



## **PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY**

***Cichorium intybus* L. var. *foliosum* Hegi**

### **LEAF CHICORY**

UPOV Code: CICHO\_INT\_FOL

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### **CPVO-TP/154/1 Rev**

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## **1. SUBJECT OF THE PROTOCOL AND REPORTING**

### **1.1 Scope of the technical protocol**

This Technical Protocol applies to all varieties of *Cichorium intybus* L. var. *foliosum* Hegi.

The protocol describes the technical procedures to be followed in order to meet the requirements of Council Regulation 2100/94 on Community Plant Variety Rights. The technical procedures have been agreed by the Administrative Council and are based on documents agreed by the International Union for the Protection of New Varieties of Plants (UPOV), such as the General Introduction to DUS (UPOV Document TG/1/3 [http://www.upov.int/export/sites/upov/resource/en/tg\\_1\\_3.pdf](http://www.upov.int/export/sites/upov/resource/en/tg_1_3.pdf)), its associated TGP documents (<http://www.upov.int/tgp/en/>) and the relevant UPOV Test Guideline TG/154/4 dated 05/04/2017 (<http://www.upov.int/edocs/tgdocs/en/tg154.pdf>) for the conduct of tests for Distinctness, Uniformity and Stability.

### **1.2 Entry into Force**

The present protocol enters into force on **19.03.2019**. Any ongoing DUS examination of candidate varieties started before the aforesaid date will not be affected by the approval of the Technical Protocol. Technical examinations of candidate varieties are carried out according to the TP in force when the DUS test starts. The starting date of a DUS examination is considered to be the due date for submitting of plant material for the first test period.

In cases where the Office requests to take-over a DUS report for which the technical examination has either been finalized or which is in the process to be carried out at the moment of this request, such report can only be accepted if the technical examination has been carried out according to the CPVO TP which was in force at the moment when the technical examination started.

### **1.3 Reporting between Examination Office and CPVO and Liaison with Applicant**

#### **1.3.1 Reporting between Examination Office and CPVO**

The Examination Office shall deliver to the CPVO a preliminary report ("the preliminary report") no later than two weeks after the date of the request for technical examination by the CPVO.

The Examination Office shall also deliver to the CPVO a report relating to each growing period ("the interim report") and, when the Examination Office considers the results of the technical examination to be adequate to evaluate the variety or the CPVO so requests, a report relating to the examination ("the final report").

The final report shall state the opinion of the Examination Office on the distinctness, uniformity and stability of the variety. Where it considers those criteria to be satisfied, or where the CPVO so requests, a description of the variety shall be added to the report. If a report is negative the Examination Office shall set out the detailed reasons for its findings.

The interim and the final reports shall be delivered to the CPVO as soon as possible and no later than on the deadlines as laid down in the designation agreement.

#### **1.3.2 Informing on problems in the DUS test**

If problems arise during the course of the test the CPVO should be informed immediately so that the information can be passed on to the applicant. Subject to prior permanent agreement, the applicant may be directly informed at the same time as the CPVO particularly if a visit to the trial is advisable.

#### **1.3.3 Sample keeping in case of problems**

If the technical examination has resulted in a negative report, the CPVO shall inform the Examination Office as soon as possible in case that a representative sample of any relevant testing material shall be kept.

## **2. MATERIAL REQUIRED**

### **2.1 Plant material requirements**

Information with respect to the agreed closing dates and submission requirements of plant material for the technical examination of varieties can be found on <http://cpvo.europa.eu/applications-and-examinations/technical-examinations/submission-of-plant-material-s2-publication> in the special issue S2 of the Official Gazette of the Office. General requirements on submission of samples are also to be found following the same link.

## **2.2 Informing the applicant of plant material requirements**

The CPVO informs the applicant that

- he is responsible for ensuring compliance with any customs and plant health requirements.
- the plant material supplied should be visibly healthy, not lacking in vigour, nor affected by any important pest or disease.
- the plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

## **2.3 Informing about problems on the submission of material**

The Examination Office shall report to the CPVO immediately in cases where the test material of the candidate variety has not arrived in time or in cases where the material submitted does not fulfil the conditions laid down in the request for material issued by the CPVO.

In cases where the examination office encounters difficulties to obtain plant material of reference varieties the CPVO should be informed.

## **3. METHOD OF EXAMINATION**

### **3.1 Number of growing cycles**

The minimum duration of tests should normally be two independent growing cycle.

### **3.2 Testing Place**

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 "Examining Distinctness" [http://www.upov.int/edocs/tgpdocs/en/tgp\\_9.pdf](http://www.upov.int/edocs/tgpdocs/en/tgp_9.pdf).

### **3.3 Conditions for Conducting the Examination**

The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

### **3.4 Test design**

Each test should be designed to result in a total of at least 100 plants, which should be divided between at least 2 replicates.

### **3.5 Additional tests**

In accordance with Article 83(3) of Council Regulation No. 2100/94 an applicant may claim either in the Technical Questionnaire or during the test that a candidate has a characteristic which would be helpful in establishing distinctness. If such a claim is made and is supported by reliable technical data, an additional test may be undertaken providing that a technically acceptable test procedure can be devised.

Additional tests will be undertaken, with the agreement of the President of CPVO, where distinctness is unlikely to be shown using the characters listed in the protocol.

### **3.6 Constitution and maintenance of a variety collection**

The process for the constitution and the maintenance of a variety collection can be summarized as follows:

Step 1: Making an inventory of the varieties of common knowledge

Step 2: Establishing a collection ("variety collection") of varieties of common knowledge which are relevant for the examination of distinctness of candidate varieties

Step 3: Selecting the varieties from the variety collection which need to be included in the growing trial or other tests for the examination of distinctness of a particular candidate variety.

#### 3.6.1 Forms of variety collection

The variety collection shall comprise variety descriptions and living plant material, thus a living reference collection. The variety description shall be produced by the EO unless special cooperation exists between EOs and the CPVO. The descriptive and pictorial information produced by the EO shall be held and maintained in a form of a database.

#### 3.6.2 Living Plant Material

The EO shall collect and maintain living plant material of varieties of the species concerned in the variety collection.

#### 3.6.3 Range of the variety collection

The living variety collection shall cover at least those varieties that are suitable to climatic conditions of a respective EO.

#### 3.6.4 Making an inventory of varieties of common knowledge for inclusion in the variety collection

The inventory shall take into account the list of protected varieties and the official, or other, registers of varieties, in particular:

The inventory shall include varieties protected under National PBR (UPOV contracting parties) and Community PBR, varieties registered in the Common Catalogue, the OECD list, the Conservation variety list and varieties in trade or in commercial registers for those species not covered by a National or the Common Catalogue.

#### 3.6.5 Maintenance and renewal/update of a living variety collection

The EO shall maintain seeds in conditions which will ensure germination and viability, periodical checks, and renewal as required. For the renewal of existing living material the identity of replacement living plant material shall be verified by conducting side-by-side plot comparisons between the material in the collection and the new material.

### **4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY**

The prescribed procedure is to assess distinctness, uniformity and stability in a growing trial.

#### **4.1 Distinctness**

##### 4.1.1 General recommendations

It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 9 'Examining Distinctness' ([http://www.upov.int/edocs/tgpdocs/en/tgp\\_9.pdf](http://www.upov.int/edocs/tgpdocs/en/tgp_9.pdf)) prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in this Technical Protocol.

Further guidance is provided in documents TGP/9 "Examining Distinctness" and TGP/8 "Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability".

##### 4.1.2 Consistent differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

##### 4.1.3 Clear differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Technical Protocols are familiar with the recommendations contained in the UPOV-General Introduction to DUS prior to making decisions regarding distinctness.

##### 4.1.4 Number of plants/parts of plants to be examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 60 plants or parts taken from each of 60 plants and any other observations made on all plants in the test, disregarding any off-type plants.

#### 4.1.5 Method of observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the third column of the Table of Characteristics (see document TGP/9 "Examining Distinctness", Section 4 "Observation of characteristics"):

|     |   |
|-----|---|
| MG: | single measurement of a group of plants or parts of plants                        |
| MS: | measurement of a number of individual plants or parts of plants                   |
| VG: | visual assessment by a single observation of a group of plants or parts of plants |
| VS: | visual assessment by observation of individual plants or parts of plants          |

Type of observation: visual (V) or measurement (M)

"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. colour charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness."

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

## 4.2 Uniformity

4.2.1 It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 10 'Examining Uniformity' ([http://www.upov.int/edocs/tgpdocs/en/tgp\\_10.pdf](http://www.upov.int/edocs/tgpdocs/en/tgp_10.pdf)) prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in this Technical Protocol:

4.2.2 The assessment of uniformity should be according to the recommendations for cross-pollinated varieties in the UPOV-General Introduction to DUS.

4.2.3 For the assessment of uniformity of inbred lines and hybrids, a population standard of 3% and an acceptance probability of at least 95% should be applied; In the case of a sample size of 100 plants, 6 off-types are allowed. In addition, the same population standard and acceptance probability should apply to clear cases of out-crossed plants in inbred lines as well as plants obviously resulting from the selfing of a parent line in hybrids.

## 4.3 Stability

4.3.1 It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 11 'Examining Stability' ([http://www.upov.int/edocs/tgpdocs/en/tgp\\_11.pdf](http://www.upov.int/edocs/tgpdocs/en/tgp_11.pdf)).

In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

## 5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

**5.2** Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

**5.3** The following have been agreed as useful grouping characteristics:

- a) Leaf: anthocyanin coloration (characteristic 7)
- b) Leaf: colour (characteristic 8)
- c) Plant: head formation (characteristic 17)
- d) Head: shape in longitudinal section (characteristic 22)

In a first step, the collection should be divided according to types as described in the Table 1. In cases of doubt to which type a variety belongs to, it should be tested under consideration of all relevant types.

**5.4** If other characteristics than those from the TP are used for the selection of varieties to be included into the growing trial, the EO shall inform the CPVO and seek the prior consent of the CPVO before using these characteristics.





Table 1: Classification of types according to characteristics

| <b>Plant: type</b>                    | <b>Plant: diameter (char. 2)</b> | <b>Leaf: length (char. 4)</b>     | <b>Leaf: width (char. 5)</b> | <b>Leaf: colour (char. 8)</b>              | <b>Leaf: anthocyanin distribution (char.9 )</b> | <b>Plant: head formation (char.17)</b> | <b>Time of Head formation (char. 18)</b> | <b>Head: shape in longitudinal section (char. 22)</b> | <b>Head: colour of outer leaves (char. 26)</b> | <b>Plant: formation of stem (char. 28)</b> |
|---------------------------------------|----------------------------------|-----------------------------------|------------------------------|--|---|--|--|---|--|--|
| <b>Chioggia</b>                       | Medium to large (notes 5-7)      | Very short to medium (notes 1- 5) | Medium to broad (notes 5-7)  | Dark green (note 4)                        | <b>Diffused only</b>                            | <b>Closed</b>                          | Very early to very late (notes 1-9)      | Circular to oblate (notes 3-4)                        | Medium to dark red (notes 7-8)                 | Absent                                     |
| <b>Verona</b>                         | Small to medium (notes 3-5)      | Medium (note 5)                   | Medium to broad (notes 5-7)  | Medium green (note 3)                      |   |  | Very early to very late (notes 1-9)      | Ovate (note 2)  | Medium red (note 7)                            | Absent                                     |
| <b>Rossa di Treviso precoce</b>       | Medium (note 7)                  | Long (note 7)                     | Narrow (note 5)              | Medium red (note 6)                        |   |  | Very early to late (notes 1-7)           | Elliptic (note 1)                                     | Medium red (note 7)                            | Absent                                     |
| <b>Pan di Zucchero/ Pain de Sucre</b> | Large (note 7)                   | Medium to long (notes 5-7)        | Very broad (note 9)          | Light green to medium green (notes 2-3)    | <b>Absent</b>                                   |  | Medium (note 5)                          | Elliptic (note1)                                      | Light green (note 3)                           | Absent                                     |
| <b>Bianca di Milano</b>               | Medium (note 5)                  | Medium (note 5)                   | Broad (note 7)               | Yellowish green to light green (notes 1-2) |   |  | Early (note 3)                           | Ovate (note 2)  | Light green (note 3)                           | Absent                                     |
| <b>Bianca invernale</b>               | Large (note 7)                   | Medium to long (notes 5-7)        | Medium to broad (notes 5-7)  | Yellowish green to light green (notes 1-2) |   |  | Late (note 7)                            | Ovate (note 2)  | Light green to medium green (notes 3-4)        | Absent                                     |
| <b>Variegata di Castelfranco</b>      | Medium to large (notes 5-7)      | Medium (note 5)                   | Broad (note 7)               | Light green (note 2)                       | <b>In patches only</b>                          |  | Medium to late (notes 5-7)               | Ovate (note 2)  | Yellowish green (note 2)                       | Absent                                     |
| <b>Variegata di Lusia</b>             | Large (note 7)                   | Medium to large (notes 5-7)       | Broad (note 7)               | Light green (note 2)                       |   |  | Early to late (notes 3-7)                | Oblate (note 4)                                       | Yellowish green (note 2)                       | Absent                                     |

| <b>Plant: type</b>               | <b>Plant: diameter (char. 2)</b> | <b>Leaf: length (char. 4)</b> | <b>Leaf: width (char. 5)</b>      | <b>Leaf: colour (char. 8)</b>          | <b>Leaf: anthocyanin distribution (char.9 )</b> | <b>Plant: head formation (char.17)</b> | <b>Time of Head formation (char. 18)</b> | <b>Head: shape in longitudinal section (char. 22)</b> | <b>Head: colour of outer leaves (char. 26)</b> | <b>Plant: formation of stem (char. 28)</b> |
|----------------------------------|----------------------------------|-------------------------------|-----------------------------------|--|---|--|--|---|--|--|
| <b>Variegata di Chioggia</b>     | Medium to large (notes 5-7)      | Medium (note 5)               | Broad (note 7)                    | Medium green (note 3)                  | <b>Diffused and in patch</b>                    |  | Late to very late (notes 7-9)            | Circular (note 3)                                     | Whitish green (note 1)                         | Absent                                     |
| <b>A grumolo verde</b>           | Small (note 3)                   | Short (note 3)                | Narrow to medium (notes 3-5)      | Light green to dark green (notes 2- 4) | <b>Absent</b>                                   | <b>Open</b>                            |  |   |  | Absent                                     |
| <b>Améliorée Blonde or Verte</b> | Medium (note 5)                  | Short to medium (notes 3-5)   | Medium (note 5)                   | Light green to dark green (notes 1-4)  | <b>Absent</b>                                   |  |  |   |  | Absent                                     |
| <b>Rosa isontina</b>             | Medium (note 5)                  | Short (note 3)                | Medium (note 5)                   | Dark red (note 7)                      | <b>Diffused only</b>                            |  |  |   |  | Absent                                     |
| <b>Rossa di Treviso 2</b>        | Large (note 7)                   | Long (note 7)                 | Narrow (note 3)                   | Medium green (note 3)                  | <b>Diffused only</b>                            | <b>Absent</b>                          |  |   |  | Absent                                     |
| <b>Catalogna</b>                 | Medium to very large (notes 5-9) | Long to very long (notes 7-9) | Narrow (note 3)                   | Light to medium green (notes 2-3)      | <b>Absent</b>                                   |  |  |   |  | Absent                                     |
| <b>Catalogna Puntarelle</b>      | Small to medium (notes 3-5)      | Long (note 7)                 | Very narrow (note 1)              | Medium to dark green (notes 3-4)       |   |  |  |   |  | Present                                    |
| <b>Barbe de Capucin</b>          | Medium (note 5)                  | Long (note 7)                 | Very narrow to narrow (notes 1-3) | Medium to dark green (notes 3-4)       |   |  |  |   |  | Absent                                     |

## 6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS

### 6.1 Characteristics to be used

The characteristics to be used in DUS tests and preparation of descriptions shall be those referred to in the table of characteristics. All the characteristics shall be used, providing that observation of a characteristic is not rendered impossible by the expression of any other characteristic, or the expression of a characteristic is prevented by the environmental conditions under which the test is conducted or by specific legislation on plant health. In the latter case, the CPVO should be informed.

The Administrative Council empowers the President, in accordance with Article 23 of Commission Regulation N°874/2009, to insert additional characteristics and their expressions in respect of a variety.

#### 6.1.2 Technical Protocols with asterisked characteristics (only for certain vegetable species)

In the case of disease resistance characteristics, only those resistances marked with an asterisk (\*) in the CPVO column are compulsory.

#### States of expression and corresponding notes

In the case of qualitative and pseudo-qualitative characteristics, all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

| State  | Note |
|--------|------|
| small  | 3    |
| medium | 5    |
| large  | 7    |

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

| State               | Note |
|---------------------|------|
| very small          | 1    |
| very small to small | 2    |
| small               | 3    |
| small to medium     | 4    |
| medium              | 5    |
| medium to large     | 6    |
| large               | 7    |
| large to very large | 8    |
| very large          | 9    |

### 6.2 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

### 6.3 Legend

For the CPVO N° column:

|     |   |  |
|-----|---|--|
| G   | Grouping characteristic   | – see Chapter 5  |
| (*) | Asterisked characteristic                                       | – see Chapter 6.1.2 (only for certain vegetable species) |
| QL  | Qualitative characteristic                                      |  |
| QN  | Quantitative characteristic                                     |  |
| PQ  | Pseudo-qualitative characteristic                               |  |
| (+) | See Explanations on the Table of Characteristics in Chapter 8.2 |  |

For the UPOV N° column:

The numbering of the characteristics is provided as a reference to the ad hoc UPOV guideline.

|     |                                |   |
|-----|--------------------------------|---|
| (*) | UPOV Asterisked characteristic | – Characteristics that are important for the international harmonisation of variety descriptions. |
|-----|--------------------------------|---|

For column "stage, method":

|                |   |
|----------------|---|
| MG, MS, VG, VS | – see Chapter 4.1.5   |
| (a)-(b)        | See Explanations on the Table of Characteristics in Chapter 8.1 |

## 7. TABLE OF CHARACTERISTICS

| CPVO N°                 | UPOV N°                 | Stage, Method | Characteristics                            | Examples   | Note                              |   |
|-------------------------|-------------------------|---------------|--|--|-----------------------------------|---|
| <b>1.</b><br><b>(+)</b> | <b>1.</b><br><b>(*)</b> | <b>VG</b>     | <b>Young plant: anthocyanin coloration</b> |  |                                   |   |
|                         |                         |               | <b>QL</b>                                  | absent   | Pan di zucchero, Améliorée blonde | 1 |
|                         |                         |               | present                                    | Palla rossa 2, Rossa di Treviso precoce            | 9                                 |   |
| <b>2.</b>               | <b>2.</b><br><b>(*)</b> | <b>MS/VG</b>  | <b>Plant: diameter</b>                     |  |                                   |   |
|                         |                         |               | <b>QN</b>                                  | (a) very small                                     | Triestina da taglio               | 1 |
|                         |                         |               |  | small  | A grumolo verde, Firestorm        | 3 |
|                         |                         |               |  | medium   | Granato, Rossa di Treviso precoce | 5 |
|                         |                         |               |  | large  | Pan di zucchero                   | 7 |
|                         |                         |               | very large                                 | Catalogna puntarelle a foglia frastagliata, Tobago | 9                                 |   |
| <b>3.</b>               | <b>3.</b><br><b>(*)</b> | <b>VG</b>     | <b>Leaf: attitude</b>                      |  |                                   |   |
|                         |                         |               | <b>QN</b>                                  | (a), (b) erect                                     | Clio, Spadona,                    | 1 |
|                         |                         |               |  | semi-erect   | Palla rossa 2                     | 3 |
|                         |                         |               | horizontal                                 | Selvatica da campo                                 | 5                                 |   |
| <b>4.</b>               | <b>4.</b><br><b>(*)</b> | <b>MS/VG</b>  | <b>Leaf: length</b>                        |  |                                   |   |
|                         |                         |               | <b>QN</b>                                  | (a), (b) very short                                |                                   | 1 |
|                         |                         |               |  | short  | A grumolo verde                   | 3 |
|                         |                         |               |  | medium   | Rossa di Verona precoce           | 5 |
|                         |                         |               |  | long   | Pan di zucchero                   | 7 |
|                         |                         |               | very long                                  | Catalogna a foglie frastagliate                    | 9                                 |   |

| CPVO N°                 | UPOV N°                 | Stage, Method   | Characteristics                     | Examples                                    | Note |
|-------------------------|-------------------------|-----------------|-------------------------------------|---|------|
| <b>5.</b>               | <b>5.</b><br><b>(*)</b> | <b>MS/VG</b>    | <b>Leaf: width</b>                  |   |      |
| <b>QN</b>               |                         | <b>(a), (b)</b> | very narrow                         | Catalogna puntarelle a foglia stretta       | 1    |
|                         |                         |                 | narrow                              | Rossa di Treviso 2                          | 3    |
|                         |                         |                 | medium                              | Rossa di Treviso precoce                    | 5    |
|                         |                         |                 | broad                               | Variegata di Castelfranco                   | 7    |
|                         |                         |                 | very broad                          | Palla rossa 5                               | 9    |
| <b>6.</b><br><b>(+)</b> | <b>6.</b>               | <b>VG</b>       | <b>Leaf: shape</b>                  |   |      |
| <b>PQ</b>               |                         | <b>(b)</b>      | broad oblate                        |   | 1    |
|                         |                         |                 | circular                            | Palla rossa 4                               | 2    |
|                         |                         |                 | broad elliptic                      | Pan di zucchero,<br>Rossa di Verona tardiva | 3    |
|                         |                         |                 | medium elliptic                     | Rossa di Treviso precoce                    | 4    |
|                         |                         |                 | narrow elliptic                     | Rossa di Treviso 2                          | 5    |
|                         |                         |                 | oblanceolate                        | Catalogna del Veneto, Clio                  | 6    |
| <b>7.</b>               | <b>7.</b><br><b>(*)</b> | <b>VG</b>       | <b>Leaf: anthocyanin coloration</b> |   |      |
| <b>QL</b>               |                         | <b>(a), (b)</b> | absent                              | Pan di zucchero                             | 1    |
| <b>G</b>                |                         |                 | present                             | Palla rossa 2                               | 9    |
| <b>8.</b><br><b>(+)</b> | <b>8.</b><br><b>(*)</b> | <b>VG</b>       | <b>Leaf: colour</b>                 |   |      |
| <b>PQ</b>               |                         | <b>(a), (b)</b> | yellowish green                     | Bianca di Milano                            | 1    |
|                         |                         |                 | light green                         | A grumolo bionda, Rosa                      | 2    |
|                         |                         |                 | medium green                        | A grumolo verde                             | 3    |
|                         |                         |                 | dark green                          | A grumolo verde scuro                       | 4    |
|                         |                         |                 | light red                           |   | 5    |
|                         |                         |                 | medium red                          | Rossa di Treviso precoce                    | 6    |
| <b>G</b>                |                         |                 | dark red                            | Rosa isontina                               | 7    |

| CPVO N°                 | UPOV N°                  | Stage, Method | Characteristics                       | Examples                | Note   |   |
|-------------------------|--------------------------|---------------|---------------------------------------|-------------------------|--|---|
| <b>9.</b><br><b>(+)</b> | <b>9.</b><br><b>(*)</b>  | <b>VG</b>     | <b>Leaf: anthocyanin distribution</b> |                         |  |   |
|                         |                          |               | <b>(a), (b)</b>                       | diffused only           | Palla rossa 2  | 1 |
|                         |                          |               |                                       | in patches only         | Variegata di Castelfranco,<br>Variegata di Lusia       | 2 |
|                         |                          |               |                                       | diffused and in patches | Variegata di Chioggia                                  | 3 |
| <b>10.</b>              | <b>10.</b>               | <b>VG</b>     | <b>Leaf: colour of midrib</b>         |                         |  |   |
|                         |                          |               | <b>(a), (b)</b>                       | whitish                 | Bianca di Milano, Bianca<br>invernale, Pan di zucchero | 1 |
|                         |                          |               |                                       | green                   | A grumolo verde, Katrina                               | 2 |
|                         |                          |               |                                       | red                     | Medusa   | 3 |
| <b>11.</b>              | <b>11.</b>               | <b>VG</b>     | <b>Leaf: profile of upper side</b>    |                         |  |   |
|                         |                          |               | <b>(a), (b)</b>                       | strongly concave        |  | 1 |
|                         |                          |               |                                       | weakly concave          | Grumolo verde scuro                                    | 2 |
|                         |                          |               |                                       | flat                    | Rossa di Treviso 2                                     | 3 |
|                         |                          |               |                                       | weakly convex           |  | 4 |
|                         |                          |               |                                       | strongly convex         | Granato  | 5 |
| <b>12.</b>              | <b>12.</b>               | <b>VG</b>     | <b>Leaf: glossiness</b>               |                         |  |   |
|                         |                          |               | <b>(a), (b)</b>                       | absent or weak          | Jupiter, Rosa  | 1 |
|                         |                          |               |                                       | medium                  | Variegata di Chioggia                                  | 3 |
|                         |                          |               |                                       | strong                  |  | 5 |
| <b>13.</b>              | <b>13.</b><br><b>(*)</b> | <b>VG</b>     | <b>Leaf: blistering</b>               |                         |  |   |
|                         |                          |               | <b>(a), (b)</b>                       | absent or very weak     | Variegata di Castelfranco                              | 1 |
|                         |                          |               |                                       | weak                    | Pan di zucchero,<br>Rossa di Verona precoce            | 2 |
|                         |                          |               |                                       | medium                  | Bianca di Milano, Uranus                               | 3 |
|                         |                          |               |                                       | strong                  | Mantovana  | 4 |
|                         |                          |               |                                       | very strong             |  | 5 |

| CPVO N°        | UPOV N°        | Stage, Method   | Characteristics                          | Examples   | Note |
|----------------|----------------|-----------------|--|--|------|
| <b>14.</b>     | <b>14.</b>     | <b>VG</b>       | <b>Leaf: undulation of margin</b>        |  |      |
| <b>QN</b>      |                | <b>(a), (b)</b> | absent or very weak                      | A grumolo verde scuro, Rossa di Treviso 2  | 1    |
|                |                |                 | weak                                     | Zuccherina di Trieste  | 2    |
|                |                |                 | medium                                   | Bianca di Milano   | 3    |
|                |                |                 | strong                                   | Barbe de Capucin   | 4    |
|                |                |                 | very strong                              |  | 5    |
| <b>15.</b>     | <b>15. (*)</b> | <b>VG</b>       | <b>Leaf: incisions of margin</b>         |  |      |
| <b>QN</b>      |                | <b>(a), (b)</b> | absent or very shallow                   | Rossa di Treviso 2   | 1    |
|                |                |                 | shallow                                  | A grumolo bionda   | 3    |
|                |                |                 | medium                                   | 24 ore   | 5    |
|                |                |                 | deep                                     |  | 7    |
|                |                |                 | very deep                                | Catalogna gigante di Chioggia, Katrina   |      |
|                |                |                 |  | Catalogna puntarelle di Gaeta, Catalogna puntarelle di Galatina                    | 9    |
| <b>16. (+)</b> |                | <b>VG</b>       | <b>Leaf: type of incisions of margin</b> |  |      |
| <b>PQ</b>      |                | <b>(a), (b)</b> | sinuate                                  | Zuccherina di Trieste, Variegata di Lusia  | 1    |
|                |                |                 | dentate                                  | Pan di zucchero, Variegata di Castelfranco, Catalogna gigante di Chioggia, Koryvos | 2    |
|                |                |                 | serrate                                  | Catalogna a foglie frastagliate, Barbe de Capucin                                  | 3    |
| <b>17.</b>     | <b>16. (*)</b> | <b>VG</b>       | <b>Plant: head formation</b>             |  |      |
| <b>PQ</b>      |                | <b>(a)</b>      | absent                                   | Catalogna puntarelle a foglia stretta, Clio  | 1    |
|                |                |                 | open                                     | A grumolo verde, Corma   | 2    |
| <b>G</b>       |                |                 | closed                                   | Bianca invernale, Palla rossa 2, Pan di zucchero, Rossa di Treviso precoce         | 3    |



| CPVO N°        | UPOV N°        | Stage, Method | Characteristics               | Examples   | Note |
|----------------|----------------|---------------|-------------------------------|--|------|
| <b>18. (+)</b> | <b>17. (*)</b> | <b>MG</b>     | <b>Time of head formation</b> |  |      |
| <b>QN</b>      |                | <b>(a)</b>    | very early                    | Palla rossa 2, Rossa di Verona precoce               | 1    |
|                |                |               | early                         | Palla rossa 3  | 3    |
|                |                |               | medium                        | Pan di zucchero, Palla rossa 4                       | 5    |
|                |                |               | late                          | Palla rossa 5, Rossa di Verona tardiva, TT506        | 7    |
|                |                |               | very late                     | Palla rossa 6, Tobago, Variegata di Chioggia         | 9    |
| <b>19.</b>     | <b>18. (*)</b> | <b>VG</b>     | <b>Head: density</b>          |  |      |
| <b>QN</b>      |                | <b>(a)</b>    | loose                         | Améliorée blonde, Grumolo verde scuro                | 3    |
|                |                |               | medium                        | A grumolo bionda, Bianca di Bergamo, Pan di zucchero | 5    |
|                |                |               | dense                         | Palla rossa 2, Variegata di Chioggia                 | 7    |
| <b>20.</b>     | <b>19. (*)</b> | <b>MS/VG</b>  | <b>Head: length</b>           |  |      |
| <b>QN</b>      |                | <b>(a)</b>    | short                         | A grumolo verde                                      | 3    |
|                |                |               | medium                        | Bianca di Milano, Jupiter, Palla rossa 4             | 5    |
|                |                |               | long                          | Rossa di Treviso precoce                             | 7    |
| <b>21.</b>     | <b>20. (*)</b> | <b>VG</b>     | <b>Head: diameter</b>         |  |      |
| <b>QN</b>      |                | <b>(a)</b>    | very small                    | A grumolo verde scuro                                | 1    |
|                |                |               | small                         | Rossa di Treviso precoce                             | 3    |
|                |                |               | medium                        | Mantovana, Rossa di Verona precoce                   | 5    |
|                |                |               | large                         | Bianca di Milano                                     | 7    |
|                |                |               | very large                    | Averto, Gloria                                       | 9    |

| CPVO N°        | UPOV N°        | Stage, Method | Characteristics  | Examples   | Note |
|----------------|----------------|---------------|--|--|------|
| <b>22. (+)</b> | <b>21. (*)</b> | <b>VG</b>     | <b>Head: shape in longitudinal section</b>   |  |      |
| <b>PQ</b>      |                | <b>(a)</b>    | ovate  | Rossa di Verona precoce                              | 1    |
|                |                |               | oblate   | Palla rossa 5  | 2    |
|                |                |               | circular   | Variegata di Chioggia                                | 3    |
| <b>G</b>       |                |               | elliptic   | Pan di zucchero,<br>Rossa di Treviso precoce         | 4    |
| <b>23. (+)</b> | <b>22. (*)</b> | <b>VG</b>     | <b>Head: shape of upper part</b>   |  |      |
| <b>QN</b>      |                | <b>(a)</b>    | flattened  | Variegata di Lusia                                   | 1    |
|                |                |               | rounded  | Lava, Palla rossa 2,<br>Variegata di Chioggia        | 2    |
|                |                |               | pointed  | Pan di zucchero, Granato,<br>Rossa di Verona precoce | 3    |
| <b>24. (+)</b> | <b>23. (+)</b> | <b>VG</b>     | <b><u>Only varieties with Plant: head formation: closed:</u> Head: degree of overlapping of upper part of leaves</b> |  |      |
| <b>QN</b>      |                | <b>(a)</b>    | very weak  | Pan di zucchero                                      | 1    |
|                |                |               | weak   | Bianca invernale                                     | 3    |
|                |                |               | medium   | Nerone, Rossini                                      | 5    |
|                |                |               | strong   | Rossa di Verona precoce                              | 7    |
|                |                |               | very strong  | Tobago   | 9    |
| <b>25. (+)</b> | <b>24. (*)</b> | <b>VG</b>     | <b>Head: anthocyanin coloration of cover leaves</b>  |  |      |
| <b>QL</b>      |                | <b>(a)</b>    | absent   | Pan di zucchero                                      | 1    |
|                |                |               | present  | Variegata di Chioggia,<br>Variegata di Lusia         | 9    |

| CPVO N°            | UPOV N°            | Stage, Method | Characteristics   | Examples  | Note |
|--------------------|--------------------|---------------|---|---|------|
| <b>26.</b>         | <b>25.</b><br>(* ) | <b>VG</b>     | <b>Head: colour of cover leaves</b>                                     |   |      |
| <b>PQ</b>          |                    | <b>(a)</b>    | whitish green   | Variegata di Chioggia   | 1    |
|                    |                    |               | yellowish green   | Bianca invernale,<br>Variegata di Lusia                                 | 2    |
|                    |                    |               | light green   | A grumolo bionda, Pan di<br>zucchero                                    | 3    |
|                    |                    |               | medium green  | A grumolo verde   | 4    |
|                    |                    |               | dark green  | A grumolo verde scuro,<br>Catalogna puntarelle a foglia<br>frastagliata | 5    |
|                    |                    |               | light red   | Rosa  | 6    |
|                    |                    |               | medium red  | Rossa di Verona precoce   | 7    |
|                    |                    |               | dark red  | Nerone, Rosa isontina   | 8    |
| <b>27.</b>         | <b>26.</b><br>(* ) | <b>VG</b>     | <b>Head: distribution of anthocyanin<br/>coloration of cover leaves</b> |   |      |
| <b>PQ</b>          |                    | <b>(a)</b>    | entire  | Rosa isontina   | 1    |
|                    |                    |               | diffused only   | Palla rossa 2   | 2    |
|                    |                    |               | in patches only   | Variegata di Castelfranco   | 3    |
|                    |                    |               | diffused and in patches   | Variegata di Chioggia   | 4    |
|                    |                    |               | densely speckled  | Tauro   | 5    |
| <b>28.</b><br>(* ) | <b>27.</b>         | <b>VG</b>     | <b>Plant: formation of stem</b>   |   |      |
| <b>QL</b>          |                    | <b>(a)</b>    | absent  | Palla rossa 2   | 1    |
|                    |                    |               | present   | Catalogna puntarelle a foglia<br>frastagliata                           | 9    |
| <b>29.</b>         | <b>28.</b>         | <b>VG</b>     | <b>Stem: degree of fasciation</b>                                       |   |      |
| <b>QN</b>          |                    | <b>(a)</b>    | weak  | Catalogna puntarelle a foglia<br>stretta                                | 3    |
|                    |                    |               | medium  | Catalogna puntarelle a foglia<br>frastagliata                           | 5    |
|                    |                    |               | strong  | Catalogna puntarelle di Galatina  | 7    |

| <b>CPVO<br/>N°</b> | <b>UPOV<br/>N°</b> | <b>Stage,<br/>Method</b> | <b>Characteristics</b>              | <b>Examples</b>             | <b>Note</b> |
|--------------------|--------------------|--------------------------|-------------------------------------|-----------------------------|-------------|
| <b>30.</b>         | <b>29.</b>         | <b>VG</b>                | <b>Flower: colour</b>               |                             |             |
| <b>QL</b>          |                    |                          | white                               | Koryvos                     | 1           |
|                    |                    |                          | blue                                | Barbe de Capucin            | 2           |
| <b>31.</b>         | <b>30.</b>         | <b>MG/VG</b>             | <b>Time of beginning of bolting</b> |                             |             |
| <b>QN</b>          |                    |                          | very early                          | Koryvos, Catalogna pugliese | 1           |
|                    |                    |                          | early                               | Poncho                      | 3           |
|                    |                    |                          | medium                              |                             | 5           |
|                    |                    |                          | late                                | Rosa isontina, TT506        | 7           |
|                    |                    |                          | very late                           | TT706                       | 9           |

## **8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS**

### **8.1 Explanations covering several characteristics**

Characteristics containing the following key in the third column of the Table of Characteristics should be examined as indicated below:







- a) Plant and head: Observations on the plant should be made just at harvest maturity stage that is specific to the plant types: Chioggia, Verona, Pain de sucre / Pan di Zucchero, Variegata and Rossa di Treviso (early type) are harvested when a head has been formed; Catalogna puntarelle is harvested when stems (puntarelle shoots) are formed and the leaves development is complete.  
All over types: when the leaves are at the stage of complete growth.
- b) Observations should be made on leaves excluding the outer and centre leaves and midrib.

### **8.2 Explanations for individual characteristics**

Ad. 1: Young plant: anthocyanin coloration at 5-6 leaf stage

Observations should be made at 5-6 leaf stage.

Ad. 6: Leaf: shape

|                            | <- broadest part ->   |  |
|----------------------------|---|--|
|                            | at middle   | above middle   |
| width (ratio length/width) |   |  |
| narrow (high)              | <br>5<br>narrow elliptic | <br>6<br>oblanceolate |
| medium (medium)            | <br>4<br>medium elliptic |  |
|                            | <br>3<br>broad elliptic |  |
|                            | <br>2<br>circular      |  |
|                            | <br>1<br>broad oblate  |  |
| broad (low)                |   |  |

Ad. 8: Leaf: colour

To observe the total area excluding midrib.

Ad. 9: Leaf: anthocyanin distribution



1  
diffused only



2  
in patches only



3  
diffused and in patches

Ad. 16: Leaf: type of incisions of margin



1  
sinuate



2  
dentate



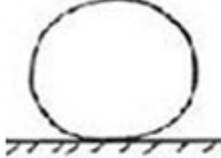



3  
serrate

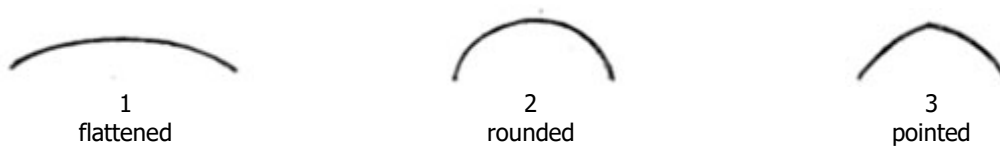
Ad. 18: Time of head formation

Time of head formation is assessed by counting the number of days between the transplanting into the field and the harvest maturity period (when the observation on head should be made). The translation of this number to a level of expression of the scale is based on the example varieties.

Ad. 22: Head: shape in longitudinal section

|                            | <- broadest part ->   |  |
|----------------------------|---|--|
|                            | below middle  | at middle  |
| width (ratio length/width) |   |  |
| narrow (high)              |   | <br>4<br>elliptic |
| medium (medium)            | <br>1<br>ovate | <br>3<br>circular |
| broad (low)                |   | <br>2<br>oblate |

Ad. 23: Head: shape of upper part



Ad. 24: Only varieties with Plant: head formation: closed: Head: degree of overlapping of upper part of leaves

Observations should be made on leaves at the heart of the plant to form a head.



### 8.3 Leaf chicory types

1. Chioggia



in development



at maturity

2. Verona



in development



at maturity

3. Rossa di Treviso precoce



in development



at maturity

4. Pan di zucchero/Pain de sucre



5. Bianca di Milano



6. Bianca invernale



7. Variegata di Castelfranco



in development



at maturity

8. Variegata di Lusia



in development



at maturity

9. Variegata di Chioggia



10. A grumolo verde



11. Améliorée blonde or verte



Améliorée blonde



Améliorée verte

12. Rosa isontina



13. Rossa di Treviso 2



in development



at maturity

14. Catalogna



Catalogna del Veneto



Spadona



Clio

15. Catalogna Puntarelle



Catalogna puntarelle a foglia frastagliata



Catalogna puntarelle di Galatina

16. Barbe de Capucin



## 9. LITERATURE

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## **10. TECHNICAL QUESTIONNAIRE**

The Technical Questionnaire is available on the CPVO website under the following reference:  
CPVO-TQ/154/1 Rev.