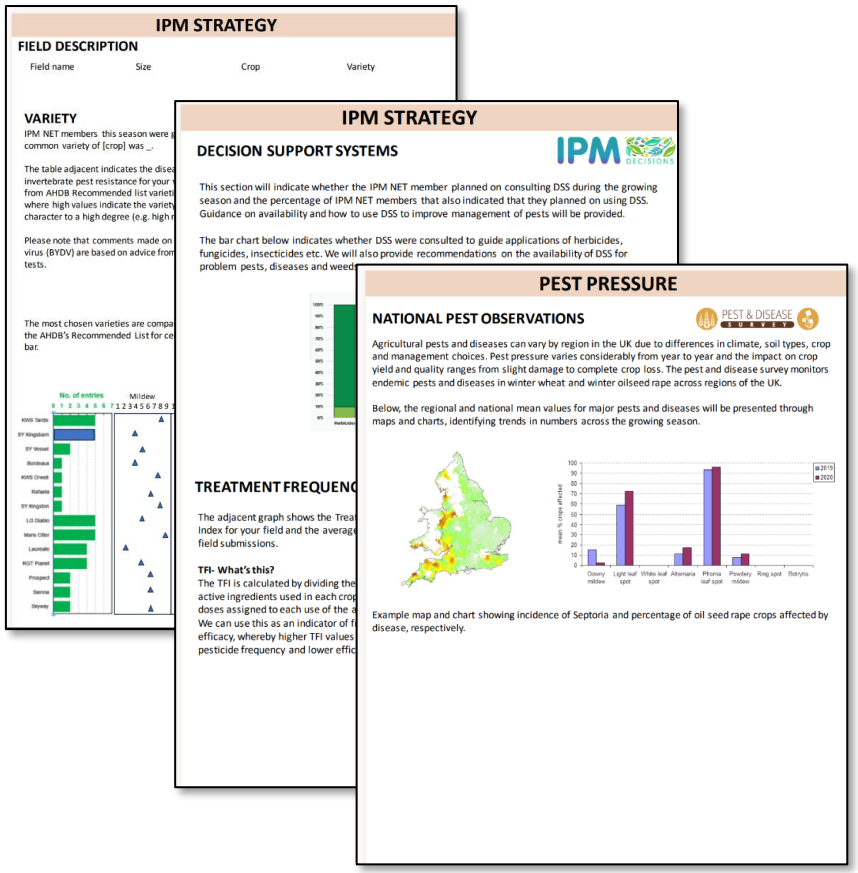
IPM NET user ID:
Farm name:
Main contact email:
Crop:
Entrant name:
Location: Region
Location: Region
Variety:

**Summary:** [Summary of regional/seasonal pest pressures, alerts, general comments, and response from data and knowledge gathered across the network.

Headline metrics reporting

IPM Tool risk outputs

Regional pressure ratings
Number of IPM tactics implemented
TFI
Gross margin

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