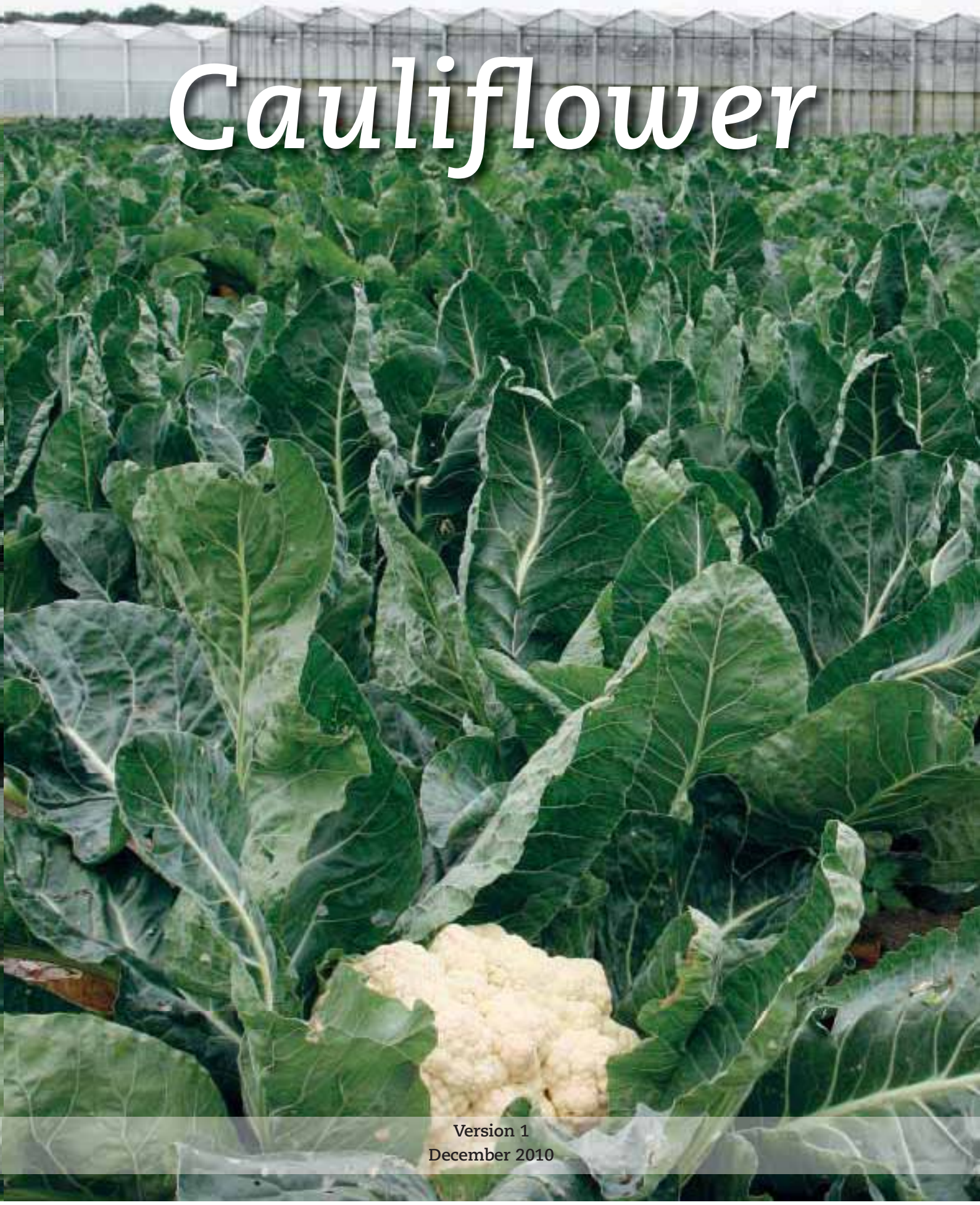
Calibration book

Brassica oleracea L.



Cauliflower

Version 1
December 2010

Naktuinbouw calibration book

Brassica oleracea L. convar. *botrytis* (L.) Alef. var. *botrytis* L.

cauliflower

Version 1

Introduction

In front of you lies the Naktuinbouw calibration book for cauliflower. This book may be used as guidance for the completion of application forms, the describing of varieties or the understanding of variety descriptions. This book can not replace the skill needed to make a variety description, but may serve as support.

Sources used
The basis for this book is the CPVO protocol CPVO-TP/45/1 which in turn is based on UPOV Guideline TG/45/7. 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).

Application 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 are prone to influence by climate (e.g. anthocyanin coloration). In this calibration book these example varieties are only included for the characteristics that appear in the Technical Questionnaire. Others are not included as many prefer their own set of example varieties, but may be found in the relevant CPVO protocol.

Website
The CPVO and UPOV documents mentioned above can be found on the Naktuinbouw website (*http://www.naktuinbouw.nl/onderwerp/kalibratieboeken*). On this website you can also find announcements of possible modifications of the published calibration books.

Helpdesk
For possible remarks, suggestions and questions on the calibration books and the website, you may contact Naktuinbouw at our email address: kalibratieboek@naktuinbouw.nl

Contents

1 Seedling: anthocyanin coloration of hypocotyl

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 an average single plant or part of plant.

Stage of observation: Ten to fourteen days after sowing.

Method of observation: Anthocyanin coloration of hypocotyl can be difficult to assess. Calibrate using example varieties.

Notes, states of expression and example varieties:

1: absent	Brio
2: present	Ciren, Dominant

1: absent 2: present

2 Plant: height (at time of harvest)

Grouping characteristic: no.

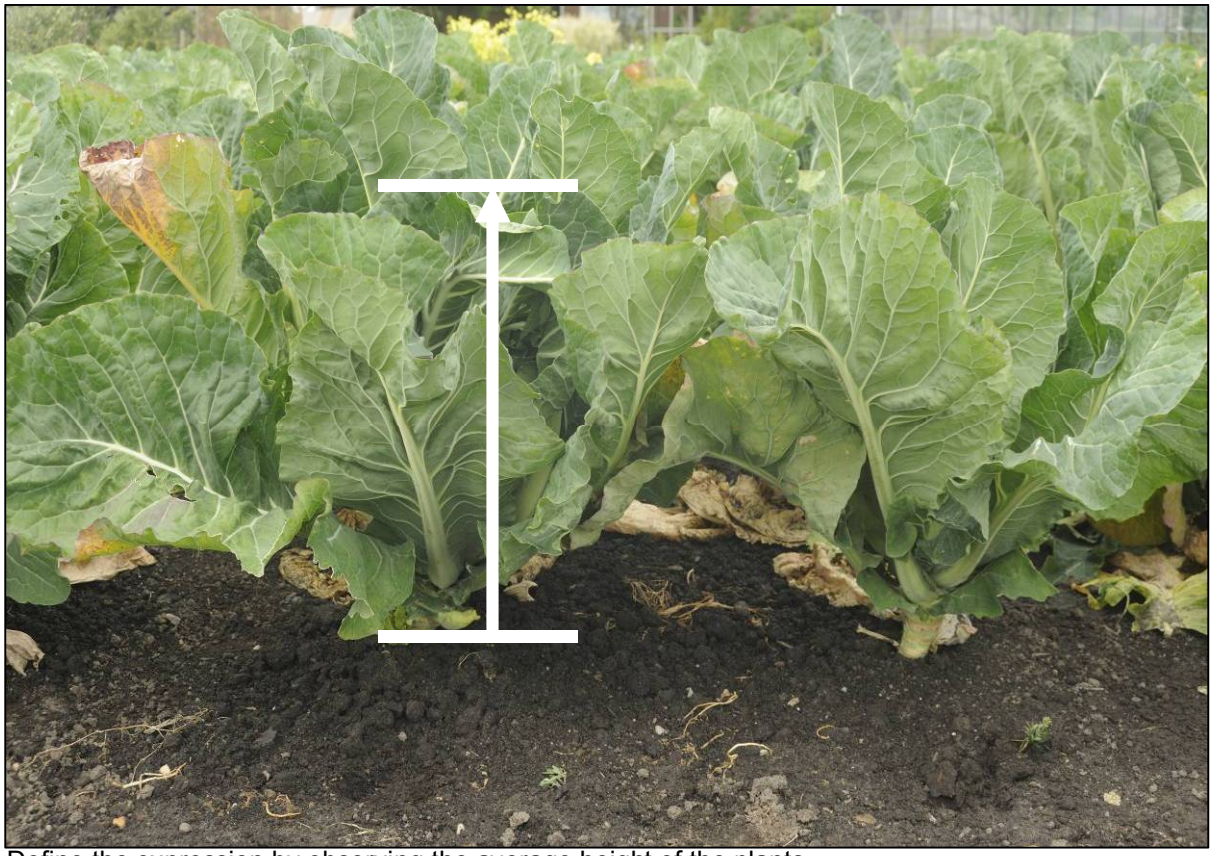
Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG/MG:** - Choice between
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant and
- Single measurement of a group of plants or parts of plants; in practice a single measurement of an average single plant or part of plant.

Stage of observation: at time of harvest.

Method of observation: This characteristic can be influenced by the environment. Use some standards as reference to facilitate the assessment of this characteristic.

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



Define the expression by observing the average height of the plants.

3 Stem: length (up to insertion of first leaf)

Grouping characteristic: no.

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

Type of observation: **VG/MG:** - Choice between
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant and
- Single measurement of a group of plants or parts of plants; in practice a single measurement of an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation.

Method of observation: Define the expression by observing the average length of the stem between the soil surface and the first leaf. Calibrate 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

4 Leaf: attitude

Grouping characteristic: no.

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

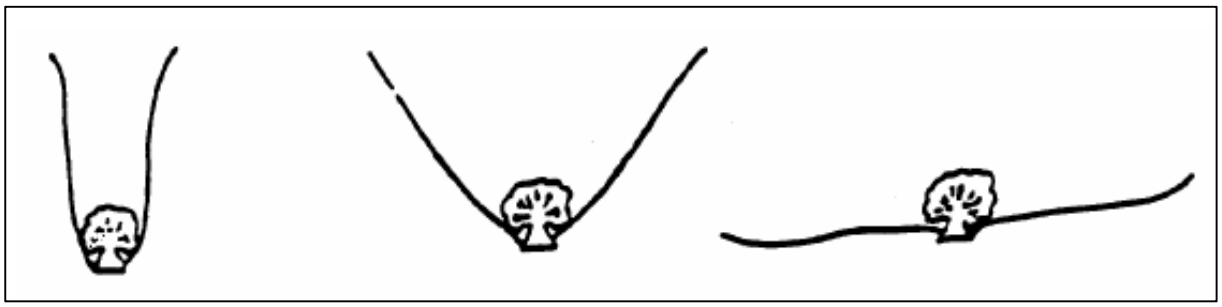
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation on the largest leaf.

Method of observation: Leaf attitude of the plant is evaluated in relation to the soil surface and is assessed by a general impression of the monster. Calibrate using example varieties.

Notes and states of expression:
1: erect.
2: erect to semi-erect
3: semi-erect
4: semi-erect to horizontal
5: horizontal

CPVO explanation:



1: erect 3: semi-erect 5: horizontal

5 Leaf: length

Grouping characteristic: no.

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

Type of observation: MS/VG – Choice between
- Calculated average of the measurement of 20 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant

Stage of observation: At the time of full development of the foliage, before curd formation on the largest leaf.

Method of observation: Visual observation. Use some standards as reference to facilitate the assessment of this characteristic.

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

6 Leaf: width

Grouping characteristic: no.

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

Type of observation: MS/VG – Choice between
- Calculated average of the measurement of 20 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant

Stage of observation: At the time of full development of the foliage, before curd formation on the largest leaf.

Method of observation: Visual observation. Use some standards as reference to facilitate the assessment of this characteristic.

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

1: very narrow 3: narrow 5: medium 7: broad 9: very broad

7 Leaf: ratio width/length

Grouping characteristic: no.

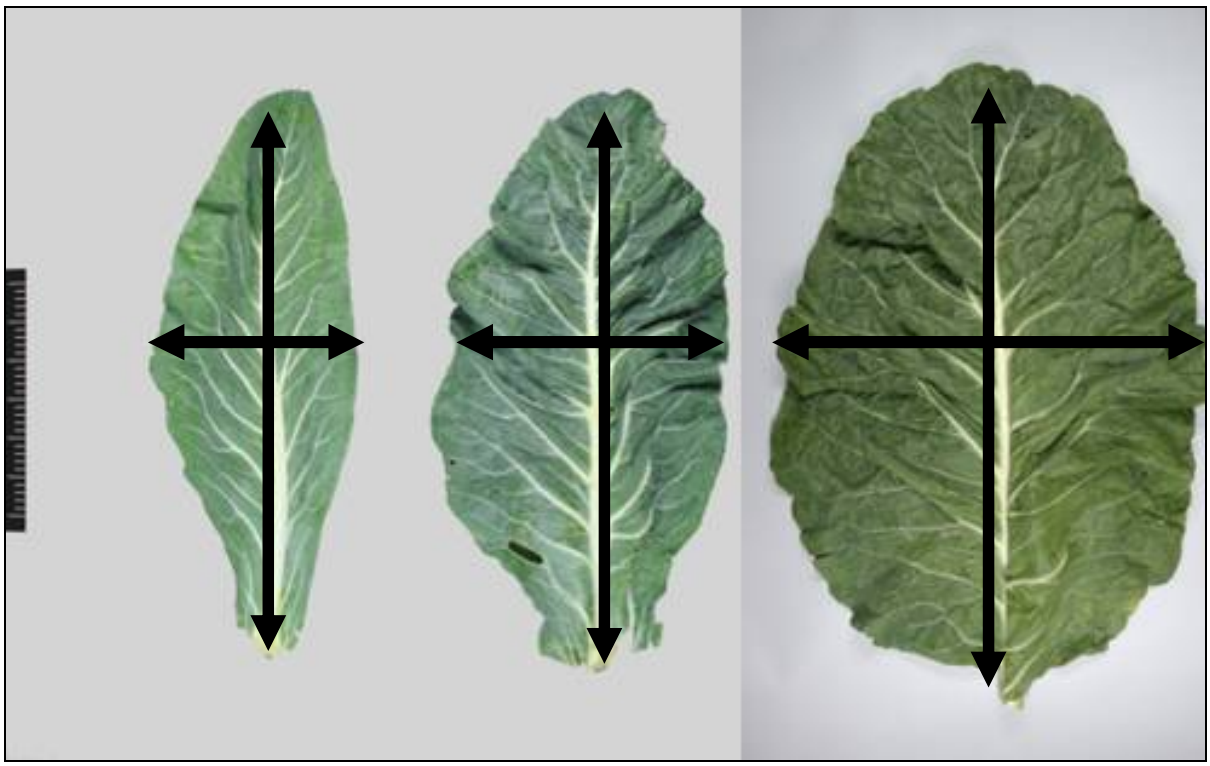
Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation on the largest leaf.

Method of observation: Visual observation. Use some standards as reference to facilitate the assessment of this characteristic.

Notes and states of expression:
1: very compressed
2; very compressed to compressed
3: compressed
4; compressed to medium
5: medium
6: medium to elongated
7: elongated
8: elongated to very elongated
9: very elongated



3: compressed 5: medium 7: elongated

8 Leaf: lobing

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 an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation.

Method of observation: Visual observation. Assess which is represented the most (general impression) using the photographs below.

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

1: absent

2: present

9 Leaf: colour (with wax if present)

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 an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation.

Method of observation: Visual observation. Calibrate using example varieties. This character should be observed during clouded weather as direct sunlight makes it nearly impossible to perform a proper observation.

Notes and states of expression:
1: green
2: grey green
3: blue green

1: green 2: grey green 3: blue green

10 Leaf: intensity of colour (with wax if present)

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 an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation.

Method of observation: Visual observation. Use some standards as reference to facilitate the assessment of this characteristic. This character should be observed during clouded weather as direct sunlight makes it nearly impossible to perform a proper observation.

Notes, states of expression and example varieties:

1: very light	
2: very light to light	
3: light	Baltimore, Ciren
4: light to medium	
5: medium	Barrier Reef, Belot, Calisa
6: medium to dark	
7: dark	Arbon, Lecerf
8: dark to very dark	
9: very dark	

11 Leaf: twisting of tip

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 an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation.

Method of observation: Visual observation. Calibrate using example varieties.

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

3: weak 5: medium 7: strong

12 Leaf: shape in cross-section

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 an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation on the largest leaf.

Method of observation: Visual observation. It concerns a general impression of the sample. Use some standards as reference to facilitate the assessment of this characteristic.

Notes and states of expression:
1: concave
2: flat
3: convex

12 Leaf: shape in cross-section

1. concave

2. flat

3. convex

12 Leaf: shape in cross-section

1: concave 2: flat 3: convex

13 Leaf: blistering

Grouping characteristic: no.

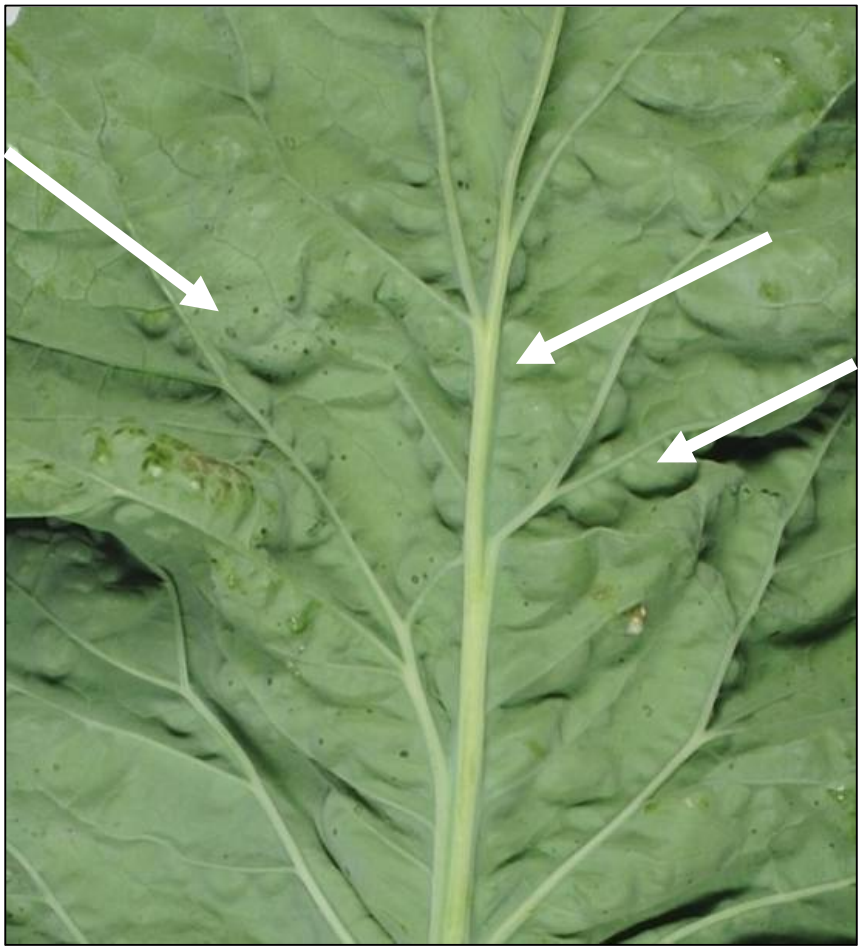
Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation on the largest leaf.

Method of observation: visual observation. Calibrate using example varieties.

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



13 Leaf: blistering

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

14 Leaf: crimping near main vein

Grouping characteristic: no.

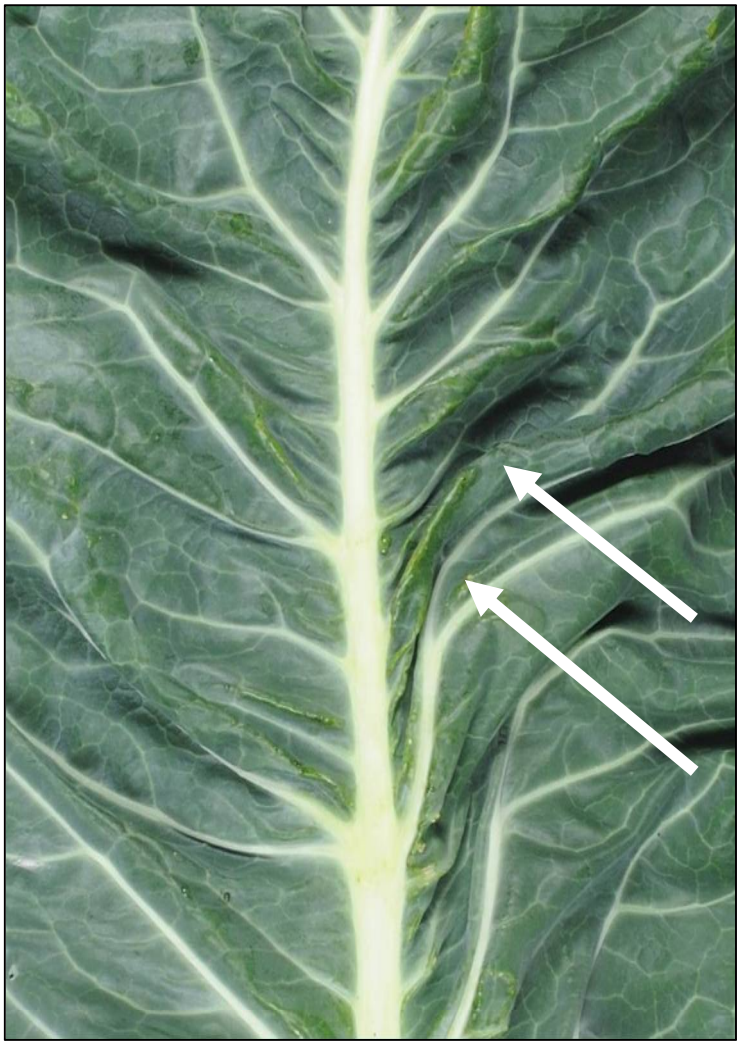
Type of characteristic: **QN** – Quantitative characteristic.

Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation on the largest leaf.

Method of observation: Visual observation. It concerns a general impression of the sample. Use some standards as reference to facilitate the assessment of this characteristic.

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



14 Leaf: crimping near main vein

3: weak 5: medium 7: strong

15 Leaf: undulation of margin

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 an average single plant or part of plant.

Stage of observation: At the time of full development of the foliage, before curd formation.

Method of observation: visual observation. It concerns a general impression of the sample. Calibrate using example varieties.

Notes and states of expression:
1: absent of 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

16 Curd: covering by inner leaves

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 an average single plant or part of plant.

Stage of observation: when the curd is fully developed (at harvest maturity).

Method of observation: Visual observation. Use some standards as reference to facilitate the assessment of this characteristic.

Notes and states of expression:
1: not covered
2: partly covered
3: fully covered

16 Curd: covering by inner leaves

1: not covered

2: partly covered

3: fully covered

17 Curd: height

Grouping characteristic: no.

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

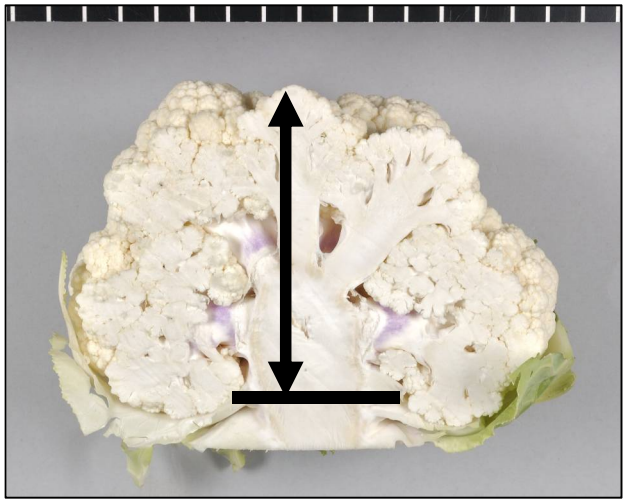
Type of observation: **MS** – Calculated average of the measurement of 20 plants or parts of plants.

Stage of observation: When the curd is fully developed (at harvest maturity).

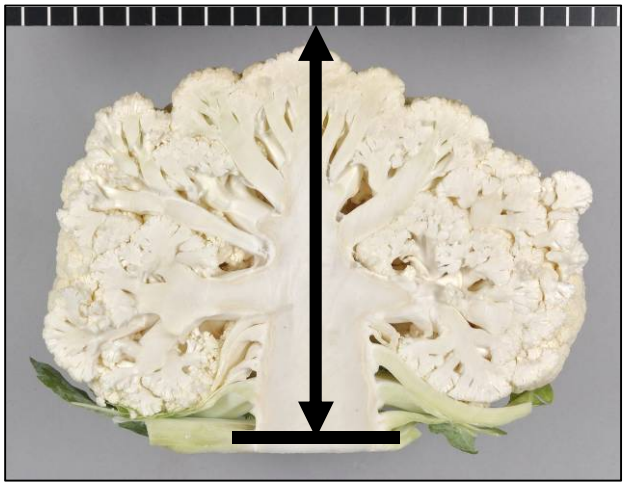
Method of observation: Calibrate using example varieties.

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

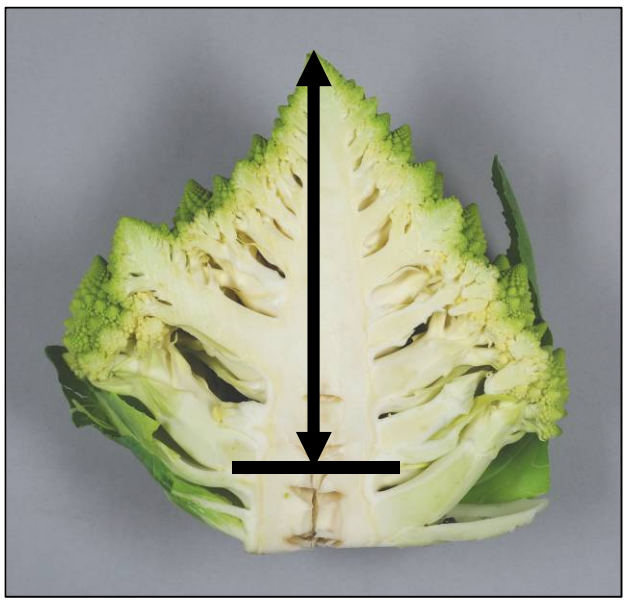
17 Curd: height



3: short



5: medium



7: tall

18 Curd: diameter

Grouping characteristic: no.

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

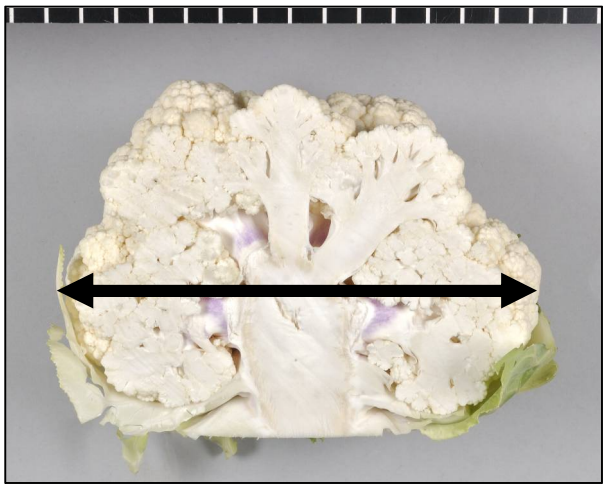
Type of observation: **MS** – Calculated average of the measurement of 20 plants or parts of plants.

Stage of observation: When the curd is fully developed (at harvest maturity).

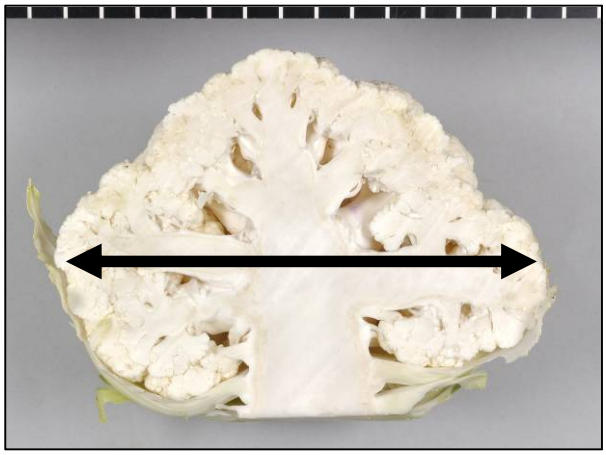
Method of observation: Calibrate using example varieties.

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

18 Curd: diameter



3: small



5: medium

7: large

19 Curd: shape in longitudinal section

Grouping characteristic: no.

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

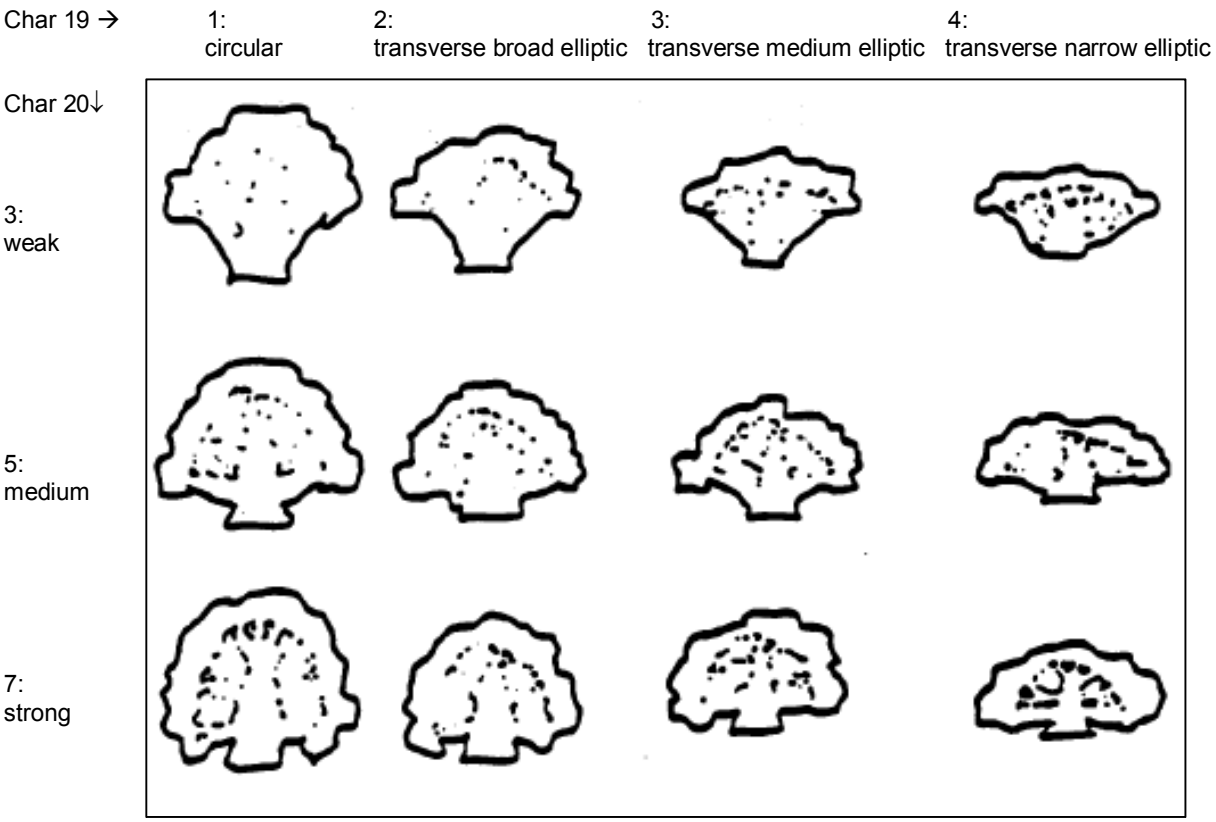
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: When the curd is fully developed (at harvest maturity).

Method of observation: Visual observation. Cut the curd in the length direction with a large and sharp knife and assess the shape of the curd according to the CPVO explanation.

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

CPVO explanation:



19 Curd: shape in longitudinal section

1: circular

2: transverse broad elliptic

4: transverse narrow elliptic

5: triangular

20 Excluding varieties with curd shape triangular: Curd: doming

Grouping characteristic: no.

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

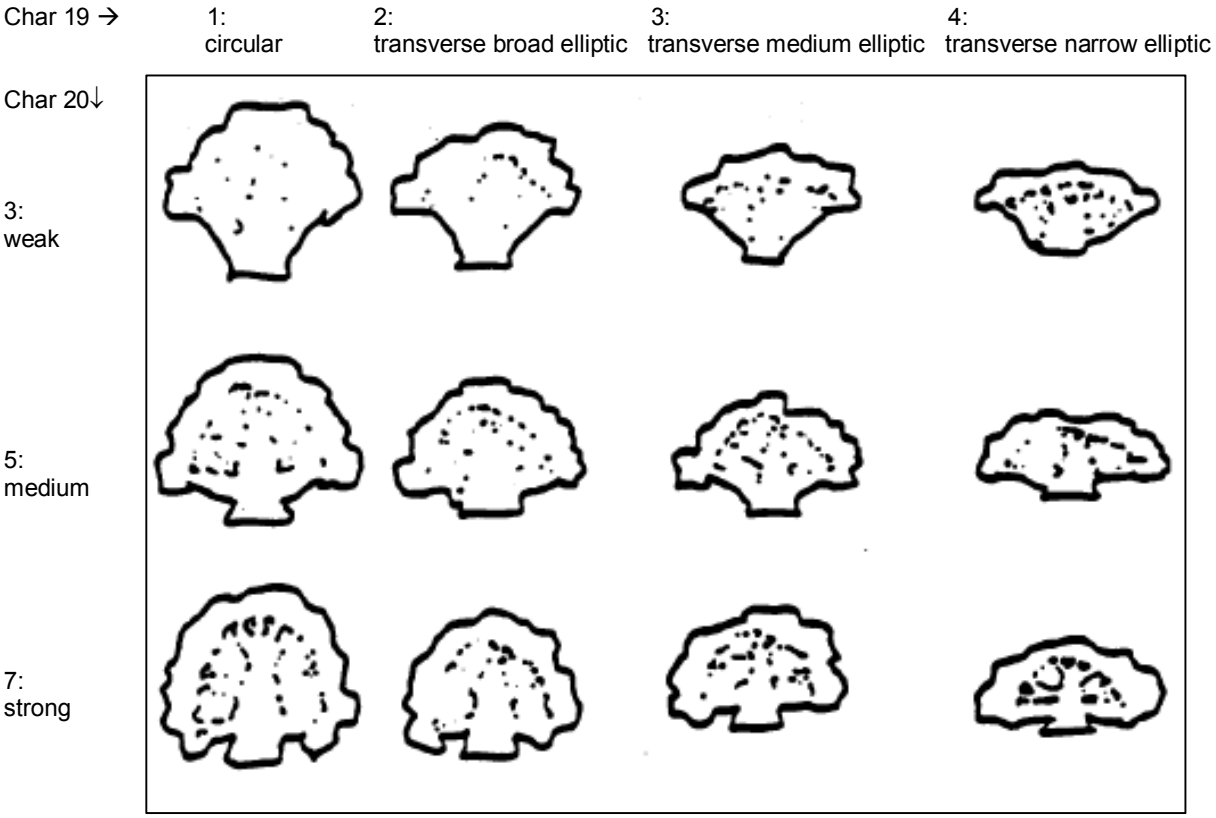
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: When the curd is fully developed (at harvest maturity).

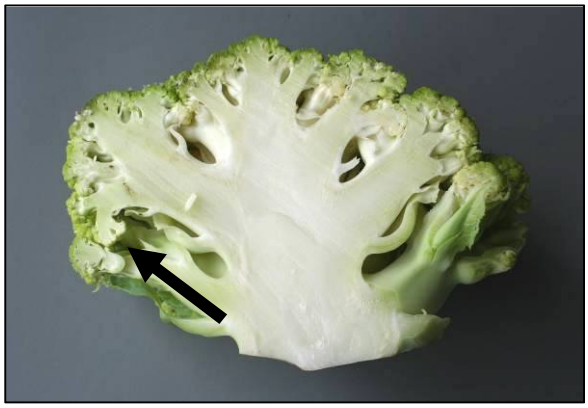
Method of observation: Cut the curd in the length direction with a large and sharp knife and assess the doming of the curd according to the CPVO explanation.

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

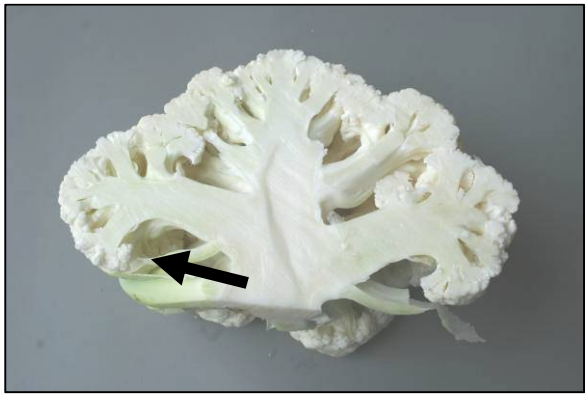
CPVO-explanation:



20 Excluding varieties with curd shape triangular: Curd: doming



1: very weak



2: weak

5: medium

9: very strong

21 Curd: 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 an average single plant or part of plant.

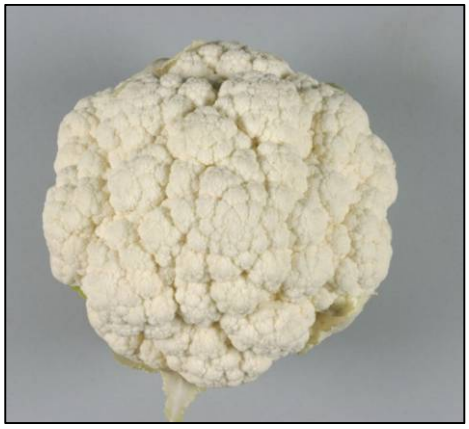
Stage of observation: When the curd is fully developed (at harvest maturity).

Method of observation: Visual observation.

Notes, states of expression and example varieties:

1: whitish	Iceberg
2: yellow	Di Jesi
3: orange	Cheddar, Sunset
4: green	Amfora
5: violet	Graffiti

21 Curd: colour



1: whitish

3: orange

4: green

5: violet

22 Curd: knobbling

Grouping characteristic: no.

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

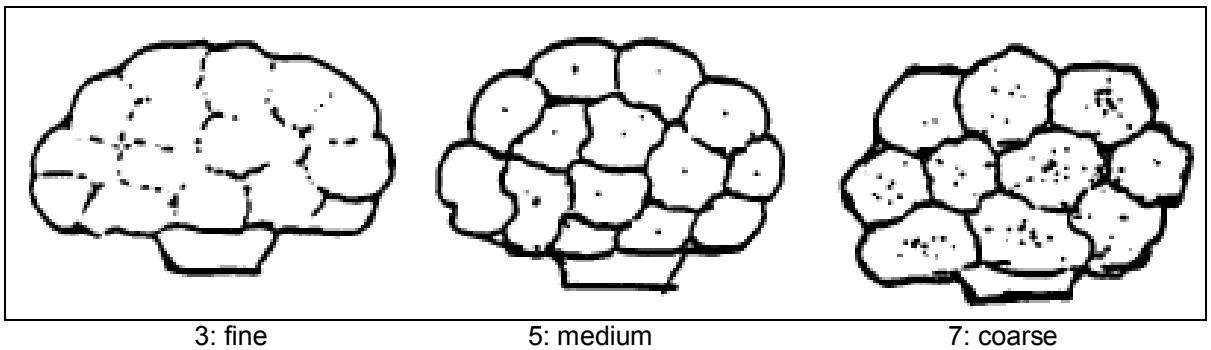
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: When the curd is fully developed (at harvest maturity).

Method of observation: visual observation. Use some standards as reference to facilitate the assessment of this characteristic and according to the CPVO explanation.

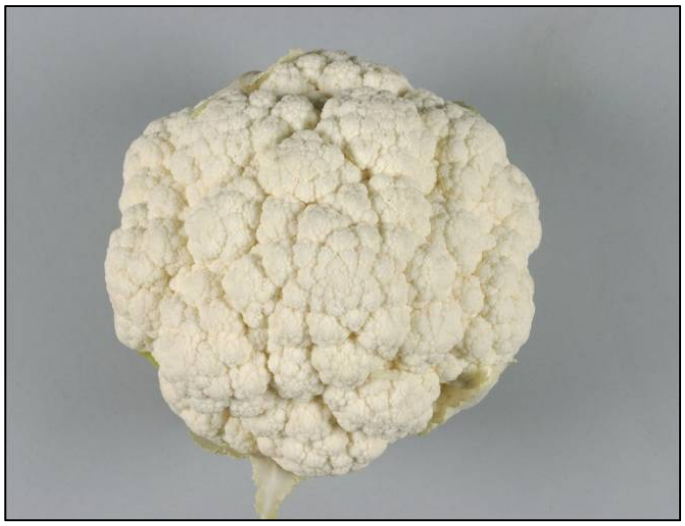
Notes and states of expression:
1: very fine
2: very fine to fine
3: fine
4: fine to medium
5: medium
6: medium to coarse
7: coarse
8: coarse to very coarse
9: very coarse

CPVO explanation:



3: fine 5: medium 7: coarse

22 Curd: knobbling



3: fine

5: medium

7: coarse

23 Curd: texture

Grouping characteristic: no.

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

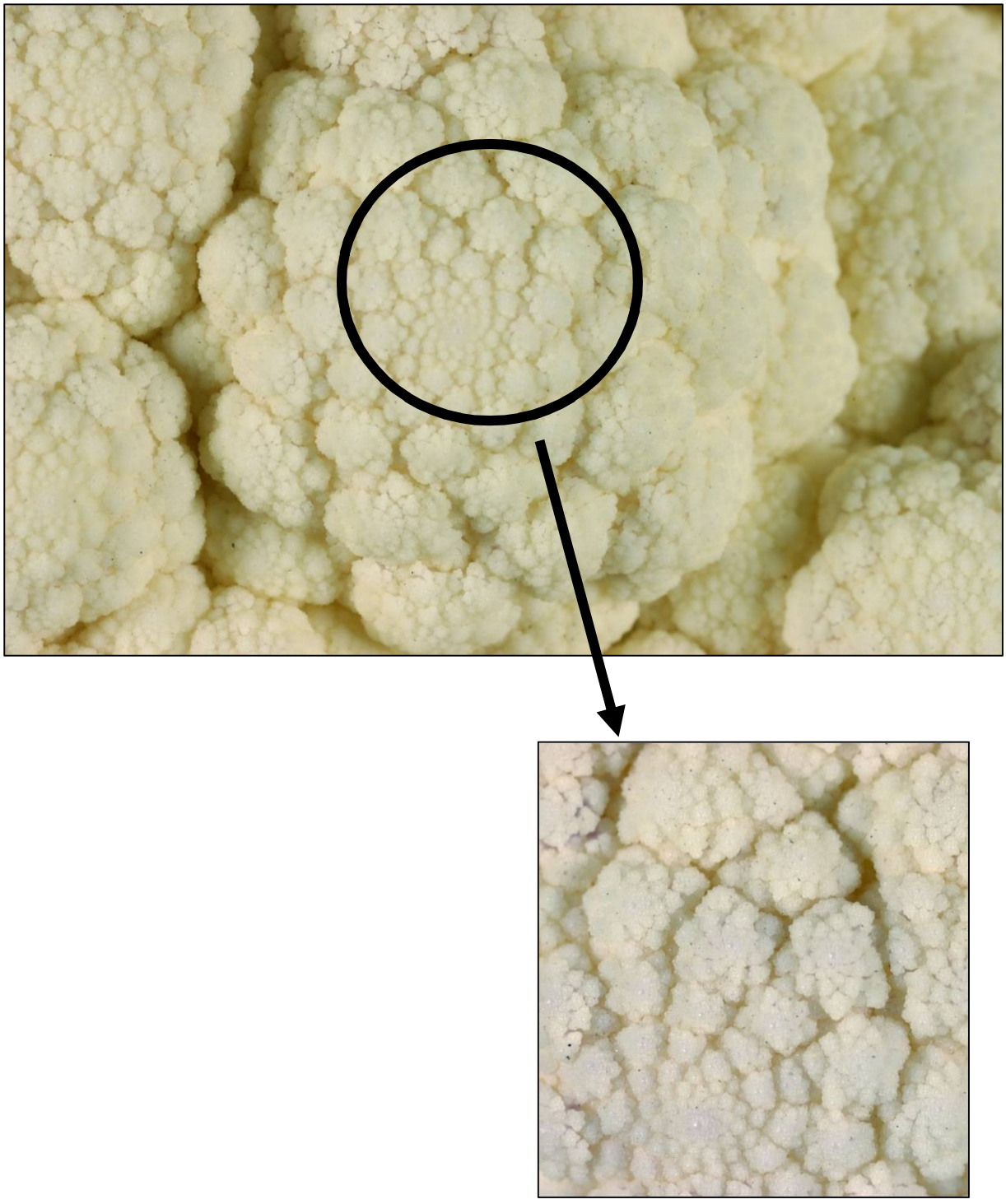
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: When the curd is fully developed (at harvest maturity).

Method of observation: visual observation. The texture is “fine” when the surface of the curd is very smooth and is “coarse” when the surface of the curd is granular. Calibrate using example varieties.

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

23 Curd: texture



24 Curd: anthocyanin coloration after harvest maturity

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 an average single plant or part of plant.

Stage of observation: When the curd is fully developed (at harvest maturity).

Method of observation: visual observation. Use some standards as reference to facilitate the assessment of this characteristic.

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

24 Curd: anthocyanin coloration after harvest maturity

1: absent

9: present

9: present

25 Flower: 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 an average single plant or part of plant.

Stage of observation: As soon as the plant is flowering.

Method of observation: Visual observation. Bolting characteristics has to be observed in a separate trial.

Notes, states of expression and example varieties:

1: white	Bruce, Ecrin
2: yellow	Lecerf

1: white 2: yellow

26 Earliness in spring planting

Grouping characteristic: yes.

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

Type of observation: **MS** – Calculated average of the measurement of 20 plants or parts of plants.

Stage of observation: When the curd is fully developed (at harvest maturity).

Method of observation: In cauliflower, earliness is strongly influenced by the temperature and the season of growing. Nevertheless, at the same place and for the same growing season, earliness is an important characteristic for the assessment of distinctness of varieties. For those reasons, no example varieties are provided in the Test Guidelines and the variety description should always state the place and the season of growing. Walk through the trial every week and define de expression as soon as the curds of the sample are mature. Calibrate using example varieties.

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

27 Earliness in summer planting

Grouping characteristic: yes.

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

Type of observation: **MS** – Calculated average of the measurement of 20 plants or parts of plants.

Stage of observation: When the curd is fully developed (at harvest maturity).

Method of observation: In cauliflower, earliness is strongly influenced by the temperature and the season of growing. Nevertheless, at the same place and for the same growing season, earliness is an important characteristic for the assessment of distinctness of varieties. For those reasons, no example varieties are provided in the Test Guidelines and the variety description should always state the place and the season of growing.
Walk through the trial every week and define de expression as soon as the curds of the sample are mature. Calibrate using example varieties.

Notes and states of expression:
1: very early autumn type
2: very early to early autumn type
3: early autumn type
4: early to medium autumn type
5: medium autumn type
6: medium to late autumn type
7: late autumn type
8: late to very late autumn type
9: very late autumn type
10: very early winter type
11: very early to early winter type
12: early winter type
13: early to medium winter type
14: medium winter type
15: medium to late winter type
16: late winter type
17: late to very late winter type
18: very late winter type

28 Male sterility

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 an average single plant or part of plant.

Stage of observation: As soon the plant is flowering.

Method of observation:
Absent = >70% fertile plants (open-pollinated varieties or hybrid varieties produced with self-incompatibility systems)
Partial = 30% to 70% fertile plants (heterozygotic genetic sterility)
Present = <30% fertile plants (sterile cytoplasm)

Male sterility is observed in a separate test. Assess male sterility in the flowers by examining of the flower has or not stamens.

Notes, states of expression and example varieties:

1: absent	Alpha 2
2: partial	Dunvez, Odegwen

28 Male sterility

1: absent

9: present

Notes

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