Animal & Plant Health Agency

United Kingdom Variety List Trials: Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) Harvest 2023

Winter oilseed rape

April 2023

Changes to Procedures

- Update to fungicides approved.
- Controls approved for winter oilseed.
- Added agreement regarding use of Moisture Meters to Section E.
- Update year from 2022 to 2023
- Added Clubroot Procedures Appendix 11

Contents

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 Winter Oilseed Rape**

A.2 Scope

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

A.3 Responsibilities

A.3.1 **Procedure 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
Cambs.
CB6 3NX
Tel No: 01353 653846
Mobile: 07747 567351
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 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**. The Trials Organiser is also responsible for finding a Seed Handling Operator who is able to carry out seed handling.

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 word “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 (e.g. 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 and Seed Handling Operators – documentation**

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 should 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 Trials Organiser is responsible for informing the Growing Trial Operators of the additional characters, which must be recorded as and when requested by applicants, and any samples that may be required for analysis.

A.4.4 **VCU trial assessments required**

Type of Character	Reference	Description of assessment - Obligatory	Description of assessment – Additional (Assessed only if requested by applicant.)
Yield	Section C	**Plot yield** **Moisture content**	
Behaviour with respect to factors in the physical environment.	Section C	**Standing ability**	*Early vigour* *Winter hardiness* *Earliness of flowering* *Plant height* *Maturity* *Stem Stiffness*
Resistance to harmful organisms	Section D	**Phoma leaf spot,** **Light leaf spot**	*Club root*
Quality characteristics (laboratory tests)	Section E	**Glucosinolate content measured on each plot** **Oil content**	*Erucic acid* *Oleic acid*

Further measurements

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

Sowing date
Harvest date
Plot size
Establishment
Stem canker

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, along with instructions as to which seed treatments or additives may be used. A list of chemicals accepted for use 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. The Trials Organiser and Applicant 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.

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 clean 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 Year 1 VCU and DUS submissions are taken from the single submitted seed stock. Year 2 and any further VCU seed submissions are authenticated by NIAB DUS Test Centre according to the procedures set out in associated document APHA DUS WOSR.

B.3.2 The Seed Handling Operator must forward 200 grams of untreated sample of the seed submitted of every variety in the trial, for authentication by the DUS test centre by the date specified by APHA. The Trials Organiser will notify the minimum quantity required to Seed Handling Operators annually.

B.3.3 All samples must be kept under suitable conditions for the authentication procedures required and must be clearly labelled and sealed.

B.3.4 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 winter oilseed rape crop to be grown. Sites should be selected for a minimum of volunteers and a five year break would be ideal. Shorter rotations are allowed in consultation with the Trials Organiser. All attempts should be made to reduce volunteer pressure within the trials.

C.2.3 Soil type should be typical of those on which winter oilseed rape is grown locally. Soil fertility and texture should be uniform across the site. The soil should be sufficiently uniform to avoid variation in the growth of the trial.

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 damage from fauna.

C.2.5 Primary cultivation is at the discretion of the growing trial operator and cultivations should follow best local practice. If previous rotations suggest there is a risk of club root tests to confirm presence should be performed.

C.3 Sowing the trial

C.3.1 **Plot size**

C.3.1.1The 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 0.5 m to 0.8 m. Sown plot width should reflect the blade width of the swather used.

Unbordered paired plots (the pairs must be drilled side-by-side) or bordered single plots are the only plot systems allowed. Unbordered paired plots must have a minimum harvested plot area of 36 m^2 per replicate and have a minimum combined width of 3 m (including inter-plot gap). Bordered plots must have a minimum harvested plot area of 18 m^2.

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 spring population of 40 plants/m^2.

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

When drilling every effort should be made to obtain even emergence. Internal gangways should not be mown until the risk of pigeon damage has passed.

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.

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 Data Handling Operator.

C.3.3.3 Trials designs will depend on the method of drilling and the method of harvest.

C.3.3.3.1 Year 1 trials - are usually three replicate incomplete block designs and will be treated with fungicide but not plant growth regulator. Other designs may be used if appropriate.

C.3.3.3.2 Year 2 trials – are usually three replicate incomplete block neighbour restricted designs and varieties are grouped by height. Trials are treated with fungicide but not plant growth regulator. Other designs may be used if appropriate.

C.3.3.3.3 In both years one and two, restored hybrid (RH), semi-dwarf (SD) and conventional open-pollinating (OP) varieties will be blocked together within the randomisation or may be fully randomised **only** if the bordered plot system is used and the total width of the discarded border between the * harvested plots is at least 1.5 m wide and the direct combining method is used.

* The width of the harvested plot is the measurement from outer row to outer row plus half of the inter-plot gap.

C.3.3.3.4 Growing Trial Operators must inform the Trials Organiser prior to plan generation which trial design they wish to use. The Trials Organiser will inform the Data Handling Organiser.

C.3.3.3.5 If plots are double width or of the bordered type where the discarded border area is less than the harvested plots, buffer plots must be inserted between the blocks of one type and the next i.e. each RH, SD and OP block will be bordered on either side by a single plot of the same type.

C.3.3.4 If there is a need to replace a planned variety e.g. if varieties are withdrawn after sowing lists have been compiled, affected plots must be sown with an appropriate control variety. 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 as soon as possible after all seed is received (target: 23rd August) and the final sowing list is known. To minimise the risk of damage by cabbage stem flea beetles, adequate soil moisture and good soil/seed contact is vital to promote rapid establishment so that plants quickly pass through the vulnerable early seedling stage. Where possible the drilling of the trial should be timed to coincide with that of the surrounding farm crop.

At all times, trial managers should take all permitted action to control or reduce pest damage. The Trials Organiser must be consulted about any actions required.

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 Plots must be laid out to allow swathing prior to harvest of the non-SD blocks without damaging the SD blocks (which must be cut direct).

C.3.5 **Confirmation of trial layout**

C.3.5.1. After full establishment and within two months 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. The location of the access gates should utilise the navigation platform What3Words.com
- 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 importance of sulphur nutrition and must apply sulphur to trials unless these are situated in areas of high sulphur deposition. Application of a minimum of 60 kg S/ha as granular compounds should be made in the early spring. Growing Trial Operators should be aware of the implications of other nutrient requirements and should be prepared to apply an appropriate treatment.

Nitrogen fertiliser should not be applied after the yellow bud stage (3.7) has commenced on the earliest variety/ies.

C.4.3 **Herbicides**

Chemicals must not be used if there are any known varietal sensitivities. If in doubt, the Trials Organiser should be consulted. Any sensitivity to herbicides to be reported to the Trials Organiser.

Products containing bifenox should not be used.

C.4.4 **Growth regulators**

Plant growth regulators must not be used.

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, seed weevil and pod midge. Where there is a risk of significant flea beetle attack Growing Trial Operators must ensure that adequate pre- and post-emergence 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

Seed may or may not be treated. Details enclosed with the seed. The trials will be fungicide treated, following the protocol as specified in Appendix 10. Disease observation plots will not receive fungicide treatment and disease records will be taken from these plots.

C.4.6 **Irrigation**

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

C.4.7 **Pathways**

Internal gangways should be made after the risk of pigeon damage has passed, usually mid stem-extension.

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 as early as possible and no later than mid-stem extension to avoid damage to remaining plants. 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 must be recorded and should be no less than 66% of the total plot length.

If necessary, plots should be separated by hand or machine, it is the Growing Trial Operator's responsibility to ensure plots are separated adequately as required without causing damage, ideally in one direction, particularly if lodging is present, to avoid possible damage or loss of plants prior to desiccation.

C.5.2 **Harvesting method**

Non semi-dwarf varieties may be swathed or desiccated (preferably using a translocated desiccant such as glyphosate) and combined direct at the discretion of the trial manager and depending on the state of the crop after flowering. Semi-dwarf blocks will not normally be swathed irrespective of the decision for the rest of the trial, but if they can be swathed without losing any pods/seed and leave adequate swath permission may be sought in advance to do so. The Trials Coordinator will require evidence (measurements/ photographs) both prior to and after swathing to show that the semi-dwarf varieties will not be/have not been penalised by swathing.

Equipment to conduct either technique must be available to the trial manager at the optimum time. The trial manager must indicate in the trial workbook which technique has been used, giving the reason for his/her choice.

Notify the Trials Organiser that harvest has taken place on the day of harvest, or first thing the following day. Yield with dry matter should be returned within 5 days of the harvest trial, together with outstanding data. If dry matters are being conducted by NIAB, yield data should be returned within 2 days.

Side knives must not be used.

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 grain from the previous plot.
- Are taken from the same source.

- Contain the weight of grain requested.

C.5.3.2 Two samples must be taken from each plot at harvest. A 200g 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 100g sample is taken, 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 bags and the second labels 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**	Including full location details: 1) a map of site location showing nearby settlements and roads 2) a sketch showing the layout of trials in the field with access points and 3) trial layout, showing plot numbers and variety codes/names.
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 variety 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 designated as exceptional by the recorder should be designated 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 VL 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 either by oven method or an approved 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 **STANDING ABILITY from all plots** **(OBLIGATORY)** **(1-9)**

1 completely lodged
9 no lodging

Lodging should be recorded at or just after flowering.

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 this time.

C.6.3.4 *WINTER HARDINESS from all plots* *(ADDITIONAL)* (1-9)

1 complete loss
9 no damage

Scored following the key given in Appendix 9. Scores should be made 7-14 days after a cold period, to allow for expression of symptoms.

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 *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.6.3.7 *MATURITY from all plots* *(ADDITIONAL)* (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.6.3.8 *STEM STIFFNESS from all plots* *(ADDITIONAL)* (1-9)

1 very weak
9 very stiff

Record at or just prior to harvest. Please note that earlier lodging may have influenced this score but as the aim is to describe the canopy at harvest no allowance should be made for this. A score of 5 can describe half the plot completely flat or the whole plot leaning at 45 degrees.

C.6.3.9 **SOWING DATE of each trial** **(OBLIGATORY) (Day/month/year)**

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

C.6.3.10 **HARVEST DATE** **(OBLIGATORY) (Day/month/year)**

This is recorded in Part 2 of the Site Information Form.

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

Record after emergence is complete and give the approximate numbers of plants per metre row for extreme values used.

C.6.3.12 **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.6.3.13 **SEED LOSS from all plots** **(OBLIGATORY)** **(1-9)**

1 severe seed loss
9 no seed loss

This must be recorded.

Record before harvest if serious loss has already occurred. Base scores either on observation of pod shattering or counts of seed on the ground. Ensure that combines are set correctly to minimise losses at harvest. Assess any serious combining losses after harvest.

C.6.3.14 **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.6.3.15 **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 and provide full location and site details (if not already given with site data 1).
2. To supply the inspector with information (for example sprays 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 **Disease observation plots**

D.1.2 The Pathology Trials Operator appointed by APHA is responsible for carrying out these procedures.

D.1.3 Disease observation plots (DOPs) are small drilled plots specifically sited in disease prone areas, where they are at high risk from natural infection. Sites may be in farm crops or adjacent to trials, but in either situation must be kept free of fungicides. NL2 candidate varieties, together with standard varieties of known resistance, are sown in DOPs. Plots are usually unreplicated but sometimes comprise 2 replications.

The precise location of sites may vary from year to year but these must be made known to the Trial Inspection and Technical Validation Operators with a month of sowing.

The number of DOP sites (including Scotland and N. Ireland) is reviewed annually.

D.2 Naturally occurring disease in VCU growing trials

D.2.1 The Growing Trial Operator is responsible for carrying out these procedures.

D.2.2 Disease Observation Plots (DOPs) will be grown with no fungicide treatment. Where the DOP's are sown adjacent to the fungicide treated replicates, a barrier of at least 6 m of untreated crop should be left between the treated and untreated plots to prevent spray drift. The plot size should be a minimum of 1.5 m^2. Disease Observation Plots are not taken to yield and are only used for the recording of natural disease infection. DOPs are only sown on sites where a natural occurring disease is reliably observed each season.

D.2.3 **Diseases recorded**

D.2.3.1 The following diseases should be recorded routinely on the whole trial if in any plots they reach the infection level of 5%. Record Turnip Yellow if there is a visible effect on the crop.

		Leaf production	Early stem extension	Yellow bud stage	Late flower	Prior to pod ripening	Harvest
Light leaf spot %	- on leaves	√	√	√	√		
	- on pods					√	
Downy mildew %		√	√	√			
Phoma leaf spot%		√	√				
Alternaria %	- on leaves			√	√		
	- on pods					√	
White leaf spot %		√	√		√		
Sclerotinia %					√	√	
Botrytis %					√	√	
Powdery mildew %				√	√	√	
Verticillium %	- on stems					√	√

D.3 Recording methods

D.3.1 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.

D.3.2 If club root is present report to Trials Organiser, see Appendix 8.

D.4 Inoculated disease tests

D.4.1 Inoculated disease tests are carried out routinely on year 1 and 2 varieties

D.4.2 **Stem canker**

D.4.2.1 Inoculum

Infected plant residues are collected from trials and crops in various parts of the UK after harvest and stored in well ventilated plastic bags or net sacks outdoors but sheltered from rain. The inoculum should reflect the diversity of the fungal population found in the UK.

D.4.2.2 Inoculation

Infected stem pieces are placed in small plots (3 rows of approximately 4 metres) at a rate of 3 pieces per m^2 at the 2-4 leaf stage. Irrigation is applied to disperse inoculum and encourage infection during dry weather.

D.4.2.3 Assessment

Phoma leaf spot is observed during the autumn and winter as an indicator of successful infection. Stem canker is assessed during the latter half of June on either 30 or 50 stems per plot in two separate trials each of four replicates using the method of Newman and Bailey (1987) incorporating internal and external infection symptoms.

D.4.3 **Light leaf spot**

D.4.3.1 Inoculum

The inoculum for stem canker (D.4.2.1) can sometimes be sufficient to cause infection with light leaf spot, but it is often necessary to inoculate with a spray of a spore suspension In addition, a light leaf spot susceptible variety is sown down the centre of each of the two small plot trials.

D.4.3.2 Inoculation

As for stem canker (D.4.2.2), and a suspension of conidia at 10^6 spores/ml applied in October/November. The spores should be collected from different regions in the UK and can be washed from leaves and frozen for storage.

D.4.3.3 Assessment

Infection levels are recorded using the key in Appendix 8 at 14-to-21-day intervals from the first appearance of symptoms until pod formation and ripening. The latter scores are made on pod material only. Scores may be omitted if no disease increase has occurred.

D.5 Additional VCU character tests

D.5.1 **Club root of winter oilseed rape**

The test is only performed for those varieties for which breeders' claim resistance, and/or make a request for the test.

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 105g sample of seed (±5g) is placed in the drier which must be at a temperature of 100 ºC ± 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.

Trials on moisture content determination by conductance moisture meters have been carried out versus oven test methods and specific advice on their use is available from the Trials Organiser.

Moisture meters can be used below a content of 11%, after which the oven method would be required.

The moisture meters must pass the annual certification by the manufacturer.

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)).

E.2.2.2 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.

E2.2.3 An alternative analytical procedure based on High Performance Liquid Chromatography (HPLC) is also permitted. The standard procedure is given in 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.

E.2.4 **Erucic acid and oleic acid determination**

The method is basically methylation of fatty acids as ISO 12966-2:2011 (section 6) followed by gas liquid chromatography as ISO 12966-1:2014.

For expediency a crude oil extract is prepared by immersing 5 g of milled rapeseed in 25 ml n-Heptane. The mixture is swirled and allowed to extract overnight. A sample of the clear supernatant is used directly in ISO 5509:1978 (section 6) as if it were the test portion re-dissolved in n-Heptane. A single determination is normally performed.

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

Appendix 1 – Approved Trial Organisers/ Operators for winter oilseed rape

Activity	Organisers / Operators Responsible
Trials Organiser	BSPB
Seed Handling Operator	NIAB
Data Handling Operator	NIAB
Pathology Trials Operator	NIAB
Trial Inspection	AHDB Cereals and Oilseeds
Technical Validation Operator	AHDB Cereals and Oilseeds
Quality Testing Operator	NIAB
Data Review and Standard Setting Operator	NIAB

Appendix 2 – Seed treatment products for use on VL trials

To be advised

Appendix 3 – Seed despatch deadline dates

VCU seed must be delivered to NIAB Seed Handling Unit by 10 August

Appendix 4 – 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
Scottish Agronomy	NIAB, SHU	Kirton, Fife
NIAB		Thorne, Yorkshire
Elsoms Seeds Ltd	NIAB. SHU	Harlaxton, Nottinghamshire
Limagrain UK Ltd	NIAB, SHU	Moortown, Lincolnshire
Elsoms Seeds Ltd (NL2 only reserve)	NIAB, SHU	Spalding, (Direct sown)
Elsoms Seeds Ltd	NIAB, SHU	Thorney Peterborough
John Innes Centre		Norfolk
Saaten Union UK Ltd	NIAB, SHU	Cowlinge, Suffolk
NIAB		Telford, Shropshire
NIAB		Callow, Herefordshire
NIAB (NL2 only)		Marlborough, Wiltshire
NIAB (NL2 only)		Birchington, Kent
NIAB		Broughton, Hampshire
KWS UK Ltd	NIAB, SHU	Framlingham, Suffolk
LS Plant Breeding (NL2 only Reserve)	NIAB, SHU	Wisbech, Cambridgeshire
SRUC (NL2 only)	NIAB, SHU	Mid-Lothian
SRUC (NL2 only)	NIAB, SHU	Angus, Aberdeenshire
NIAB (NL2 only)		Croft, North Yorkshire

Growing Trial Operator	Seed Handling Operator (If not Trial Operator)	Location of trial
NIAB (NL2 only)		Berwick, Northumberland
Scottish Agronomy	NIAB, SHU	Scottish Borders

2. Pathology Trials Operator

Pathology Trials Operator	Location of trial
NIAB	Cambridgeshire

Appendix 5 – Control varieties for VCU assessments

Variety	Yield controls
Aurelia	Yield control (Hybrid) and buffer
Ambassador	Yield control (Hybrid)
Aspire	Yield control (Conventional) and buffer
DK Expansion	Yield control (Hybrid)
PT303	Yield control (Hybrid)
Resort	High erucic control required only if candidates entered
PT279CL	NL2 Clearfield comparator
Matrix CL	NL1 Clearfield comparator
V316OL	Holl Comparator

Variety	Disease controls
DK Exsteel	light leaf spot resistance
PT279CL	light leaf spot susceptible
Aspire	Yield control (Conventional) and buffer
Resort	High erucic control required only if candidates entered
Aurelia	Yield control (Hybrid) and buffer
Nikita	stem canker susceptible and light leaf spot resistance
Crome	stem canker susceptible
DK Expansion	stem canker resistance
Crocodile	stem canker susceptible
Croozer	stem canker resistance
DK Explicit	stem canker resistance
Nizza CL	light leaf spot susceptible pathology benchmark

Appendix 6 – Dates for submission of data

To Trials Organiser

Record	Latest date of receipt by Trials Organiser
Site data part 1 (including site sketch)	Within 2 months 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

Plot Records to Data Handling Operator

Record	Date
Plot records	Non-yield field data: Within 10 days of record being taken or by date of harvest. Yield and moisture data: Within 3 days of harvest date. Quality data: Within 3 days of receipt of samples.

Plot samples to Quality Testing Operator

Samples	Date
Plot samples for quality testing	Within 2 days of harvest.

Appendix 7 – Growth stages of oilseed rape

Main Growth Stage	Growth stage	Description of Growth Stage
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
Flower bud 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

Main Growth Stage	Growth stage	Description of Growth Stage
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

Appendix 8 – Assessment of oilseed rape diseases

Use for assessing light leaf spot, Alternaria, downy 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.

% Infection	Leaves	Pods
0	No infection observable	No infection observable
0.1	Trace of infection	Trace of infection
1	Diseased leaves with 1 small lesion; plants with a few scattered lesions	Terminal raceme with a few scattered lesions
5	Leaves appear 1/10 infected; diseased leaves with 2 lesions	Terminal raceme appears 1/10 infected; diseased pods with 1 or 2 lesions
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
25	Area appears ½ infected ½ green	Area appears ½ infected ½ green
50	Area appears more infected than green	Area appears more infected than green
75	Very little green tissue left	Very little green tissue left
100	Leaves/pods dead - no green tissue left	Leaves/pods dead - no green tissue left

Other disease assessments:

Club root
Any suspected club root in trials should be confirmed by sampling 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.**

Verticilium %
Should be assessed as the % of stems infected within a plot when the symptoms are clearly visible. Its presence should be notified to the co-ordinators.

Appendix 9 – Winter hardiness assessment key

This is scored on a 1-9 scale. A high figure shows good winter hardiness

1. Total loss of plant
2. Very severe leaf damage, up to 75% loss of plants
3. Very severe leaf damage, up to 50% loss of plants
4. Severe leaf damage, severe leaf loss, up to 25% loss of plants estimated
5. Severe leaf damage, loss of lower leaves and slight loss of plants
6. Severe leaf scorch, loss of lower leaves
7. Moderate leaf scorch
8. Slight to very slight leaf scorch
9. No damage

Appendix 10 – Fungicide and early insecticide protocol for winter oilseed rape variety trials 2023

Last updated: August 2022

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

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

This programme is for use on AHDB Recommended List and National List winter oilseed rape trials in 2023:

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

It is an experimental protocol and is designed to meet the protocol aim of keeping disease levels in treated plots as low as is possible in all varieties and in all trials. It is not intended to follow commercial practice.

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

Fungicides should be applied at the stated dose rates unless agreed otherwise with the regional advisors via the RL Trials Co-ordinator. Changes to dose rates will only be sanctioned in exceptional circumstances.

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

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

Important: Every care has been taken to ensure that all mixtures, rates and timings are approved, meeting COSSH regulations and manufacturer's guidelines. However, it is the responsibility of the Trial Manager to ensure that they meet all current regulations at the time of application. The Trials Co-ordinators should be notified of any conflict between the protocol and current regulations.

Products, active substances and manufacturers

Product	Type	Active substance	Amount of active substance	Manufacturer
Filan	Fungicide	Boscalid	50% w/w	BASF
Hallmark Zeon	Insecticide	Lambda-cyhalothrin and 1,2-benzisothiazolin-3-one	100 g/l	Syngenta
Pictor	Fungicide	Boscalid + Dimoxystrobin	200:200 g/l	BASF

Proline 275	Fungicide	Prothioconazole	275 g/l	Bayer

WINTER OILSEED RAPE - SPRING 2023

Fungicide Protocol for the North and East/West regions

Target	Treatment timing	Product / active ingredient	Rate
Target Foliar diseases	Onset of spring growth prior to stem extension	Proline 275	0.63 l/ha
Target Alternaria, Botrytis and Scierotinia	Onset of spring growth prior to stem extension	Pictor	0.375 - 0.5 l/ha*
To target sclerotinia	Onset of spring growth prior to stem extension	Pictor	0.375 - 0.5 l/ha*

***Note:** If there is a strong likelihood that soil or weather conditions will prohibit the application of the second Pictor spray, then apply full rate Pictor at this timing (maximum of 0.5 l/he permitted).

Note: G.S.4.5 - 5.0 (up to 3 weeks later or just prior to 50% of pods at final size (G.S.75 BBCH)

Note: a fungicide application for Sclerotinia control should be applied to untreated trials especially where these trials are taken to yield.

Appendix 11 - ADDITIONAL OILSEED RAPE CLUB ROOT TESTING IN GLASSHOUSE

Procedure

1. Aims of Test

This test is to confirm the level of resistance to non-'Mendel' resistance-breaking isolates of Clubroot only, until other sources of resistance to the 'Mendel' breaking strains are reported.

All current varieties with Clubroot resistance possess a single, monogenic, dominant gene which gives their resistance, and they all rely on this single gene.

The original resistant variety was 'Mendel' and all current varieties giving resistance to Clubroot are said to exhibit 'Mendel' resistance.

Only non-'Mendel' resistance-breaking isolates of Clubroot shall be used in the test until other sources of resistance are reported.

The presence of only non-'Mendel' resistance-breaking isolates of Clubroot in the test shall be confirmed in the control varieties.

2. Preparation of spores

Characterised non-'Mendel' resistance-breaking isolates of Clubroot galls in the freezer in centrifuge room - unit 33, labelled galls for future experiments.

Grind up the spores using an ultra turrex homogeniser (best to use the metal adapters). Chop up the galls and put in a 15ml plastic tube and add a few ml of water to cover the galls.

Homogenise until the galls are ground up.

Filter this suspension into another 50ml tube through 2 layers of wet muslin. Centrifuge the filtered suspension at 100g for 5 min. This step removes the large starch granules, the club root spores are in the supernatant.

Carry out a count using an improved Neubauer Haemocytometer (e.g. disposable units). Identify the large square in the centre of the grid and the 25 medium squares within it (each of the medium squares contains 20 smaller squares). Count the number of spores in 10 medium squares and take

Calculation can then be made of the dilution required to get a count of 2 x 105 spores per ml to apply to the plants as a root drench 50mls of this concentration to be applied to each pot.

3. Inoculation of compost with club root spores

Compost, John Innes no.3 pre-treated with club root spores before planting seed. Pot size 9 x 9 x 8 cm. Apply 50 ml of club root spores at conc. of 2 x 105 spores per ml per pot. Plant several pre-treated seeds per pot and thin down to 1 plant per pot.

A susceptible control oil seed rape variety e.g. Anastasia.

A resistant control oil seed rape variety e.g. Crocodile.

Controlled environment growth room to be used. Temperature for club root development should be a minimum of 18°C. Phytotoxicity is to be recorded weekly. Assessment 8 weeks after planting.

4. Club Root severity scale

The scale has a zero score and up to 3 club root levels. Roots are evaluated for the severity of clubroot symptoms on a 0 to 3 scale as follows:

0 = no galling,

1 = few small galls (small galls on less than one-third of the roots),

2 = moderate galling (small to medium galls in one third to two-thirds of the roots),

3 = severe galling (medium to large galls in more than two thirds of the roots).

The severity ratings are used to calculate the disease severity index (DSI) for each line using the formula:

$$r = \frac{\sum(((a*0)+(b*1)+(c*2)+(d*3))*100)}{\text{number of reps}}$$

Where

r = disease severity rating

a = number of plants with score 0

b = number of plants with score 1

c = number of plants with score 2

d = number of plants with score 3

5. Data and analysis

Data for each replicate control and candidate are to be sent to Louise Everest at BSPB for subsequent collation into the final report.

WINTER OILSEED RAPE - Autumn 2023 (for the 2023/24 harvest year).

Insecticide Protocol – both North and East/West regions

IMPORTANT: FLEA BEETLE

If, during the establishment period, AHDB thresholds are exceeded or if the crop is growing more slowly than it is being destroyed, apply Hallmark Zeon (75 ml/ha) and repeat in 10-14 days if necessary. If, after using Hallmark, control is poor, a repeat spray should NOT be applied. Do not apply Hallmark if an insecticide with an alternative mode of action is authorised. Trial Managers must check with a BASIS qualified advisor before application.

APHIDS: Apply Teppeki (0.1 kg/ha) up to 8 true leaves unfolded at the first fungicide timing to control the peach-potato aphid vectors if populations are high as indicated in AHDB Aphid News (ahdb.org.uk/aphidnews).

This publication is available at www.gov.uk/government/publications

Any enquiries regarding this publication should be sent to us at

webmaster@apha.gov.uk

www.gov.uk/apha

The Animal and Plant Health Agency (APHA) is an executive agency of the Department for Environment, Food & Rural Affairs, and also works on behalf of the Scottish Government and Welsh Government.