RECOMMENDEDLISTS

AHDB Recommended Lists (RL) for cereals and oilseeds: Cereal Trials protocols (2022–26)

This protocol was believed to comply with relevant agrochemical, environmental and other regulations at the time of writing but it is the responsibility of the contractor to ensure that it continues to comply. In the event of non-compliance the protocol should not be followed but the Field Trials Manager should be notified at once of how the protocol requirements would breach regulations.

Any deviation from this protocol other than under the circumstances described above may result in a breach of contract and should be agreed in advance.

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APPENDIX 1 - PROTOCOL FOR THE ASSESSMENT OF GRAIN DRY MATTER IN CEREAL TRIALS USING ELECTRONIC MOISTURE ANALYSERS **12**

Part 1: Introduction

Please note that this protocol is reviewed annually and distributed pre-harvest.

The quality work undertaken on samples from AHDB Recommended List trials contributes important data to the process of variety evaluation. Small differences between the quality characteristics of varieties may have important implications for their commercial prospects and for this reason the integrity of the quality tests and of the samples provided by trial managers to collaborating laboratories is of great importance and always under scrutiny. Please take every care to provide the samples requested, dry and/or store them carefully and despatch them quickly when asked to do so.

Quality assurance checks will be carried out on parameters such as:

- the time taken to deliver samples to their destination following harvest (making allowances for drying times etc.)
- varietal identity and purity
- moisture content
- damage by pests such as orange wheat blossom midge
- damage caused during the harvest or by overheating during drying
- infestation by grain from volunteers, weed seeds and pests
- disease infection

Barley samples for Micromalting (Grain Quality, MMG) are especially prone to damage, since they have to exhibit a high level of germination for malting characteristics to be properly assessed. Please take every care in the harvest of all of your samples and give them the highest possible priority, drying them to 12% moisture content before storage.

Part 2: Sample collection

2.1 All samples

Should be representative of the variety/plot from which they are taken with minimal contamination. When sampling on-combine, it is essential to minimise the risk of contamination by grain of the previous plot. Samples should not be taken until several seconds after grain has started flowing fully from the combine elevator.

Should be taken from the same rep or reps. Do not take one sample of a variety from one rep and a sample of another variety from a different rep. If sufficient grain to meet all requirements cannot be obtained from a single plot, then grain from more than one plot of the variety should be bulked together and thoroughly mixed before sub-sampling.

Should be taken from reps that are free of lodging. If lodging is a problem, discuss with the Field Trials Senior Manager, Mark Bollebakker AHDB, before harvesting the plots.

Should contain the weight of grain requested. In the case of wheat, milling and baking samples are selected only from sites with a combination of good Hagberg, protein, specific weight and freedom from damage by pests, disease and weathering. It is therefore recommended that for winter and spring wheat, you collect samples in large bags and sub-sample for nabim and Campden BRI only if requested to do so. Grain quality and Campden BRI physical quality samples will still need to be sub-sampled immediately.

All samples must have a label both inside and outside the bag.

Samples may not be required from every variety - refer to the sample requirement spread sheet for details. Labels are often produced and distributed before final requirements are known and so you may be supplied with labels that are not actually required.

Each sample bag should be secured tightly using good quality parcel string. Do not use baler string, elastic bands, wire or plastic ties. As much space as possible should be left within the bag to allow for air movement when drying/conditioning.

2.2 Labels and strings

Labels will be supplied pre-printed with the trial and variety identity and the type of test they are intended for. This information is printed on each label twice, separated by a perforation to make separation of the two halves easy. One half of the label should go inside the filled bag and the other attached to the samples by strong parcel string (or, in the case of dry matter samples by rubber bands). Please remember that laboratory staff have to untie and re-tie several hundred sample strings during the course of the campaign, so it would be appreciated that you do not tie them in such a way that they cannot easily be untied or have to be cut. Please do not use cable-ties, wire ties or baler string.

2.3 Dry matter samples

There are limitations on the use of electronic moisture analysers for dry matter determination (see Appendix 1 below) and it may be necessary to take samples for assessment by oven or NIR - you must have a sampling and labelling system in place to facilitate this (i.e. labelled air-tight containers or polythene bags). It is assumed that trial operators will use their own system for containing and labelling these samples and we will not send bags or labels unless you have previously requested them. It is essential that if you have not requested bags or labels, that you do have alternative arrangements in place.

2.4 Quality samples

General

Grain quality samples are required from most treated yield trials but there are exceptions, such as second wheat trials.

Other sample types are also required from pre-selected varieties at a sub-set of trials. Labels will be sent for all samples but since not all of them will be required it is suggested that trial managers take and store bulk samples from which these sub-samples can later be taken if required. It is assumed that you will use your own large bags to contain these bulk samples but if this is a problem, please contact Sarah-Jane Osborne.

Cloth bag sizes

Sample bags have the approximate following sizes:

- 7” x 9½” (170mm x 240mm) are for glucosinolates only
- 9½” x 13½” (240mm x 340mm) bags are for 1–2 kg samples.
- 12½” x 18½” (320mm x 470mm) bags are for 3–5 kg samples and 2 kg oat samples.
- 17½” x 30” (440mm x 760mm) bags are for 5 kg oat and 8 kg wheat samples.

2.5 Storage and drying

Grain deteriorates extremely quickly if it is stored when damp and under certain conditions can be rendered useless within hours. With the exception of malting barley, samples should be dried to 15% moisture content before they are stored or transported.

Malting samples (e.g. MMG) are especially prone to damage because the grain has to germinate to be of any use so they should be dried to 12% moisture content or below.

Drying should be done on site using a cold/warm air dryer. The drying temperature should not exceed 45°C for barley and 60°C for any other cereals.

Where it is necessary to store samples, it is very important that they are stored in good conditions, dry and vermin free. Discuss any drying or storage problems with the Field Trials Manager.

There are three levels of priority:

1. Samples to be sent immediately after harvest
2. Those to be sent as soon as possible after harvest, once the moisture content of the samples has been dried down to 12% (barley) or 15 % (other crops). Samples should be in transit within 48 hours of harvest – if drying takes longer than this, please contact Mark Bollebakker
3. Those to be held on site at 12% or 15% moisture content awaiting further instructions (e.g. MMG samples). Once notification is received that samples are required, it is very important that they are dispatched quickly (within 48 hours of notification)

2.6 Packaging and transporting samples

All samples of a similar type should be packaged together and separated from other samples. Strong sacks should be used to hold the samples, which should be clearly labelled with the contents (i.e. the sample type). 25 kg per item is normally a carrier's weight limit.

Some of the laboratory addresses and contact details are given below but those for nabim, BCE Chopin and MMG malting samples will be given when samples are requested.

Samples should be sent via your usual carrier with the exception of BCE Chopin samples, for which arrangements will be made at the time samples are requested.

Samples not required may be discarded but please consult Sarah-Jane Osborne (sarah-jane.osborne@ahdb.org.uk) before discarding any samples.

Part 3: Instructions relating to specific sample types

3.1 Dry matter samples

If you use polythene bags, half fill the bag with grain, insert a half label facing outwards between the grain and the bag, expel as much air as possible by gently applying pressure and then seal the bag by folding the top of the bag two or three times and secure it with a rubber band. Insert the other half of the label under the rubber band facing outwards and then apply a second rubber band across the label at right-angles to the first band. The samples should be processed as soon as possible but they can be stored in a cold store for a short period if necessary.

NIAB can determine dry matter content by the oven method for you by prior arrangement only. Contact David Evershed before harvest begins (details in Part 4).

3.2 Wheat

3.2.1. Grain quality

It is essential that wheat grain quality samples are despatched immediately when they are at or below 15% moisture content to NIAB Park Farm. The samples will be used to assess protein content and Hagberg Falling Number values. These data will then be communicated to Campden BRI and nabim who will select the sample sets with the best combination of quality attributes for further testing.
Grain quality samples are not *normally* required from 2nd wheat trials but if there is any suspicion of damage by orange wheat blossom midge larvae please contact Mark Bollebakker and retain a small (approx. 50 gram) sample of all varieties in envelopes for assessment.

3.2.2 Campden BRI Physical Quality

Physical quality samples of 50g are used by Campden BRI for sample selection purposes. Grain which is in poor physical condition (shrivelled, discoloured etc.) may be excluded from milling and baking tests. 50g samples should be taken from the two winter wheat control varieties Skyfall and KWS Barrel (use small pay-packet type envelopes labelled with the site name, trial code and variety name) and posted to Clothilde Baker at Campden BRI immediately after harvest. An assessment of physical quality will be made on these samples, which, together with the protein and Hagberg data from Grain Quality samples will assist in determining which sets of samples should be called in for milling and baking tests.

3.2.3 Campden BRI, BCE Chopin and nabim milling and baking quality

Special plots are being grown to provide high quality milling samples for nabim, Campden BRI and BCE export testing from which samples will hopefully be suitable. However, we are also asking for samples to be taken from a sub-set of first wheat trials which will be held in reserve. Please take samples in large, clean, labelled cloth or hessian bags and store them at 15% moisture in good, pest-free conditions. Bags to hold this grain can be supplied if necessary.

If the samples are requested by the labs, please send them as quickly as possible.

An AHDB Cereals and Oilseeds carrier will be used to transport BCE Chopin samples – details will be sent at harvest if the samples are required.

3.2.4 Distilling

These should be sent immediately when they are at or below 15% moisture content to Dr James Brosnan at the Scottish Whisky Research Institute using your usual carrier.

3.3 Barley

3.3.1. Grain quality 1

1 kg Grain Quality samples from specified control varieties only should be sent immediately when they are at or below 12% moisture content to David Evershed, Biochemistry, Analytical Services, NIAB, Park Farm, Villa Road, Impington, Cambridge, CB24 9NZ using your usual carrier:

Control varieties: Winter barley: Craft and SY Venture
Spring barley: RGT Planet, Laureate and LG Diablo

Do not send in non-control samples unless/until they are called (see below) and do not send in MMG malt brewing or malt distilling samples until they are called for.

3.3.2. Grain quality 2

The control samples sent to NIAB (as described above) will be used to assess physical quality, germination and grain nitrogen content. Samples that are judged to be suitable for grain quality and MMG micromalting tests will then be called in by the Field Trials Manager, Sarah-Jane Osborne.

Note that barley grain quality samples are also used for MMG malting tests and it is essential that they are dried and stored at the correct moisture content (12%). Please contact the Field Trials Manager if you have any problems with drying or storage.

3.3.3. Dormancy samples

1 kg dormancy samples are to be despatched to NIAB Park Farm with the grain quality 2 samples, see above.

3.3.4. MMG malting quality

Hold on-site until requested (likely to be mid-October). Contact details and lab addresses will be sent with the request. If requested, to be sent using your usual carrier.

Malting samples are prone to rapid deterioration if stored improperly or at a high moisture content so please ensure they are kept in a dry store and at a maximum moisture content of 12%. Please contact the Field Trials Senior Manager if you have any problems with drying or storage.

3.4 Oats

3.4.1. 2 kg Grain quality

All 2 kg oat samples (both NL and RL varieties) should be dispatched *immediately* they are at or below 15% moisture content to Campden BRI using your usual carrier.

3.4.2. 3 kg Milling

These may be used by the oat milling industry. Please retain them on-site at or below 15% moisture content and await further instructions.

3.4.3. 500g Hullability

Please retain on-site at or below 15% moisture content and await further instructions.

3.5 Rye and triticale

3.5.1. Grain quality

Grain Quality samples should be despatched immediately when they are at or below 15% moisture content to David Evershed, Biochemistry, Analytical Services, NIAB, Park Farm, Villa Road, Impington, Cambridge, CB24 9NZ using your usual carrier.

3.5.2. 250g Grain distilling (Winter Triticale only)

Please retain (RL varieties only) on-site at or below 15% moisture content and await further instructions.

Part 4: Contacts

At the time of despatch of samples please notify the following people that they are in transit by e-mail i.e. the addressee (see addresses listed below) & the Field Trials Manager Sarah-Jane Osborne (sarah-jane.osborne@ahdb.org.uk)

Sample type	**Address to:**
500g dry matter **by prior arrangement only** 1 kg NIAB Grain Quality (all crops except oats)	David Evershed Barn 2 NIAB Park Farm Villa Road Impington Cambridge CB24 9NZ Tel: 01223 342228 E-mail: david.evershed@niab.com
2 kg Grain Quality (Oats only)	Clothilde Baker Cereals & Ingredients Characterisation Campden BRI Station Road Chipping Campden Gloucestershire GL55 6LD Tel: 01386 842287 Clothilde.Baker@CampdenBRI.co.uk
50g Campden BRI Physical Quality (wheat) Campden BRI - wheat (8 kg bread / 4 kg biscuit)	Clothilde Baker Cereals & Ingredients Characterisation Campden BRI Station Road Chipping Campden Gloucestershire GL55 6LD Tel: 01386 842287 Clothilde.Baker@CampdenBRI.co.uk
1 kg Distilling (wheat) (RL) 500g Distilling (wheat) (NL) 250g Grain distilling (winter triticale) (RL varieties only)	Dr James Brosnan The Robertson Trust Building Scottish Whisky Research Institute Research Park North Riccarton Edinburgh EH14 4AP Tel: 0131 449 8900 james.brosnan@swri.co.uk
4 x 2 kg BCE Chopin Alveograph (wheat)	Lab contact details to be sent when requested.
1 kg MMG malt brewing (barley) 1 kg MMG malt distilling (barley) 2 kg MMG grain distilling (barley)	Lab contact details to be sent when requested.
nabim (wheat)	Lab contact details to be sent when requested.
3 kg Milling (oats)	Lab contact details to be sent if required.

Part 5: Summary of sample requirements – Harvest 2022

Crop	Sample type	Lab	When to send in	Comments
All	Dry matter	NIAB Park Farm (David Evershed)	Immediately after harvest	**Only if arrangements made prior to harvest**
Wheat	50g Campden BRI Physical Quality	Campden BRI (Clothilde Baker)	Post immediately after harvest	WW controls only: Skyfall and KWS Barrel
	1 kg NIAB Grain Quality	NIAB Park Farm (David Evershed)	As soon as samples at 15% moisture content or below	
	1 kg Distilling (RL) 500g Distilling (NL)	SWRI (James Brosnan)	As soon as samples at 15% moisture content or below	
	Campden BRI (8 kg bread & 4 kg biscuit)	Campden BRI (Clothilde Baker)	If requested. Store at 15% moisture content	
	4 x 2 kg BCE Chopin Alveograph	To be arranged.	If requested. Store at 15% moisture content	AHDB Cereals and Oilseeds carrier (to be arranged).
	nabim – wheat	To be arranged	If requested. Store at 15% moisture content	
Barley	1 kg NIAB Grain Quality 1	NIAB Park Farm (David Evershed)	As soon as samples at **12%** moisture content or below, t**he following Grain Quality controls only.** Winter barley: Craft and SY Venture Spring barley: RGT Planet, Laureate and LG Diablo	**Controls only**
	1 kg NIAB Grain Quality 2	NIAB Park Farm (David Evershed)	If requested. Store at **12**% moisture content	All other varieties
	1 kg Dormancy samples	NIAB Park Farm (David Evershed)	To be sent with 1kg NIAB Grain Quality 2 samples (above). Store at **12**% moisture content.	All varieties
	1 kg MMG malt for brewing	To be arranged	If requested. Store at **12%** moisture content	
	1 kg MMG malt for distilling	To be arranged	If requested. Store at **12%** moisture content	Spring barley only
	2 kg MMG grain distilling	To be arranged	If requested. Store at **12%** moisture content	Spring barley only

Oats	2 kg Grain Quality	Campden BRI	As soon as samples at 15% moisture content or below	
	3 kg Milling	To be arranged	If requested. Store at 15% moisture content	
	500g Hullability	To be arranged	If requested. Store at 15% moisture content	
Rye & triticale	1 kg NIAB Grain Quality	NIAB Park Farm (David Evershed)	As soon as samples at 15% moisture content or below	
	250g Grain distilling (winter triticale only) RL varieties only	SWRI (James Brosnan)	If requested. Store at 15% moisture content or below	Winter Triticale RL varieties only

Appendix 1 - Protocol for the assessment of grain dry matter in cereal trials using electronic 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 regularly calibrated 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 one 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 one 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 should 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 or NMR.
- 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 or NMR may be used should it be necessary. Plot identity labels and bags can be supplied by AHDB Cereals and oilseeds but this is by prior arrangement only and **it will be assumed that these are not required unless they are requested by the trial manager.**
- 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 or NMR should be used.
- The data sent to AHDB Cereals and Oilseeds can be in the form Dry Matter% or Moisture Content% but the measure used must be clearly shown.

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.