Calibration book

Allium cepa (Cepa Group),
Allium cepa (Aggregatum Group) and
Allium oschaninii O; Fedtsch. and hybrids between them

onion, echalion, shallot, grey shallot

Version 2
January 2025

Introduction

The primary function of this onion, echalion, shallot and grey shallot calibration book is to supply the user with practical guidance in assessing the official characteristics of this crop. To achieve this, we have tried to illustrate and elucidate each characteristic as clear as possible. Since 2010, the year we started to develop calibration books in different crops, they have proved to be of immeasurable help for both the layman in his first acquaintance with a certain crop as the experienced examiner that wants to calibrate and fine-tune his observations.

Sources used

The basis for this calibration book is the CPVO protocol TP/46/2 that in its turn is based on UPOV guideline TG/46/7. 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).

Websites UPOV and CPVO
The most recent protocol versions, documents and general information can be found on the websites of the UPOV and CPVO.

International Union for the Protection of New Varieties of Plants (UPOV)
www.upov.int/portal/index.html.en

Community Plant Variety Office (CPVO)
www.cpvo.europa.eu/en

Methodology

The UPOV system is based on the expression of characteristics that are related to the states of expression of example varieties. You will find the example varieties for each characteristic in the CPVO protocol and UPOV Guidelines. In the calibration book you find two types of characteristics: visually assessed characteristics and measured characteristics. The states of the visually assessed characteristics can be compared with the visual states of the expression of example varieties. In the calibration book you may find drawings or pictures to assist in the decision on the applicable state of expression. For measured characteristics this is more complicated as in many cases the value of the measurements are 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 appear to be sensitive for climate conditions (e.g. anthocyanin coloration).
For guidance on the assessment of resistance characteristics we refer to the CPVO protocols and UPOV guidelines as well.

About Naktuinbouw

Naktuinbouw (Netherlands Inspection Service for Horticulture) is an independent agency carrying out official inspection and certification tasks in horticultural seeds and plants, under accreditation and responsibility of the Dutch government. Naktuinbouw is an Autonomous Public Authority (APA).

Registration and Plant Breeders' Rights
Naktuinbouw is the organisation in the Netherlands authorised to assess varieties of agricultural, floricultural, arboricultural, and vegetable crops for distinctness, uniformity, and stability (DUS testing) for registration purposes and/or granting Plant Breeders' Rights, both on Dutch and EU level.

Inspection

In the obligatory inspection system, Naktuinbouw applies the prescribed European directives and legislation for propagating material for floricultural, arboricultural, and vegetable crops. These directives are anchored in Dutch legislation in the form of the Netherlands Seeds and Planting Materials Act. Naktuinbouw is an independent and unbiased party. Public duties relating to basic

inspections that are the responsibility of other quality and/or inspection services (national and international) are not performed or only performed on a cooperative basis.

Voluntary quality inspections
Naktuinbouw also operates various voluntary quality inspections. These systems (Naktuinbouw Elite, NAL) complement the inspections or place more stringent requirements than the legislative directives. One of the areas in which this applies is, for instance, testing plant material for plant health, quality, identity, and purity. This testing is carried out for producers of propagating material, either individual companies or groups of producers.

Promoting quality
Naktuinbouw also focuses on promoting quality (partially via a system of quality brands) and certain specialisms. This concerns national and international companies from the entire horticultural chain.

Website Naktuinbouw
www.naktuinbouw.com

Helpdesk

For possible remarks, suggestions, and questions on this calibration book, please contact us at dushelpdesk@naktuinbouw.nl.

How to use this calibration book

To maximise the benefits of this calibration book please take note of the following:

- This calibration book was developed in The Netherlands and the photos are taken from material grown under Dutch climate conditions.

  Characteristics that are sensitive for climate- and environmental conditions can express themselves stronger, weaker, in a different (part of the) scale than presented in this calibration book. Therefore, the user should be cautious and always cross-check (calibrate) information gained from this calibration book with locally existing knowledge and conditions.

- Images and photos of certain characteristics such as leaf- and fruit colour serve only to illustrate the variation present in the crop and should not be used as an absolute reference.

- Observations should not be influenced or disturbed by too strong or too weak light conditions. Choose a cloudy day, a favourable time or create favourable circumstances for observations.

- Use and adapt this calibration book to fit local conditions.

We wish you good luck in using this calibration book and appreciate your comments.

Contents

35	Time of sprouting during storage
36	Male sterility

1. Plant: number of leaves per pseudostem

Grouping characteristic: no.

Type of characteristic: QN - Quantitative characteristic.

Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: Pay attention that one or two leaves may already have died back.

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

1. Plant: number of leaves per pseudostem

5: medium

6: medium to many

7: many

8: many to very many

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

2. Foliage: attitude

Grouping characteristic: no.

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

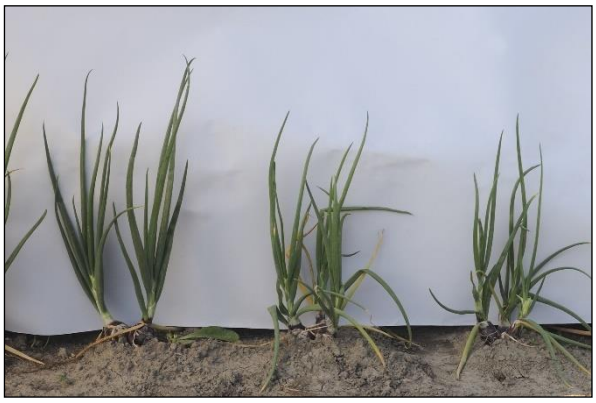
Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

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


1: erect


2: erect to semi-erect


3: semi-erect


4: semi-erect to horizontal

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

3. Foliage: waxiness

Grouping characteristic: no.

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

Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

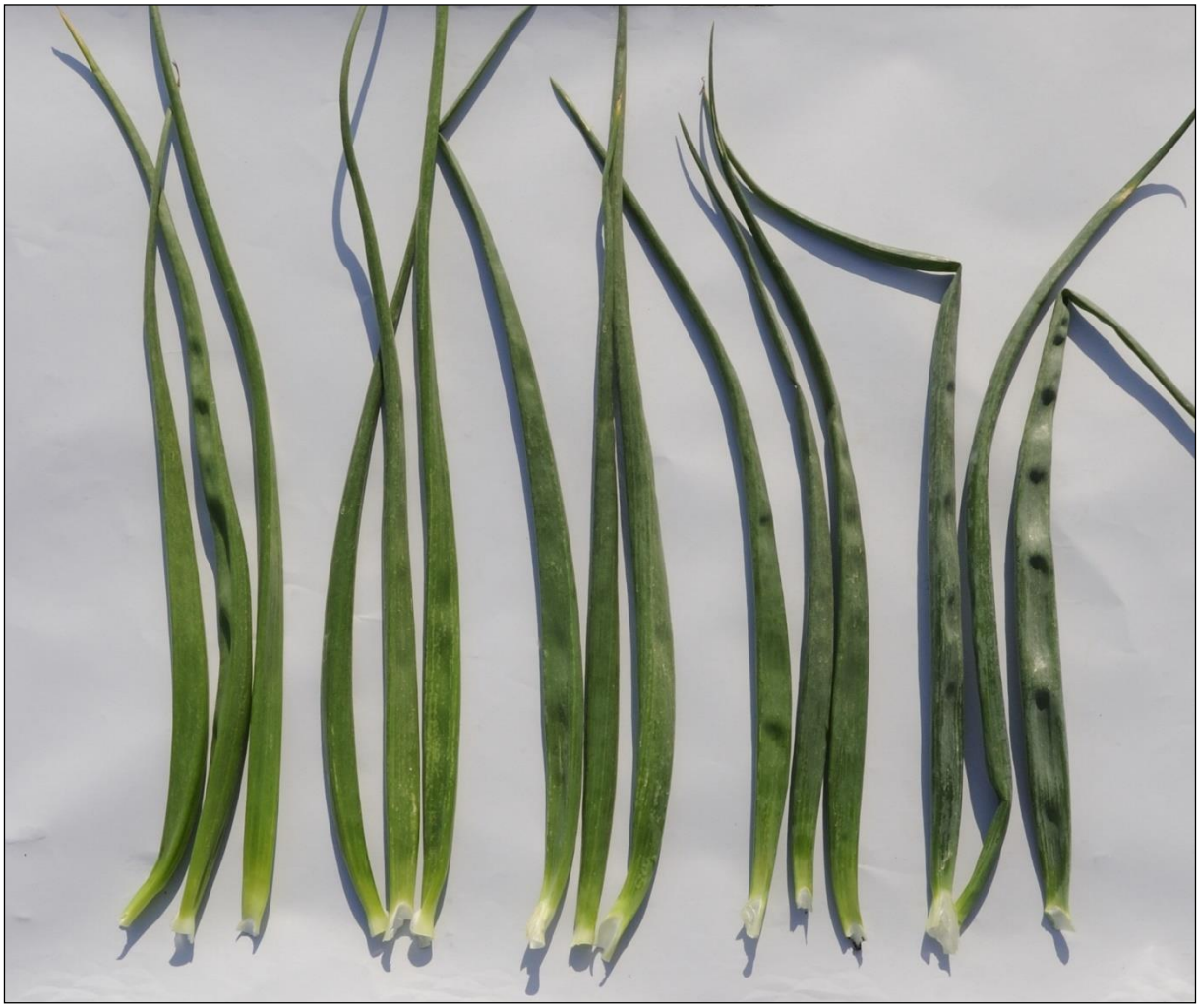
Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: By trying to remove the waxy layer by hand, one gets a good impression of the thickness of the waxy layer. In rainy years, a rather thin waxy layer may more or less washed off. In hot and dry weather, on the contrary, the waxy layer becomes stronger. Therefore, the use of example varieties is important.

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. Foliage: waxiness



1: absent or very weak 3: weak 5: medium 7: strong 9: very strong

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

4. Foliage: intensity of green colour

Grouping characteristic: no.

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

Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

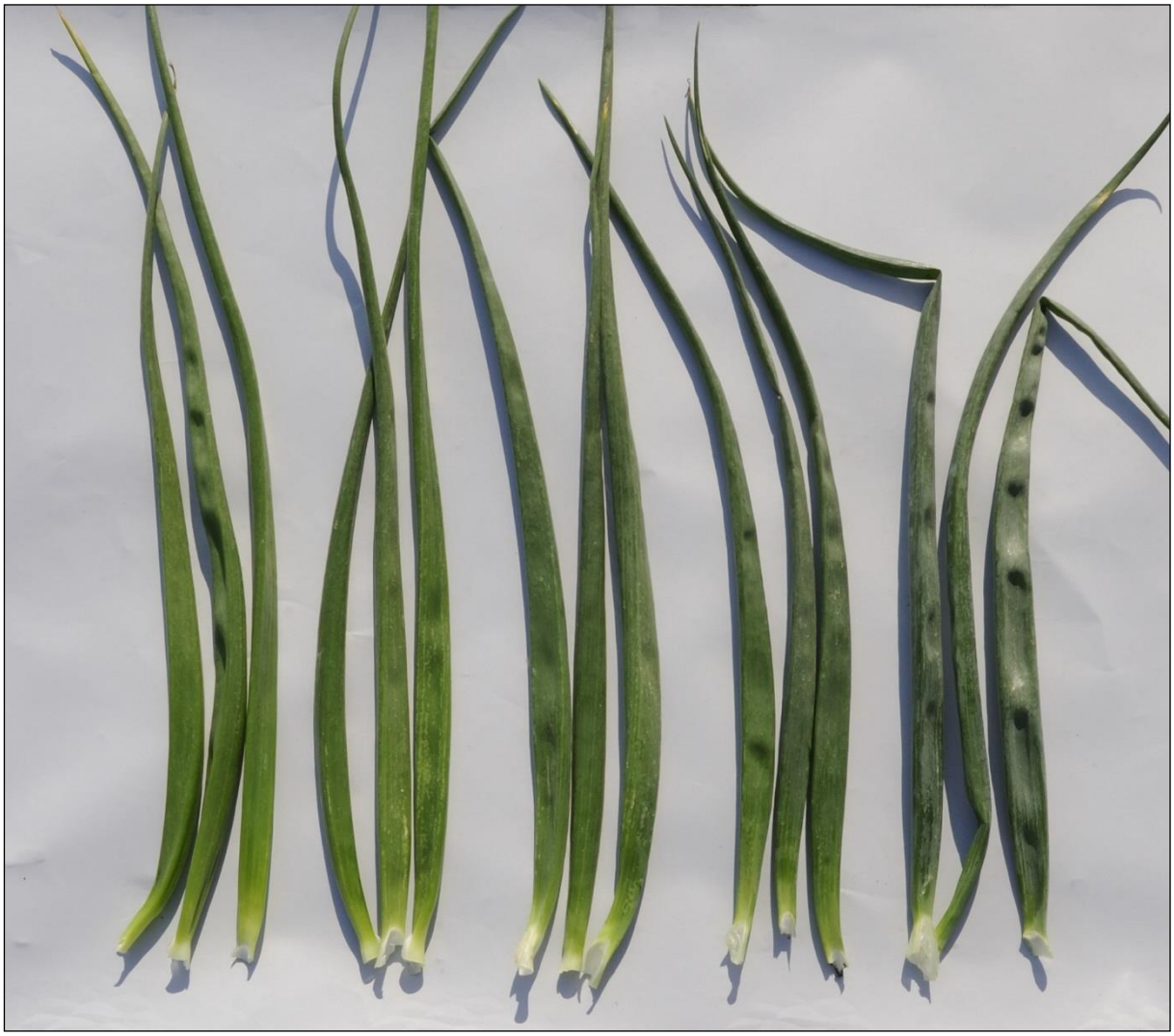
Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: Observe the intensity of the green colour including the waxy layer.

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



1: very light 3: light 5: medium 7: dark 9: very dark

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

5. Foliage: cranking

Grouping characteristic: no.

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

Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

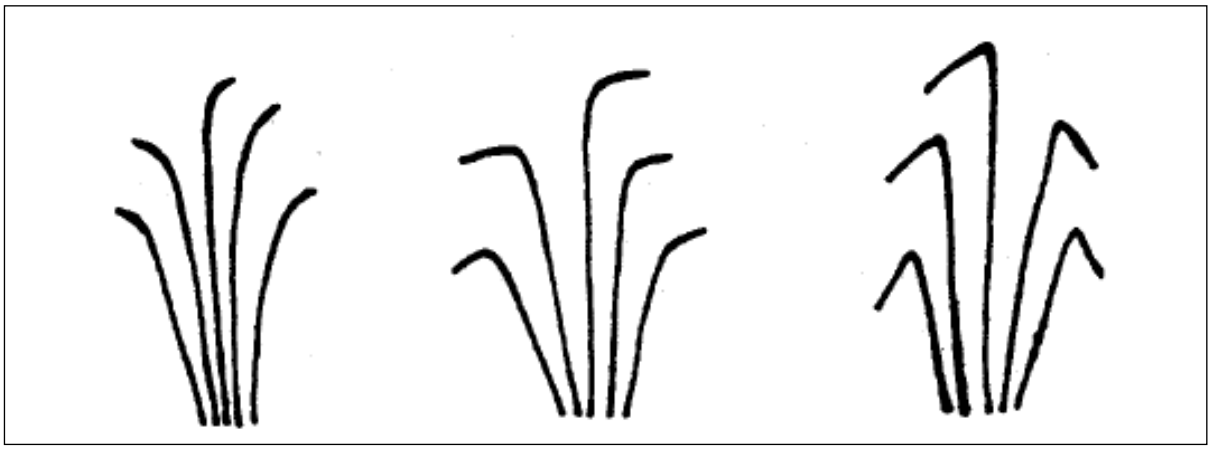
Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

Remarks: Do not make the observation too early, because cranking is getting stronger during the growing season.

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

CPVO explanation:



1: absent or weak 2: intermediate 3: strong

5. Foliage: cranking

1: absent or weak

2: intermediate

3: strong

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

6.1. Onion varieties only: Leaf: length

Grouping characteristic: no.

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

Type of observation: VG/MS
VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

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

6.2. <u>Shallot varieties only:</u> Leaf: length

Grouping characteristic: no.

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

Type of observation: VG/MS
VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

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


1: very short


3: short

6.2. <u>Shallot varieties only:</u> Leaf: length

5: medium

7: long

9: very long

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

7.1. <u>Onion varieties only:</u> Leaf: diameter

Grouping characteristic: no.

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

Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

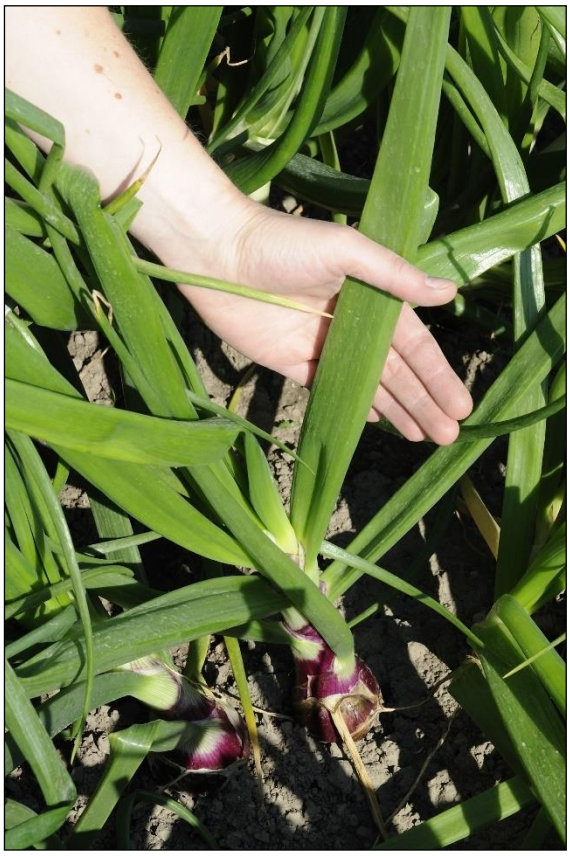
Notes and states of expression:
1: very small
2: very small to small
3: small
4: small to medium
5: medium
6: medium to large
7: large
8: large to very large
9: very large


1: very small


3: small

5: medium

7: large



9: very large

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

7.2. Shallot varieties only: Leaf: diameter

Grouping characteristic: no.

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

Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

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


1: very small


3: small

7.2. <u>Shallot varieties only:</u> Leaf: diameter

5: medium

7: large

9: very large

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

8. <u>Onion varieties only:</u> Pseudostem: length (up to highest green leaf)

Grouping characteristic: no.

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

Type of observation: VG/MS

VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

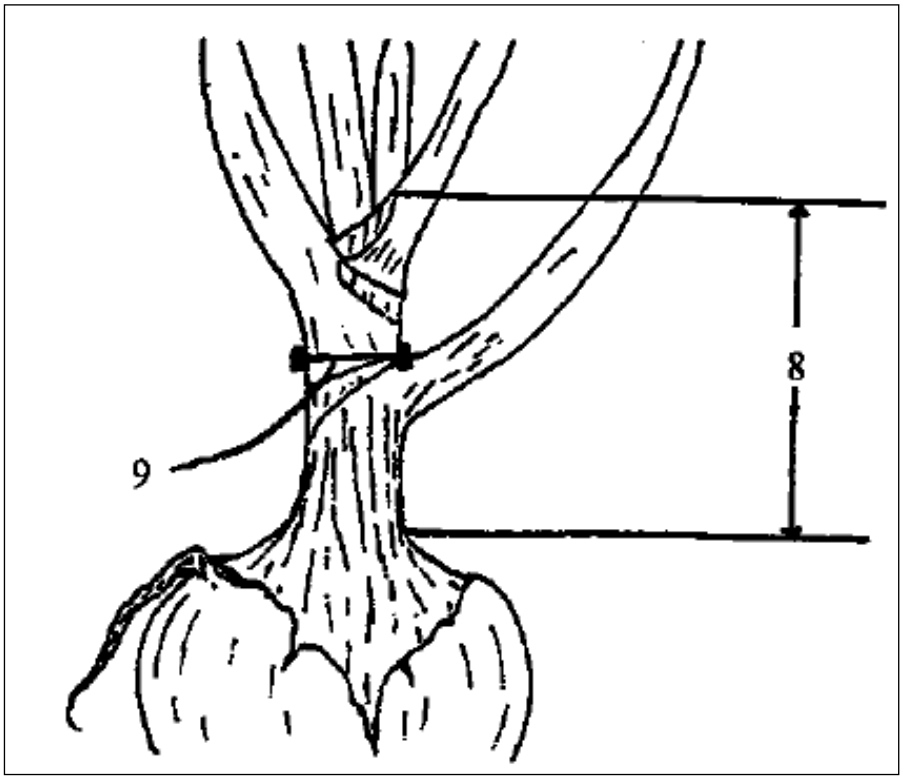
Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

Remarks: -

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:



8. <u>Onion varieties only:</u> Pseudostem: length (up to highest green leaf)

2: very short to short 3: short 5: medium 6: medium to long 8: long to very long 9: very long

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

9. <u>Onion varieties only:</u> Pseudostem: diameter (at mid-point of length)

Grouping characteristic: no.

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

Type of observation: VG/MS

VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

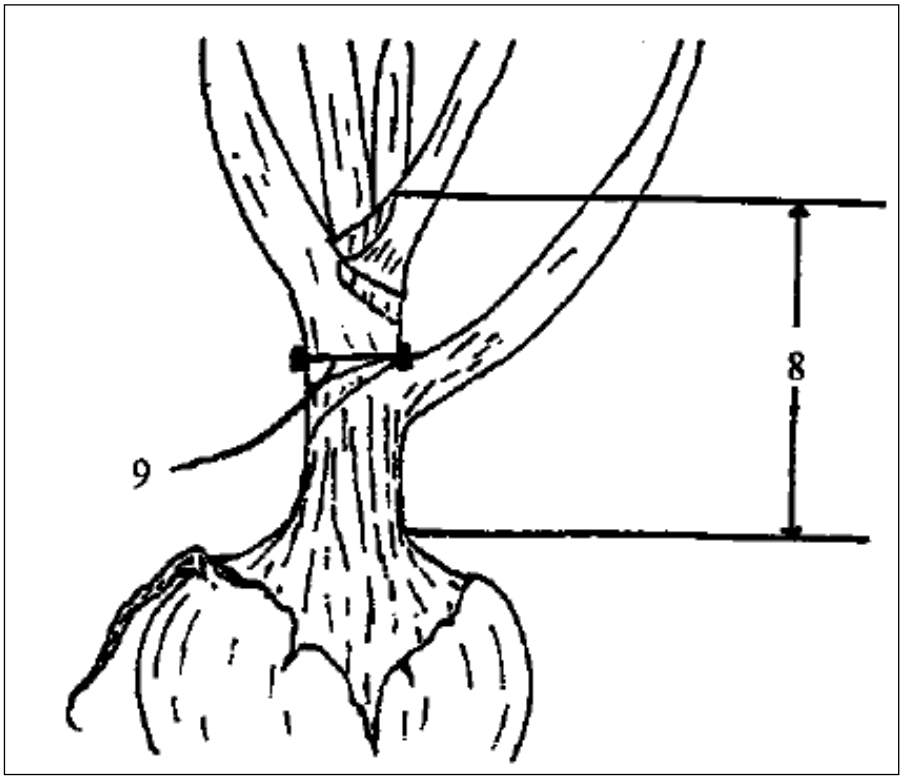
Stage of observation: Observations should be made on full grown plants, before foliage fall-over.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

Remarks: -

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

CPVO explanation:



9. <u>Onion varieties only:</u> Pseudostem: diameter (at mid-point of length)

1: very small 3: small 5: medium 7: large 9: very large

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

10. <u>Seed propagated varieties only:</u> Bulb: Tendency to split into bulblets (with dry skin around each bulblet)

Grouping characteristic: yes.

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

Type of observation:

- **For varieties applied as onion/echalion: VG** - Visual assessment by a single observation of a group of plants or parts of plants.
- **For varieties applied as seed shallot: MS** - Measurement of a number of individual plants or parts of plants.

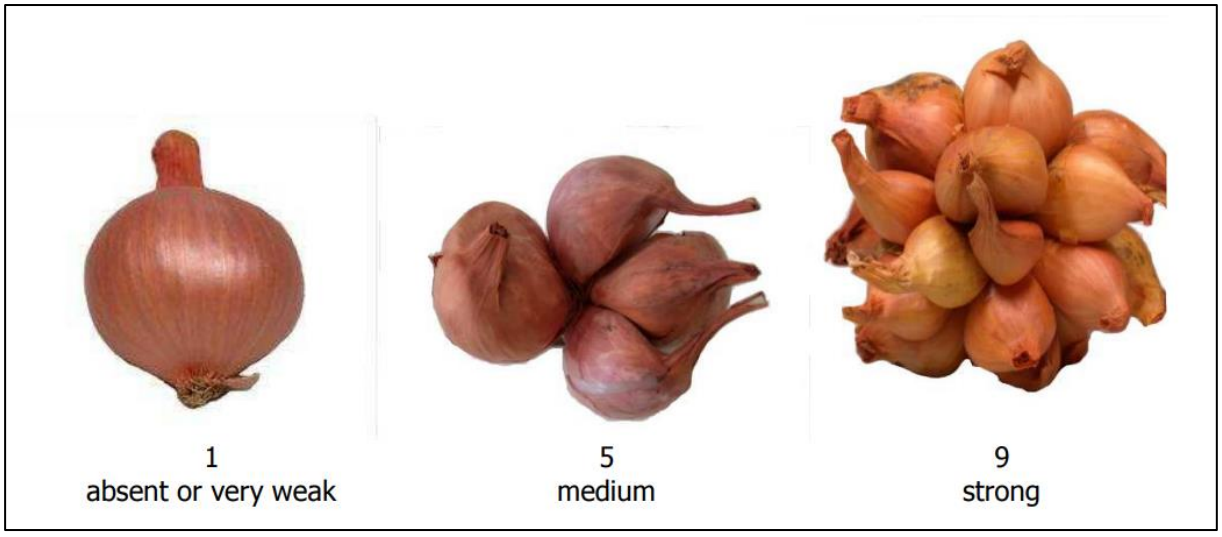
Stage of observation: To be judged on material directly grown from seed. Observations should be made at harvest maturity.

Method of observation: Visual observation or measurement. Use example varieties to determine the proper note.

Remarks: For varieties applied as seed shallot: harvest the plants one by one and directly count the number of bulblets per plant. Per replication an average number of bulblets per plant is calculated. The calculated averages are compared using a variance analysis (ANOVA) in GENSTAT. Standard varieties are used to define the range of expressions and assign notes to the applications.

Notes and states of expression:	**<u>NL example varieties</u>**
1: absent or very weak	Cuisse de poulet (O), Owa (O), Picador (S)
2: very weak to weak	
3: weak	Camelot (S)
4: weak to medium	
5: medium	Koribel (S)
6: medium to strong	
7: strong	Creation (S)
8: strong to very strong	
9: very strong	Tropix (S), Maserati (S)

CPVO explanation:



11. Bulb: degree of splitting into bulblets (with dry skin around each bulblet)

Grouping characteristic: yes.

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

Type of observation:

- **For varieties applied as vegetative shallot: VG** - Visual assessment by a single observation of a group of plants or parts of plants.
- **For varieties applied as seed shallot: MS -** Measurement of a number of individual plants or parts of plants.

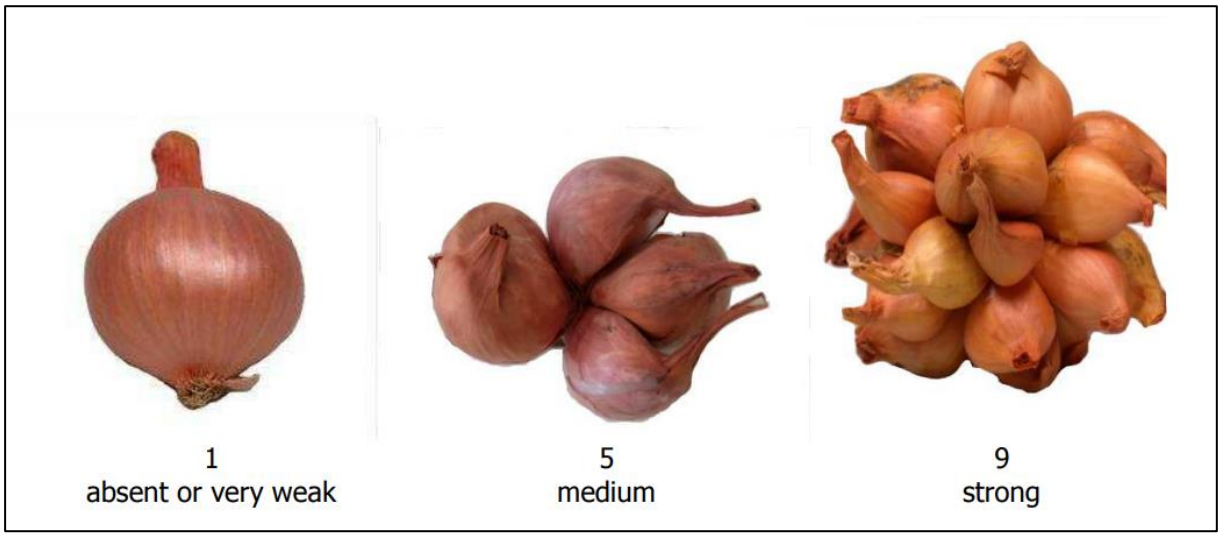
Stage of observation: To be judged on material directly grown from submitted bulbs or from replanted bulbs harvested from seed-propagated varieties. Observations should be made at harvest maturity.

Method of observation: Visual observation or measurement. Use example varieties to determine the proper note.

Remarks: For varieties applied as seed shallot: harvest the plants one by one and directly count the number of bulblets per the plant. Per replication an average number of bulblets per plant is calculated. The calculated averages are compared using a variance analysis (ANOVA) in GENSTAT. Standard varieties are used to define the range of expressions and assign notes to the applications.

Notes and states of expression:	**NL example varieties**
1: absent or very weak	Cuisse de poulet (O)
2: very weak to weak	
3: weak	Owa (O)
4: weak to medium	
5: medium	Lorient (S), Picador (S)
6: medium to strong	
7: strong	Koribel (S)
8: strong to very strong	
9: very strong	Creation (S)

CPVO explanation:



12.1. Onion varieties only: Bulb: size

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

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

12.1. Onion varieties only: Bulb: size

1: very small 3: small 5: medium 7: large 9: very large

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

12.2. Shallot varieties only: Bulblet: size

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: To be judged on material directly grown from submitted bulbs or from replanted bulbs harvested from seed-propagated varieties. Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

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

13.1. Onion varieties only: Bulb: height

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

Type of observation: VG/MS
VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

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

13.2. <u>Shallot varieties only:</u> Bulblet: height

Grouping characteristic: no.

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

Type of observation: VG/MS

VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

Stage of observation: To be judged on material directly grown from submitted bulbs or from replanted bulbs harvested from seed-propagated varieties. Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

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

14.1. Onion varieties only: Bulb: diameter

Grouping characteristic: no.

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

Type of observation: VG/MS
VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

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

14.2. Shallot varieties only: Bulblet: diameter

Grouping characteristic: no.

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

Type of observation: VG/MS

VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

Stage of observation: To be judged on material directly grown from submitted bulbs or from replanted bulbs harvested from seed-propagated varieties. Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

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

15.1. <u>Onion varieties only:</u> Bulb: ratio height/diameter

Grouping characteristic: no.

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

Type of observation: VG/MS

VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

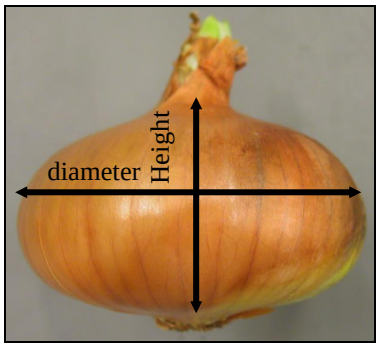
Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

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

15.1. <u>Onion varieties only:</u> Bulb: ratio height/diameter



2: very small to small


4: small to medium


5: medium


5: medium


8: large to very large

15.2. Shallot varieties only: Bulblet: ratio height/diameter

Grouping characteristic: no.

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

Type of observation: VG/MS

VG: Visual assessment by a single observation of a group of plants or parts of plants
MS: Measurement of a number of individual plants or parts of plants.

Stage of observation: To be judged on material directly grown from submitted bulbs or from replanted bulbs harvested from seed-propagated varieties. Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

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

16. Bulb/Bulblet: position of maximum diameter

Grouping characteristic: no.

Type of characteristic: QN – Quantitative characteristic.

Type of observation: VG - Visual assessment by a single observation of a group of plants or parts of plants.

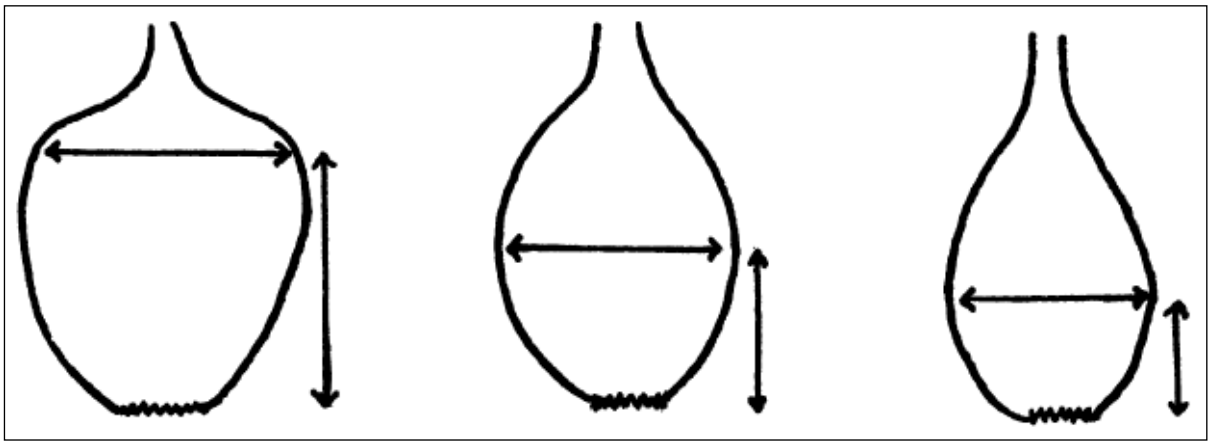
Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

Remarks: -

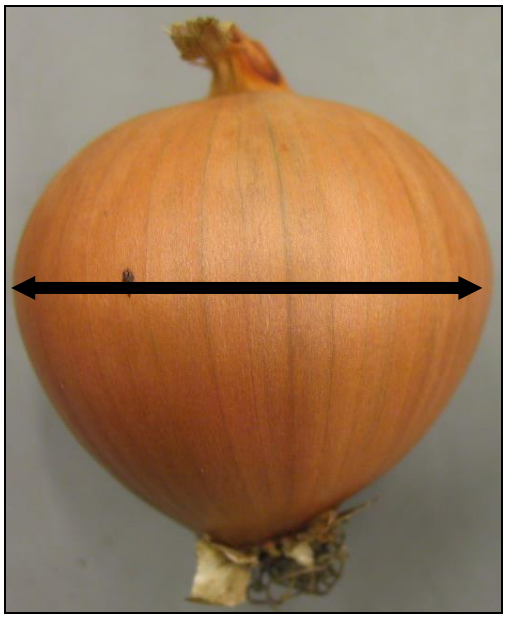
Notes and states of expression:
1: towards stem end
2: at middle
3: towards root end

CPVO explanation:

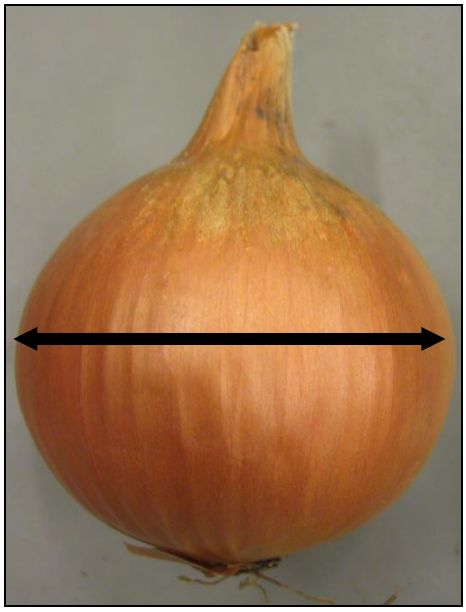


1: towards stem end 2: at middle 3: towards root end

16. Bulb/Bulblet: position of maximum diameter



1: towards stem end



2: at middle

17. Bulb/Bulblet: width of neck

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

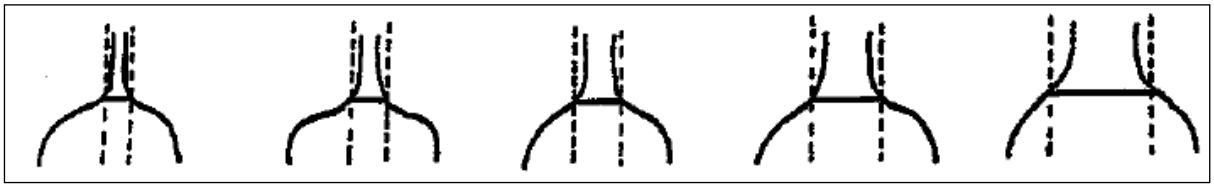
Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

Remarks: -

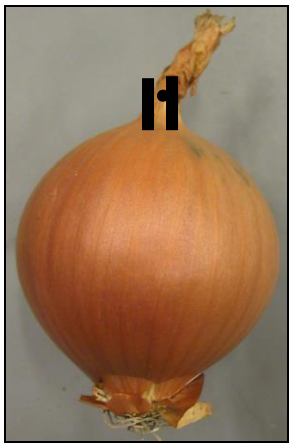
Notes and states of expression:
1: very narrow
2: very narrow to narrow
3: narrow
4: narrow to medium
5: medium
6: medium to broad
7: broad
8: broad to very broad
9: very broad

CPVO explanation:

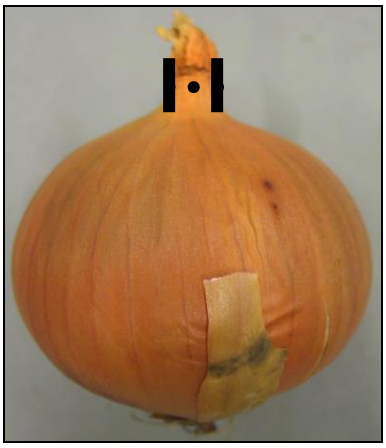


1: very narrow 3: narrow 5: medium 7: broad 9: very broad

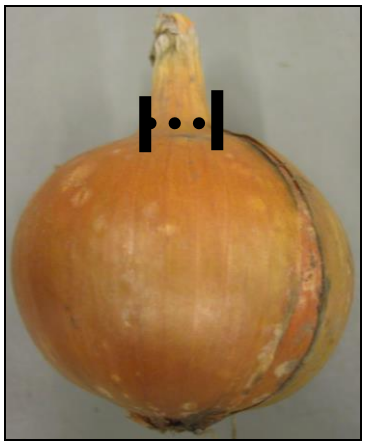
17. Bulb/Bulblet: width of neck



3: narrow



5: medium



7: broad

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

18. Bulb/Bulblet: shape (in longitudinal section)

Grouping characteristic: yes.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

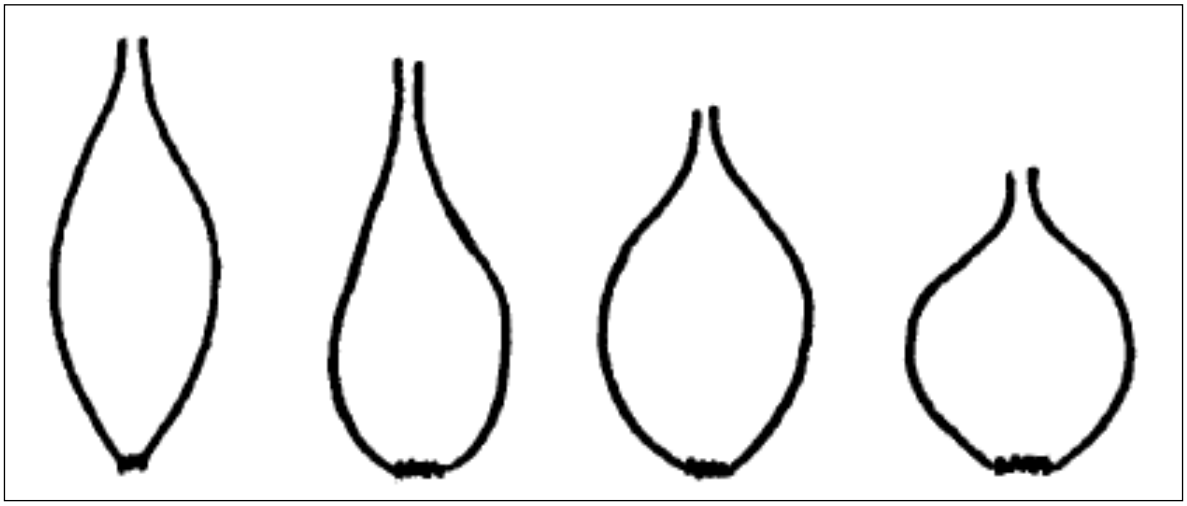
Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

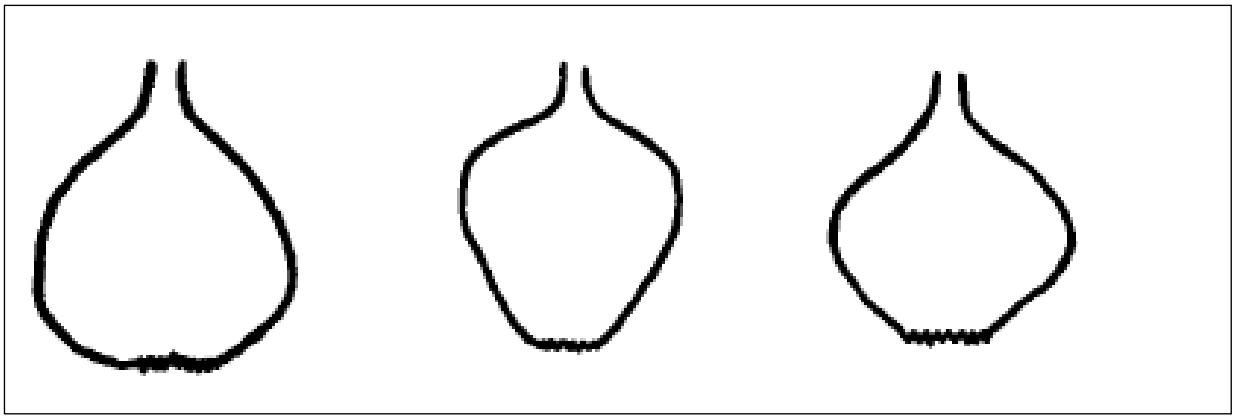
Remarks: -

Notes and states of expression:
1: elliptic
2: medium ovate
3: broad elliptic
4: circular
5: broad ovate
6: broad obovate
7: rhombic
8: transverse medium elliptic
9: transverse narrow elliptic

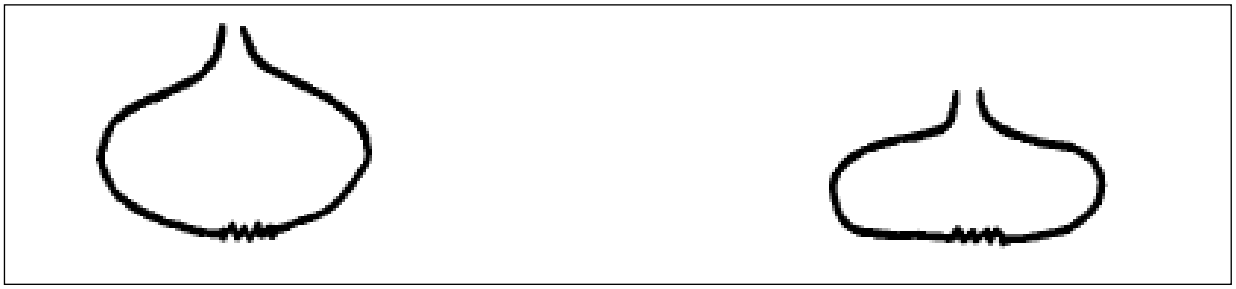
CPVO explanation:



1: elliptic 2: medium ovate 3: broad elliptic 4: circular



5: broad ovate 6: broad obovate 7: rhombic



8: transverse medium elliptic 9: transverse narrow elliptic

18. Bulb/Bulblet: shape (in longitudinal section)


1: elliptic


2: medium ovate


3: broad elliptic


4: circular


6: broad obovate


7: rhombic


8: transverse medium elliptic


9: transverse narrow elliptic

19. <u>Onion varieties only:</u> Bulb/Bulblet: shape of stem end (as for 18)

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

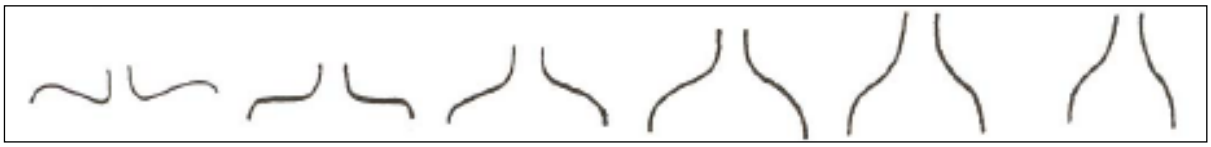
Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

Remarks: -

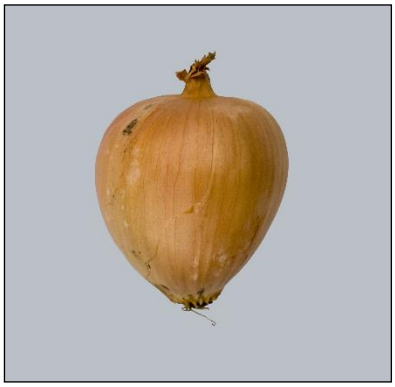
Notes and states of expression:
1: depressed
2: flat
3: slightly raised
4: rounded
5: slightly sloping
6: strongly sloping

CPVO explanation:



1: depressed | 2: flat | 3: slightly raised | 4: rounded | 5: slightly sloping | 6: strongly sloping

19. <u>Onion varieties only:</u> Bulb/Bulblet: shape of stem end (as for 18)



2: flat

3: slightly raised

4: rounded

5: slightly sloping

6: strongly sloping

20. Bulb/Bulblet: shape of root end (as for 18)

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

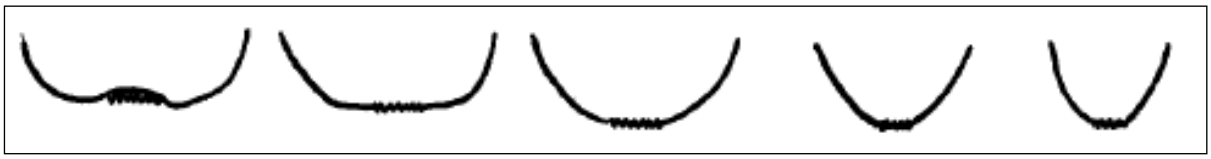
Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties, illustrations and CPVO explanation to determine the proper note.

Remarks: -

Notes and states of expression:
1: depressed
2: flat
3: round
4: weakly tapered
5: strongly tapered

CPVO explanation:



1: depressed | 2: flat | 3: round | 4: weakly tapered | 5: strongly tapered

20. Bulb/Bulblet: shape of root end (as for 18)

1: depressed

2: flat

3: round

4: weakly tapered

5: strongly tapered

21. Bulb/Bulblet: adherence of dry skin after harvest

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

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


5: medium


7: strong

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

22. Bulb/Bulblet: thickness of dry skin

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: Rub skins between fingertips to feel the thickness.

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

23. Bulb/Bulblet: base colour of dry skin

Grouping characteristic: yes.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

Notes and states of expression:
1: white
2: grey
3: green
4: yellow
5: brown
6: pink
7: red

1: white 4: yellow 5: brown 6: pink 7:red

24. Excluding varieties with white dry skin: Bulb/Bulblet: intensity of base colour of dry skin

Grouping characteristics: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: -

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

24. <u>Excluding varieties with white dry skin:</u> Bulb/Bulblet: intensity of base colour of dry skin

Base colour: pink

3: light 5: medium 7: dark

Base colour: red

1: very light 3: light 5: medium 7: dark 9: very dark

Base colour: brown

1: very light 3: light 5: medium 7: dark 9: very dark

These images serve only to illustrate the variation present in the crop and should not be used as an absolute reference. Please note that the scale can differ depending on the growing conditions.

25. Bulb/Bulblet: hue of colour of dry skin (in addition to base colour)

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: -

Notes and states of expression:
1: absent
2: greyish
3: greenish
4: yellowish
5: brownish
6: pinkish
7: reddish
8: purplish

26. Bulb/Bulblet: coloration of epidermis of fleshy scales

Grouping characteristic: no.

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

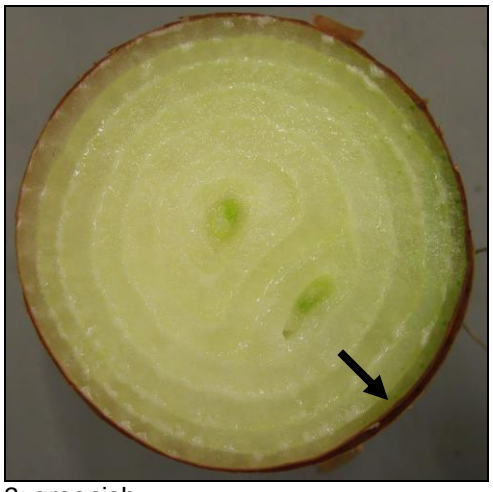
Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

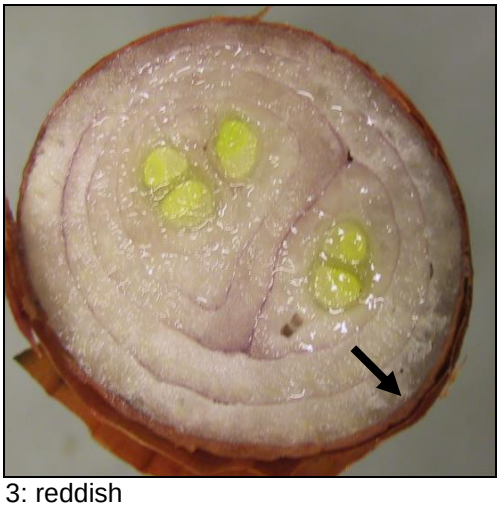
Stage of observation: Observations should be made after harvest, but before the bulb starts sprouting during storage.

Method of observation: Visual observation. Use example varieties and illustrations to determine the proper note.

Remarks: Cut the bulbs, peel a few fleshy scales and observe the epidermis.

Notes and states of expression:
1: absent
2: greenish
3: reddish


2: greenish


3: reddish

27. Bulb/Bulblet: number of growing points per kg

Grouping characteristic: yes.

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

Type of observation:

- **For varieties applied as onion/echalion: VG -** Visual assessment by a single observation of a group of plants or parts of plants.
- **For varieties applied as shallot: MS -** Measurement of a number of individual plants or parts of plants.

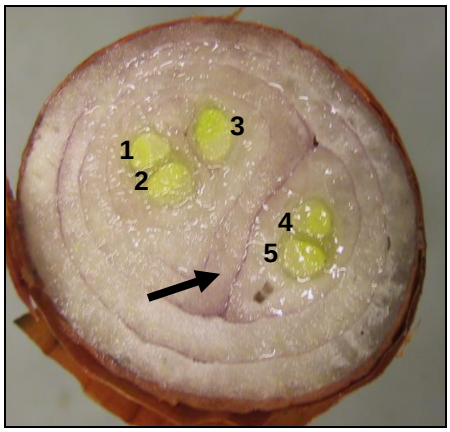
Stage of observation: For varieties applied as onion/ echalion to be judged on material directly grown from seed. For varieties applied as shallot to be judged on material directly grown from submitted bulbs or from replanted bulbs harvested from seed-propagated varieties. Observations should be made after harvest, at the end of storage, just before the bulb starts to sprout.

Method of observation: Visual observation or measurement. Use example varieties to determine the proper note.

Remarks: For varieties applied as shallot: identify and weigh 20 bulbs/bulblets per plot. All bulbs/bulblets should be cut in transverse section at ⅓ of the length from the base. Each axis appears as a point, often greenish in colour surrounded by tissue rings. Per replication an average number of growing points per kg is calculated. The calculated averages are compared using a variance analysis (ANOVA) in GENSTAT. Standard varieties are used to define the range of expressions and assign notes to the applications.

Notes and states of expression:	**NL example varieties**
1: very low	
2: very low to low	
3: low	Cuisse de poulet (O), Owa (O)
4: low to medium	
5: medium	Koribel (S)
6: medium to high	
7: high	Creation (S)
8: high to very high	
9: very high	Tropix (S)

CPVO explanation:
For a given variety, the number of growing points per bulb will vary according to the size of the bulb, and the size of the bulb will be influenced by the size of the bulb from which it originated. However, the weight of bulb per growing point is consistent for a given variety, irrespective of the size of the bulb. Thus, the characteristic observes the number of growing points per kg (i.e. the inverse of the weight of bulb per growing point).



28. Bulb/bulblet: dry matter content

Grouping characteristic: no.

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

Type of observation: **MG** – Single measurement of a group of plants or parts of plants.

Stage of observation: Observations should be made directly after harvest.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: After the trial is harvested a bulk sample of 5 average bulbs per plot is collected. Dry matter content is determined*. Per replication an average dry matter content is calculated. The calculated averages are compared using a variance analysis (ANOVA) in GENSTAT. A conversion table is used to assign notes to the applications.

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

***CPVO explanation:**
Dry matter content should be determined according to Chapter 3.5 (e.g. one sample of 20 bulbs from each plot). From these bulbs the dry skin should be removed as well as the protruding part of the root disk. From these 20 bulbs a bulk sample should be prepared by cutting the bulbs into small pieces of 1-5 mm size. A representative sample should be weighed directly after cutting (the biodegradation of sugars and carbohydrates starts as soon as cells are damaged). The samples should be dried for 2 hours at 105^{o}C and then the temperature should be lowered to 65^{o}C during 22 hours. Lowering of temperature is necessary to avoid caramelization. The remaining weight should be assessed after 24 hours. From these figures the dry matter content may be calculated. The dry matter content could also be assessed by refractometer.

29. Onion varieties only: Tendency to bolting in spring sown trials

Grouping characteristic: no.

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

Type of observation:
- **In protocol VG** - Visual assessment by a single observation of a group of plants or parts of plants.
- **In practice MG** - Single measurement of a group of plants or parts of plants.

Stage of observation: Observations should be made during the whole growing season until harvest maturity.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: Record once a week the number of bolting plants per plot. At the end of the growing season a total number of bolting plants per replication is obtained. Per variety these numbers are compared using a variance analysis (ANOVA) in GENSTAT. Standard varieties are used to define the range of expressions and assign notes to the applications.

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. Onion varieties only: Time of beginning of bolting in spring sown trials

Grouping characteristic: no.

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

Type of observation:
- **In protocol MS** - Measurement of a number of individual plants or parts of plants.
- **In practice MG** - Single measurement of a group of plants or parts of plants.

Stage of observation: Observations should be made during the whole growing season until harvest maturity.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: Record once a week the date of emergence of the first bolting plant. Standard varieties are used to define the range of expressions and assign notes to the applications.

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

31. Onion varieties only: Tendency to bolting in autumn sown trials

Grouping characteristic: no.

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

Type of observation: **VG** - Visual assessment by a single observation of a group of plants or parts of plants.

Stage of observation: Observations should be made during the whole growing season until harvest maturity.

Method of observation: Visual observation. Use example varieties to determine the proper note.

Remarks: This characteristic is not applicable, as an autumn trial is not performed by Naktuinbouw.

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

32. Onion varieties only: Time of beginning of bolting in autumn sown trials

Grouping characteristic: no.

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

Type of observation: **MS** - Measurement of a number of individual plants or parts of plants.

Stage of observation: Observations should be made during the whole growing season until harvest maturity.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: This characteristic is not applicable, as an autumn trial is not performed by Naktuinbouw.

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

33. Onion varieties only: Time of harvest maturity for autumn sown trials (foliage fall-over in 80% of plants)

Grouping characteristic: no.

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

Type of observation: **MS** - Measurement of a number of individual plants or parts of plants.

Stage of observation: Observations should be made from the day the foliage of the first plant is falling over until the foliage of at least 80% off the plants has fallen-over.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: This characteristic is not applicable, as an autumn trial is not performed by Naktuinbouw.

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

34.1. <u>Onion varieties only:</u> Time of harvest maturity for <u>spring</u> sown trials (as for 33).

Grouping characteristic: no.

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

Type of observation:
- **In protocol MS** - Measurement of a number of individual plants or parts of plants.
- **In practice MG** - Single measurement of a group of plants or parts of plants.

Stage of observation: Observations should be made when the foliage of starts falling over, until the foliage of at least 80% of the plants has fallen-over.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: Record twice a week the total percentage of foliage fall-over until 80% of the foliage has fallen-over. At the end of the growing season for each variety the time of harvest maturity is compared using a variance analysis (ANOVA) in GENSTAT. Standard varieties are used to define the range of expressions and assign notes to the applications.

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

Foliage which has fallen over.

34.2. <u>Shallot varieties only:</u> Time of harvest maturity (as for 33)

Grouping characteristic: no.

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

Type of observation:
- **In protocol MS** - Measurement of a number of individual plants or parts of plants.
- **In practice MG** - Single measurement of a group of plants or parts of plants.

Stage of observation: Observations should be made when the foliage of starts falling over, until the foliage of at least 80% of the plants has fallen-over.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: Record twice a week the total percentage of foliage fall-over until 80% of the foliage has fallen-over. At the end of the growing season for each variety the time of harvest maturity is compared using a variance analysis (ANOVA) in GENSTAT. Standard varieties are used to define the range of expressions and assign notes to the applications.

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

35. Time of sprouting during storage

Grouping characteristic: no.

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

Type of observation:
- **In protocol MS** - Measurement of a number of individual plants or parts of plants.
- **In practice MG** - Single measurement of a group of plants or parts of plants.

Stage of observation: Observations should be made from the moment the first bulbs start sprouting.

Method of observation: Measurement. Use example varieties to determine the proper note.

Remarks: Every 6 weeks record the number of sprouting bulbs and the number of non-sprouting bulbs. Afterwards the percentage of sprouting bulbs related to the total number of bulbs is calculated. The averages for each variety are compared using a variance analysis (ANOVA) in GENSTAT. Standard varieties are used to define the range of expressions and assign notes to the applications.

If none or only a few bulbs were sprouting, the variety will be put back in storage and the procedure is repeated after 6 weeks.

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

CPVO explanation:
Care should be taken to exclude damaged bulbs. Storage temperature should be maintained between 2°C and 5°C with good ventilation which can be achieved by storing in stacking, slotted trays.
In climates which have cooler summer temperature, it is advisable to ‘cure’ bulbs for 2 weeks at a temperature of 30-35°C. Temperatures above 40°C should be avoided to prevent growth of *Aspergillus niger*. A minimum of 50 bulbs are required to assess sprouting. Assessment should be carried out every 2 to 4 weeks.

36. Male sterility

Grouping characteristic: yes.

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

Type of observation:

- **In protocol VG** - Visual assessment by a single observation of a group of plants or parts of plants.
- **In practice VS** - Visual assessment by observation of individual plants or parts of plants.

Stage of observation: Observations should be made on the flowering plant of replanted bulbs in the second year.

Method of observation: Visual observation.

Remarks: Twice a week individual flowering plants are checked for pollen production. At the end the percentage of male sterile plants is calculated.

Notes and states of expression:
1: absent or very weak
2: weak
3: strong

CPVO explanation:
After replanting of harvested bulbs in the second year, flowers will emerge. In dry weather, when flowers are completely open, male sterility should be assessed by checking if pollen is released from the anthers. This characteristic has to be observed plant by plant; the expression represents the percentage of male sterile plants.

State	Note	% male sterility
absent or very weak	1	0-10 %
weak	2	11-80 %
strong	3	81-100 %