



Animal &
Plant Health
Agency

Great Britain and Northern Ireland Variety List Trials: Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) Harvest 2026

Fodder Kale

May 2025

Changes since last version

- Title changed from United Kingdom to Great Britain and Northern Ireland
- A.3.2.1 Jeremy Widdowson details removed

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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 Field Beans.

A.2 Scope

A.2.1 These procedures apply to all varieties of Fodder Kale.

A.3 Responsibilities

A.3.1 Procedures Developments 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 Trials Organisers and Operators

A.3.2.1 Trails Organisers

a) England and Wales

British Society of Plant Breeders Ltd (BSPB)

BSPB House

114 Lancaster Way Business Park

Ely

Cambs.

CB6 3NX

Tel No: 01353 653200

Email: bspb-trials@bspb.co.uk

a) Scotland

SASA

Roddinglaw Road

Rdinburg

EH12 9FJ

Cambs.
CB6 3NX

Tel No: 0131 2448899
Email: seeds@sasa.gov.scot

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 Seed Handling Operators who are able to carry out seed handling. Seed Handling Operators prepare trial seed for sowing on behalf of any Growing Trial Operator 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 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 a 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 A.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 Handling of trial seed

A.3.5.1 The Trials Organiser is responsible for organising the handling 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 fit for the purpose. Seed treatment products are listed in Appendix 2.

A.3.6 Dispatch of seed

A.3.6.1 The Trials Organiser will arrange for seed to be dispatched by the agreed deadlines to the Growing Trial Operators, and, for authentication, to the DUS testing centres including, where appropriate, foreign testing authorities.

A.3.7 Monitoring of VCU Growing Trial Operators and Seed Handling Operators – 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.3.9 Labelling of seed

A.3.9.1 The Trials Organiser 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

A.4 Summary of growing trials, tests, and assessments 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 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 Special tests

An additional test for characters not specified in the procedures may be requested by the applicant. APHA is responsible for liaison with the Trials Organisers to produce a procedure for the conduct of a special test or trial. This procedure would require the approval of the National Authorities

A.4.4 Summary of VCU trial assessments required

Bold = Obligatory *Italic = Additional if requested by the applicant*

Type of character	Reference	Description of assessment - Obligatory
Yield	Section C	*Plot yield Moisture content
Resistance to harmful organisms	Section D	Powdery mildew <i>Club Root</i>
Behaviour with respect to factors in the physical environment	Section C	Plant population Flowering date <i>Establishment</i> <i>Height</i> <i>Lodging</i> <i>Stem rotting</i> <i>Leafiness</i> <i>Winter hardiness</i> <i>Re-growth</i>
Quality characteristics	Section E	Dry matter content

A.4.4.1 Further measurements

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

Sowing date

Harvest date

Plot size

Harvest losses (where present at level which will affect results)

Fresh yield

Section B – Seed handling procedures

B.1 Seed handling procedures

B.1.1 See GENERAL INFORMATION, SECTION 5 - Minor Crop VCU Procedures Introduction.

B.2 Authentication of VCU seed

B.2.1 The Seed Handling Operator must forward 50 g 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.

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 should follow best practice i.e. no brassicas grown in the previous two years.

C.2.3 Soil type should be typical of those on which kale are 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 wild fauna.

C.2.5 The trial area should be cultivated in the direction of ploughing and drilled across the direction of ploughing and cultivation such that each plot receives similar treatments. Cultivations should follow best practice.

C.2.6 The frequency, direction and approximate date of all cultivations carried out since the last crop should be recorded in the site details record sheet.

C.3 Sowing the trial

C.3.1 Plot size

C.3.1.1 Plot should be drilled to a greater length than required and then trimmed back to appropriate length. The plot size should be sown to allow a minimum target harvest plot after trimming, of 10 m². There will be a minimum of three replicates sown. Replicates are dependent on the number of varieties to be tested.

C.3.2 Plant population

C.3.2.1 Drilling should achieve a target final uniform plant population of 20-60 plants per m².

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 Trial Design and Data Handling Operator.

C.3.3.2 The trial should be sown according to the plan produced by the Trial Design and 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.3.3.3 Buffer plots may be required in some instances. The Trials Organiser will advise if this is the case.

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 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.3.4.2 At least two rows of discard should be drilled on either side of the trial with the same drill and while the trial is drilled

C.3.4.3 Precautions must be taken to avoid any missing rows. Any missing rows or parts of rows must be noted on the drilling plan and reported to the Trials Organiser within one month of emergence.

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 Trial Design and 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.

C.4.2 Fertiliser and spray application

Applications of fertilisers and sprays should be uniform. It is normally best to apply these across the direction of the plots. The precision application of chemicals post-drilling down the rows is permitted where appropriate, but wheeling's within or between plots post drilling are not acceptable unless they consistently occur in the same place in each plot.

C.4.3 Fertiliser application

Applications of fertilisers 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.

C.4.4 Herbicides

The Trials Organiser must be consulted. Application should be across the direction of drilling.

C.4.5 Pest and disease control

C.4.5.1 Pest control

Appropriate seed dressings must be applied as approved by the Trials Organiser. The chemical seed treatment applied to the trial seed should control some soil-borne pests and may provide some early-season control of insect-borne-virus vectors. However, appropriate pesticide treatments should be undertaken to control virus vectors through the season. Precautions should be taken against attacks by, for example, birds, deer, rabbits, hares, mice, and insects.

C.4.5.2 Disease control

Seedling diseases should be controlled by the routine seed-dressings used and viruses should be controlled by targeting their insect-vectors (see C.4.5.1 above).

C.4.6 Irrigation

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

C.4.8 Plot assessment

Plots should be assessed at the time of the population count to determine whether they are suitable for harvest. Weak plots may occur due to mechanical or varietal problems. If the problem is considered to be varietal the plots must remain as part of the trial. If the problem is considered to be mechanical the plots should either be treated as missing or as half plots.

Plots affected should be notified to the Trials Organiser at the time of detection

C.4.8.1 Half plots – plots with gaps or poor uniformity may occur

If plots have gaps due to mechanical or agronomic problems, it may be necessary to eliminate the poor area by reducing the plot to a uniform length. Removal must be across all rows - whole rows cannot be discarded. These plots should be measured and pegged at the time of the population counts.

C.4.8.2 Missing plots – plots with gaps or poor uniformity may occur

If plots are weak due to mechanical or agronomic problems throughout their entire length, it may be necessary to make the plots missing. These plots should be pegged at the time of the population counts and a symbol should be entered in subsequent data records (see C.6.2.5). The plots should be clearly indicated when the data is sent to the Trial Design and Data Handling Operator.

C.5 Harvesting

C.5.1 Timing of harvesting

C.5.1.1 Date of harvesting will be according to a schedule which will be drawn up by the Trials Organiser after consultation with the Growing Trial Operators. Trials should normally be harvested around twenty weeks after drilling.

C.5.1.2 Plots should be trimmed to their final harvest length as described in C.4.7 above. The plot dimensions must be measured prior to harvesting. If it is necessary to reduce the harvest size as described in C.4.8.1 above, give clear details with the yield file. Individual harvested plot lengths should be recorded.

C.5.2 Harvesting method

C.5.2.1 All trials will be harvested by harvesting equipment approved by the Trials Organiser.

C.5.3 Samples

C.5.3.1 A sample of the chopped material (minimum 500 g) should be taken for dry matter analysis from each plot. A composite sample from all rows should be taken. Make every attempt to ensure that the sample is well mixed and representative of the plot.

C.5.3.2 All samples should be labelled with the labels provided by the Trials Organiser.

C.5.3.3 The samples should be delivered to the appropriate Quality Testing Operator as soon as practical after harvest.

C.5.3.4 All plot samples must be labelled with the 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 Trial Design and 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, recording and inspections

2. ***Site data part 1**

- 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

3. ***Site data part 2**

Details of agrochemical applications and irrigation.

4. **Plot records**

Plot data

- 1 Least leafy
- 9 Most leafy

C.6.3.13 *WINTER HARDINESS* from all plots (ADDITIONAL) (1-9)

- 1 Complete loss
- 9 No damage

Scored following the key given in Appendix 8. Scores should be made 7-14 days after a cold period, to allow for expression of symptoms.

C.6.3.14 *RESISTANCE TO STEM ROTTING* from all plots (ADDITIONAL) (1-9)

- 1 All stems rotting
- 9 No stems rotting

C.6.3.15 *RE-GROWTH* from all plots (ADDITIONAL) (1-9)

Record the incidence of axillary side shoots where:

- 1 None
- 9 Extensive

C.6.3.16 **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 either as an estimated % of plants affected, or as % leaf area attacked in accordance with the procedure in Section D for disease.

Records for other scores should be taken as % plants affected or on a 1 to 9 scale. Include definitions of 1 to 9 on the scale.

C.6.3.17 **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 to:

1. Give inspectors reasonable access to trials and provide full location and site details (if not already given with site data 1)
2. Provide the inspector with information (for example pesticide sprays applied etc) within 7 days of a request
3. Co-operate with the inspector in making any non-routine assessments required to establish the validity of the trial (for example population counts)

4. Carry out any action agreed in consultation with the inspector. 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 Naturally occurring disease in VCU growing trials

D.1.2.1 Naturally occurring disease is normally recorded in the growing trials. Confirmation of the identity of a disease should be obtained from an appropriate plant pathologist if required.

D.1.2.2 **Recording methods**

D.1.2.3 Diseases are assessed using the timings and appropriate assessment keys given in Appendix 7. All disease records to be sent to the appropriate Trial Design and Data Handling Operator as soon as they are made.

D.1.2.4 If club root is present report to Trials Organiser who will provide instructions.

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. The Growing Trial Operators are responsible for producing representative samples for quality assessment as indicated in Section C.

E.2 Quality assessment methodology for obligatory and additional tests

E.2.1 Dry weight determination

The treatment of samples and the time interval between cutting and weighing should be such that there is no significant moisture loss between the weighing of the plot fresh yield and the weighing of the fresh weight of the sample.

A fully representative sub-sample (min 500 g) of well chopped fresh material is accurately weighed, or an accurately recorded catch weight (min 500 g recorded to one decimal place) taken. Although in some instances all of the sampling and weighing of fresh material may be carried out in the field, it is acceptable for samples to be brought to the laboratory for weighing. If the latter option is followed the representative sample is immediately sealed in a 500-gauge polythene bag and kept out of direct sunlight and as cool as possible until transported to the laboratory. Each sample is identified with a label.

The sample is placed in the drier which must be at a temperature of $100\text{ }^{\circ}\text{C} \pm 4\text{ }^{\circ}\text{C}$ with the air re-circulator set in the range 80-100% recirculation to restore the temperature to $100\text{ }^{\circ}\text{C} \pm 4\text{ }^{\circ}\text{C}$ as rapidly as possible. When the temperature is restored to $100\text{ }^{\circ}\text{C} \pm 4\text{ }^{\circ}\text{C}$ the air regulator is set at 80% recirculation i.e., 20% fresh hot air. The air regulator is critical for even rapid drying. The samples are dried $100\text{ }^{\circ}\text{C} \pm 4\text{ }^{\circ}\text{C}$ for such time as is necessary for complete drying.

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.

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

F.1.2 The Trial Design and 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, cultivations, soil details, fertiliser and agrochemical applications.

F.2.3 Details of any agrochemical applications are also recorded and forwarded to the Trials Organiser.

F.3 Data processing

F.3.1 Processing of individual agronomic and disease variates

F.3.2 A list of the agronomic, yield and disease variates, which may be recorded and processed, are specified in Sections C, D and E. After scrutiny, copies of the results will be returned to the Growing Trial Operator for action as agreed by the Trials Organiser.

F.4 Other tests and trials

F.4.1 Any additional or alternative designs required for the assessment of additional VCU characters not detailed in Annex E of the MINOR CROPS VCU TRIAL PROTOCOL will be added to these Procedures as and when approved by the NLSC.

Supporting Document for Appendices

Appendices for this main procedure are stored in a separate document, which is updated closer to the start of the growing trial to include the latest information on controls and trial organisers. This will be published on [VCU protocols and procedures for testing agricultural crops - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/614222/vcu_protocols_and_procedures_for_testing_agricultural_crops.pdf)



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