



Animal &
Plant Health
Agency

Great Britain and Northern Ireland Variety Lists & UK Plant Breeders' Rights Technical Protocol for Official Examination of Distinctness, Uniformity and Stability (DUS)

Fodder kale

***Brassica oleracea* L.convar.acephala(DC.)
Alef.var.medullosa Thell+Var viridis L.**

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Changes since last version

- No changes since last version.

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Section A – General Information

A.1 Purpose

A.1.1 This Protocol sets out the procedures for conducting tests and assessments in relation to official examinations of DUS, maintenance of reference stocks and verification of VCU submissions of varieties of Fodder Kale entered for Variety Listing (VL) trials and Plant Breeders' Rights (PBR).

A.2 Scope

A.2.1 These procedures apply to all varieties of Fodder Kale. Special procedures and responsibilities for Genetically Modified (GN) varieties are set out in Sections A5 and A6.

A.2.2 Except where specified in this protocol or authorised by the Plant Variety Rights Office for the UK, Animal and Plant Health Agency (APHA); only Variety List candidates, Plant Breeders' Rights candidates, candidates for Foreign Authorities and the reference varieties may be incorporated in the DUS tests.

A.3 Responsibilities

A.3.1 The growing tests and assessments in this protocol are carried out under the responsibility of the Secretary of State for Environment, Food and Rural Affairs, Scottish Ministers, Welsh Ministers and the Minister for Agriculture, Environment and Rural Affairs in Northern Ireland (the National Authorities).

A.3.2 They are supervised, on behalf of the National Authorities, by officials of the Testing Authorities: APHA; the Scottish Government (SG); the Department of Agriculture, Environment and Rural Affairs (DAERA); and the Welsh Government (WG).

A.3.3 This protocol is authorised by the Plant Variety and Seeds Committee (PVSC). It cannot be amended without its approval. Requests and suggestions for amendment of the protocol should be put in writing to APHA or the Test Centre.

A.3.4 The procedures are administered by:

Plant Variety Rights Office for the UK

Animal and Plant Health Agency

Eastbrook

Shaftesbury Road

Cambridge.

CB2 8DR

Email: pvs.helpdesk@apha.gov.uk

A.3.5 Test Centre

The DUS growing tests and assessments in this protocol are coordinated and carried out by:

Niab

Barn 1 Park Farm

Villa Road

Impington

Cambridge

CB24 9NZ

Tel No.: 01223 342200

Email address: DUStesting@niab.com

A.3.6 The Test Centre is responsible for providing the appropriate facilities

A.4 Non-Compliance with the Protocol

A.4.1 Where the protocol uses the word “must” for any action then failure to carry out this action will result in non-compliance. Where non-compliance occurs or there are concerns regarding the validity of any data or tests this must be reported to APHA. Where this protocol uses the word “should” for any action this is the method to be followed unless there are clear technical reasons which can be justified by the Test Centre.

A.5 Responsibility for GM Releases

A.5.1 GM Release Consent Holders are responsible for GM releases. All parties involved in DUS work operating under a GM Release Consent must adhere to the instructions of the Release Consent where necessary, to comply with the relevant consent conditions. Where DUS protocol non-compliance occurs, this must be reported to the consent holder and the Test Centre who will notify APHA.

A.6 Procedures for GM Varieties

A.6.1 Applicants intending to enter GM candidates must consult APHA, well in advance of their application, about specific requirements under GM regulations.

A.6.2 The Test Centre must ensure that no test or trial sites are planted with GM candidates and/or varieties until APHA has given the specific clearances.

A.7 Associated Documents

A.7.1 The following documents are associated with this protocol.

Reference	Title
Fodder Kale VCU Procedure and Protocol	United Kingdom Variety List Trials: Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) of Fodder Kale
UPOV TG/1/3	General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonised Descriptions of New Varieties of Plants (19.04.2002)
UPOV TGP/8/4	Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability (01.11.2019)
UPOV TGP/9/2	Examining Distinctness (29.10.2015)
UPOV TGP/10/2	Examining Uniformity (01.11.2019)
UPOV TG/90/7	Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, Kale (B Brassica oleracea L. var. costata DC.; Brassica oleracea L. var. medullosa Thell.; Brassica oleracea L. var. sabellica L.; Brassica oleracea L. var. viridis L.; Brassica oleracea L. var. palmifolia DC.) (24.10.2023)
GB and NI Variety Lists	The Seeds (National Lists of Varieties) Regulations 2001 (as amended) and The Seeds (Variety Lists) Regulations (Northern Ireland) 2020
Plant Varieties Act 1997	Plant Breeders' Rights Regulations 1998 and Plant Varieties Act 1997
Plant Breeders' Rights 2019	The Plant Breeders' Rights (Amendment etc.) (EU Exit) Regulations 2019 as amended by The Animal Health, Invasive Alien Species, Plant Breeders' Rights and Seeds (Amendment etc.) (EU Exit) Regulations 2019 and The Plant Breeders' Rights (Amendment) (EU Exit) Regulations 2020

Section B – Application Requirements

B.1 Purpose

B.1.1 The purpose of this section is to identify the specific requirements for Variety Listing and/or Plant Breeders' Rights applications, as appropriate.

B.2 Scope

B.2.1 These procedures apply to all applications.

B.2.2 Testing will be carried out according to these procedures. Any changes to the procedures (including new characteristics) should be agreed in advance of submitting an application, by contacting APHA.

B.3 Responsibilities

B.3.1 The applicants are responsible for ensuring that these procedures are complied with.

B.4 Receipt of Applications

B.4.1 The latest date for receipt of applications for Variety Listing and/or for Plant Breeders' Rights is stated on the GOV website (<https://www.gov.uk/guidance/national-lists-of-agricultural-and-vegetable-crops>).

B.4.2 The procedures for the submission of Variety Listing and Plant Breeders' Rights applications, Technical Questionnaires (TQs) and for payment of administration fees can be obtained from APHA PVS at the address shown in Section A or on the GOV website (<https://www.gov.uk/guidance/national-lists-of-agricultural-and-vegetable-crops>)

B.4.3 Applicants should note in the TQ, submitted with the application, any additional characteristics which may require examinations that are listed in the DUS characteristics section D, 5.2 or 5.3 (an additional fee may be required).

B.5 Receipt of Seed

B.5.1 The latest date for receipt of seed is stated in the Seed Gazette. In the absence of exceptional circumstances, seed submissions received after this date will be refused. Instructions for the delivery of seed will be made available to applicants by APHA (<https://www.gov.uk/guidance/national-lists-of-agricultural-and-vegetable-crops>).

B.6 Seed Quality Requirements

B.6.1 The seed must satisfy the certification requirements for basic seed as laid down in the seed marketing legislation of the Devolved Administrations.

B.6.2 The seed must not be chemically treated. Seed treatment, where appropriate, will be undertaken by the test centre. The chemicals applied and rates of application will be determined by the test centre.

B.7 Seed Quantity

B.7.1 Year 1

One seed submission for VCU and DUS of 600g to be sampled for DUS as definitive stock.

B.7.2 Year 2 and Further Year Submissions

A sample of 6g (2 x 3g) of seed withdrawn from the VCU submission in year 2 and any further years to authenticate the submission.

B.7.3 Shortfall in Seed Quantities

Where insufficient seed is unavailable in the first instance a further stock should be supplied in the following year which will be authenticated against the original submission. An additional charge may be applied. This must be agreed in advance with APHA and the test centre.

B.8 Labelling Requirements, including Provisions for GM Varieties

B.8.1 Applicants must clearly label their seed, inside and outside the bag, with the following information:

- Applicant
- AFP number (if known)
- Breeder's Reference number or name
- Type of Seed (Combined submission of DUS and VCU)
- Quantity of seed

B.8.2 All packages of GM material must be labelled clearly as "GMO" or "Genetically Modified Organism".

Section C – Growing Test Procedures

C.1 Purpose

C.1.1 The purpose of this section is to provide details of the procedures used in the growing tests for DUS analysis.

C.2 Scope

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

C.3 Responsibilities

C.3.1 The Test Centre is responsible for conducting these procedures.

C. 3.2 The Test Centre will be responsible for ensuring that no material supplied to them is used for any other purpose than the conduct of these procedures or the release of reference samples for authorised purposes (See Section E7).

C.4 Reference Varieties

C.4.1 The principles governing the selection of reference varieties are set out in Appendix 1.

C.4.2 Seed of reference varieties will be supplied by the Test Centre.

C.5 Design of Tests

C.5.1 The Test Centre is responsible for selecting a suitable site which should be on ground that has not grown a seed-bearing cruciferous crop for six years or more but may be less where it has been determined the risk of contamination is negligible.

C.5.2 Crop husbandry should follow best practice for all operations and particularly as regards cultivation, drilling, fertiliser and spray application, use of irrigation and control of pests and diseases.

C.5.3 The minimum duration of tests should normally be two independent growing cycles. The National List and Seeds Committee (NLSC) must be informed on any proposed changes to the number of cycles. Tests will be carried out under conditions ensuring normal growth. The size of the plots will be such that plants or parts of plants may be

removed for measuring and counting without prejudice to the observations which must be made up to the end of the growing period.

C.5.4 From information given in the Technical Questionnaire the candidate variety may be grown in a single spaced-plant test and compared with other varieties. Fodder Kale is not grouped according to any morphological or agronomic properties, therefore all varieties in the reference collection are grown with candidate varieties.

C.5.5 Plots are sown from the submitted seed in each year of tests.

- Number of replicates: minimum of 2
- Total number of plants examined/variety: minimum of 180

In test year 2 or any subsequent years of testing, close comparisons may be made with similar submitted material. Special side-by-side comparisons may also be established in more difficult cases to help resolve problems of distinctness or study uniformity in more detail.

C.6 Records and Recording

C.6.1 All records and plot data should be in a form determined and validated by the Test Centre.

C.6.2 Characters, recording details and instructions are given in Section D. Any variant and abnormal plant or plants resulting from an adverse reaction to husbandry practice are recorded but excluded from analysis.

C.6.3 In the first test cycle, characters, as indicated in Section D, are measured on all varieties and the data analysed to assess uniformity of the candidate variety and to determine the most similar reference varieties. (For details see Section G).

C.6.4 In the second test cycle, characters, as indicated in Section D, are measured on all varieties in test and the data analysed and, together with those from the first test cycle, used to assess distinctness and uniformity of the candidate variety (for details see Section G).

C.6.5 At the end of the second year of test, candidate varieties that are not distinct may be grown in additional close comparison plots in a third year for which an additional charge will be made to the applicant.

C.6.6 If the Test Centre notices unusual or novel characters in candidate varieties they must be noted at any time and a photographic record taken.

C.7 Communications with the Applicant

C.7.1 The Test Centre will notify the applicant or the agent of any DUS problems at the earliest practical opportunity as they arise during the test. All such notifications must be copied to APHA.

C.7.2 In the case of distinctness problems, if confidentiality considerations allow, the applicant should be informed which variety is not distinct and be invited to submit any information which may help to distinguish them.

C.7.3 If DUS problems arise, applicants will be invited to visit the DUS tests by arrangement so that the material can be examined (if appropriate), and discussions held with the Test Centre.

C.7.4 After each test cycle the results are summarised and reported to the applicant and APHA by the Test Centre.

Section D – Summary of DUS Characteristics to be Assessed, Method of Assessment and Standards Applied

D.1 Purpose

D.1.1 The purpose of this section is to summarise the characteristics to be assessed.

D.2 Scope

D.2.1 The section summarises characteristics, states of expression, method of observation and standards required for DUS assessment.

D.3 Responsibilities

D.3.1 The Test Centre is responsible for coordinating the procedures in this summary of characteristics.

D.4 Organisation

D.4.1 4.1 The minimum duration of tests to assess characteristics is normally two independent growing cycles. Shorter durations may be applied for assessment of additional characteristics. Proposed changes to the number of growing cycles must be approved by the NLSC.

D.5 DUS Characteristics to be Assessed

D.5.1 Routine Characteristics

The following table summarises the DUS characteristics to be routinely examined.

Note:

- * a characteristic which must be examined according to the UPOV Guidelines.
- G a grouping characteristic.

Type of observation of characteristics:

- MG Single measurement of a group of plants or parts of plants

- MS: Measurement of a number of individual plants or parts of plants
- VG: Visual assessment by a single observation of a group of plants or parts of plants
- VS: Visual assessment by observation of individual plants or parts of plants Number of plants or sample size for assessment:
- Measured Characteristics: Sample size 60 Visually scored Characteristics: Sample size 180

D.5.2 Fodder Kale Characteristics Routinely Recorded in DUS Tests

UK	UPOV TG/90/7	Character	Sample source (Material examined)	Number of plants or sample size for assessment	Method of assessment and recording	States of expression	D Method Minimum difference	U Method
1	1*	Plant: height	DUS plot	60	MS	3 short 5 medium 7 tall	2 @ 5%	Visual assessment and F3 statistic
2	2*	Plant: position of growing point	DUS plot	180	VG	1 lower part 3 middle part 5 upper part	2 @ 5%	Visual assessment and F3 statistic
3	5	Stem: length	DUS plot	60	MS	3 short 5 medium 7 long	2 @ 5%	Visual assessment and F3 statistic
4	6	Stem: diameter	DUS plot	60	MS	3 small 5 medium 7 large	2 @ 5%	Visual assessment and F3 statistic
5	7	Stem: tendency to branch	DUS plot	180	VG	1 weak 3 medium 5 strong	2 @ 5%	Visual assessment and F3 statistic

UK	UPOV TG/90/7	Character	Sample source (Material examined)	Number of plants or sample size for assessment	Method of assessment and recording	States of expression	D Method Minimum difference	U Method
12	12*	Leaf: number of lobes	DUS plot	180	VG	1 absent or very few 3 medium 5 very many	2 @ 5%	Visual assessment and F3 statistic
13	13	Leaf: length of petiole wing	DUS plot	180	VG	3 short 5 medium 7 long	2 @ 5%	Visual assessment and F3 statistic
14	N/A	Leaf: petiole length/leaf blade width ratio	DUS plot	60	MS	3 low 5 medium 7 high	2 @ 5%	Visual assessment and F3 statistic
15	N/A	Leaf: total length of petiole and blade	DUS plot	60	MS	3 short 5 medium 7 long	2 @ 5%	Visual assessment and F3 statistic
16	N/A	Leaf: glaucosity	DUS plot	180	VG	1 absent or weak 2 medium 3= strong	2 @ 5%	Visual assessment and F3 statistic
17	14*	Leaf blade: length	DUS plot	60	MS	3 short 5 medium 7 long	2 @ 5%	Visual assessment and F3 statistic

UK	UPOV TG/90/7	Character	Sample source (Material examined)	Number of plants or sample size for assessment	Method of assessment and recording	States of expression	D Method Minimum difference	U Method
18	15*	Leaf blade: width	DUS plot	60	MS	3 narrow 5 medium 7 broad	2 @ 5%	Visual assessment and F3 statistic
19	16*	Leaf blade: length/width ratio	DUS plot	60	MS	3 low 5 medium 7 high	2 @ 5%	Visual assessment and F3 statistic
20	17	Leaf blade: number of incisions	DUS plot	180	VG	3 few 5 medium 7 many	2 @ 5%	Visual assessment and F3 statistic
21	19	Leaf blade: curvature of midrib	DUS plot	180	VG	1 incurved 2 straight 3 slightly recurved 4 moderately recurved 5 strongly recurved 6 very strongly recurved	2 @ 5%	Visual assessment and F3 statistic
22	20	Leaf blade: blistering	DUS plot	180	VG	3 weak 5 medium 7 strong	2 @ 5%	Visual assessment and F3 statistic
23	21	Leaf blade: folding in cross section	DUS plot	180	VG	1 absent or very weak 3 medium 5 very strong	2 @ 5%	Visual assessment and F3 statistic

UK	UPOV TG/90/7	Character	Sample source (Material examined)	Number of plants or sample size for assessment	Method of assessment and recording	States of expression	D Method Minimum difference	U Method
24	22	Lead blade: twisting	DUS plot	180	VG	1 absent or very weak 3 medium 5 very strong	2 @ 5%	Visual assessment and F3 statistic
25	23	Leaf blade: undulation of margin	DUS plot	180	VG	1 absent or very weak 3 medium 5 very strong	2 @ 5%	Visual assessment and F3 statistic
26	24	Only for varieties with Leaf blade: undulation of margin: absent or very weak to weak: Leaf blade: recurvature of margin	DUS plot	180	VG	1 absent or weak 2 medium 3 strong	2 @ 5%	Visual assessment and F3 statistic
27	25	Petiole: length	DUS plot	60	MS	1 absent or very short 3 medium 5 very long	2 @ 5%	Visual assessment and F3 statistic
28	26	Petiole: width	DUS plot	60	MS	1 very narrow 3 medium 5 very broad	2 @ 5%	Visual assessment and F3 statistic

D.5.3 Approved Additional Characteristics

UK	UPOV TG/90/7	Character	Sample source (Material examined)	Number of plants or sample size for assessment	Method of assessment and recording	States of expression	D Method Minimum difference	U Method
30	N/A	Stem: length/stem diameter ratio	DUS plot	60	MS	3 low 5 medium 7 high	2 @ 5%	Visual assessment and F3 statistic
33	N/A	Stem: number of leaf scars	DUS plot	180	VG	1 absent or very few 3 medium 5 very many	2 @ 5%	Visual assessment and F3 statistic
34	N/A	Stem: prominence of leaf scar indentation	DUS plot	180	VG	1 absent or very weak 3 medium 5 very strong	2 @ 5%	Visual assessment and F3 statistic
36	N/A	Stem: shape in cross section	DUS plot	180	VG	1 round 2 angular	1 state	Visual assessment and F3 statistic
38	N/A	Stem: intensity of anthocyanin	DUS plot	180	VG	1 absent or very weak 3 medium 5 very strong	2 @ 5%	Visual assessment and F3 statistic
40	N/A	Stem: ridging	DUS plot	180	VG	1 absent 9 present	1 state	Visual assessment and F3 statistic

UK	UPOV TG/90/7	Character	Sample source (Material examined)	Number of plants or sample size for assessment	Method of assessment and recording	States of expression	D Method Minimum difference	U Method
50	N/A	Plant: total length (including side branches at flowering)	DUS plot	60	MS	1 very short 3 short 5 medium 7 long 9 very long	2 @ 5%	Visual assessment and F3 statistic
65	N/A	Flower: intensity of yellow colour	DUS plot	180	VG	1 very weak 3 medium 5 very strong	2 @ 5%	Visual assessment and F3 statistic
66	N/A	Flower: length of petal	DUS plot	60	MS	1 very short 3 short 5 medium 7 long 9 very long	2 @ 5%	Visual assessment and F3 statistic
67	N/A	Flower: width of petal	DUS plot	60	MS	1 very narrow 3 narrow 5 medium 7 broad 9 very broad	2 @ 5%	Visual assessment and F3 statistic
94	N/A	Time of flowering: 10% flowering	DUS plot	180	MG	1 very early 3 early 5 medium 7 late 9 very late	2 @ 5%	Visual assessment and F3 statistic

UK	UPOV TG/90/7	Character	Sample source (Material examined)	Number of plants or sample size for assessment	Method of assessment and recording	States of expression	D Method Minimum difference	U Method
95	N/A	Time of flowering 50% flowering	DUS plot	180	MG	1 very early 3 early 5 medium 7 late 9 very late	2 @ 5%	Visual assessment and F3 statistic

D.5.5 New Additional DUS Characteristics

Applicants can suggest new additional characters on the Technical Questionnaire for testing DUS or after notification by the DUS Test Centre of distinctness problems (for procedures see Section F).

Section E – Reference Seed Stock Maintenance and VCU Seed Stock Authentication Procedures

E.1 Purpose

E.1.1 This section sets out the procedures for reference seed stock maintenance and VCU seed stock authentication (if applicable).

E.2 Scope

E.2.1 These procedures apply to all reference collection varieties and VCU seed submissions where the VCU seed has not been taken from the same bulk as the seed used for the DUS test.

E.3 Responsibilities

E.3.1 The Test Centre is responsible for conducting these procedures.

E.4 Procedures for Reference Seed Stock Maintenance

E.4.1 The seed sample submitted with the successful or pending application is considered to be the definitive stock of the variety. Subject to meeting the required certification standards (see Section B) a small portion of the seed is sown for observations and measurements. The remainder is dried and stored under controlled and monitored refrigerated conditions as part of the official reference collection.

E.4.2 If during the normal tests there is any evidence that a seed stock is deteriorating in storage, or that stocks reduce to less than 50g, a request should be made to the maintainer asking for a replacement stock (300g) of the variety. This replacement stock must be authenticated against the definitive reference sample.

E.4.3 Plots will be established from any replacement reference seed sample to be authenticated and compared visually with the definitive seed over a maximum of two recording seasons. Plots must be examined through all the growth stages from early habit to full flowering. If the new seed sample cannot be visually distinguished from the reference seed, it will be accepted as representing the variety. It will then be considered as the definitive seed and substituted for the existing definitive seed in the reference collection.

E.4.4 In the event of the replacement sample not meeting the required acceptance standards set out in E.4.3, an additional replacement sample will be requested. If the additional replacement sample does not meet the acceptance criteria set out in E.4.3, the variety will be deleted from the reference collection and the Variety Lists reviewed.

E.5 Procedures for VCU Seed Stock Authentication

E.5.1 Side-by-side plots will be established from any VCU seed sample to be authenticated and compared visually with the definitive DUS seed over the recording season.

E.5.2 The plots must be examined from establishment, through flowering to maturity.

E.5.3 If the VCU seed sample cannot be visually distinguished from the DUS definitive stock it will be accepted as representing the variety.

E.5.4 If the VCU seed sample can be visually distinguishable from the DUS definitive stock in the authentication plots then it will not be accepted as representing the candidate variety and the problem must be reported to APHA as soon as it is identified

E.6 Procedures for the Inclusion of New Common Knowledge Varieties into the Reference Collection

E.6.1 When a new variety enters into common knowledge such that it must be included in the reference collection, a request will be sent by the Test Centre to the Testing Authority which has added this variety to its Variety List for the supply of at least 25g of seed of the definitive sample. This seed will then be used to validate a larger sample (300g) of seed from the breeder. The standards for this validation will be as for VCU seed stock authentication (see E.5).

E.7 Release of Reference Samples for Authorised Purposes

E.7.1 A maximum of 25g of seed of reference samples can be supplied by the Test Centre, on request, to UK and UPOV DUS Testing Authorities and UK and OECD Seed Certification Agencies. The recipient is notified in writing that this material, or any material derived from it, must not be supplied to a Third party or used for any other purpose than as a reference for official DUS testing or seed certification.

E.7.2 Provision of reference samples, other than in E.7.1, to any other parties must be authorised by APHA.

Section F – Procedures for Assessment of New Additional DUS Characters

F.1 Purpose

F.1.1 This section sets out the procedures for assessment of new additional DUS characters for varieties of Fodder Kale entered for Variety Lists trials and/or PBR trials.

F.2 Scope

F.2.1 These procedures apply to applications where additional DUS characteristics which have not been previously approved by the NLSC, are requested for use in the examination of DUS

F.3 Responsibilities

F.3.1 The Test Centre is responsible for liaising with the applicant to produce a proposed procedure for the conduct of new tests. This procedure must ensure that Distinctness, Uniformity and Stability requirements will be met.

F.3.2 All new additional characteristics must be authorised by the NLSC in consultation with the PVSC.

F.4 Reference Varieties

F.4.1 The reference varieties must include varieties from which the candidate variety is not distinct, as well as other varieties for control purposes.

F.4.2 Seed of reference varieties will be supplied by the Test Centre.

F.5 Procedures

F.5.1 Details of the proposed special test or assessments will be submitted to the NLSC.

F.5.2 The NLSC may commission a test or trial to further investigate a proposal. The applicant will be advised by APHA of arrangements and costs.

F.5.3 Where the test for a character is approved by the NLSC it should be subsequently listed in Section D.5.2 or D.5.3 as appropriate.

Section G – Procedures for DUS Decisions

G.1 Purpose

G.1.1 This section sets out the standards to assess distinctness, uniformity, and stability of varieties of Fodder Kale.

G.2 Scope

G.2.1 These procedures apply to all varieties of Fodder Kale entered for Variety Listing and/or Plant Breeders' Rights tests and those being tested on behalf of Foreign Authorities.

G.3 Responsibilities

G.3.1 The Test Centre is responsible for applying the criteria for DUS, set out in this procedure.

G.3.2 The Test Centre is responsible for producing the DUS report in accordance with these procedures and for ensuring that they are in accordance with the UPOV Guidelines.

G.4 Reference Varieties

G.4.1 Appendix 1 sets out which varieties are considered as reference varieties for these procedures.

G.5 Distinctness

G.5.1 In accordance with associated document UPOV TG/1/3, varieties can be considered distinct where they have a different expression in a grouping character.

G.5.2 The standard applied for distinctness over two years of test is a clear and consistent difference between the candidate variety and each of the reference varieties in at least one character. This difference must be repeated in the same direction in 2 years out of 2 at a significance level of $P=0.05$ or repeated in the same direction in 2 years out of 3 at a significance level of $P=0.05$, with a non-significant difference in either direction in the other year.

G.5.3 The standard applied over three years of test is as described in G.5.2.

G.5.4 Where varieties are grown in close proximity under the same conditions, and a direct comparison can be made, distinctness can be determined on the basis of visual observation. If the visual observation shows the two varieties are clearly distinct, then a case will be presented to APHA and the NLSC with any supporting evidence.

G.6 Uniformity

G.6.1 Uniformity is assessed for all characteristics used to establish Distinctness.

G.6.2 Any variant plants (off-types) are identified by visual assessment in the field and are marked for a decision on omission for recording depending upon incidence across replicates. Care is taken to ensure that the plants that are counted are not the result of any non-genetic factors such as environment, pest or disease or husbandry. The number of variants should not normally exceed the number allowed using the population standards detailed below.

G.6.3 Off-type standards for visually assessed characters:

- Population standard = 2%
- Acceptance probability = 95%
- Eg: 7 off-types in a population of 180 plants

G.6.4 After the variants have been excluded, the characteristics listed in Section D5 are used to assess the uniformity of the remaining plants.

G.6.5 Provided a variety meets the off-type standard, it can be considered sufficiently uniform after two test cycles if, for all measured characters necessary for distinctness, the variety is not significantly greater than the mean of the reference varieties at the 2% significance level in each year of test.

G.7 Stability

G.7.1 A variety is considered sufficiently stable when there is no evidence to indicate that it lacks uniformity or fails to conform to the essential characteristics of its description in different submissions or in different tests.

G.8 DUS Report and Variety Description

G.8.1 Upon completion of the DUS examination the DUS Summary Report will be submitted to APHA and will be discussed at the relevant DUS Test Centre Meeting. This report will specify all non-routine characteristics for establishing distinctness.

G.8.2 The final DUS report, including the full variety description for positive reports, will be submitted to APHA. The characteristics to be used in the description are identified in Section D.

Appendix 1 – Reference Collection Varieties

AX1 Variety Listing and Plant Breeders Rights

AX1.1 The DUS reference collection, for any given category of plant variety comprises the following at the time when the application for the candidate is made:

AX1.1.1 All other candidate varieties already in DUS test in the UK or entering testing at the same time as the candidate.

AX1.1.2 All varieties with UK PBR.

AX1.1.3 All varieties on the OECD variety list that are listed by countries with comparable climatic conditions to the UK.

AX1.1.4 All varieties protected under National PBR (UPOV contracting parties) with comparable climatic conditions to the UK

AX1.1.5 Any varieties nominated by the applicant as being comparable i.e., known to be similar.

AX1.1.6 Any other varieties considered to be comparable i.e., known to be similar by the appropriate Test Centre or DUS Centre Group.

AX1.1.7 Other available comparable varieties in common knowledge.



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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.