Animal &
Plant Health
Agency

Great Britian Variety List and Northern Ireland Variety List / Plant Breeders' Rights Technical Protocol for the Official Examination of Distinctness, Uniformity, and Stability (DUS)

Potato

(*Solanum tuberosum* L.)

March 2025

Contents

Section A - General Information

1 Purpose

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 potato entered for Variety Lists (VL)Trials and Plant Breeders' Rights (PBR).

2 Scope

2.1 These procedures apply to all varieties of potato (*Solanum tuberosum* L.). Special procedures and responsibilities for Genetically Modified (GM) varieties are set out in Sections A5

and A6.

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 may be incorporated in the DUS tests.

3 Responsibilities

3.1 The growing tests and assessments in this protocol are carried out under the responsibility of tthe National Authorities.

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

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

3.4 The procedures are administered by:

Plant, Varieties and Seeds

Animal and Plant Health Agency

Eastbrook

Shaftesbury Road

Cambridge

CB2 8DR Email: pvs.helpdesk@apha.gov.uk

3.5 Test Centre

The DUS growing tests and assessments in this protocol are co-ordinated and carried out by:

Potato Variety Testing Team

SASA

Roddinglaw Road

EDINBURGH

EH12 9FJ Email potatovarietytesting@sasa.gov.scot

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

4 Non-Compliance with the Protocol

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 not to do so which can be justified by the Test Centre.

5 Responsibility for GM Releases

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 Holder 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.

6 Procedures for GM Varieties

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

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.

7 Associated Documents

7.1 List of documents associated with this protocol

Reference	Title
Potatoes VCU Protocol	United Kingdom Variety List Trials: Protocol and Procedures for Examining the Value for Cultivation and Use (VCU) of Potatoes
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. 9.4.2002
UPOV TG/23/7	Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, Potato. 25.10.2022
UPOV TGP/8/5	Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability. 28.10.2022
UPOV TGP/9/2	Examining Distinctness. 29.10.2015
UPOV TGP/10/2	Examining Uniformity. 01.11.2019
GB and NI Variety Lists	The Seeds (National Lists of Varieties) Regulations 2001 (as amended) and The Seeds (Variety List) 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

1 Purpose

1.1 The purpose of this section is to identify the specific requirements for Variety Lists and Plant Breeders' Rights applications as appropriate.

2 Scope

2.1 These procedures apply to all applications.

3 Responsibilities

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

4 Receipt of Applications

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/national-lists-of-agricultural-and-vegetable-crops).

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.UK website at https://www.gov.uk/national-lists-of-agricultural-and-vegetable-crops

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).

5 Receipt of Seed / Sample

5.1 The latest date for receipt of seed is stated in the Seed Gazette. In the absence of exceptional circumstances, 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/national-lists-of-agricultural-and-vegetable-crops).

6 Seed Quality Requirements

6.1 The seed must satisfy the certification requirements for basic category seed potatoes as laid down in the seed marketing legislation of the National Authorities.

Seed tubers must be derived, in the UK, from seed crops which satisfy the conditions for Approved Stock as set out by the National Authorities

6.2 Seed tubers must be size graded 30mm x 50mm, be in sound condition, be substantially free from soil and not be visibly unfit for planting by reason of mechanical damage, attack by pest, disease or any other condition which would impair subsequent growth.

6.3 Minitubers are acceptable for trials provided they meet the minimum size requirement.

6.4 Seed tubers must not have been chemically treated and must be delivered in new sacks or other new containers.

7 Seed Quantity

7.1 The number of tubers required for DUS testing each year is a minimum of 150 tubers. If a variety is submitted for PBR and NL testing, the number of tubers required is 600 each year. In the event of deterioration of seed prior to planting, replacement tubers may be acceptable provided that they are from the same stock, and will, in the opinion of the Test Centre, not affect the assessments.

7.2 Shortfall in Seed Quantities

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

8 Requirements for Seed Tubers, including Provisions for GM Varieties

8.1 Seed tubers derived in the UK must be from field-grown seed crops which satisfy the conditions for Approved Stock as set out by the National Authorities . Each package or container holding the seed tubers submitted for trials should be accompanied by a plant passport and be sealed by part of the plant passport/label.

8.2 Seed tubers submitted for trials from seed stocks grown in the European Union should be accompanied by a phytosanitary certificate. Each package or container holding the seed tubers submitted for trials should be officially sealed.

8.3 Applicants wishing to submit varieties which have been propagated within the EU and which do not meet the requirements for the issue of a phytosanitary certificate may apply for an import licence under Article 40 of the Plant Health (Scotland) Order 2005 (as amended). Similar legislation also applies in England, Wales and Northern Ireland. The Plant Health (England) Order 2015. The Plant Health (Wales) Order 2018. The Plant Health (Northern Ireland) Order 2018. Any import licence granted will be subject to conditions and a copy must accompany the seed tubers.

8.4 Applicants wishing to submit seed tubers which have been produced outside the EU must initially apply for a licence under the Plant Health (Official Controls and Miscellaneous Provisions) (Scotland) Regulations 2019, or the equivalent legislation in England, Wales and Northern Ireland to bring a restricted number of tubers through quarantine. Only the produce of these tubers further multiplied in the EU and meeting the requirements in 8.1, 8.2 or 8.3 will be eligible for tests and trials.

9 Labelling Requirements, Including Provisions for GM Varieties

9.1 Applicants must clearly label their sample, inside and outside the bag, with the following information:

- AFP number (if known)
- Breeder’s Reference number or name

9.2 All packages of GM material must be labelled clearly as “GMO” or "Genetically Modified Organism"

Section C – Growing Test Procedures

1 Purpose

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

2 Scope

2.1 These procedures apply to all varieties of potato.

3 Responsibilities

3.1 The Test Centre is responsible for conducting these procedures.

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).

4 Reference Varieties

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

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

5 Design of Tests

5.1 The minimum duration of tests should normally be two independent growing cycles. The National List and Seeds Committee (NLSC) must agree any proposed changes to the number of cycles .

5.2 Sprout Test

Sprout characteristics are assessed following a procedure similar to that described by A Howing, R. Suk & B. Ros (1986. *Acta Horticulturae* 182: 359-363). In February or early March, tubers are

mounted, rose end uppermost, on pins under a very low light intensity (small incandescent light bulbs, approx. 6-volt, 0.05 amp) with an intensity of 7 to 11 lux. There are a minimum of 5 replications for each variety. After *c* 12 weeks incubation at 20°C, the characteristics 1 to 11 listed in Section D 5.1 and as described in Appendix 2 are recorded in comparison with the example varieties.

5.3 Growing Test

5.3.1 The Test Centre is responsible for selecting a suitable site which should be on ground that has normally not had a potato crop in the previous five years, but the interval may be less where the risk is negligible.

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

5.3.3 Test varieties will be planted in plots, providing a minimum of 60 plants divided between at least 2 replications. One replication may also be used for VCU purposes. In this latter replication, the varieties will be planted according to VCU maturity group i.e., first early or second early and maincrop. In the other replication, varieties will be planted according to 5 DUS maturity groups: very early, early, medium, late and very late. Varieties will be randomised within each maturity replication.

5.3.4 Seed tubers should be spaced 25 to 35 cm apart for very early varieties and 30 to 40 cm apart for all other maturity groups.

5.3.5 The candidate varieties may be grown in a single row plot for comparison with very similar varieties, particularly if these are identified.

6 Records and Recording

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

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

6.3 In the first recording year, characters, as indicated in Section D 5.1, are assessed on all candidate varieties and the data analysed to determine the most similar reference varieties. (For details see Section G).

6.4 In the second recording year, characters, as indicated in Section D 5.1, are assessed on all candidate varieties and the data analysed and, together with those from the first year, used to determine the distinctness of a candidate variety. (For details see Section G). Uniformity and stability are determined visually over 2 years.

6.5 If the Test Centre notices unusual or novel characters in a candidate variety, a note and a photographic record must be made at any time.

7 Communications with the Applicant

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.

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.

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.

7.4 After each recording season, the results may, if necessary, be 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

1 Purpose

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

2 Scope

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

3 Responsibilities

3.1 The Test Centre is responsible for co-ordinating the procedures in this summary of characteristics.

4 Organisation

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

5 DUS Characteristics to be Assessed

5.1 Routine Characteristics

The following table summarises the DUS characteristics to be routinely examined. Notes and instructions on recording the characteristics are provided at Appendix 2 and referenced in Tables as follows: a) = Sprouts, b) = Bud stage, c) = Inflorescences / Flowers stage, and d) = Plant at Foliage Ripening, e) = Tuber after Harvest.

All characteristics, other than 31 (Plant: time of maturity) and 32 (Tuber: form) are recorded by visual assessment by a single observation of a group of plants or parts of plants (VG).

Character 31 is recorded by measurement of a group of plants or plant parts **(MG).**
Character 32 is recorded using a combination of measurement of a number of individual plants or parts of plants (MS) and visual assessment by a single observation of a group of plants or parts of plants (VG).

For each characteristic, a state of expression other than those listed can be recorded where it is clear that the characteristic is on a continuous scale. For example, character 1 gives 3 example states but states between these examples and at either end are possible and should be recorded.

Note:	Definition
*	A characteristic which must be examined according to UPOV Guidelines. These are important for the international harmonisation of variety descriptions and should always be examined for DUS and included in the variety description except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.
G	A grouping characteristic

Type of observation of characteristics

MG	Single measurement of a group of plants of 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

QN	Indicates a quantitative character i.e., the range of variation is continuously expressed one dimension. States of expression are primarily for descriptive purposes and not for distinctness.
PQ	Indicates a pseudo-qualitative character i.e., the range of variation is at least partly continuous but is expressed in more than one dimension.

A. DUS characteristics routinely recorded for sprouts

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example Varieties (UK options in italics)	Available number of states
1	1 a) QN	**Lightsprout: size**	After 12 weeks incubation	3=Small 5=Medium 7=Large	Laura, Diamant, Victoria Solist	9 states
2*	2 a) PQ	**Lightsprout: shape of base**	After 12 weeks incubation	1=Globose 2=Ovoid 3=Conic 4=Broad cylindrical 5=Narrow cylindrical	Albatros, *Ivory* *Russet* Laura, Bintje, Solist Diamant, Innovator Cecile, *Spunta*	5 states
3*	3 a) QN	**Lightsprout: anthocyanin colouration of base**	After 12 weeks incubation	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very strong	Estima Solist Arielle, *Desiree* Abbot, Victoria, Agria, Red Emmalie	9 states
4* G	4 G a) QN	**Lightsprout: proportion of blue in anthocyanin colouration of base**	After 12 weeks incubation	1=Absent or low 2=Medium 3=High	Arielle, Solist, Victoria Abbot, J*ester, Bruar* Agria, Purple Majesty	3 states
5*	5 a) QN	**Lightsprout: hairiness of base**	After 12 weeks incubation	1=Absent or very sparse 3=Sparse 5=Medium 7=Dense 9=Very dense	Slaney Goldmarie Albatros, Laura Abbot, *Purple Majesty* Oxania, *Dunluce*	9 states
6	6 a) QN	**Lightsprout: size of apex in relation to base**	After 12 weeks incubation	3= Small 5=Medium 7=Large	Laura Albatros, King Edward Abbot, *Osprey*	9 states
7	7 a) QN	**Lightsprout: habit of apex**	After 10 weeks incubation	1=Closed 3=Intermediate 5=Open	Laura ArielleDiamant, Solist	5 states
8	8 a) QN	**Lightsprout: anthocyanin colouration of apex**	After 12 weeks incubation	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very strong	Estima, Innovator Solist Laura, Spunta Agria, Blaue St. Galler, *Purple Majesty*	9 states

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example Varieties (UK options in italics)	Available number of states
9	9 a) QN	**Lightsprout: hairiness of apex**	After 12 weeks incubation	1=Absent or very sparse 3=Sparse 5=Medium 7=Dense 9=Very dense	Goldmarie Laura Albatros, *Ivory* *Russet,* *Mayan Gold* Abbot, *Olympus* Camilla	9 states
10*	10 a) QN	**Lightsprout: number of root tips**	After 12 weeks incubation	3=Few 5=Medium 7=Many	Estima, Solist, Arielle, BintjeInnovator	9 states
11	11 a) QN	**Lightsprout: length of lateral shoots**	After 12 weeks incubation	3=Short 5=Medium 7=Long	Laura, Producent, Estima, Princess Spunta	9 states

B. DUS characteristics to be routinely examined for plant at flower bud stage

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example varieties (UK options in italics)	Available number of states
12	12 b) QN	**Plant: foliage structure**	Flower Bud	1=Stem Type 2=Intermediate 3=Leaf Type	Agria, Estima Premiere Kennebec	3 states
13*	13 b) QN	**Plant: growth habit**	Flower Bud	3=Upright 5=Semi-upright 7=Spreading	Victoria Desiree, Secura, *King Edward* Solist	9 states
14*	14 b) QN	**Stem: anthocyanin colouration**	Flower Bud	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very strong	Estima Victoria, *Atlantic* Laura, Saturna Desiree Blaue St. Galler, Vitelotte Noir, *Arran Victory*	9 states
15	15 QN	**Leaf: size**	Flower Bud	3=Small 5=Medium 7=Large	King Edward Laura Kennebec	9 states
16	16 b) QN	**Leaf: arrangement of leaflets**	Flower Bud	1=Overlapping 3=Touching 5=Free	Albatros, *Olympus* Premiere, Solist Goldmarie	5 states
17	17 b) QN	**Leaf: number of secondary leaflets**	Flower Bud	3=Few 5=Medium 7=Many	Goldmarie, Solist Victoria	9 states
18	18 QN	**Leaf: intensity of green colour**	Flower Bud	3=Light- 5=Medium 7=Dark	Solist Kuras, Victoria Spunta	9 states
19	19 b) QN	**Leaf: anthocyanin colouration of midrib**	Flower Bud	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very strong	Solist Russet Burbank Laura Romanze, *Desiree* Bildtstar, Roseval	9 states
20	20 b) QN	**Second pair of lateral leaflets: width in relation to length**	Flower Bud	3=Narrow 5=Medium 7=Broad	Innovator, Russet Burbank Desiree Cayenne, *Olympus*	9 states

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example varieties (UK options in italics)	Available number of states
21	21 b) QN	**Terminal and lateral leaflets: frequency of coalescence**	Flower Bud	1=absent or very few 3=Medium 5=Very many	Courage Goldmarie Cardinia, *Alex*	5 states
22*	22 c) QN	**Flower bud: anthocyanin colouration**	Flower Bud	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very Strong	Solist Pompadour, *Isle of Jura* Victoria Osprey Blaue St. Galler, Cayenne, *Mayan Gold, Olympus*	9 states

C. DUS characteristics to be routinely examined at inflorescences / flowers stage

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example Varieties (UK options in italics)	Available number of states
23*	23 c) QN	**Plant: number of inflorescences**	Flowering	1=Absent or very few 3=Few 5=Medium 7=Many 9=Very many	King Edward*(<1)* Arielle *(1-5)* Laura *(5-15)* Agria, Innovator*(15-30)* Euroesa, *Maris Piper (>30)* *a % Plants in Flower* *b Infls/Plant)* *c Flowers/Infl.* *No/Plant = a x b x c / 100*	9 states
24	24 c) QN	**Inflorescence: size**	Flowering	3=Small 5=Medium 7=Large	Estima, Solist Goldmarie, *Desiree* Innovator, Victoria	9 states
25	25 c) QN	**Peduncle: anthocyanin colouration**	Flowering	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very strong	Estima, Solist, Victoria Saturna Desiree, *Olympus* Blaue St. Galler, *Mayan Gold*	9 states

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example Varieties (UK options in italics)	Available number of states
26	26 c) QN	**Corolla diameter: size**	Flowering	1=Very Small 3=Small 5=Medium 7=Large 9=Very Large	Sommergold, *Gemson* Laura Innovator Roseval	9 states
27* G	27 c) G QN	**Corolla: intensity of anthocyanin colouration on inner side**	Flowering	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very Strong	Solist Laura, Pirol, Secura Osprey, Quadriga Courage Ramona, *Mayan Gold*	9 states
28* G	28 G QN	**Corolla: proportion of blue in anthocyanin colouration on inner side**	Flowering	1=Absent or low 2=Medium 3=High	Laura, Osprey Courage, Secura Pirol, Quadriga, *Purple Majesty*	3 states
29*	29 QN	**Corolla: extent of anthocyanin colouration on inner side**	Flowering	1=absent or very small 3=Small 5=Medium 7=Large 9=Very large	Vitelotte Noir Laura Pirol Bildtstar Courage	9 states
30	30 QN	**Plant: height**	Flowering	1=Very short 2=Short 3=Medium 4=Tall 5=Very tall	Mimi *Duke of York* Arielle, Leyla, *Desiree* *Maris Piper* Agria, Pirol	5 states

D. DUS characteristics to be routinely examined at the plant at foliage ripening

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example Varieties (UK options in italics)	Available number of states
31* G	31 G QN	**Plant: time of maturity**	Foliage ripening	1=Very early 3=Early 5=Medium 7=Late 9=Very late	Leyla, Solist, Princess, *Courage*, *Estima* Laura *Desiree* Euroesa, *Maris Piper* Kuras, Producent,	9 states

E. DUS characteristics to be routinely examined at the tuber after harvest

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	Example Varieties (UK options in italics)	Available number of states
32*	32 d) QN	**Tuber: form**	After harvest	1=Round 2=Short-oval 3=Oval 4= Long-oval 5=Long 6=Very long	*KurasOlympus* Courage Diamant, RamonaInnovator Spunta Pompadour, *Mayan Gold*	6 states
33	33 QN	**Tuber: depth of eyes**	After harvest	1=Very shallow 3=Shallow 5=Medium 7= Deep 9=Very deep	Nadine Agria, Innovator, Courage Kuras, Sommergold Vitelotte Noir	9 states
34* G	34 G d) PQ	**Tuber: colour of skin**	After harvest	1=Light yellow brown 2=Yellow 3=Orange brown 4=Light red 5=Medium red 6=Dark red 7=Mottled red 8=Blue violet 9=Mottled blue violet	Nadine Agria, Solist Karo, Velu, *Ivory Russet* Bildtstar, *Sarpo Mira* Laura Romanze, *Mimi* Cara, *King Edward* Blaue St. Galler, Vitellotte Noir, *Purple Majesty* Catriona, Kestrel	9 states
35	35 QN	**Tuber: texture of skin**	After harvest	1=Smooth 2=Medium 3=Rough	Laura Solist Ivory Russet, Russet Burbank	3 states
36*	36 PQ	**Tuber: colour of base of eye**	After harvest	1=White 2=Yellow 3=Red 4=Blue	Nadine Agria,Solist Quarta, Romanze, *Red Emmalie* Double Fun, Vitelotte Noir, *Purple Majesty*	4 states

37*	37 d) PQ	**Tuber: colour of flesh**	After harvest	1=White 2=Yellowish white 3=Light Yellow 4=Medium yellow 5=Deep yellow 6=Red 7=Red parti-coloured 8=Blue 9=Blue violet parti-coloured	Kuras, Russet Burbank Desiree, Estima Diamant, Solist Bildstar, Quarta Laura, Princess Red Emmalie Early Rose Purple Majesty Herd Laddie	9 states

6 Other Characteristics Recorded

The following table summarises other characteristics which have been approved by the NLSC and may be recorded and stored on SASA's variety database. Information obtained from these characteristics will not be included in the DUS decision or report.

UPOV TG/23/7	UK	Character	Optimal Stage for Assessment	State of Expression	UK Example varieties	Available number of states
N/A	38 QN	**Leaflet: waviness of margin**	Flower Bud	1=Absent or very weak 3=Weak 5=Medium 7=Strong 9=Very strong	Umatilla Russet Grata Marabel, Home Guard Aiko Sava, Riviera, Waregem	9 states
N/A	39 QN	**Leaflet: depth of veins**	Flower Bud	3=Shallow 5=Medium 7=Deep	Pirol, Home Guard Premiere Bernadette, Red Pontiac	9 states
N/A	40 QN	**Flower corolla: pigment on rear (White Flowers)**	Flowering	1=Absent 9=Present	Estima Majestic	2 states

6.1 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

1 Purpose

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

2 Scope

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.

3 Responsibilities

3.1 The Test Centre is responsible for conducting these procedures.

4 Procedures for Reference Seed Stock Maintenance

4.1 The seed sample submitted by the applicant for testing is considered to be the definitive stock of the variety. Subject to meeting the required health quality standards (see B 6), a few tubers will be transferred to the SASA reference potato variety collections and maintained annually as part of a living collection, except if the candidate variety is not accepted for Variety Listing.

4.2 Tubers may also be produced from micro plants derived from the submitted seed sample which have been tested to comply with the requirements of Plant Health (EU Exit) Regulations 2019 and the corresponding National Regulations. This material will then incorporated into SASA's Reserve Virus Tested Potato Collection and will be used to renew varieties in the main reference collection, as appropriate.

5 Procedures for VCU Seed Stock Authentication

5.1 Evidence will be requested from the breeder of the relationship between the VCU seed sample and the definitive DUS seed sample. Sprouts, plants and tubers will be compared visually with the definitive stock over the recording season, if necessary.

5.2 If the new seed sample cannot be visually distinguished from the reference stock, it will be accepted as representing the variety

5.3 If the VCU seed sample can be distinguished visually from the definitive stock in the authentication plots, then it will not be accepted as representing the candidate variety.

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

6.1 When a new variety enters into common knowledge such that it must be included in the reference collection for comparative purposes, 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 4 tubers. A UPOV description may also be requested from the Testing Authority.

7 Release of Reference Samples for Authorised Purposes

7.1 A maximum of 5 tubers of seed of reference samples can be supplied by the Test Centre, on request, to UK and UPOV DUS Testing Authorities and UK and UNECE Seed Certification Agencies, provided 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. Varieties which are in the public domain can be supplied subject to a germplasm acquisition agreement.

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

Section F – Procedures for Assessment of New Additional DUS Characteristics

1 Purpose

1.1 This section sets out the procedures for assessment of new additional DUS characters for varieties of potato entered for Variety Listing and/or PBR trials.

2 Scope

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.

3 Responsibilities

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 will be met.

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

4 Reference Varieties

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

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

5 Procedures

5.1 Details of the proposed special test or assessments will be submitted to the NLSC to consider the feasibility of setting up a test acceptable to the UK Authorities. The applicant will be advised by APHA of arrangements and costs.

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.

5.3 Where the test for a character is approved by the NLSC it should be subsequently listed in Section D 5.1.

Section G – Procedures for DUS Decisions

1 Purpose

1.1 This section sets out the standards used to assess distinctness, uniformity and stability of varieties of potato.

2 Scope

2.1 These procedures apply to all varieties of potato entered for Variety Listing and Plant Breeders' Rights tests and those being tested for Foreign Authorities.

3 Responsibilities

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

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

4 Reference Varieties

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

5 Distinctness

5.1 In accordance with associated document UPOV TG1/3, varieties can be considered distinct where they have a different expression in a grouping character from varieties in the reference collection identified as being similar. For PQ characters, the difference must be clear i.e. at least 1 state and, for QN characters, the difference must be visually clear or consistent.

5.2 Where varieties are grown in close proximity under the same conditions, and a direct comparison can be made, distinctness may be determined on the basis of visual observation. In these circumstances, the basis for distinctness will be clearly recorded.

6 Uniformity

6.1 Uniformity is assessed visually for all characteristics used to establish distinctness.

6.2 Any variants identified by visual assessment are marked and counted, and their proportions calculated. Variants are defined as plants which are clearly not of the variety. Care is taken to ensure that the plants which are counted are not the result of any non-genetic factors such as environment, pest or disease or husbandry.

6.3 After the variants and abnormal plants have been excluded, the characters listed in Section D are used to assess the uniformity of the remaining plants.

6.4 Uniformity is assessed in both years of the two-year test period and in further years for those characteristics being assessed for distinctness.

6.5 For characters which are not measured, the uniformity standard is tabulated in UPOV TC/34/5. The total number of variants in the two test years is calculated to give the value “k” and the total number of plants in the two test years gives the value “n”. Where a third year of uniformity data is required, the same principle, i.e., that of adding the numbers of variants and the total numbers of plants examined, is applied.

7 Stability

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.

8 DUS Report and Variety Description

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.

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

1 Variety Listing and Plant Breeders' Rights

1.1 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:

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

1.3 All varieties with UK PBR.

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

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

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

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

1.8 Other available comparable varieties in common knowledge.

Appendix 2 – Potato Variety Description

2. Notes and instructions (based on UPOV

Guidelines – reference TG/23/7)2

2.1 Explanations covering several characteristics

Characteristics containing the following key in the Table of Characteristics should be examined as indicated below:

(a) Observations should be made on lightsprouts grown according to the following method:
The spectrum and the intensity of the light source are the most important factors for the expression of lightsprouts characteristics. This spectrum is defined by the type of lamps and the voltage used. When extremes of temperature are avoided, the influence of the temperature on the speed of development is small. A good expression of the characteristics is obtained when the lightsprouts are grown in a light-sealed cabinet at room temperature under continuous light provided by small incandescent bulbs (6V AC/0.05 A) giving an intensity of 7 to 11 lux (approximately 8 bulbs per square meter, 20-30 cm above the tubers).

Observations should be made in a room with indirect day light when the characteristics 7 (habit of apex) and 11 (length of lateral shoots) have reached their maximum differentiation. Example varieties should be used to determine the optimal stage for observations.

The development of lightsprouts depends on the time of test after harvest. Development increases with age of tubers. If the test is started already about 100 days after harvest, the appropriate stage for observations might be reached only after about 14 weeks due to dormancy and/or slow development. If the test is started later, the appropriate stage for observations might be reached after a shorter period.

An image demonstrating the parts of the lightspout is available in UPOV TG/23/7 (Section 8.1, a).

(b) The intensity of the anthocyanin colouration should be observed. The extent and the distribution
should not be considered.

(c) Observations should be made on fully developed leaves from the centre of the plant. One leaf from
each of 10 plants should be picked from a main stem halfway between the top and the bottom of the plant.

(d)

Observations of flower colour should be made on the inner side of freshly opened flowers; the

best moment is early in the morning.

An image demonstrating the parts of the inflorescence is available in UPOV TG/23/7 (Section 8.1, d).

(e) Observations should be made within two weeks after harvest. Tubers should be shielded from sunlight as this may have an effect on the colour.

A) Sprouts

Character 2: Shape of base

An image providing examples of the five lightspout shapes is available in UPOV TG/23/7

(Section 8.2, Ad.2).

Character 3: intensity of anthocyanin colouration of base.

If light sprout appears green, then record as “absent”

Character 4: proportion of blue in anthocyanin colouration of base

The colour of anthocyanin results from a red and blue component. If the proportion of blue is low, the anthocyanin appears red violet. If the proportion of blue is high, the anthocyanin appears blue violet.

Character 5: hairiness of base

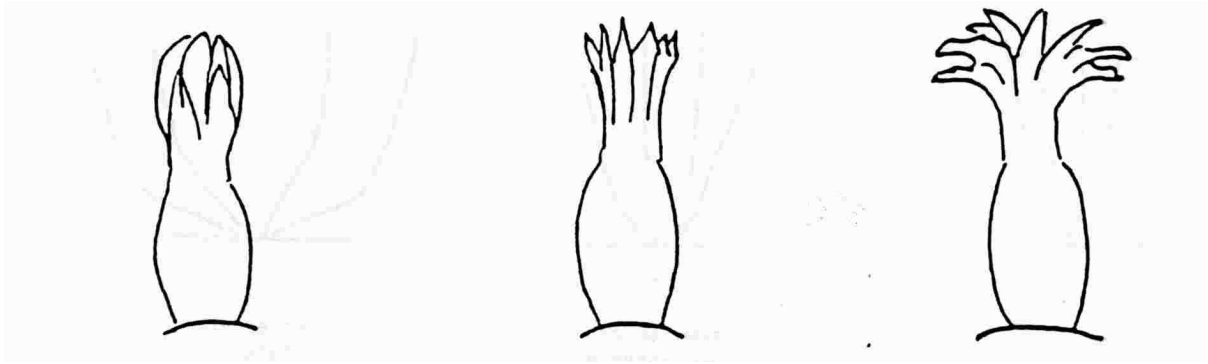
It is recommended to use a magnifier.

Hairiness is not always evenly distributed over the lightsprout. The total amount of hairiness of the base should be averaged over the total area of the lightsprout base.

Character 6: size of apex in relation to base

The size of the apex should be examined in relation to the size of the base.

Character 7: habit of apex



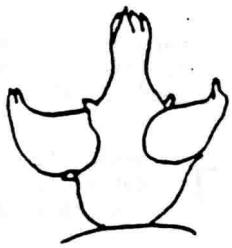
Closed (1) Medium (3) Open (5)

Character 9: hairiness of the apex

It is recommended to use a magnifier.

Hairiness is not always evenly distributed over the lightsprout. The total amount of hairiness of the apex should be averaged over the total area of the lightsprout apex.

Character 11: length of lateral shoots



Short (3)

Medium (5)

Long (7)

B) Plant Foliage/Flower bud stage

These records on foliage should be made when flower buds are clearly fully developed on the plants and just before the first flowers are fully opened throughout the plot.

Character 12: Plant: foliage structure

Stem-type: foliage open, stems clearly visible

Intermediate: foliage half open, stems partly visible

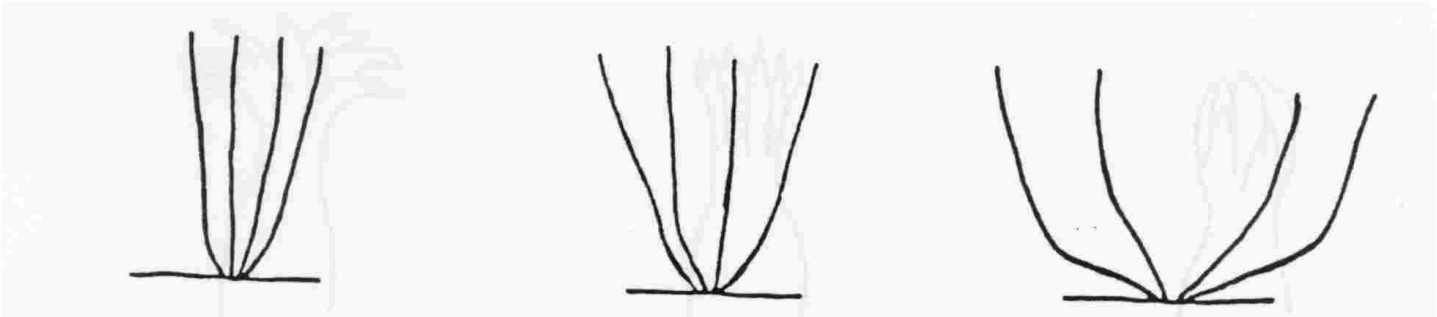
Leaf-type: foliage closed, stems not or hardly visible

An image providing examples of the foliage

structure is available in UPOV TG/23/7 (Section

8.2, Ad.12)

Character 13: Plant: Growth habit



Upright (1) semi-upright (3) Spreading (5)

Character 14: Stem: anthocyanin colouration

Observations for intensity should be observed on the lower three quarter of the stems.

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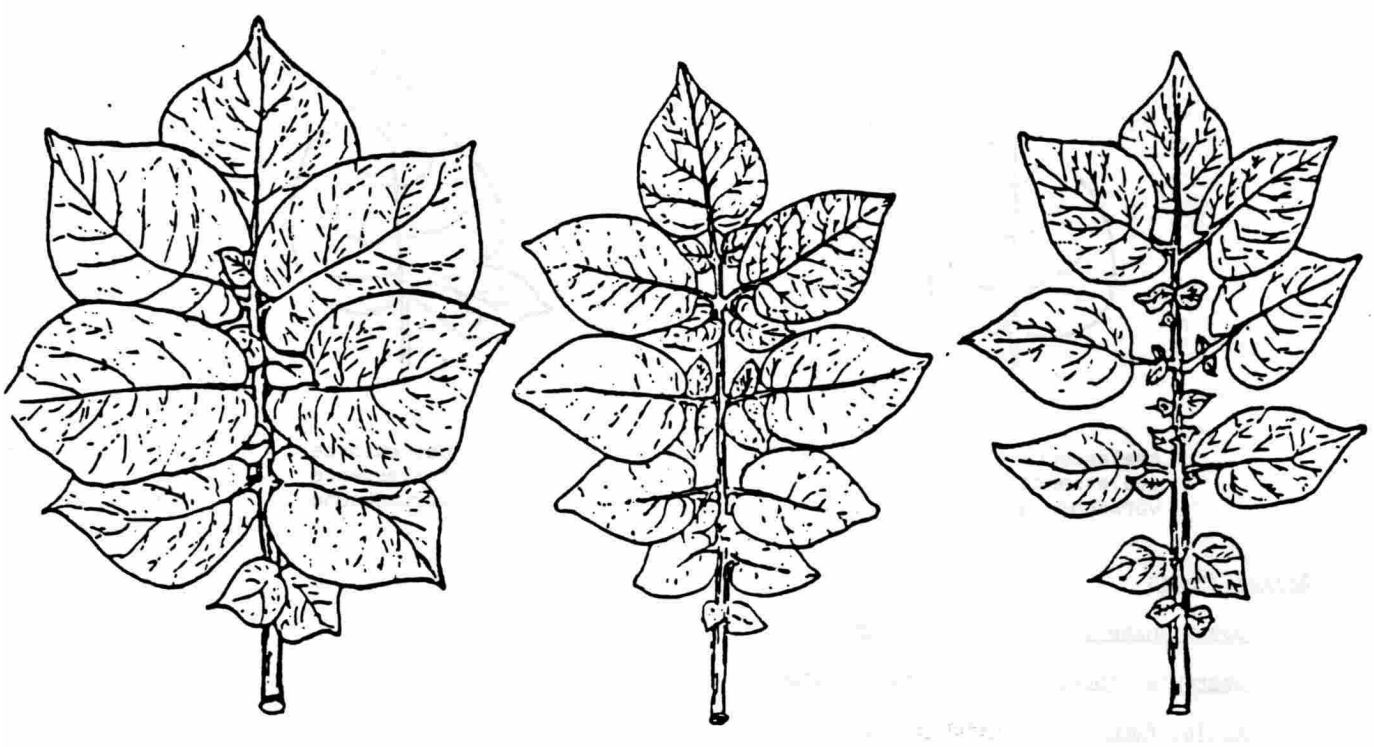
Character 16: Leaf: arrangement of leaflets



Overlapping (1) Touching (3) Free (5)

Character 17: Leaf: number of secondary leaflets

An image providing examples of few, medium, and many secondary leaflets is available in UPOV TP/23/7 (Section 8.2, Ad.17).

Character 18: Leaf: intensity of green colour

Observations should be made on fully developed leaves in the centre of the plant, preferably not in direct sunlight.

Character 19: Leaf:anthocyanin colouration of midrib

The intensity of the anthocyanin colouration should be observed. The extension and the distribution should not be considered.

Observations should be made on the upper side of the leaf.

Character 20: Second pair of lateral leaflets: width in relation to length

Narrow (3) Medium (5) Broad (7)

Character 21: Terminal and lateral leaflets: frequency of coalescence

Observations should be made on fully developed leaves throughout the whole plant.

An image providing examples of coalescence is available in UPOV TP/23/7 (Section 8.2, Ad.21).

Character 22: Flower bud: anthocyanin colouration

The observations should be made on fully developed buds before the corolla is visible.

C) Inflorescence / Flowers stage

Character 23: Plant: number of inflorescences

During the flowering period the plots are observed several times and the number is scored. The highest score reached is noted as the final state of expression.

The frequency of inflorescences may be determined by dividing the product of the percentage plants in flower, the number of inflorescences per plant and the number of flowers per inflorescence by one hundred.

Character 24: Inflorecsence: size

The general impression of the whole plot is observed.

Character 28: Corolla: proportion of blue in anthocyanin colouration on inner side

The colour of anthocyanin results from a red and a blue component. If the proportion of blue is low the anthocyanin appears red violet. If the proportion of blue is high the anthocyanin appears blue violet.

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D) Plant at Foliage Ripening

Character 31: Plant: time of maturity

The time of maturity is reached when 80% of the leaves are dead.

E) Tuber after Harvest

Character 32: Tuber: form

The form is defined by length to width ratio. The predominant form should be observed.

An image providing examples of the six tuber shapes is available in UPOV TP/23/7 (Section 8.2, Ad.32).

Characters 36: Tuber: colour of base of eye

Not applicable for varieties with particolored skin (note 7 and 9 in characteristic 34: Tuber: color of skin).

Character 37: Tuber: colour of flesh

Observations should be made on freshly cut tubers. A few minutes after cutting the tuber, the flesh may be discoloured.

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