UNITED KINGDOM NATIONAL LIST TRIALS: TRIAL PROCEDURES FOR OFFICIAL EXAMINATION OF VALUE FOR CULTIVATION AND USE (VCU) HARVEST 2019

Spring Oilseed Rape

Changes from Harvest 2018 VCU Procedures

1. p11, C.6.3.9 to C.6.3.11 – “where present at a level which will affect results” deleted.
2. p19, Appendix 4 – Trial Operators and sites: only county of trial.

GROWING TRIALS, TESTS AND ASSESSMENT PROCEDURES FOR SPRING OILSEED RAPE

Page

SECTION A - GENERAL INFORMATION

A.1. PURPOSE

A.1.1 This document sets out the approved procedures to be used for growing trials, tests and assessments as required by the current **Protocol for Official Examination of Value for Cultivation and Use for Spring Oilseed Rape.**

A.2. SCOPE

A.2.1 These procedures apply to all varieties of Spring Oilseed Rape.

A.3. RESPONSIBILITIES

A.3.1 Procedures Development Group

The Procedures Development Group is responsible for reviewing these procedures annually and making amendments for which it has responsibility, in accordance with the provisions of the VCU Protocol.

A.3.2 Organisers and Operators

A.3.2.1 Trials Organiser

British Society of Plant Breeders Ltd (BSPB)
BSPB House
114 Lancaster Way Business Park
Ely Tel No: 01353 653846
Cambs. Fax No: 01353 661156
CB6 3NX Email Jeremy.widdowson@bspb.co.uk

A.3.2.2 The Trials Organiser is responsible for ensuring all **VCU Protocol** and **Procedures** requirements are followed and liaison with all Operators carrying out trials for National List purposes, including supply of seed and data handling.

A.3.2.3 Data Handling Operator

The Data Handling Operator identified by the Trials Organiser is responsible for trial design and data validation in accordance with the **VCU Protocol** and associated **Procedures.**

A.3.2.4 Growing Trial Operators, Seed Handling Operators and Quality Testing Operators.

The Trials Organiser is responsible for identifying potential Growing Trial Operators and Quality Testing Operators to carry out trials and tests as determined by the Procedures Development annual review in accordance with the **VCU Protocol**, and these **Procedures**.

A.3.2.5 A list of all approved Organisers and Operators is shown in Appendix 1.

A.3.3 VCU Protocol and Procedures non-compliance

A.3.3.1 Where these procedures use the words “must or will” for any action then failure to carry out this action will result in non-compliance. Where the word “should” is used for any action then this is the method to be followed unless there are clear reasons not to, which can be justified by the operator as technically sound.

A.3.3.2 The Trials Organiser will forward any reports on **VCU Protocol or Procedures** non-compliance to APHA within 1 week of receipt. The Trials Organiser will obtain authorisation from APHA for any actions, including those necessary to remedy non-compliances, which are not within the requirements of the **VCU Protocol**. Such actions must be recorded as non-compliance. Where emergency action is required and

APHA staff are not available (eg evenings/weekends) the Trials Organiser should act but report this to APHA at the earliest opportunity. Where GMOs are concerned the arrangements are as detailed in section 3.4.

A.3.4 **Procedures for GM varieties**

A.3.4.1 The National Authorities and Trials Organiser will develop procedures for GM varieties if an application for a GM candidate variety is received.

A.3.5 **Processing of Seed**

A.3.5.1 The Seed Handling Operator is responsible for organising the processing of seed of candidate varieties submitted by the applicant, and seed of control, or other reference varieties, in accordance with the requirements set out in these **Procedures** and the current **VCU Protocol**. The Trials Organiser will ensure that any seed treatments or additives are approved for the purpose. Approved products are listed in Appendix 2.

A.3.6 **Dispatch of Seed**

A.3.6.1 The Trials Organiser will arrange for seed to arrive at the Seed Handling Operator by the relevant deadline - see Appendix 3. The Seed Handling Operator is responsible for processing and dispatch of seed to Growing Trial Operators and DUS testing centres (including, where appropriate, foreign testing authorities) within the relevant deadlines.

A.3.7 **Monitoring of Growing Trial Operators**

A.3.7.1 The Trials Organiser will take any necessary action to enforce deadline dates and quality standards for required documentation.

A.3.7.2 The Trials Organiser will ensure Growing Trial Operators and Seed Handling Operators have access to all current protocols and procedures relevant to them and that they are notified of any amendments.

A.3.8 **Seed Quantities**

A.3.8.1 The Trials Organiser will determine the quantity of seed required for all VCU tests and trials in each annual series, including authentication, and will notify the applicant of quantities and delivery addresses.

A.3 9 **Labelling of seed**

A.3.9.1 The Seed Handling Operator is responsible for ensuring all seed is clearly labelled with variety name/breeders reference and AFP number.

A.3.10 Seed Quality

A.3.10.1 Seed submitted for VCU testing must meet the standards for the final generation of seed given in the appropriate seed regulations, in respect of germination, analytical purity and content of other seeds and any other impurities. The seed must be free of adventitious genetically modified presence and accompanied by a declaration to this effect.

A.4. SUMMARY OF GROWING TRIALS, TESTS AND ASSESSMENT PROCEDURES

A.4.1 The number of trials and site locations are as detailed in Appendix 4.

A.4.2 Control varieties are listed in Appendix 5.

A.4.3 The Trials Organiser is responsible for informing the Growing Trial Operators of any additional characters, which must be recorded as and when requested by applicants, and any samples that may be required for analysis. Any sensitivity to herbicides to be reported to the Trials Organiser.

A.4.4 **VCU trial assessments required**

Bold = Obligatory *Italics = Additional only if requested by the applicant*

Type of Character	Reference	Description of assessment
Yield	Section C	**Plot yield,** **Moisture content**
Behaviour with respect to factors in the physical environment.	Section C	**Maturity** **Standing ability** *Early vigour* *Plant height* *Earliness of flowering*
Resistance to harmful organisms	Section D	Presence and severity of **Light Leaf Spot, powdery mildew** and **Stem Canker** recorded in the field. Other diseases should be recorded if they meet the infection levels specified in Section D.
Quality characteristics (Laboratory Tests)	Section E	**Glucosinolate content measured on each plot** **Oil content**

FURTHER MEASUREMENTS
The following must be measured or recorded in all trials, following procedures in Section C.

Sowing Date
Harvest date
Plot size
Bird Damage
Seed Loss
Combine losses

SECTION B – SEED HANDLING PROCEDURES

B.1. RESPONSIBILITIES

B.1.1 The Seed Handling Operator is responsible for carrying out the following seed handling procedures.

B.2. SEED HANDLING PROCEDURES

B.2.1 The Seed Handling Operator will receive a sowing list from APHA. A list of chemicals approved by the Procedures Development Group is at Appendix 2.

B.2.2 The Seed Handling Operator must record receipt of seed from applicants by checking it off against the sowing list as it arrives. APHA should be notified of any damage to the packaging, loss of seed or identification problems within one working day of receipt.

B.2.3 Once seed has been treated, it must be kept safely until required for drilling, authentication and quality control. The Seed Handling Operator must retain 50 grams untreated sample of the seed of every variety in the trial for authentication by the DUS Test Centre.

B.2.4 The Seed Handling Operator must record use of treatment chemicals in accordance with best practice and in full observance of all manufacturers' recommendations and relevant statutory obligations.

B.2.5 Any seed treatment equipment used must be fit for the purpose, properly calibrated, set up and operated in accordance with the manufacturer's recommendation.

B.2.6 Cross contamination must be avoided by ensuring equipment is cleaned between weighing and treatments.

B.2.7 A record must be kept of chemicals used and date of treatment.

B.2.8 Seed treatment should take place as near to the drilling date as possible.

B.2.9 Once seed has been treated, it must be kept safely until required for drilling and quality control. The Seed Handling Operator must retain a 50 gram sample of treated seed until one month after harvest.

B.3. AUTHENTICATION OF VCU SEED

B.3.1 The Seed Handling Operator must forward 50 grams of untreated samples of the VCU seed submitted of every variety in the trial, for authentication by the DUS test centre according to procedures laid down and notified by APHA.

B.3.2 All samples must be kept under suitable conditions for the authentication procedures required and must be clearly labelled and sealed.

B.3.3 If the level of off-types recorded in DUS tests or VCU authentication of a candidate variety exceeds 10%, the VCU data will be considered invalid.

SECTION C – GROWING TRIAL PROCEDURES

C.1. RESPONSIBILITIES

C.1.1 The Growing Trial Operators are responsible for conducting the trials according to these procedures.

C.2. SITE SUITABILITY

C.2.1 The Growing Trial Operator will be responsible for providing a suitable site, which meets the following criteria.

C.2.2 Previous cropping must be appropriate for a spring oilseed rape crop to be grown.

C.2.3 Soil type should be typical of those on which spring oilseed rape is grown locally. Soil fertility and texture should be uniform across the site. The soil should be sufficiently uniform with no substantial variations in previous cropping, ridges and furrows, etc.

C.2.4 The trial should be sited away from trees, hedges, headlands and other features, which are likely to cause uneven growth or encourage grazing damage from birds, rabbits, hares, mice etc.

C.2.5 Primary cultivation at the discretion of the growing trial operator and cultivations should follow best local practice.

C.3 SOWING THE TRIAL

C.3.1 **Plot size**

C.3.1.1 The harvested plot area per variety must be not less than 20 m^2 per replicate and four replicates must be used. Plots should be drilled to a greater length than required and cut back to the required length prior to harvest. The plot width for calculating harvested area is measured centre gap to centre gap with an inter-plot gap in the range 0.5m to 0.8m. Sown plot width should reflect the blade width of the swathers where used.

C.3.2 **Plant population**

C.3.2.1 Seed rates may be adjusted to suit site conditions at the discretion of the trials operator with the aim of producing a plant population of between 80 and 100 plants/m^2. Hybrids should be drilled at 80% seed rate.

The following formula will be used to calculate the seed rate for a given thousand seed weight:-

$$\text{Seed rate (kg/ha)} = \frac{(\text{Target population} \times \text{Thousand seed weight}) \times 100)}{(\text{Establishment\%} \times \text{Germination \%})}$$

For operators using seed counters the following formula can be used to calculate required seed numbers per plot:-

$$\text{Seeds per plot} = \frac{(\text{Target population} \times \text{Drilled plot area}) \times 10{,}000)}{(\text{Establishment\%} \times \text{Germination \%})}$$

Establishment % can vary greatly between locations and drilling techniques and figures as low as 60% are not uncommon. A good assessment of this figure is important in establishing successful trials.

C.3.3 **Trial layout**

C.3.3.1 The Trials Organiser, following consultation with APHA, produces provisional sowing lists. The Trials Organiser will make final sowing lists available to Growing Trial Operators, along with the trial plans produced by the Data Handling Operator. There should be no correction for differences in germination percentage.

C.3.3.2 The trial should be sown according to the plan produced by the Data Handling Operator and may be an incomplete block design. In an incomplete block design each replicate is split into a number of sub-blocks. Any splitting of replicates must be between sub-blocks and not through sub-blocks. Varieties can be moved within a sub-block but must not be moved from their sub-block. Varieties must not be moved around within the plan e.g. if drilling errors occur. If plots are moved out of their original sub-block they will have to be treated as missing plots. If there are any queries please contact the Trials Organiser.

C.3.3.4 If there is a need to replace a planned variety e.g. if varieties are withdrawn, affected plots must be sown with any of the standard control varieties. Any such replacements must be agreed with the Trials Organiser. The control varieties are listed in Appendix 5.

C.3.4 **Drilling**

C.3.4.1 Trials should be drilled when soil and weather conditions are conducive to rapid establishment. Where possible, time the drilling of the trial to coincide with that of the surrounding farm crop.

C.3.4.2 Care must be taken with drill settings and drilling speed to ensure satisfactory and uniform establishment and plant population from plot to plot. It is also important to ensure that there is no carry over of seed between plots.

C.3.4.3 At least ***one*** discard plot must be drilled on either side of the trial with the same drill and at the same time that the trial is drilled.

C.3.4.4 Precautions must be taken to avoid any missing rows. Any missing rows or parts of rows must be noted in the trial diary and reported to the Trials Organiser within one month of emergence.

C.3.4.5 Flea Beetle post emergence controls should be applied.

C.3.5 **Confirmation of trial layout**

C.3.5.1 After full establishment and within one month of sowing the Growing Trial Operator must confirm that the trial has been sown to plan or give full details of any changes to plan. This should be done by clearly highlighting the changes in the electronic plan and returning it to the Data Handling Operator.

- Return a completed site data 1 sheet including the following information:
- Site location details including how to get to the field.
- Sketch showing the layout of the trial in the field, in relation to other trials and showing access roads, gates, etc.
- Trial sketch showing plot numbers and variety codes and/or names
- A short post-establishment report of the condition of the trial.

C.4 HUSBANDRY

C.4.1 **Agronomy**

Where not specified in these procedures agronomy should follow best local practice, advisory and regulatory guidelines. Application of fertilisers and sprays should be uniform. It is normally best to apply these across the direction of the plots. Application wheelings should not run through the harvested plot area.

C.4.2 Fertiliser application

It should take into account inherent fertility, previous cropping, winter rainfall, the best local practice. All fertiliser applications should take account of the AHDB Nutrient Management Guide (RB209), the corresponding advisory publications in England, Wales, Scotland and Northern Ireland and past trialling experience.

Growing Trial Operators should be aware of the implications of other nutrient requirements (especially Sulphur) and should be prepared, if necessary, to apply appropriate treatments.

C.4.3 Herbicides

The Trials Organiser must be consulted. .

C.4.4 Growth Regulators

These should not be used on spring oilseed rape trials.

C.4.5 Pest and Disease Control

C.4.5.1 Pest Control

Seed dressings may include an insecticide element. Precautions should be taken against attacks by slugs and insects such as cabbage stem flea beetle, cabbage root fly, pollen beetle, seed weevil and pod midge. Where there is a risk of significant flea beetle or pollen beetle attack Growing Trial Operators must ensure that adequate control measures are taken. Birds can cause damage near harvest, especially when trials are near houses. Control is difficult but every effort should be made to minimise losses. Assessments should be made wherever damage occurs since decisions have to be made on the validity of each plot affected. Grazing, particularly by pigeons, may be selective and control measures should be taken if necessary.

C.4.5.2 Disease control

Growing Trials Operators should be aware that severe outbreaks of Sclerotinia, powdery mildew and Alternaria could threaten the validity of the trial and should weather patterns favour the build up of these diseases, then an appropriate fungicide should be applied at mid-flower for Sclerotinia, or from mid-flower to pod senescence for Alternaria. Though the risks of Sclerotinia and Alternaria development are generally lower in SOSR than WOSR, damaging attacks could occur. Sclerotinia may develop if a flush of apothecia production coincides with flowering and periods of wet weather; Alternaria may develop rapidly if warm and wet conditions occur during late flowering and pod development. If control measures were ineffective for any reason, and these diseases did develop, levels should be recorded according to the instructions in Appendix 8. Other disease control should only be undertaken after agreement by the Trials Organiser.

C.4.6 Irrigation

Irrigation will not be permitted without the specific agreement of the Trials Organiser.

C.4.7 Pathways

Internal pathways should be made after the risk of pigeon damage has passed.

C.5 HARVESTING

C.5.1 Timing of harvesting

C.5.1.1 Date of harvesting will be determined by the Growing Trial Operator based on crop maturity and local weather conditions.

C.5.1.2 Plots should be trimmed to their final length prior to harvesting. The plot dimensions must be measured prior to harvesting. If it is necessary to reduce the size of any plot at harvest give clear details on the yield file. Individual harvested plot lengths should be recorded.

C.5.2 **Harvesting method:**

Trials can be swathed or desiccated and direct combined, depending on the specific requirements of the trials as determined by the Growing Trials Operator. This should be recorded on the site information form. Side knives must **not** be used.

If the trial is to be cut direct, a header-extension should be fitted to the plot combine to minimise table losses

C.5.3 **Samples**

C.5.3.1 It is essential that all samples:

- Are 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 of seed from the previous plot.
- Are taken from the same source.
- Contain the weight of seed requested.

C.5.3.2 Two samples must be taken from each plot at harvest. A 200 g sample must always be taken at the time of plot weighing and sealed in a polythene bag for dry matter and oil content determination. In addition a 100 g sample is taken and sealed in a cloth bag for glucosinolate analysis. One label should be placed inside the bag and this sealed by rolling over the top and securing the bag and the second label with rubber bands. At sites where higher moisture levels are frequently experienced and dry matters are determined immediately in the trial operator's laboratory a single sample of 500g per plot and subsequently divided may be taken for dry matter, oil and glucosinolate content.

C.5.3.3 All bagged samples must be kept in good condition at a moisture content and temperature appropriate for long term storage. They should be clearly marked both inside and outside the container/bag.

C.5.3.4 Samples may not be required from every variety - the Trials Organiser will provide details of which varieties require samples, the quantities required and the tests to be carried out.

C.5.3.5 Sample drying should be undertaken using a cold/warm air drier to reduce moisture content to 9% or below according to the procedures in E.2.

C.5.3.6 All plot samples must be labelled with trial identification number, variety name/breeders reference, AFP number, plot number and Growing Trial Operator identification number.

C.5.4 **Submission of data and samples**

C.5.4.1 Appendix 6 lists the records, with deadlines, to be sent to the Trials Organiser. Diary sheets and any other field records should be returned to the Trials Organiser within 5 working days of harvest.

C.5.4.2 All plot records should be transmitted to the Data Handling Operator following the deadlines set out in Appendix 6. The Growing Trial Operator should ensure that data are free from errors before transmission. After scrutiny, copies of results will be returned to the Growing Trial Operator for action as agreed by the Trials Organiser.

C.5.4.3 All samples should be sent to the Quality Testing Operator following the deadlines set out in Appendix 6.

C.6 RECORDS

C.6.1 There are four components:

1. **Diary** Field notes of trial status.

2.* **Site data part 1** Site details including site sketch, map and location, previous cropping, soil analysis, fertiliser applications and sowing date.

3. **Site data part 2** Details of agrochemical applications and irrigation.

4. **Plot records** Plot data.

* Template available from Trials Organiser

C.6.1.1 An entry in the Diary sheet should be made on every trials visit and any observations relevant to variety performance should be recorded. If the trial is in good condition, with no problems, this should be recorded.

C.6.2 **Plot records**

C.6.2.1 Plot data may be recorded direct onto a data logger using a system approved by the Trials Organiser or recorded on paper then entered and validated onto a computer using an approved system. A system of ensuring that data are recoverable, in the event of loss of original data, must be implemented, e.g. copy and safe storage. Whichever method is used, individual plot data will only be accepted by the Data Handling Operator in an approved format using the variate names and units as listed in Sections C and D.

C.6.2.2 All observations should be checked at the time of recording to ensure that they lie within acceptable limits for the character recorded. Observations that have been identified as exceptional by the recorder should be identified with a note on the approved data file or hard copy medium describing the possible causes together with a recommendation for their exclusion or inclusion in the trial analysis.

C.6.2.3 Plot numbers on record sheets must correspond with the numbering on the field plan.

C.6.2.4 If a character is not recorded or is missing the Growing Trial Operator should indicate in the diary or on the recording sheet the reason why it has been excluded.

C.6.2.5 Where a plot record is missing the Growing Trial Operator should enter "*" in the approved data file or hard copy medium and, unless the non-recording of the plot has already been agreed with the Trials Organiser, append a note to the file explaining why a missing value has been entered for that plot. The Growing Trial Operator should not enter "0" for missing plots.

C.6.2.6 All records should be returned as soon as reasonably possible. Indicative deadlines are given in Appendix 6. All records must be returned by the final deadlines.

C.6.3 Procedures for recording Characters

The following procedures must be followed for measuring all characters to be used in NL decision-making.

C.6.3.1 PLOT YIELD AND MOISTURE CONTENT (OBLIGATORY) (kg)

The following information must accompany the yield data:

The moisture content % of the harvested grain determined by oven method.

Plot length: the plot length harvested in metres.
Plot width: the width of the harvested plot in metres from outer row to outer row plus half of the inter-plot gap on either side. The adjustment for the inter-plot gap should be no greater than 0.8m.

If these are not the same for every plot, a separate record must be submitted

Growth stage: usually 9.9 at harvest. The Growth Stage Chart for oilseed rape is at Appendix 7.

Yield (in kilograms). Note clearly any tare weight to be subtracted.
Yield, moisture content, plot length, plot width and harvest date should be sent to the data Handling Operator within 5 days of harvesting the trial.

C.6.3.2 MATURITY from all plots (OBLIGATORY) (1-9)

Maturity should be judged with a visual estimate of canopy senescence, where;
1 all pods green
9 all pods bleached and brittle

Unrepresentative areas of the plot should be avoided when making assessments, for example, localised diseased infections.

C.6.3.3 *EARLY VIGOUR* *from all plots* *(ADDITIONAL)* (1-9)

1 very weak
9 very vigorous

Record also, the weediness and predominant weeds present at the time of assessment.

C.6.3.4 *PLANT HEIGHT* *from all plots* *(ADDITIONAL)* (cm)

Record average plot height at the end of flowering before leaning or lodging takes place. If lodging has occurred, choose a representative area of the plot, lift a number of plants against the measuring pole and record an average height.

C.6.3.5 *EARLINESS OF FLOWERING* *from all plots* *(ADDITIONAL)* (1-9)

1 very late
9 very early

Record when the earliest variety is in full flower and score all varieties relative to this. An assessment on one occasion is normally sufficient. Estimate the date of full flowering for the earliest control variety.

C.6.3.6 SOWING DATE of each trial (OBLIGATORY) (Day/month/year)

This is recorded in Part 1 of the Site Information Form.

C.6.3.7 **STEM STIFFNESS** **from all plots** **(OBLIGATORY)** **(1-9)**

1 completely lodged
9 no lodging

The aim of this score is to describe the canopy structure at harvest. A score of 5 can describe half the plot completely flat or the whole plot leaning at 45 degrees.

C.6.3.8 **HARVEST DATE** **(OBLIGATORY)** **(Day/month/year)**

C.6.3.9 **BIRD DAMAGE** **from all plots** **(OBLIGATORY)** **(1-9)**

1 all plants severely damaged
9 no plants damaged

This must be recorded.

Indicate the cause of damage and, in the Diary section, what action has been taken to minimise further damage.

C.6.3.10 **(Resistance to) SEED LOSS** **(OBLIGATORY)** **(1-9)**

1 severe seed loss
9 no seed loss

This must be recorded.

Base scores either on observation of pod shattering or counts of seed on the ground if shedding is thought to be serious. Seed loss is easier to assess before combining. Ensure that combines are set correctly to minimise losses at harvest. Estimate the number of seeds lost per m^2 for the plot(s) with the most losses so that the approximate yield loss can be estimated.

C.6.3.11 **COMBINE LOSSES** **from all plots** **(OBLIGATORY)** **(1-9)**

This must be recorded.

Combine losses should be assessed if the losses are thought sufficient to exclude the yield data from results. Indicate the estimated number of grains lost per m^2 for the lowest score given on the 1 to 9 scale.

9 = no combine losses.

C.6.3.12 **SITE FACTORS**

Any factors which may have affected the yield of the trial or individual plots must be noted and accompany the yield data.

Where varietal differences are seen in pest or disease attack, records should be made in accordance with the procedure in Section D for disease.

Records for other scores should be taken as plants affected on a 1 to 9 scale. Include definitions for each rating on the 1 to 9 scales.

C.6.3.14 **Trial Inspection**

All trials will be inspected by the Trial Inspection and Technical Validation Operator and, in some cases, it may be necessary to visit on more than one occasion.

The requirements for Growing Trial Operators in respect of inspections are as follows:

1. To give reasonable access to trials to inspectors.
2. To supply the inspector with information (for example pesticides applied etc) within seven days of a request.
3. To co-operate with the inspector in making any non-routine assessments required to establish the validity of the trial (for example population counts).
4. To carry out any action agreed in consultation with the inspector. In particular it is important that any requirement to shorten plots is undertaken. The data on plots that the trials operator and inspector agree to exclude should not be submitted..

SECTION D - DISEASE TESTING PROCEDURES

D.1 ASSESSMENT OF NATURAL INFECTION

D.1.1 The Growing Trial Operator is responsible for carrying out these procedures.

D.1.2 **Disease Observation Plots**

No disease observation plots are grown routinely.

D.1.3 **Naturally occurring disease in VCU growing trials**

D.1.3.1 Light leaf spot, powdery mildew and stem canker should be recorded when the level of infection on the most affected variety is over 5% or a score of 4 of the leaf or infected plants.

D.1.3.2 Other naturally occurring disease is not normally recorded in the growing trials. However, if disease levels increase to more than 5%/score 4 of the leaf area (or 5%/score 4 of infected plants as appropriate for the diseases) on the most affected variety a score should be made on the whole trial and sent to the Data Handling Operator. Confirmation of the identity of a disease should be obtained from an appropriate plant pathologist if required.

D.1.3.3 **Recording methods**

D.1.3.4 Appropriate assessment keys are given in Appendix 8. All disease records to be sent to the Data Handling Operator as soon as they are made.

Disease data should be received by 31st August.

D.2 INOCULATED DISEASE TESTS

No inoculated disease tests are carried out routinely.

SECTION E - QUALITY TESTING PROCEDURES

E.1. RESPONSIBILITIES

E.1.1 The Quality Testing Operator appointed by the Trials Organiser is responsible for conducting approved quality tests according to these procedures.

E.2 QUALITY ASSESSMENT METHODOLOGY

E.2.1 Moisture content determination

The following procedure must be followed;

A 105 g sample of seed (± 5g) is placed in the drier which must be at a temperature of 100ºC ± 4°C with the air recirculator set in the range 80-100% recirculation in order to restore the temperature to 100°C ± 4°C as rapidly as possible. When the temperature is restored to 100°C ± 4°C the air regulator is set at 80% recirculation i.e. 20% fresh hot air. The regulator is critical for rapid drying. The samples are dried at 100°C ± 4°C for such time as is necessary for complete drying. Each sample is identified with a label.

The dried sample is carefully removed from the drier as soon as the sample is cool enough for accurate weighing. The dry weight is recorded to one decimal place.

When all samples from a given trial have been recorded, the fresh and dry weights are immediately reported to the Trials Organiser. When the moisture contents are reported as a percentage, the fresh weight should be reported as 100.

Moisture content determination by conductance moisture meter will not be acceptable.

E.2.2 Glucosinolate Determination

E.2.2.1 The standard method is based on X-ray fluorescence spectroscopy. The standard procedure is given in modification of ISO 9167-2: 1994 (the modification being that the instrument is now a more up to date version which has silicon drift detectors (SDD)).

E2.2.2 Because of the variable moisture content of trials material the following modification to ISO 9167-2:1994 is permitted:

All analyses may be carried out on material which has been oven dried at 100°C +4°C for a minimum of 5 hrs. If this option is chosen then the instrument must be calibrated against whole rapeseed reference materials which have been similarly dried. The sulphur reference values used for calibration should be the values for the un-dried reference material, this ensures the instrument gives analytical results at the correct moisture basis despite the drying step. A single determination is normally performed.

E.2.2.3 An alternative analytical procedure based on High Performance Liquid Chromatography (HPLC) is also permitted. The standard procedure is given in ISO 10633-1:1995. HPLC is used when there is reason to believe samples contain exogenous sulphur - for example seed which is chemically dressed. The method is standardised daily (when in use) against reference samples to ensure the activity of the sulphatase preparation, the suitability of the sinigrin standard and the reproducibility of the laboratory procedures. Three extracts are prepared from a test sample, one without internal standard and two with added internal standard.

E.2.3 Oil Content Determination

Analysis is performed using continuous emission NMR following ISO 5511:1992. Results are expressed as apparent oil as a percentage at 9% moisture.

The stability of the equipment is checked at two-hourly intervals through the working day by the use of weighed oil standards. A single determination is normally performed on each test sample.

SECTION F - TRIAL DESIGN AND DATA HANDLING PROCEDURES

F.1. PLAN VALIDATION AND STORAGE

F.1.1 After the trial has been drilled, the Growing Trial Operator must:

a) Confirm that the trial has been drilled according to plan and provide the sowing date, by returning site data 1 and associated trial sketch to the appropriate Data Handling Operator.

b) If any amendments to the plan have been made, return a hard copy of the plan to the appropriate Data Handling Operator with any amendments clearly indicated. Alternatively, amendments may be notified electronically with the agreement of the Data Handling Operator.

F.1.2 The Data Handling Operator will check these for statistical validity and, once this has been done, will load the plan on the database.

F.2 DATA RECORDING

F.2.1 Data are recorded using the methods and characters given in Sections C, D and E.

F.2.2. Site information is recorded for each trial including, for example, data on previous cropping, seed rates, soil details and fertiliser applications.

F.2.3 Details of any agrochemical applications are also recorded and retained by the Growing Trial Operator.

F.3 OTHER TESTS AND TRIALS

F.3.1 Any additional or alternative designs required for the assessment of additional VCU characters not detailed in Appendix 3 of the **VCU TRIAL PROTOCOL** for spring oilseed rape will be added to these **Procedures** as and when approved by the NLSC.

APPROVED TRIAL ORGANISERS/OPERATORS FOR SPRING OILSEED RAPE

ACTIVITY	ORGANISERS/OPERATORS RESPONSIBLE
Trials Organiser	BSPB
Seed Handling Operator	NIAB
Data Handling Operator	AHDB Cereals and Oilseeds
Pathology Trials Operator	None
Trial inspection	AHDB Cereals and Oilseeds
Technical Validation Operator	AHDB Cereals and Oilseeds
Quality Testing Operator	NIAB
Data Review and Standards Setting Operator	NIAB

SEED TREATMENT PRODUCTS FOR USE ON NL TRIALS

To be advised

SEED DESPATCH DEADLINE DATES

VCU seed must be delivered to NIAB Seed Handling Unit by 15th January.

GROWING TRIAL OPERATORS AND TRIAL LOCATIONS

1. Growing Trial Operators/Seed Handling Operators

Growing Trial Operator	Seed Handling Operator (If not trial operator)	Location of Trial
CERC, Harper Adams University	NIAB	Shropshire
LS Plant Breeding	NIAB	Cambridgeshire
Scottish Agronomy	NIAB	Perthshire

2. Pathology Trials Operator

Pathology Trials Operator	Location of Trial
Not applicable	-

CONTROL VARIETIES FOR VCU ASSESSMENTS

The Control Varieties:

Mirakel
Makro

A. DATES BY WHICH RECORDS SHOULD BE SENT TO TRIALS ORGANISER

Record	Latest date of receipt by Trials Organiser
Site data part 1 (including site sketch)	Within 1 month of drilling trial
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

B. DATES FOR SUBMISSION OF PLOT RECORDS TO DATA HANDLING OPERATOR

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

C. DATES FOR SUBMISSION OF PLOT SAMPLES TO QUALITY TESTING OPERATOR

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

GROWTH STAGES OF OILSEED RAPE

	GrowthStage	
Germination and Emergence	0.0	Dry seed
Leaf Production	1.0	Both cotyledons unfolded and green
	1.1	First true leaf emerged
	1.2	Second true leaf emerged
	1.3 etc	Third true leaf emerged
Stem Extension	2.0	No internodes (rosette)
	2.5	About five internodes
Flowerbud Development	3.0	Only leaf buds present
	3.1	Flower buds present but enclosed by leaves
	3.3	Flower buds visible from above ('green bud')
	3.5	Flower buds raised above leaves
	3.6	First flower stalks extending
	3.7	First flower buds yellow ('yellow bud')
Flowering	4.0	First flower opened
	4.1	10% all buds opened
	4.3	30% all buds opened
	4.5	50% all buds opened
Pod Development	5.3	30% potential pods
	5.5	50% potential pods
	5.7	70% potential pods
	5.9	All potential pods
Seed Development	6.1	Seeds expanding
	6.2	Most seeds translucent but full size
	6.3	Most seed green
	6.4	Most seed green-brown mottled
	6.5	Most seeds brown
	6.6	Most seed dark brown
	6.7	Most seed black but soft
	6.8	Most seed black and hard
	6.9	All seeds black and hard
Leaf Senescence	7.0	
Stem Senescence	8.1	Most stem green
	8.5	Half stem green
	8.9	Little stem green
Pod Senescence	9.1	Most pods green
	9.5	Half pods green
	9.9	Few pods green

ASSESSMENT OF OILSEED RAPE DISEASES

Use for assessing light leaf spot, Alternaria, downy mildew, powdery mildew, Phoma and white leaf spot on leaves and pods:

1) Examine all leaves and pods in 3 areas of each plot.
2) Ignore all naturally senescent tissue.
3) Include all necrosis and chlorosis attributable to disease.
4) Estimate % infection using the descriptions below. Record the average % infection from the 3 areas. Interpolate values if necessary. Disease may be recorded on a 1-9 scale but the data must be submitted as a percentage score. Both scales are given in the assessment key.

1-9 score	% Infection	LEAVES	PODS
1	0	No infection observable	
2	0.1	Trace of infection	
3	1	Diseased leaves with 1 small lesion; plants with a few scattered lesions	Terminal raceme with a few scattered lesions
4		Leaves appear 1/10 infected; diseased leaves with 2 lesions	Terminal raceme appears 1/10 infected; diseased pods with 1 or 2 lesions
5	10	Leaves appear ¼ infected; diseased leaves with few large or many small lesions	Terminal raceme appears ¼ infected; diseased pods with 2 or more lesions
6	25	Area appears ½ infected ½ green	
7	50	Area appears more infected than green	
8	75	Very little green tissue left	
9	100	Leaves/pods dead - no green tissue left	

These descriptions are guides for specific levels; interpolate between these points as necessary e.g.15%, 27%, 60% etc.

Other disease assessments:

Club root
Any suspected club root in trials should be confirmed by sampling between 10 and 30 plants within the suspected area, and its presence notified to the co-ordinators.

Sclerotinia %
Should be assessed as the % of stems with complete girdling leading to 'whiteheads' within a plot.

Botrytis%
Should be assessed as the % of stems infected within a plot.

Stem canker
Stem canker may be assessed by pulling up 30 stems per plot before harvest. Stems should be pulled at random throughout the plot, but since access is likely to be very difficult, aim to take 15 stems from the second drill row on each side of the plot, using the first 3-5m of the plot length. Appropriate sampling times are usually from the middle of June onwards. If sampling is not carried out prior to swathing, it must be done ***as soon as possible afterwards, within a maximum of 2 days.***