



Animal &
Plant Health
Agency

United Kingdom Variety List Trials: Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) Harvest 2024

Cereals – Wheat, Barley, Oats, Triticale, Rye, Spelt
Wheat

Appendices

October 2023

Changes

- Updated Appendix 1 to include Spring Triticale and Rye
- Added updated trial operators from SRUC to Scottish Agronomy to Appendix 4
- Updated controls for Winter Wheat to note that LG SKYSCRAPER is now only Yr2 and will be removed in Harvest 2025 update and CHAMPION is replacement variety

Contents

Changes	2
Scope.....	5
Appendix 1 – Approved Trial Organisers/ Operators for wheat, barley, oats, triticale, rye and spelt wheat.....	6
Appendix 2 – Seed treatment products for use on NL trials.....	7
Appendix 3 – Seed dispatch deadline dates	8
Appendix 4 – Growing Trial Operators and trial locations	9
1 Growing Trial Operators/Seed Handling Operators	9
H spring rye	11
2. Pathology Trials Operator.....	12
Appendix 5 – Control varieties for VCU assessments	13
Appendix 6 – Plant growth regulator protocol for cereal variety trials - 2022/2023	14
Appendix 7 – Fungicide protocol for cereal variety trials – 2022/23.....	23
Winter wheat.....	26
Recommended List Fungicide and PGR Ag Chem product labels	2
Appendix 8 – Moisture content determination for yield	3
1 Oven method	3
2 Electronic moisture assessment (moisture analysers).....	4
3 NIR determination.....	5
Appendix 9 – Dates by which records should be submitted.....	6
1 To Trials Organiser.....	6
2 Plot records to Data Handling Operator.....	6
3 Plot samples to Quality Testing Operator	6

Appendix 10 – Growth stages of cereals	7
Appendix 11 – Assessment keys for cereal diseases	9
Ear Blight of wheat (<i>Fusarium</i> Spp.).....	13
Wheat glume blotch (<i>Septoria nodorum</i> Berk.).....	15

Scope

This document contains the appendices for the main guidance document:

Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) Harvest 2023 –
Cereals – Wheat, Barley, Oats, Triticale, Rye, Spelt Wheat

Appendix 1 – Approved Trial Organisers/ Operators for wheat, barley, oats, triticale, rye and spelt wheat.

Activity	Organisers/Operators Responsible
Data Handling Operators	BioSS* AHDB Cereals and Oilseeds** NIAB***
Trials Organiser	BSPB
Pathology Trials Operator	NIAB
Trial Inspection and Technical Validation Operator	AHDB Cereals and Oilseeds and SASA
Quality Testing Operators	NIAB and Campden BRI
Data Review and Standards Setting Operator	NIAB

*Wheat, Barley, Oats, Spring Triticale and Spring Rye

**Triticale, Rye

*** Spelt wheat

Appendix 2 – Seed treatment products for use on NL trials

Where there are alternative treatments, all varieties in the trial must be treated with the same product

Crop	Treatment
Winter wheat	Prothioconazole + Tebuconazole (Redigo Pro) Kinto Plus (Fluxapyroxad, Triticonazole and Fludioxonil) may be used
Winter barley	Prothioconazole + Tebuconazole (Redigo Pro). Raxil Star. Kinto Plus (Fluxapyroxad, Triticonazole and Fludioxonil) may be used
Winter oats	Prothioconazole + Tebuconazole (Redigo Pro). Kinto Plus (Fluxapyroxad, Triticonazole and Fludioxonil) may be used
Spring wheat	Prothioconazole + Tebuconazole (eg Redigo Pro)
Spring barley	Prothioconazole + Tebuconazole (Redigo Pro)
Spring oats	Prothioconazole + Tebuconazole (Redigo Pro)
Winter Triticale	Prothioconazole + Tebuconazole (Redigo Pro) Kinto Plus (Fluxapyroxad, Triticonazole and Fludioxonil) may be used
Rye	Prothioconazole + Tebuconazole (Redigo Pro) Kinto Plus (Fluxapyroxad, Triticonazole and Fludioxonil) may be used
Spelt wheat	No Treatment

Appendix 3 – Seed dispatch deadline dates

VCU seed must be delivered to each Growing Trials Operator/ Seed Handling Operator by:

Winter wheat	15 th September
Triticale	1 st September
Rye	1 st September
Spelt wheat	1 st September
Winter barley	8 th September
Winter oats	15 th September
Spring wheat	23 rd October
Spring barley	15 th January
Spring oats	15 th January

Appendix 4 – Growing Trial Operators and trial locations

1 Growing Trial Operators/Seed Handling Operators

A winter wheat

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Saaten Union UK Ltd		Wold Newton, Lincolnshire	T and UnT
NIAB		Terrington, Norfolk	T only
NIAB		Callow, Herefordshire	T and UnT
Elsoms Wheat Ltd		Spalding, Lincolnshire	T, UnT and L
KWS UK Ltd		Orford, Suffolk	T and UnT
KWS UK Ltd		Frisby on the Wreak, Leicestershire	T and L
RAGT Seeds Ltd		Ickleton, Cambridgeshire	T only
Agrii		Great Dunmow, Essex	T only
Limagrain UK Ltd		Elmswell, Bury St Edmunds, Suffolk	T only
Syngenta Ltd		Horncastle, Lincolnshire	T only
Envirofield		Kidlington, Oxfordshire	T only
NIAB		Broughton, Hampshire	T only
NIAB		Petham, Kent	T only
Frontier Agriculture Ltd	Saaten Union	Driffield, Yorkshire	T only
SRUC	Scottish Agronomy	West of Ormiston, East Lothian	T, UnT and L
DSV UK Ltd		Wardington, Banbury, Oxon	T only
Scottish Agronomy		Tayside, Angus	T and UnT

B spring wheat

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Saaten Union UK Ltd		Cowlinge, Suffolk	T and DOP
John Innes Enterprise		Norwich, Norfolk	T and DOP
KWS UK Ltd		Fowlmere, Cambridgeshire	T and DOP
NIAB		Sutton Scotney, Hampshire	T only
Stockbridge Technology Centre	Saaten Union	Cawood, North Yorkshire	T only
Frontier Agriculture		Bleasby, Lincolnshire	T only

C winter barley

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Agrii		Great Dunmow, Essex	T only
Saaten Union UK Ltd		Cowlinge, Suffolk	T only
KWS UK Ltd		Fulbourn, Cambridgeshire	T only
Syngenta Ltd		Great Sturton, Lincolnshire	T and UnT
Scottish Agronomy		Balgonie, Fife	T and UnT
NIAB		Wimborne, Dorset	T and UnT
NIAB TAG		Callow, Herefordshire	T and UnT
Frontier Agriculture	Saaten Union	Driffield, Yorkshire	T only

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
SRUC	NIAB	Edinburgh	T and UnT
Scottish Agronomy	NIAB	Mertoun Farms, Melrose	T and UnT
Scottish Agronomy		Mains of Auchreddie, Ellon	

D spring barley

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
KWS UK LTD		Fulbourn, Cambridgeshire	T only
NIAB TAG		Morley, Norfolk	T only
Scottish Agronomy		Gateside, Nr Kinross	T and UnT
Syngenta Ltd		Great Sturton, Lincolnshire	T and UnT
Stockbridge Technology Centre	Saaten Union	Cawood, North Yorkshire	T only
Scottish Agronomy		Hill of Fearn, Tain	T only
Trials Force	Agrii	Steelstrath, Aberdeenshire	T and UnT
NIAB		Andover, Hants	T and UnT
Trials Force	Agrii	Cullen, Banffshire	T only
SRUC		West of Ormiston, East Lothian	T only
Scottish Agronomy		Tayside, Angus	UnT only
AFBI	Agrii	Crossnacreevy	T and UnT

E winter oats

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Agrii		Great Dunmow, Essex	T only
Scottish Agronomy		Balgonie, Fife	T and U
NIABTAG		Callow, Herefordshire	T and U
NIABTAG		Hampshire	T only

F spring oats

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Scottish Agronomy		Fife	T and UnT
Saaten Union		Cowlinge, Suffolk	T and UnT
NIAB		Callow, Herefordshire	T only
Scottish Agronomy	TBC	TBC	T and UnT
AFBI	Agrii	Crossnacreevy	T and UnT

G winter rye

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Saaten Union UK Ltd		Cowlinge, Suffolk	T and UnT

H spring rye

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Saaten Union UK Ltd		Cowlinge, Suffolk	T only

I winter triticale

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Saaten Union UK Ltd		Cowlinge, Suffolk	T only

J spring triticale

Growing Trial Operator	Seed Handling Operator (if not Trial Operator)	Location of trial	Trial description
Saaten Union UK Ltd		Cowlinge, Suffolk	T only

2. Pathology Trials Operator

Pathology Trials Operator	Location of trial
NIAB	UK

Appendix 5 – Control varieties for VCU assessments

The Control varieties are (will be reviewed in May 2024):

Control varieties	
Winter wheat	LG Skyscraper (Feed) (Yr2 Only) Gleam (Feed) Skyfall (Bread making) KWS Extase (Bread making) LG Astronomer (Biscuit) Champion (Feed) (Yr1)
Winter barley	Craft (Malting) KWS Feeris (6 row Feed) SY Kingsbarn (6 row Hybrid Feed) Electrum (Malting) KWS Tardis (Feed)
Winter oats	Cromwell Mascani Dalguise Grafton (Comparator) – naked oat
Winter triticale	KWS Fido Kasyno
Spelt wheat	Zollernspelz
Spring barley	SY Tungsten Propino RGT Planet LG Diablo Laureate Skyway
Spring triticale	Doublet Trimour
Spring wheat	KWS Ladum KWS Cochise Hexham
Spring oats	Canyon WPB Isabel Aspen Lennon
Winter rye	SU Performer
Spring rye	SU Vergil Ovid

Appendix 6 – Plant growth regulator protocol for cereal variety trials - 2022/2023

Last updated: February 2023

Recommendations by Paul Gosling, BASIS registration number R/E/8107/IFM.

RL Trials Co-ordinator: Mark Bollebakker 01480 482989

NL Co-ordinator: Jeremy 01353 653846

The following notes are given for guidance in the use of plant growth regulators (PGRs) on Recommended List trials. The full manufacturer instructions should be consulted prior to the storage, handling or use of any agrochemical product. The instructions and advice given on product labels should be followed at all times. There should be no conflicting advice between that given in this protocol and on the product label; if there appears to be any conflict, inform the Trials Co-ordinators before the application is made.

Table 1: Summary of applications for NL trials

Crop	Fungicide treated plots	Plots or DOP's without fungicide	Lodging trials
Winter wheat	YES	NO	NO
Spring wheat (late autumn or spring sown)	YES	NO	N/A
Winter barley	YES, UNLESS THE CROP IS STRESSED AND THE RISK OF LODGING IS NEGLIGIBLE.	YES, UNLESS THE CROP IS STRESSED AND THE RISK OF LODGING IS NEGLIGIBLE.	NO
Spring barley	Only if a high risk of lodging	NO	NO
Winter oats	YES, +F/+PGR PLOTS ONLY.	N/A	NO
Spring oats	YES, +F/+PGR PLOTS ONLY.	NO	N/A
Winter rye	YES	YES	N/A

Winter triticale	YES	YES	N/A
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Plant growth regulators should not be applied to trials grown specifically for the assessment of lodging. There are important restrictions relating to the use of plant growth regulators.

Crop damage can occur if manufacturers' guidelines are not followed.

Common restrictions are those relating to crops that:

- are sited on soils of low fertility
- are suffering from herbicide damage
- are under stress from drought, waterlogging or any other cause
- were sown in the very late spring

Trial managers should consult the manufacturer's instructions to see if any of these restrictions apply.

IN ALL CASES, PLANT GROWTH REGULATOR SHOULD BE APPLIED TO DESIGNATED PLOTS ONLY AS SPECIFIED IN THE AHDB RECOMMENDED LIST CEREAL TRIALS PROTOCOL

General guidance and notes specific to the use of PGRs on variety trials

Products should be used according to current manufacturers' instructions. It is the responsibility of the Trial Manager to ensure that the growth stages of all of the varieties in the trial are within the manufacturer's guidelines for use. The following notes are intended to highlight matters of particular relevance to the use of PGR products on variety trials and timings are relevant to earliest varieties.

The **Terpal** doses in this protocol are below full rate (**2.0 l/ha**).

Consult the Trials Co-ordinators if you feel that a higher dose is needed e.g. if there is a risk of severe lodging. However, be aware that late applications of **Terpal** (e.g. at around the flag leaf emergence stage) at higher doses can lead to crop damage or stimulate the production of secondary tillers.

Winter wheat and late autumn sown Spring wheat

Product	Crop	Rate & timing
Either split dose 3C Chlormequat 750+ Moddus	Winter wheat only	3C Chlormequat 750 at 1.0 l/ha at G.S. 25 – 30 PLUS †Moddus at 0.1 l/ha if applied at the G.S 30 timing. Followed at G.S. 31 – 32 by 3C Chlormequat 750 at 1.0 l/ha PLUS †Moddus at 0.1 – 0.2 l/ha. Do not apply if any variety is beyond the G.S. 32 timing.
<u>OR</u> SINGLE DOSE (Winter wheat and late sown autumn sown spring wheat) 3C Chlormequat 750 + Moddus	Winter wheat	3C Chlormequat 750 at 1.5 – 2.0 l/ha at GS30 – 31 (in the North and North-west regions this can be delayed to GS32) PLUS †Moddus at 0.1 – 0.2 l/ha. Do not apply if any variety is beyond G.S. 32.
<u>OR</u> SINGLE DOSE (Winter wheat and late sown autumn sown spring wheat) 3C Chlormequat 750 + Moddus	Spring wheat	3C Chlormequat 750 at 1.25 l/ha at GS30 – 31 (in the North and North-west regions this can be delayed to G.S. 32) PLUS †Moddus at 0.1 – 0.2 l/ha. Do not apply if any variety is beyond G.S. 32.
*Terpal		Either single-dose of 0.75 – 1.5 l/ha (depending on lodging risk and *condition of the crop) at GS32 – 37 OR (particularly for the early sown crops) a split dose of 1.0 l/ha at GS33 plus 0.75 l/ha at GS37 Maximum individual dose is 2.0 l/ha, maximum total dose is 2.0 l/ha and maximum number of treatments is 2 per crop.

***Terpal** should not be applied to any variety in the trial if the leaf sheaths have split and the ears are visible.

- **DO NOT** apply **Terpal** if the crop is suffering from herbicide damage or physical stress caused by e.g., waterlogging, drought, take-all.
 - **DO NOT** apply in temperatures above 21°C. If, in Winter wheat/Spring wheat trials there are large differences in growth stages; contact the RL Trials Co-ordinator/ NL Coordinator.
- † **Moddus** - Apply unless the crop is stressed or the lodging risk is negligible.

Spring sown Spring wheat trials

Product	Rate & timing
3C Chlormequat 750 + Moddus	Single half dose of 0.6 l/ha at GS 30 – 31. Consult the Trials Co-ordinator if the crop is late sown and/or under stress. Do not apply if any variety is beyond G.S. 31.

Terpal and Moddus should not be applied to spring sown Spring Wheat trials.

Winter barley trials

Product	Rate & timing
3C Chlormequat 750 + Moddus	3C Chlormequat 750 at 1.5 – 2.0 l/ha at G.S. 25 – 30 PLUS †Moddus at 0.1 – 0.2 l/ha if applied at the G.S. 30 timing.
Moddus	Optional: G.S. 31 – 32 in high fertility situations (0.1 – 0.2 l/ha)
Terpal	0.75 – 1.0 l/ha at *G.S. 32 – 39

*The preferred option for **Terpal** is for the product to be applied separately from the T2 application. Terpal should not be applied on any variety in the trial if the leaf sheaths have split and the ears are visible. Do **NOT** apply Terpal if the crop is suffering from herbicide damage or physical stress caused by e.g. waterlogging, drought, take-all. Do **NOT** apply in temperatures above 21°C.

† **Moddus**. Apply unless the crop is stressed or the lodging risk is negligible.

Spring barley trials

Product	Rate & timing
Moddus	<i>Optional: Moddus may be applied at 0.1-0.2 l/ha at GS30 for increased rooting and tiller survival and where lodging may be expected</i>
Terpal	<i>Optional: Terpal 0.5 l/ha at GS32-37. Apply only if the risk of lodging is high and the crop shows no signs of stress.</i>

Winter and Spring oat trials

Product	Rate & timing
Moddus	<i>Optional: Moddus at 0.1 – 0.2 l/ha, in high lodging risk situations and if applied at G.S. 30.</i>
3C Chlormequat 750 Option for an <u>additional</u> Canopy in high-risk situations	<p>Single dose: 3C Chlormequat 750 1.5 – 2.0 l/ha at G.S.31 – 32. A non-ionic wetting agent should be used - see product label.</p> <p><u>In high-risk situations Canopy 0.75 – 1.5 l/ha up to G.S. 41.</u></p>

Apply routinely as a single application to all appropriate trials unless it is felt that the application is inadvisable, in which case the Trials Co-ordinators should be consulted

Winter rye & triticale trials

Product	Rate & timing
3C Chlormequat 750	Either single dose: 3C Chlormequat 750 at 1.0 l/ha PLUS †Moddus at 0.1 – 0.2 l/ha at G.S. 30
3C Chlormequat 750	Or (optional for rye) split dose: 3C Chlormequat 750 1.0 l/ha at G.S. 31 – 32 PLUS †Moddus at 0.1 – 0.2 l/ha
Terpal	Terpal 1.5 – 2.0 l/ha at G.S. 37 (use lower rate if crop is stressed). Or Medax Max 0.3 – 0.4 kg/ha should be used if Terpal timing is missed at G.S. 37. This is safe up to G.S. 49 and is safer for use on the ear in comparison to Terpal.

† Moddus. Apply unless the crop is stressed or the lodging risk is negligible

Spring triticales (NL trial)

Product	Rate & timing
3C Chlormequat 750	Single dose: 3C Chlormequat 750 at 2.0 l/ha

Appendix 7 – Fungicide protocol for cereal variety trials – 2022/23

Last updated: December 2022

Recommendations by Paul Gosling, BASIS registration number R\E\8107\IFM.

RL Trials Co-ordinator:	Mark Bollebakker	01480 482989
NL Co-Ordinator:	Jeremy Widdowson	01353 653846

This programme is for use on AHDB Recommended List and National List cereal trials in 2021/22:

- For spring and summer applications to trials for harvest 2022.
- For autumn applications to trials to be harvested in 2023

It is an experimental protocol and is designed to meet the protocol aim of keeping disease levels in treated plots below 5% infection in all varieties and in all trials. It is not intended to follow commercial practice.

Please note that most treatments are compulsory, and the rates and timings specified should be adhered to as closely as possible. The protocol is robust and, if applied correctly, should be effective. **If, however, disease levels rise above 5% (e.g., if weather conditions do not allow optimal application), please contact Mark Bollebakker (RL) or Jeremy Widdowson (NL) to discuss an appropriate course of action.**

Fungicides should be applied at the stated dose rates unless agreed otherwise with the RL Trials Co-ordinator or NL Co-ordinator. Changes to dose rates will only be sanctioned in exceptional circumstances, such as drought-stressed trials under low disease pressure.

Please contact the RL Trials Co-ordinator or NL Co-ordinator if you have any difficulty in sourcing a particular product.

In some cases, two or more products may be available from a company with the same active substances and formulation; if you wish to use such a product and it is not listed in this protocol, contact the RL Trials Co-ordinator or NL Co-ordinator. Generic products should be avoided as they may contain the same active substances but in a different formulation.

Important: Every care has been taken to ensure that all mixtures, rates, and timings are approved, meeting COSSH regulations and manufacturers and statutory guidelines. However, it is the responsibility of the Trial Manager to ensure that they meet all current regulations at the time of application. It is recommended to seek advice from a qualified BASIS advisor for suitability to local conditions and regulatory compliance. The RL Trials Co-ordinator or NL Co-ordinator should be notified of any conflict between the protocol and current regulations.

In accordance with FRAC guidelines, only two applications of strobilurin fungicides and two SDHI fungicides are to be applied to any crop.

Product	Active substances	Amount of active substance	Manufacturer
Comet 200	Pyraclostrobin	200 g/l	BASF
Cyflamid	Cyflufenamid	50 g/l	Certis
Elatus ERA	Benzovindiflupyr Prothioconazole	75 g/l 150 g/l	Syngenta
Entargo	Boscalid	500 g/l	BASF
Fandango	Fluoxastrobin Prothioconazole	100 g/l	Bayer CropScience
Imtrex	Fluxapyroxad	62.5 g/l	BASF
Arizona	Folpet	500 g/l	Adama
Proline 275	Prothioconazole	275 g/l	Bayer
Prosaro	Prothioconazole Tebuconazole	125 g/l 125 g/l	Bayer
Revystar XE	Mefentrifluconazole Fluxapyroxad	47.5/100 g/l	BASF
Siltra Xpro	Bixafen Prothioconazole	60/200g/l	Bayer
Sunorg-Pro	Metconazole	90g/l	BASF
Talius/Justice	Proquinazid	200 g/l	DuPont

Product	Active substances	Amount of active substance	Manufacturer
Tebuconazole – Tebcur 250	Tebuconazole	250 g/l	Belchim/Rotam
Univoq	Fenpicoxamid	50 g/l	Corteva
	Prothioconazole	100 g/l	

Winter wheat

Treatment Timing	Growth Stage (G.S) Traget timing or disease.	Product a.i.	Rate
Before TO			
	Optional in autumn or early spring if rusts present	Monkey	1.5 l/ha
TO	G.S. 30 (no later than when 50% of varieties at G.S.30)		
		Cyflamid +	0.25-0.30 l/ha
		Melcanazole +	0.5 l/ha
		Comet 200	0.4-0.6 l/ha
T1	G.S.32 (with most varieties at G.S.32)		
	For eye spot situation	Revystar XE +	1.0 to 1.25 l/ha
		Entargo +	0.5 l/ha
		Phoeniz +	1.5 l/ha
		Talius/Justice	0.15 l/ha
	For heavy rust situation	Revystar XE +	1.0 to 1.25 l/ha
		Elatus Era +	0.6 l/ha
		Phoenix +	1.5 l/ha

		Talius/Justice	0.15 l/ha
T1.5	G.S.33 (targeting leaf 2 emerging)		
		Tebuconazole	0.75 l/ha
Note: 14 day interval between T1.5 Tebuconazole application and T2 application.			
		Prothioconazol	0.6 l/ha

Winter wheat

Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
	Contact Trials Manager if significant yellow rust pre T0.		
T0	G.S. 30 (with no later than when 50% of varieties at G.S.30)		
		Cyflamid +	0.25 – 0.35 l/ha
		Sunorg-Pro - Metconazole +	0.5 l/ha
		Comet 200	0.4 – 0.6 l/ha
T1	G.S. 32 (with most varieties at G.S. 32)		
For eye spot situation		Revystar XE +	1.0 – 1.25 l/ha
		Entargo +	0.5 l/ha
		Arizona +	1.0 l/ha
		Talius/Justice	0.15 l/ha
For heavy rust situation		Revystar XE +	1.0 – 1.25 l/ha
		Elatus Era +	0.6 l/ha

		Arizona +	1.0 l/ha
		Talius/Justice	0.15 l/ha
T 1.5	G.S. 33 (targeting leaf 2 emerging)		
<i>Optional in a rust situation</i>		<i>Tebuconazole</i>	<i>0.75 l/ha</i>
<i>Note: 14-day interval between T1.5 Tebuconazole application and T2 application</i>			
<i>Or in a Septoria</i>		<i>Prothioconazole</i>	<i>0.6 l/ha</i>
<i>Note: Arizona can only be used at one timing either here or at T3</i>		+ Arizona	1.0 l/ha
T2	G.S 39 – 45 and no later than 4 weeks after T1 application		
		Univoq	1.25 – 1.5 l/ha
Note: <u>Strongly</u> recommended for rust in East and Southern regions.		Tebuconazole +	0.75 – 1.0 l/ha
		Arizona	1.0 l/ha
<i>Optional - If mildew established</i>		<i>Cyflamid</i>	<i>0.25 – 0.35 l/ha</i>
T3	G.S. 55 – 61 Timing for Fusarium control (very early anthesis preferred).		
		Prosaro +	0.8 – 1.0 l/ha

		Comet 200 +	0.4 – 0.6 l/ha
<i>Optional - if not used at T1.5 can only be used up to GS59.</i>		Arizona	1.0 l/ha
Post T3			
For extreme septoria or brown rust situations please contact the relevant trials co-ordinator			
NOTE			
No more than TWO applications of a SDHI product should be applied to any cereal crop			
<i>Depending whether "Knock down" or protectant activity is required, applications of Cyflamid (eradicator) and Talius/Justice (protectant) can be swapped at T0 or T1. DO NOT APPLY CONSECUTIVE APPLICATIONS OF PRODUCTS CONTAINING CYFLAMID</i>			
<i>For Cyflamid, the maximum number of treatments is TWO PER CROP on ALL recommended cereals, to be applied ONLY IN SPRING</i>			
Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
Pre T1			
<i>For disease infections before G.S. 29 consult the relevant trials co-ordinator.</i>			
T1	G.S. 29 – 31		
		Revystar XE +	1.0 – 1.25 l/ha
		Comet 200 +	0.4 – 0.6 l/ha
		Arizona +	1.0 l/ha
		Talium/Justice	0.15 l/ha
T2	G.S. 37 and no later than 3 weeks after T1 application		

		Revystar XE +	1. – 1.25 l/ha
		Arizona	1.0 l/ha
	<i>Optional if mildew established</i>	<i>Cyflamid</i>	<i>0.25 – 0.5 l/ha</i>
T3	G.S. 51 – 61		
		Prosaro +	0.8 l/ha
		Comet 200 +	0.4 – 0.6 l/ha
	<i>If including Arizona, must not exceed G.S. 59</i>	<i>Arizona</i>	<i>1.0 l/ha</i>

When you are applying optional treatments make sure you adhere to Product Labels regarding maximum total dose and maximum number of treatments.

Spring wheat - autumn sown.

Treatment Timing	Growth Stage (G.S.) Target timing or disease.	Product/ a.i.	Rate
Before T0			
<i>For disease infections before G.S. 29 consult the relevant trials operator.</i>			
T1	G.S. 29 - 31		
	<i>For heavy rust situation</i>	<i>Elatus Era +</i>	<i>0.6 l/ha</i>
		<i>Revystar XE +</i>	<i>1.0 to 1.25 l/ha</i>
		<i>Phoenix +</i>	<i>1.5 l/ha</i>
		<i>Talius/Justice</i>	<i>0.15 l/ha</i>
	<i>For eyespot situation</i>	<i>Entargo +</i>	<i>0.5 l/ha</i>
		<i>Revystar XE +</i>	<i>1.0 to 1.25 l/ha</i>
		<i>Phoenix +</i>	<i>1.5 l/ha</i>
		<i>Talius/Justice</i>	<i>0.15 l/ha</i>
T 1.5	Optional if difficulty keeping to 3 week timings		
	<i>In a rust situation</i>	<i>Tebuconazole</i>	<i>0.75 l/ha</i>
Note: 14 day interval between T1.5 Tebuconazole application and T2 application.			

	<i>Or in a septoria situation</i>	<i>Prothioconazole</i>	<i>0.6 l/ha</i>
T2	G.S 37 and no later than 3 weeks after T1 application		
		Revystar XE +	1.0-1.25 l/ha
		Phoenix	1.5 l/ha
	<i>Optional if high yellow rust pressure, strongly recommend for in the East and Southern regions.</i>	<i>Tebuconazole</i>	<i>0.75-1.0 l/ha</i>

Spring wheat - spring sown.

Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
Pre T1			
<i>For disease infections before G.S. 29 consult the relevant trials co-ordinator.</i>			
T1	G.S. 29 – 31		
		Revystar XE +	1.0 – 1.25 l/ha
		Comet 200 +	0.4 – 0.6 l/ha
		Arizona +	1.0 l/ha
		Talius/Justice	0.15 l/ha
T2	G.S. 37 and no later than 3 weeks after T1 application		
		Revystar XE +	1. – 1.25 l/ha
		Arizona	1.0 l/ha
		<i>Cyflamid</i>	<i>0.25 – 0.5 l/ha</i>
T3	G.S. 51 – 61		
		Prosaro +	0.8 l/ha
		Comet 200 +	0.4 – 0.6 l/ha
		<i>Arizona</i>	<i>1.0 l/ha</i>
<i>If including Arizona, must not exceed G.S. 59</i>			

Winter barley

Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
Before T0			
<i>Optional - If net blotch or mildew present in Autumn or early Spring please contact the trials co-ordinator</i>			
T0	G.S. 26 – 30 at start of Spring growth		
		Proline 275 +	0.3 – 0.5 l/ha
		Comet 200	0.35 – 0.5 l/ha
T1	G.S. 30 – 31 No later than 4 weeks after T0 application		
Note: Maximum application of Siltra Xpro is 1.0 l/ha.		Siltra Xpro +	0.5 – 0.75 l/ha
		Arizona +	1.5 l/ha
		Cyflamid	0.25 – 0.35 l/ha
T2	G.S 39 – 45 (earliest varieties should not exceed G.S. 45)		
		Revystar XE +	1.0 – 1.25 l/ha
		Arizona	1.5 l/ha
<i>Optional: If net blotch or rhynchosporium is developing.</i>		Proline 275	0.3 – 0.5 l/ha
<u>Not to be applied after the start of flowering.</u>			
T3	G.S. 59 – 61		
<i>Optional (TO BE CONSIDERED COMPULSORY IF BROWN RUST IS A RISK). <u>Must not be applied after the start of flowering</u></i>		Fandango Or	0.75 l/ha

NOTE: Comet 200 must be applied before G.S. 59	<i>Proline 275 +</i>	<i>0.3 – 0.5 l/ha</i>
	<i>Comet 200</i>	<i>0.35 – 0.5 l/ha</i>

Spring barley

Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
T0	G.S. 13 – 15		
<i>Optional: If disease is present</i>		<i>Proline 275</i>	<i>0.2 – 0.4 l/ha</i>
T1	G.S. 25 – 31 Applications at the early end of this range may be necessary if rhynchosporium or mildew are developing.		
		Siltra Xpro +	0.4 – 0.6 l/ha
		Arizona	1.0 l/ha
<i>Optional: if mildew is present</i>		<i>Cyflamid</i>	<i>0.25 – 0.35 l/ha</i>
T2	G.S 45 – 59 (earliest varieties should not exceed G.S.59) no later than 3 weeks after T1 application. If any varieties have passed G.S. 59 contact relevant trials co-ordinator.		
Note: If trial is grown for malting quality Revystar XE <u>must not</u> be applied after G.S. 45		Revystar XE +	0.75 –1.0 l/ha
		Arizona	1.5 l/ha
T3	G.S. 59 – 69		
<i>Optional: If net blotch or rhynchosporium or fusarium developing</i>		<i>Proline 275</i>	<i>0.3 – 0.5 l/ha</i>

Winter oats

Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
T0	G.S. Mid to late tillering		
		Cyflamid +	0.25 – 0.35 l/ha
		Prothioconazole	0.35 l/ha
T1	G.S. 31		
	Note: Maximum applications Siltra Xpro is 1.0 l/ha.	Siltra Xpro +	0.4 – 0.6 l/ha
		Talius/Justice	0.15 l/ha
	<i>Optional - if crown rust is a problem.</i> <i>Note: Only <u>TWO</u> applications of Comet 200 permitted per crop. Apply at <u>T1 OR T2</u> which ever more appropriate to season and conditions.</i>	Comet 200	0.5 l/ha
T2	G.S. 39 – 45		
	Note: Maximum application of Siltra Xpro is 1.0 l/ha.	Siltra Xpro +	0.4 – 0.6 l/ha
		Cyflamid	0.25 – 0.35 l/ha
	<i>Optional - If crown rust is a problem, SEE NOTE ABOVE</i>	Comet 200	0.5 l/ha
T3	G.S. 45 – 59		

<p>Optional: If crown rust pressure has remained high before G.S.59 – 61. SEE NOTE ABOVE, NOT IF NOT APPLIED AT T1 & T2, MAX 2 APPLICATIONS PER CROP</p>	Comet 200+	0.5 l/ha
	Tebuconazole/ Toledo	0.5 l/ha

Spring oats

Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
T0	G.S. 13 – 15		
	<i>Optional: If mildew present.</i>	Cyflamid +	0.25 – 0.35 l/ha
		Prothioconazole	0.35 l/ha
T1	G.S. Mid to late tillering		
	Note: Maximum applications Siltra Xpro is 1.0 l/ha.	Siltra Xpro +	0.4 – 0.6 l/ha
		Talius/Justice	0.2 l/ha
	<i>Optional: If crown rust is a problem.</i>	Comet 200	0.5 l/ha
T2	G.S. 39 – 45		
		Siltra Xpro +	0.4 – 0.6 l/ha
		Cyflamid	0.25 – 0.35 l/ha
	<i>Optional: If crown rust pressure is a problem.</i>	Comet 200+	0.5 l/ha
		Tebuconazole	0.5 l/ha

Winter rye & triticale

Treatment Timing	Growth Stage (G.S.) - target timing or disease	Product / active ingredient	Rate
T0	G.S. 30		
		Tebuconazole +	0.75 – 1.0 l/ha
		<i>Optional: If mildew present, TRIALS OPERATORS' DISCRETION WETHER TO USE EITHER AT T0 OR T1.</i>	Cyflamid 0.25 – 0.35 l/ha
T1	G.S. 31 – 32		
	Increase rate for high rust.	Elatus Era +	1.0 l/ha
		<i>Optional: If mildew present, TRIALS OPERATORS' DISCRETION WETHER TO USE EITHER AT T0 OR T1.</i>	Cyflamid 0.25 – 0.35 l/ha
T2	G.S. 39 – 45		
		Revystar XE	0.5 – 1.0 l/ha
T3	G.S. 59 – 61		
	<i>Optional: Rye only if rust remain a problem before G.S.61.</i>	Prosaro	0.8 l/ha

Spring triticale

Growth Stage (G.S.) - target timing or disease	Product / active ingredient		Rate
G.S.31 – 32			
	Elatus Era +		1.0 l/ha
	Talius/Justice		0.15 l/ha
G.S. 32 – 45			
	Revystar XE		0.5 – 0.75 l/ha

Recommended List Fungicide and PGR Ag Chem product labels

Introduction

This list can be used to help find the relevant product labels for PGRs, fungicides, herbicides, and insecticides listed in the main protocols. The links below can be used to navigate to the company page and search for the product labels.

Adama UK

[Listen > Learn > Deliver | ADAMA](#)

BASF

[Product Labels, MSDSs & EISs \(basf.co.uk\)](#)

Bayer Crop Science

[Crop Protection Products from Bayer Crop Science UK](#)

Belchim UK

[Products UK – Belchim Crop Protection](#)

Certis Europe

[Products A-Z and Key Documents | Certis Europe United Kingdom](#)

Corteva/DU Pont

[Find a Product | Corteva Agriscience](#)

Syngenta

[Labels and SDS downloads | Syngenta](#)

Appendix 8 – Moisture content determination for yield

Yield data must be corrected to 15% moisture content. In order to do this, the moisture content of the harvested plot grain is required. One of three methods of determining dry matter must be used – the oven method, electronic moisture analysers method or NIR determination.

1 Oven method

Samples are dried until constant mass is achieved. For expediency it is permissible to dry samples for a fixed time provided it can be demonstrated that this is sufficient to reliably achieve constant mass for samples even when the chosen apparatus is fully loaded with samples.

Apparatus and Equipment.

Oven. Electrically heated and controlled in such a way that, during normal working, the mean temperature of the air and of the shelves carrying the test samples is 100° C and operates within the range 96 - 104° C. (Temperature to be reviewed by the Procedures Development Group).

The oven should be regularly maintained and regularly checked for correct operation.

Sample drying trays. Durable under test conditions and being of a size which enables the test sample to be distributed evenly within the tray and at depth which does not protract the drying time.

Balance. Accuracy 0.1 g ± 0.05 g. The balance should be regularly serviced and calibrated. Frequent checks on its correct operation should be made during the period when the balance is in use.

Method

The test samples are received direct from the combine in hermetically sealed bags or containers. Weigh a fully representative 100 g sub-sample or an accurately recorded catch-weight between 100-200 g and place into the drying tray with an identifying label.

Place the drying trays containing the test samples into the pre-heated oven. Dry the test samples for the pre-determined period or until constant mass is achieved (see below).

Remove the test samples from the oven and allow to cool to ambient temperature.

Record the dry weight of the test sample to 0.1 g.

If achievement of constant mass is to be directly measured, five check samples should be removed from a range of positions within the oven after a period of about 16hrs. The dry weight of these samples should be recorded as above. The check samples should be returned to the oven and dried for a further 2 hours and the dry weight again recorded. A dry matter content of less than 0.3% between the two determinations will be accepted as representing constant mass. If constant mass has not been achieved, the check samples should be returned to the oven for further periods of two hours until constant mass is observed.

Results

The dry matter content of the test sample is calculated as follows;

$$\text{Dry matter (\%)} = \frac{\text{Dry test sample weight}}{\text{Original test sample weight}} \times 100$$

When all samples from a given trial have been recorded, the fresh and dry weights are immediately reported to the Data Handling Operator electronically. When the dry weights are reported as a percentage, the fresh weight should be reported as 100.

2 Electronic moisture assessment (moisture analysers)

Principles

Moisture analysers, either separate instruments or probes on combines, may be used for determining the dry matter of harvested grain. There are no restrictions on the make or model of moisture analyser that may be used, provided the conditions described below are met.

The manufacturer's recommendations for use must be followed. On-combine analysis must only be carried out on equipment specifically manufactured for this purpose. 'Desk-top' analysers should not be used on the combine because it has been shown that heat and vibration can cause inaccuracy.

Equipment

The analysing equipment must:

- be calibrated at least once annually for each crop according to the manufacturer's instructions using check samples (see reference below) and have a moisture content accuracy of plus/minus 0.5%. The calibration data should be retained for a minimum of 1 year.
- be serviced regularly, especially just prior to harvest, according to manufacturer recommendations. The action taken should be documented and the information held for a minimum of 1 year.

- be fit for use in accordance with manufacturer instructions. It should have an adequate power supply throughout operation. Instructions should be held with the machine and all operators adequately trained in its operation.

In the field:

- the determination of dry matter must be the same for all plots in a trial replicate. For this reason, there should be minimal risk of rainfall during the harvest of a replicate. If there is a significant risk then backup samples should be taken from all plots to allow comparison through the oven method.
- the grain samples to be analysed must be between 83 and 88% dry matter (12 to 17% moisture content). If it is possible that samples in a replicate may fall outside this range, samples must be taken from all plots so that the oven method may be used should it be necessary. Polythene bags and plot identity labels must be carried at all times to allow this to be carried out.
- The grain to be analysed must be fully ripe with no green ears/grains in any sample. In these cases the samples for the oven method should be used.
- The data sent to the Data Handling Operator must be in the form DRY MATTER%.

References:

BS 4317-24:1990, ISO 7700/1-1984 Methods of test for cereals and pulses. Method of checking the calibration of moisture meters for cereals.

3 NIR determination

The NIR method is permitted for the measurement of moisture content provided that the instrument uses current UK NIR Network calibrations for the appropriate crops. The operator must also participate in the monthly ring checks for the various calibrations being used to demonstrate that the instrument and operating practices are performing within specification. Records of the results of the monthly ring checks should be available for inspection if required.

Appendix 9 – Dates by which records should be submitted

1 To Trials Organiser

Record	Latest date of receipt by Trials Organiser
Site data part 1 (including site sketch)	Within 2 months of drilling trial (autumn sown trials) Within 1 month of drilling trial (spring sown trials)
Site data part 2	By the time trials harvested
Plot records (in approved electronic format)	Growing Trial Operator should notify Trials Organiser that trial has been harvested within 2 days of harvest

2 Plot records to Data Handling Operator

Record	Date
Plot records SHOULD be sent to Data Handling Operator	Yield and moisture data within 3 days of harvest Other data within 10 days of record being taken

3 Plot samples to Quality Testing Operator

Samples	Date
Plot samples for quality testing SHOULD be sent to Quality Testing Operator	Within 2 days of harvest

Appendix 10 – Growth stages of cereals

SEEDLING GROWTH

- 10 first leaf through coleoptile
- 11 first leaf unfolded
- 12 2 leaves unfolded
- 13 3 leaves unfolded
- 14 4 leaves unfolded
- 15 5 leaves unfolded
- 16 6 leaves unfolded
- 17 6 leaves unfolded
- 18 8 leaves unfolded
- 19 9 or more leaves unfolded

TILLERING

- 20 main shoot only
- 21 main shoot and 1 tiller
- 22 main shoot and 2 tillers
- 23 main shoot and 3 tillers
- 24 main shoot and 4 tillers
- 25 main shoot and 5 tillers
- 26 main shoot and 6 tillers
- 27 main shoot and 7 tillers
- 28 main shoot and 8 tillers
- 29 main shoot and 9 or more tillers

STEM ELONGATION

- 30 Ear at 1 cm
- 31 1st node detectable
- 32 2nd node detectable
- 33 3rd node detectable
- 34 4th node detectable
- 35 5th node detectable
- 36 6th node detectable
- 37 flag leaf just visible
- 39 flag leaf ligule/collar just visible

BOOTING

- 41 flag leaf sheath extending
- 43 boots just visibly swollen
- 45 boots swollen
- 47 flag leaf sheath opening
- 49 first awns visible

INFLORESCENCE (EAR EMERGENCE)

- 51 First spikelet of inflorescence just visible
- 52 $\frac{1}{4}$ of inflorescence emerged
- 55 $\frac{1}{2}$ of inflorescence emerged
- 57 $\frac{3}{4}$ of inflorescence emerged
- 59 inflorescence completed

ANTHESIS

- 60 beginning of anthesis
- 61
- 64 anthesis half-way
- 65
- 68 anthesis completed
- 69

MILK DEVELOPMENT

- 71 caryopsis watery ripe
- 73 early milk
- 75 medium milk
- 77 late milk

DOUGH DEVELOPMENT

- 83 early dough
- 85 soft dough
- 87 hard dough

RIPENING

- 91 caryopsis hard (difficult to divide by thumb-nail)
- 92 caryopsis hard (can no longer be dented by thumb-nail)
- 93 caryopsis loosening in daytime

Reference: Tottman D R, Broad H (1987) Decimal Code for the Growth Stages of Cereals
Annals of Applied Biology 100, 683-687.

Appendix 11 – Assessment keys for cereal diseases

- 1) Examine top 4 leaves. If top leaf has been fully expanded for less than 14 days, refer to 2nd leaf as 'top leaf'.
- 2) Ignore all naturally senescent leaf tissue.
- 3) Include all chlorosis and necrosis attributable to disease.
- 4) Record % infection; use interpolated values (e.g. 3%) if necessary.

If foci present, record average over the plot as a whole.

% Infection	Crown rust	Yellow rust	Brown rust
0	No infection observed		
0.1	1 small cluster of pustules per tiller	1 stripes per tiller	25 pustules per tiller
1	1 cluster per leaf	2 stripes per leaf	100 pustules per leaf
5	Most tillers infected but some top leaves uninfected	Most tillers infected but some top leaves uninfected	Top leaf – numerous pustules but leaves appear green overall
10	All leaves infected but leaves appear green overall	All leaves infected but leaves appear green overall	Top leaf – pustules sufficiently dense to give brown appearance in patches
25	Leaves appear ½ infected ½ green		
50	Leaves appear more infected than green		
75	Very little green leaf tissue left		
100	Leaves dead - no green tissue left		

% Infection	Septoria	Rhynchosporium	Net blotch
0	No infection observed		
0.1	1 lesion per 10 tiller	1 lesion per 10 tillers	1 small lesion per 10 tillers
1	2 small lesions per tiller	1 lesion per tiller	1 small lesion per tiller
5	Small lesions beginning to form areas of dead tissue across width of leaf	Discrete lesions on most tillers, about 2 per leaf	2 lower leaves appear ¼ infected. Other leaves - few lesions
10	2 lower leaves – large areas of diseased tissue some covering 1/3 of leaf	Lesions coalescing but leaves appear green overall	2 lower leaves appear ½ infected. Other leaves - numerous lesions
25	Leaves appear ½ infected ½ green		
50	Leaves appear more infected than green		
75	Very little green leaf tissue left		
100	Leaves dead - no green tissue left		

% Infection	Mildew
0	
0.1	3 pustules per tiller
1	5 pustules per leaf
5	2 lower leaves appear $\frac{1}{4}$ infected
10	2 lower leaves appear $\frac{1}{2}$ infected
25	Leaves appear $\frac{1}{2}$ infected $\frac{1}{2}$ green
50	Leaves appear more infected than green
75	Very little green leaf tissue left
100	Leaves dead - no green tissue left

% Infection	Ramularia
0	
1 – 5	Sparse lesions on upper leaves
6 – 10	More lesions on upper leaves
11 – 20	Numerous lesions on middle and upper leaves with some necrosis
21 – 30	Many lesions and severe necrosis on upper leaves and lesions on middle leaves
31 – 40	Extensive lesions on upper leaves many lesions on middle leaves and necrosis
41 – 50	Severe damage to upper leaves more lesions and necrosis on middle and lower leaves
51 – 75	100% lesions on upper leaves severe necrosis on middle leaves
75 – 100	Almost all leaves necrotic with lesions on all leaves

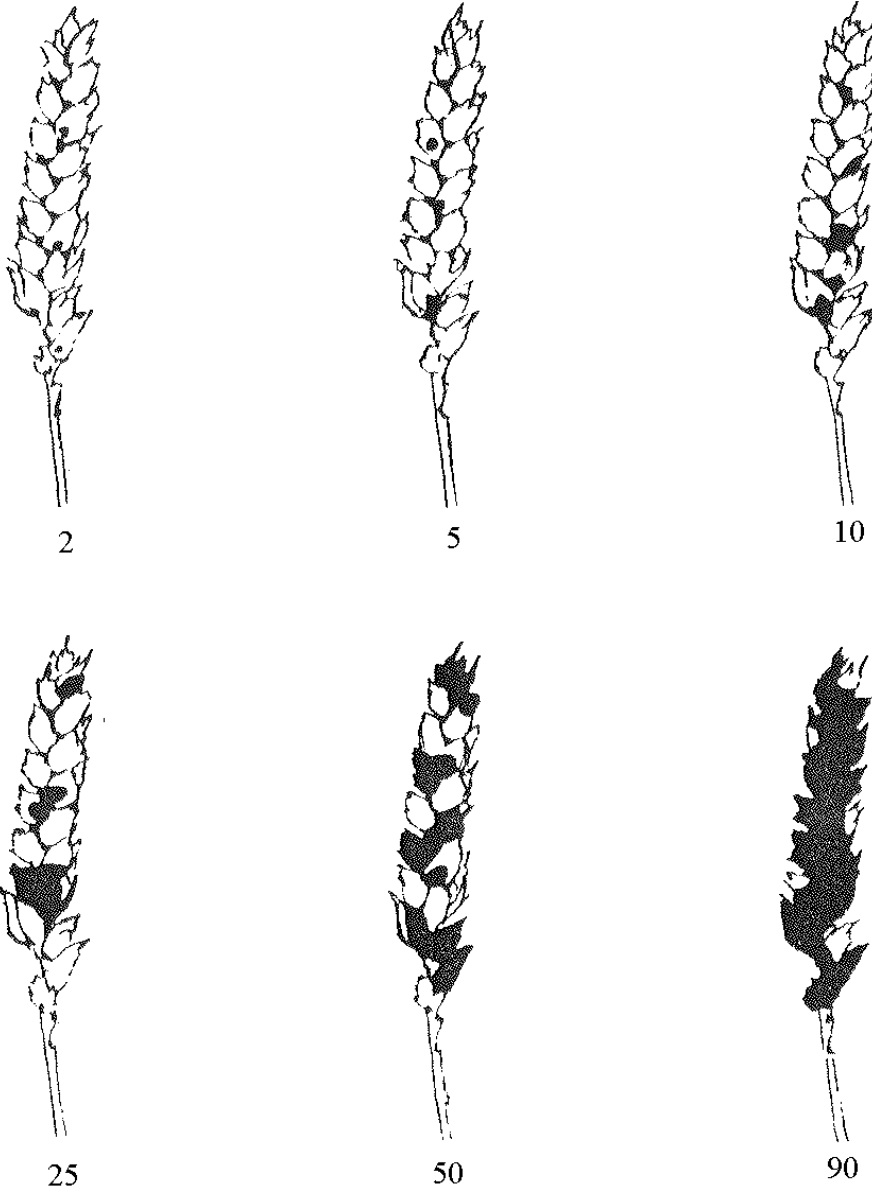
Ear Blight of wheat (*Fusarium Spp.*)

Percentage area infected
(0 = Healthy)

Notes on assessment

1)
out the

Carry



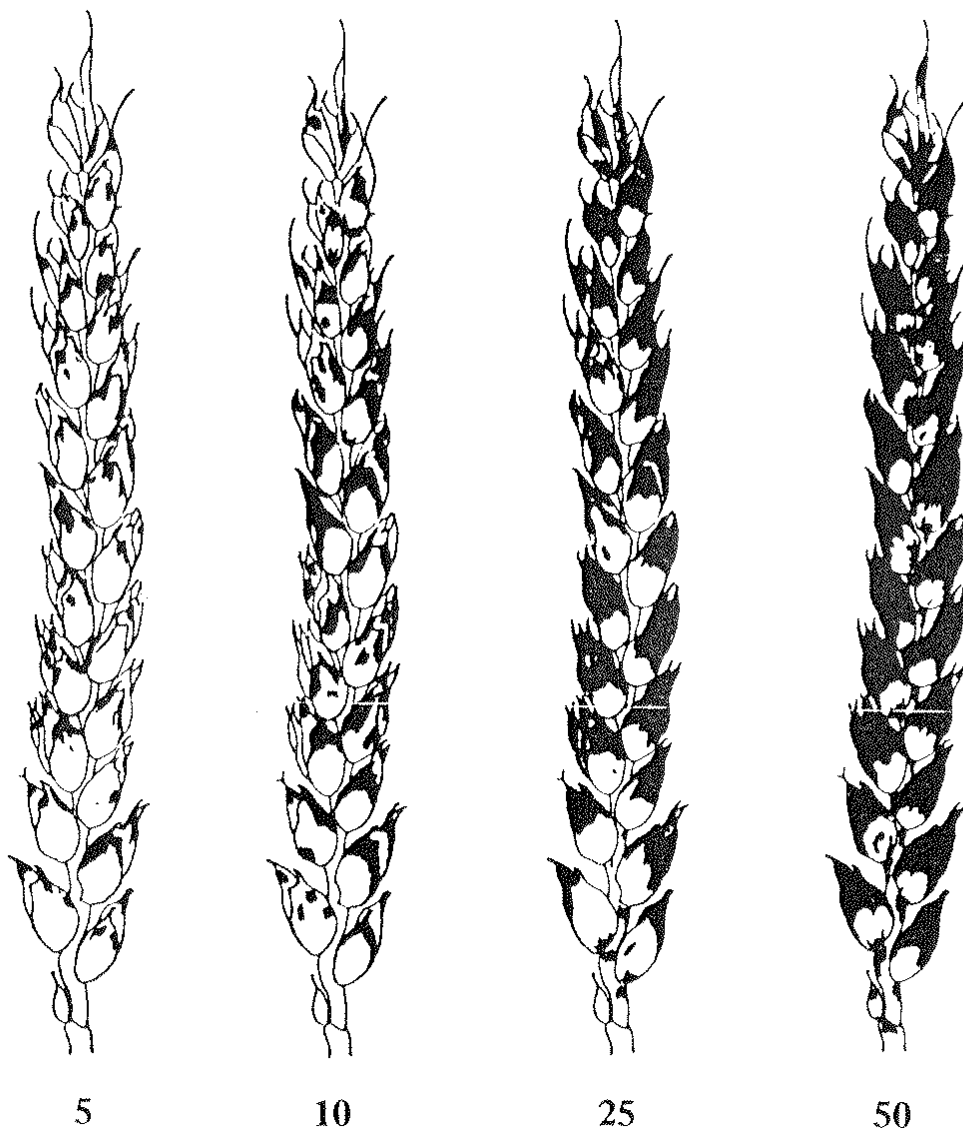
assessment between GS 80-90.

- 2) Conduct a 'whole-plot' assessment using the diagram above as a guide to infection levels.
- 3) Estimate the infection level at several points in the plot, giving a single score per plot that is representative of the whole plot.

For further details see Parry D W, Bayles R A & Priestley R H (1984).

Resistance of winter wheat varieties to Ear Blight (*Fusarium culmorum*).
Journal the National Institute of Agricultural Botany 16, 465-468.

Wheat glume blotch (*Septoria nodorum* Berk.)



Percentage of ear affected

Notes on assessment

- 1) Carry out the assessment between GS 80-90.
- 2) Conduct a 'whole-plot' assessment using the diagram above as a guide to infection levels.
- 3) Estimate the infection level at several points in the plot, giving a single score per plot that is representative of the whole plot.

For further details see Parry D W, Bayles R A & Priestley R H (1984).
Resistance of winter wheat varieties to Ear Blight (*Fusarium culmorum*).
Journal the National Institute of Agricultural Botany 16, 465-4

For further information and photos see the HGCA cereals encyclopaedia at <http://cereals.ahdb.org.uk/>.



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