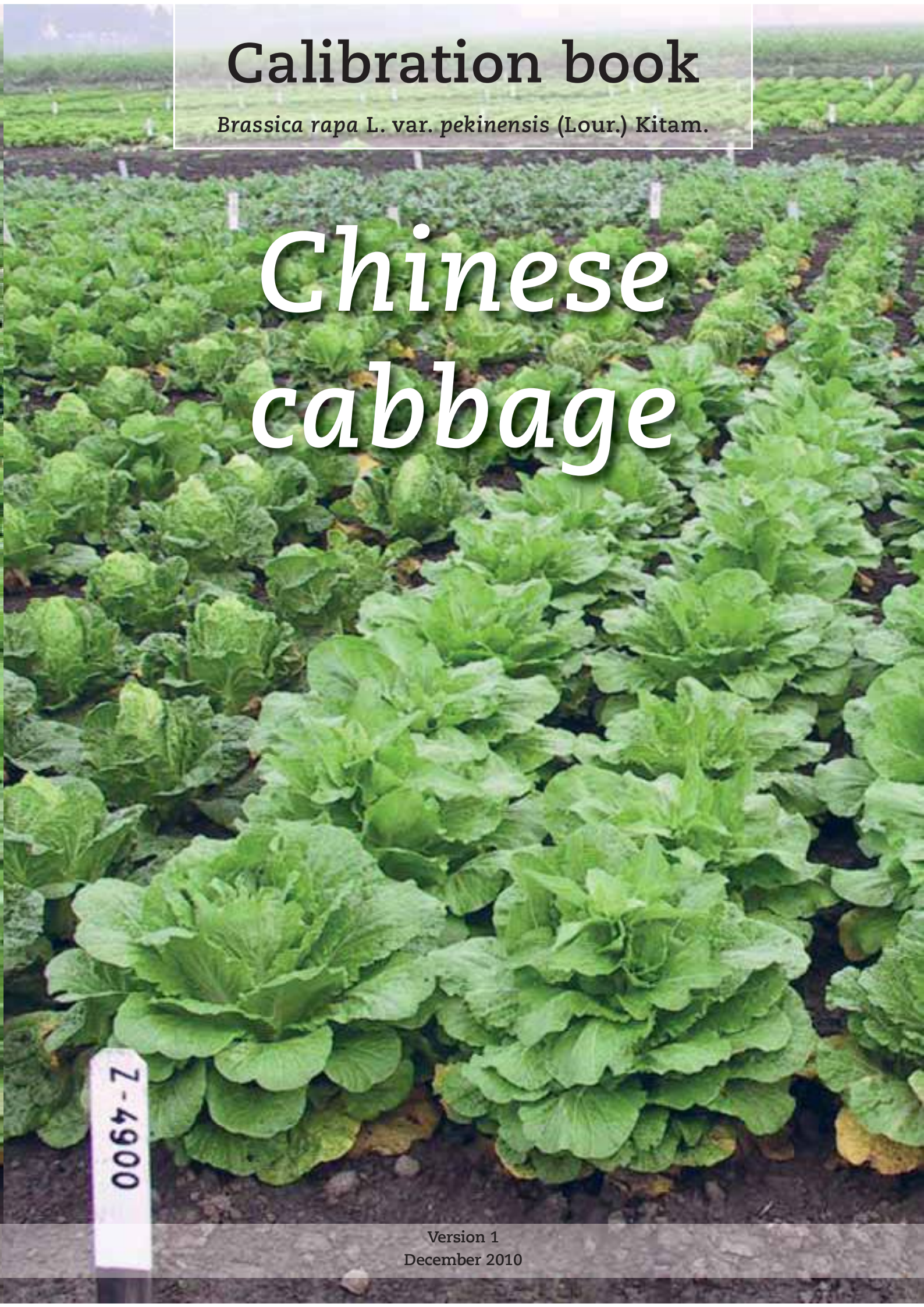
Calibration book

Brassica rapa L. var. *pekinensis* (Lour.) Kitam.

Chinese cabbage



Version 1
December 2010

Naktuinbouw calibration book

Brassica rapa L. var. *pekinensis* (Lour.) Kitam.

Chinese cabbage

Version 1

Introduction

In front of you lies the calibration book for Chinese 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/105/1 which in turn is based on UPOV Guideline TG/105/4. 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 Plant: habit (at the beginning of head formation)

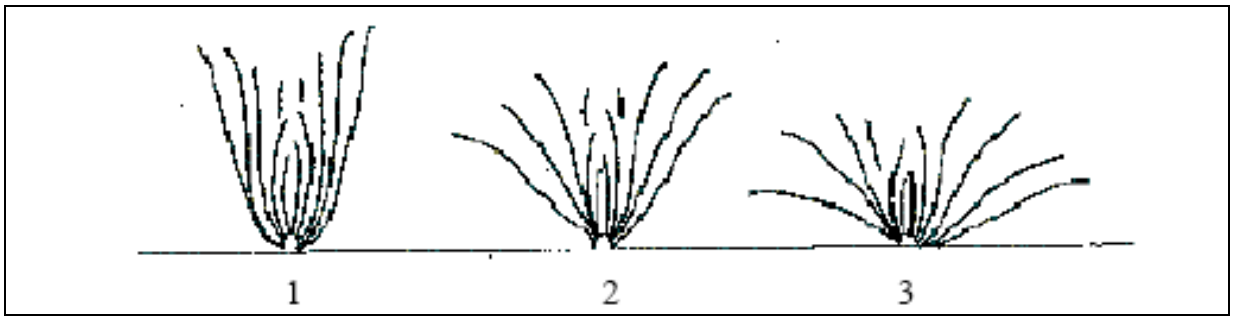
Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed, at the beginning of head formation.

Method of observation: Visual assessment by a single observation of a group of plants.

Notes and states of expression:
1: erect
2: semi-erect
3: spreading

CPVO-explanation:



1: erect 2: semi-erect 3: spreading

2 Plant: height

Grouping characteristic: no.

Stage of observation: At harvest maturity, before harvesting.

Method of observation: Visual assessment by a single observation and measurement of a group of plants.

Notes and states of expression:

1: very short	
2: very short to short	
3: short	Regina
4: short to medium	
5: medium	Muso
6: medium to tall	
7: tall	Shousai
8: tall to very tall	
9: very tall	

3 Outer leaf: length

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an fully developed average leaf. Observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess length of outer leaf.

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

4 Outer leaf: maximum width

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of a fully developed average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess maximum width of outer leaf.

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

5 Outer leaf: shape (before harvest maturity)

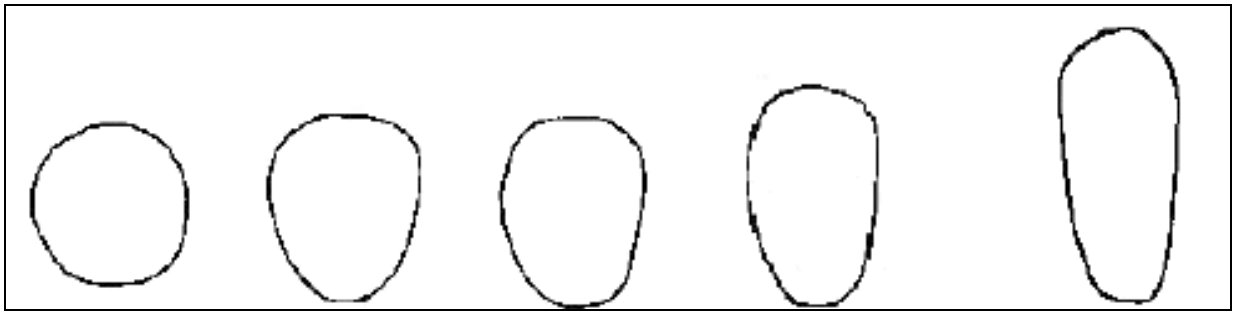
Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of a fully developed average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess shape of outer leaf.

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

CPVO-explanation:



1: circular 2: broad obovate 3: obovate 4: narrow obovate 5: narrow elliptic

6 Outer leaf: apex

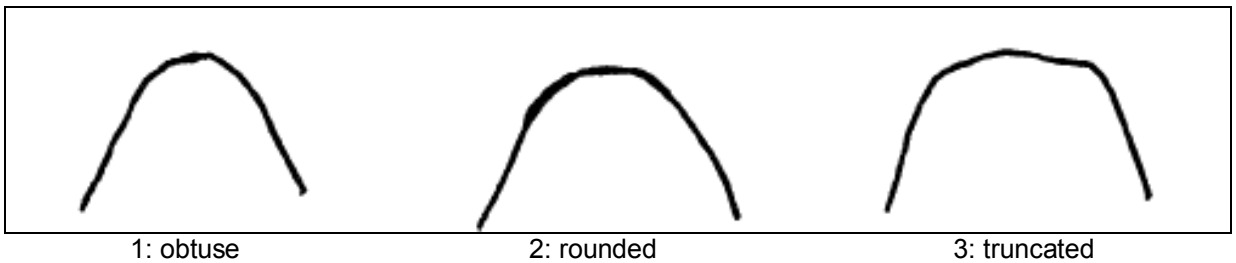
Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf.

Notes and states of expression:
1: obtuse
2: rounded
3: truncated

CPVO-explanation:



1: obtuse 2: rounded 3: truncated

7 Outer leaf: number of blisters on upper side

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess number of blisters on outer leaf.

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

3: few 5: medium 7: many

8 Outer leaf: size of blisters on upper side

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess size of blisters on upper side.

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

3: small (Granat) 5: medium

9 Outer leaf: colour

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess colour of outer leaf.

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

10 Varieties with green outer leaves only: Intensity of green colour

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess intensity of green colour.

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

11 Outer leaf: anthocyanin coloration

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf.

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

12 Outer leaf: glossiness

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess glossiness.

This character should be observed during clouded weather as direct sunlight makes assessment nearly impossible.

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

13 Outer leaf: hairiness (at lower side)

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf, on the lower side of the outer leaf. Calibrate using standard varieties and assess hairiness.

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

14 Outer leaf: profile in longitudinal section (excluding leaf base)

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess profile in longitudinal section.

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

15 Outer leaf: undulation of margin

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess degree of undulation.

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

1: very weak

3: weak

5: medium

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference.

16 Outer leaf: incisions of margin (at distal part)

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess the extent of incisions.

Notes and states of expression:
1: absent
2: intermediate
3: strong

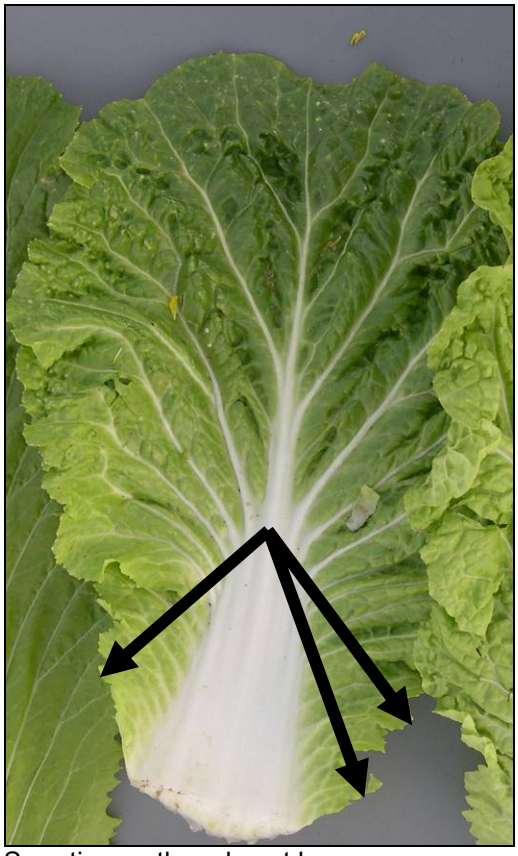
17 Outer leaf: serration of margin (at base)

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess the extent of serration.

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



Serration on the edge at base

18 Outer leaf: midrib in cross section (at mid-point)

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of a group of plants or parts of plants. Collect several leaves and observe the state of the midrib in cross section.

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

19 Outer leaf: length of midrib

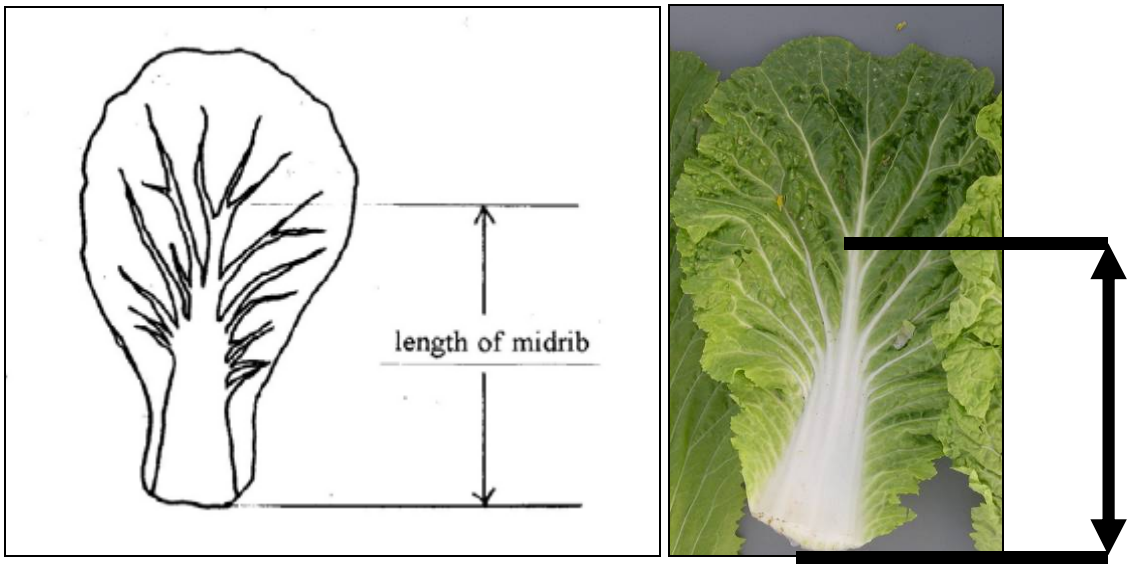
Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess length of midrib.

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:



Length of midrib

20 Outer leaf: width of midrib (at base)

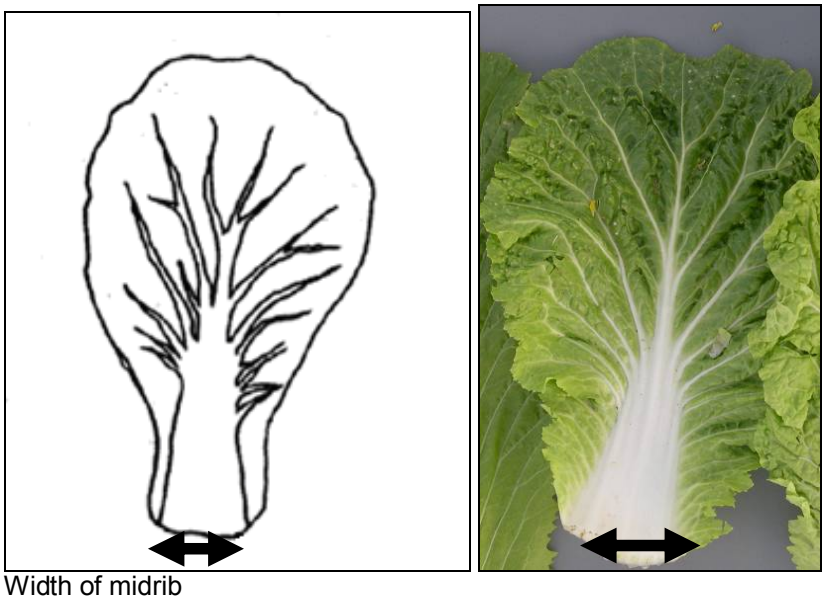
Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess width of midrib.

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

CPVO-explanation:



Width of midrib

21 Outer leaf: colour of midrib

Grouping characteristic: no.

Stage of observation: When the outer leaf is fully developed at the beginning of head formation.

Method of observation: Visual assessment by a single observation of an average leaf. All observations should be made on the upper side of the outer leaf. Calibrate using standard varieties and assess colour of midrib.

Notes and states of expression:
1: white
2: light green
3: green

22 Head: height

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants. Calibrate using standard varieties and assess head height.

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

3: short | 4 :short tot medium (Questar) | 5: medium (Vitimo) | 6: medium tot high (Emiko) | 7: high (Granat)

23 Head: maximum width

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants. Calibrate using standard varieties.

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

3: narrow (Granat)

5: medium

7: broad

24 Head: shape in longitudinal section

Grouping characteristic: yes.

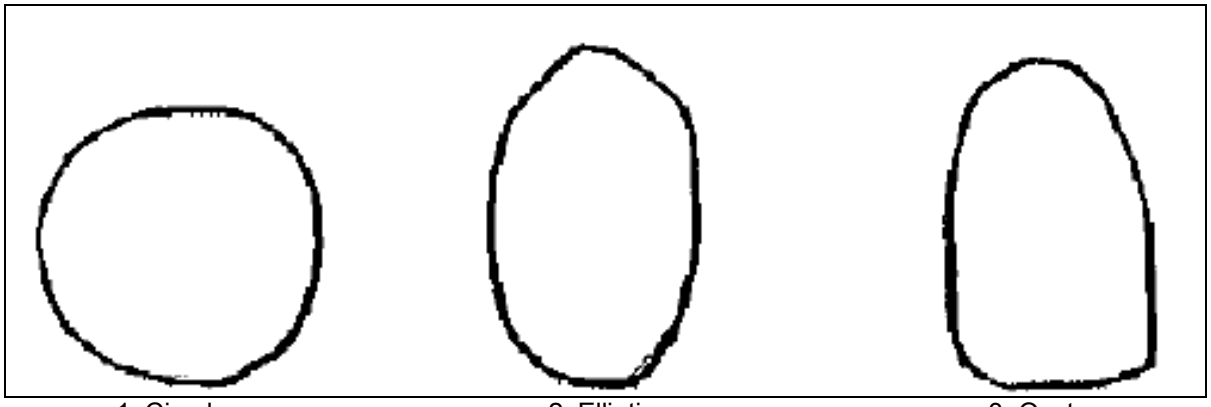
Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants. Calibrate using standard varieties and assess head shape..

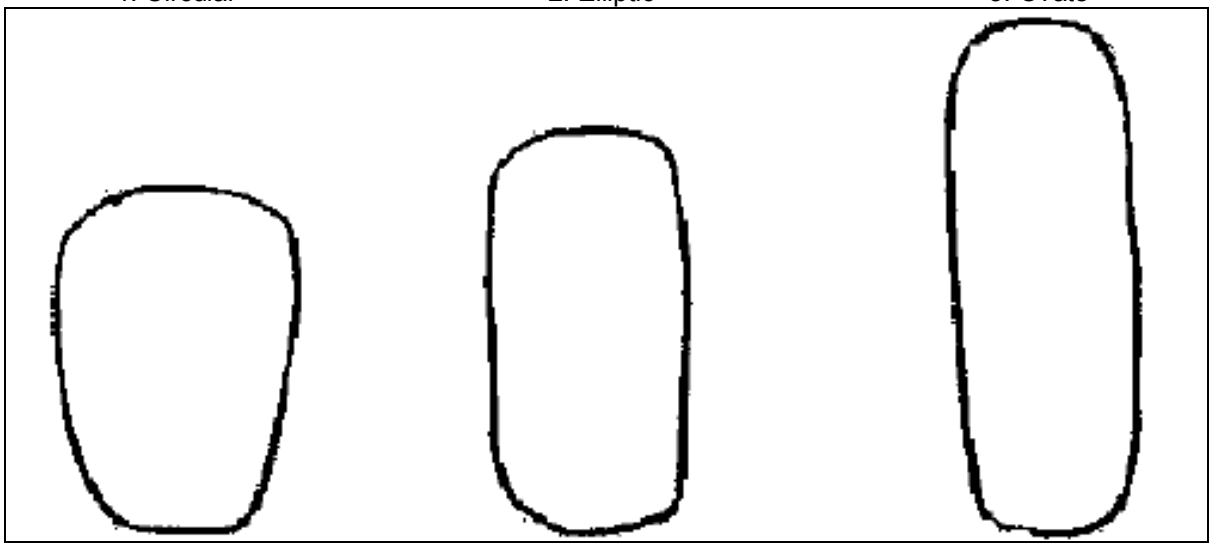
Notes and states of expression:

1: circular	Kenshin
2: elliptic	Hayamidori
3: ovate	Shinjyu
4: obovate	Hamamidori
5: oblong	Chushu
6: narrow oblong	Shousai

CPVO-explanation:



1: Circular 2: Elliptic 3: Ovate



4: Obovate 5: Oblong 6: Narrow oblong

25 Head: type

Grouping characteristic: yes.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants. Calibrate using standard varieties and observe head type.

Notes and states of expression:

1: open	Monument
2: half-open	Spectrum
3: closed	Kinap, Muso

25 Head: type

1: open Monument

2: half-open Spectrum

3: closed Emiko

26 Closed head variety only: Head: degree of overlapping leaf

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants or parts of plants. Calibrate using standard varieties and assess degree of overlap.

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

27 Head: colour of top

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants or parts of plants. Calibrate using standard varieties and assess colour.

Notes and states of expression:
1: white
2: yellow
3: yellow green
4: green

28 <u>Varieties with green top only:</u> Head: intensity of green colour of wrapper leaf

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants or parts of plants. Calibrate using standard varieties and assess colour intensity.

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

29 Head: blistering of wrapper leaf

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants or parts of plants. Calibrate using standard varieties and assess degree of blistering.

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

30 Head: internal colour

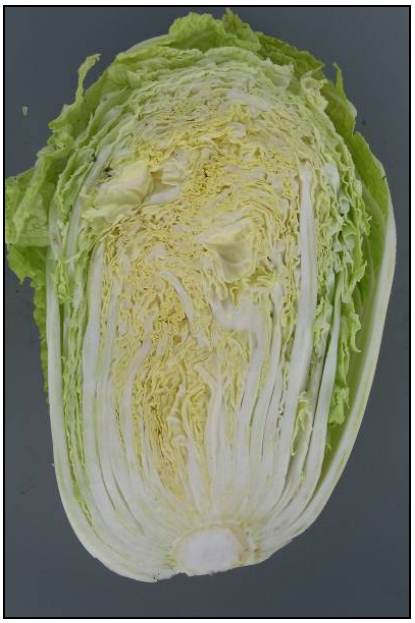
Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants or parts of plants. Calibrate using standard varieties and assess internal colour.

Notes and states of expression:
1: whitish
2: yellow
3: orange


1: whitish (Emiko)


2: yellow (Vitimo)


3: orange (Orankin)

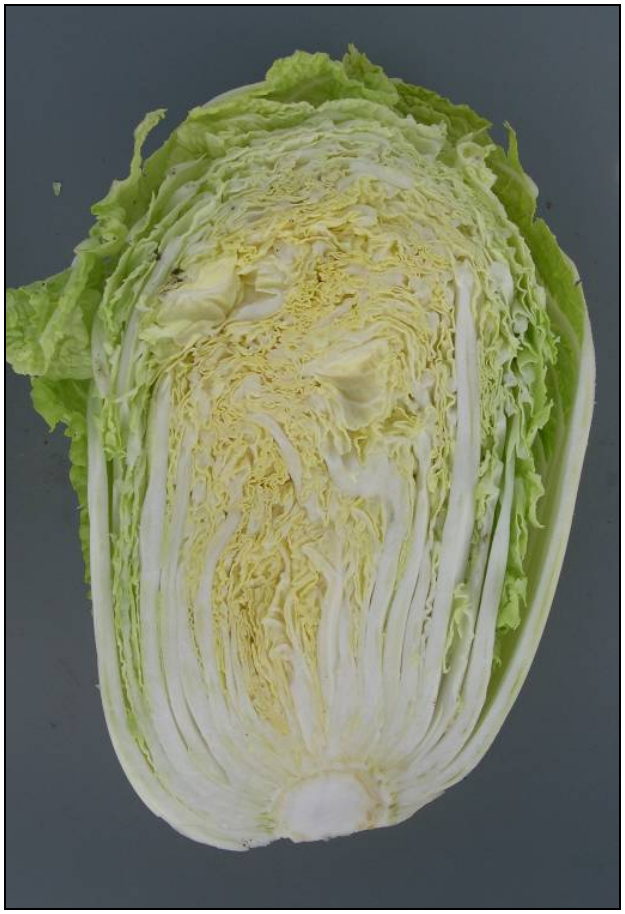
31 Head: firmness (at harvest maturity)

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment on the basis of several dissected individuals. Calibrate using standard varieties (maturing at identical periods) and assess head firmness.

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


4: loose to medium


7: firm

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference.

32 Head: apex of internal stem (at harvest maturity)

Grouping characteristic: no.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment on the basis of several dissected individuals.

Important: Do not use individuals that are overripe. In cabbages that have passed beyond the maturity stage the inflorescence is developing on the tip of the internal stem, giving the impression of a pointed apex.

Notes and states of expression:
1: pointed
2: round
3: truncate

2: round 1: pointed

33 Time of harvest maturity

Grouping characteristic: yes.

Stage of observation: At harvest maturity.

Method of observation: Visual assessment by a single observation of a group of plants or parts of plants. Calibrate using standard varieties and assess time of harvest maturity.

Notes and states of expression:

	Example variety
1: very early	Kenshin
2: very early to early	
3: early	Regina, Sprinter
4: early to medium	
5: medium	Muso, Nestor
6: medium to late	
7: late	Chusyu, Granado
8: late to very late	
9: very late	Treasure Island

Notes

Notes

Notes

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