UNITED KINGDOM VARIETY LIST TRIALS: PROCEDURES FOR TRIAL INSPECTION AND TECHNICAL VALIDATION, TRIAL DESIGN AND DATA HANDLING AND OFFICIAL SUPERVISION OF TRIALS FOR VALUE FOR CULTIVATION AND USE (VCU)

Contents

SECTION A - GENERAL INFORMATION

A.1 INTRODUCTION

A.1.1 An agricultural plant variety is accepted by the National Authorities on to the GB (Great Britain) and/or NI (Northern Ireland) Variety List in accordance with the provisions of the Seeds (National List of Varieties) Regulations 2001and the Seeds (Variety Lists) Regulations (Northern Ireland) 2020

A.1.2 It is a condition of acceptance, (under Regulation 5(3) (c) of the Seeds (National List of Varieties) Regulations 2001 and Regulation 5(5) (C) of Seeds (Variety Lists) Regulations (Northern Ireland) 2020 that a variety must be of satisfactory value for cultivation and use.

A.1.3 Value for cultivation and use (VCU) is assessed by tests and growing trials in accordance with the appropriate protocols and procedures.

A.2 PURPOSE

A.2.1 The requirements for conducting inspection, technical and official supervision of growing trials, tests, and assessments in relation to official examinations of VCU of varieties of agricultural crops entered for Variety List Trials are set out in these procedures.

A.3 SCOPE

A.3.1 These procedures apply to all species of agricultural crops entered for GB and/or NI Variety List trials.

A.4 RESPONSIBILITIES

A.4.1 The trial design and data handling of growing trials, tests, and assessments outlined in this procedure are carried out, regarding GB, under the responsibility of the Secretary of State for Environment, Food and Rural Affairs, the Scottish Ministers and the Welsh Ministers, and regarding NI, the Minister for Agriculture, Environment and Rural Affairs in Northern Ireland (the “National Authorities”).

A.4.2 The are supervised by officials of the National Authorities, i.e., Animal and Plant Health Agency (APHA), the Scottish Government the Department of Agriculture, Environment and Rural Affairs for Northern Ireland

A.4.3 The procedures in this paper are authorised by the National List and Seeds Committee (NLSC). They cannot be amended without its approval. Requests and suggestions for amendment to the procedures should be put in writing to APHA.

A.4.4 These procedures are administered by:

Plant Varieties and Seeds
Animal and Plant Health Agency (APHA)
Eastbrook
Shaftesbury Road,
Cambridge
CB2 8DR

Email: pvs.helpdesk@apha.gov.uk

A.4.5 All VCU Trials Organisers, VCU Trial Design and Data Handling Operators, VCU Trial Inspection and Technical Validation Operators involved in the procedures referred to in paragraph A.2.1 must be approved by the National Authorities and have access to suitable facilities and expertise. The list of approved operators is given at Appendix 1.

A.5. COMPLIANCE WITH THE PROCEDURES

A.5.1 If non-compliance occurs or there are concerns regarding the validity of any data, tests, or trials, this must be reported to APHA), within 10 working days of becoming aware of the issue.

SECTION B - TRIAL DESIGN

B.1 TRIAL DESIGN

B.1.1 Trial designs are supplied by the Trial Design and Data Handling Operator. For potatoes, the Trials Organiser designs the trials, with input from the Trial Design and Data Handling Operator.

B.1.2 The list of approved Operators and Organisations for Trial Design and Data Handling are shown in Appendix 1.

B2 DESIGN OF GROWING TRIALS

B.2.1 Trials series

- Candidate varieties are sown in a series of growing trials (VCU trials) along with control varieties.

- In order to cover a range of growing conditions, trials are generally planted in each of two years at locations representative of those in which commercial crops will be grown.

B.2.2 Control varieties

- The role of control varieties is to provide a trial baseline that links the performance of candidate varieties in the current trials with that of varieties on the Variety Lists, which have been tested in earlier years.

- The number of control varieties sown in trials influences the reliability and accuracy with which a candidate variety's performance is ranked relative to that of National List varieties. Trials should include a minimum of one control in each VCU crop category, e.g., maturity, ploidy. Control varieties should express a range of yield, quality, and agronomic and disease characters. In potatoes, different characters are assessed in each trial and so different sets of Controls may be chosen.

- It is also important that a stand-alone analysis of each trial provides reliable estimates of error for hypothesis testing. This may involve increasing the number of controls and/or increasing the number of replicates. Trials with less than 12 plots are not recommended.

B.2.3 Maximising Precision

- Introduction: Within each trial, varieties are allocated to plots in a controlled way. The main aim in allocating varieties to plots in the field is to maximise precision and to minimise bias.

- Effective blocking: To limit the effects of extraneous variation, plots of the control and candidate varieties are located as close together as possible in the field and each replicate is managed, as far as possible, as a single unit, e.g., when spraying.

- Randomised complete block (RCB) designs: RCB arrangements are normally used where the number of varieties is 14 or less.

- Alpha-lattice designs: If the number of varieties is 15 or more then alpha-lattice incomplete block designs are recommended. The appropriate alpha-lattice design is chosen so that:

- The shape of the sub block is such that the soil and environmental variation between plots within the sub block is minimised.
- The average efficiency of pair wise comparisons is as large as possible given the number of varieties in the trial, the replication, and the block size.

- Replication: At least two plots of each variety are sown in a trial for all crops where yield is a major character in VCU assessment.

B.2.4 Minimising bias

- Randomising varieties: To avoid bias in the allocation of varieties to plots, the following procedures are applied independently for each trial when generating a plan:

  - for randomised blocks, each variety, starting with the control varieties, is assigned a code number ranging from 1 through to the number of varieties in the experiment.

  - for alpha-lattice designs, the control varieties are normally randomised to the first code numbers in the plan to ensure that controls are distributed across the trial area; this property arises from the method of design construction.

  - code numbers for the candidate varieties are then randomised to subsequent codes.

  - the code numbers are randomised within the plan in stages - in RCB designs, by plots within replicate blocks; for alpha-lattice designs by incomplete blocks within replicate blocks, followed by plots within (incomplete) blocks.

- Restricted randomisation: In certain circumstances, interference can occur between plots of neighbouring varieties, e.g., taller varieties may dominate shorter neighbours. Where it is possible to obtain prior information on the factors associated with interference, e.g., plant height, then neighbour-restricted alpha-lattice designs may be introduced so that varieties that interfere significantly with each other, e.g., extremely tall and extremely short varieties, do not appear in neighbouring plots.

- Restricted randomisation: Varieties may be grouped according to type. For example, in oats these are conventional and semi-dwarf. In these cases, it is beneficial to keep varieties from the same group together within each replicate in the trial, facilitating management and reducing interference if the drill type cannot accommodate sufficient separation of individual plots. Separate designs and randomisations are produced for each group and the position of the groups within the replicates is randomised.

B.2.5 Communicating the Design; the information supplied to the VCU Growing Trial Operator includes:

- The trial identifier and management, a list of varieties and the code letters or numbers used to identify them in the plan.

- Design type and the plan i.e., the randomised arrangement with plots numbered in sequence, the replicates and small blocks indicated and the code letters of the varieties and treatments.

B.2.6 Plan Validation and Storage

- The VCU Growing Trial Operator must return layout details to the VCU Trial Design and Data Handling Operator within 15 days of the date of sowing. A copy of the plan should be

returned with:

- The name of the VCU Growing Trial Operator
- The date of sowing
- Any changes between generated and sown plan marked
- The trial location using What3words or other agreed geocode location system
- A sketch map of the trial, including the trial location as laid out in the field with the plot numbers and variety codes, which occur at the beginning and end of each bank. The direction of north is indicated along with the position of the main entrance to the field. (For some crops the sketch map can be returned with the first site data information.)

- The VCU Trial Design and Data Handling Operator must check the actual layout against the computer plan. The sketch map provided by the trials officer is checked against the computer-held plan to ensure, in particular, that the plot numbering sequence in which the observations are to be recorded agrees with that given in the computer-held plan. If changes have been made, the VCU Trial Design and Data Handling Operator must consider statistical validity of the new plan, especially with regard to the blocking applied. If the changes are such that the validity of the plan is materially reduced, the VCU Trial Design and Data Handling Operator and the Trials Organiser should agree an appropriate action.

- A copy of the validated plan is stored in a computer file or on a database by the VCU Trial Design and Data Handling Operator and this file is used for subsequent processing of data. Checked, and stored plans must be sent as soon as possible via e-mail to the VCU Trials Inspection and Technical Validation Operator.

B.2.7 APHA will inform the VCU Trial Design and Data Handling Operator of any special tests to be carried out.

SECTION C – INSPECTION PROCEDURES

C.1 VCU GROWING TRIAL OPERATORS

C.1.1 The VCU Trials Organiser will provide the VCU Trial Inspection and Technical Validation Operators with a list and contact details of the VCU Growing Trial Operators.

C.2 TIMING OF INSPECTIONS

C.2.1 Individual trials will be officially inspected at least once by the appropriate VCU Trial Inspection and Technical Validation Operator. Additional inspections may be required in the case of problem trials or in the event of queries.

C.2.2 VCU Trial Inspection and Technical Validation Operators will give VCU Growing Trial Operators sufficient warning of visits so that arrangements can be made with host growers.

C.2.3 Inspections shall be carried out at the best time to observe any defects in the trials. See Appendix 6 for guidelines on timing of inspections.

C.3 ACCESS AND OTHER REQUIREMENTS

C.3.1 The requirements for VCU Growing Trial Operators in respect of inspections are:

- To give the VCU Trial Inspection and Technical Validation Operator reasonable access to the trials and in normal circumstances to be present at the trial's inspection. Details must be supplied of site location, layout of trials within the field and of plots/varieties within the trial.

- To supply the VCU Trial Inspection and Technical Validation Operator with information e.g., pesticide sprays applied etc within seven days of a request if before harvest or as soon as possible and within 72 hours if at or after harvest.

- To carry out actions agreed in consultation with the VCU Trial Inspection and Technical Validation Operator and the Trials Organiser; including any extra field records required for Technical Validation. It is important that any requirement to shorten plots is undertaken and that missing values are returned on any plots which have been excluded from the trial.

- To discuss the state of the trial with the VCU Trial Inspection and Technical Validation Operator and to carry out any action required because of the inspection and agreed in a plan of action. Details of the action will be given in the report

C.4 INSPECTION REPORTS

C.4.1 The VCU Trial Inspection and Technical Validation Operator shall record the findings on a standard form (see Appendix 2 and Appendix 3 for guidance notes).

C.4.2 The VCU Trial Inspection and Technical Validation Operator is responsible for ensuring that the completed Trial Inspection Form is sent to the VCU Trials Organiser, the VCU Growing Trial Operator, the VCU Trial Design and Data Handling Operator, APHA and VCU Data Review Operator.

C.4.3 Reports on trials rated “Good” or “Satisfactory” with no observed problems or further action required by the VCU Trial Inspection and Technical Validation Operator must be submitted to all parties noted in section C.4.2 within 20 working days of the inspection.

C.4.4 Notification detailing the problems and any required remedial actions of trials rated “Of Concern”, “Proposed Abandonment” or “Satisfactory” but with problems requiring remedial action or a further inspection must be submitted to all parties noted in section C.4.2 within 5 working days of the inspection and full reports then submitted within 10 working days of inspection.

C.5 INSPECTION CRITERIA

C.5.1 The VCU Trial Inspection and Technical Validation Operator shall assess each trial using the criteria and guidelines given in Appendix 3. These are given as guidance and should be used as appropriate for the species and trial under inspection.

SECTION D - DATA ANALYSIS

D.1. INTRODUCTION TO DATA ANALYSIS

D.1.1 All routine statistical analyses of individual trials are carried out by the VCU Trial Design and Data Handling Operator using established and agreed statistical procedures. Any changes in statistical methods must be discussed and agreed by the Interdepartmental Statistician Group (IDSG) and NLSC before implementation.

D.1.2 Analysis of VCU trial data is done in two stages:

- Within-trial: plot data from each trial are summarised to give variety means and estimates of individual trial precision.

- Over-trials: trial variety means from trials are assembled in a summary table classified by varieties, trials, and years. Analysis of this table provides the variety means and estimates of between-trials precision, which are the basis of VCU decisions.

D.1.3 Arrangements for detecting unusual observations and trial results and methods for summarising variety trial data to reach a decision on varieties are described in Section D.3.

D.1.4 The VCU Trial Design and Data Handling Operator carries out within-trial analyses. The Data Review and Standard Setting Organisation carries out the final over-trials analyses.

D.2 PRELIMINARY CHECKS

D.2.1 Preliminary checks by the VCU Trial Design and Data Handling Operator shall include checks that:

- Any changes to the plan have been documented and allow a valid statistical analysis.

- Character names and units are correct

- Trial ID is shown on the recording sheet.

- Minimum and maximum values are within expected limits

- Multiple records have been recorded correctly, e.g., totals for leaning and lodging do not exceed 100%

- There are records for every plot and replicate (as applicable)

- Date and growth stage have been recorded

- Non-yield characters are as consistent across replicates as expected for the character.

- The data required to determine fresh yield or sugar yield, (e.g., dry matter and sugar content and gross output etc) are available

- For approved crops, a moisture analyser has been used on all plot dry matter values in the pre-defined range noting plots that fall outside this range.

- All plots or replicates identified during the trials inspection as being of concern have been resolved, adjusted for size or omitted

D.3 WITHIN-TRIAL ANALYSIS

D.3.1 Methods of analysis: for characters of major importance and where they are available, plot data are subject to analysis of variance. For incomplete block-designed trials, variety means are adjusted for block differences. This may be done by specific procedures, such as those found in VTAB (Variety Tabulation), or by using REML (Restricted Maximum Likelihood). For secondary VCU characters, simple variety means are calculated.

D.3.2 Presentation of results: For some characters of major importance, the mean of the control varieties and the candidate variety means are usually presented with the standard error of differences, LSDs (least significant difference), F ratio or F probability significance.

For other characters, means only are presented.

D.3.3 Transformations: the PDG (Procedures Development Group who report to the NLSC), who will take the advice of the IDSG, will consider the use of transformations. It will be applied on a long-term basis.

D.3.4 Data loss:

- In the case of yield characters, if observations on a variety are lost for all but one replicate, then the results for that variety are normally treated as missing for the trial, with the following provisos:

    - If a component of the Dry Matter (DM) yield assessment is lost, and the component can be reliably estimated from the remaining observation(s), then its value is replaced by an estimated value, e.g., the mean of the other assessments.

    - In the case of herbage cut yields where a single plot value is missing for a cut then missing values are estimated using standard statistical missing value estimation procedures.

    - In all cases of loss of part of the plot, the residuals should be scrutinised carefully before making a decision to accept the plot values. If more than a half (½) of a plot is lost, the plot values should always be removed.

    - If more than one third (1/3) of the plots in a replicate are missing, then the residuals should be scrutinised before accepting data from the remaining plots.

    - If more than a half (½) of the plots in a sub-block of an incomplete block design are missing, then the residuals should be scrutinised before accepting the data from the rest of the sub-block.

- For other characters, an observation from just one replicate is normally treated as sufficient to complete the records for the trial.

- Where plots are partially damaged, e.g., rabbit damage, and an assessment of the damage to each plot is available, then an analysis of data may be done which adjusts yield data for the effects of damage.

D.3.5 Within-trial monitoring; this section applies to yield data. Variates other than yield are subject to levels of checking commensurate with their importance in the decision-making process and with the nature of the data. Yield analyses must be sent to the VCU Trials Inspection and Technical Validation Operator for validation.

- Range checks: average yields from a trial should be within the range expected from the crop in agricultural practice. If they are out of range, then the DM yield calculations and the harvested plot dimensions should be checked.

- Coefficient of Variation (CV); the CV should be within the limit set for the crop by the Data Review and Standard Setting Organisation. The CV may be high because yields are low and would be within limits if based on average yields from other trials. If not, then careful technical scrutiny of the trial data should be conducted by the VCU Trial Design and Data Handling Operator. The VCU Trial Design and Data Handling Operator should send CVs to the Data Review and Standard Setting Organisation.

- Variety yield F-ratio; the ratio of the variety yield mean square to the residual mean square in the analysis of variance should usually be statistically significant at the 5% level or lower. Check that the field plan is correct and that the plot data have been entered correctly. Sometimes, trials with small numbers of varieties may not reach statistical significance. Conversely, varieties within the trial may be significantly different from each other but not significantly different from the mean. The VCU Trial Design and Data Handling Operator should send information on F-ratio significance levels to the Data Review and Standard Setting Organisation.

- Residuals:

    - The VCU Trial Design and Data Handling Operator must check the individual plot values for yield by examining standardised residuals. A residual is the plot yield less the value predicted by the model used for analysis and is standardised by dividing by the root mean square of all residuals. The standardised residual is distributed as “Students t” with (number of varieties-1) x (number of replicates-1) degrees of freedom, to a high level of approximation. Assuming that there are 20 degrees of freedom (df) or more for error estimation, 95% of such residuals should lie in the range +2.1 to –2.1, 99% should fall in the range +2.8 to -2.8, and 99.9% in the range +3.6 to -3.6.

    - Where plot yields have residuals greater than 2.8 or less than –2.8 the Data Handling organisation must check with the VCU Growing Trial Operator whether the results appear to have been correctly recorded and handled. Information on residuals must be sent to the VCU Trials Organiser and the VCU Trials Inspection and Technical Validation Operator. The VCU Trials Inspection and Technical Validation Operator, with advice from the VCU Data Handling Organisation, will then decide whether there is valid justification for excluding data.

- Data loss: For all routinely recorded characters where a loss of trial data occurs, the loss is highlighted in inspection reports by the VCU Trials Inspection and Technical Validation

Operator.

D.3.6 Rounding of numbers; Whilst all calculations are carried out to the maximum accuracy permitted by the computational algorithms involved, the results are presented in rounded form, usually to an accuracy of three significant digits for the smallest number.

SECTION E - TECHNICAL VALIDATION OF TRIALS PLOT DATA

E.1 TRIALS FOR VALIDATION

E.1.1 The VCU Trials Organiser shall supply the VCU Trial Inspection and Technical Validation Operator with a list of trials for technical validation.

E.1.2 The VCU Trial Design and Data Handling Operator will forward all recorded site and plot data to the VCU Trial Inspection and Technical Validation Operator together with the preliminary validation.

E.2 VALIDATION OF YIELD DATA

E.2.1 The VCU Trial Design and Data Handling Operator shall conduct the first stage of validation of yield data as detailed in D3 – within trial analysis. The results will be passed to the VCU Trial Inspection and Technical Validation Operator for use during final validation.

E.3 VALIDATION OF NON-YIELD DATA

E.3.1 The VCU Trial Inspection and Technical Validation Operator will review data on agronomic characters and disease levels to ensure that they fall within expected limits.

E.3.2 Disease data. Checks by the VCU Trial Design and Data Handling Operator shall include verification that:

- If disease data from a fungicide treated trial is >5% in any plot that this is reported to the VCU Trial Inspection and Technical Validation Operator,
- If an unexpected pattern and level of disease is recorded in a trial this is reported to the VCU Trial Inspection and Technical Validation Operator.

E.4 CONFIRMATION OF DATA FOR OVER-TRIALS ANALYSIS

E.4.1 Using the analyses, plot data and advice from the VCU Trial Design and Data Handling Operator, the VCU Trial Inspection and Technical Validation Operator shall decide, in consultation with the VCU Growing Trial Operator, whether any results are unrepresentative and/or unreliable and should be excluded. Additional information such as the trials inspection reports, knowledge and experience of crops and trials, and accepted best practice may also be used to decide whether any data should be excluded.

E.4.2 As part of the validation process all results will be checked using the analysis. This may include data from the previous season where the trial set is limited. Results that differ significantly from and/or show low correlation with the set will be scrutinised before inclusion in the set. The VCU Trial Inspection and Technical Validation Operator shall decide, in consultation with the VCU Growing Trial Operator, whether any results are unrepresentative and/or unreliable and should be excluded.

E.4.3 On completion of validation, the VCU Trial Inspection and Technical Validation Operator will confirm with the VCU Trial Design and Data Handling Operator which data are acceptable to be included in the final data analysis.

E.4.4 VCU Trial Design and Data Handling Operator will forward all relevant data to the VCU Data Review and Standard Setting Organisation.

E.4.5 When the VCU Trial Inspection and Technical Validation Operator have made decisions on all trials for a crop, the resulting datasets are presented to the VCU trials organiser at a data review meeting. After the data review meeting the VCU Trial Inspection and Technical Validation Operator will finalise the validations and forward all relevant data to the VCU Trial Design and Data Handling Operator.

SECTION F - OFFICIAL SUPERVISION

F.1 SCOPE OF OFFICIAL SUPERVISION

F.1.1 These procedures apply to all official supervision of official measures of all GB and NI VCU trials.

F.2 RESPONSIBILITIES

F.2.1 In accordance with the arrangement between the VCU Trial Organiser and the National Authorities, VCU Trial Organisers shall:

- Find potential VCU Trial Operators and VCU Seed Handling Operators for each trial series.
- Manage day-to-day activities to ensure that all requirements are met in respect of seed distribution, conduct of tests and trials, and submission of data.

F.2.2 VCU Trial Organisers are responsible for submitting annually to APHA any auditing procedures and their outcomes that they or VCU Trial Operators, VCU Seed Handling Operators, VCU Pathology Trials Operators, VCU Quality Test Operators and VCU Data Handling Operators may have.

F.2.3 VCU Trial Inspection and Technical Validation Operators are responsible for ensuring the trials are conducted in accordance with the official VCU Trial Procedures for National Lists VCU trials. For selected trials, VCU Trial Operators are also responsible for satisfactorily completing the trial site inspection report form.

F.2.4 VCU Trial Inspection and Technical Validation Operators shall inspect and report on VCU growing trials to assess compliance and fitness for purpose, in accordance with the arrangement between the VCU Trial Inspection Operator and the National Authorities detailed in this procedure.

F.2.5 VCU Trial Inspection and Technical Validation Operators are also responsible for submitting their inspection reports to APHA, a summary of which will be presented to the NLSC within the annual official supervision report.

F.2.5 A member, or nominated contact, of the NLSC, shall undertake an inspection of the VCU Trial Inspection and Technical Validation Operators records and processes at least once every three years. That report shall be submitted to the NLSC and PVSC.

F.3 PROCEDURES FOR VCU OFFICIAL SUPERVISION TRIALS AUDIT

F.3.1 A sample of VCU Trial Operators and their sites will be visited annually by representatives from the National Authorities to assess whether the procedures for trialling comply with the official procedures for National Lists VCU trials.

F.3.2 The VCU Trial Operator and sites will be selected for audit inspection on the basis of 10% of the trials for major species and 5% of those categorised as minor species.

F.3.3 The number of VCU Trial Operators and sites selected for audit shall be agreed by NLSC annually.

F.3.4 Selection will be based evenly over VCU Trial Operators and sites but may be targeted to address particular problems. Geographical distribution and rotational requirement from year to year

should be ensured. Whilst only one visit to each site is envisaged, additional visits may be made to ensure the necessary outcome of follow-up action required.

F.3.5 Assessment will be by means of an inspection of the field trial and a checklist and trial site audit inspection report form. The checklist and trial site audit inspection report form will be sent to the VCU Trial Operator via the VCU Trial Organiser to be completed prior to the visit and submitted to the assessor who will audit it at the time of the visit. The model checklist and trial site audit inspection form are at Appendix 4. Any non-compliances or areas requiring follow-up should be recorded at the time of the visit.

F.3.6 The VCU Trial Organiser or a representative should attend the visit together with the VCU Trial Operator.

F.3.7 The VCU Trial Inspection and Technical Validation Operators shall send their trial site audit inspection reports to APHA). A summary report of these will be submitted to the NLSC, indicating any areas of concern, prior to proposed decisions on candidate varieties being made.

F.3.8 The VCU Trial Organisers shall submit to APHA, on an annual basis, any audit procedures that they or the VCU Trial Operators, VCU Seed Handling Operators, VCU Pathology Trials Operators, VCU Quality Test Operators and VCU Data Handling Operators may have in place and the results of those audits. APHA will examine these audits, carry out any further administrative audits as necessary, and report the outcome to the NLSC.

F.3.9 The National Authorities' Technical Experts for VCU trials within the National Authorities and the NLSC shall scrutinise data for decision-making and seek any further information requiring clarification or authenticity prior to the decision as to the suitability of candidate varieties for the National Lists.

SECTION G - PROCEDURES FOR TRIAL DESIGN, DATA HANDLING AND DATA VALIDATION

G.1 PROCEDURES FOR TRIAL DESIGN, DATA HANDLING, DATA VALIDATION AND DATA REVIEW

G1.1 Data analysis and data
preparation, in a mutually agreed format, must be carried out by the relevant organisations within the KPI's detailed below:
KPI (Key Performance Indicator) for maximum number of working days for organisation to complete task from data receipt.

Task and organisations responsible	KPI in Working days
In Trials data analysis: **VCU Trials Design and Data Handling Operator**	5
Over Trials data analysis*: **VCU Trial inspection and Technical Validation Operator**	2
Data review Meeting: **VCU Trials Design and Data Handling Operator** **VCU Trial inspection and Technical Validation Operator** **VCU Trial Organiser**	1
Review and Calculation of Data: **Data review and Standard Setting Organisation**	10
VCU Recommendations: **Technical Experts**	10
Variety Listing proposals: **NLSC**	2
Data preparation for Gazette publication: **APHA**	10

* Over Trials data analysis can only commence once all In Trial data analysis is completed

Dates or completion of the above tasks will be set annually by APHA, in consultation with the responsible organisations, considering the NLSC decision meeting date and likely harvest date depending on seasonal conditions.

APPENDIX 1

APPROVED OPERATORS AND ORGANISATIONS

Crop	VCU Trials Organiser	VCU Trial Design and Data Handling Operator	VCU Trial Inspection and Technical Validation Operator	VCU Data Review Operator
Cereals (wheat, barley, oats)	BSPB	BioSS	AHDB Cereals and Oilseeds	NIAB
Winter oilseed rape	BSPB	NIAB	AHDB Cereals and Oilseeds	NIAB
Spring oilseed rape, winter rye, winter triticale and linseed	BSPB	AHDB Cereals and Oilseeds	AHDB Cereals and Oilseeds	NIAB
Field peas, field beans and lupins	BSPB	BioSS	PGRO (inspection) NIAB (validation)	NIAB
Sugar beet	BSPB	NIAB	NIAB	NIAB
Herbage	BSPB	NIAB, BioSS and AFBI*	NIAB, SASA and AFBI*	NIAB
Maize	BSPB	NIAB	NIAB	NIAB
Potatoes	SASA	BioSS	SASA	SASA and BioSS
Minor crops not included above	BSPB	NIAB	NIAB	NIAB

* The approved organisations are NIAB for England & Wales, BioSS and SASA for Scotland, and AFBI for Northern Ireland.

AHDB,	Agriculture & Horticulture Development Board Stoneleigh Park Kenilworth Warwickshire CV8 2TL	AFBI	Agri-Food and Biosciences Institute Plant Testing Station 50 Houston Road Crossnacreevy Belfast BT6 9SH
BioSS	Biomathematics and Statistics for Scotland JCMB Kings Buildings Edinburgh EH93JZ	BSPB	British Society of Plant Breeders Ltd BSPB House 114 Lancaster Way Business Park Ely Cambridge CB6 3NX
PGRO	Processors Growers Research Organisation The Research Station Great North Road Thornhaugh Peterborough PE8 6HJ	NIAB	NIAB 93 Lawrence Weaver Road Cambridge CB3 0LE

APPENDIX 2

UKVARIETY LIST VCU TRIAL INSPECTION REPORT

Crop	
Year	
Operator code	
Trial Code	
Site (Operator/County/Nearest settlement)	
Date of Inspection	
Trial Inspector	
Trial contractor present	
Does contractor agree with the report?	

Management & husbandry

Does the trial meet procedures specifications (e.g., soil type)?		If the answer to any question is no, add comments here
Is the field suitable?		
Is the trial in a suitable position within the field?		
Is seedbed preparation & drilling of a good standard?		
Has the trial been sown to plan?		
Are the harvest plot dimensions, OK?		
Is the plant population, OK?		
Have buffers been sown as required?		
Is weed control acceptable?		
Is the trial free of pest damage?		
Are numbers of volunteers acceptable?		
If a fungicide required, has it been effective?		
If PGR (Plant Growth Regulator) is required, has it been effective?		

Current state of trial

Is trial uniformity acceptable?		If the answer to any question is no, add comments here
Is rep uniformity acceptable?		
Are individual plots free of problems?		
Are all varieties free of problems?		
Is the trial acceptable on the day of the visit?		

Summary report	

Post-harvest validation for cereals and oilseeds

Is the plot length/width constant?		If the answer to any question is no, add comments here
Have actions suggested in the trial report been implemented?		
Are moistures 12-17%?		
Is the yield within a sensible range?		
Is the trial free from grain loss, sprouting etc?		
Manual check: is the yield (corrected for moisture) correct?		
If a with fungicide trial, is it free of significant disease?		
If a cereals or oilseeds with plant growth regulator trial, is it free of significant lodging?		
Is the CV, OK?		

Final trial validation

Is the trial valid?		If the answer to any question is no, add comments here
Reason if rejected		
Is the non-yield data valid?		
Validator's initials		
Date of validation		

APPENDIX 3

CRITERIA FOR TRIALS INSPECTION

Sowing date **Previous crop** **Soil type**	Do these meet the procedures, if defined, and/or are they appropriate to the trial crop?
Suitability of field **Position in field**	Is the soil apparently uniform in terms of texture, depth, structure, and drainage? Is there water nearby that might lead to water logging? Is the field steeply sloping? Are there features such as trees and hedgerows that might give rise to pest problems or effects such as shading or wind effects that might cause abnormal lodging? Are there inoculated disease plots nearby that might give abnormal disease pressure? Is the site free of problems from previous cropping e.g., volunteers, club root in oilseed rape, or herbicide effects? Are there genetically modified (GM) plants in the field or nearby?
Standard of drilling and field operations	Are there any interruptions in the plot drilling? Are there consistent distances between neighbouring rows and inter-plot gaps? Are tractor wheeling's/tramlines at right angles to the direction of plot drilling? If the field is sloping, has the trial been laid out such that the plots are at right angles to the contours? Are there any staggered plot ends?
Drilled to plan	Were there any changes to the plan supplied? If so, have these changes been relayed to the Data Handling Operator?
Plant population	Does the plant population appear to be correct?
Are there buffers	If applicable, have buffers, i.e., between hybrids and open pollinating oilseed varieties, been drilled as required?
Weed control	What is the size and population of weeds? Are there any pernicious weeds such as blackgrass, couch, wild oats, brome? Have they been sprayed and, if so, has the herbicide been effective? Are weeds competing or likely to compete with the crop?
Pest control	Is there any damage by pests such as insects, birds, rodents, molluscs etc? Is the crop significantly damaged and will it recover? What measures are being/have been taken to minimise the problem?
Disease control	If the trial should have been sprayed, does it appear to have been effective (is the level of any disease >10% in any plot?) If there is an untreated trial in the field, compare the levels of disease between the treated and untreated plots.
Volunteers	Indicate approximately how many volunteers are present by assessing in the inter-plot gaps. How big are the volunteer plants? Are they likely to be suppressed by the crop or compete with it? Is the volunteer population constant across the trial or do they appear in bands? If they appear in bands, are they across the direction of plot drilling? If volunteers present estimate the percentage ground cover occupied by them.
Uniformity	Indicate whether the trial is growing uniformly within the reps.

	Indicate if there is any difference in growth between reps. Indicate if there is a severe problem with specific plots and note which plots are affected. Indicate if there is a problem with individual varieties and note which varieties are affected and inform the plant breeder/agent. If there is any lodging indicate if it appears to be caused by differences in soil fertility or environmental effects rather than variety.
Any conflict with protocol or procedures	Does the trial meet the protocol and procedures specification for soil type, rotation, sowing date, or any other definition? Are the harvestable plot dimensions acceptable?
Please rate the acceptability of the trial as follows:	
Good:	Evenly established well-grown trial that meets protocol and procedures requirements.
Satisfactory:	Some problems, such as small areas of poor growth, missing plots or missing rows within plots. Some plots or parts of plot may need to be excluded but overall trials should provide satisfactory data.
Of concern:	Larger areas of poor establishment or growth, affecting replicates. Disease levels >10% in fungicide treated trials. A second trial Inspection may be carried out to assess subsequent development. Requires careful validation at harvest.
Proposed abandonment of trial:	Problems with the trial which cannot be resolved.

APPENDIX 4

Trial Operator, site and species inspected:

Plant Variety Rights Office
Eastbrook Shaftesbury Rd
Cambridge, CB2 8DR

E-Mail: pvs.helpdesk@apha.gov.uk

CHECKLIST AND TRIAL SITE AUDIT REPORT FORM FOR ASSESSING COMPLIANCE WITH THE OFFICIAL PROTOCOL FOR DUS TRIALS AND PROCEDURES FOR VCU TRIALS

Please complete and return this form to (input team contact) at the above within 4 weeks of receiving the e-mail request.

Trial Operator	
Trial site	
Address of Trial Operator	
Telephone Number	
Mobile Telephone Number	
Fax Number	
E-mail Address	

Please complete questions by √ for yes and x for no

1. General Requirements of the DUS Protocol or VCU Procedures

1. GM Varieties

Have GM varieties in the trial been sown at a separate site and the work at that site is in accordance with the relevant GM release consent.		

Comments		

1.2 Special DUS or VCU Examinations

Have all additional examinations been set up for any special DUS/VCU tests?		
Comments		

1.3 Late Submissions of Seed

Have all late submissions of seed, as agreed by PVS, been sown in the trial?		
Comments		

1.4 Seed Quality

Were seed treatments successfully applied?		
Comments		

1.5 Seed Quantity

Have authentications been carried out where there were shortfalls on quantities of seed for parent or grandparent lines?		
Comments		

1.6 Labelling

Has all seed been correctly labelled?		
Comments		

1.7 Reference Varieties for DUS tests or Control Varieties for VCU trials

Has the reference collection been selected and sown in accordance with the requirements in the DUS protocol or VCU procedures as appropriate?		
Comments		

2. Trial Site Report Form

Location:
Species inspected:

Site Information	Comments by Trial Operator	Auditor's Initial
Is the trial in the correct position?		

What was the previous cropping?		
Are there any volunteers?		
What is the plot size?		
How many plot reps are there?		
Are the plots labelled?		
Has the trial established?		
Is there uniformity of growth?		
Has a herbicide been applied?		
Has a fungicide been applied?		
Has a fertiliser been applied?		
Has any protection been applied?		
What are the levels of weed?		
What are the levels of disease?		
Is there any insect pest damage?		
Are there any nutrient shortages?		
Is there any bird, mammal damage?		
Are there any missing/unusable plots?		
Provide list of trials on the site. AFP, Breeders ref.		
Provide copy of the plan of the field trials.		
Provide photographs of the field trial		
Provide details of audits carried out on this trial.		

Trial Operator's comments and recommendations

Auditor's comments and recommendations with respect to protocol compliance, fitness for purpose and action required

Trial Operator: **Date:**
Trial Auditor: **Date:**

Appendix 5

List of Trial GB/NI VCU Sites

Crop	Operator	Location
Wheat		
Barley		
Oats		
Winter Oilseed Rape		
Field Beans		
Sugar Beet		
Ornamentals		
Ryegrasses		
White Clover		
Festulolium		
Potatoes		
Vegetables		

Appendix 6

Timing of Inspections

Crop	Timing	Comments
Winter Oilseed Rape	March	To allow the assessment of plant population after the winter
Cereals	May - July	To assess the effectiveness of fungicide, plant growth regulator and fertiliser applications and the uniformity of growth and development
Perennial Crops	Spring of the year after their establishment and thereafter annually in late spring/early summer	
All Crops		Trials may be inspected earlier if there are serious concerns relating to establishment or growth and development prior to trial inspection visits, or later if there are other appropriate concerns