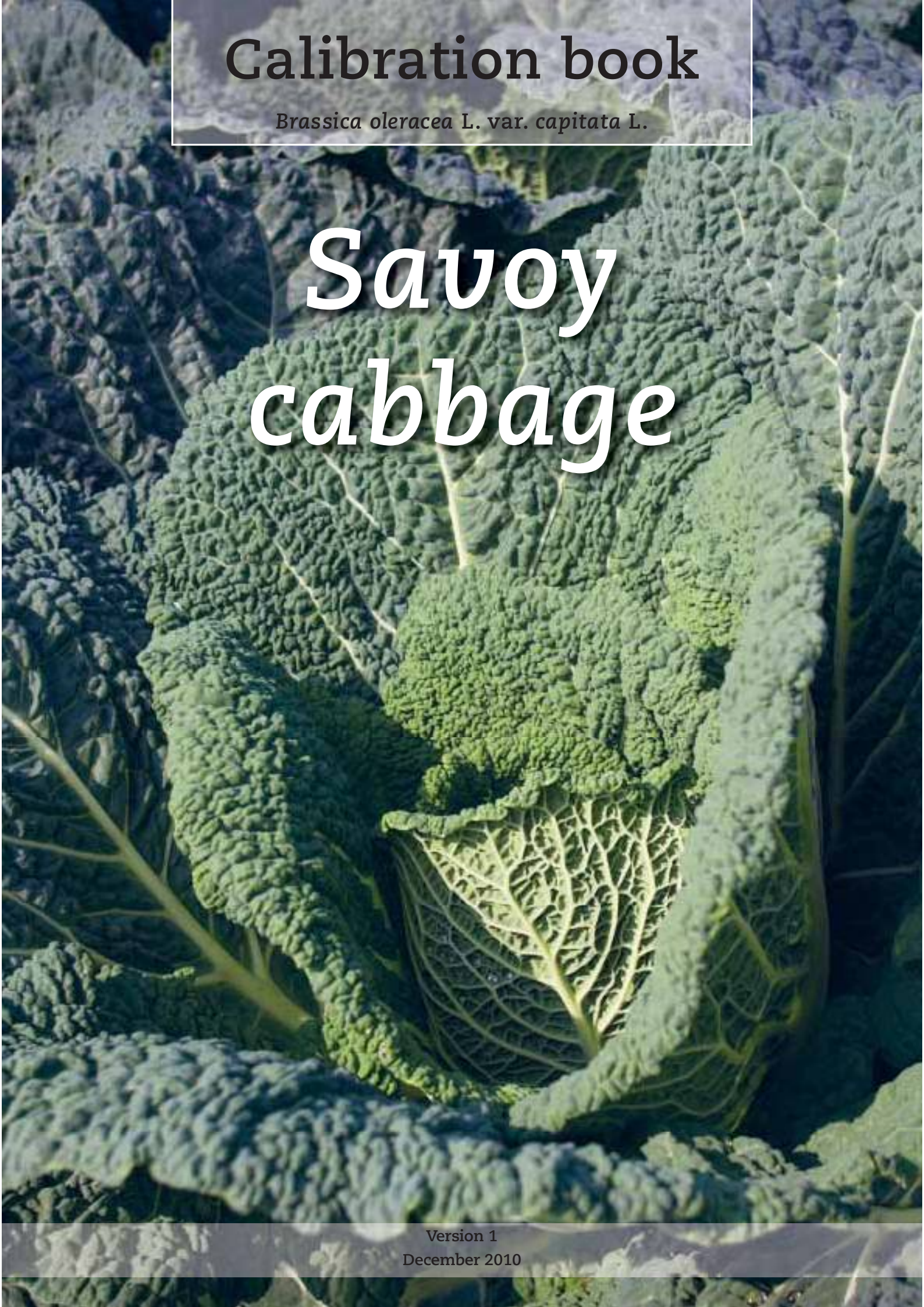
Calibration book

Brassica oleracea L. var. *capitata* L.



Savoy cabbage

Version 1
December 2010

Naktuinbouw calibration book

Brassica oleracea L. var. *capitata* L.

Savoy cabbage

Version 1

Introduction

In front of you, you find the Naktuinbouw calibration book for savoy cabbage. 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/48/2 which in turn is based on UPOV Guideline TG/48/7. 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.

Example varieties
If besides Savoy cabbage example varieties also varieties are mentioned in characteristics that apply for white and red cabbage also, the varieties are linked to the relevant species using (S), (W) and (R) respectively.

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

1.3 Plant: height

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: On fully developed plants before reaching harvest maturity.

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

Notes, states of expression and example varieties:

1: very short	
2: very short to short	
3: short	Fitis, Vorbote 2
4: short to medium	
5: medium	Marner Grünkopf
6: medium to long	
7: long	Hammer, Roi de l'hiver 2
8: long to very long	
9: very long	Bloemendaalse Gele

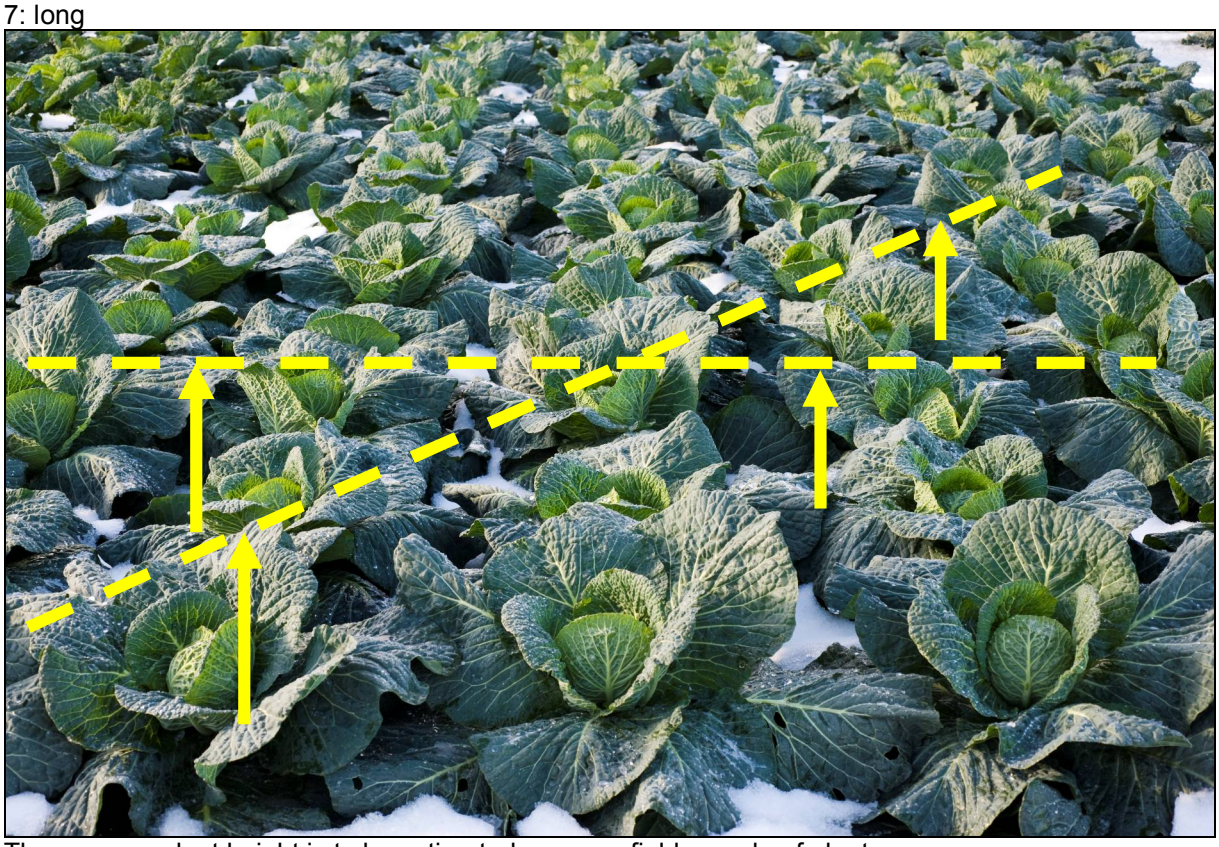
1.3 Plant: height

3: short

5: medium

1.3 Plant: height

7: long



The average plant height is to be estimated across a field sample of plants.

2.3 Plant: maximum diameter (including outer 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.

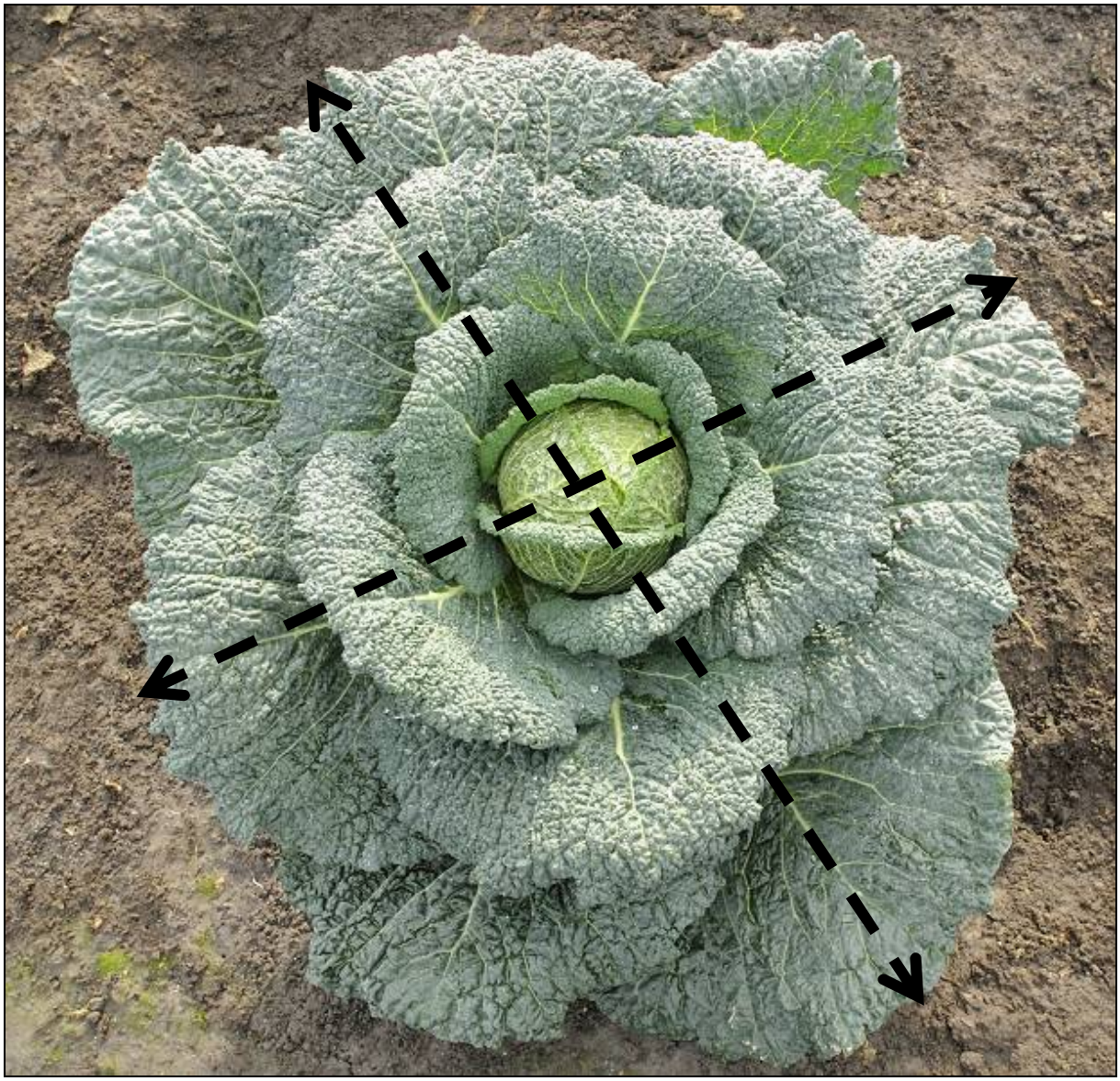
Stage of observation: On full grown plants before harvest maturity.

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

Explanation: the distance between the plants is always the same. Observe and compare if the outer leaves of the plants touch each other and if there is more or less soil visible between the plants and plant rows.

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

2.3 Maximum diameter (including outer leaves)



When assessing the maximum diameter the outer leaf should be included. The degree of plant cover can be used to assess the average diameter of the plant.

2.3 Maximum diameter (including outer leaves)

5. medium

7. large

3 Plant: length of outer stem.

Grouping characteristic: no.

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

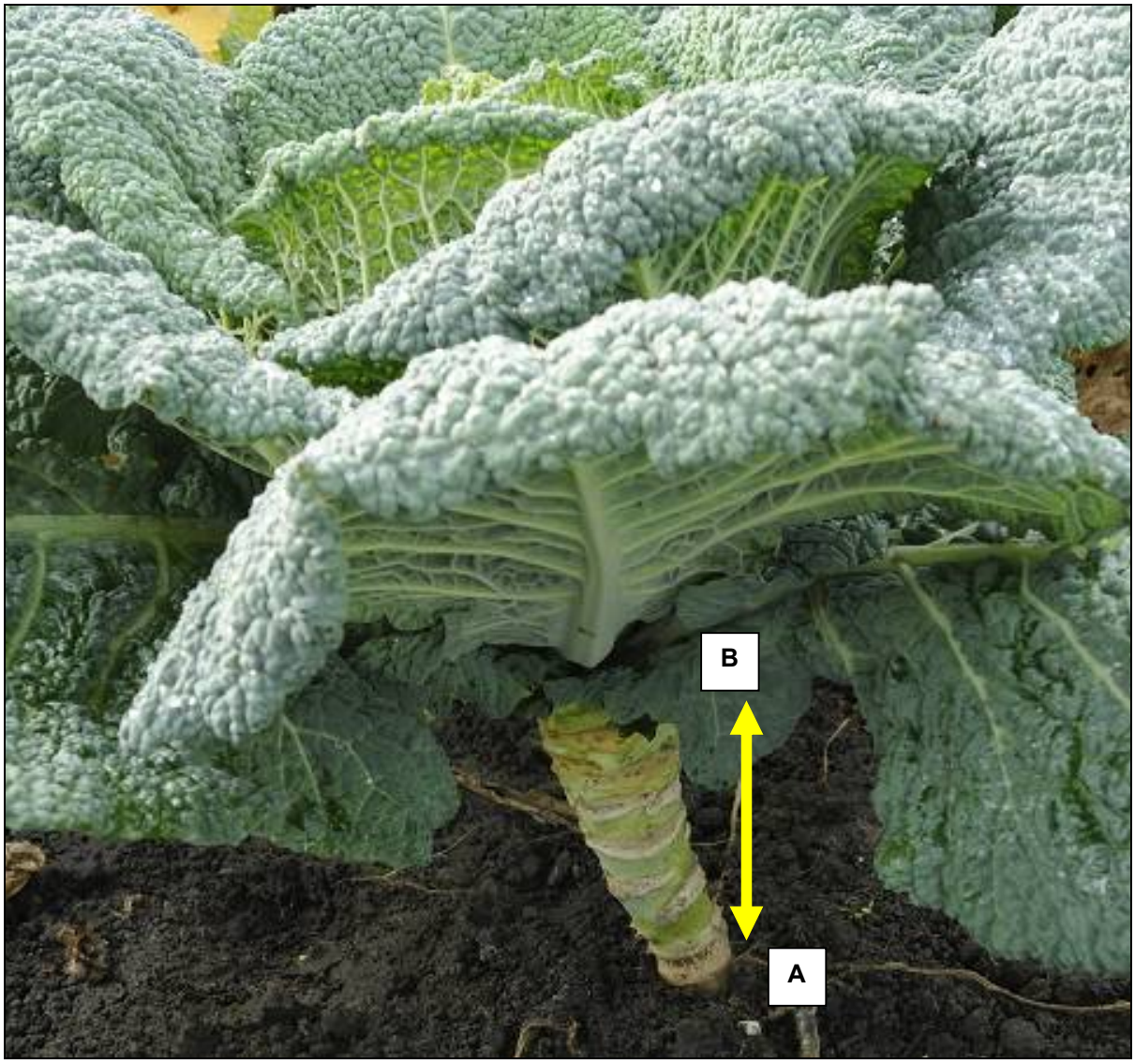
Type of observation: MS/VG – Choice between
- Calculated average of the measurement of 20 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant

Stage of observation: On full grown plants before harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Observe the average length of the outer stem by deciding the distance between soil surface and the lowest leaves.

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

3 Plant: length of outer stem



4 Plant: attitude of outer 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: On full grown plants before harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Observe the attitude of the outer leaves on the second crown of outer leaves. Do not use the leaves on the ground.

Notes and states of expression:
1: very erect
2: very erect to erect
3: erect
4. erect to semi-erect
5. semi-erect
6. semi-erect to prostate
7. prostate
8. prostate to very prostate
9. very prostate

3: erect

4 Plant: attitude of outer leaves

5: semi-erect

6: semi-erect to prostate

5.3 Outer leaf: 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 an average single plant or part of plant.

Stage of observation: On full grown plants before harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Observe the size of the outer leaves or second crown of outer leaves. Do not use the lowest leaves on the soil level.

Notes, states of expression and example varieties:

1: very small	
2: very small to small	
3: small	Promasa
4. small to medium	
5. medium	Belvoy
6. medium to large	
7. large	Vertus 3
8. large to very large	
9. very large	

5.3 Outer leaf: size

3: small 4. small to medium 5. medium 7. large

6 Outer leaf: shape of blade

Grouping characteristic: no.

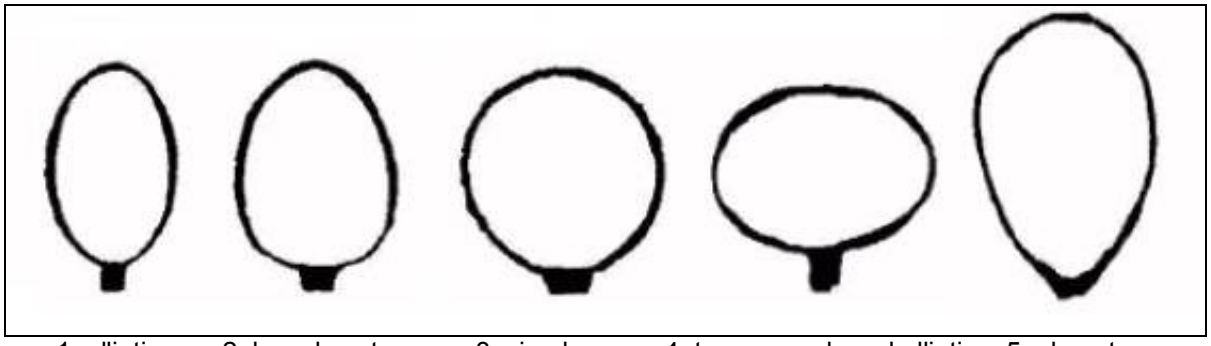
Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Observe the size of the outer leaves or second crown of outer leaves. Do not use the lowest leaves on the soil level. Cut the leaves from the stem. Place the leaves on the soil as flattened as possible and observe the shape with the help of the following figures. Compare several leaves as this character may slightly vary within a plant.

Notes and states of expression:
1: elliptic
2: broad ovate
3: circular
4: transverse broad elliptic
5: obovate



1: elliptic 2: broad ovate 3: circular 4: transverse broad elliptic 5: obovate

6 Outer leaf: shape of blade

1: elliptic

3: circular

5: obovate

7 Outer leaf: profile of upper side of blade

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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Determine the profile on the upper side of the second whirl of outer leaves.

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

7 Outer leaf: profile of upper side of blade

1: concave

3: convex

8.2 Outer leaf: degree of 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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Determine the degree of blistering of the second whirl of outer leaves.

Notes, states of expression and example varieties:

1: absent or very weak	De Pontoise 2
2: very weak to weak	
3: weak	Celsa
4: weak to medium	
5: medium	Savoy King
6: medium to strong	
7: strong	Hammer
8: strong to very strong	
9: very strong	Novusa, Roi de l'hiver

3: weak

8.2 Outer leaf: degree of blistering

5: medium

7: strong

9.2 Outer leaf: size of blisters

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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Determine the size of the blisters on the outer leaf of the 2nd whirl of leaves.

Notes, states of expression and example varieties:

1: very small	
2: very small to small	
3: small	Roi de l'hiver 2
4: small to medium	
5: medium	Hammer
6: medium to large	
7: large	Vertus 2
8: large to very large	
9: very large	

9.2 Outer leaf: size of blisters

5: medium

9: very large

10 Outer leaf: crimping

Grouping characteristic: no.

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

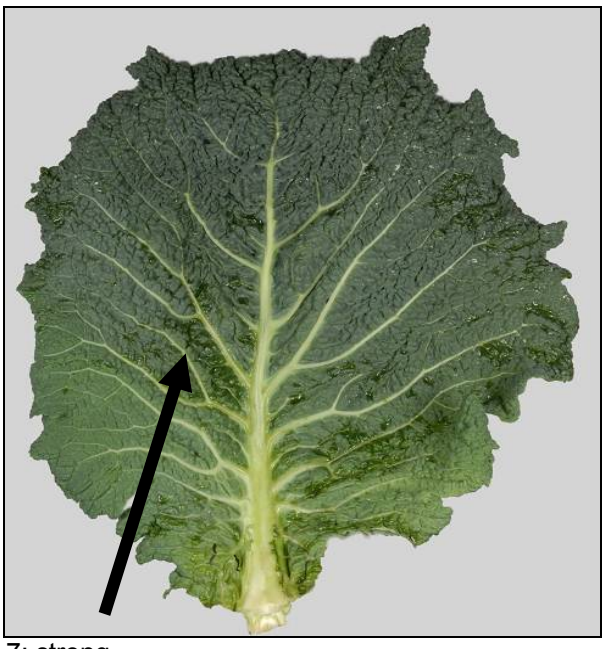
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: On fully developed plants before reaching harvest maturity.

Method of observation: A single observation for each experimental plot (general impression). Determine the extent of crimping on the outer leaf of the 2nd whirl of leaves. Do not use the lower leaves that are on or near the soil. Calibrate using example varieties and perform observation.

Notes and states or 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


5: medium


7: strong

11 Outer leaf: colour (with wax)

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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression).

Notes, states or expression and example varieties:

1: yellow green	
2: green	Hammer
3: grey green	Roi de l'hiver
4: blue grey	
5: violet	

CPVO explanation:
States 1-4 concern white and Savoy cabbage; state 5 only concerns red cabbage.

11 Outer leaf: colour (with wax)

1: yellow green

2: green

3: grey green

12 Outer leaf: intensity of 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 an average single plant or part of plant.

Stage of observation: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). This character is difficult to assess in bright sunlight. If possible, asses the colour intensity of the outer leaf during clouded weather.
Usually varieties with blue green leaves (Char 11) usually the intensity of colour is scored as note 7.

Notes, states of expression and example varieties:

1: very light	
2: very light to light	
3: light	Bloemendaalse Gele
4: light to medium	
5: medium	Kilosa
6: medium to dark	
7: dark	Norma
8: dark to very dark	
9: very dark	

3: light

12 Outer leaf: intensity of colour

5: medium

7: dark

14 Outer leaf: waxiness

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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression).

Remarks: The extent of grey is related to the presence of wax on the outer leaf surface. 'Greyish' implies here that the outer leaf has a strong wax layer, which offers some protection against Thrips.

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

14 Outer leaf: waxiness

5: medium

7: strong

15 Outer 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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression).

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

15 Outer leaf: undulation of margin

5: medium

7: strong

16 Outer leaf: reflexion of margin

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: On fully developed plants before reaching harvest maturity.

Method of observation: Visual observation. Perform a single observation for each experimental plot (general impression).

Determine the presence of reflexion in the upper side of the second whirl of outer leaves. In the case of reflexion, the margin of a leaf is bent outward and downward.

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

16 Outer leaf: reflexion of margin

1: absent

9: present

17 Head: shape in longitudinal section

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: Upon reaching harvest maturity.

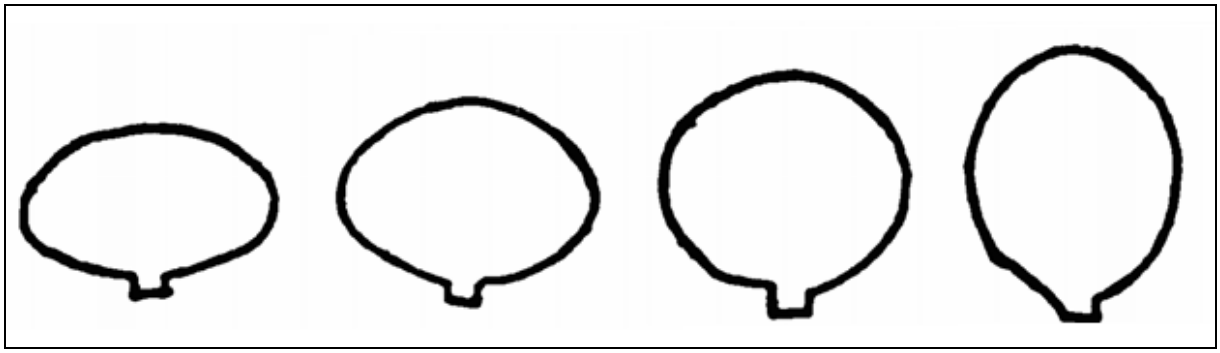
Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Make a section of the cabbage with a sharp knife along the vertical plane and determine the shape using the illustrations in the CPVO explanation.

Notes, states of expression and example varieties:
1: transverse narrow elliptic
2: transverse elliptic De Pontoise 2
3: circular
4: broad elliptic
5: broad obovate
6: broad ovate
7: angular ovate

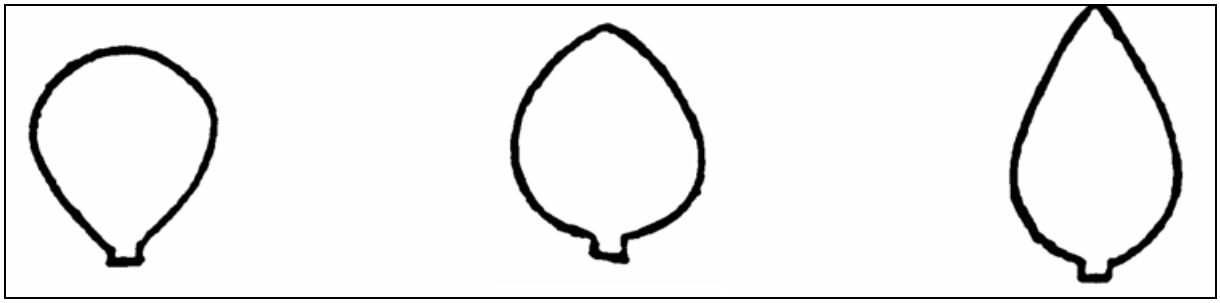
2: transverse elliptic 3: circular 3: circular 3: circular 7: angular ovate

17 Head: shape in longitudinal section

CPVO explanation:



1: transverse narrow elliptic 2: transverse elliptic 3: circular 4: broad elliptic



5: broad obovate 6: broad ovate 7: angular ovate

18 Head: shape of base in longitudinal section

Grouping characteristic: no.

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

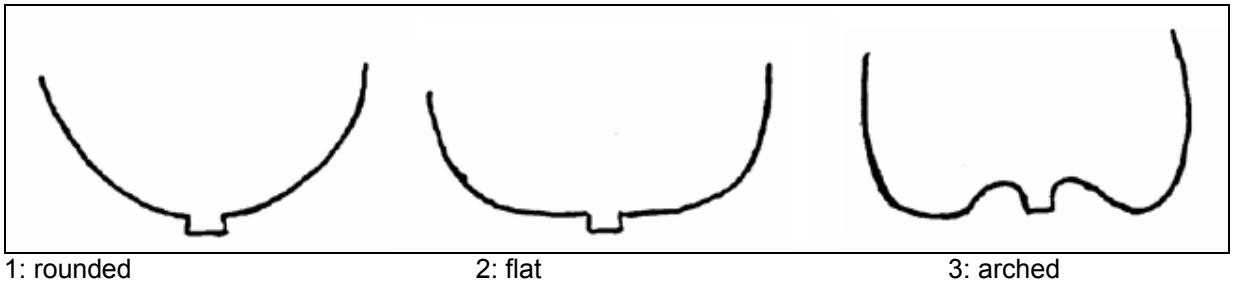
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine the shape using the illustrations in the CPVO explanation.

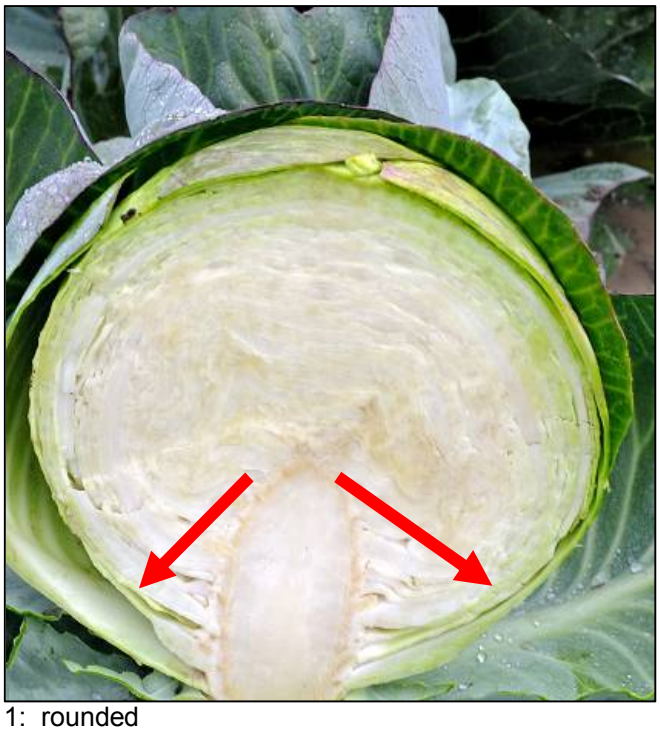
Notes and states of expression:
1: rounded
2: flat
3: arched

CPVO explanation:

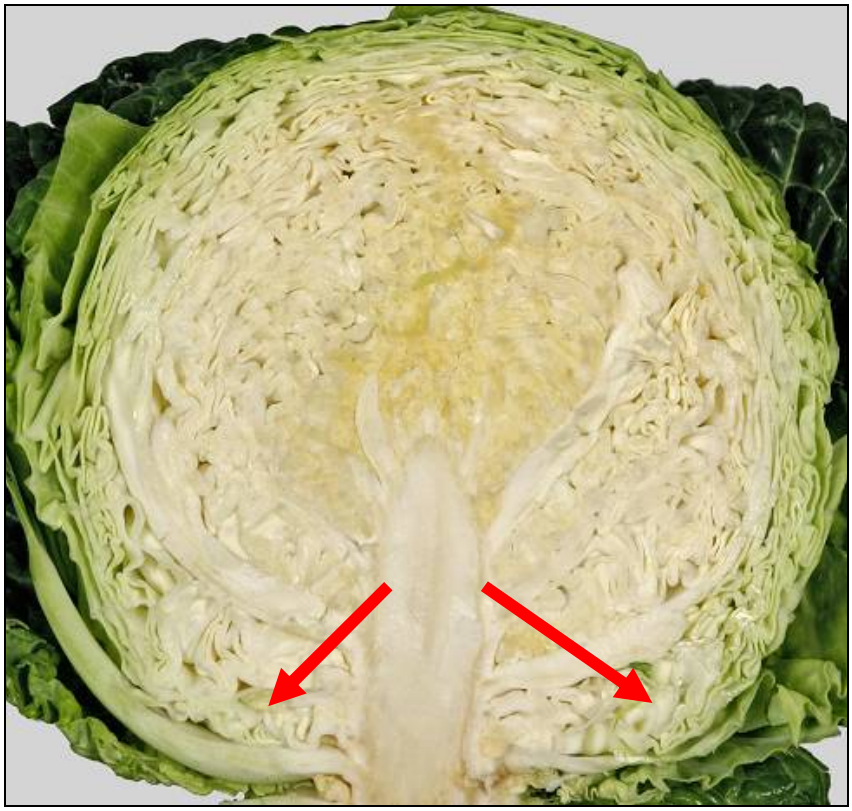


1: rounded 2: flat 3: arched

18 Head: shape of base in longitudinal section



1: rounded



2: flat

19 Head: length

Grouping characteristic: no.

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

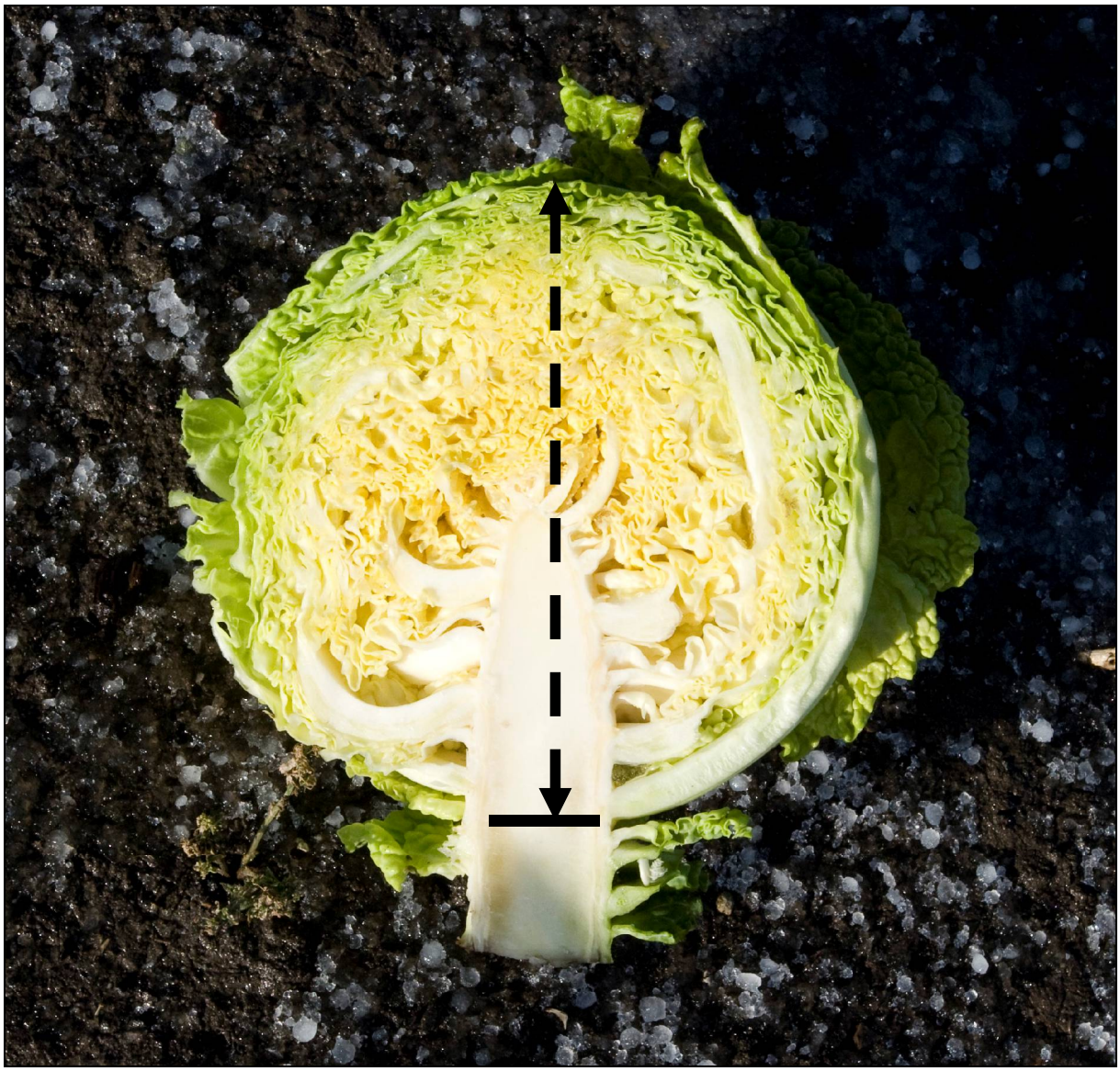
Type of observation: MS/VG – Choice between
- Calculated average of the measurement of 20 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant

Stage of observation: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine length of the head using the illustrations in the CPVO explanation.

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

19 Head: length



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20 Head: diameter

Grouping characteristic: yes.

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

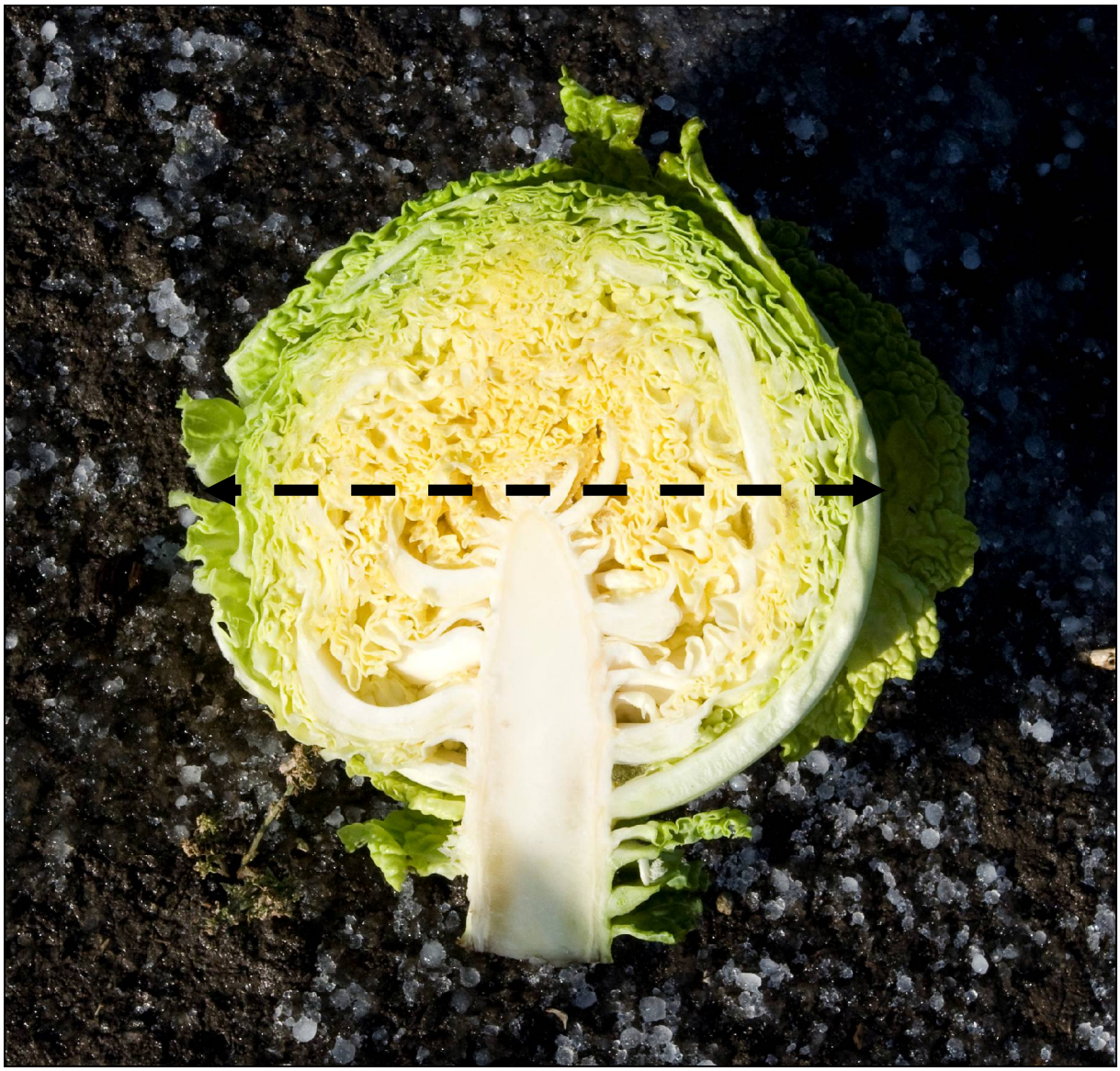
Stage of observation: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine the diameter of the head using the illustrations in the CPVO explanation.

Notes, states of expression and example varieties:

1: very small	
2: very small to small	
3: small	Vorbote 2
4: small to medium	
5: medium	Celsa, Pampa
6: medium to large	
7: large	
8: large to very large	
9: very large	

20 Head: diameter



21 Head: position of maximum diameter

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: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine whether the maximum diameter of the head is located above or below middle plane of the cabbage.

Notes and states of expression:
1: towards top
2: at middle
3: towards base

21 Head: position of maximum diameter

2: in center

3: below center

22 Head: cover

Grouping characteristic: no.

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

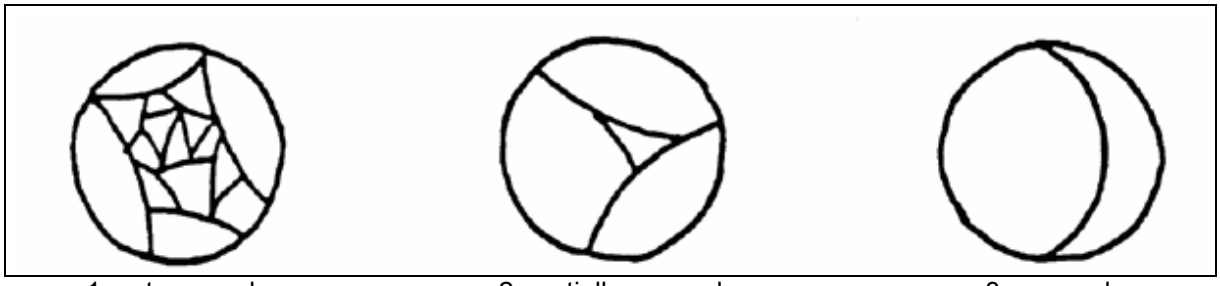
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: Upon reaching harvest maturity..

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Observe the head from above and determine the extent of cover using the CPVO explanation below.

Notes and states of expression:
1: not covered
2: partially covered
3: covered

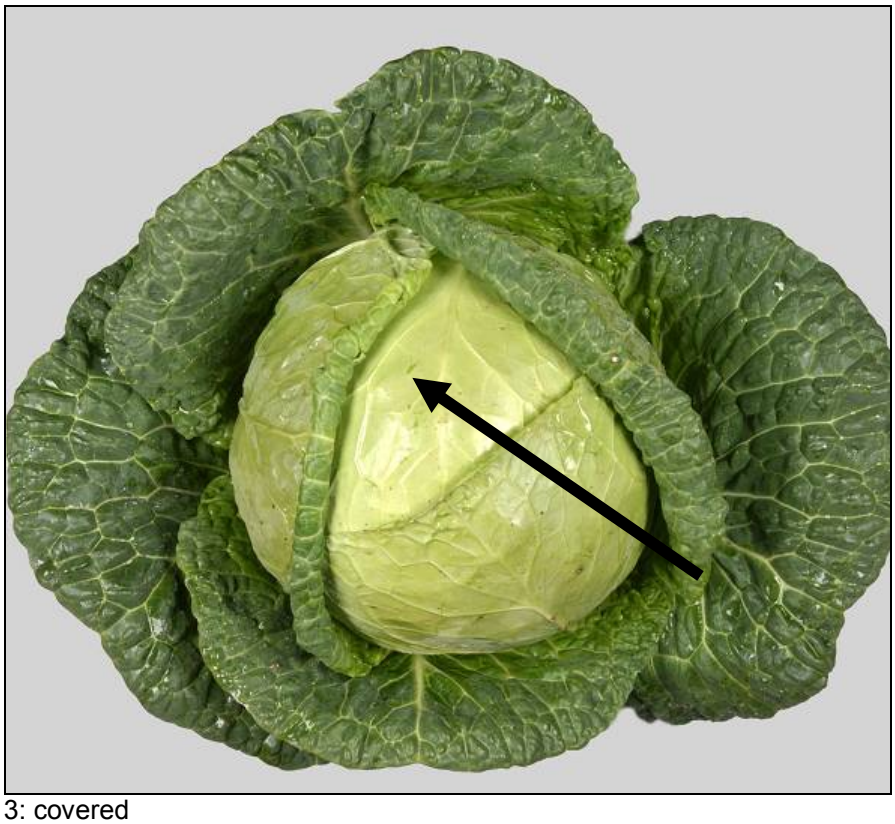
CPVO explanation:



1: not covered 2: partially covered 3: covered

22 Head: cover

1: not covered



3: covered

23 Savoy cabbage varieties only: Head: blistering of cover leaf

Grouping characteristic: no.

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

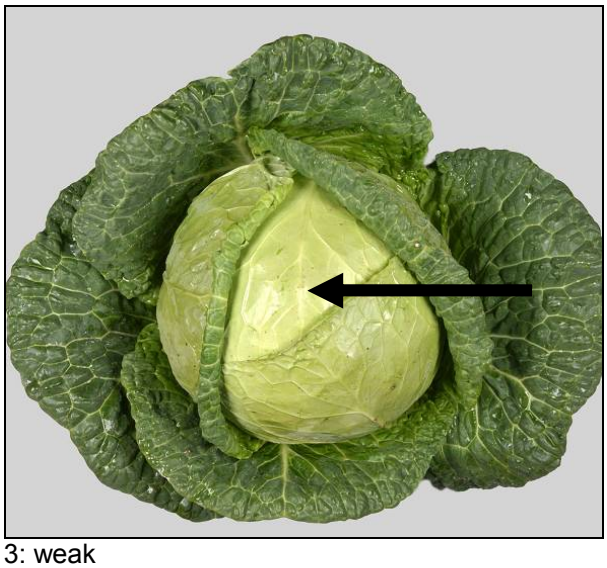
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: Upon reaching harvest maturity.

Method of observation: A single observation for each experimental plot (general impression).
Determine the intensity of blistering using example varieties in the trial.

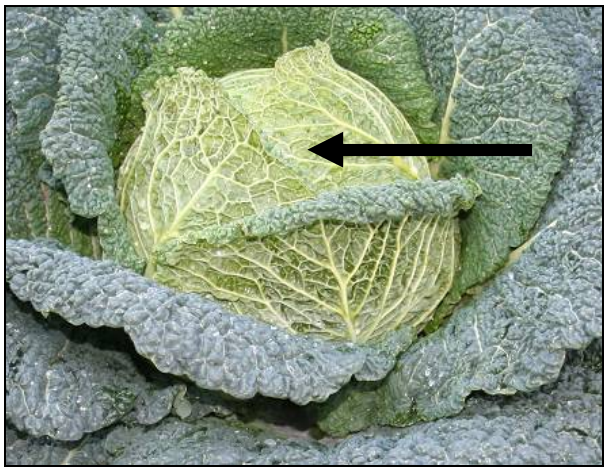
Notes and states or expression:
1: absent or very weak
2: very weak to weak
3: weak
4: weak to medium
5: medium
6: medium to strong
7: strong
8: strong to very strong
9: very strong

23 Savoy cabbage varieties only: Head: blistering of cover leaf



3: weak

5: medium



7:strong

24 Head: reflexion of margin of cover leaf

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: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Determine whether the margin of the cover leaf is reflexed using the illustration on the next page.

Remarks: Reflexion of the margin of the cover leaf is usually present.

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

1: absent

24 Head: reflexion of margin of cover leaf

9: present

25 Head: colour of cover leaf

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: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Determine the colour of the cover leaf using the illustration on the next page.

CPVO explanation: States 1-4 concern white and Savoy cabbage; state 5 only concerns red cabbage.

Notes and states of expression:
1: yellow green
2: green
3: grey green
4: blue green
5: violet

1: yellow green

25 Head: colour of cover leaf

2: green

5: violet

26 Head: intensity of colour of cover leaf

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: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). This character can only be judged properly by comparing the application with suitable example varieties.

Remarks:
This character is difficult to assess in bright sunlight. If possible, asses the colour intensity of the outer leaf during clouded weather. It is important not to let the cabbage become overripe as the colour intensity of the cover leaf fades in later stages.

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

26 Head: intensity of colour of cover leaf

Example of differences in colour intensity of the cover leaf.

27 White cabbage and Savoy cabbage varieties only: Head: anthocyanin coloration of cover leaf

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: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Determine the extent of anthocyanin colouration of the cover leaf.

Remarks:
Environmental factors such as temperature and the availability of nutrients can have a strong influence on the anthocyanin colouration of the cover leaf. Plant stress and cold will cause additional anthocyanin colouration.

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

27 White cabbage and Savoy cabbage varieties only: Head: anthocyanin coloration of cover leaf

Anthocyanin colouration on the cover leaf.

28 Head: internal colour

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: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine the internal colour of the head.

Notes and states of expression:
1: whitish
2: yellowish
3: greenish
4: violet

28 Head: internal colour

1: whitish

2: yellowish

4: violet

30 Head: density

Grouping characteristic: yes.

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

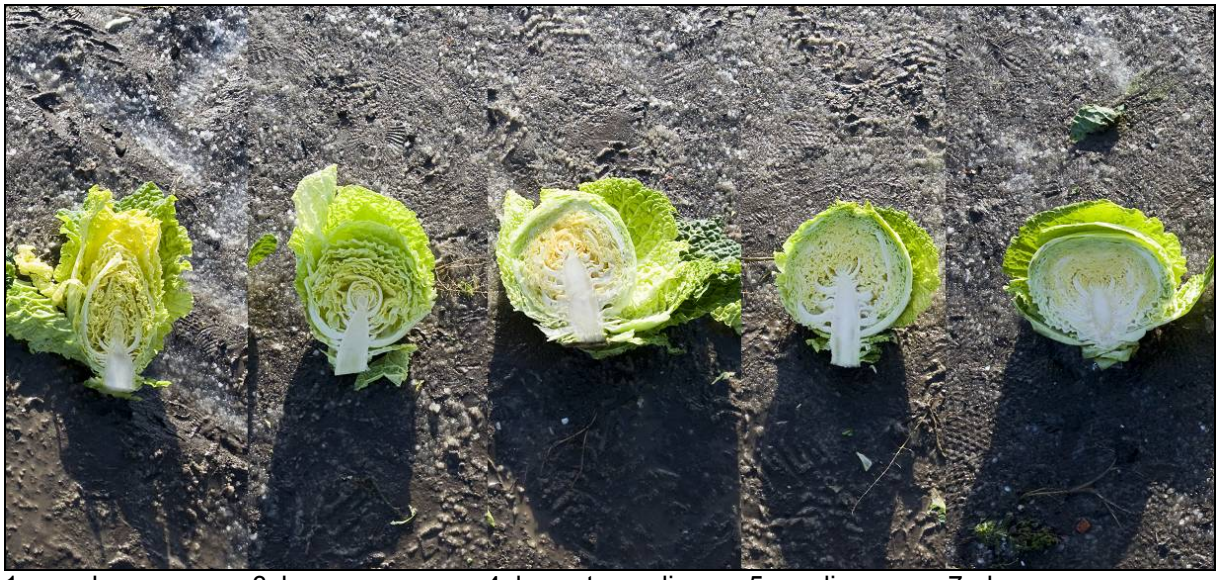
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine the density of the head.

Notes, states of expression and example varieties:

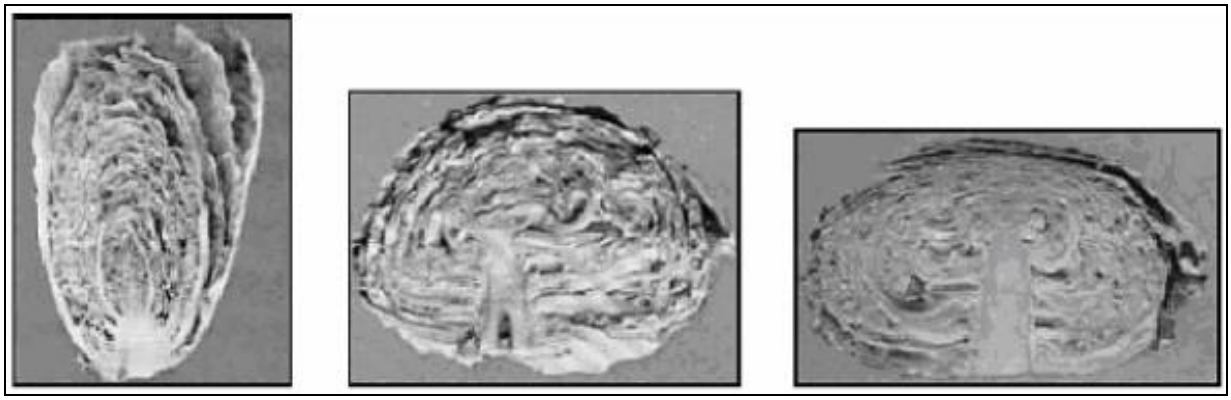
1: very loose	
2: very loose to loose	
3: loose	
4: loose to medium	
5: medium	Dacato, Spivoy
6: medium to dense	
7: dense	Pampa
8: dense to very dense	
9: very dense	



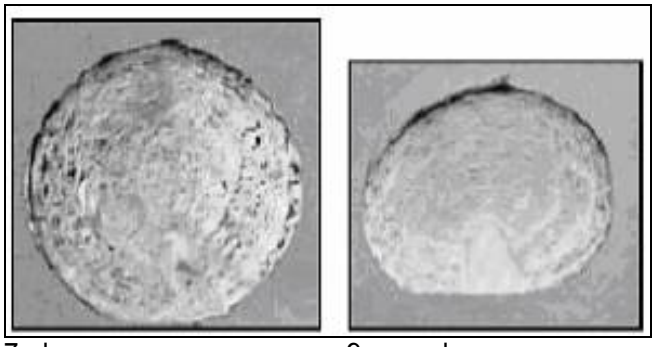
1: very loose 3: loose 4: loose to medium 5: medium 7: dense

30 Head: density

CPVO explanation:



1: very loose 3: loose 5: medium



7: dense 9: very dense

31 Head: internal structure

Grouping characteristic: no.

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

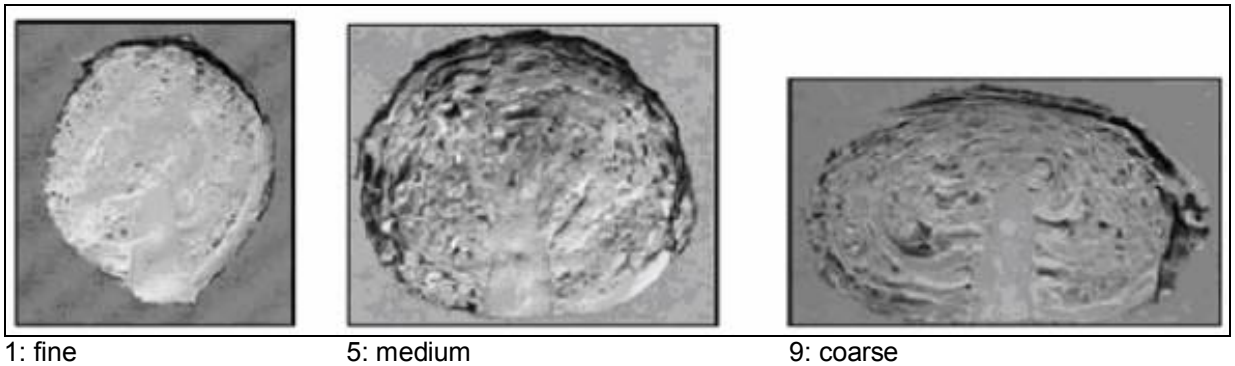
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and assess the internal structure of the head.

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:



1: fine 5: medium 9: coarse

31 Head: internal structure

5: medium

32 Head: relative length of interior stem compared to length of head

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: Upon reaching harvest maturity.

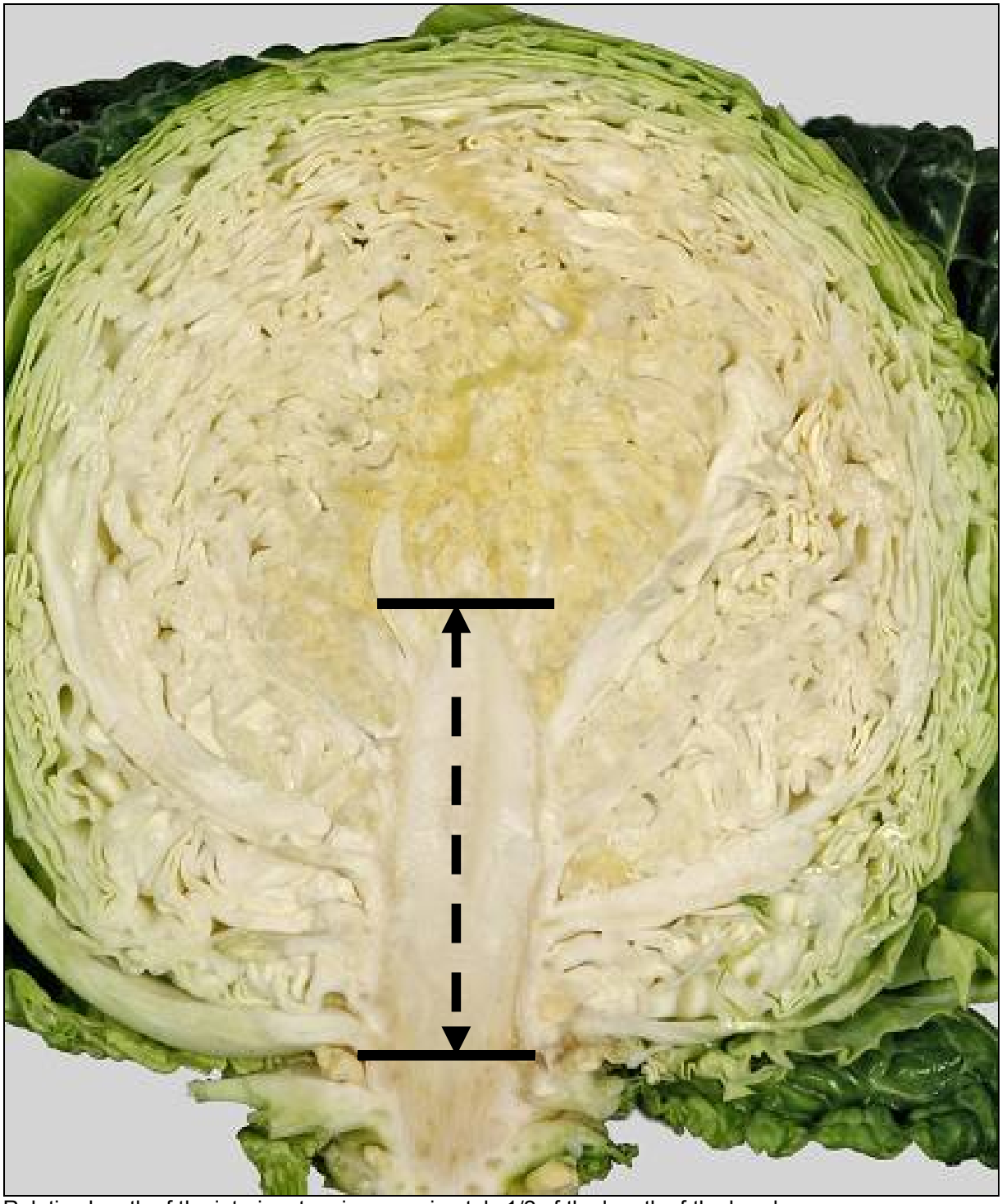
Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine the relative length of the interior stem compared to the length of the head.

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:

Short: relative length of the interior stem is approximately 1/8 of the length of the head.
Medium: relative length of the interior stem is approximately 1/4 of the length of the head.
Long: relative length of the interior stem is approximately 1/2 of the length of the head.

32 Head: relative length of interior stem compared to length of head



Relative length of the interior stem is approximately 1/2 of the length of the head.

33.3 Time of harvest maturity

Grouping characteristic: yes.

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: Upon reaching harvest maturity.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Asses character before bursting.

Remarks: The evaluation of this character requires some experience. Some varieties are not meant for agriculture in Western Europe (for example Tronchuda type cabbages that will not produce a firm cabbage under Western European growing conditions).

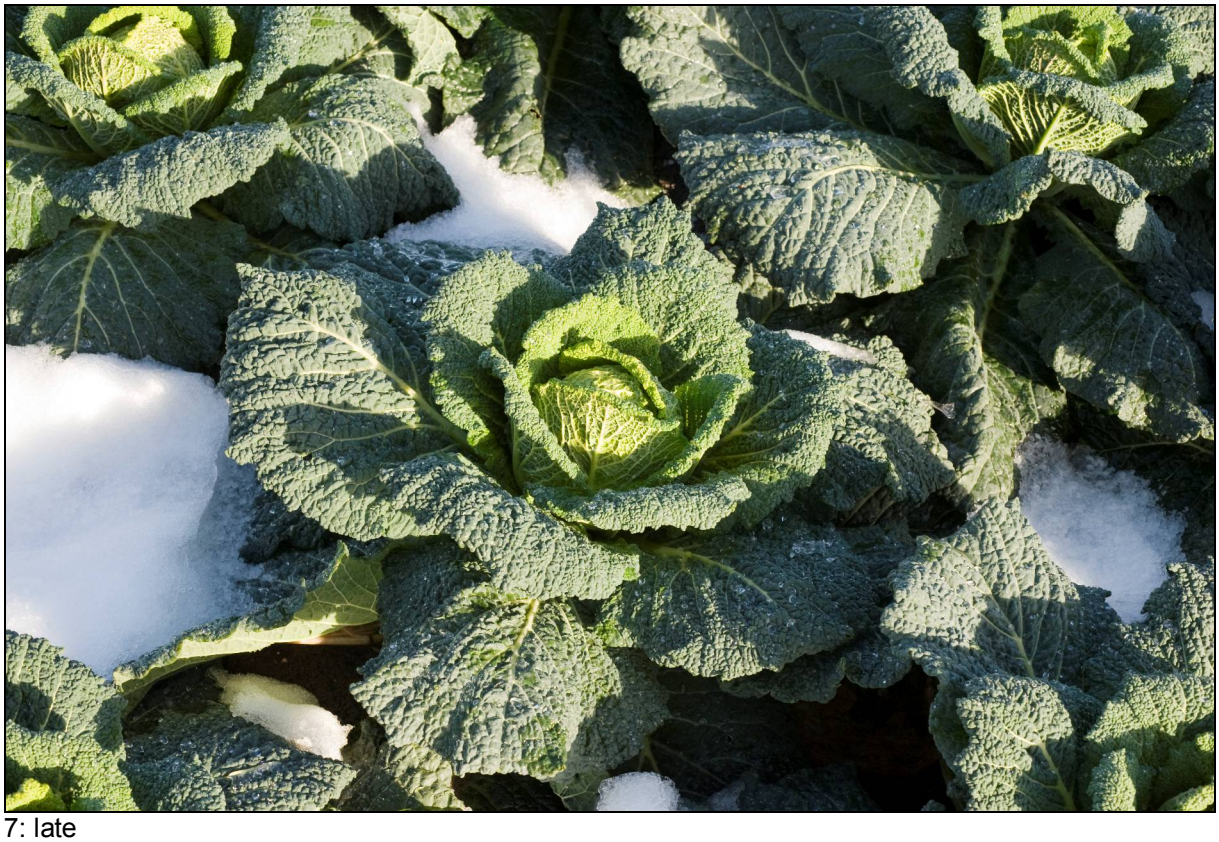
Notes, states of expression and example varieties:

1: very early	Spivoy
2: very early to early	
3: early	Walasa
4: early to medium	
5: medium	Belvoy
6: medium to late	
7: late	Hammer
8: late to very late	
9: very late	Alexander's Nº 1

2: very early to early

33.3 Time of harvest maturity

5: medium



7: late

34 Time of bursting of head after maturity

Grouping characteristic: no.

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

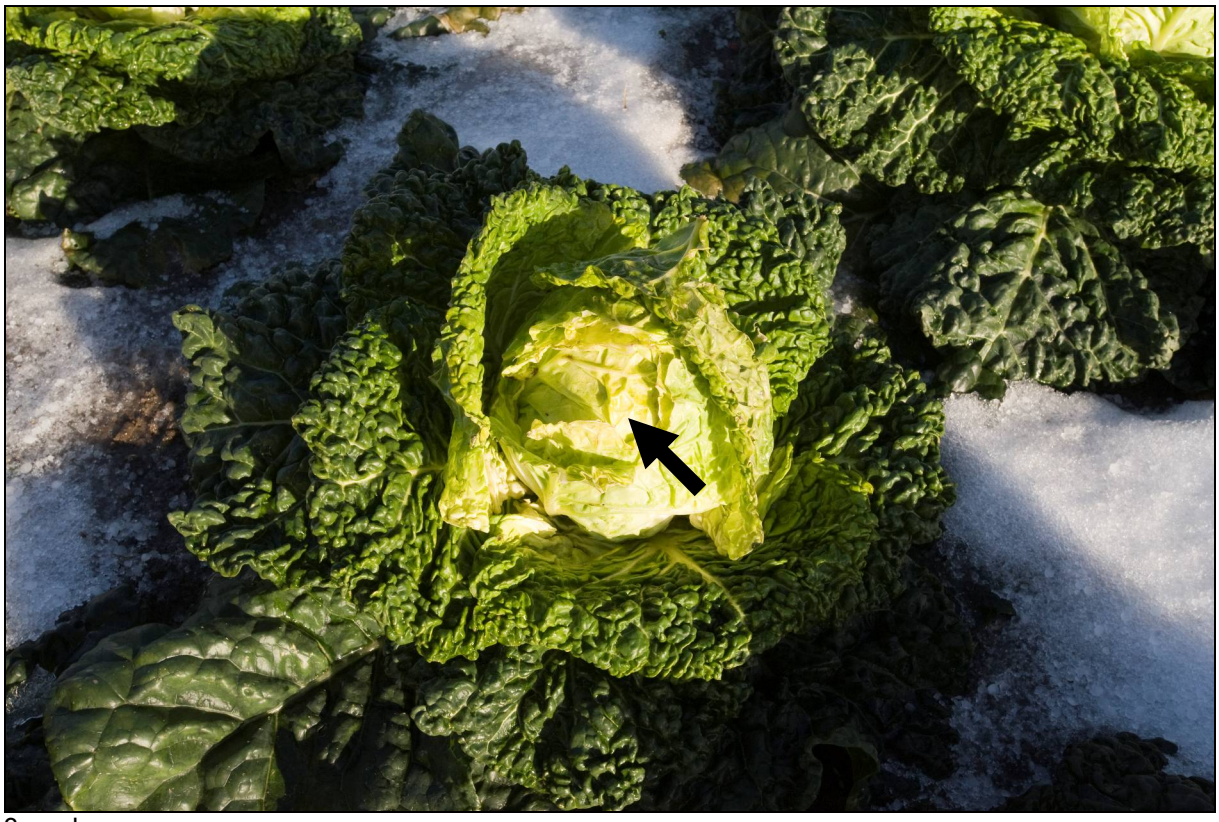
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: After harvesting when the cabbage begins to burst.

Method of observation: Visual observation. Calibrate using example varieties. Perform a single observation for each experimental plot (general impression). Perform observation when 20% of the cabbages have burst.

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

34 Time of bursting of head after maturity



3: early

5: medium

35 Male sterility

Grouping characteristic: no.

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

Type of observation: **VS** – Calculated average of the individual assessments of 20 plants or parts of plants.

Stage of observation: During the flowering stage.

Method of observation: Visual observation.

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

CPVO explanation:
Check for the presence of pollen stamen.

a) if pollen is present, then male sterility is absent.
b) if pollen is absent, then male sterility is present.

35 Male sterility

Sterility present 9: sterile Sterility absent 1: fertile

36 Resistance to race 1 of *Fusarium oxysporum* f. sp. *conglutinans*

Grouping characteristic: no.

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

Type of observation: **VS** – Calculated average of the individual assessments of 20 plants or parts of plants.

Stage of observation: See explanation.

Method of observation: See explanation.

Notes, states of expression and example varieties:
1: absent Roem van Enkhuizen 2 (W)
9: present Delight YR (W), Gloria (W)

CPVO explanation:

Records must be taken under conditions of controlled infection

Method

Maintenance of races

Type of medium:	on agar medium at 20°C.
Special conditions:	multiplication by passing on parts of the agar medium to liquid Czapek-Dox-Broth. This liquid medium must be shaken permanently.

Execution of test

Growth stage of plants:	young plants, about two weeks after sowing.
Temperature:	about 25°C.
Light:	normal glasshouse conditions.
Growing method:	seeds sown in peat soil at rather low temperature: 12-14ºC during day time and 10-12º during night time.
Method of inoculation:	roots of lifted young plants are soaked during 5 minutes in a suspension of spores and parts of mycelium, thereafter replanting.
Duration of test:	
- from sowing to inoculation:	2 weeks.
- from inoculation to reading:	first symptoms 7 days after inoculation, final reading 18 days after inoculation.
Number of plants tested:	20.
Remarks:	The disease might be a quarantaine-disease in some countries. Race 1 of this pathogen is common; very rarely other races occur.

Notes

Notes

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