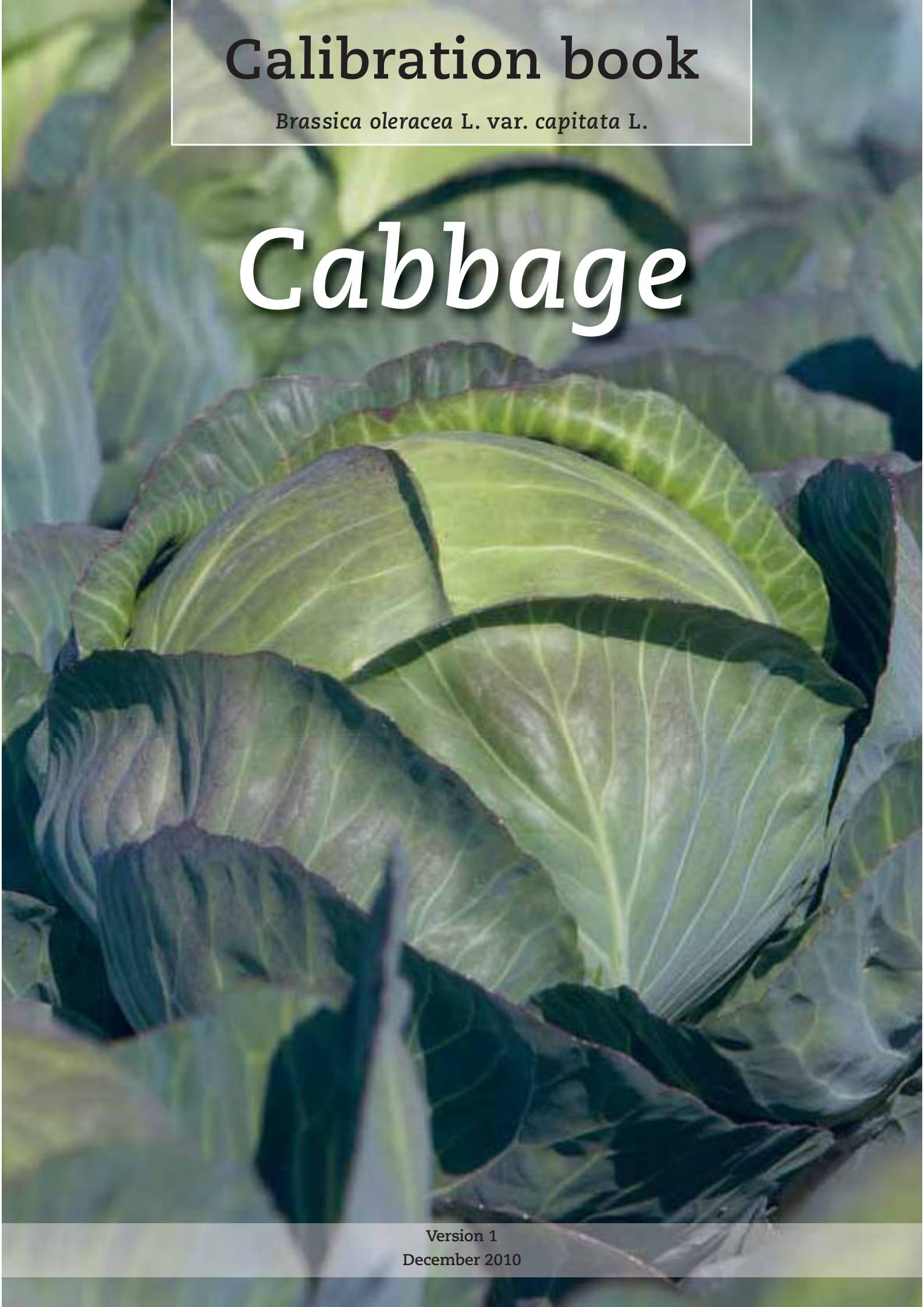
Calibration book

Brassica oleracea L. var. *capitata* L.

Cabbage



Version 1
December 2010

Naktuinbouw calibration book

Brassica oleracea L. var. *capitata* L.

cabbage

Version 1

Introduction

In front of you, you find the Naktuinbouw calibration book for cabbage, white Cabbage and red 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 example varieties are mentioned in characteristics that apply for white and red cabbage, the varieties are linked to the relevant species using (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

1.1 White cabbage varieties only: Plant: height
1.2 Red cabbage varieties only: 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.

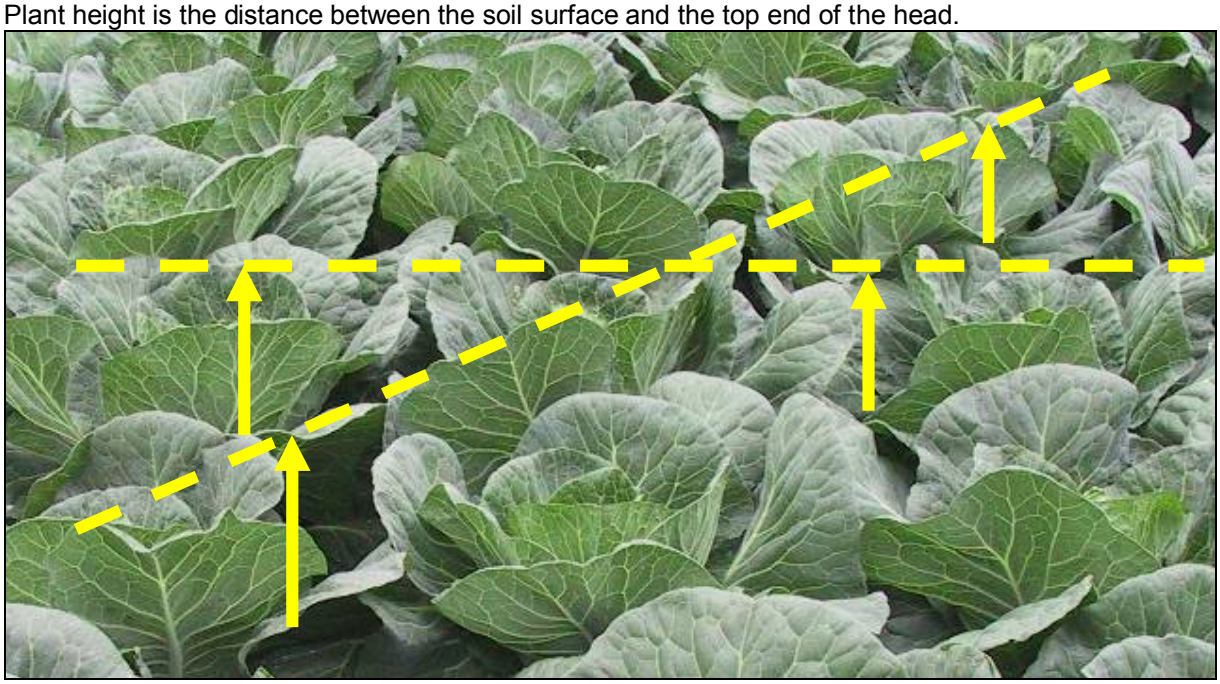
Method of observation: Visual observation. Calibrate using example varieties.

Notes, states of expression and example varieties:

1: very short	Langedijker Allervroegste (R), Primero (R)
2: very short to short	
3: short	Gouden Akker (W), Minicole (W), Marner Frührotkohl (R), Ruby Ball (R)
4: short to medium	
5: medium	Marner Lagerweiss (W), Strukton (W), Allrot (R), Roxy (R)
6: medium to tall	
7: tall	Amager hochstrunkig (W), Thurner (W), Zerlina (W), Langedijker Bewaar 3 (R), Langedijker Herfst (R) Rovita (R)
8: tall to very tall	
9: very tall	Filderkraut (W)

1.1 White cabbage varieties only: Plant: height
1.2 Red cabbage varieties only: Plant: height

Plant height is the distance between the soil surface and the top end of the head.



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

2.1 White cabbage varieties only: Plant: maximum diameter (including outer leaves)
2.2 Red cabbage varieties only: 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.

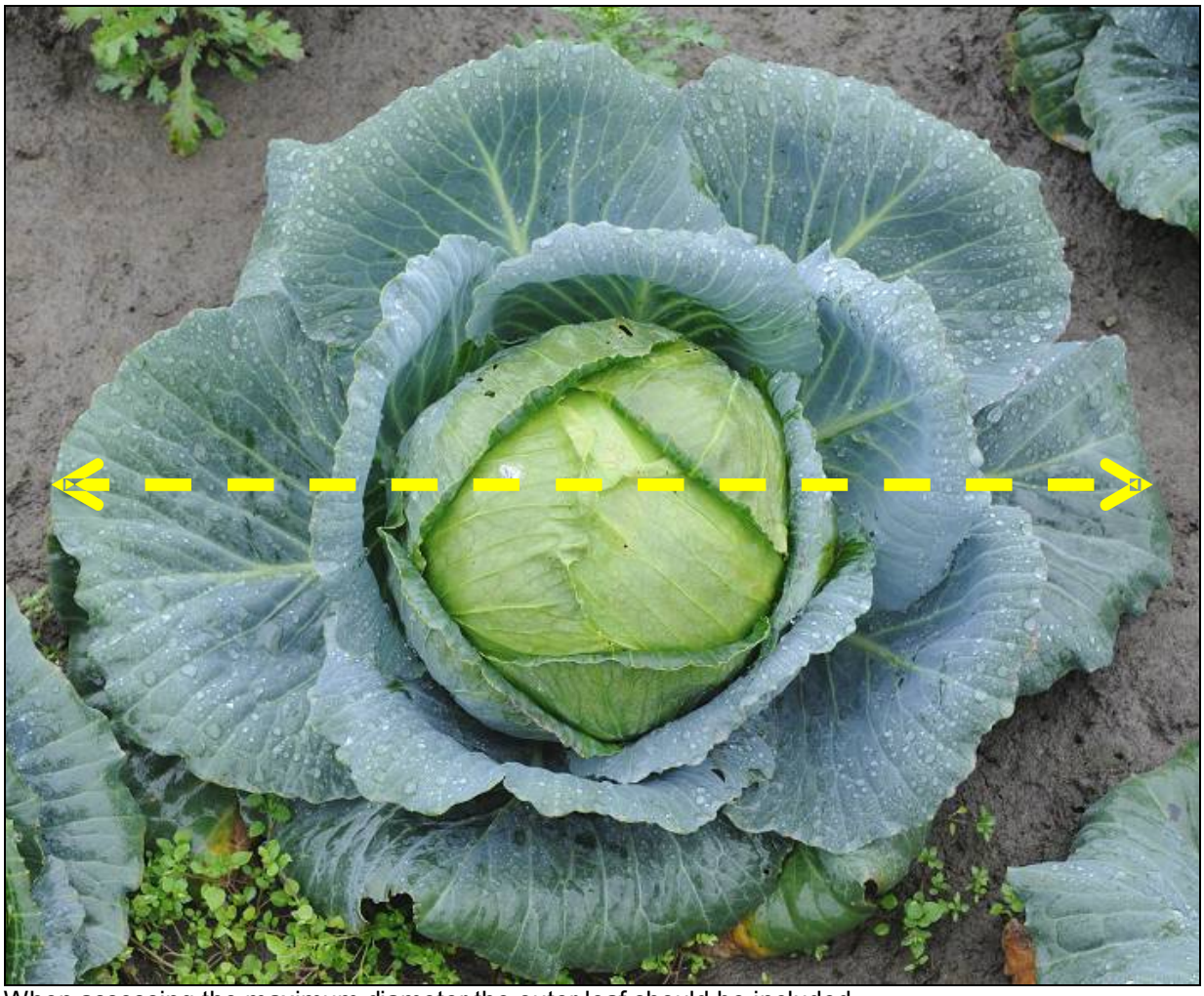
Stage of observation: On full grown plants before harvest maturity.

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

Explanation: make sure that 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

2.1 White cabbage varieties only: Plant: maximum diameter (including outer leaves)
2.2 Red cabbage varieties only: Plant: 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.

3 Plant: length of outer stem.

Grouping characteristic: no.

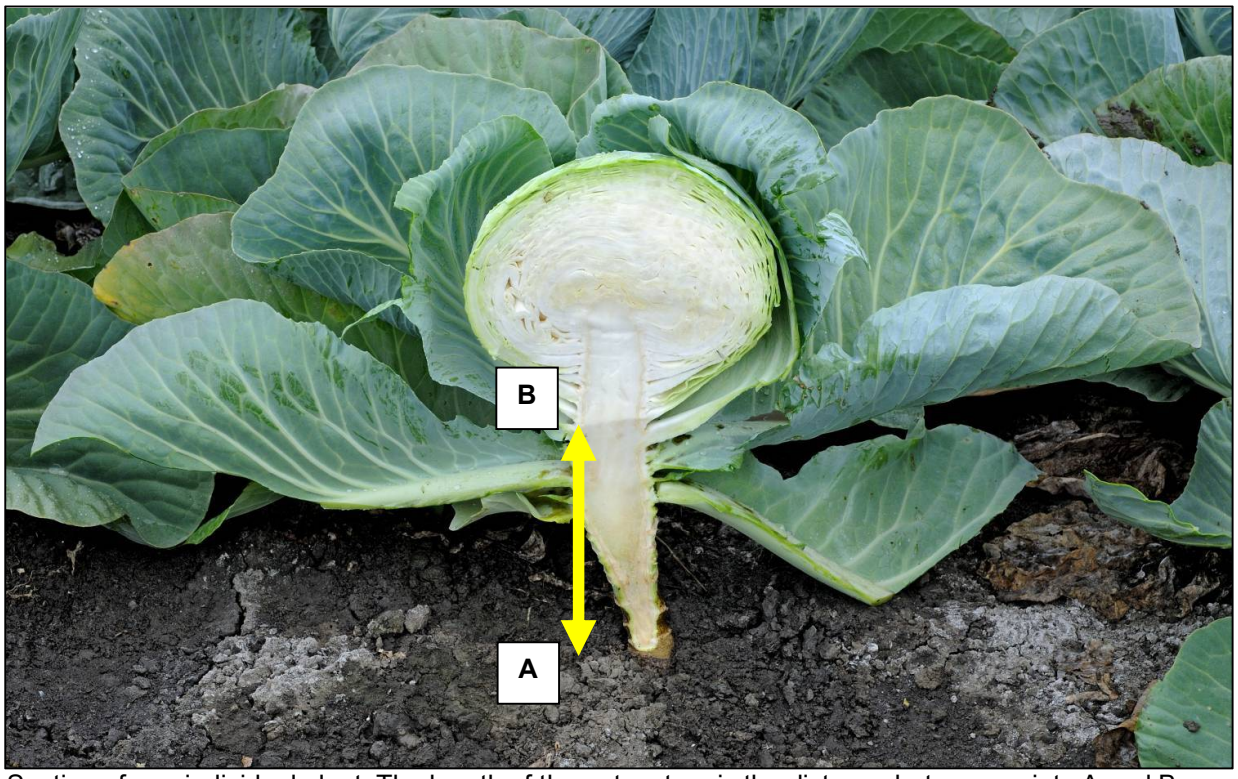
Type of characteristic: **QN** – Quantitative characteristic.

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



Section of one individual plant. The length of the outer stem is the distance between points A and B.

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

4 Plant: attitude of outer leaves

3: erect Filderkraut

5: semi-erect Cape Horn

6: semi-erect to prostate Hermes

5.1 White cabbage varieties only: Outer leaf: size
5.2 Red cabbage varieties only: 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	Golden Cross (W), Langedijker Allervroegste (R), Primero (R)
4. small to medium	
5. medium	Atria (W), Braunsweiger (W), Marner Lagerweiss (W), Langedijker Vroege (R), Ruby Ball (R)
6. medium to large	
7. large	Robuster (W), Thurner (W), Langedijker Herfst (R), Marner Lagerrot (R), Rovita (R)
8. large to very large	
9. very large	

5.1 White cabbage varieties only: Outer leaf: size
5.2 Red cabbage varieties only: Outer leaf: size

Outer leaf size. Left: 7: large Mastergreen. Right: 3: small Gouden Akker.

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.

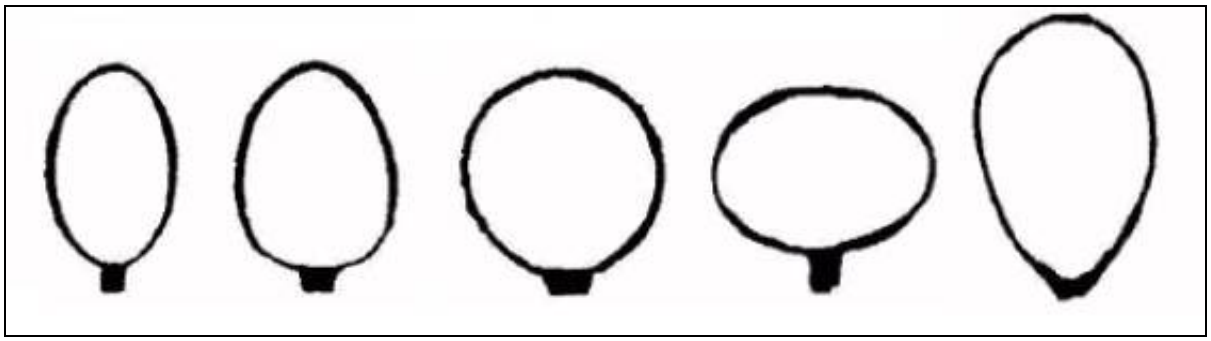
Stage of observation: On fully developed plants before reaching harvest maturity.

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

5: obovate 3: circular 4: transverse broad elliptic

CPVO explanation:



1: elliptic 2: broad ovate 3: circular 4: transverse broad elliptic 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 Slawdena

2: plane Golden cross

8.1 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	Slawdena (W), Rookie (R)
2: moderate	Fieldrocket (W), Langedijker Herfst (R)
3: strong	Roem van Enkhuizen 3 (W), Kissendrup (R)

1: absent or very weak Slawdena

2: medium Krautkaiser

3: strong Winter special

9.1 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 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


5: medium Hermes


7: large Winter special

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	April (W)
2: green	
3: grey green	Bison (W), Gloria (W)
4: blue grey	Market Prize (W)
5: violet	Langedijker Bewaar 2 (R)

CPVO explanation:

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

11 Outer leaf: colour (with wax)

2: green Gouden Akker

3: grey green Galaxy

4: Blue grey Shelta

5: Violet Rebecca

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	Gouden Akker (W), Rebus (R)
4: light to medium	
5: medium	Cabri (W), Redsky (R)
6: medium to dark	
7: dark	Excel (W), Integro (R)
8: dark to very dark	
9: very dark	

12 Outer leaf: intensity of colour

3: light Gouden Akker

5: medium Slawdena

7: dark Shelta

13 Red cabbage varieties only: Outer leaf: green flush

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. 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.

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

13 Red cabbage varieties only: Outer leaf: green flush

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: absent to 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 Outer leaf: waxiness

3: weak Gouden Akker

5: medium Sintra

7: strong Galaxy

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

15 Outer leaf: undulation of margin

3: weak Discover

5: medium Roem van Enkhuizen II

7: strong Filderkraut

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. 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 Slawdena

9: present Ramkila

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.

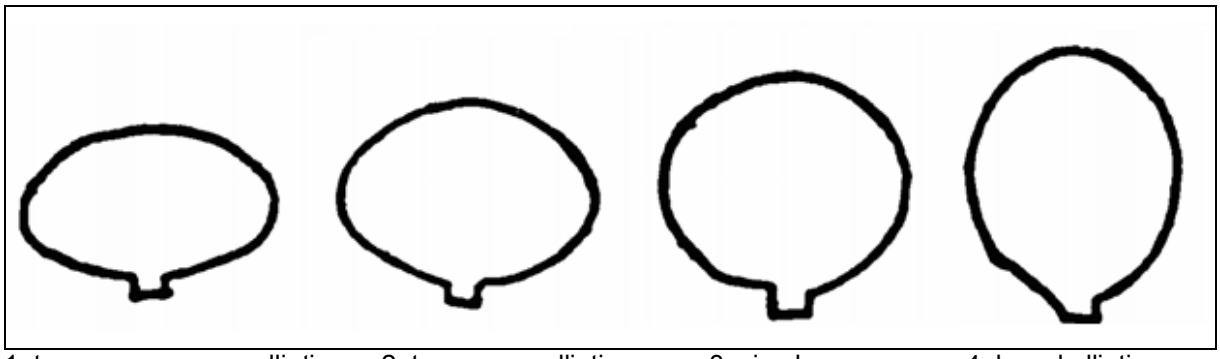
Stage of observation: Upon reaching harvest maturity.

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

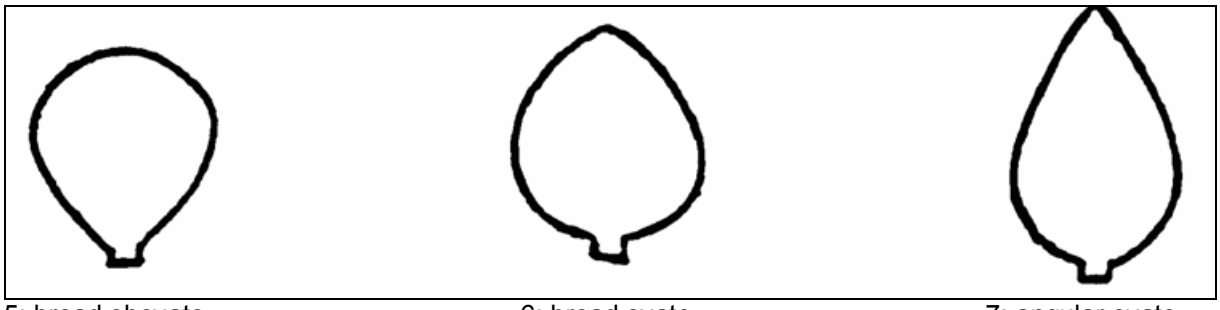
Notes, states of expression and example varieties:

1: transverse narrow elliptic	Braunschweiger (W)
2: transverse elliptic	Centurion (W), Conquistador (W)
3: circular	Octoking (W), Roem van Enkhuizen 2 (W)
4: broad elliptic	Langedijker Herfst (R)
5: broad obovate	Langedijker Bewaar (W)
6: broad ovate	Cape Horn (W)
7: angular ovate	Filderkraut (W), Hispi (W)

CPVO explanation:



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



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

17 Head: shape in longitudinal section

2: transverse elliptic Brunswijker

3: circular Castello

7: angular ovate Duchy

18 Head: shape of base in longitudinal section

Grouping characteristic: no.

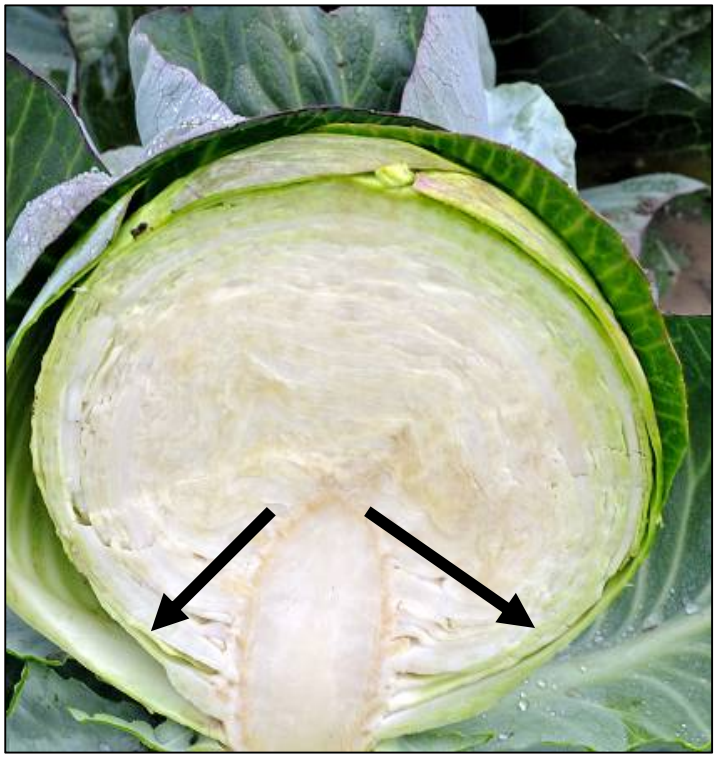
Type of characteristic: **PQ** – Pseudo-qualitative characteristic.

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.

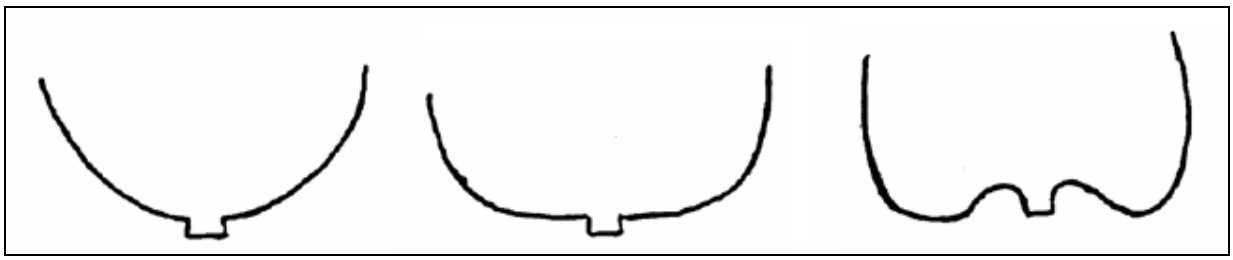
Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine the shape using the illustrations in the CPVO explanation.

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



1: rounded

CPVO explanation:



1: rounded 2: flat 3: arched

19 Head: length

Grouping characteristic: no.

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

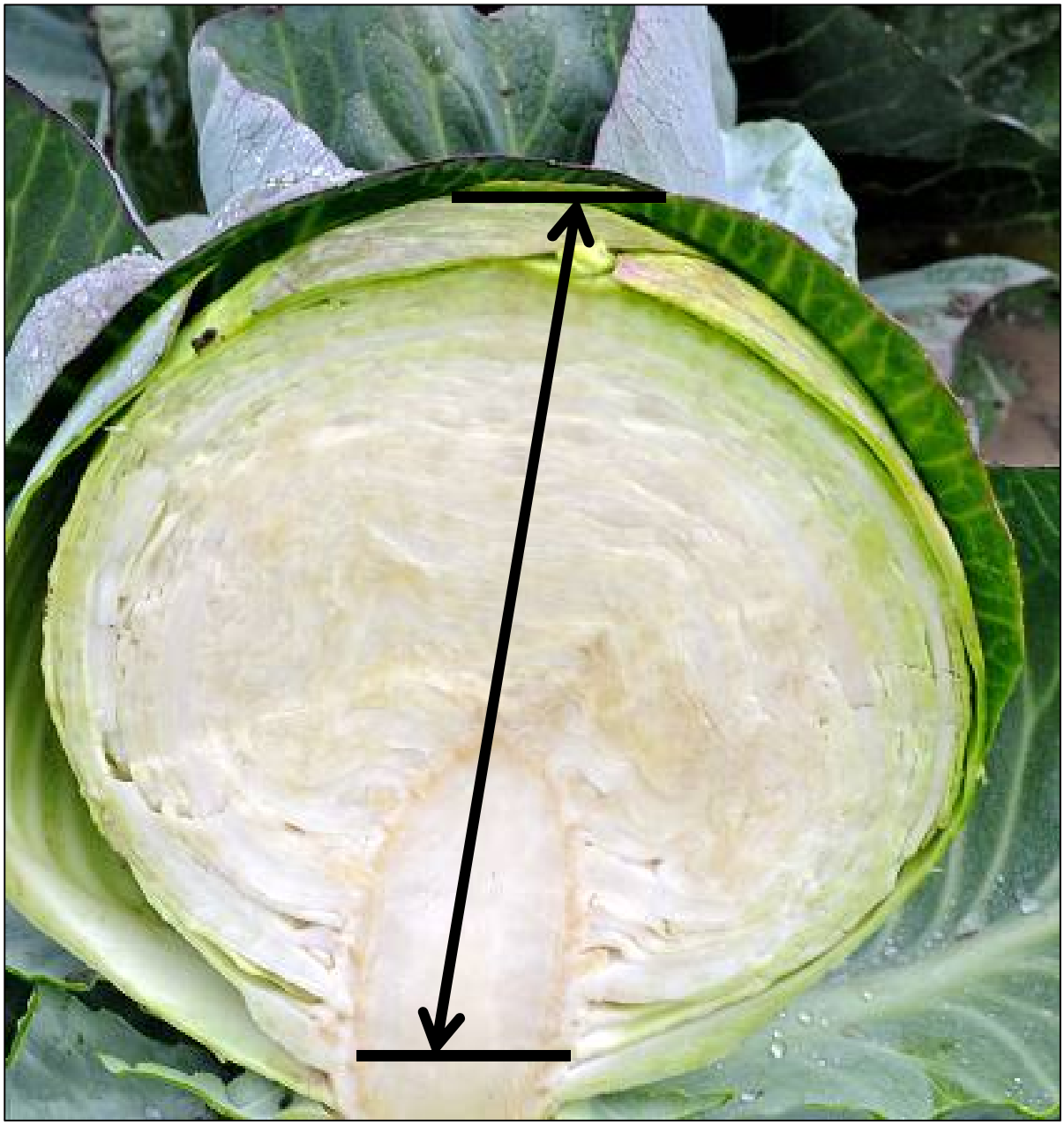
Type of observation: MS/VG – Choice between
- Calculated average of the measurement of 20 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant

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



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	Marner Allfrüh (W)
4: small to medium	
5: medium	
6: medium to large	
7: large	Braunschweiger (W), Quintal d'Alsace (W)
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


2: maximum diameter at middle


3: maximum diameter towards base

22 Head: cover

Grouping characteristic: no.

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

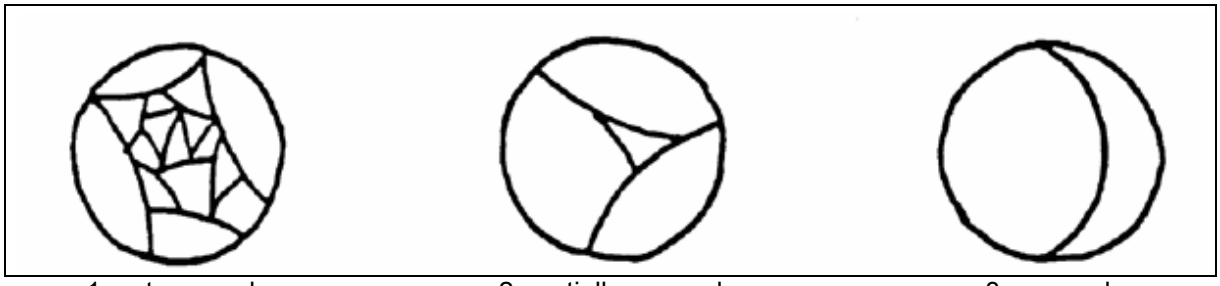
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

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

3: covered Rendero

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

24 Head: reflexion of margin of cover leaf

Reflexion of the margin of the cover leaf: 9: present Rendero

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

25 Head: colour of cover leaf

2: green

3: grey 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 in white cabbage.

Example of differences in colour intensity of the cover leaf in white cabbage.

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 coloration.

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 of white cabbage.

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

29 Red cabbage varieties only: Head: intensity of internal 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: 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: 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

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.

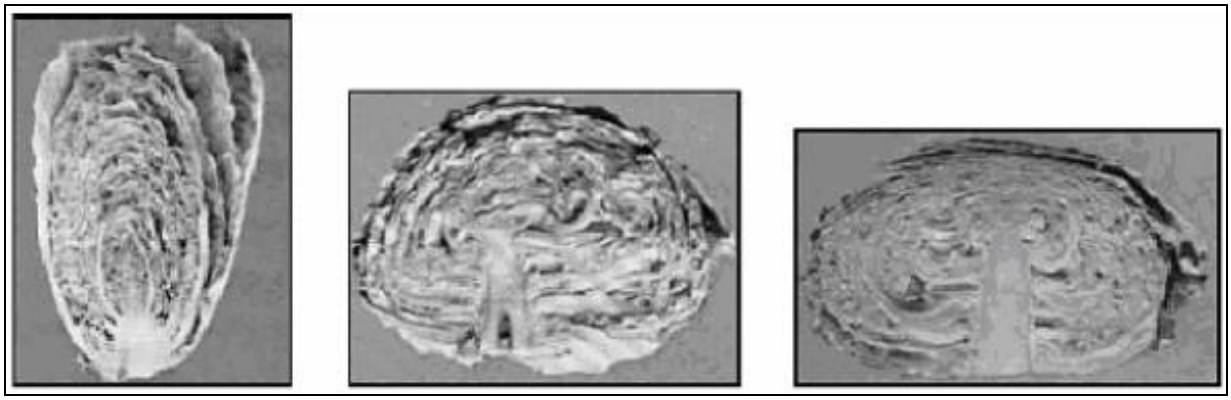
Method of observation: Visual observation. Calibrate using example varieties. Make a section of the cabbage with a sharp knife along the vertical plane and determine the density of the head.

Notes, states of expression and example varieties:

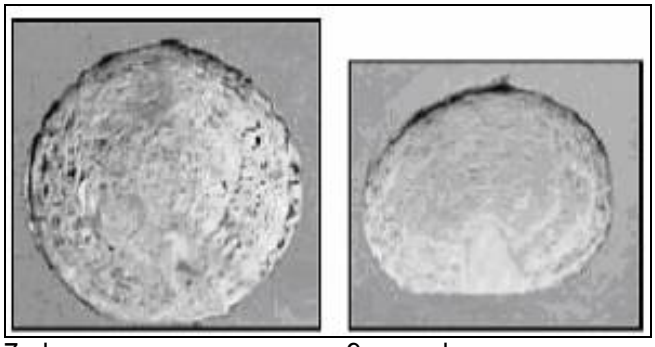
1: very loose	Mignon (W)
2: very loose to loose	
3: loose	Hornspi (W)
4: loose to medium	
5: medium	
6: medium to dense	
7: dense	
8: dense to very dense	
9: very dense	Slawdena (W)

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.

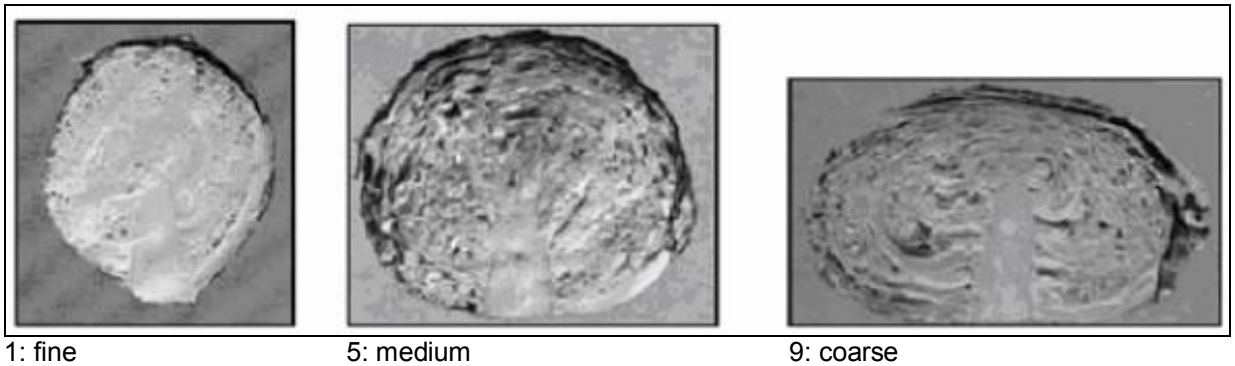
Type of observation: **VG** – Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

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.

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.

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

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

Relative length of the interior stem is approximately 1/3 of the length of the head (length: 3).

33.1 White cabbage varieties only: Time of harvest maturity
33.2 Red cabbage varieties only: 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	Golden Cross (W)
2: very early to early	
3: early	Green Express (W), Hijula (W), Langedijker Vroege (R), Normiro (R), Ruby Ball (R)
4: early to medium	
5: medium	Roem van Enkhuizen 2 (W), Autoro (R) Langedijker Herfst (R), Marner Septemberrot (R)
6: medium to late	
7: late	Holsteiner platter (W), Marner Lagerweiss (W), Strukton (W), Huzaro (R), Langedijker Bewaar 2 (R), Marner Lagerrot (R)
8: late to very late	
9: very late	Bartolo (W)

White cabbage upon reaching harvest maturity.

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 show bursting.

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


White cabbages at bursting stage.

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.

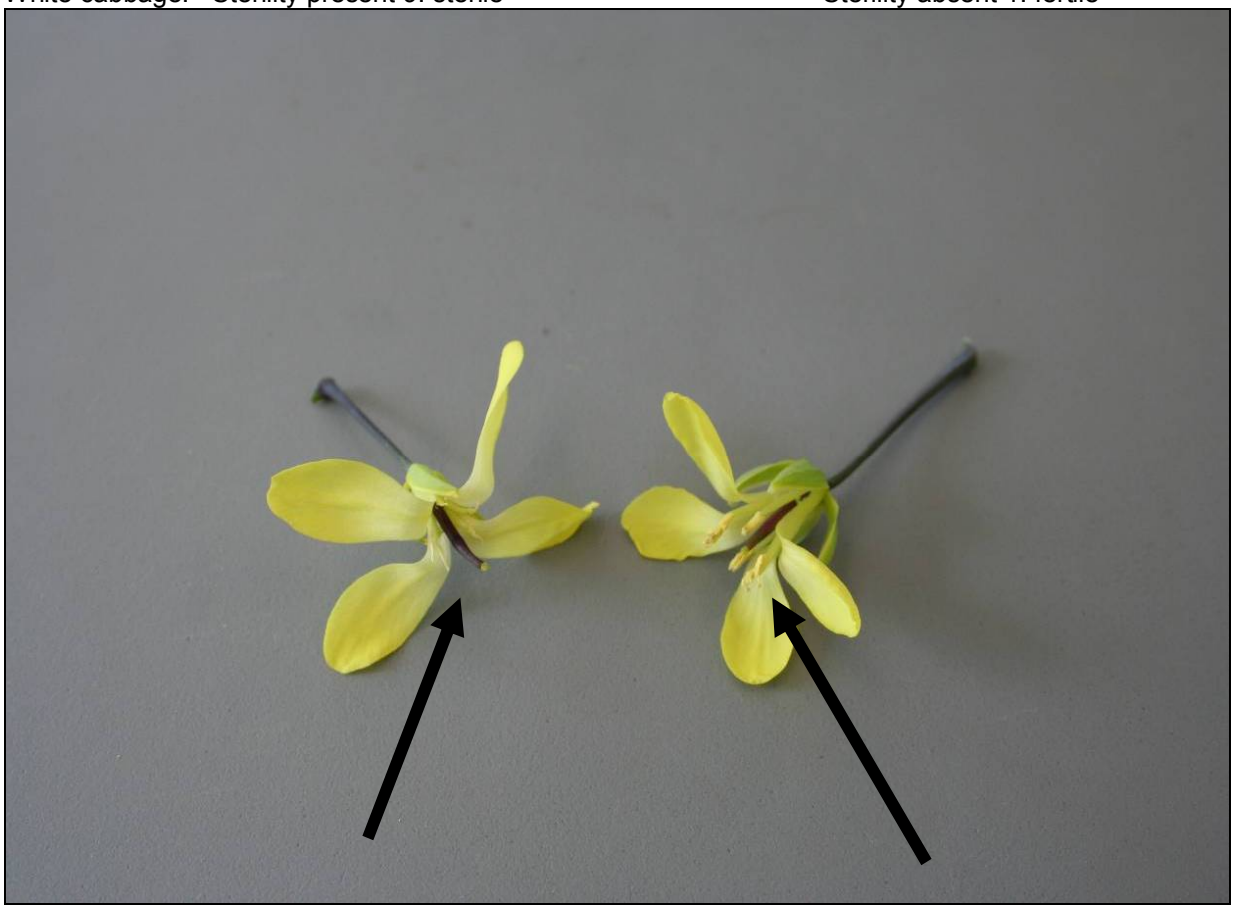
Notes and states of expression:
1: absent
9: present

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

White cabbage: Sterility present 9: sterile Sterility absent 1: fertile



Red cabbage: 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

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