

Calibration book

Apium graveolens L. var. *dulce* (Mill.) Pers.

Apium graveolens L. var. *secalinum* Alef.

Celery



Naktuinbouw calibration book

Apium graveolens L. var *dulce* (Mill.) Pers.

Apium graveolens L. var. *secalinum* Alef.

celery

Version 1

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Introduction

In front of you lies the Naktuinbouw calibration book for celery. 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/082/1 which in turn is based on UPOV Guideline TG/82/4. 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

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1 Plant: height

Grouping characteristic: no.

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

Type of observation: **MS/VG** – Choice between

- Calculated average of the measurement of 20 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant

Stage of observation: At harvest maturity.

Method of observation: Visual observation. The height of the plant will be observed.

Notes, states of expression and example varieties:

- | | |
|------------------------|---------------|
| 1: very short | Afina |
| 2: very short to short | |
| 3: short | Claudius |
| 4: short to medium | |
| 5: medium | Green Sleeves |
| 6: medium to tall | |
| 7: tall | Martine |
| 8: tall to very tall | |
| 9: very tall | Giant Red |

2 Foliage: attitude

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. Observe the foliage attitude in relation to the main stem.

Notes, states of expression and example varieties:

| | |
|-----------------------------|------------------------|
| 1: erect | Autumn Gold |
| 2: erect to semi-erect | Green Sleeves |
| 3: semi-erect | Shamrock |
| 4: semi-erect to horizontal | Amsterdam Donkergroene |
| 5: horizontal | Martine |



1: erect



2: erect to semi-erect

2 Foliage: attitude



3: semi-erect



4: semi-erect to horizontal



5: horizontal

3 Foliage: number of 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: At harvest maturity.

Method of observation: Visual observation. Observe the number of leaves at the plant.

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

CPVO explanation:

Observations should exclude lateral shoots.

4 Foliage: intensity of green colour (excluding petiole)

Grouping characteristic: no.

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

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation of mature leaves. As a remark, the hue of green colour (yellowish, greyish etc.) can be noted separately. Please observe on a cloudy day as bright sun shine makes observation unreliable.

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

4 Foliage: intensity of green colour (excluding petiole)



1: very light

3: light

5: medium

7: dark

9: very dark

5 Foliage: glossiness

Grouping characteristic: no.

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

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the 'amount' of glossiness on the mature leaves.

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

6 Foliage: blistering

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the amount of blisters on the mature leaves. Pay attention to the differences between leaf blistering and leaf creasing. Leaf blisters are the bulges on the leaf, where as the leaf creasing is a fold in the leaf.

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



1: very weak

3: weak

5: medium

7: strong

7 Leaf length (including petiole)

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. The leaf length of the mature leaf concerns the entire length of the leaf, including the petiole. This means from the beginning at the stem to the top of the terminal leaflet (see 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

CPVO explanation:

VIII. Explanations on the Table of Characteristics

Ad. 8, 9, 10, 16, 17

| | | |
|----------|---|---|
| Leaf: | length (including petiole) (8) | <p>The diagram shows a celery plant with several leaves. A vertical line on the right side is labeled '8' and spans from the base of the stem to the top of the terminal leaflet. A vertical line labeled '9' spans from the stem to the top of the first pair of leaflets. A vertical line labeled '16' spans from the stem to the top of the second pair of leaflets. A horizontal line labeled '17' indicates the width of the stem. A circular inset labeled '10' shows a magnified view of the terminal leaflet.</p> |
| Leaf: | distance between 1 st and 2 nd pair of leaflets (9) | |
| Leaf: | size of the terminal leaflet (10) | |
| Petiole: | length (16) width (17) | |

7 Foliage: length (including petiole)



3: short

5: medium

7: long

8 Leaf: distance between 1st and 2nd leaflet pairs

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

Type of observation: MS/VG – Choice between

- Calculated average of the measurement of 30 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the distance between the 1st and 2nd leaflet pairs (see explanation). Find the first leaflet pair from below the stem and observe the distance to the next leaflet pair. The note will be determined as a result of the example varieties in the trial.

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:

| VIII. <u>Explanations on the Table of Characteristics</u> | |
|---|---|
| <u>Ad. 7, 8, 9, 15, 16</u> | |
| Leaf: | length (including petiole) (7) |
| Leaf: | distance between 1 st and 2 nd pair of leaflets (8) |
| Leaf: | size of the terminal leaflet (9) |
| Petiole: | length (15) width (16) |

The diagram illustrates a celery plant stem with several leaves. A vertical line on the right side of the stem is labeled '7', indicating the total length of the leaf including the petiole. A horizontal line across the stem between the first and second pairs of leaflets is labeled '8', representing the distance between these pairs. A circle around the topmost leaflet is labeled '9', indicating its size. A vertical line along the stem is labeled '15', representing the length of the petiole. A horizontal line across the stem is labeled '16', representing the width of the petiole.

8 Leaf: distance between 1st and 2nd leaflet pairs



3: kort



5: midden

9 Leaf: size of the terminal leaflet

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the size of the terminal leaflet (see CPVO explanation). The terminal leaflet is always connected to a stem.

Notes, states of expression and example varieties:

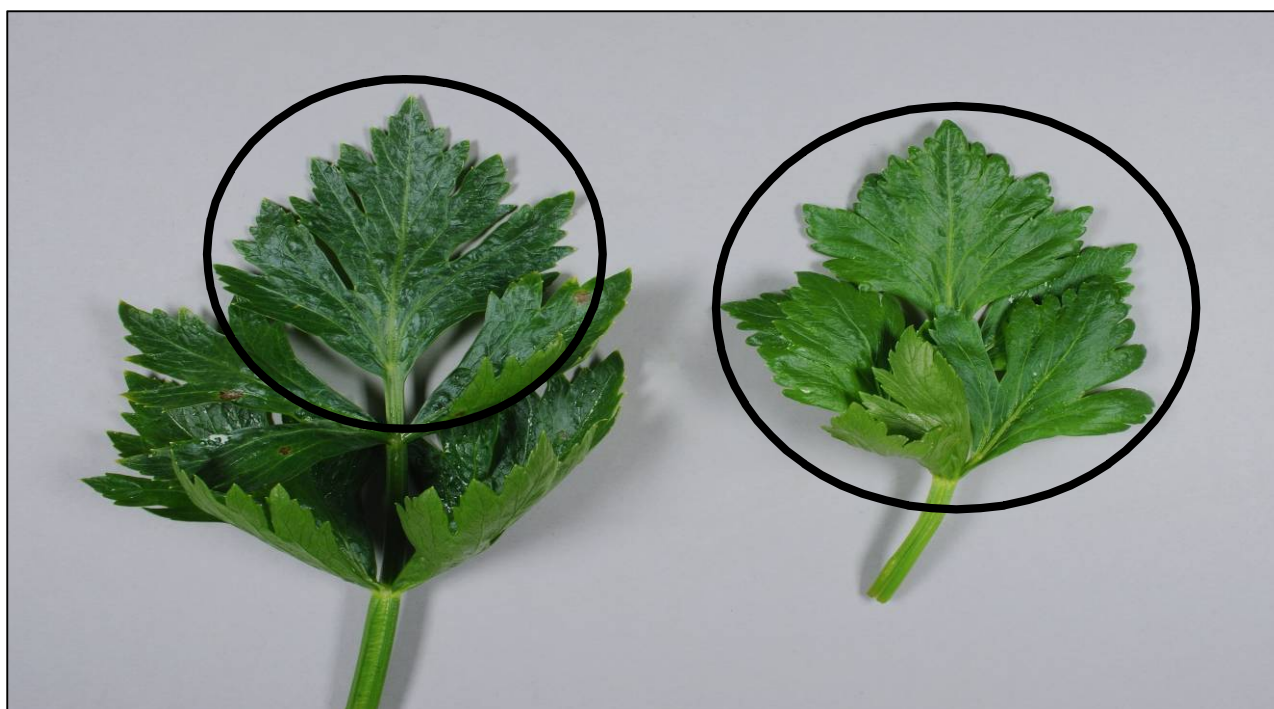
- 1: very small
- 2: very small to small
- 3: small Giant Red, Stardust
- 4: small to medium
- 5: medium Shamrock
- 6: medium to large
- 7: large Early Spring
- 8: large to very large
- 9: very large

CPVO explanation:

| VIII. <u>Explanations on the Table of Characteristics</u> | |
|---|---|
| <u>Ad. 7, 8, 9, 15, 16</u> | |
| Leaf: | length (including petiole) (7) |
| Leaf: | distance between 1 st and 2 nd pair of leaflets (8) |
| Leaf: | size of the terminal leaflet (9) |
| Petiole: | length (15) width (16) |

The diagram illustrates a celery plant with several measurement points indicated by vertical and horizontal lines with arrows. A vertical line on the right side of the plant is labeled '7', representing the total length of the leaf including the petiole. A shorter vertical line is labeled '8', representing the distance between the first and second pairs of leaflets. A circular callout at the top of the plant is labeled '9', highlighting the terminal leaflet. A vertical line on the stem is labeled '15', representing the length of the petiole. A horizontal line across the stem is labeled '16', representing the width of the petiole.

9 Leaf: size of the terminal leaflet



10 Leaflet: shape of tips on 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.

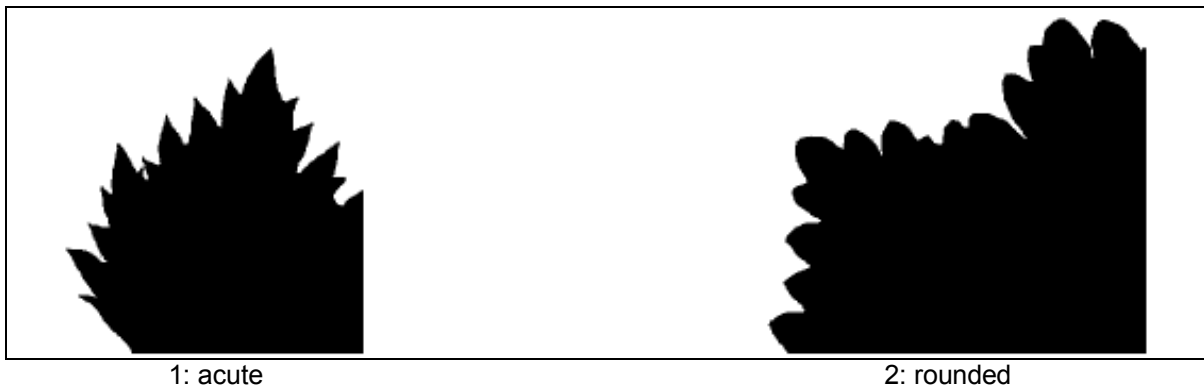
Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the shape of the tip on the margin (see CPVO explanation).

Notes, states of expression and example varieties:

1: acute Trinova, Bolivar
2: rounded D'Elne

CPVO explanation:



11 Leaflet: density of margin incisions

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

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

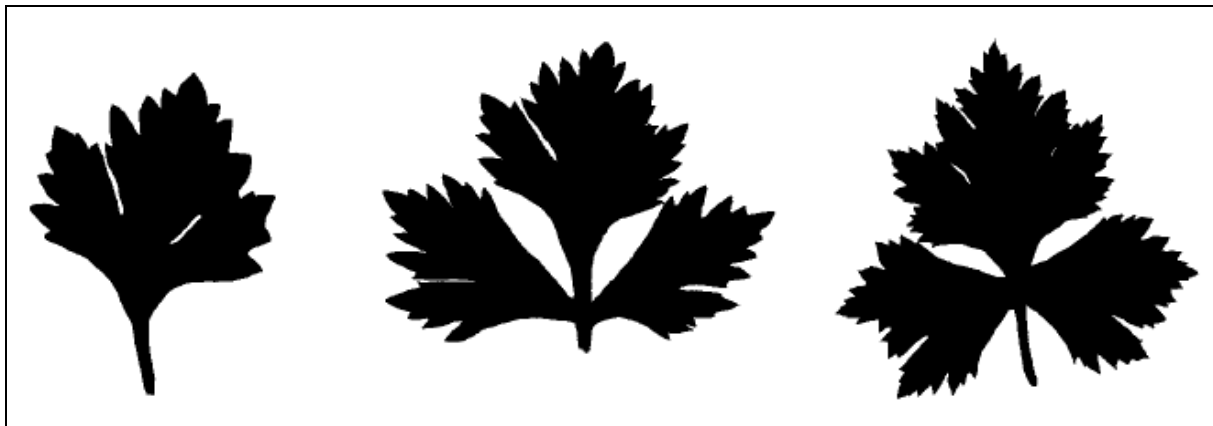
Stage of observation: At harvest maturity.

Method of observation: Visual observation. The density of margin incisions of tip on margin is the number of incisions on margin (see CPVO explanation).

Notes and states of expression:

- 1: very sparse
- 2: very sparse to sparse
- 3: sparse
- 4: sparse to medium
- 5: medium
- 6: medium to dense
- 7: dense
- 8: dense to very dense
- 9: very dense

CPVO explanation:



3: sparse

5: medium

7: dense

11 Leaflet: density of margin incisions



3: sparse

5: medium

7: dense

12 Leaflet: spacing of lobes

Grouping characteristic: no.

Type of characteristic: QL – Qualitative characteristic.

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the space between the lobes of the leaflet (see CPVO explanation).

Notes, states of expression and example varieties:

| | |
|-----------------|------------------------|
| 1: not touching | Golden Spartan, Uta |
| 2: touching | Early Spring, Victoria |
| 3: overlapping | Claudius |

CPVO explanation:

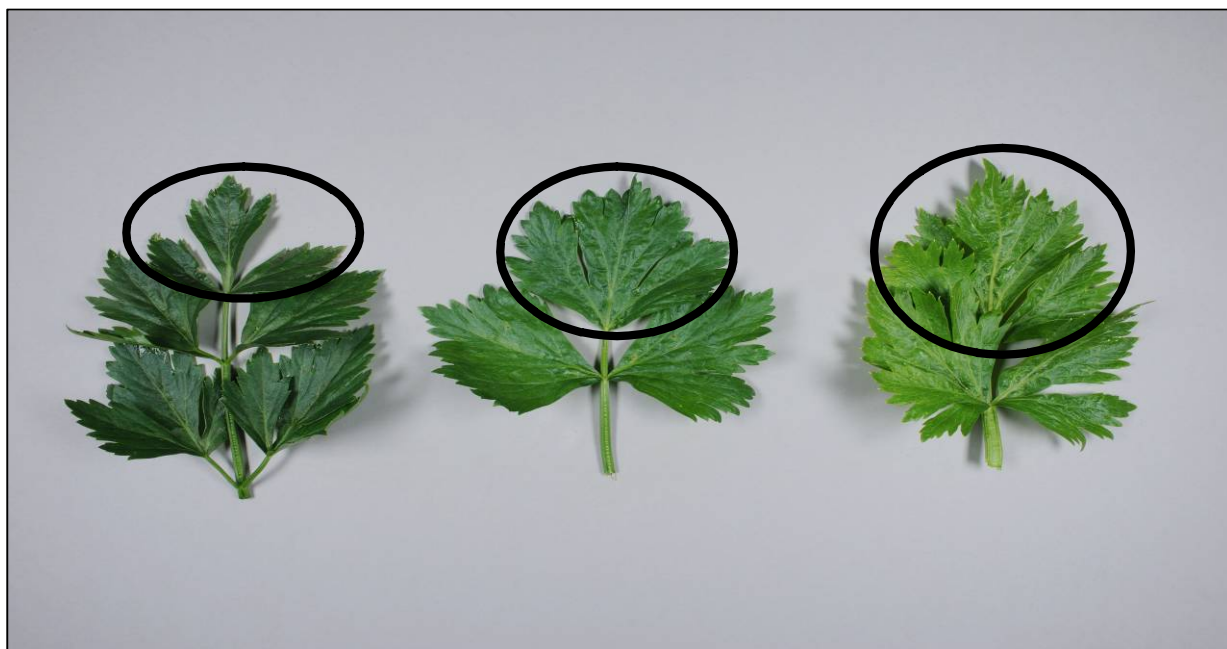


1: Not touching

2: touching

3: overlapping

12 Leaflet: spacing of lobes



1: not touching

2: touching

3: overlapping

13 Petiole: anthocyanin coloration

Grouping characteristic: yes.

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

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the absence or presence of “purple/red” coloration on the petiole. The expression is genetically determined. However, the degree of anthocyanin coloration is influenced by a number of factors. Firstly by temperature: when the temperature is low, anthocyanin coloration can be more prominent: Secondly by different kinds of stress factors: Thirdly when there is too much irradiance.

As a result of the possible influence by the above-mentioned factors, it is important to take a good look at the example varieties in the same trial.

Notes, states of expression and example varieties:

1: absent Golden Spartan
9: present Giant Red

14 Petiole: intensity of anthocyanin coloration

Grouping characteristic: no.

Type of characteristic: QL – Quantitative characteristic.

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the absence or presence of “purple/red” coloration on the petiole. The expression is genetically determined. However, the degree of anthocyanin coloration is influenced by a number of factors. Firstly by temperature: when the temperature is low, anthocyanin coloration can be more prominent: Secondly by different kinds of stress factors: Thirdly when there is too much irradiance.

As a result of the possible influence by the above-mentioned factors, it is important to take a good look at the example varieties in the same trial.

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

15 Petiole: length

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

Type of observation: MS/VG – Choice between

- Calculated average of the measurement of 30 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

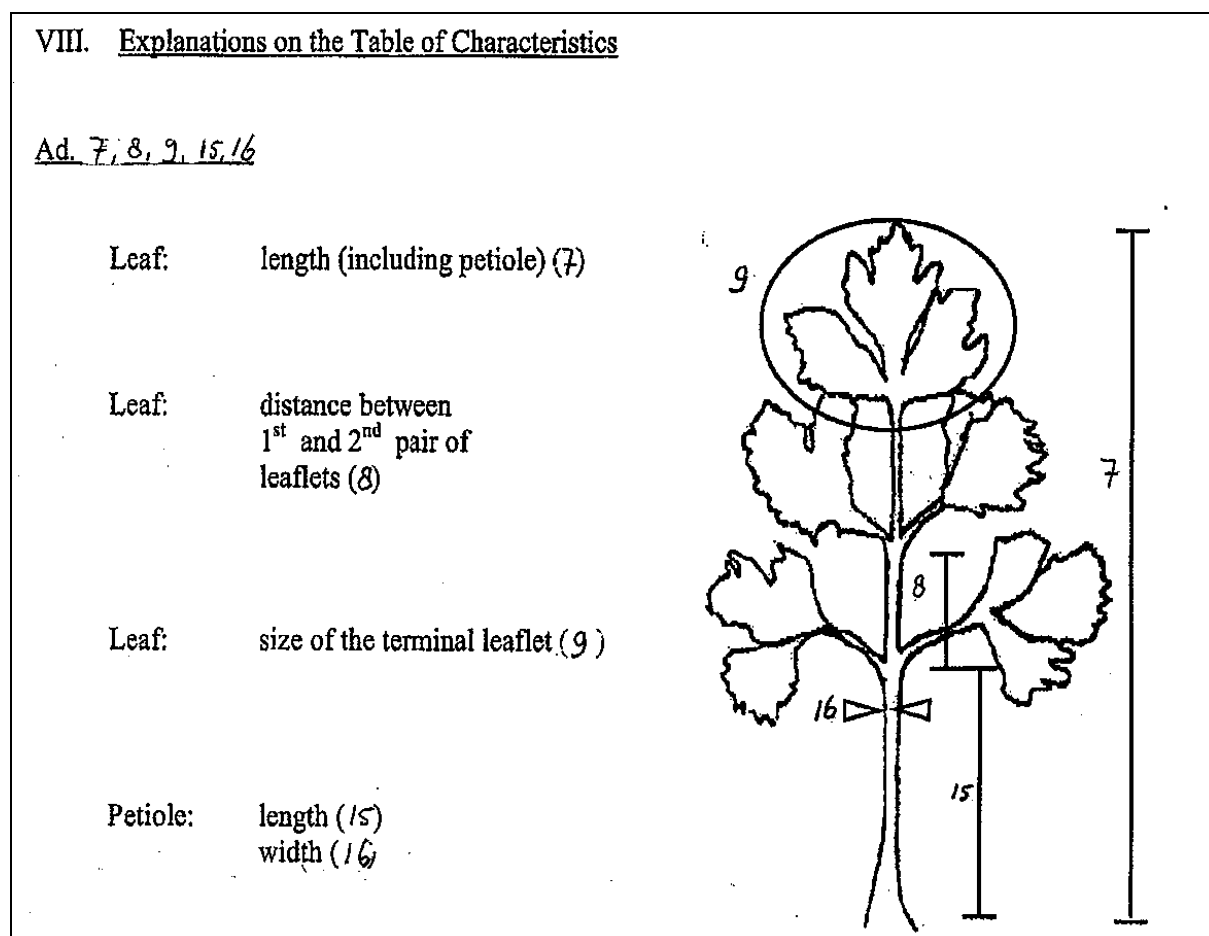
Stage of observation: At harvest maturity.

Method of observation: Visual observation. The length of the petiole will be observed (see 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

CPVO explanation:



16 Petiole: width

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

Type of observation: MS/VG – Choice between

- Calculated average of the measurement of 30 plants or parts of plants and
- Single visual assessment of a group of plants or parts of plants; in practice a single assessment of an average single plant or part of plant.

Stage of observation: At harvest maturity.

Method of observation: Visual observation. The width of the petiole will be observed (see 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

CPVO explanation:

VIII. Explanations on the Table of Characteristics

Ad. 7, 8, 9, 15, 16

| | | |
|----------|---|--|
| Leaf: | length (including petiole) (7) | <p>The diagram illustrates a celery plant with several measurements indicated by lines and numbers. A vertical line on the right side of the plant is labeled '7', representing the total length including the petiole. A horizontal line between the first and second pairs of leaflets is labeled '8'. A circle around the topmost leaflet is labeled '9'. A vertical line along the stem is labeled '15', representing the petiole length. A horizontal line across the stem is labeled '16', representing the petiole width.</p> |
| Leaf: | distance between 1 st and 2 nd pair of leaflets (8) | |
| Leaf: | size of the terminal leaflet (9) | |
| Petiole: | length (15) width (16) | |

17 Petiole: prominence of ribs

Grouping characteristic: no.

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

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. This characteristic is about the depth of the ribs on the outside of the petiole.

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

18 Petiole: profile of inner side in cross section

Grouping characteristic: no.

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

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

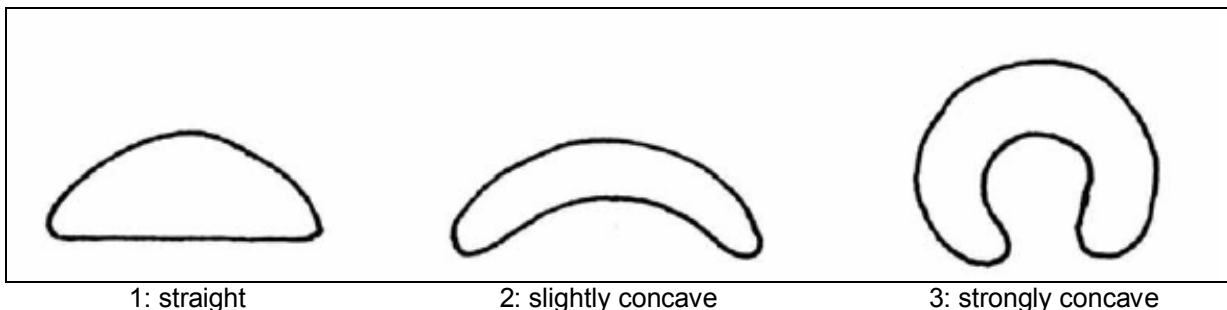
Stage of observation: At harvest maturity.

Method of observation: Visual observation (see explanation).

Notes and states of expression:

- 1: straight
- 2: slightly concave
- 3: strongly concave

CPVO explanation:



19 Petiole: self-blanching

Grouping characteristic: yes.

Type of characteristic: QL – Qualitative characteristic.

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. Self-blanching means that the petiole has a yellowish green colour with few or no chlorophyll at all, this in contradiction to the green petiole in the non self blanching types.

Notes, states of expression and example varieties:

1: absent Groene Pascal
9: present Autumn Gold



1: absent

9: present

20 Petiole: only non self-blanching varieties: intensity of green colour

Grouping characteristic: no.

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

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

Stage of observation: At harvest maturity.

Method of observation: Visual observation. The intensity of green colour of the petiole will be observed. This characteristic should be observed when the weather is cloudy because (bright) sunlight can influence the observation.

Notes, states of expression and example varieties:

- | | |
|------------------------|---------------|
| 1: very light | |
| 2: very light to light | |
| 3: light | Autumn Gold |
| 4: light to medium | |
| 5: medium | Green Sleeves |
| 6: medium to dark | |
| 7: dark | Giant Red |
| 8: dark to very dark | |
| 9: very dark | |

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