



Animal &
Plant Health
Agency

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

**Field Pea and Pea
Pisum sativum L.**

May 2026

Changes since last version

- Updated document date from September 2025 to March 2026
- Section C
 - Add new Section 5.6
 - Detailing minimum number of plants required for test
- Section D
 - Section 5.1
 - Updated sample sizes for assessment
 - Section 5.2
 - Updated numbers of plants or sample size for assessment in table of characteristics routinely recorded from 350 to 100
 - UPOV character 35 - Updated number of plants or sample size for assessment from at least 350 to 20 plants (10 plants per replicate)
 - UPOV character 36 - Updated number of plants or sample size for assessment from at least 350 to 20 plants (10 plants per replicate)
 - UPOV character 50 - Updated number of plants or sample size for assessment from 200 seeds sampled from 2 replicate to At least 200 seeds
 - UPOV character 51 - Updated number of plants or sample size for assessment from 200 seeds sampled from 2 replicate to At least 200 seeds
 - UPOV character 59 - Updated number of plants or sample size for assessment from 20 plants or at least 200 plants to 20 plants in lab or at least 100 plants in field
 - Section 5.3
 - Updated numbers of plants or sample size for assessment in table of previously approved characteristics not routinely recorded from 350 to 100
 - Duplicate character entry (Pod: emerald (reduced wax) removed

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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 Value for Cultivation (VCU) submissions of varieties of Field Pea and Pea entered for Variety List (VL) Trials and Plant Breeders' Rights (PBR).

A.2 Scope

A.2.1 These procedures apply to all varieties of Field Pea and Pea. Special procedures and responsibilities for Genetically Modified (GM) 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, the Scottish Ministers, the 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 Office

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:

Vegetable DUS Test Centre

SASA

Roddinglaw Road

Edinburgh

EH12 9FJ

Tel No: 0131-244 8890

Email: vegvarietytesting@sasa.gov.scot

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 specific clearances.

A.7 Associated Documents

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

| Reference | Title |
|--------------------------------------|--|
| Field Pea VCU Protocol | United Kingdom Variety List Trials: Protocol for Official Examination of Value for Cultivation and Use (VCU): Field Pea April 2016 |
| Field Pea VCU Procedures – July 2023 | United Kingdom Variety List Trials: Procedures for Official Examination of Value for Cultivation and Use (VCU Harvest 2024) |
| 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/8/5 | 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/7/10 Rev. 23 | Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, Peas (<i>Pisum sativum</i> L.) (25.10.2022) |
| UPOV TWC/26/14 | An Adjustment to the COYD Method When Varieties are Grouped Within the DUS Trial (01.08.2008) |
| 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.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>). Applications received after these dates may be considered for inclusion in the current year's tests and trials on a case-by-case basis.

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 on the GOV website and is set administratively by APHA. 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, if required, 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 1st Test Cycle

Field Pea DUS: 3 kg

Pea: 3,000 or 12,000 seeds

B.7.2 2nd Test Cycle

Field Pea: No further seed required

Pea: 9,000 seeds if 3,000 seeds provided in the 1st test cycle No seed if 12,000 seeds provided in the 1st test cycle

B.7.3 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 applied. This must be agreed in advance with APHA and the test centre.

B.7.4 A sample of 250 g of untreated seed (or a minimum number of 500 seeds if seed weight is small) will be made available from the Field Pea VCU submission for authentication by the DUS Centre against the original submission. (Section B.2.3 Field Pea Protocol for Official Examination of Value for Cultivation and Use (VCU)).

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 Field Pea and Pea.

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 DUS Test Centre is responsible for selecting a suitable site which should be on ground that has normally not had a Legume crop in the previous five years 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 weeds, 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.

C.5.4 From information given in the TQ the candidate variety may be grown in plots and compared with varieties which are in the same classification for the following characters:

UPOV characteristics that can be used for grouping:

Plant: anthocyanin coloration (characteristic 1)

Stem: fasciation (characteristic 3)

Stem: length (characteristic 4)

Stem: number of nodes up to and including first fertile node (characteristic 5)

Leaf: leaflets (characteristic 8)

Stipule: flecking (characteristic 20)

Only varieties with stem fasciation absent:

Plant: maximum number of flowers per node (characteristic 25)

Pod: length (characteristic 37)

Pod: parchment (characteristic 39)

Excluding varieties with pod parchment:

Pod: thickened wall (characteristic 40)

Only varieties with Pod: thickened wall: absent:

Pod: shape of distal part (characteristic 41)

Pod: curvature (characteristic 42)

Pod: colour (characteristic 43)

Immature seed: intensity of green colour (characteristic 47)

Seed: type of starch grains (characteristic 49)

Seed: colour of cotyledon (characteristic 52)

Only varieties with plant anthocyanin coloration present:

Seed: marbling of testa (characteristic 53)

Only varieties with plant anthocyanin coloration present:

Seed: violet or pink spots on testa (characteristic 54)

Seed: hilum colour (characteristic 55)

Seed: weight (characteristic 57)

Resistance to *Fusarium oxysporum* f. sp. *pisi* (Characteristic 58)

Resistance to *Erysiphe pisi* Syd. (Characteristic 59)

Additional grouping characters used in the UK:

Seed: shape (characteristic 48)

Seed: corrugatus (Marrowfat) (UK approved characteristic – see D.5.3)

Plant: habit (UK approved characteristic – see D.5.3)

Foliage: colour (characteristic 6)

Flower: wing colour (varieties with plant anthocyanin only) (characteristic 26)

Pod: intensity of green colour (to confirm immature seed colour) (characteristic 44)

Pod: suture strings (varieties with thickened pod wall only) (characteristic 45)

C.5.5 Varieties known to be clearly different from the candidate on any other discontinuous or continuous characteristic may be excluded from the trial. If this exclusion is based on a characteristic which is not listed in Section D 5.2, approval by the NLSC must be sought. See Section F for further information on additional characters.

C.5.6 Each test should result in a total of at least 100 plants, which should be divided between two or more replicates.

C.5.7 The tests are carried out using a grouped design, with a plot of each candidate and close control variety present in each replicate as follows:

- Number of replications 2 or more
- Number of rows per plot 2 (each side of wire netting)
- Spacing between plot rows 0.2 m (approx.)
- Plot length 3 m
- Number of plants per replicate 220
- Hence, number of plants per variety 440
- Plant spacing 0.025 m (approx.)

Groups are randomised and varieties are randomised with groups.

C.5.8 Seed is hand sown in the field between late March and early May according to a plan produced by the Test Centre. Varieties are coded by the Test Centre.

C.5.9 Any candidate with distinctness problems in the first test cycle may be grown side by side with their close controls in the second or third test cycles.

C.5.10 Recordings are taken on each trial from approximately 6 weeks after sowing until harvest maturity stage. Characters recorded are listed in Section D.

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.5.2, are recorded on all candidates and their close controls. The data for measured characters are analysed and used to assess the distinctness and uniformity of the candidate varieties. (For details see Section G).

C.6.4 In the second test cycle, characters, as indicated in Section D, are assessed on all varieties in test and the data analysed and, together with those from the first test cycle, are

used to assess the distinctness and uniformity of the candidate varieties. (For details see Section G).

C.6.5 If a third test cycle is necessary, characters, as indicated in Section D.5.2, are recorded on all candidates and their close controls. The data for measured characters are analysed and, together with those from the first and second test cycles, are used to assess the distinctness and uniformity of the candidate varieties. (For details see Section G).

C.6.6 If the Test Centre notices unusual or novel characters in a candidate, a note may be made of those at any time and a photographic record made.

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 The minimum duration of tests to assess characteristics is normally two independent growing cycles. Shorter duration 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 UPOV

G a grouping characteristic

Type of observation of characteristics:

MG Single measurement of a group of plants or part 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 - 20 plants or parts of plants

Scored Characteristics: Sample size – all plants in test (at least 100 plants per variety)

D.5.2 Field Pea and Pea Characteristics Routinely Recorded in DUS Tests

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--------------------------------------|-------------------|--|------------------------------------|--|---|---|
| 95 | 1*G | Plant: anthocyanin coloration | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| 56 | 2 | Stem: anthocyanin coloration of axil | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 absent 2 single ring 3 double ring | Clear visual difference 1 state | Off-type standard |
| 09 | 3*G | Stem: fasciation | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| 70 | 4*G | Stem: length | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS | 1 very short 3 short 5 medium 7 long 9 very long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|-------------------|--|------------------------------------|--|---|---|
| 71 | 5*G | Stem: number of nodes up to and including first fertile node | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS | 1 very few 3 few 5 medium 7 many 9 very many | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 45G | 6* | Foliage: colour | DUS plot | At least 100 plants from 2 replicates | PQ VG | 1 yellow green 2 green 3 blue green | Clear visual difference 1 state | Off-type standard |
| 46 | 7 | <u>Only varieties with foliage colour: green</u> Foliage: intensity of colour | DUS plot | At least 100 plants from 2 replicates | QN VG | 3 light 5 medium 7 dark | Clear visual difference 2 states | Visual assessment score > 5 |
| 92 | 8*G | Leaf: leaflets | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| 72 | 9 | Leaf: maximum number of leaflets | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 few 5 medium 7 many | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|------------------------------------|-------------------|--|------------------------------------|--|--|--|
| 109 | 10 | Leaflet: size | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 1 very small 3 small 5 medium 7 large 9 very large | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 50 | 11 | Leaflet: length | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 short 5 medium 7 long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 51 | 12 | Leaflet: width | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 narrow 5 medium 7 broad | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 36 | 13 | Leaflet: position of broadest part | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 1 at middle or slightly towards base 2 moderately towards base 3 strongly towards base | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--------------------|-------------------|--|------------------------------------|--|--|--|
| 53 | 14 | Leaflet: dentation | DUS plot | At least 100 plants from 2 replicates | QN VG | 1 absent or very weak 3 weak 5 medium 7 strong 9 very strong | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |
| 41 | 15* | Stipule: length | DUS Plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 short 5 medium 7 broad | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 44 | 16* | Stipule: width | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 narrow 5 medium 7 broad | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 100 | 17 | Stipule: size | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 small 5 medium 7 long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|------------------------------------|-------------------|--|------------------------------------|--|--|--|
| 103 | 18 | Stipule: length from axil to tip | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 short 5 medium 7 long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 101 | 19 | Stipule: length of lobe below axil | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 1 absent or very short 3 short 5 medium 7 long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 43 | 20*G | Stipule: flecking | DUS Plot | At least 100 plants from 2 replicates | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| 37 | 21 | Stipule: density or flecking | DUS plot | At least 100 plants from 2 replicates | QN VG | 1 very sparse 3 sparse 5 medium 7 dense 9 very dense | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|---|-------------------|--|------------------------------------|--|--|--|
| 03 | 22 | Petiole: length from axil to first leaflet or tendril | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 short 5 medium 7 long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 110 | 23 | <u>Only varieties with leaflets absent</u> : Petiole: length from axil to last tendril | DUS plot | At least 100 plants from 2 replicates | QN MS/VG | 3 short 5 medium 7 long | Clear visual difference or 2 states or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 113 | 24* | Time of flowering | DUS plot | At least 100 plants from 2 replicates | QN MG | 1 very early 3 early 5 medium 7 late 9 very late | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 19 | 25*G | <u>Only varieties with stem fasciation absent</u> : Plant: maximum number of flowers per node | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 1 one 2 one to two 3 two 4 two to three 5 three 6 three to four 7 four or more | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 Off-type standard tests |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|-------------------|--|------------------------------------|---|--|--|
| 34G | 26* | <u>Only varieties with plant anthocyanin coloration present:</u> Flower: colour of wing | DUS plot | At least 100 plants from 2 replicates | PQ VG | 1 white with pink blush 2 pink 3 reddish purple | Clear visual difference 1 state | Visual assessment score > 5 Off-type standard |
| 31 | 27 | <u>Only varieties with plant anthocyanin coloration absent:</u> Flower: colour of standard | DUS plot | At least 100 plants from 2 replicates | PQ VG | 1 white 2 whitish cream 3 cream | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |
| 25 | 28 | Flower: width of standard | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 narrow 5 medium 7 broad | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 26 | 29* | Flower: shape of base of standard | DUS plot | At least 100 plants from 2 replicates | QN VG | 1 strongly raised 3 moderately raised 5 level 7 moderately arched 9 strongly arched | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--------------------------------------|-------------------|--|------------------------------------|--|--|--|
| N/A | 30 | Flower: undulation of standard | DUS plot | At least 100 plants from 2 replicates | QN VG | 1 absent or very weak 3 weak 5 medium 7 strong 9 very strong | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |
| 22 | 31 | Flower: width of upper sepal | DUS plot | At least 100 plants from 2 replicates | QN VG | 3 narrow 5 medium 7 broad | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |
| N/A | 32 | Flower: shape of apex of upper sepal | DUS plot | At least 100 plants from 2 replicates | PQ VG | 1 acuminate 2 acute 3 rounded | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |
| 112 | 33 | Peduncle: length of spur | DUS plot | At least 100 plants from 2 replicates | QN MS/VS | 3 short 5 medium 7 long | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|-------------------|--|------------------------------------|--|--|--|
| 07 | 34 | Peduncle: length from stem to first pod | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 3 short 5 medium 7 long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 111 | 35 | Peduncle: length between first and second pods | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VS | 3 short 5 medium 7 long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 78 | 36 | Peduncle: number of bracts | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS | 1 absent or few 2 medium 3 many | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 74 | 37*G | Pod: length | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 1 very short 3 short 5 medium 7 long 9 very long | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|-------------------|--|------------------------------------|--|--|--|
| 75 | 38* | Pod: width | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS/VG | 1 very narrow 3 narrow 5 medium 7 broad 9 very broad | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 90 | 39*G | Pod: parchment | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 absent or partial 2 entire | Clear visual difference 1 state | Off-type standard |
| N/A | 40*G | <u>Excluding varieties with pod parchment: entire:</u> Pod: thickened wall | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| 62 | 41*G | <u>Only varieties with pod: thickened wall: absent:</u> Pod: shape of distal part | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 pointed 2 blunt | Clear visual difference 1 state | Off-type standard |
| 61 | 42*G | Pod: curvature | DUS plot | At least 100 plants from 2 replicates | QN VG | 1 absent or very weak 3 weak 5 medium 7 strong 9 very strong | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|-------------------|--|------------------------------------|---|--|--|
| 79 | 43*G | Pod: colour | DUS plot | At least 100 plants from 2 replicates | PQ VG | 1 yellow 2 green 3 blue-green 4 purple | Clear visual difference 1 state | Off-type standard |
| 67G | 44 | <u>Only varieties with pod colour green</u> Pod: intensity of green colour | DUS plot | At least 100 plants from 2 replicates | QN VG | 3 light 5 medium 7 dark | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |
| 88G | 45* | <u>Excluding varieties with pod parchment: entire:</u> Pod: suture strings | DUS plot | At least 100 plants from 2 replicates | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| 76 | 46* | Pod: number of ovules | DUS plot | 20 plants (10 plants from 2 replicates) | QN MS | 3 few 5 medium 7 many | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 year tests |
| 68 | 47*G | Immature seed: intensity of green colour | DUS plot | 20 plants (10 plants from 2 replicates) | QN VG | 3 light 5 medium 7 dark | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|---|-------------------|---|------------------------------------|---|--|---|
| -G | 48 | Seed: shape | Submitted seed | At least 200 seeds (excluding 'end' seeds in the pod) | PQ VG | 1 ellipsoid 2 cylindrical 3 rhomboid 4 irregular | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| 86 | 49*G | Seed: type of starch grains | Submitted seed | Sequential sampling up to a maximum of 20 seeds | QL VG | 1 simple 2 compound | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| 91 | 50* | <u>Only varieties with seed shape: cylindrical; and type of starch grains: simple.</u> Seed: wrinkling of cotyledon | Harvest seed | At least 200 seeds | QL VG | 1 absent 9 present | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|-------------------|---|------------------------------------|---|--|---|
| 24 | 51* | <u>Only varieties with seed:</u> <u>type of starch grains:</u> <u>compound:</u> Seed: intensity of wrinkling of cotyledon | Harvest seed | At least 200 seeds | QN VG | 3 weak 5 medium 7 strong 9 very strong | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| 85 | 52*G | Seed: colour of cotyledon | Submitted seed | Sequential sampling up to a maximum of 20 seeds | PQ VG | 1 green 2 yellow 3 orange | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| 98 | 53*G | <u>Only varieties with plant anthocyanin coloration present:</u> Seed: marbling of testa | Submitted seed | At least 200 seeds | QL VG | 1 absent 9 present | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|-------------------|--|------------------------------------|--|--|---|
| 84 | 54*G | <u>Only varieties with plant anthocyanin coloration present:</u> Seed: violet or pink spots on testa | Submitted seed | At least 200 seeds | QL VG | 1 absent 2 faint 3 intense | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| 82 | 55*G | Seed: hilum colour | Submitted seed | At least 200 seeds | QL VG | 1 same colour as testa 2 darker than testa | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| N/A | 56 | <u>Only varieties with plant anthocyanin coloration present:</u> Seed: colour of testa | Submitted seed | At least 200 seeds | PQ VG | 1 reddish brown 2 brown 3 brownish green | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |

| UK No. | UPOV TG/7/10 Rev. 2 2022 | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method: standard applied |
|--------|--------------------------|--|---|--|------------------------------------|--|--|---|
| 80 | 57*G | Seed: weight | Harvest seed | 200 seeds | QN MG | 1 very low 3 low 5 medium 7 high 9 very high | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| 96 | 58G | Resistance to <i>Fusarium oxysporum</i> f. sp. <i>pisii</i> Race 1 | Laboratory raised plants | 20 plants | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | 59G | Resistance to <i>Erysiphe pisi</i> Syd. | Laboratory raised plants or additional field plot | 20 plants in lab or at least 100 plants in field | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | 60 | Resistance to <i>Ascochyta pisi</i> . Race C | Laboratory raised plants | 20 plants | QL VG | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |

D.5.3 Previously Approved Characteristics Not Routinely Recorded in DUS Tests

The following table summarises characteristics no longer used which have been approved by the NLSC and can be examined at the request of the applicant where necessary to establish Distinctness. A fee may be charged for examination of these characteristics as advised by APHA, Plant Varieties and Seeds.

| UPOV | UK | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method and standard applied |
|------|-----|---|-------------------|--|--|-----------------------|--|---|
| N/A | N/A | Seed: accreted funicle | Submitted seed | At least 200 seeds: | Visually scored on representative sample | 1 absent 9 present | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |
| N/A | G | Seed: <i>corrugatus</i> (rimpling, not wrinkling) - marrowfat types | Submitted seed | At least 200 seeds | Visually scored on representative sample | 1 absent 9 present | Clear visual difference 1 state | If there is evidence of a mixture, Uniformity will be assessed on a sample of single plants. Off-type standard |

| UPOV | UK | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method and standard applied |
|------|-----|---|-------------------|--|--|--|--|---|
| N/A | 01 | Plant: height at flowering | DUS plot | At least 100 plants from 2 replicates | Measured (one representative measurement per plot) | 1 very short 3 short 5 medium 7 tall 9 very tall | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 Off-type standard |
| N/A | N/A | Plant: height after flowering | DUS plot | At least 100 plants from 2 replicates | Measured (one representative measurement per plot) | 1 very short 3 short 5 medium 7 tall 9 very tall | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 Off-type standard |
| N/A | 11 | Plant: habit | DUS plot | At least 100 plants from 2 replicates | Visual observation | 1 dwarf 9 tall | Clear visual difference | Visual assessment score > 5 Off-type standard |
| N/A | 12 | Time of flowering (80% plants with one flower open) | DUS plot | At least 100 plants from 2 replicates | Dated (one representative value per plot) | 1 very early 3 early 5 medium 7 late 9 very late | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 years tests |

| UPOV | UK | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method and standard applied |
|------|-----|--|-------------------|--|--|-----------------------|--|-------------------------------|
| N/A | N/A | Foliage: silvery grey colour | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Foliage: emerald (reduced wax) | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Leaf: waxiness of surface of upper leaflet | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | 93 | Stipule: type of development | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Stipule: 'rabbit-eared' stipules | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |

| UPOV | UK | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method and standard applied |
|------|-----|--|-------------------|--|--|--------------------------------|--|--|
| N/A | N/A | Stipule: waxiness of surface of upper stipule | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Flower: cerise colour | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | 27 | <u>Reddish purple flowered varieties only:</u> Flower: intensity of colour of the standard | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 3 weak 5 medium 7 strong | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |
| N/A | 35 | <u>Reddish purple flowered varieties only:</u> Flower: intensity of reddish purple coloration of wing | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 3 weak 5 medium 7 strong | Clear visual difference or 2 states | Visual assessment score > 5 Off-type standard |

| UPOV | UK | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method and standard applied |
|------|-----|---|-------------------|--|---|---|--|-------------------------------|
| N/A | N/A | Pod: type of concave curvature | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 along pod length 2 towards pod tip | Clear visual difference or 2 states | Off-type standard |
| | | | | | | | | |
| N/A | 87 | <u>Varieties with anthocyanin only</u> : Pod: anthocyanin coloration of suture | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | 83 | <u>Varieties with anthocyanin only</u> : Pod: spots of anthocyanin coloration on outer wall | DUS plot | At least 100 plants from 2 replicates | Visually scored plot score on 2 replicates | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Resistance to Race 2 of Pea Wilt (<i>Fusarium oxysporum</i> f. sp. <i>pisi</i>) | Submitted seed | 36 plants | Visual observation on inoculated young plants | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |

| UPOV | UK | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method and standard applied |
|------|-----|--|-------------------|--|---|-----------------------|--|-------------------------------|
| N/A | N/A | Resistance to <i>Pseudomonas syringae</i> pv <i>pisi</i> Pathovar 2 | Submitted seed | 40 plants | Visual observation on inoculated young plants | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Resistance to <i>Pseudomonas syringae</i> pv. <i>pisi</i> Pathovar 4 | Submitted seed | 40 plants | Visual observation on inoculated young plants | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Resistance to Seed-borne Mosaic Virus (SbmV), Strain P1 | Submitted seed | 40 plants | Visual observation on inoculated young plants | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Resistance to Bean Yellow Mosaic Virus (BYMV) | Submitted seed | 40 plants | Visual observation on inoculated young plants | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |
| N/A | N/A | Resistance to Pea Enation Mosaic Virus (PEMV) | Submitted seed | 40 plants | Visual observation on inoculated young plants | 1 absent 9 present | Clear visual difference 1 state | Off-type standard |

| UPOV | UK | Character | Material examined | Number of plants or sample size for assessment | Method of assessment and recording | States of expression | D Method and Minimum Distance required | U Method and standard applied |
|------|-----|---|-------------------|--|------------------------------------|-------------------------------|--|---|
| N/A | N/A | Height of scale lobe (right hand side) on 2 nd Scale Leaf | Glasshouse plot | As advised by IDSG and approved by the NLSC | Measured | 3 short 5 medium 7 tall | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 years tests |
| N/A | N/A | Height of central spike/lobe on 2 nd Scale Leaf | Glasshouse plot | As advised by IDSG and approved by the NLSC | Measured | 3 short 5 medium 7 tall | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 years tests |
| N/A | N/A | Internode: diameter between 1 st and 2 nd fertile nodes at full green pod stage | Glasshouse plot | As advised by IDSG and approved by the NLSC | Measured | 3 short 5 medium 7 tall | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 years tests |
| N/A | N/A | Stipule maximum length at node 3 | Glasshouse pot | As advised by IDSG and approved by the NLSC | Measured | 3 short 5 medium 7 tall | Clear visual difference or COYD @ 2% for both 2 and 3 year tests | Visual assessment score > 5 or COYU @ 0.1% for both 2 and 3 years tests |

New Additional DUS Characteristics: Applicants can suggest new characters on the TQ 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 quality standards, a small portion of the seed is sown for observation and measurement. The remainder is stored under controlled and monitored storage 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 have low quantity, a request will be made to the maintainer asking for a replacement stock of the variety. This replacement stock must be authenticated, by comparing plots established from the replacement seed with that of the definitive seed, over a maximum of two test cycles.

E.4.3 If the replacement seed sample cannot be visually distinguished from the definitive reference stock, it will be accepted as representing the variety. If there are visual differences, the new sample will be recorded and will be accepted as representing the variety if there are no significant ($P=0.02$) differences in the first recording cycle, or no significant ($P=0.02$) differences over two test cycles in a COYD analysis (see associated document UPOV TGP/8/1 for details). It may then be accepted as definitive and

substituted for the existing definitive stock in the reference collection. These procedures may be modified, where, in the opinion of the technical officer, differences are the result of environmental or cultural factors.

E.4.4 A replacement sample or an additional replacement sample will be considered sufficiently uniform after one recording cycle, if the level of off-types is the same or less than the number at 1% population standard and 95% acceptance probability, and the standard deviations of the measured characters are not significantly greater at the 0.1% ($P=0.001$) significance level than that of the mean standard deviations of the control varieties. Over 2 years the additional replacement sample will be considered sufficiently uniform if the Combined Over Years Uniformity (COYU) is not significantly greater at the 0.1% ($P=0.001$) significance level than that of the reference varieties. These procedures may be modified, where, in the opinion of the technical officer, differences are the result of environmental or cultural factors.

E.4.5 In the event of the replacement sample not meeting the required acceptance standards, an additional replacement sample is requested. Plots will be established from any additional replacement seed sample and compared over a maximum of two test cycles. 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 Evidence will be requested from the applicant of the relationship between the VCU seed sample and the definitive DUS seed sample. Plots will be established from any VCU seed sample to be authenticated and compared visually with the definitive stock over the recording cycle.

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 reference stock it will be accepted as representing the variety.

E.5.4 If the VCU seed sample is visually clearly different from the definitive stock in the authentication plots, then it will not be accepted as representing the candidate variety. This procedure may be modified, where, in the opinion of the technical officer, differences are the result of environmental or cultural factors.

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, it must be included in the reference collection if seed is available. A request for seed will be sent by the Test Centre to the maintainer of the variety, and an official description will be requested from the Testing Authority which registered the variety. If an official description is provided, seed received will be assumed to be definitive if the seed conforms to the official description. Small differences in the expression of quantitative characters are likely to be the result of recording in a different environment and will be considered as conforming to the description. If no official description is available, seed will be assumed to be definitive.

E.6.2 If the seed does not conform to the official description to an acceptable standard, the sample shall not be accepted as definitive. A replacement sample will be requested and the relevant Testing Authority informed. The standards for the validation will be as for authentication of replacement seed (seed E4).

E.7 Release of Reference Samples for Authorised Purposes

E.7.1 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, 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.

E.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 Characters

F.1 Purpose

F.1.1 This section sets out the procedures for assessment of new additional DUS characters for varieties of field pea and pea entered for Variety Listing 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.5.1, 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 used to assess distinctness, uniformity and stability of varieties of Field Pea and Pea.

G.2 Scope

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

G.3 Responsibilities

G.3.1 The 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 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 Distinctness is normally assessed in two independent test cycles, but a candidate variety could be considered distinct after one test cycle if there are no other similar varieties. A third independent test cycle may be undertaken if distinctness is not established after two test cycles.

G.5.3 The distinctness standard applied for qualitative characters is a difference of one state, unless otherwise indicated in Section D. For pseudo-qualitative characters the distinctness standard is a difference of 1, 2 or 3 states depending on the characteristic.

G.5.4 If a candidate is clearly different in a visually observed quantitative character, it is considered to be distinct, without the need for repeated observation.

G.5.5 Where varieties are grown in close proximity under the same conditions, and a direct comparison can be made, a candidate is considered to be distinct if a clear visual difference is observed in a quantitative character.

G.5.6 Where varieties are not grown in close proximity, a candidate is considered to be distinct if a difference of at least two states (see table in section D 5.2 and D 5.3) is recorded in a visually observed quantitative character.

G.5.7 The standard for measured or counted quantitative characters, is, at least, a 2% ($P = 0.02$) significant difference in one character over two or three test cycles in a Combined Over Years Distinctness (COYD) analysis. Please see associated document UPOV TGP/8/1 for details.

G.5.8 Where COYD cannot be applied, alternative methods should be considered.

G.5.8.1 When the number of varieties grown does not provide sufficient degrees of freedom for use of the standard COYD analysis, alternative methods should be adopted. If there is sufficient historical data (at least 5 years and sufficient degrees of freedom) then the long-term LSD is applied. This LSD is calculated using up to 10 years of the most recent data. If there is insufficient historical data, the 2 x 1% method should be used.

G.5.8.2 Where the candidate has a full complement of data for two test cycles, but there is only data for control varieties for one test cycle, the use of FITC (Fitted Constant program in DUST) may be applied. This situation may arise due to the loss of plant material within plots in any one year or where suitable control varieties were not grown in both test cycles. The standard applied for Distinctness in such cases is $P = 0.01$.

G.6 Uniformity

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

Uniformity based on the assessment of 'Off-types'

G.6.2 The assessment of Off-types is undertaken in both test cycles and the total number of 'off-types' combined should not exceed the number allowed using the population standards.

G.6.3 Off-type plants in the glasshouse or field are identified and marked for exclusion from recording.

G.6.4 The total number of off-type plants recorded in the test, should not exceed the number indicated in UPOV TGP/8/1 using a population standard of 1% and a 95% acceptance probability. In a population of 440 plants, 8 off-types are allowed.

G.6.5 Where the number of off-types in the first test cycle exceeds 8 but is less than 15, the applicant may submit a new seed sample (Resubmission) in the second test cycle with the aim of meeting the off-type standard. Distinctness will be assessed on data from the original seed submitted in the first test cycle and on data from the resubmitted seed in the second test cycle. The resubmitted seed will be authenticated against the original seed in side by side plots.

G.6.6 After the variants have been excluded, the characteristics listed in Section D.5 are used to assess the uniformity of the remaining plants, according to the methods described.

Uniformity based on the assessment of general variation where no measurements are recorded:

G.6.7 Uniformity of continuous variation (quantitative characters) is assessed visually according to the following scale:

| Score | Description |
|--------------|---------------------------|
| 1-5 | unacceptable (1 is worst) |
| 6-9 | acceptable (9 is best) |

A candidate with a visual uniformity score of 6 or more is satisfactory.

Uniformity based on the assessment of general variation where measurements are recorded:

G.6.8 Provided a variety meets the off-type standard, it can be considered sufficiently uniform after two, or three, test cycles if, for all measured characters necessary for distinctness, the Combined Over Years Uniformity (COYU) analysis is not significantly greater than that of the reference varieties at the 0.1% ($P = 0.001$) significance level (see document TGP/8/1). In all cases an examination of data from individual test cycles is carried out to investigate the uniformity problem indicated by the COYU result. Decisions on whether any outlier plants (off-types) identified by data analysis should be excluded from the calculation of variety means and standard deviations, should be taken by the Test Centre.

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.