Animal &
Plant Health
Agency

United Kingdom Variety List Trials: Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) Harvest 2024

Field peas – spring and winter sown

Appendices

July 2023

Changes

Contents

Scope

This document contains the appendices for the main guidance document:

Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) Harvest 2024 – Field peas – spring and winter sown

Appendix 1 – Approved Trial Organisers/ Operators

Spring sown peas

Activity	Organisers / operators responsible
Data Handling Operator	BioSS
Trials Organiser	BSPB
Pathology Trials Operator	NIAB
Trial Inspection Operator	PGRO
Technical Validation Operator	NIAB
Quality Testing Operators	NIAB/SASA
Data Review and Standards Setting Operator	NIAB

Winter sown peas

Activity	Organisers / operators responsible
Data Handling Operator	NIAB
Trials Organiser	BSPB
Growing Trial Operator	LSPB
Seed Handling Operator	NIAB
Pathology Trials Operator	NIAB
Trial Inspection	PGRO
Technical Validation Operator	NIAB
Quality Testing Operators	NIAB/SASA
Data Review and Standards Setting Operator	NIAB

Appendix 2 – Seed treatment and fungicide products for use on VL trials

To be advised.

Appendix 3 – Seed despatch deadline dates

VCU seed must be delivered to each Seed Handler by:

Spring sown peas – 31 January

Winter sown peas – 1 October

Authentication samples, if requested, must be delivered to the appropriate DUS Test Centre.

Appendix 4 – Growing Trial Operators and Trial Locations

Spring sown peas

Growing Trial Operator	Seed Handling Operator (If not Trial Operator)	Location of trial
NIAB	Trial Operator	Petham, Kent
PGRO	Trial Operator	Stubton, Lincolnshire
Darlow Contract Services	Trial Operator	Soham, Cambridgeshire
NIAB	Trial Operator	Sutton Scotney, Hampshire
NIAB	Trial Operator	Headley Hall, North Yorkshire

Winter sown peas

Growing Trial Operator	Seed Handling Operator (If not Trial Operator)	Location of trial
LSPB	Trial Operator	Impington, Cambridgeshire

Pathology Trials Operator

Pathology Trials Operator	Location of Trial
NIAB	Cambridge

Appendix 5 – Control varieties for VCU assessments

Spring peas

Yield controls:
Bluetime
KAMELEON

Quality controls:
Sakura (for comparison with marrowfat pea candidates)

Pathology benchmark varieties:
Downy Mildew: Kahuna
Bibao
Maro

Winter peas

Yield controls:
Dexter
Lapony

Appendix 6 – Dates by which records should be submitted

To Trials Organiser

Record	Latest date of receipt by Trials Organiser
Site data part 1(including site sketch)	Within 2 months of drilling trial (autumn sown trials). Within one month of drilling trial (spring sown trials)
Site data part 2	By the time trials are harvested
Plot records (in approved electronic format)	Growing Trial Operator should notify Trials Organiser that trial has been harvested within 2 days of harvest

Plot records to Data Handling Operator

Record	Date
Plot records SHOULD be sent to Data Handling Operator	Within 10 days of record being taken

Plot samples to Quality Testing Operator

Samples	Date
Plot samples for quality testing SHOULD be sent to the Quality Testing Operator	Within 2 days of harvest

Appendix 7 – Moisture content

Determination for yield

Moisture content % of harvested material enables yield at 15% moisture content to be calculated.

This can be determined by either of two methods.

1. The Oven Method. Here the sealed sample taken at harvest is dried in an oven until no more moisture can be removed. The dried weight is then recorded and by comparison with the pre-dried sample weight, moisture content can be calculated.

2. Harvesting and conditioning of each plot and then reweighing and measuring moisture content electronically.

Oven method

The following procedure must be followed:

1. A fully representative sub-sample of approx 500 grams is weighed to 1 decimal place and then placed in the drier, which must be at a temperature of 100°C ± 4°C with the air recirculator set in the range 80-100% recirculation in order to restore the temperature to 100°C ± 4°C as rapidly as possible. When the temperature is restored to 100°C ±4°C the air regulator is set at 80% recirculation i.e. 20% fresh hot air. The regulator is critical for rapid drying. The samples are dried at 100°C ±4°C for such time as is necessary for complete drying.

2.The dried sample is carefully removed from the drier as soon as the sample is cool enough for accurate weighing. The dry weight is recorded to one decimal place.

3. When all samples from a given trial have been recorded, the moisture content % must be immediately reported to the Data Handling Operator electronically using the character names given in Section C 6.3

Conditioning and electronic moisture meter method

Conditioning

1. Each plot must be harvested and the entire produce put into clean sacks or other suitable containers, labelled and sealed. The grain parcels should then be dried using a cold/warm air drier where the drying temperature is not in excess of 60°C.

2. The grain should be dried for such time as is necessary to reach equilibrium with their surroundings. The parcels should then be weighed and the moisture content recorded using an appropriate electronic moisture meter as set out below. The moisture content after drying must not exceed 17%.

3. The Growing Trial Operator returns the weight and moisture content to the Data Handling Operator.

Moisture meters

Principles

Moisture meters may only be used for the measurement of grain moisture below 17%. There are no restrictions on the make or model of moisture analyser that may be used, provided the conditions described below are met.

The manufacturer's recommendations for use must be followed. On-combine analysis is not approved, as currently no model is sufficiently accurate over the likely range of moisture contents.

Equipment

The analysing equipment must:

- Be calibrated at least once annually for each crop according to the manufacturer's instructions using check samples (see reference below) and have a moisture content accuracy of plus/minus 0.5%. The calibration data should be retained for a minimum of 1 year.
- Be serviced regularly, especially just prior to harvest, according to manufacturer recommendations. The action taken should be documented and the information held for a minimum of 1 year.
- Be fit for use in accordance with manufacturer instructions. It should have an adequate power supply throughout operation. Instructions should be held with the machine and all operators adequately trained in its operation.

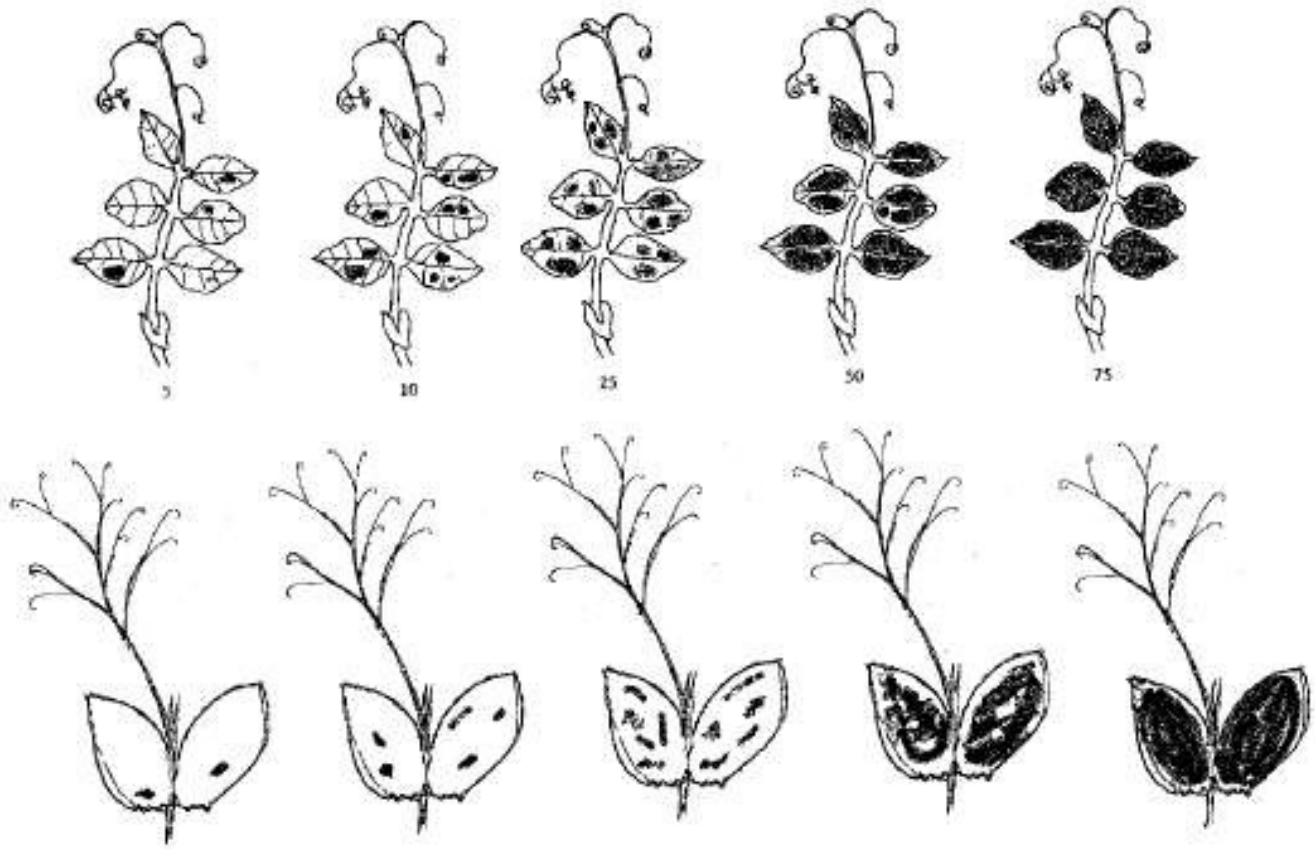
Measuring moisture in conditioned grain

- The grain samples to be analysed must be between 12 to 17% moisture content.
- The grain to be analysed must be fully ripe. In other cases, the samples for the oven method should be used.
- The data must be in the form of moisture content %.

References: BS 4317-24:1990, BS 7700/1-2008 Methods of test for cereals and pulses. Method of checking the calibration of moisture meters for cereals.

Appendix 8 – Disease assessment for pea

Downy Mildew (*Peronospora viciae*)



Appendix 8: diagram illustrating the area of Downy Mildew infection on pea leaves. The area of the pea leaf infected is depicted with examples from: 5 %, 10 %, 25 %, 50 %, to 75 % infection. No observable infection will correspond to a score of 0. This diagram should be used as a guide for carrying out the assessment.

Notes on assessment:

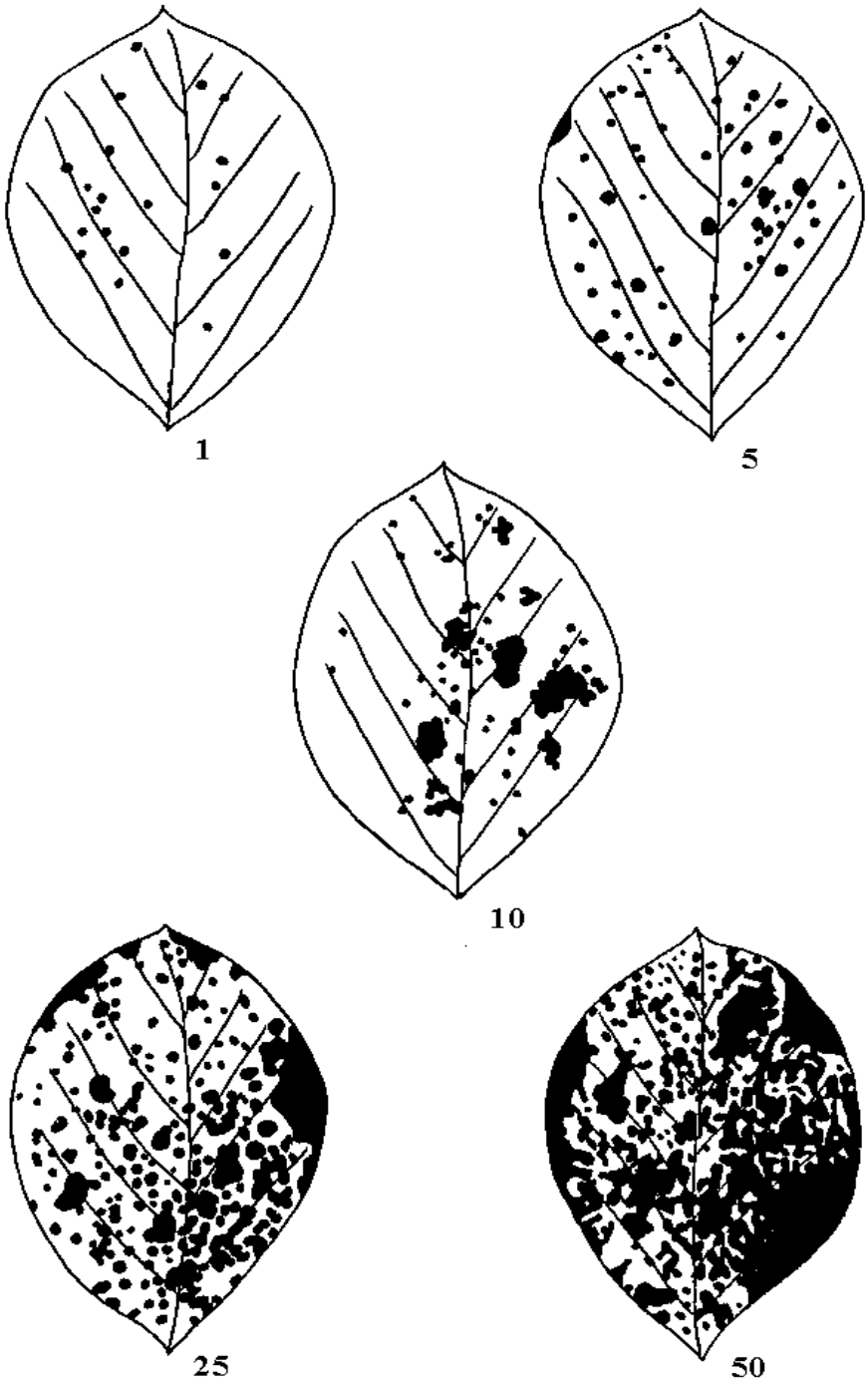
1. Examine all leaves in 3 areas of each plot.

2. Include all chlorosis and necrosis attributable to downy mildew.

3. Where isolated foci of high infection occur, they should be averaged over the area as a whole.

4. Estimate % infection using the illustrations above as a guide. Interpolate values if necessary. Record the average % infection per plot from the 3 areas.

Bacterial blight and mycosphaerella



Appendix 8: diagram illustrating the area of Bacterial Blight on pea leaves. The area of the pea leaf infected is depicted with examples from 1 % to 50 % infection. No observable infection will correspond to a score of 0. This diagram should be used as a guide for carrying out the assessment.

Notes on assessment:

Examine all the leaves on plants within 4 to 6 areas of each plot, each area being approximately $1m^{2.}$ Assess the mean % leaf area infected with disease.

Appendix 9 – Phenological growth stages and BBCH-identification keys of pea (*Pisum sativum* L.)

Weber and Bleiholder, 1990; Feller et al., 1995 b

The extended BBCH-scale is a system for a uniform coding of phenologically similar growth stages of all mono- and dicotyledonous plant species. The decimal code, which is divided into principal and secondary growth stages, is based on the well-known cereal code developed by ZADOKS et al. (1974) in order to avoid major changes from this widely used phenological key.

- The general scale forms the framework within which the individual scales are developed. It can also be used for those plant species for which no special scale is currently available.
- Similar phenological stages of each plant species are given the same code
- For each code, a description is given, and for some important stages, drawings are included
- For the description of the phenological development stages, clear and easily recognised (external) morphological characteristics are used.
- Except where stated otherwise, only the development of the main stem is taken into consideration
- The growth stages refer to representative individual plants within the crop stand. Crop stand characteristics may also be considered.
- Relative values relating to species- and/or variety-specific ultimate sizes are used for the indication of size.
- The secondary growth stages 0 to 8 correspond to the respective ordinal numbers or percentage values. For example stage 3 could represent: 3rd true leaf, 3rd tiller, 3rd node or 30% of the final length or size typical of the species or 30% of the flowers open.
- Post harvest or storage treatment is coded 99.
- Seed treatment before planting is coded 00.

The entire developmental cycle of the plants is subdivided into ten clearly recognizable and distinguishable longer-lasting developmental phases. These principal growth stages are described using numbers from 0 to 9 in ascending order. Owing to the very many different plant species there may be shifts in the course of the development or certain stages may even be omitted. The principal growth stages need not proceed in the strict sequence defined by the ascending order of the figures, but can occasionally also proceed in parallel.

Code Description

Principal growth stage 0: germination

1. Dry seed
2. Beginning of seed Imbibition
03. Seed imbibition complete
05 Radicle emerged from seed
7. Shoot breaking through seed coat
8. Shoot growing towards soil surface, hypocotyl arch visible
9. Emergence: shoot emerges through soil surface ("cracking stage")

Principle growth stage 1: leaf development

10. Pair of scale leaves visible
11. First true leaf (with stipules) unfolded or first tendril developed
12. 2 leaves (with stipules) unfolded or 2 tendrils developed
13. 3 leaves (with stipules) unfolded or 3 tendrils developed

Stages continuous till …..

19. 9 or more leaves unfolded (with stipules) unfolded or 9 or more tendrils developed

Principal growth stage 3: Stem elongation (main shoot)

30 Beginning of stem elongation
31. 1 visibly extended internode [1]
32. 2 visibly extended internodes [1]
33. 3 visibly extended internodes [1]

Stages continuous till …..

39. 9 or more visibly extended internodes [1]

[1] The first internode extends from the scale leaf node to the first true leaf node

Principal growth stage 5: Inflorescence emergence

51. First flower buds visible outside leaves
55. First separated flower buds visible outside leaves but still closed
59. First petals visible, flowers still closed

Principal growth stage 6: flowering

60. First flowers open (sporadically within the population)
61. Beginning of flowering: 10% of flowers open
62. 20% of flowers open
63. 30% of flowers open
64. 40% of flowers open
65. Full flowering: 50% of flowers open
67 Flowering declining
69 End of flowering

Principal growth stage 7: development of fruit

71. 10% of pods have reached typical length; juice exudes if pressed
72. 20% of pods have reached typical length; juice exudes if pressed
73. 30% of pods have reached typical length; juice exudes if pressed. Tenderometer value: 80 TE
74. 40% of pods have reached typical length; juice exudes if pressed. Tenderometer value: 95TE
75. 50% of pods have reached typical length; juice exudes if pressed. Tenderometer value: 105 TE
76. 60% of pods have reached typical length; juice exudes if pressed. Tenderometer value: 115 TE
77. 70% of pods have reached typical length. Tenderometer value: 130 TE
79. Pods have reached typical size (green ripe); peas fully formed

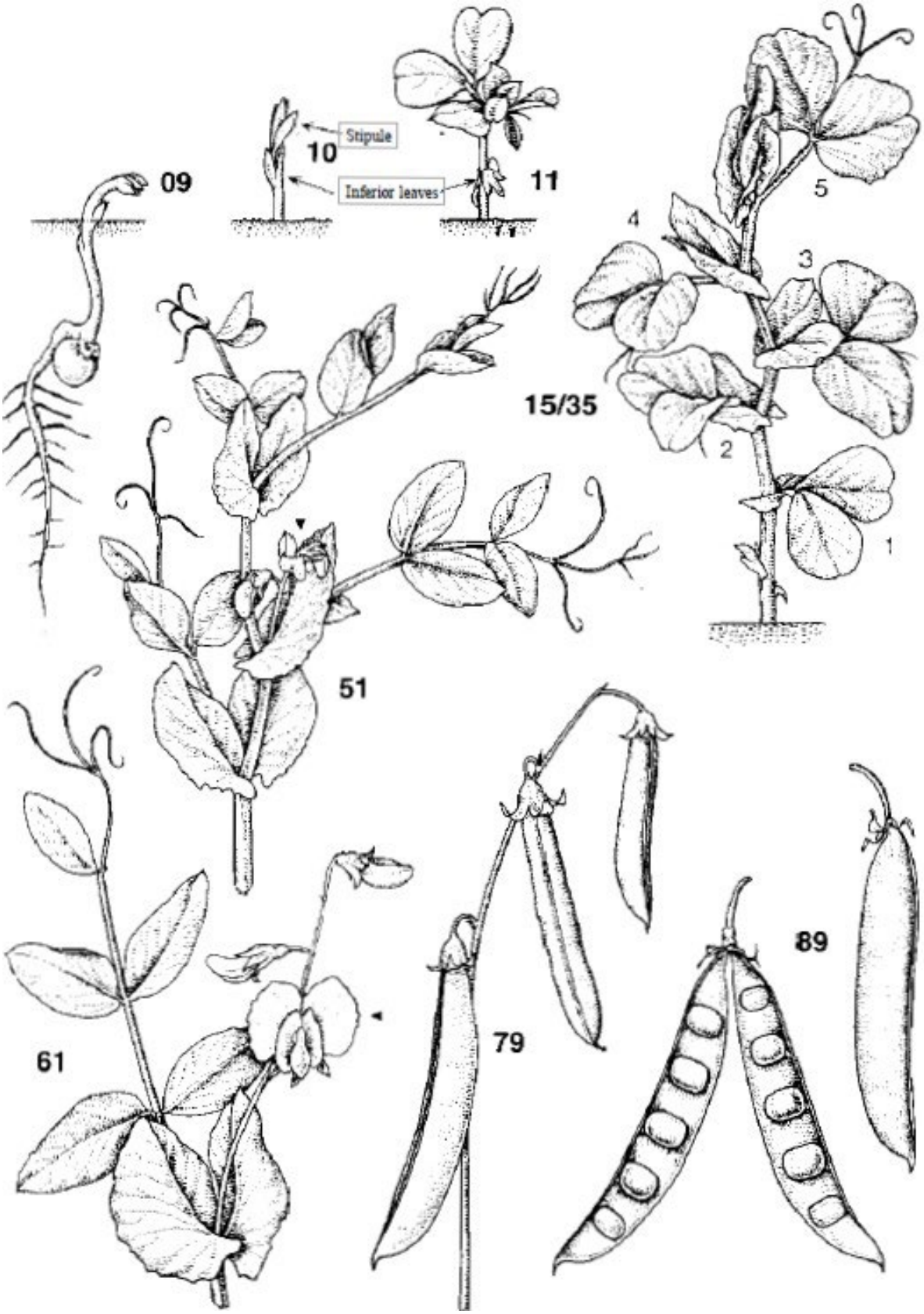
Principal growth stage 8: ripening

81. 10% of pods ripe, seeds final colour, dry and hard
82. 20% of pods ripe, seeds final colour, dry and hard
83. 30% of pods ripe, seeds final colour, dry and hard
84. 40% of pods ripe seeds final colour, dry and hard
85. 0% of pods ripe seeds final colour, dry and hard
86. 60% of pods ripe seeds final colour, dry and hard
87. 70% of pods ripe seeds final colour, dry and hard
88. 80% of pods ripe seeds final colour, dry and hard
89. Fully ripe: all pods dry and brown. Seeds dry and hard (dry ripe)

Principal growth stage 9: senescence

97 Plants dead and dry
99 Harvested product

Pea growth stages



Appendix 9: Diagram illustrating the main growth stages of a Pea plant, as outlined in the section above.

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www.gov.uk/apha

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