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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

ARTICHOKE, CARDOON *

UPOV Code: CYNAR_CAR

Cynara cardunculus L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from France

to be considered by

the Technical Working Party for Vegetables
at its forty-fourth session, to be held in Veliko Tarnovo, Bulgaria,from July 5 to 9, 2010

*Alternative Names:**

Botanical name	*English*	*French*	*German*	*Spanish*
Cynara cardunculus L.	Globe artichoke, Artichoke Cardoon	Artichaut Cardon		

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

~~Other associated UPOV documents: { GN 2 (Cover page) – Associated Documents }~~

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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highlighting: amendments in accordance with document TGP/7/2

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Cynara cardunculus* L..

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of seed (seed propagated varieties) or plant (vegetatively propagated varieties).

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

a) seed propagated varieties: 67 g or 1400 seeds
b) vegetatively propagated varieties: 60 plants.

In the case of seed, the seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should be stated by the applicant.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 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.

3. Method of Examination

3.1 Number of Growing Cycles

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

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”.

3.3 Conditions for Conducting the Examination

3.3.1 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.

~~3.3.2 The recommended method of observing the characteristic is indicated by the following key in the second column of the Table 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~~

3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 40 plants, which should be 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

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

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 Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.1.4 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations for the purposes of distinctness should be made on 10 plants or parts taken from each of 10 plants, 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 second 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. color 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 these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

(a) Cross-pollinated varieties

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

(b) Hybrid varieties/Inbred lines

4.2.3 For the assessment of uniformity of inbred lines or hybrids, 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 a population standard of 5% with the same acceptance probability should be applied to clearly recognizable inbred plants. In the case of a sample size of 40 plants, the additional maximum number of clearly recognizable inbred plants allowed would be 4.

(c) Vegetatively propagated varieties

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

- Leaf: intensity of lobbing (characteristic 4)
- Petiole: thickness at 35 cm from base (characteristic 15)
- Main stem: diameter (at about 10 cm below central flower head) (characteristic 20)
- Central flower head: length (characteristic 21)
- Central flower head: diameter (characteristic 22)
- Outer bract: thickness at base (characteristic 40)
- Plant: number of lateral heads on main stem (characteristic 41)

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

(a) Central flower head: time of appearance (characteristic 18)
(b) Central flower head: shape in longitudinal section (characteristic 23)
(c) Outer bract: color (external side) (characteristic 31)

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

(a) Petiole: color (characteristic 10)
(b) Petiole: length of spines (characteristic 17)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 "Examining Distinctness".

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.2.2 In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), 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

6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 “Development of Test Guidelines”.

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

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

6.5 Legend

(*) Asterisked characteristic – see Chapter 6.1.2

QL: Qualitative characteristic – see Chapter 6.3
QN: Quantitative characteristic – see Chapter 6.3
PQ: Pseudo-qualitative characteristic – see Chapter 6.3

MG, MS, VG, VS: See Chapter ~~3.3.2~~ 4.1.5

(a)~~, (b), (c), -~~ (d) See Explanations on the Table of Characteristics in Chapter 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8.2

Example varieties
(A): Artichoke
(C): Cardoon

7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1-1.	**VG/ MG**	**Artichoke varieties only: Plant: height**					
QN	**(a)**	short					3
		medium				Vert Globe	5
		tall				Madrigal	7
1-2.	**VG/ MG**	**Cardoon varieties only: Plant: height**					
QN	**(a)**	short					3
		medium				Rouge d'Alger	5
		tall				Verde de Peralta	7
2.	**VG**	**Leaf: attitude**					
		erect				Pètre (A), Vert de Provence (A), Vert de Vaulx en Velin (C)	1
QN	**(a)**	semi-erect				Olympus (A), Camus de Bretagne (A), Plein blanc amélioré (C)	3
		horizontal				Symphony (A), Blanc Hyerois (A)	5
~~**3. (*)**~~	~~**VG**~~	~~**Leaf: length of spines**~~	-	-	-	-	-
~~(+)~~		~~absent to very short~~				~~Madrigal (A)~~	~~1~~
~~**QN**~~	~~**(a)**~~	~~short~~				~~Loma (A), Plein blanc amélioré (C)~~	~~3~~
		~~medium~~					~~5~~
		~~long~~				~~Epineux argenté de Plainpalais (C)~~	~~7~~
		~~very long~~	-	-	-		~~9~~

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4. **(*)** (+)	**VG/ MG**	**Leaf: intensity of lobing**					
QN	**(a)**	weak				Blanca de Tudela (A), Violet de Provence (A), Plein blanc amélioré Puvis (C)	3
		medium				Loma (A), Plein blanc amélioré (C), Ateca (C)	5
		strong				Opal (A), Vert de Vaulx en Velin (C)	7
5. **(+)**	**VG**	**Lobe: shape of tip (excluding terminal lobe)**					
QL	**(a)**	narrow acute				Matterhorn (A), Vert de Vaulx en Velin (C), Ateca (C)	1
		broad acute				Plein blanc amélioré (C)	2
		rounded					3
6. **(+)**	**VG/ MG**	**Lobe: number of secondary lobes**					
QN	**(a)**	absent or very few				Violet de Provence (A), Plein blanc amélioré Puvis (C)	1
		few				Matterhorn (A), Camus de Bretagne (A), Rouge d'Alger (C)	3
		medium				Blanc Hyerois (A), Popvert (A), Vert de Vaulx en Velin (C)	5
		many				Opal (A)	7
		very many					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7.	**VG**	**Leaf blade: blistering**					
QN	**(a)**	weak				Matterhorn (A), Blanc Hyerois (A), Plein blanc amélioré (C)	3
		medium				Calico (A), Rouge d'Alger (C)	5
		strong				Harmony (A), Chrysanthème (A)	7
8.	**VG**	**Leaf blade: color**					
PQ	**(a)**	yellow green				Blanc Hyerois (A), Bianco avorio a foglia frastagliata (C)	1
		ligth green				Salambo (A)	2
		medium green				Plein blanc amélioré (C)	3
		dark green				Madrigal (A)	4
		grey green				Symphony (A), Camus de Bretagne (A), Vert de Vaulx en Velin (C)	5
9.	**VG**	**Artichoke varieities only: Petiole: anthocyanin coloration at base**					
QN	**(a)**	absent or very weak				Blanca de Tudela	1
		weak				Loma, Castel	3
		medium				Opal, Pètre, Adir	5
		strong				Violet de Provence	7
		very strong					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. (*)	**VS**	**Cardoon varieties only: Petiole: color**					
PQ	**(a)**	whitish				Plein blanc amélioré	1
mod		~~light~~ green				Vert de Vaulx en Velin	2
		~~medium green~~					
		~~dark green~~					
		~~light red~~					
		~~medium red~~					
		~~dark~~ red				Rouge d'Alger	3
11.	**VG/ MG**	**Cardoon varieties only: Petiole: length free of leaflets**					
QN	**(a)**	short					3
		medium					5
		long					7
12.	**VG/ MG**	**Cardoon varieties only: Petiole: length of edible part**					
QN	**(a)**	short					3
		medium				Gigante di Romagna, Vert de Vaulx en Velin	5
		long				Ateca	7
13.	**VG/ MG**	**Cardoon varieties only: Petiole: width at 5cm from base**					
QN	**(a)**	narrow					3
		medium				Vert de Vaulx en Velin	5
		broad				Plein blanc amélioré	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14.	**VG/ MG**	**Cardoon varieties only: Petiole: width at 35cm from base**					
QN	**(a)**	narrow					3
		medium				Vert de Vaulx en Velin	5
		broad				Verde de Peralta	7
15. (*)	**VG/ MG**	**Petiole: thickness at 35cm from base**					
QN	**(a)**	very thin					1
		thin					3
		medium				Vert de Vaulx en Velin	5
		thick					7
		very thick					9
16.	**VG/ MG**	**Cardoon varieties only: Petiole: profile of inner side at 5cm from base**					
QN	**(a)**	slightly concave				Plein blanc amélioré	3
		moderately concave				Rouge d'Alger	5
		strongly concave					7
		~~*For CARDOON varieties only:*~~ **~~Petiole: hollowing~~**					
17. **(*)** **(+)**	**VG/ MG**	~~*For CARDOON varieties only:*~~ **Petiole: length of spines**					
QN	**(a)**	short				Plein blanc amélioré	3
		medium				Vert de Vaulx en Velin	5
		long				Epineux argenté de Plainpalais	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. (*) (+)	**VG/ MG**	**Artichoke varieties only: Central flower head: time of appearance**					
QN	**(a)**	early				Blanca de Tudela	3
		medium				Opal	5
		late				Madrigal	7
19-1.	**VG/ MG**	**Artichoke varieties only: Main stem: height from base to central flower head**					
QN	**(b)**	short				Opal, Blanca de Tudela	3
		medium				Matterhorn, Madrigal	5
		tall				Olympus	7
19-2.	**VG/ MG**	**Cardoon varieties only: Main stem: height from base to central flower head**					
QN	**(b)**	short					3
		medium				Plein blanc amélioré, Puvis	5
		tall				Ateca	7
20. (*)	**VG/ MG**	**Main stem: diameter (at about 10 cm below central flower head)**					
QN	**(b)**	small					3
		medium					5
		large					7
21. (*)	**VG/ MG**	**Central flower head: length**					
QN	**(b)**	short				Ateca (C)	3
		medium				Imperial Star (A)	5
		long				Adir (A)	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
22. **(*)**	**VG/ MG**	**Central flower head: diameter**					
QN	**(b)**	small				Ateca (C)	3
		medium					5
		large				Matterhorn (A)	7
23. **(*)** **(+)**	**VG**	**Artichoke varieties only: Central flower head: shape in longitudinal section**					
PQ	**(b)**	circular					1
mod		elliptic				Chrysanthème	2
		medium ovate				Opal, Magrigal	3
		triangular				Violet de Provence	4
		oblate					5
24. **(+)**	**VG**	**Artichoke varieties only: Central flower head: shape of tip**					
QL	**(b)**	acute				Violet de Provence	1
mod		rounded				Camus de Bretagne, Concerto, Madrigal	2
		flat				Chrysanthème	3
		depressed				Pètre	4
25.	**VG**	**Artichoke varieties only: Central flower head: anthocyanin coloration of inner bracts**					
QN	**(c)**	absent or very weak				Popvert	1
mod		weak				Harmony,Madrigal, Opal, Catsel	3
		medium				Matterhorn, Blanc Hyerois	5
		strong				Chrysanthème	7
		very strong				Salambo	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26. **(+)**	**VG**	**Artichoke varieties only: Central flower head: density of inner bracts**					
QN	**(c)**	sparse					3
		medium				Blanca de Tudela, Camus de Bretagne	5
		dense				Madrigal	7
27. **(+)**	**VG/ MG**	**Artichoke varieties only: Receptacle: diameter**					
QN	**(c)**	small				Violet de Provence	3
		medium				Camus de Bretagne, Opal	5
		large				Salambo	7
28. **(+)**	**VG/ MG**	**Artichoke varieties only: Receptacle: thickness**					
QN	**(c)**	thin				Blanc Hyerois, Blanca de Tudela	3
		medium				Daniel, Pètre	5
		thick				Camus de Bretagne, Castel	7
29. **(+)**	**VG**	**Artichoke varieties only: Receptacle: shape in longitudinal section**					
QN	**(c)**	flat					1
		slightly depressed				Camus de Bretagne, Salambo, Tempo	2
		strongly depressed				Blanc Hyerois, Imperial Star	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30. **(+)**	**VG/ MG**	**Artichoke varieties only: Central flower head: time of beginning of opening**					
QN		early				Chrysanthème, Imperial Star, Loma	3
		medium				Camus de Bretagne	5
		late				Blanca de Tudela, Madrigal, Popvert	7
31. **(*)** **(+)**	**VG**	**Artichoke varieties only: Outer bract: color (external side)**					
PQ	**(d)**	green				Blanc Hyerois, Blanca de Tudela, Harmony	1
		green with violet stripes				Violet de Provence	2
mod		green with violet blush				Opal??	3
		violet with green stripes				Chrysanthème	4
		mainly violet				Cric, Salambo, Concerto	5
		entirely violet				Velours	6
32.	**VG**	**Artichoke varieties only: Outer bract: hue of color (external side)**					
QL	**(d)**	absent				Calico	1
		bronze				Blanc Hyerois, Sakiz	2
		grey				Camus de Bretagne	3
33. **(*)** **(+)**	**VG**	**Artichoke varieties only: Outer bract: shape of apex**					
QL	**(d)**	acute				Harmony, Spinoso Sardo	1
		flat				Concerto, Talpiot	2
		emarginate				Chrysanthème, Imperial Star, Madrigal, Matterhorn	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
34. **(+)**	**VG**	**Artichoke varieties only: Outer bract: depth of emargination**					
QN	**(d)**	shallow				Castel, Pyrenees, Violet de Provence	3
		medium				Blanc Hyerois, Monquelina	5
		deep				Chrysanthème, Imperial Star	7
35. **(+)**	**VG**	**Artichoke varieties only: Outer bract: reflexing of tip**					
PQ	**(d)**	reflexed towards center of flower head				Chrysanthème	1
		straight				Castel, Violet de Provence	2
		reflexed towards outside of the flower head				Olympus	3
36. **(*)**	**VG**	**Artichoke varieties only: Outer bract: length of spine**					
QN	**(d)**	absent or very short				Matterhorn, Opal	1
mod		short				Chrysanthème, Pyrenees	3
		medium				Violet de Provence	5
		long				Spinoso Sardo	7
		very long					9
37. **(+)**	**VG**	**Artichoke varieties only: Outer bract: mucron**					
QL	**(d)**	absent				Chrysanthème, Pyrenees	1
		present				Camus de Bretagne	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
38. (*)	**VG**	**Artichoke varieties only: Outer bract: shape**					
QN	**(d)**	broader than long				Calico, Cric, Pètre	1
		as broad as long				Camus de Bretagne, Pètre	2
		longer than broad				Harmony, Vert de Provence	3
39. (+)	**VG/ MG**	**Artichoke varieties only: Outer bract: length of base**					
QN	**(d)**	short					3
		medium					5
		long					7
40. (*) (+)	**VG/ MG**	**Outer bract: thickness at base**					
QN	**(d)**	very thin					1
		thin					3
		medium				Blanc Hyerois, Imperial Star, Popvert,	5
		thick				Pètre	7
		very thick					9
41. (*) (+)	**VG/ MG**	~~***For ARTICHOKE varieties only:***~~ **Plant: number of lateral heads on main stem**					
QN		very few					1
		few					3
		medium					5
		many					7
		very many					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
42.	**VG/ MG**	**Artichoke varieties only: Tendancy to produce lateral shoots at base**					
QN		weak				Madrigal, Matterhorn, Blanc Hyerois, Castel	3
		medium				Harmony, Violet de Provence, Chrysanthème, Popvert	5
		strong				Blanca de Tudela	7

8. Explanations on the Table of Characteristics

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

Characteristic 15 (*): **Petiole: thickness at 35 cm from base**

1
2 } Artichoke
3
4
5
6 } Cardoon
7
8
9

Characteristic 20 (*): **Main stem: diameter (at about 10 cm below central flower head)**

1
2 } Cardoon
3
4
5
6 } Artichoke
7
8
9

Characteristic 21 (*): **Central flower head: length**

1
2 } Cardoon
3
4
5
6 } Artichoke
7
8
9

Characteristic 22 (*): **Central flower head: diameter**

1
2 } Cardoon
3
4
5
6 } Artichoke
7

Characteristic 40 (*): Outer bract: thickness at base

1		
2		Cardoon
3		
4		
5		
6		Artichoke
7		
8		
9		

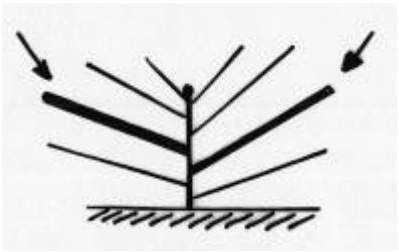
Characteristic 41 (*): Plant: number of lateral heads on main stem

1		
2		Artichoke
3		
4		
5		
6		Cardoon
7		
8		
9		

8.1 Explanations covering several characteristics

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

(a) Characteristics on **plant, foliage (leaf, leaf blade and petiole**) which have to be described at fully vegetative development, just after the first flower head appears, but before the main flowering stem starts to stretch. Stage 10-12 leaves = on the 3rd – 4th whorl of leaves from the base of the plant.



(b) Characteristics on **the main flowering stem and central flower head** have to be described at the harvest stage of the central flower head (before opening).

(c) All these characteristics have to be described on **harvested central flower heads**, cut in **longitudinal section.**

(d) All these characteristics on **the outer bracts** have to be described **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: length of spines

FR: I propose to delete this characteristic, and to extend the Char 17: Petiole: length of spines to the Cardoon AND the Artichoke. The length of spines on leaf and petiole is correlated.

Not yet available

1	3	5	7	9
absent or very short	short	medium	long	very long

Ad. 4: Leaf: intensity of lobing

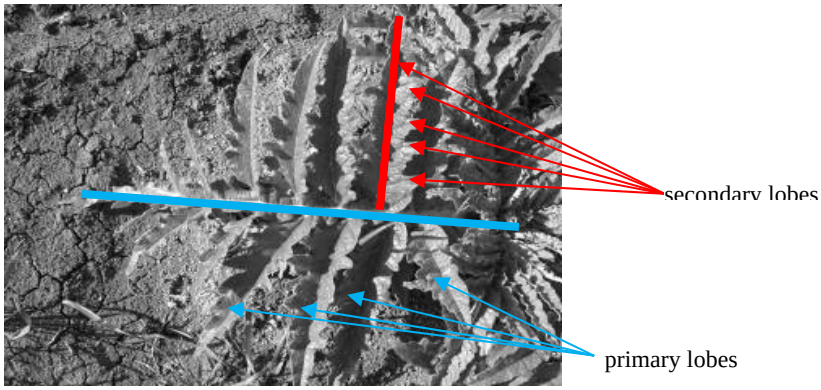
It includes the number of the primary lobes AND the secondary lobes of the leaf.

3	5	7
weak	medium	strong

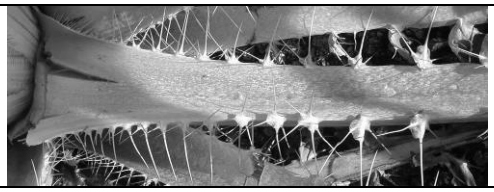
Ad. 5: Lobe: shape of tip (excluding terminal lobe)

1	2	3
narrow acute	broad acute	rounded

Ad. 6: Lobe: number of secondary lobes

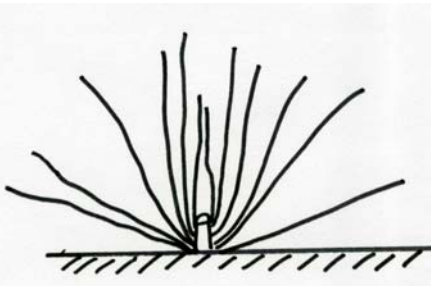


Ad. 17: ~~*For Cardoon varieties only:*~~ Petiole: length of spines

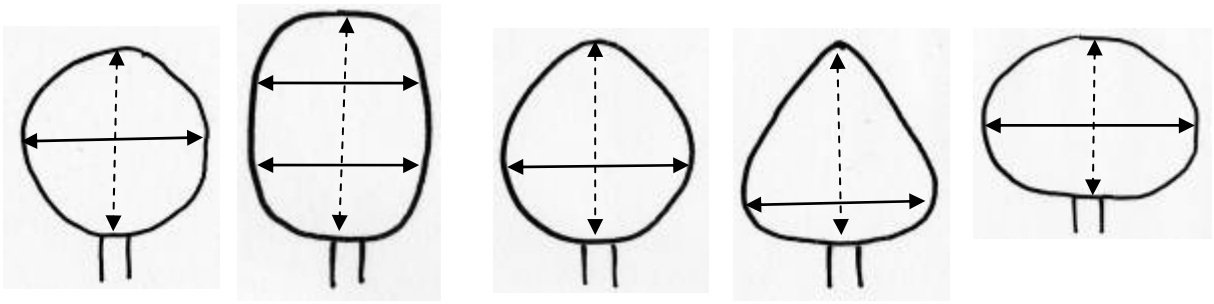
short	3	
medium	5	
long	7	

Ad. 18: Artichoke varieties only: Central flower head: time of appearance

It corresponds to the first phenological stage - stage A – described by Foury (1967). Completely wrapped in the leaves, the main stem is still very short. The central flower head is perceptible to the touch at the bottom of the rosette.

Ad. 23: Artichoke varieties only: Central flower head: shape in longitudinal section



1 circular | 2 elliptic | 3 medium ovate | 4 triangular | 5 oblate

1. circular : d ~ h
2. elliptic: d1 ~ d2 << h
3. ovate: d is in the medium third of the flower head height
4. triangular: d is in the basal third of the flower head height
5. oblate: d >> h

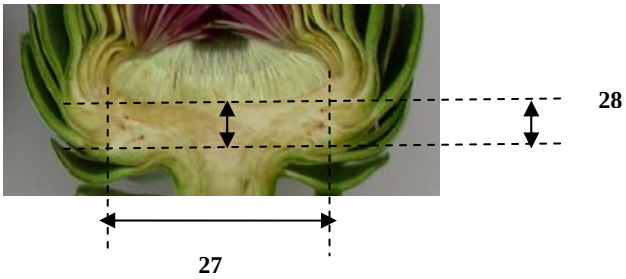
Ad.24: Artichoke varieties only: Central flower head: shape of tip

1 acute | 2 rounded | 3 flat | 4 depressed

Ad.26: Artichoke varieties only: Central flower head: density of inner bract

3 sparse | 5 medium | 7 dense

Ad. 27: Artichoke varieties only: Receptacle: diameter (27)
Ad. 28: Artichoke varieties only: Receptacel: thickness (28)



Ad. 29: Artichoke varieties only: Receptacle: shape in longitudinal section

3
flat

5
slightly depressed

7
strongly depressed

Ad. 31: Artichoke varieties only: Outer bract: color (external side

1
green

2
green with violet stripes

3
green with violet blush

4
violet with green stripes

5
mainly violet

6
entirely violet

Ad. 32: Artichoke varieties only: Outer bract: hue of color (external side)

The hue “bonze” - state 2, char 32- can be superposed on a green or a violet background.

	
on a green background	on a violet background

Ad. 33: Artichoke varieties only: Outer bract: shape of apex

Type Spinoso sardo
To provide (IT?)

1
acute

2
flat

3
emarginate

Ad. 34: Artichoke varieties only: Outer bract: depth of emargination

3
shallow

5
medium

7
deep

Ad. 35: Artichoke varieties only: Outer bract: reflexing of tip




1
reflexed towards center of flower head


2
straight


3
reflexed towards outside of flower head

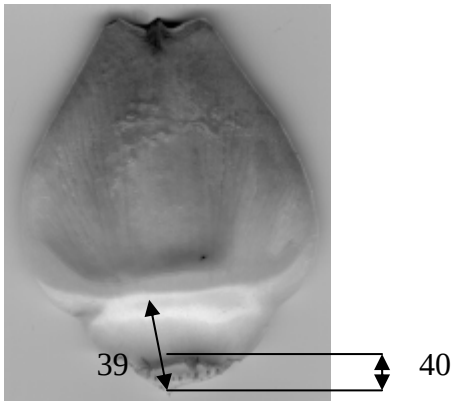
Ad. 37: Artichoke varieties only: Outer bract: mucron


1
absent

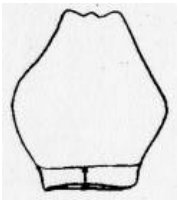
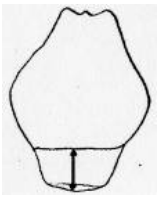
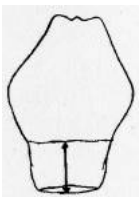

9
present

Ad. 39: Artichoke varieties only: Outer bract: length

Ad. 40: Artichoke varieties only: Outer bract:: thickness of base



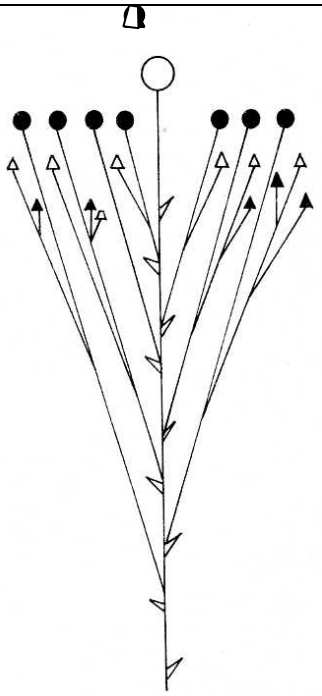
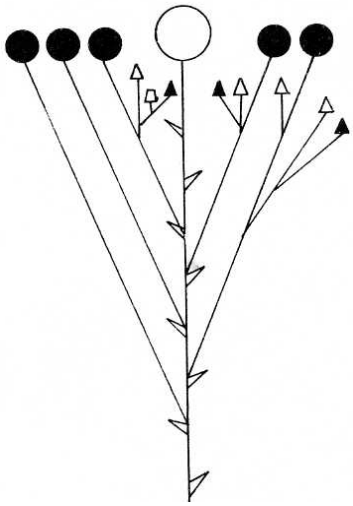
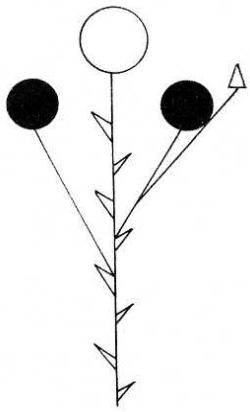
Ad. 39: Artichoke varieties only: Outer bract: length of base

		
3	5	7
short	medium	long

Ad. 40: Artichoke varieties only: Outer bract: thickness of base

		
3	5	7
thin	medium	thick

Ad. 41: Plant: number of lateral heads on main stem

		Flower heads order 1 = 2 = 3 = 4 = 5 = 
Cardoon type	interspecific hybrid type	Artichoke type

Source: Foury C., Ann. Amélior. Plantes (1969).

9. Literature

Baznizky, J. et Zohary, D. 1994 : Breeding of seed-planted artichoke. Plant Breeding Reviews 12: 253-267

Bravi, R., Saccardo et al. [---] to complete

Doré, C., Varoquaux, F. co-ordinators 2006 : Histoire et amélioration de cinquante plantes cultivées, chap. Artichaut : 71-83

Foury, C. 1967 : Étude de la biologie florale de l'artichaut (*Cynara scolymus* L.); Application à la sélection. 1re partie : données sur la biologie florale, Ann. Amélior. Plantes 17 (4): 357-373

Foury, C. 1969 : Étude de la biologie florale de l'artichaut (*Cynara scolymus* L.); Application à la sélection. 2e partie : étude des descendances obtenues en fécondation contrôlée, Ann. Amélior. Plantes 19 (1): 23-52

Foury, C. et Aubert, S. 1977 : Observations préliminaires sur la présence et la répartition de pigments anthocyaniques dans un mutant d'artichaut (*Cynara scolymus* L.) à fleurs blanches, Ann. Amélior. Plantes 27 (5): 603-612

Foury, C. 1978 : Quelques aspects de l'histoire des variétés d'artichaut (*Cynara scolymus* L.), Journal d'agric. traditionnelle et de botanique appliquée, XXV (1) janvier-mars 1978

Foury, C. 1979 : Quelques aspects pratiques de la sélection généalogique de l'artichaut, 1-Présentation, création de lignées, Ann. Amélior. Plantes 29 (4): 383-418

Foury, C. 1989 : Ressources génétiques et diversification de l'artichaut (*Cynara scolymus* L.), Acta Horticulturae 242: 155-166

Pécaut, P. et Martin F. 1993 : Variation occuring after natural and *in vitro* multiplication of early Mediterranean cultivars of globe artichoke *Cynara scolymus* L. Agronomie 13: 909-919

Péron, J.Y. 2006: Références productions légumières, 2ème edition. chap. Artichaut :150-159

Péron, J.Y. 2006: Références productions légumières, 2ème édition. chap. Cardon :194-197

Zohary, D. et Basnizky J. 1975 : The cultivated artichoke – *Cynara scolymus* L. Its probable wild ancestors. Economic Botany 29: 233-235

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire (please indicate the relevant species)

1.1 Botanical name	*Cynara cardunculus* L.
1.2 Common name	[ ] Globe artichoke [ ] Cardoon

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]
(please state parent varieties)

(……..……..…)	x	(……..……..…)
female parent		male parent

(b) partially known cross [ ]
(please state known parent variety(ies))

(……..……..…)	x	(……..……..…)
female parent		male parent

(c) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.4 Other [ ]
(please provide details)”

(please provide details)

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

4.2 Method of propagating the variety

(a) Vegetative propagation [ ]

(b) Seed propagation
- Hybrid [ ]
- Parental line [ ]
- Open pollinated [ ]

(c) Other [ ]
(please provide details) [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
	Whatever it is a CARDOON or an ARTICHOKE variety		
5.1 (4)	**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	Loma (A), Plein blanc amélioré (C), Ateca (C)	5 [ ]
	medium to strong		6 [ ]
	strong	Opal (A), Vert de Vaulx en Velin (C)	7 [ ]
	strong to very strong		8 [ ]
	very strong		9 [ ]
5.2 (15)	**Petiole: thickness at 35cm from base**		
	very thin		1 [ ]
	very thin to thin		2 [ ]
	thin		3 [ ]
	thin to medium		4 [ ]
	medium	Vert de Vaulx en Velin	5 [ ]
	medium to thick		6 [ ]
	thick		7 [ ]
	thick to very thick		8 [ ]
	very thick		9 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
5.3 (20)	**Main stem: diameter (at about 10 cm below central flower head)**		
	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 [ ]
5.4 (21)	**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 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
	Whatever it is a CARDOON or an ARTICHOKE variety		
5.5 (22)	**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 [ ]
5.6 (40)	**Outer bract: thickness at base**		
	very thin		1 [ ]
	very thin to thin		2 [ ]
	thin		3 [ ]
	thin to medium		4 [ ]
	medium	Blanc Hyerois, Imperial Star, Pètre, Popvert	5 [ ]
	medium to thick		6 [ ]
	thick	Pètre	7 [ ]
	thick to very thick		8 [ ]
	very thick		9 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
	Whatever it is a CARDOON or an ARTICHOKE variety		
5.7 (41)	**Plant: number of lateral heads on main stem**		
	very few		1 [ ]
	very few to few		2 [ ]
	few		3 [ ]
	few to medium		4 [ ]
	medium		5 [ ]
	medium to many		6 [ ]
	many		7 [ ]
	many to very mane		8 [ ]
	very many		9 [ ]
	If it is declared as a CARDOON variety		
5.8a (10)	**<u>Cardoon varieties only</u>: Petiole: color**		
	whitish	Plein blanc amélioré	1 [ ]
	green	Vert de Vaulx en Velin	2 [ ]
	red	Rouge d'Alger	3 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
	If it is declared as a CARDOON variety		
5.9a (17)	**Cardoon varieties only: Petiole: length of spines**		
	very short		1 [ ]
	very short to short		2 [ ]
	short	Plein balnc amélioré	3 [ ]
	short to medium		4 [ ]
	medium	Vert de Vaulx en Velin (C)	5 [ ]
	medium to long		6 [ ]
	long	Epineux argenté de Plainpalais (C)	7 [ ]
	long to very long		8 [ ]
	very long		9 [ ]
	If it is declared as an ARTICHOKE variety		
5.8b (18)	**Artichoke varieties only: Central flower head: time of appearance**		
	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 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
	If it is declared as an ARTICHOKE variety		
5.9b (23)	**<u>Artichoke varieties only</u>: Central flower head: shape in longitudinal section**		
	circular		1 [ ]
	elliptic	Chrysanthème	2 [ ]
	medium ovate	Opal, Madrigal	3 [ ]
	triangular	Vilet de Provence	4 [ ]
	oblate		5 [ ]
5.10b (31)	**<u>Artichoke varieties only</u>: Outer bract: color (external side)**		
	green		1 [ ]
	green with violet stripes		2 [ ]
	green with violet blush		3 [ ]
	violet with green stripes		4 [ ]
	mainly violet		5 [ ]
	entirely violet		6 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

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(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	Leaf: intensity of lobing	weak	medium

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

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

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

Yes [ ] No [ ]

(If yes, please provide details)

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

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

A representative color image of the variety should accompany the Technical Questionnaire.

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

9. Information on plant material to be examined or submitted for examination.

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, pesticide) Yes [ ] No [ ]

(c) Tissue culture Yes [ ] No [ ]

(d) Other factors Yes [ ] No [ ]

Please provide details for where you have indicated “yes”.

……

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant’s name

Signature Date

[End of document]