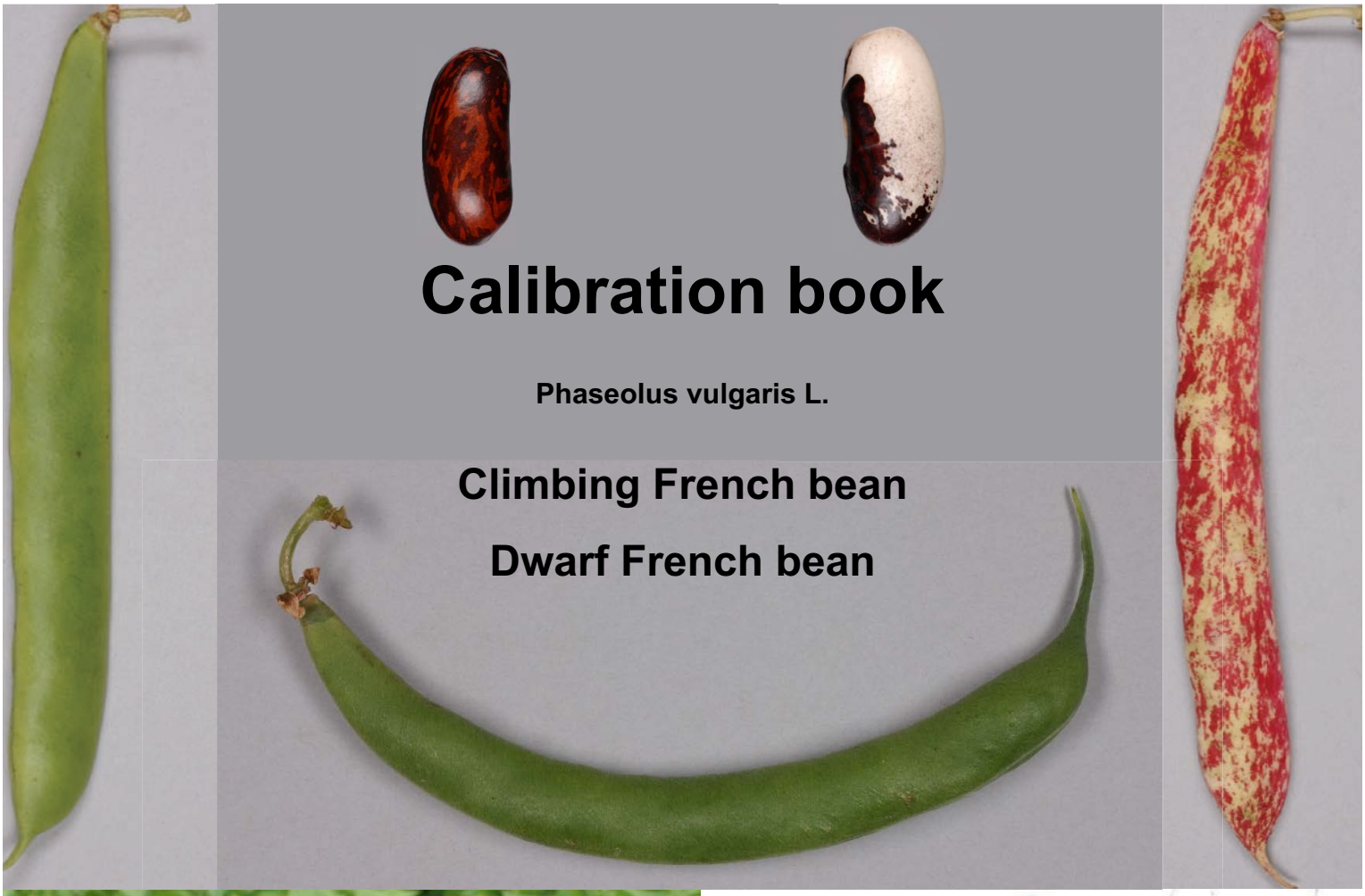

Calibration book

Phaseolus vulgaris L.

Climbing French bean

Dwarf French bean

Version 2

Introduction

The primary function of this French bean calibration book is to supply the user with practical guidance in assessing the official characteristics of this crop. To achieve this we have tried to illustrate and elucidate each characteristic as clear as possible. Since 2010, the year we started to develop calibration books in different crops, they have proved to be of immeasurable help for both the layman in his first acquaintance with a certain crop as the experienced examiner that wants to calibrate and fine-tune his observations. We wish you every success in the use of this manual.

Sources used

The basis for this book is the CPVO protocol TP/012/4 Final that in its turn is based on UPOV Guideline TG/12/9. Please also use these sources for reference when using this calibration book. The application of this calibration book is based on the general UPOV principles on the definitions and use of characteristics of variety descriptions (UPOV TG/1/3).

Websites UPOV and CPVO
The most recent protocol versions, documents and general information can be found on the websites of the UPOV and CPVO

International Union for the Protection of New Varieties of Plants (UPOV)
http://www.upov.int/portal/index.html.en

Community Plant Variety Office (CPVO)
http://www.cpvo.europa.eu/main/en/home

Methodology

The UPOV system is based on the expression of characteristics that are related to the expression values of example varieties. In the calibration book you find two types of characteristics; visually assessed characteristics and measured characteristics. The value of the visually assessed characteristics can be compared with the visual value of the expression of example varieties. In the calibration book you may find drawings or pictures to assist in the decision on the applicable expression. For measured characteristics this is more complicated as in many cases the value of the measurements is depending on the (climatical) conditions of the trials. The use of example varieties in these cases is indispensable. The same applies for those visually assessed characteristics that appear to be sensitive for climate conditions (e.g. anthocyanin coloration).

About Naktuinbouw

Naktuinbouw (Netherlands Inspection Service for Horticulture) is an independent agency carrying out official inspection and certification tasks in horticultural seeds and plants, under accreditation and responsibility of the Dutch government. Naktuinbouw is an Autonomous Public Authority (APA) regulated by the Ministry of Economic Affairs.

Registration and Plant Breeders' Rights
Naktuinbouw is the organisation in the Netherlands authorised to assess varieties of agricultural, floricultural, arboricultural and vegetable crops for distinctness, uniformity and stability (DUS testing) for registration purposes and/or granting Plant Breeders' Rights, both on Dutch and EU level.

Inspection
In the obligatory inspection system, Naktuinbouw applies the prescribed European directives and legislation for propagating material for floricultural, arboricultural and vegetable crops. These directives are anchored in Dutch legislation in the form of the Netherlands Seeds and Planting Materials Act. Naktuinbouw is an independent and unbiased party. Public duties relating to basic inspections that are the responsibility of other quality and/or inspection services (national and international) are not performed or only performed on a cooperative basis.

Voluntary quality inspections

Naktuinbouw also operates various voluntary quality inspections. These systems (Naktuinbouw Elite, NAL) complement the inspections or place more stringent requirements than the legislative directives. One of the areas in which this applies is, for instance, testing plant material for plant health, quality, identity and purity. This testing is carried out for producers of propagating material, either individual companies or groups of producers.

Promoting quality
Naktuinbouw also focuses on promoting quality (partially via a system of quality brands) and certain specialisms. This concerns national and international companies from the entire horticultural chain.

Website Naktuinbouw
http://www.naktuinbouw.eu/en

Helpdesk

For possible remarks, suggestions and questions on the calibration books, you may use the kalibratieboek@naktuinbouw.nl e-mail account.

How to use this manual

To maximise the benefits of this calibration book please note of the following:

- This calibration book was developed in The Netherlands and the photos are taken from material grown under Dutch climate conditions. Characteristics that are sensitive for climate- and environmental conditions can express themselves stronger, weaker, in a different (part of the) scale than presented in this book. Therefore the user should be cautious and always cross-check (calibrate) information gained from this book with locally existing knowledge and conditions.

- Images and photos of certain characteristics such as leaf- and fruit color serve only to illustrate the variation present in the crop and should not be used as an absolute reference.

-  Observations should not be influenced or disturbed by too strong or too weak light conditions.
  Choose a cloudy day, a favourable time or create favourable circumstances for observations

- Use and adapt this calibration-book to fit local conditions.

We appreciate and invite your comments on this calibration book

Regards,

Bert Scholte

Manager Varieties and Trials
Naktuinbouw, The Netherlands

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40	Seed	length
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1 Plant: anthocyanin coloration of hypocotyl

Grouping characteristic: no.

Type of characteristic: **QL** – Qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: After germination; when the hypocotyl can be clearly seen. This is usually between two to four weeks after sowing.

Method of observation: Visually observe the presence of anthocyanin coloration on the hypocotyl.

Notes and states of expression:
1: absent
9: present

2 Plant: growth type

Grouping characteristic: yes.

Type of characteristic: **QL** – Qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: On an adult plant, but before maturity of the pod.

Method of observation: To determine the growth type, visually observe whether the main stem is growing around the wire (climbing bean) or if it stops growing and ends in a flower (pod) (dwarf bean).

Notes, states of expression and example varieties:

1: dwarf	Callide (D), Capitole (D)
2: climbing	Phenomene (C), Bacle (C)

3 Climbing beans only: Plant: architecture

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: On an adult plant, but before maturity of the pod.

Method of observation: Visually observe the architecture of the plant as a whole. When the lower part of the plant is much broader and bearing more leafs than the upper part, the plant has a pyramidal architecture. When the width of the lower part of the plant is similar to the width of the upper part with a similar quantity of leafs, the architecture is considered rectangular.

Notes and states of expression:
1: pyramidal
2: rectangular

3 Climbing beans only: Plant: architecture

1: pyramidal

2: rectangular

1 pyramidal (left) and 2 rectangular (right) side by side

4 Dwarf beans only: Plant: dwarf type

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: On an adult plant, but before the maturity of the pod.

Method of observation: Visually observe whether the sample plants are vining or non-vining.

Notes and states of expression:
1: non-vining
2: vining

5 Dwarf beans only: Plant: height

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: MG/MS/VG – Choice between
- Single measurement of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety
- Measurement of a number of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: On an adult plant, but before maturity of the pod.

Method of observation: Visually observe the height of the plant. Use example varieties to determine the proper note.

Notes and states of expression:
1: very low
2: very low to low
3: low
4: low to medium
5: medium
6: medium to high
7: high
8: high to very high
9: very high

6 <u>Climbing beans only:</u> Plant: start of climbing (80% of plants)

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

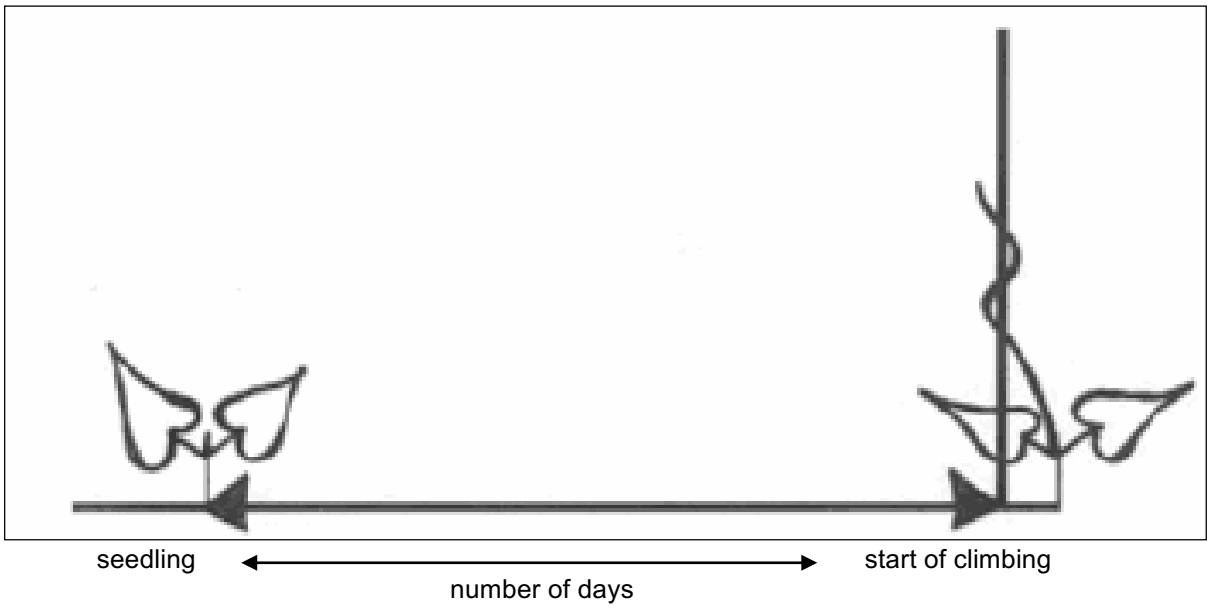
Type of observation: MG/MS/VG – Choice between
- Single measurement of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety
- Measurement of a number of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: As soon as the plants in trial start climbing.

Method of observation: Visually observe when 80 per cent of the plants of one sample are climbing along the wire. Then the starting date of climbing can be noted. Use example varieties in the trials for calibration. The data can be converted into states of expression using the example varieties. E.g. Variety A is known to be scored a 5 (medium). If the new variety starts climbing some days earlier, the correct note is likely to be lower than a 5 (medium).

Notes and states of expression:
1: very early
2: very early to early
3: early
4: early to medium
5: medium
6: medium to late
7: late
8: late to very late
9: very late

CPVO explanation:



7 <u>Climbing beans only:</u> Plant: speed of climbing

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: Cotyledon leaf stage and plant with a height of 1,5 meters.

Method of observation: Observe the number of days between the cotyledon leaf stage and reaching a height of 1.5 meters. Use example varieties to determine the proper note.

Notes and states of expression:
1: very slow
2: very slow to slow
3: slow
4: slow to medium
5: medium
6: medium to rapid
7: rapid
8: rapid to very rapid
9: very rapid

CPVO explanation:
Number of days between the cotyledon leaf stage and reaching a height of 1.5 meters.

8 Leaf: intensity of green colour

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

Method of observation: Visual observation of the adult leafs in the middle third part of the plants. Making use of example varieties helps in determining the proper expression.

Notes, states of expression and example varieties:

1: very light	
2: very light to light	
3: light	Rote von Paris (D), Goldelfe (C)
4: light to medium	
5: medium	Fori (D), Valja (D)
6: medium to dark	
7: dark	Dubra (D), Goldfish (D), Silvia (C)
8: dark to very dark	
9: very dark	Diva (D)

8 Leaf: intensity of green colour

Variety in intensity of green colour of the leafs.

This image serves only to illustrate the variation present in the crop and should not be used as an absolute reference.

9 Leaf: rugosity

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

Method of observation: Visual observation of adult leafs in the middle-third part of the plants. For this characteristic the amount of blisters on the leaf (between the nerves) has to be observed. This means the degree of rugosity and not the size of the blisters themselves. Look at the average plants in the sample and use example varieties to calibrate.

Notes and states of expression:
1: absent or very weak
2: absent or very weak to weak
3: weak
4: weak to medium
5: medium
6: medium to strong
7: strong
8: strong to very strong
9: very strong

10 Terminal leaflet: size

Grouping characteristic: no.

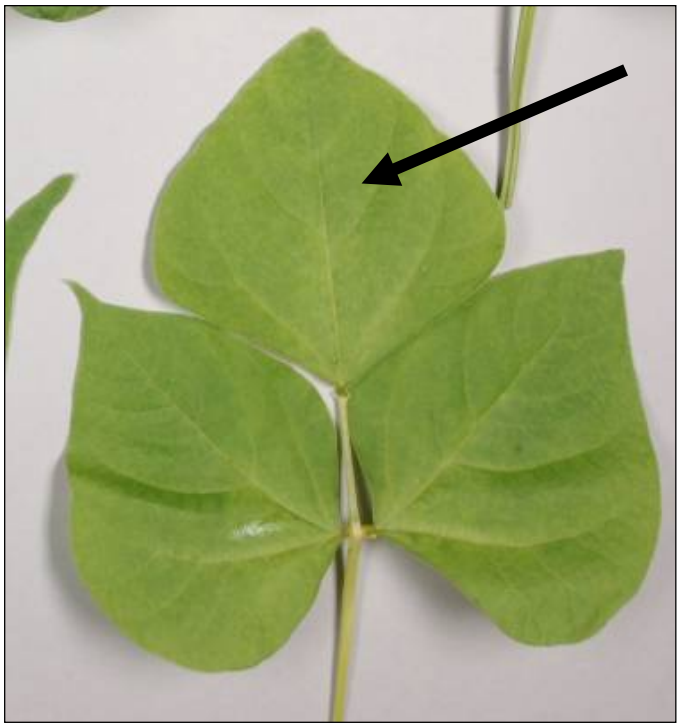
Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

Method of observation: Visual observation of adult leafs in the middle third part of the plants. Describe the average size of terminal leaflets of the leafs in the sample. Use example varieties to calibrate.

Notes and states of expression:
1: very small
2: very small to small
3: small
4: small to medium
5: medium
6: medium to large
7: large
8: large to very large
9: very large



Terminal leaflet of a leaf.

10 Terminal leaflet: size

Variety in size of terminal leaflets.

This image serves only to illustrate the variation present in the crop and should not be used as an absolute reference.

11 Terminal leaflet: shape

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

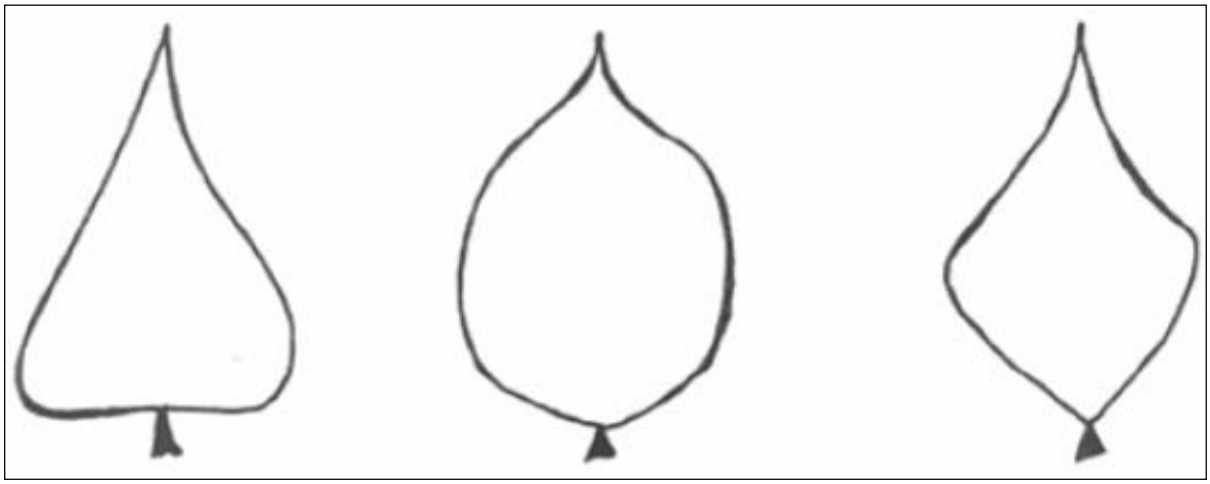
Method of observation: Visual observation of adult leafs in the middle third part of the plants. Describe the average shape of terminal leaflets of the leafs in the sample. Use example varieties to calibrate.

Notes and states of expression:
1: triangular
2: triangular to circular
3: circular
4: circular to quadrangular
5: quadrangular

1: triangular 3: circular 5: quadrangular

11 Terminal leaflet: shape

CPVO explanation:



1: triangular 3: circular 5: quadrangular

12 Terminal leaflet: apex

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

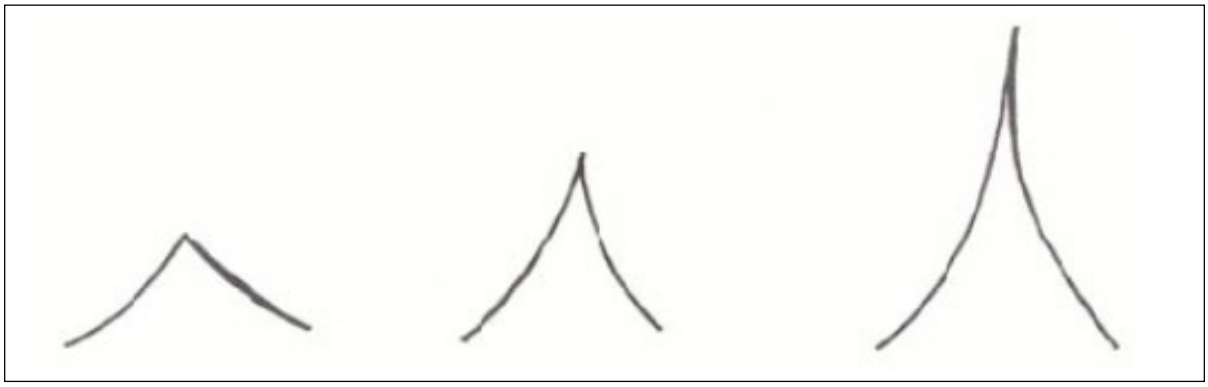
Method of observation: Visual observation of adult leafs in the middle third part of the plants. Describe the average shape of the terminal leaflets of the leafs in the sample. Use example varieties to calibrate.

Notes and states of expression:
1: very short acuminate
2: very short acuminate to short acuminate
3: short acuminate
4: short acuminate to medium acuminate
5: medium acuminate
6: medium acuminate to long acuminate
7: long acuminate
8: long acuminate to very long acuminate
9: very long acuminate

3: short acuminate 5: medium acuminate 7: long acuminate

12 Terminal leaflet: apex

CPVO explanation:



3: short acuminate 5: medium acuminate 7: long acuminate

13 Dwarf beans only: Inflorescences: location (at full flowering)

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

Method of observation: Visually observe of the location of the inflorescences at full flowering of the average plants. Use example varieties to calibrate.

Notes and states of expression:
1: in foliage
2: partly in foliage
3: above foliage

14 Flower: size of bract

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: Describing the size of the bracts can be done at a young pod stage as well as at full flowering.

Method of observation: Describe the average size of the bracts using example varieties to calibrate.

Notes, states of expression and example varieties:

1: very small	
2: very small to small	
3: small	Fanion (D), Nerina (D), Ryco (D), Fidel (C), Markant (C)
4: small to medium	
5: medium	Torrina (D), Meicy (C)
6: medium to large	
7: large	Label (D), Pfälzer Juni (D), Toplong (C)
8: large to very large	
9: very large	

The bract of a pod

15 Flower: colour of standard

Grouping characteristic: yes.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

Method of observation: Visual observation of the colour of the standard of an open flower. Always observe several flowers per sample. The difference between expression 1 (white) and 2 (pinkish white) is sometimes difficult to see. Expression 2 (pinkish white) are often flowers which appear white but have pink veination. Seeds of coloured flowers are coloured and anthocyanin colouration on the hypocotyl is present. Use example varieties to calibrate.

Notes, states of expression and example varieties:

1: white	Tuf (D)
2: pinkish white	
3: pink	Maxi (D), Vilbel (D)
4: violet	Delinel (D), Purple Teepee (D)

15 Flower: colour of standard

1: white

2: pinkish white

3: pink

4: violet

16 Flower: colour of wing

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the leaf should be made at the time of full flowering (all plants with flowers in bloom).

Method of observation: Visual observation of the colour of wing of an open flower. Always observe several flowers per sample. The difference between expression 1 (white) and 2 (pinkish white) is sometimes difficult to see. Expression 2 (pinkish white) are often flowers which appear white but have pink veination. Seeds of coloured flowers are coloured and anthocyanin colouration on the hypocotyl is present. Use example varieties to calibrate.

Notes and states of expression:
1: white
2: pinkish white
3: pink
4: violet

Wings of the flower

16 Flower: colour of wing

1: white

2: pinkish white

3: pink

4: violet

17.1 Dwarf beans only: Pod: length (excluding beak)

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **MS** – Measurement of a number of individual plants or parts of plants.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Measure length by hand or with help of a digital photographic analysis system. Harvest 20 mature pods per sample and calculate the average length. Use example varieties to determine the proper note.

Notes, states of expression and example varieties:

1: very short	
2: very short to short	
3: short	Prelude, Tuf
4: short to medium	
5: medium	Amity, Lusia
6: medium to long	
7: long	Dubra, Loma
8: long to very long	
9: very long	Daisy, Longking, Maja

17.2 Climbing beans only: Pod: length (excluding beak)

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **MS** – Measurement of a number of individual plants or parts of plants.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Measure length by hand or with help of a digital photographic analysis system. Harvest 20 mature pods per sample and calculate the average length. Use example varieties to determine the proper note.

Notes, states of expression and example varieties:

1: very short	
2: very short to short	
3: short	Juwagold
4: short to medium	
5: medium	
6: medium to long	
7: long	Fidel
8: long to very long	
9: very long	Toplong

18 Pod: width at maximum point

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **MS** – Measurement of a number of individual plants or parts of plants.

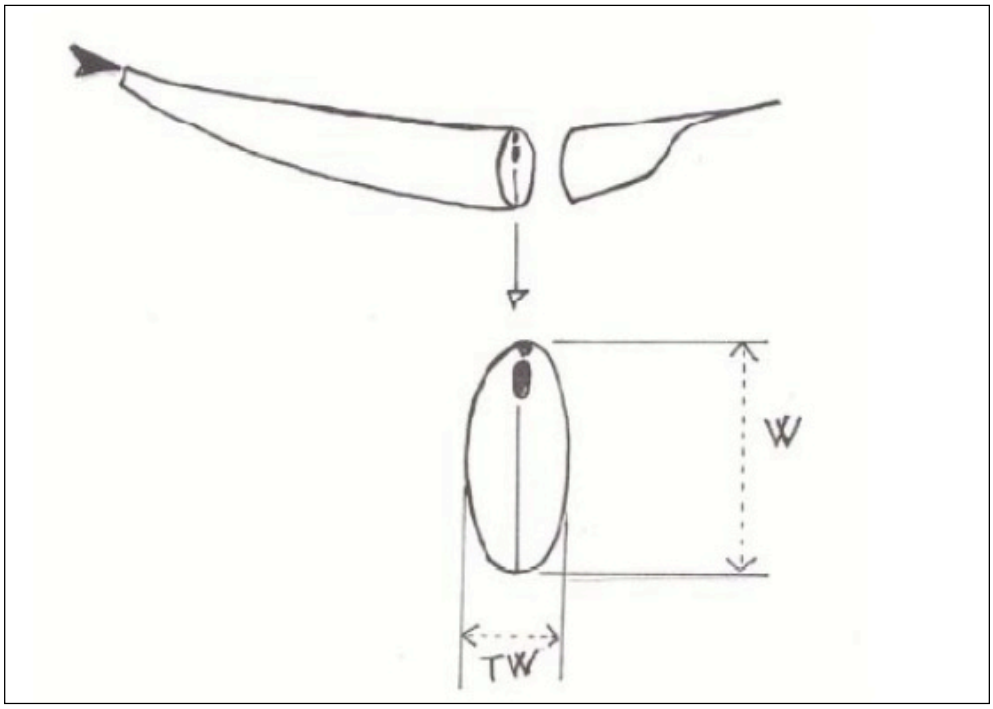
Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Measure width by hand or with help of a digital photographic analysis system. Harvest 20 mature pods per sample and calculate the average width. It is imperative to measure the width at the widest point of the pod. Use example varieties to determine the proper note.

Notes and states of expression:

1: very narrow	
2: very narrow to narrow	
3: narrow	Cabri (D), Tuf, (D) Necores (C)
4: narrow to medium	
5: medium	Regulex (D), Meicy (C)
6: medium to broad	
7: broad	Pfälzer Juni (D), Perle von Marbach (C)
8: broad to very broad	
9: very broad	

CPVO explanation:



Width at maximum point.

19 Pod: transversal width

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

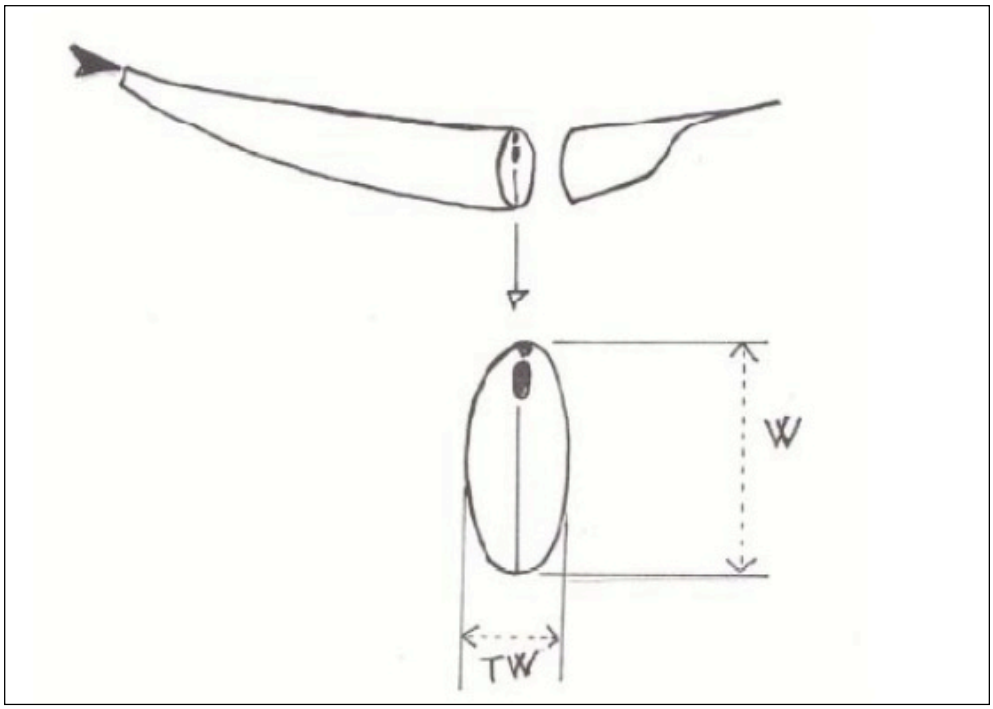
Type of observation: MS/VG – Choice between
- Measurement of a number of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Measure width by hand or with help of a digital photographic analysis system. Harvest 20 mature pods per sample and calculate the average width. It is imperative to measure the width at the widest point of the pod. Use example varieties to determine the proper note.

Notes and states of expression:
1: very narrow
2: very narrow to narrow
3: narrow
4: narrow to medium
5: medium
6: medium to broad
7: broad
8: broad to very broad
9: very broad

CPVO explanation:



Transversal width.

20 Pod: ratio transversal width/width at maximum point

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

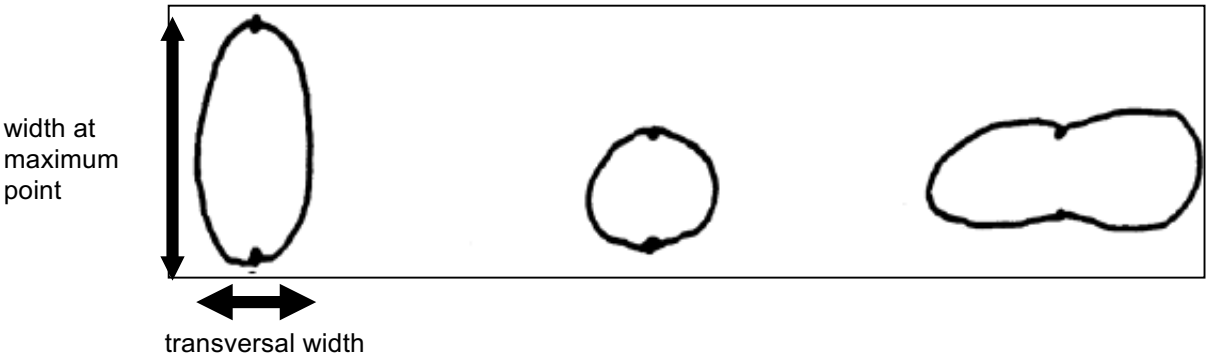
Type of observation: MS/VG – Choice between
- Measurement of a number of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the ratio between the transversal width and the width at the pod's maximum point. Make use of example varieties to decide on the proper note.

Notes and states of expression:
1: very small
2: very small to small
3: small
4: small to medium
5: medium
6: medium to large
7: large
8: large to very large
9: very large

CPVO explanation:



3: small 5: medium 7: large

21 Pod: shape of cross section (through seed)

Grouping characteristic: yes.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

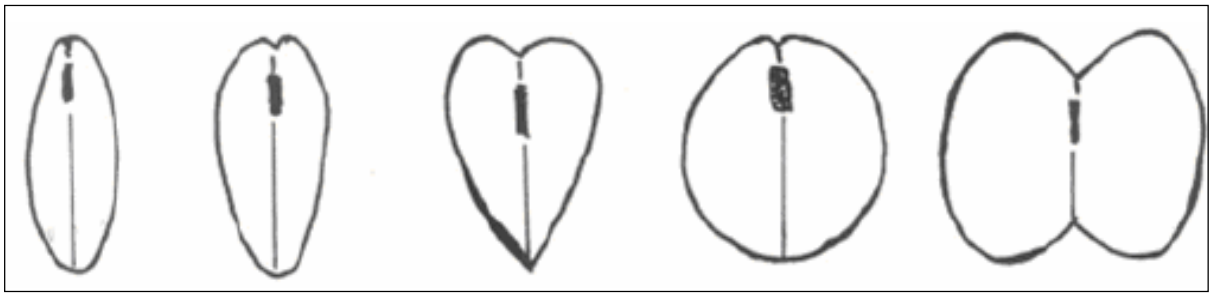
Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the average shape of the pods of the variety in the trial. Cut the pod in half through a seed and determine the shape.

Notes, states of expression and example varieties:

1: narrow elliptic	
2: elliptic to ovate	Pascal (D), Pfälzer Juni (D), Regulex (D)
3: cordate	Daisy (D)
4: circular	Tuf (D)
5: eight-shaped	Tendercrop White seeded (D)

CPVO explanation:



1: narrow elliptic 2: elliptic to ovate 3:cordate 4: circular 5: eight-shaped

22 Pod: ground colour

Grouping characteristic: yes.

Type of characteristic: **QL** – Qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the colour of the average pod at fresh market maturity.

Notes, states of expression and example varieties:

1: yellow	Golddukat (D), Goldfish (D), Goldmarie (C)
2: green	Filetty (D), Diva (D), Fortissima (C)
3: violet	Purpiat (D), Purple Teepee (D)

yellow green violet

23 Pod: intensity of ground colour

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the intensity of the ground colour of the pods at fresh market maturity. Use example varieties to determine the proper note.

Notes and states of expression:
1: very light
2: very light to light
3: light
4: light to medium
5: medium
6: medium to dark
7: dark
8: dark to very dark
9: very dark

3: light 5: medium 7: dark

24 Pod: secondary colour

Grouping characteristic: no.

Type of characteristic: **QL** – Qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the secondary colour of the pod should be made at maturity.

Method of observation: Visually observe the presence of a secondary colour on a pod. The pod has to be mature. Otherwise the secondary colour may not yet be visible.

Notes, states of expression and example varieties:
1: absent Tuf (D)
9: present Marbel (D)

1: absent 9: present

25 Pod: hue of secondary colour

Grouping characteristic: no.

Type of characteristic: **QL** – Qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the secondary colour of the pod should be made at maturity.

Method of observation: Visually observe the hue of the secondary colour. Pod has to be mature. Otherwise the secondary colour may not yet be visible.

Notes and states of expression:
1: pink
2: red
3: violet


1: pink


2: red


3: violet

26 Pod: density of flecks of secondary colour

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the secondary colour of the pod should be made at maturity.

Method of observation: Visually observe the density of the flecks of the secondary colour. The pod has to be mature. Otherwise the secondary colour might not yet be visible. Use example varieties to determine the proper note.

Notes and states of expression:
1: very sparse
2: very sparse to sparse
3: sparse
4: sparse to medium
5: medium
6: medium to dense
7: dense
8: dense to very dense
9: very dense

1: very sparse 3: sparse 5: medium 7: dense 9: very dense

27 Pod: stringiness on ventral suture

Grouping characteristic: yes.

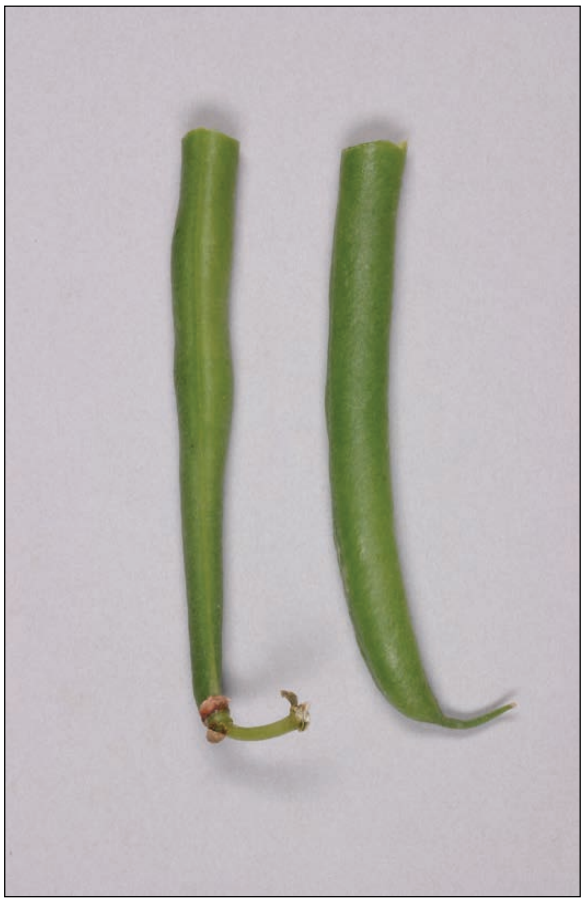
Type of characteristic: **QL** – Qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the presence of strings on the ventral suture by breaking the pod in half. The stringiness emerges from the ventral suture of the pod. The string is very strong and should not be confused with the oakum, which has a weaker structure.

Notes, states of expression and example varieties:
1: absent Cabri (D), Tuf (D)
9: present Facta (D), Marbel (D)


1: absent


9: present

CPVO explanation:
This characteristic should be observed just after the fresh market stage, by breaking the beak and pulling it from the pod. The stringiness emerges from the ventral suture of the pod. The string is very strong and should not be confused with the oakum, for example, which has a weaker structure.

28 Pod: degree of curvature

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

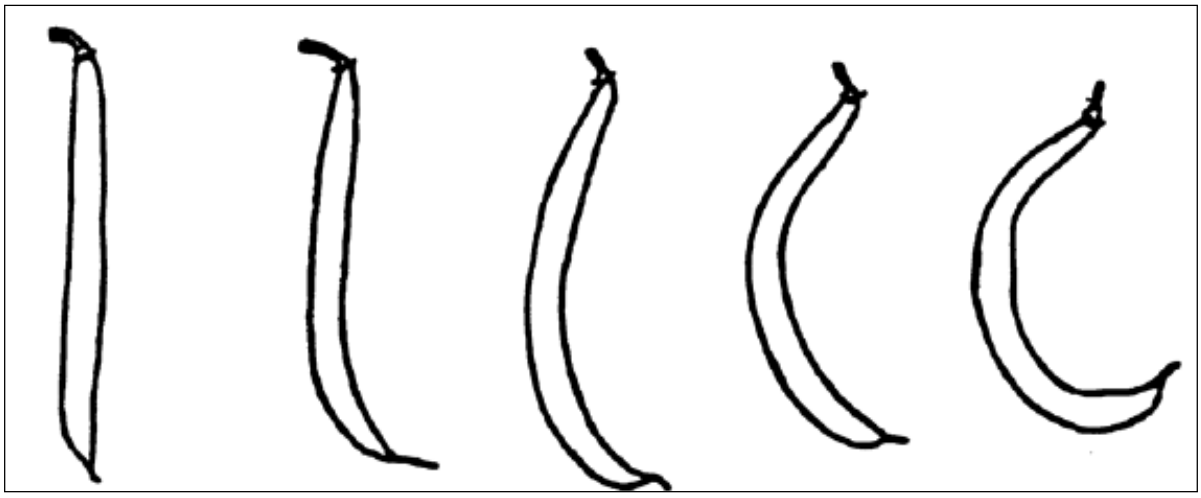
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the degree of curvature on mature pods. Use example varieties to determine the proper note.

Notes and states of expression:
1: absent or very weak
2: very weak to weak
3: weak
4: weak to medium
5: medium
6: medium to strong
7: strong
8: strong to very strong
9: very strong

CPVO explanation:



1: absent or very weak 3: weak 5: medium 7: strong 9: very strong

29 Pod: shape of curvature

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

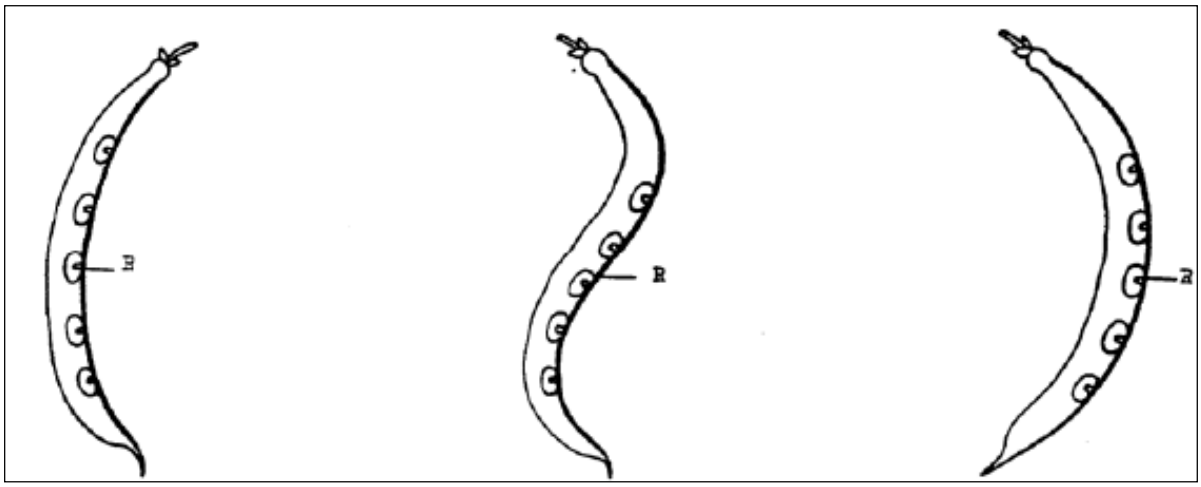
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the shape of the curvature of the mature pod. Concave and convex shapes are easily confused, so it is imperative to determine the side of the dorsal suture (the side where the seeds are attached).

Notes and states of expression:
1: concave
2: s-shaped
3: convex

CPVO explanation:



1: concave 2: s-shaped 3: convex
R = dorsal suture

30 Pod: shape of distal part (excluding beak)

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the shape of the distal part excluding the beak. Look at the entire sample and determine the average shape.

Notes and states of expression:
1: acute
2: acute to truncate
3: truncate

CPVO explanation:

1: acute 2: acute to truncate 3: truncate

31 Pod: length of beak

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: MS/VG – Choice between
- Measurement of a number of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the length of the beak. Use example varieties to calibrate.

Notes and states of expression:
1: very short
2: very short to short
3: short
4: short to medium
5: medium
6: medium to long
7: long
8: long to very long
9: very long

1: very short 3: short 5: medium 7: long 9: very long

32 Pod: curvature of beak

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the degree of curvature of the beak. Use example varieties to determine the proper note.

Notes and states of expression:
1: absent or very weak
2: very weak to weak
3: weak
4: weak to medium
5: medium
6: medium to strong
7: strong
8: strong to very strong
9: very strong

1: Absent or very weak 3: weak 5: medium 7: strong 9: very strong

33 Pod: texture of surface

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at the time of fresh market maturity.

Method of observation: Visually observe the surface of the pod and determine the roughness of its texture. Use example varieties to determine the proper note.

Notes and states of expression:
1: very smooth
2: very smooth to smooth
3: smooth
4: smooth to moderately rough
5: moderatly rough
6: moderatly rough to rough
7: rough
8: rough to very rough
9: very rough

34 Pod: constrictions (at dry stage)

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VS/VG: -** Choice between
- Visual assessment by observation of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observation on the pod should be made at dry stage.

Method of observation: Visually observation in trial when the pods are over mature, almost dry.

Notes and states of expression:
1: absent or very weak
2: moderate
3: strong

1: absent or very weak 2: moderate 3: strong

35 Seed: weight

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **MS/MG:** -Choice between
- Measurement of a number of individual plants or parts of plants and
- Single measurement of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: The most reliable way is to follow the ISTA practice. Thus seed weight should be measured on four samples of 100 seeds after which the average can be calculated. Then use example varieties to determine the proper note.

Notes, states of expression and example varieties:

1: very low	Cabri (D), Decibel (D), Label (D)
2: very low to low	
3: low	Belfin (D), Ingo (D)
4: low to medium	
5: medium	Duplica (D), Konservenstolz (D), Juwagold (C)
6: medium to high	
7: high	Regulex (D), Fidel (C)
8: high to very high	
9: very high	Facta (D), Rote von Paris (D), Precores (C)

CPVO explanation:
The seed weight should be measured on four saples of 100 seeds.

36 Seed: shape of median longitudinal section

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

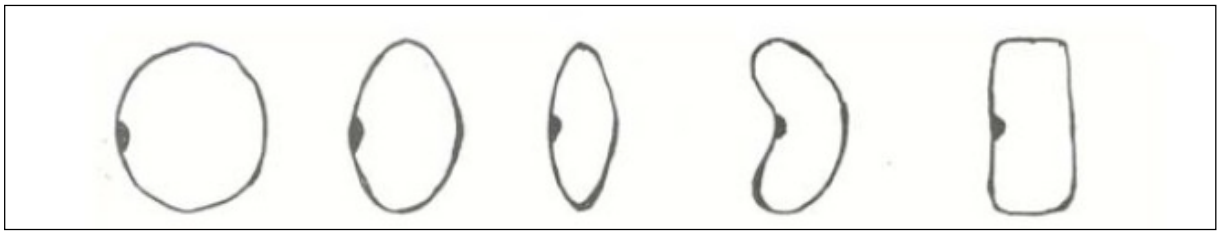
Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Determine the shape of the seed by visual observation. Use the image below to determine the corresponding expression.

Notes and states of expression:
1: circular
2: circular to elliptic
3: elliptic
4: kidney-shaped
5: rectangular

1: circular 2: circular to elliptic 3: elliptic 4: kidney-shaped 5: rectangular

CPVO explanation:



1: circular 2: circular to elliptic 3: elliptic 4:kidney-shaped 5: rectangular

37 Varieties with kidney-shaped seed only: Seed: degree of curvature

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Visually observe the degree of curvature on kidney-shaped seeds. Use example varieties to determine the proper note

Notes and states of expression:
1: very weak
2: very weak to weak
3: weak
4: weak to medium
5: medium
6: medium to strong
7: strong
8: strong to very strong
9: very strong


3: weak


5: medium

38 Seed: shape of median cross-section

Grouping characteristic: no.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

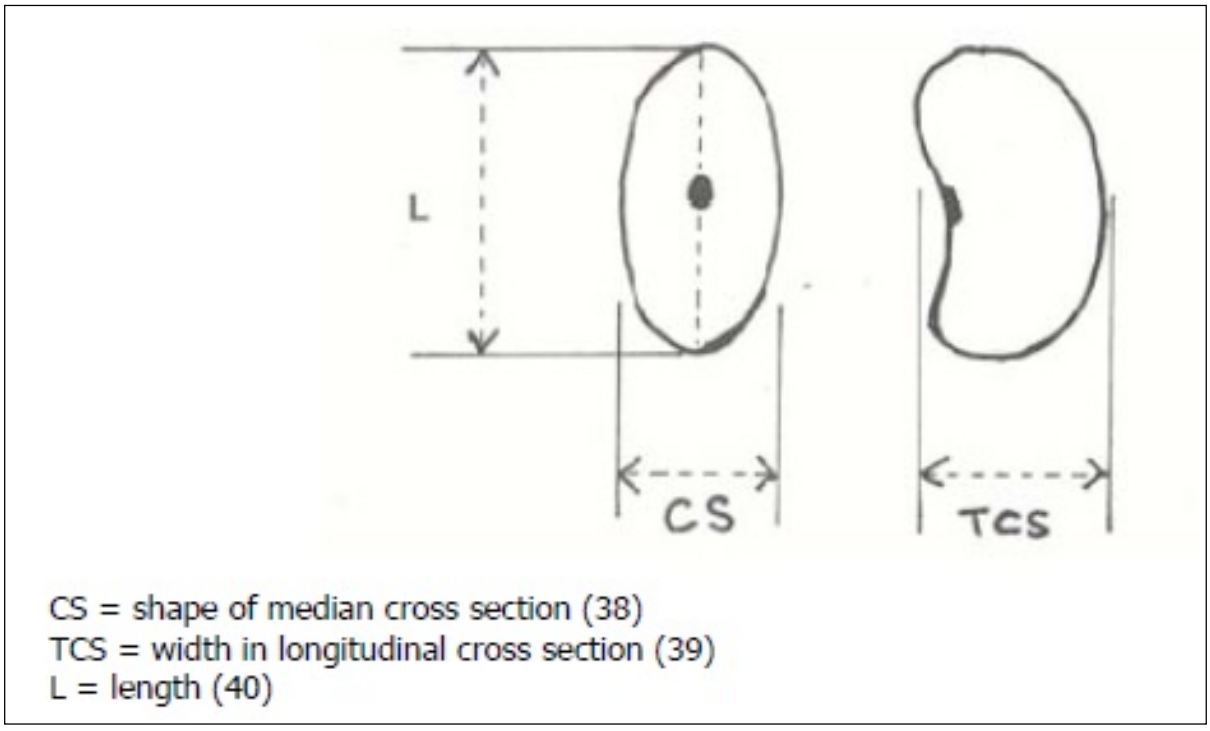
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Facing the hilum of the seed, describe the shape of median cross section using visual observation.

Notes and states of expression:
1: flat
2: narrow elliptic
3: medium elliptic
4: broad elliptic
5: circular

CPVO explanation:



39 Seed: width in cross-section

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

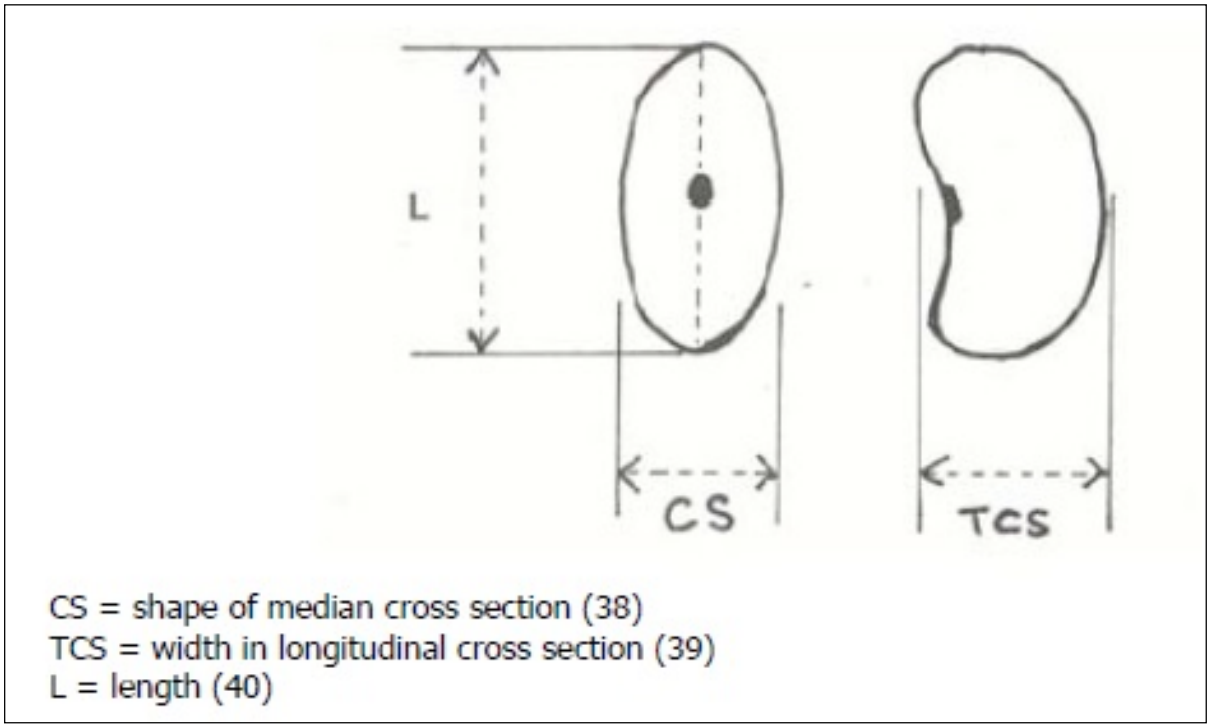
Type of observation: MS/VG – Choice between
- Measurement of a number of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Place the bean on its side (with the hilum facing either the left or right side) and visually observe the width in cross section. Use example varieties to determine the proper note.

Notes and states of expression:
1: very narrow
2: very narrow to narrow
3: narrow
4: narrow to medium
5: medium
6: medium to broad
7: broad
8: broad to very broad
9: very broad

CPVO explanation:



40 Seed: length

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

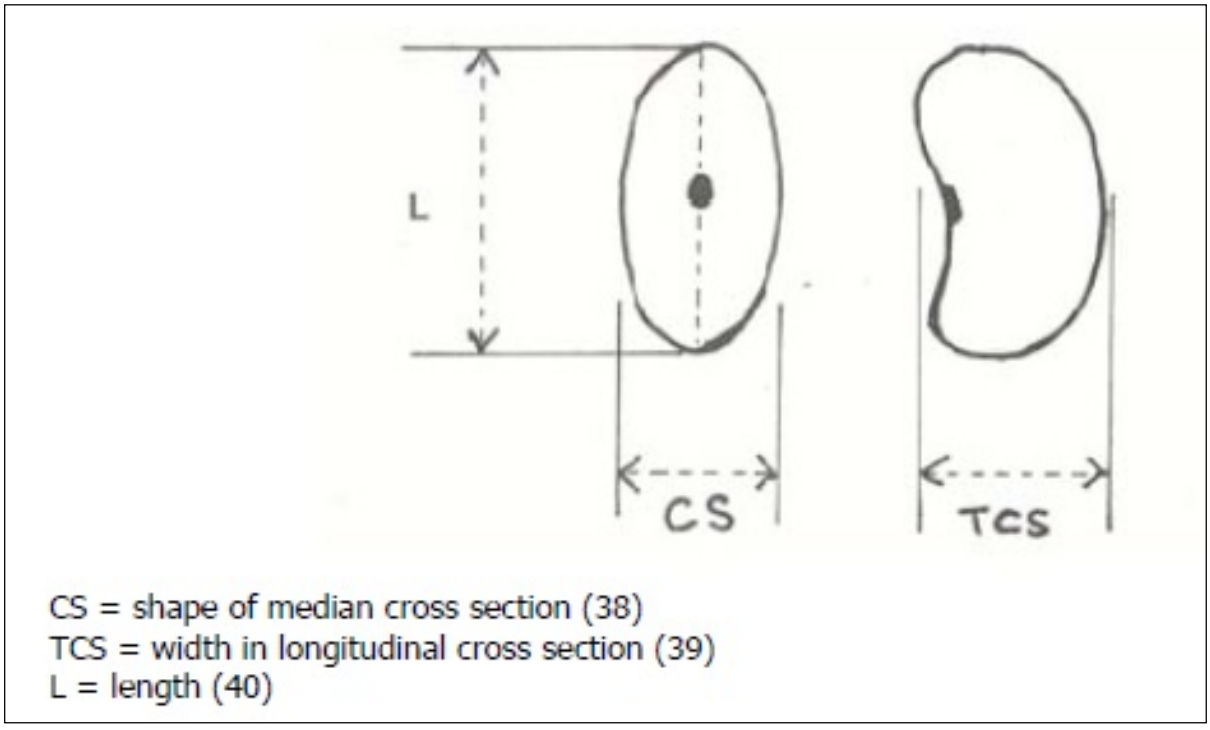
Type of observation: MS/VG – Choice between
- Measurement of a number of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Visually observe the length of the seed and determine the proper note by using example varieties.

Notes and states of expression:
1: very short
2: very short to short
3: short
4: short to medium
5: medium
6: medium to long
7: long
8: long to very long
9: very long

CPVO explanation:



CS = shape of median cross section (38)
TCS = width in longitudinal cross section (39)
L = length (40)

41 Seed: number of colours

Grouping characteristic: yes.

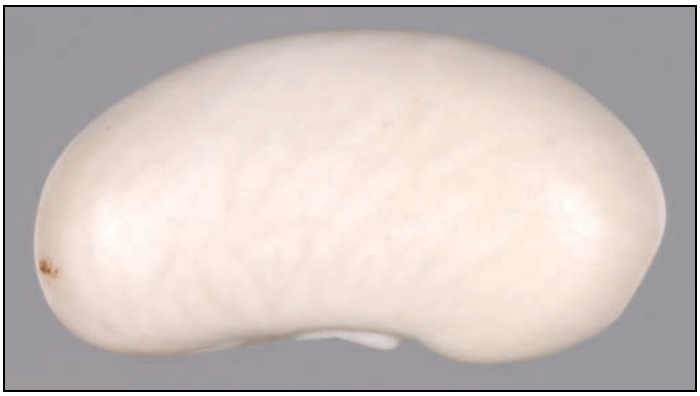
Type of characteristic: **QL** – Qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Visually observe the number of colours on the seeds.

Notes and states of expression:
1: one
2: two
3: more than two


1: one


2: two

42 Seed: main colour (largest area)

Grouping characteristic: yes.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

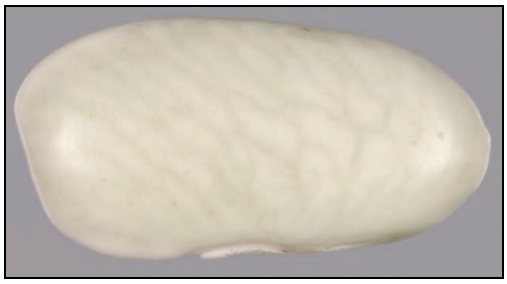
Method of observation: Visually observe the main colour of the seeds. In case of two or more colours, choose the colour that covers the largest area.

Notes, states of expression and example varieties:

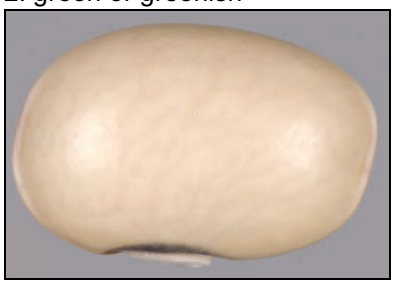
1: white	Goldfish (D), Tuf (D)
2: green or greenish	Muriel (D), Pascal (D)
3: grey	
4: yellow	Gele Citroen (D)
5: beige	Purple Teepee (D), Blauhilde (C)
6: brown	Primel (D), Sunray (D)
7: red	Flageolet rouge (D)
8: violet	
9: black	Delinel (D), Vilbel (D)

42 Seed: main colour (largest area)


1: white

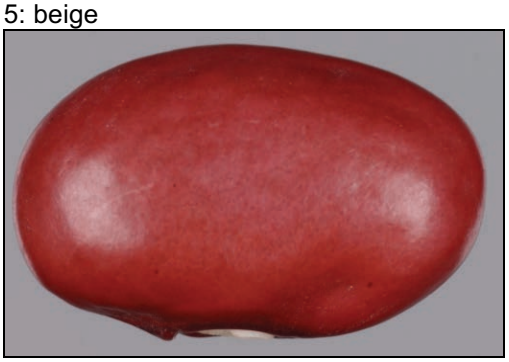

2: green or greenish

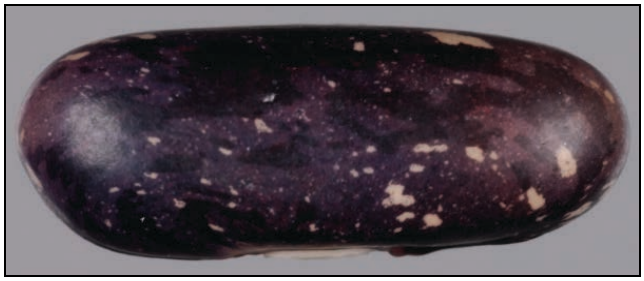

3: grey


4: yellow


5: beige


6: brown


7: red


8: violet


9: black

43 Seed: predominant secondary colour

Grouping characteristic: yes.

Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

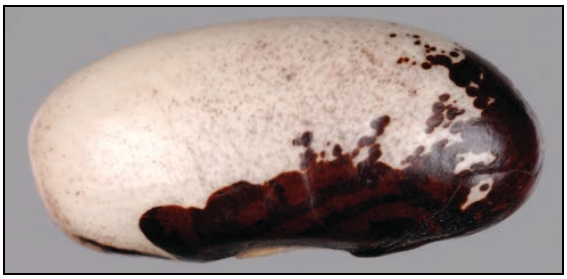
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: In case of multicoloured seeds, first determine the colour that covers the second largest area. Then state the expression that corresponds with the secondary colour.

Notes, states of expression and example varieties:

1: grey	
2: yellow	
3: beige	
4: brown	
5: red	Fiori (D)
6: violet	Marbel (D)
7: black	Brittle Wax (D)



4: brown

7: black

CPVO explanation:
The predominant secondary colour is the colour with the second largest area. If several secondary colours exist, the competent authorities will add one or more characteristics as necessary.

44 Seed: distribution of secondary colour

Grouping characteristic: no.

Type of characteristic: **QL** – Qualitative characteristic.

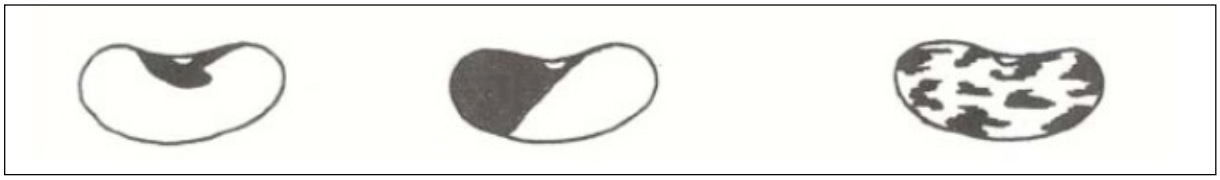
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Take an average seed and determine the expression corresponding to the correct distribution of the secondary colour.

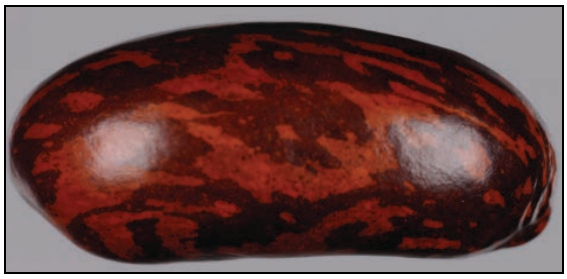
Notes and states of expression:
1: around hilum
2: on half of grain
3: on entire grain

CVPO-explanation:



1: around hilum 2: on half of grain 3: on entire grain

1: around hilum



3: on entire grain

45 Seed: Veining

Grouping characteristic: no.

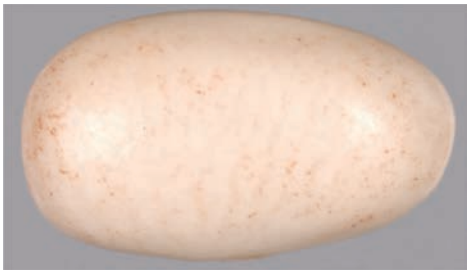
Type of characteristic: **QN** – Quantitative characteristic

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: All observations on the seed should be made on dry seed harvested from the plots.

Method of observation: Visually observe the degree of venation of the seeds. Use example varieties to determine the proper note.

Notes and states of expression:
1: very weak
2: very weak to weak
3: weak
4: weak to medium
5: medium
6: medium to strong
7: strong
8: strong to very strong
9: very strong


3: weak


5: medium


7: strong

46 Time of flowering: (50% of the plants with at least one flower)

Grouping characteristic: no.

Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VS/VG: -** Choice between
- Visual assessment by observation of individual plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of a single plant or part of plant which represents the variety.

Stage of observation: As soon as 50% of the plants have at least one open flower.

Method of observation: Visually observe the time of flowering. When 50% of the plants have at least one open flower, note the date of that day. Do this for each variety. Then use example varieties to calibrate and calculate the note corresponding to each date.

Notes, states of expression and example varieties:

1: very early	Pfälzer Juni (D)
2: very early to early	
3: early	Prelude (D), Fortissima (C), Perle von Marbach (C)
4: early to medium	
5: medium	Fanion (D), Groffy (D), Hilda (C), Precores (C)
6: medium to late	
7: late	Necores (C)
8: late to very late	
9: very late	