

Integrated Pest Management in Cereal Crops

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Integrated Pest Management SR SERVICE

"Integrated pest management (IPM) means careful consideration of all available plant protection methods and sub-sequent integration of appropriate measures that discourage the development of populations of harmful organisms (including weeds, diseases, insect and other animal pests), and keep the use of plant protection products and other forms of intervention to levels that are economically and ecologically justified, and reduce or minimise risks to human health and the environment. IPM emphasises the growth of a healthy crop with the least possible disruption to agroecosystems and encourages natural (nonchemical) pest control mechanisms"

(The Sustainable Use Directive 2009/128/ EC).







Integrated Pest Management

• Optimal mix of pest control techniques + tools



• Factors: Profit, Risk, Sustainability, Safety



2nd year Agriculture students @SRUC



improve performance control pest "ultivation natural options chemical prevention management plan prevention damage natural predators pest contol low inputs management industry regulations crop walking profit efficient problem cost effective CrO Process Suppression new approaches plan harm plant species legislation new approaches plan harm plant species threat chemical unwanted organisms disease farmer weather conditions methods wild flower habitats sampling agronomist net profit pest population timing yield loss resources producer identification tillage procedures production system crop health pest control pesticide maximum yield industry professional help the environment pest management alternatives to chemicals







IPM barley Workshop, various stakeholders



minimise negative impacts awareness of alternatives crop rotations crop protection strategies effective control disease management physical control biosecurity thresholds holistic view new approaches cultivation fungicide human health crop requirements use of pesticides tillage organic techniques soil organic matter sustainability pest avoidance open mind reduce fertilizer pest thresholds environmental health timina appropriate chemical control pest management biological control cover crops modern chemistry mechanical control fertilizer application disease avoidance improve yield environmental tools

cultural control natural control chemical control









- Optimal mix of pest control techniques + tools
- Factors: Profit, Risk, Sustainability, Safety















Crop rotation





Rotation: crop selection



- Choose crops appropriate to farm and market
- Diversify to spread risk and workload
- Include legumes within rotation
- Include spring and autumn crops
- Consider crop sequence
 - Nutrients
 - Weeds
 - Pests
 - <u>Diseases</u>







Norfolk 4-course rotation:

Traditional rotation



Rotation or Alternation?





















'Break' crops





Profitable Rotations



The profitability of the rotation is more important than that of the individual break-crop



Crop rotation: Disease control



- Remove host materials
 - Reduce local inoculum threat
- Offers good control of:
 - Restricted host range
 - Soil-borne
- Limited control if:
 - Pathogen has long lived resting structure
 - Wind-borne spore dispersal















Eyespot risk forecasting

- Stem base disease
- Oculimacula yallundae (W type)
- O. acuformis (R type)

Factor	Effect on eyespot
Ploughing	+/-
Preceding host crops	++
Early sowing date	++
Heavy soil	+
High rainfall (region)	++











Eyespot risk of winter wheat

1. Calculate the pre-sowing risk score

Factor	Level	Risk points	Score
Region	East	0	
	North	1	
	West	5	
Soil type	Light	0	
	Medium	1	
	Heavy	4	
Previous crop	Non-host	0	
	Other cereal	7	
	Wheat	8	
Tillage	Minimum till	0	
	Plough	6	
Sowing date	Late	0	
(before or after 6 October)	Early	2	

Pre-sowing risk score

Take action based on the pre-sowing risk

Pre-sowing risk score	Pre-sowing risk category	Action*		
1-4	Low risk (L)	Assess in string		
5-9	Low-medium risk (LM)	Assess in shring		
10-14	Medium risk (M)	14 M		
15-19	Medium-high risk (MH)	Consider agronomic control; assess in spring		
20-25	High risk (H)	second of the second		



Assess eyespot in the field as the % incidence of plants at GS31-32 with eyespot symptoms.

SR

FARM

ADVISORY

SERVICE

Determine fi	nal		Eyespot disease assessment			
eyespot dise	ase risk	1%-4%	5%-9%	10%-14%	15%-19%	>20%
	1-4	L	LM	M	MH	н
Dra couving	5-9	LM	M	М	MH	н
risk score	10-14	M	M	MH	MH	н
Tisk score	15-19	MH	MH	MH	н	н
	20-25	н	Н	H	H	Н

Take action based on the final eyespot risk

Final eyespot disease risk	Action
Low risk (L)	Specific avagent treatment may not be justified
Low-medium risk (LM)	Specific eyespor rearrient may not be justified
Medium risk (M)	Treatment may be justified where eyespot has been
Medium-high risk (MH)	a recurring disease on individual fields, leading to consistent yield loss
High risk (H)	Treatment may be justified even in fields where eyespot has rarely been known to cause yield damage



Eyespot Sampling in Ireland SP SERVICE

- 2015 (31 crops) + 2016 (105 crops)
- Sampled @GS31-32 + GS70-85











The European Agricultural Fund for Faul Development Europe Investing in naval areas



- Incidence (April) ≠ Severity (July)
- Fungicides: Azole + SDHI @T1
- Species?: R type = less symptomatic @GS31-32









Eyespot IPM

- Resistant varieties
- Rotation
- Cultivation type
- Monitor
- Keep records











Scottish Government Riaghaltas na h-Alba gov.scot













Scottish Government Riaghaltas na h-Alba gov.scot

IPM: Septoria tritici blotch





- 1. Agronomic practices
- 2. Varietal resistance
- 3. Fungicides



Variety choice: 1st line of defence?





Aviator Xpro applied at T1 & T2



Variety	Resistance	Optimum Rate
Cordiale	4	2.0
Einstein	5	0.7
Lion	7	0.7
Stigg	8	0.3





Slide courtesy of Joe Lynch (Teagasc)

Fungicide timing





Flag leaf and ear contribute 65% of total yield







Building fungicide programmes: STB control in Ireland







T0: 1L Bravo T1: 0.8L Proline & 1L Bravo T2: 1.6L Adexar & 1L Bravo T3: 1.2L Prosaro



Slide courtesy of Steven Kildea (Teagasc)

Only apply when needed!





9 Sites

Range of varieties

T1: Proline 0.8L & Bravo 1.0L

T2: Adexar 1.6L & Bravo 1.0L

T3: Prosaro 1.2L (Gleam 2.0L 2012)





No significant yield benefit from T0's





Creissen et al. 2017. Crop Protection 104.

Septoria IPM



- Resistant varieties
- Removing infected trash/stubble
- Fungicide stewardship
 - -Anti resistance strategy







IPM: Ramularia leaf spot



- Agronomic practices
- Varietal resistance
- Fungicides















IPM Trials: Which combo?



- Sow date
- Seed rate
- Varietal resistance (including mixtures/blends)
- Fungicide programmes
- Winter wheat
- Winter barley
- Spring barley





Improving perception + adoption SR FARM ADVISORY SERVICE

- Establish baselines
- England, Scotland, NI and ROI
- ♦ 14 IPM Q's +
- 8 socio economic/demographic Q's.

- ID barriers to uptake
- Change perception
- ID underperformers
- Direct research and KE activity





Best arable farming practice survey

- Pleaseans we the quantions as accurably as yo can. Good date is needed to provide reliable ed vice basil to formers and ad visors.
- Paese new that the same 'peaks' relets, to also and, would and increasively peaks (insects and mellious)
- Similarly, "pesticules' refers to fungiciales, interfaciales and molikacicales
- Revise read question instructions carefully as the type of response required may very from question to question.
- Place complete the survey in fell
- 1. How femilier are you with Integrated Pest Management (JPM)? Please lick one onswer only
 - D Notat all familiar (if this answer, place move direct to Guestion 3.)
 - 0 Somewhat unfamilier
 - **B** Moderately familiar
- 8 familiar
- 5 Veytamiler
- which of the following factors do you consider to be important components: of IPM? Please tol: and don'n every now.

	very unimpertant	Not important	Nettive ingontant an animpontant	Tairly Important	Very important
Preventative measures (hypere practices such as clearing equipment, sourcing clean seed etc.)					
Boligical control methods (growing competitive crops, beetle banks etc.)					
Cultural control methods (altering dolling states to reduce disease, increasing reading rate to control weath, rotating coups est.)					
Monitoring and surveillance of intert pert, well and disease levels (corpositing, reacting, to high diseases/pert pressore alerts etc.)					
Minimum assort periodies					

 What proportion of your lend is in continuous cereal production i.e. growing cereals on the same lend for 5 or more contexcutee, years without, growing a break crop (e.g. oileed rape, beam, peer, gravi)² Piezar circle die wiervont proportion delaw.

None	1-2%	28-50N	51+75%	76-100%
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4. Why do you practice continuous careal production? More than one enswer may be provided

- E Iden't packe it
- 1 land ansatable for other coga
- Climite unsultable for other croge
- 0 Reacons to much service premietaring a facilitie impained to provi some consultance pr
- E Greater risk associated with griving different crops



On-line planning IPM tool for Scotland

The Scottish Government

Consultation Hub

Find Consultations

We Asked, You Said, We Did

Mailing List Signup

Contact

Integrated Pest Management Plan for Scottish Growers

Overview

This plan has been adapted from the National Farmers Union Integrated Pest Management (IPM) plan, promoted by the Voluntary Initiative, to help Scottish farmers meet their legal obligation to take reasonable precautions to protect human health and the environment when using pesticides. Completing an IPM plan will help the landowner/contractor to make the best possible and most sustainable use of all available methods for controlling pests, weeds and diseases.

What is Integrated Pest Management (IPM)?

Integrated pest management is a site specific, whole farm approach to maximising the efficiency of production whilst minimising negative effects on the environment. This should involve minimising pest, weed and disease risks and includes the use of crop rotations, appropriate cultivation techniques, the use of resistant varieties, tailored and efficient use of artificial inputs such as fertilisers, pesticides and fossil fuels and the enhancement of wildlife habitats. Pest monitoring and the use of thresholds for treatment are a component in reducing reliance on pesticides. christian storstein@gov.scot Key Dates Status: Open Runs from 11 May 2016 to 14 Jun 2022 Other Information Audience: People of Scotland Interests: Farming

http://bit.ly.pestmanagementplan







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Summary



- Understand the biology of the pest/disease/weed you are trying to control.
- Assess the risk and select suitable combinations of control measures to tackle your specific set of issues.
- Keep monitoring the problem, evaluating control measures and keeping records.
- Completing an IPM plan for your own farm/business will help you focus your efforts.







Thank You









