CPVO · OCVV
Community Plant Variety Office
Office Communautaire des Variétés Végétales

PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Cynara cardunculus L.

ARTICHOKE, CARDOON

UPOV Code: CYNAR_CAR

Adopted on 27/02/2013

Entry into force on 27/02/2013

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CPVO-TP/184/2

1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to all varieties of ***Cynara cardunculus* L**.

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/en/publications/intro_dus.htm), its associated TGP documents (http://www.upov.int/en/publications/tgp/) and the relevant UPOV Test Guideline TG/184/4 dated 20/10/2011 (link to provide) for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on **27.02.2013**. 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://www.cpvo.europa.eu/main/en/home/documents-and-publications/s2-gazette 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 cycles.

The two independent growing cycles should be in the form of two separate plantings.

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/export/sites/upov/en/publications/tgp/documents/tgp_9_1.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

3.4.1 Each test should be designed to result in a total of at least 40 plants, divided between at least two replicates.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

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

(a) Fruit species and seed propagated agricultural and vegetable species
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.

(b) Vegetatively propagated agricultural and vegetable species
The variety collection shall comprise variety descriptions; no living reference collection is required. 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

(a) Fruit species and seed propagated agricultural and vegetable species
The EO shall collect and maintain living plant material of varieties of the species concerned in the variety collection.

(b) Vegetatively propagated agricultural and vegetable species and ornamental species
The EO shall obtain living plant material of reference varieties as and when those varieties need to be included in growing trials or other tests.

3.6.3 Range of the variety collection

Outdoor grown fruit species and seed-propagated agricultural and vegetable species
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

(a) Seed propagated species
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.

(b) Vegetatively propagated species
The EO shall maintain the variety collection under appropriate growing conditions (e.g. glasshouse, orchard, in vitro), where it shall be ensured that the plants are adequately irrigated, fertilised, pruned and protected from harmful pests and diseases. 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 or by checking the identity of the new material against the variety description.

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/export/sites/upov/en/publications/tgp/documents/tgp_9_1.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.

Decision standards

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 10 plants or parts taken from each of 10 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

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/export/sites/upov/en/publications/tgp/documents/tgp_10_1.pdf) prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in this Technical Protocol:

(a) Cross-pollinated varieties: The assessment of uniformity for cross-pollinated varieties should be according to the recommendations for cross-pollinated varieties in the UPOV-General Introduction to DUS.

(b) Inbred lines and hybrids: For the assessment of uniformity for inbred lines and hybrid varieties, a population standard of 5% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 40 plants, 4 off-types are allowed. In addition, for hybrids, the same population standard and acceptance probability should be applied to clearly recognisable indred plants. In the case of a sample size of 40 plants, 4 clearly recognisable inbred plants would be allowed.

(c) Vegetatively propagated varieties: For the assessment of uniformity of vegetatively propagated varieties, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 40 plants, 2 off-types are allowed.

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/export/sites/upov/en/publications/tgp/documents/tgp_11_1.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 or plant 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.

The following characteristics are used for grouping of varieties into Artichoke or Cardoon:

(a) Midrib: thickness at 35 cm from base (characteristic 14)

(b) Main stem: height from base to central flower head (characteristic 18)

(c) Main stem: diameter (characteristic 19)

(d) Central flower head: length (characteristic 20)

(e) Central flower head: diameter (characteristic 21)

(f) Outer bract: thickness at base (characteristic 39)

(g) Plant: number of lateral heads on main stem (characteristic 40)

The following have been agreed as useful grouping characteristics within Artichoke:

(a) Leaf: intensity of lobing (characteristic 3)

(b) Artichoke varieties only: Main stem: time of beginning of elongation (characteristic 17)

(c) Artichoke varieties only: Main stem: height from base to central flower head (characteristic 18.1)

(d) Artichoke varieties only: Central flower head: shape in longitudinal section (characteristic 22)

(e) Artichoke varieties only: Outer bract: violet colour on external side (characteristic 30)

The following have been agreed as useful grouping characteristics within Cardoon:

(a) Leaf: intensity of lobing (characteristic 3)

(b) Cardoon varieties only: Midrib: colour (characteristic 9)

(c) Midrib: length of spines (characteristic 16)

(d) Cardoon varieties only: Main stem: height from base to central flower head (characteristic 18.2)

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.

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.

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

G	Grouping characteristic	– see Chapter 5
(*)	Asterisked characteristic	– see Chapter 6.1.2
MG, MS, VG, VS	– see Chapter 4.1.5	
QL	Qualitative characteristic	
QN	Quantitative characteristic	
PQ	Pseudo-qualitative characteristic	

Legend: Explanations covering several characteristics

(a)-{d}	See Explanations on the Table of Characteristics in Chapter 8.1
(+)	See Explanations on the Table of Characteristics in Chapter 8.

7. TABLE OF CHARACTERISTICS

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
1.1	**1.1**	**VG/MS**	**<u>Artichoke varieties only</u>: Plant: height**		
QN		**(a)**	short		3
			medium	Vert Globe (A)	5
			tall	Madrigal (A)	7
1.2	**1.2**	**VG/MS**	**<u>Cardoon varieties only</u>: Plant: height**		
QN		**(a)**	short		3
			medium	Rouge d'Alger (C)	5
			tall	Verde de Peralta (C)	7
2.	**2.**	**VG**	**Leaf: attitude**		
QN		**(a)**	erect	Pètre (A), Vert de Provence (A), Vert de Vaulx en Velin (C)	1
			semi erect	Camus de Bretagne (A), Olympus (A), Plein blanc amélioré (C)	3
			horizontal	Blanc hyérois (A), Symphony (A)	5
3.	**3. (*)**	**VG**	**Leaf: intensity of lobing**		
(+)		**(a)**	weak	Blanca de Tudela (A), Plein blanc amélioré Puvis (C), Violet de Provence (A)	3
QN			medium	Ateca (C), Loma (A), Plein blanc amélioré (C)	5
G			strong	Opal (A), Vert de Vaulx en Velin (C)	7
4.	**4.**	**VG**	**Lobe: shape of tip (excluding terminal lobe)**		
(+)		**(b)**	narrow acute	Ateca (C), Matterhorn (A), Vert de Vaulx en Velin (C)	1
PQ		**(c)**	broad acute	Plein blanc amélioré (C)	2
			rounded		3

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
5.	**5.**	**VG**	**Lobe: number of secondary lobes**		
(+)		**(a)**	absent or very few	Plein blanc amélioré (C), Puvis (C), Violet de Provence (A)	1
QN			few	Camus de Bretagne (A), Matterhorn (A), Rouge d'Alger (C)	3
			medium	Blanc hyérois (A), Popvert (A), Vert de Vaulx en Velin (C)	5
			many	Opal (A)	7
			very many		9
6.	**6.**	**VG**	**Leaf blade: blistering**		
QN		**(a)**	weak	Blanc hyérois (A), Matterhorn (A), Plein blanc amélioré (C)	3
			medium	Calico (A), Rouge d'Alger (C)	5
			strong	Chrysanthème (A), Harmony (A),	7
7.	**7.**	**VG**	**Leaf blade: colour**		
PQ		**(a)**	yellow green	Bianco avorio a foglia frastagliata (C), Blanc hyérois (A)	1
			light green	Salambo (A)	2
			medium green	Plein blanc amélioré (C)	3
			dark green	Madrigal (A)	4
			grey green	Camus de Bretagne (A), Symphony (A), Vert de Vaulx en Velin (C)	5
8.	**8.**	**VG**	**<u>Artichoke varieties only</u>: Midrib: anthocyanin coloration at base**		
QN		**(a)**	absent or very weak	Blanca de Tudela	1
			weak	Castel, Loma	3
			medium	Adir, Opal, Pètre	5
			strong	Violet de Provence	7
			very strong		9

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
9.	**9. (*)**	**VG**	**<u>Cardoon varieties only</u>: Midrib: colour**		
PQ		**(a)**	whitish	Plein blanc amélioré	1
			light green	Vert de Vaulx en Velin	2
			medium green		3
			dark green		4
			light red		5
			mediuim red		6
G			dark red	Rouge d'Alger	7
10.	**10.**	**VG/MS**	**<u>Cardoon varieties only</u>: Midrib: length free of leaflets**		
QN		**(a)**	short		3
			medium		5
			long		7
11.	**11.**	**VG/MS**	**<u>Cardoon varieties only</u>: Midrib: length from base to apex**		
(+)		**(a)**	short		3
QN			medium	Gigante di Romagna, Vert de Vaulx en Velin	5
			long	Ateca	7
12.	**12.**	**VG/MS**	**<u>Cardoon varieties only</u>: Midrib: width at 5cm from base**		
(+)		**(a)**	narrow		3
QN			medium	Vert de Vaulx en Velin	5
			broad	Plein blanc amélioré	7
13.	**13.**	**VG/MS**	**<u>Cardoon varieties only</u>: Midrib: width at 35cm from base**		
(+)		**(a)**	narrow		3
QN			medium	Vert de Vaulx en Velin	5
			broad	Verde de Peralta	7

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
14.	**14. (*)**	**VG/MS**	**Midrib: thickness at 35 cm from base**		
(+)		**(a)**	very thin	Matterhorn (A),Violet de Camargue (A)	1
QN			thin	Opal (A),	3
			medium	Plein blanc amélioré Puvis (C)	5
			thick	Plein blanc amélioré (C)	7
G			very thick	Verde de Peralta (C)	9
15.	**15.**	**VG**	**<u>Cardoon varieties only</u>: Midrib: profile of inner side at 5cm from base**		
QN		**(a)**	slightly concave	Plein blanc amélioré	3
			moderately concave	Rouge d'Alger	5
			trongly concave		7
16.	**16. (*)**	**VG/MG**	**Midrib: length of spines**		
(+)		**(a)**	absent or very short	Bianco inerma (C), Madrigal (A)	1
QN			short	Castel (A), Plein blanc amélioré (C)	3
			medium	Vert de Vaulx en Velin (C), Violet de Provence (C)	5
G			long	Epineux argenté de Plainpalais (C), Spinoso Sardo (A)	7
17.	**17. (*)**	**MG**	**<u>Artichoke varieties only</u>: Main stem: time of beginning of elongation**		
(+)			early	Blanca de Tudela	3
QN			medium	Opal	5
G			late	Madrigal	7

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
18.		**VG/MS**	**Main stem: height from base to central flower head**		
			very short		1
			very short to short	Blanca de Tuleda (A), Opal (A)	2
			short		3
			short to medium	Madrigal (A), Matterhorn (A)	4
			medium		5
			medium to tall	Olympus (A), Cynamed (C)	6
			tall	Plein blanc amélioré Puvis (C)	7
			tall to very tall	Plein blanc amélioré (C)	8
			very tall	Ateca (C)	9
18.1	**18.1**	**VG/MS**	**<u>Artichoke varieties only</u>: Main stem: height from base to central flower head**		
QN		**(b)**	short	Blanca de Tudela, Opal	3
			medium	Madrigal, Matterhorn	5
			tall	Olympus	7
18.2	**18.2**	**VG/MS**	**<u>Cardoon varieties only</u>: Main stem: height from base to central flower head**		
QN		**(b)**	short		3
			medium	Plein blanc amélioré, Puvis	5
			tall	Ateca	7
19.	**19. (*)**	**VG/MS**	**Main stem: diameter**		
(+)		**(b)**	small		3
QN			medium		5
G			large		7
20.	**20. (*)**	**VG/MS**	**Central flower head: length**		
QN		**(b)**	short	Ateca (C)	3
			medium	Imperial Star (A)	5
G			long	Adir (A)	7

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
21.	**21. (*)**	**VG/MS**	**Central flower head: diameter**		
QN		**(b)**	small	Ateca (C)	3
			medium		5
G			large	Matterhorn (A)	7
22.	**22. (*)**	**VG/MS**	**Artichoke varieties only: Central flower head: shape in longitudinal section**		
(+)		**(b)**	triangular	Violet de Provence	1
PQ			ovate	Madrigal, Opal	2
			oblong	Chrysanthème	3
			circular		4
G			oblate		5
23.	**23.**	**VG**	**Artichoke varieties only: Central flower head: shape of apex**		
(+)		**(b)**	acute	Violet de Provence	1
PQ			rounded	Camus de Bretagne, Concerto, Madrigal	2
			flat	Chrysanthème	3
			depressed	Pètre	4
24.	**24.**	**VG**	**Artichoke varieties only: Central flower head: anthocyanin coloration of inner bracts**		
QN		**(c)**	absent or very weak	Popvert	1
			weak	Catsel, Harmony, Madrigal, Opal	3
			medium	Blanc hyérois, Matterhorn	5
			strong	Chrysanthème	7
			very strong	Salambo	9
25.	**25.**	**VG**	**Artichoke varieties only: Central flower head: density of inner bracts**		
(+)		**(c)**	sparse		3
QN			medium	Blanca de Tudela, Camus de Bretagne	5
			dense	Madrigal	7

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
26.	**26.**	**VG**	**Artichoke varieties only: Receptacle: diameter**		
(+)		**(c)**	small	Violet de Provence	3
QN			medium	Camus de Bretagne, Opal	5
			large	Salambo	7
27.	**27.**	**VG/MS**	**Artichoke varieties only: Receptacle: thickness**		
(+)		**(c)**	thin	Blanc hyérois, Blanca de Tudela	3
QN			medium	Daniel, Pètre	5
			thick	Camus de Bretagne, Castel	7
28.	**28.**	**VG**	**Artichoke varieties only: Receptacle: shape in longitudinal section**		
(+)		**(c)**	flat or slightly depressed		1
QN			moderately depressed	Camus de Bretagne, Salambo, Tempo	2
			strongly depressed	Blanc hyérois, Imperial Star	3
29.	**29.**	**MG/ MS**	**Artichoke varieties only: Central flower head: time of beginning of opening**		
(+)			early	Chrysanthème, Imperial Star, Loma	3
QN			medium	Camus de Bretagne	5
			late	Blanca de Tudela, Madrigal, Popvert	7
30.	**30. (*)**	**VG**	**Artichoke varieties only: Outer bract: violet colour on external side**		
(+)		**(d)**	absent or very weak	Harmony	1
PQ			weak	Violet de Provence	2
			medium	Chrysanthème	3
			strong	Concerto, Salambo	4
G			very strong	Velours	5
31.	**31.**	**VG**	**Artichoke varieties only: Outer bract: coloration of apex on external side**		
(+)		**(d)**	green	Calico	1
QL			bronze	Blanc hyérois, Sakiz	2
			grey	Camus de Bretagne	3

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
32.	**32. (*)**	**VG**	**Artichoke varieties only: Outer bract: shape of apex**		
(+)		**(d)**	acute	Harmony, Spinoso Sardo	1
PQ			flat	Concerto, Talpiot	2
			emarginate	Chrysanthème, Imperial Star, Madrigal, Matterhorn	3
33.	**33.**	**VG**	**Artichoke varieties only: Outer bract: depth of emargination**		
(+)		**(d)**	shallow	Castel, Pyrenees, Violet de Provence	1
QN			medium	Blanc hyérois, Monquelina	3
			deep	Chrysanthème, Imperial Star	5
34.	**34.**	**VG**	**Artichoke varieties only: Outer bract: reflexing of tip**		
(+)		**(d)**	inwards	Chrysanthème	1
QN			straight	Castel, Violet de Provence	2
			outwards	Olympus	3
35.	**35. (*)**	**VG**	**Artichoke varieties only: Outer bract: length of spine**		
QN		**(d)**	absent or very short	Matterhorn, Opal	1
			short	Chrysanthème, Pyrenees	3
			medium	Violet de Provence	5
			long	Spinoso Sardo	7
			very long		9
36.	**36.**	**VG**	**Artichoke varieties only: Outer bract: mucron**		
(+)			absent	Chrysanthème, Pyrenees	1
QL			present	Camus de Bretagne	9
37.	**37. (*)**	**VG**	**Artichoke varieties only: Outer bract: shape**		
QN		**(d)**	broader then long	Calico, Cric, Pètre	1
			as broad as long	Camus de Bretagne, Pètre	2
			longer than broad	Harmony, Vert de Provence	3

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
38.	**38.**	**VG/MS**	**<u>Artichoke varieties only</u>: Outer bract: length of base**		
(+)		**(d)**	short		3
QN			medium		5
			long		7
39.	**39. (*)**	**VG/MG**	**Outer bract: thickness at base**		
(+)		**(d)**	thin		1
QN			medium	Blanc hyérois (A), Imperial Star (A), Popvert (A)	2
G			thick	Pètre (A)	3
40.	**40. (*)**	**VG/MS**	**Plant: number of lateral heads on main stem**		
QN			very few		1
			few	Blanc hyérois (A)	3
			medium	Salambo (A)	5
			many	Chrysanthème (A)	7
G			very many	Cynamed (C)	9

8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS

Key for grouping varieties into artichoke and cardoon

- to classify varieties as Artichoke if at least one characteristic is in the Artichoke zone and no characteristics are in the Cardoon zone (in the grey zone for all other characteristics)

- to classify as Cardoon if at least one characteristic is in the Cardoon zone and no characteristics in the Artichoke zone (in the grey zone for all other characteristics)

- in all other cases the variety to be grown in both Artichoke and Cardoon trials.

The following characteristics are used for grouping of varieties into Artichoke or Cardoon:

Characteristic 14: Midrib: thickness at 35 cm from base	
1 2	Artichoke
3 4 5 6	
7 8 9	Cardoon
Characteristic 18: Main stem: height from base to central flower head	
1 2 3 4 5	Artichoke
6 7	
8 9	Cardoon
Characteristic 19: Main stem: diameter	
1 2	Cardoon
3 4 5	
6 7 8 9	Artichoke
Characteristic 20: Central flower head: length	
1 2 3	Cardoon
4 5	
6	Artichoke

7 8 9	
Characteristic 21: Central flower head: diameter	
1 2 3	Cardoon
4 5	
6 7 8 9	Artichoke
Characteristic 39: Outer bract: thickness at base	
1 2	Cardoon
3 4	
5 6 7 8 9	Artichoke
Characteristic 40: Plant: number of lateral heads on main stem	
1 2 3 4	Artichoke
5 6 7	
8 9	Cardoon

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) Characteristics on plant, foliage (leaf, leaf blade and midrib = the central vein of the leaf, running down the centre of the blade) should be observed at fully vegetative development, just after the first flower head appears, but before the main flowering stem starts to elongate. Observations should be made at 10-12 leaves-stage on the 3rd-4th whorl of leaves from the base of the plant.

(b) Characteristics on the main flowering stem and central flower head should be observed at the harvest stage of the central flower head (largest size of central flower head just before reflexing of lower part of bracts).

(c) These characteristics should be observed on harvested central flower heads, cut in longitudinal section.

(d) Characteristics on the outer bract should be observed on the 5th whorl of bracts from the base of the central flower head (close to the middle third of the flower head).

8.2 Explanations for individual characteristics

Ad. 3: Leaf: intensity of lobing

It includes the number of the primary lobes and the secondary lobes of the leaf.

3
weak

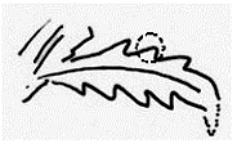
5
medium

7
strong

Ad. 4: Lobe: shape of tip (excluding terminal lobe)

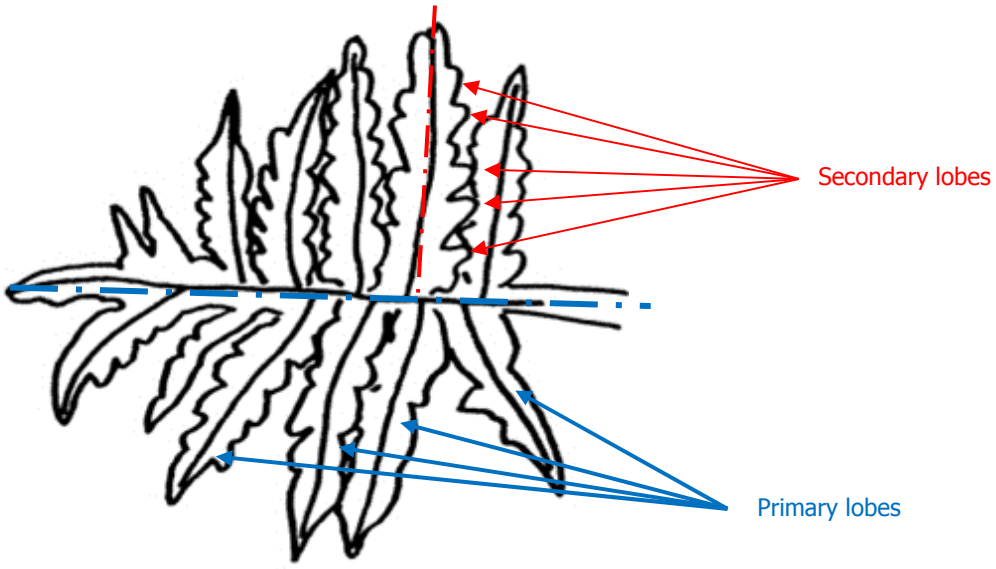
1
narrow acute

2
broad acute



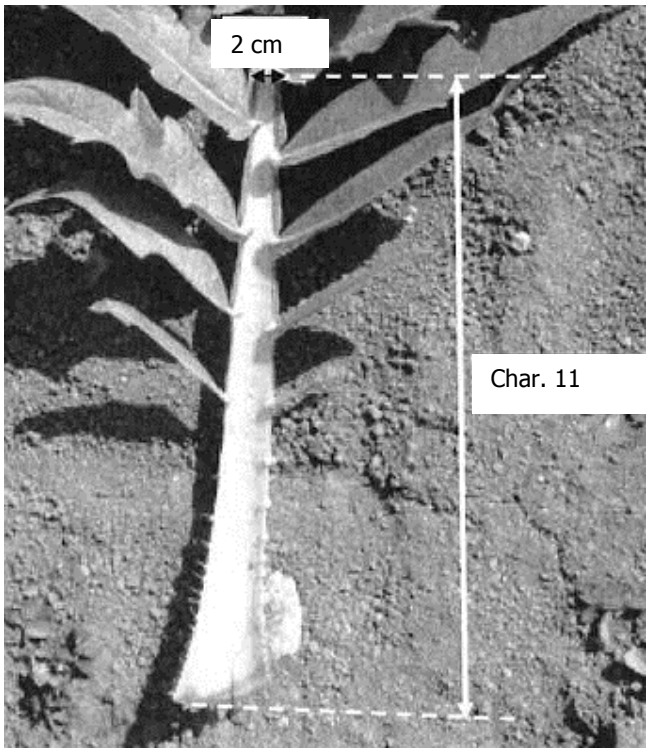
3
rounded

Ad. 5: Lobe: number of secondary lobes

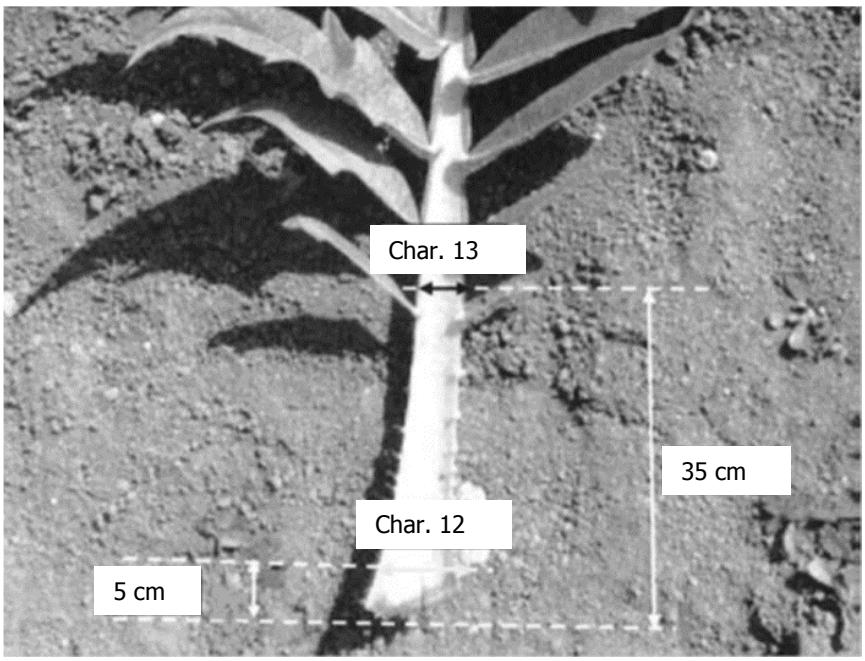


Ad. 11: Cardoon varieties only: Midrib: length from base to apex

The length of the midrib is estimated by the distance between the base of the leaf to the point at 2 cm width on the rib.



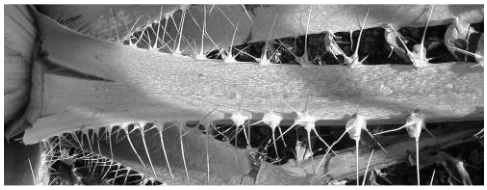
Ad. 12: Cardoon varieties only: Midrib: width at 5 cm from base
Ad. 13: Cardoon varieties only: Midrib: width at 35 cm from base



Ad. 14: Midrib: thickness at 35 cm from base

1	3	5	7	9
very thin	thin	medium	thick	very thick

Ad. 16: Midrib: length of spines

short	3	
medium	5	
long	7	

Ad. 17: Artichoke varieties only: Main stem: time of beginning of elongation

The time of beginning of elongation is when the flower stem emerges from the rosette of leaves.

The functioning of the cauline apex dominates the whole life of the plant. After forming a rosette of leaves, its transformation leads to the development of a complex form of inflorescence: a cyme of flower heads.

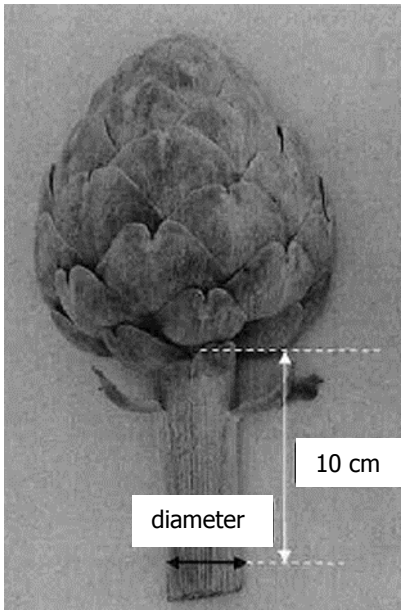
According to Foury (1967), there are six phenological stages during floral organogenesis. The two first stages clearly define the development of the flowering stem.

Stage A: Completely enveloped by the leaves, the main stem is still very short. The head is palpable at the bottom of the rosette.

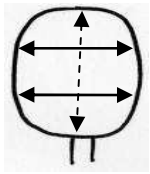
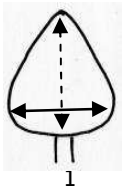
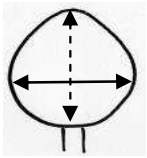
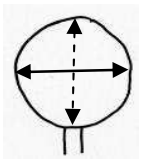
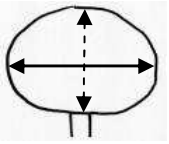
Stage B: The growth of the main stem and the deployment of the leaves show the flower head in the centre of the rosette of leaves.

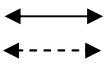
Ad. 19: Main stem: diameter

The main stem diameter can be measured with a calliper at 10 cm below the central flower head, at the stage of its full physiological development (harvest stage).



Ad. 22: Artichoke varieties only: Central flower head: shape in longitudinal section

		Position of the broadest part		
		below middle		**at middle**
		clearly	slightly	
Ratio length / width	elongated			 oblong
		 1 triangular	 2 ovate	 4 circular
	compressed			 5 oblate

 Maximum diameter = d
Maximum height = h

Ad. 23: Artichoke varieties only: Central flower head: shape of apex

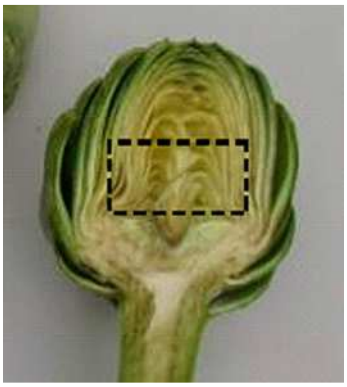

1
acute


2
rounded

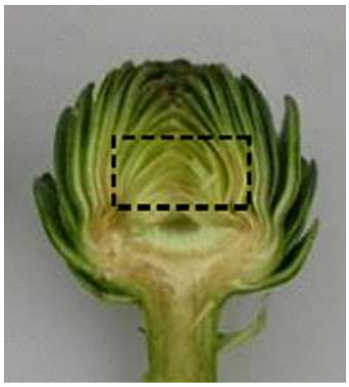

3
flat


4
depressed

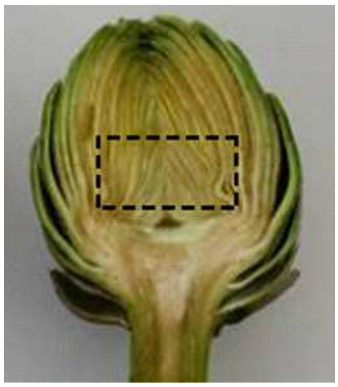
Ad. 25: Artichoke varieties only: Central flower head: density of inner bracts



3
sparse

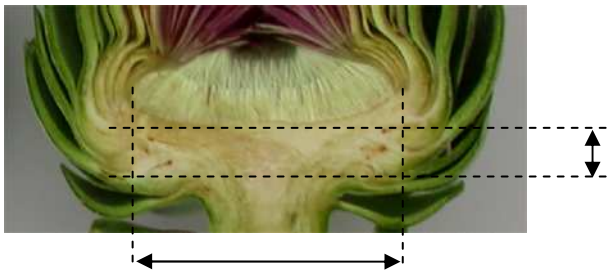


5
medium



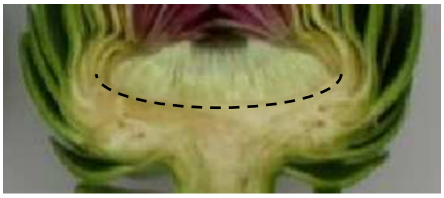
7
dense

Ad. 26: Artichoke varieties only: Receptacle: diameter
Ad. 27: Artichoke varieties only: Receptacle: thickness

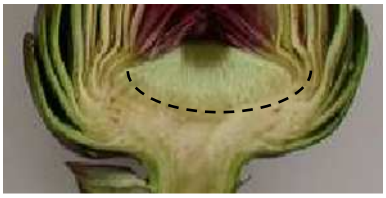


Char. 26

Ad. 28: Artichoke varieties only: Receptacle: shape in longitudinal section



1
flat or slightly depressed



2
moderately depressed

3
strongly depressed

Ad. 29: Artichoke varieties only: Central flower head: time of beginning of opening

The time of beginning of opening of the central flower head is when the central flower head has opened on 50% of plants

Ad. 30: Artichoke varieties only: Outer bract: violet colour on external side

1 absent or very weak | 2 weak | 3 medium | 4 strong | 5 very strong

Ad. 31: Artichoke varieties only: Outer bract: colour of apex on external side

1 green | 2 bronze | 3 grey

Ad. 32: Artichoke varieties only: Outer bract: shape of apex

1 acute | 2 flat | 3 emarginate

Ad. 33: Artichoke varieties only: Outer bract: depth of emargination

1 shallow | 3 medium | 5 deep

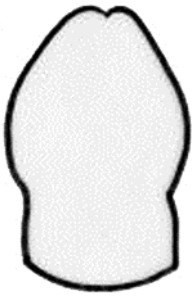
Ad. 34: Artichoke varieties only: Outer bract: reflexing of tip

1
inwards

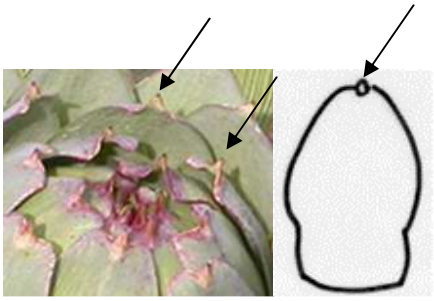
2
straight

3
outwards

Ad. 36: Artichoke varieties only: Outer bract: mucron

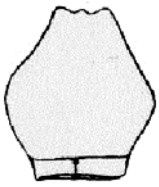


1
absent

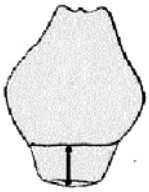


9
present

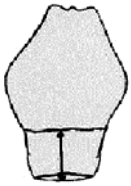
Ad. 38: Artichoke varieties only: Outer bract: length of base



3
short



5
medium



7
long

Ad. 39: Outer bract: thickness at base

1
thin

2
medium

3
thick

9. LITERATURE

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10. TECHNICAL QUESTIONNAIRE

CPVO · OCVV
Community Plant Variety Office
Office Communautaire des Variétés Végétales

TECHNICAL QUESTIONNAIRE

to be completed in connection with an application for Community Plant Variety Rights
Please answer all questions. A question without any answer will lead to a non-attribution of an application date. In cases where a field / question is not applicable, please state so.

1. **Botanical taxon:** Name of the genus, species or sub-species to which the variety belongs and common name

Cynara cardunculus **L.**

[ ] GLOBE ARTICHOKE

[ ] CARDOON

2. **Applicant(s):** Name(s) and address(es), phone and fax number(s), Email address, and where appropriate name and address of the procedural representative

3. **Variety denomination**

a) Where appropriate proposal for a variety denomination:

b) Provisional designation (breeder's reference):

4. Information on the breeding scheme and propagation of the variety

4.1 Method of maintenance and reproduction

a) i) hybrid [...]

ii) open-pollinated variety [...]

iii) parent line [...]

b) (ii) seed propagated [...]

(iii) vegetatively propagated [...]

c) Other information on genetic origin and breeding method

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in the CPVO Protocol; please mark the state of expression which best corresponds).

Characteristics	Example varieties	Note
5.1 (3) Leaf: intensity of lobing		
very weak		1 [ ]
very weak to weak		2 [ ]
weak	Blanca de Tudela (A), Violet de Provence (A), Plein blanc amélioré Puvis (C)	3 [ ]
weak to medium		4 [ ]
medium	Ateca (C), Loma (A), Plein blanc amélioré (C)	5 [ ]
medium to strong		6 [ ]
strong	Opal (A), Vert de Vaulx en Velin (C)	7 [ ]
strong to very strong		8 [ ]
very strong		9 [ ]

	Characteristics	Example varieties	Note
5.2 (14)	**Midrib: thickness at 35 cm from base**		
	very thin	Matterhorn (A), Violet de Camargue (A)	1 [ ]
	very thin to thin		2 [ ]
	thin	Opal (A)	3 [ ]
	thin to medium	Vert de Vaulx en Velin (C)	4 [ ]
	medium	Plein blanc amélioré Puvis (C)	5 [ ]
	medium to thick	Menuet (A),	6 [ ]
	thick	Plein blanc amélioré (C)	7 [ ]
	thick to very thick		8 [ ]
	very thick	Verde de Peralta (C)	9 [ ]
5.3 (16)	**Midrib: length of spines**		
	absent or very short	Bianco inerma (C), Madrigal (A)	1 [ ]
	very short to short		2 [ ]
	short	Castel (A), Plein blanc amélioré (C)	3 [ ]
	short to medium		4 [ ]
	medium	Vert de Vaulx en Velin (C), Violet de Provence (C)	5 [ ]
	medium to long		6 [ ]
	long	Epineux argenté de Plainpalais (C), Spinoso Sardo (A)	7 [ ]
	long to very long		8 [ ]
	very long		9 [ ]

	Characteristics	Example varieties	Note
5.4 (19)	**Main stem: diameter**		
	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 [ ]
5.5 (20)	**Central flower head: length**		
	very short		1 [ ]
	very short to short		2 [ ]
	short	Ateca (C)	3 [ ]
	short to medium		4 [ ]
	medium	Imperial Star (A)	5 [ ]
	medium to long		6 [ ]
	long	Adir (A)	7 [ ]
	long to very long		8 [ ]
	very long		9 [ ]

	Characteristics	Example varieties	Note
5.6 (21)	**Central flower head: diameter**		
	very small		1 [ ]
	very small to small		2 [ ]
	small	Ateca (C)	3 [ ]
	small to medium		4 [ ]
	medium		5 [ ]
	medium to large		6 [ ]
	large	Matterhorn (A)	7 [ ]
	large to very large		8 [ ]
	very large		9 [ ]
5.7 (39)	**Outer bract: thickness at base**		
	thin		1 [ ]
	medium	Blanc hyérois, Imperial Star, Popvert	2 [ ]
	thick	Pètre	3 [ ]
5.8 (40)	**Plant: number of lateral heads on main stem**		
	very few		1 [ ]
	very few to few		2 [ ]
	few	Blanc hyérois	3 [ ]
	few to medium		4 [ ]
	medium	Salambo	5 [ ]
	medium to many		6 [ ]
	many	Chrysanthème	7 [ ]
	many to very many		8 [ ]
	very many	Cynamed	9 [ ]

	Characteristics	Example varieties	Note
5.9 (17)	**<u>Artichoke varieties only</u>: Main stem: time of beginning of elongation**		
	very early		1 [ ]
	very early to early		2 [ ]
	early	Blanca de Tudela	3 [ ]
	early to medium		4 [ ]
	medium	Opal	5 [ ]
	medium to late		6 [ ]
	late	Madrigal	7 [ ]
	late to very late		8 [ ]
	very late		9 [ ]
5.10 (18.1)	**<u>Artichoke varieties only</u>: Main stem: height from base to central flower head**		
	very short		1 [ ]
	very short to short		2 [ ]
	short	Blanca de Tudela, Opal	3 [ ]
	short to medium		4 [ ]
	medium	Madrigal, Matterhorn	5 [ ]
	medium to tall		6 [ ]
	tall	Olympus	7 [ ]
	tall to very tall		8 [ ]
	very tall		9 [ ]
5.11 (22)	**<u>Artichoke varieties only</u>: Central flower head: shape in longitudinal section**		
	triangular	Violet de Provence	1 [ ]
	ovate	Madrigal, Opal	2 [ ]
	oblong	Chrysanthème	3 [ ]
	circular		4 [ ]
	oblate		5 [ ]

Characteristics		Example varieties	Note
5.12 (30)	**<u>Artichoke varieties only</u>: Outer bract: violet colour on external side**		
	absent or very weak	Harmony	1 [ ]
	weak	Violet de Provence	2 [ ]
	medium	Chrysanthème	3 [ ]
	strong	Concerto, Salambo	4 [ ]
	very strong	Velours	5 [ ]
5.13 (9)	**<u>Cardoon varieties only</u>: Midrib: colour**		
	whitish	Plein blanc amélioré	1 [ ]
	light green	Vert de Vaulx en Velin	2 [ ]
	medium green		3 [ ]
	dark green		4 [ ]
	light red		5 [ ]
	medium red		6 [ ]
	dark red	Rouge d'Alger	7 [ ]
5.14 (18.2)	**<u>Cardoon varieties only</u>: Main stem: height from base to central flower head**		
	very short		1 [ ]
	very short to short		2 [ ]
	short		3 [ ]
	short to medium		4 [ ]
	medium	Plein blanc amélioré Puvis	5 [ ]
	medium to tall		6 [ ]
	tall	Ateca	7 [ ]
	tall to very tall		8 [ ]
	very tall		9 [ ]

6. Similar varieties and differences from these varieties:

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination of similar variety	Characteristic in which the similar variety is different[1)]	State of expression of similar variety	State of expression of candidate variety

[1)] In the case of identical states of expressions of both varieties, please indicate the size of the difference

7. Additional information which may help in the examination of the variety

7.1 Resistance to pests and diseases

[ ] YES, please specify

[ ] NO

7.2 In addition to the information provided in sections 5 and 6, are there any other characteristics which may help to distinguish the variety?

[ ] YES, please specify

[ ] NO

7.3 Are there any special conditions for growing the variety or conducting the examination?

[ ] YES, please specify

[ ] NO

7.4 Other information

[ ] YES, please specify

[ ] NO

7.5 Photo

It is recommended to provide a representative colour image of the variety to accompany the Technical Questionnaire

8. GMO-information required

The variety represents a Genetically Modified Organism within the meaning of Article 2(2) of Council Directive EC/2001/18 of 12/03/2001.

[ ] YES [ ] NO

If yes, please add a copy of the written attestation of the responsible authorities stating that a technical examination of the variety under Articles 55 and 56 of the Basic Regulation does not pose risks to the environment according to the norms of the above-mentioned Directive.

9. Information on plant material to be examined

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 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 the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a) Microorganisms (e.g. virus, bacteria, phytoplasma)	[ ] Yes	[ ] No
(b) Chemical treatment (e.g. growth retardant or pesticide)	[ ] Yes	[ ] No
(c) Tissue culture	[ ] Yes	[ ] No
(d) Other factors	[ ] Yes	[ ] No

Please provide details of where you have indicated "Yes":

10. Possible place of the technical examination

In case the CPVO needs to arrange a technical examination for this candidate variety, there might be more than one examination office entrusted by the CPVO suitable to grow your variety. In this case, the Office will decide on the place of the technical examination but you might wish to express here a preference in respect of an examination office. The available entrusted examination offices for that species can be found in the S2 Gazette under
http://www.cpvo.europa.eu/main/en/home/documents-and-publications/s2-gazette

I/we hereby declare that to the best of my/our knowledge the information given in this form is complete and correct.

Date Signature Name

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