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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

ECHINACEA

UPOV Code(s): ECNCE

Echinacea Moench.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from United Kingdom
to be considered by the
Technical Working Party for Ornamental Plants and Forest Trees
at its fifty-third session, to be held in Roelofarendsveen, Netherlands,
from 2021-06-07 to 2021-06-11

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Echinacea Moench.	Echinacea, Cone Flower	Échinacée	Echinacea, Igelkopf	Equinácea

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

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP 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.]

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Echinacea* Moench.

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 young plants, or seed.

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

vegetatively propagated varieties: 10 young plants
seed propagated varieties: a sufficient quantity of seed to produce 40 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.

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

3.1.1 The minimum duration of tests should normally be a single growing cycle.

3.1.2 The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

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 Because daylight varies, color determinations made against a color chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform with the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background. The color chart and version used should be specified in the variety description.

3.4 Test Design

3.4.1 In the case of vegetatively propagated varieties, each test should be designed to result in a total of at least 10 plants.

3.4.2 In the case of seed-propagated varieties, each test should be designed to result in a total of at least 40 plants which should be divided between at least 2 replicates.

3.4.3 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 or Parts of Plants to be Examined

In the case of vegetatively propagated varieties, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 9 plants or parts taken from each of 9 plants and any other observation made on all plants in the test, disregarding any off-type plants.

In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 1.

In the case of seed-propagated varieties, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 30 plants or parts taken from each of 30 plants and any other observation made on all plants in the test, disregarding any off-type plants.

In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 1.

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 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:

4.2.2 These Test Guidelines have been developed for the examination of vegetatively propagated and cross-pollinated seed propagated varieties. For varieties with other types of propagation, the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species" Section 4.5 "Testing Uniformity" should be followed.

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

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 10 plants, 1 off-type is 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 have been agreed as useful grouping characteristics:

(a) Plant: height (characteristic 2)
(b) Leaf: variegation (characteristic 11)
(c) Ray floret: main color of inner side (characteristic 28)
with the following groups:
Gr. 1: green
Gr. 2: white
Gr. 3: yellow
Gr. 4: orange
Gr. 5: red
Gr. 6: pink
Gr. 7: purple
(d) Disc: type (characteristic 36)
(e) Disc: color of tip of paleae (spikes) (characteristic 44)
(f) Only varieties with disc type: anemone: Disc: color after disc florets open (characteristic 47)
with the following groups:
Gr. 1: green
Gr. 2: white
Gr. 3: yellow
Gr. 4: orange
Gr. 5: red
Gr. 6: pink
Gr. 7: purple

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 All relevant states of expression are presented in the characteristic.

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note
1 2	**3 4**	**5 6**	**7**			
	Name of characteristics in English	**Nom du caractère en français**	**Name des Merkmals auf Deutsch**	**Nombre del carácter en español**		
	states of expression	types d’expression	Ausprägungsstufen	tipos de expresión		

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

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

6 (a)-(d) See Explanations on the Table of Characteristics in Chapter 8.1

7 Not applicable

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
1.		**QN VG**					
		Plant: growth habit					
		upright				Mount Hood	1
		semi upright				Green Jewel, Ida	2
		semi spreading				Mistral	3
		spreading					4
2.	**(*)**	**QN MG/MS/VG**	**(+)**				
		Plant: height					
		very short				SWEET271	1
		very short to short					2
		short				ECHOR273	3
		short to medium					4
		medium				Noectwo	5
		medium to tall					6
		tall				Razzmatazz	7
		tall to very tall					8
		very tall					9
3.		**QN VG**	**(+)**				
		Plant: floriferousness					
		very weak					1
		weak				Razzmatazz	2
		medium				SWEET271	3
		strong				Hilmooocosy	4
		very strong					5
4.		**PQ VG**	**(+)**				
		Stem: color					
		green				Green Jewel	1
		green tinged weakly purple				Catharina	2
		green tinged strongly purple				Merlot	3
		purple				Fatal Attraction	4

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
5.		**QN** **VG**					
		Stem: number of leaves					
		very few					1
		few				SWEET271	2
		medium				ECHOR273	3
		many				Hilmooocosy	4
		very many					5
6.	**(*)**	**QN** **MS/VG**	**(a)**				
		Leaf: length (including petiole)					
		very short					1
		very short to short					2
		short				Mistral	3
		short to medium					4
		medium				Merlot	5
		medium to long					6
		long				Green Jewel	7
		long to very long					8
		very long					9
7.	**(*)**	**QN** **MS/VG**	**(a)**				
		Leaf: width					
		very narrow					1
		very narrow to narrow					2
		narrow				Purity	3
		narrow to medium					4
		medium				Green Jewel	5
		medium to broad					6
		broad				Catharina	7
		broad to very broad					8
		very broad					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
8.	**(*)**	**QN MS/VG**	**(a)**				
		Leaf : length/width ratio					
		very low					1
		very low to low					2
		low				Merlot	3
		low to medium				Hilmooocosy	4
		medium					5
		medium to high					6
		high				Secret Glow	7
		high to very high					8
		very high					9
9.		**QN VG**	**(a)**				
		Leaf blade: position of broadest part					
		at middle or slightly towards base					1
		moderately towards base				ECHOR273	2
		strongly towards base				Milkshake	3
10		**QN VG**	**(a)**				
		Leaf: intensity of green color					
		light				Tomato Soup	1
		medium				Purity	2
		dark				Fatal Attraction	3
11	**(*)**	**QL VG**	**(a)**				
		Leaf: variegation					
		absent				ECHOR273	1
		present				Prairie Frost	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
12	**(*)**	**QN VG**	**(a)**				
		Leaf: rugosity					
		absent or very weak				Hot Papaya	1
		absent or very weak to weak					2
		weak				Summer Cocktail	3
		weak to medium					4
		medium				Green Jewel	5
		medium to strong					6
		strong				Catharina	7
		strong to very strong					8
		very strong					9
13		**QN VG**	**(a)**				
		Leaf: glossiness					
		absent or very weak				Mistral	1
		weak				After Midnight	2
		medium					3
		strong				Pineapple Sundae	4
14	**(*)**	**QN VG**	**(+) (a)**				
		Leaf: indentations of margin					
		absent or very few				Hot Papaya	1
		few				Catharina	2
		medium				Green Jewel	3
		many					4
15	**(*)**	**PQ VG**					
		Peduncle: color					
		green				Green Jewel	1
		green tinged weakly purple				Hilmooocosy	2
		green tinged strongly purple					3
		purple				After Midnight	4

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
16		**QN** **VG**					
		Peduncle: pubescence					
		absent or sparse				Hot Papaya	1
		medium				Hilmooocosy	2
		dense				Green Jewel	3
17	**(*)**	**QN** **MS/VG**	**(+)** **(b)**				
		Flower head: diameter					
		very small					1
		very small to small				Hilmooocosy	2
		small					3
		small to medium					4
		medium				Green Jewel	5
		medium to large					6
		large				Merlot	7
		large to very large					8
		very large					9
18	**(*)**	**QN** **MS/VG**	**(+)** **(b)**				
		Flower head: height					
		very short					1
		very short to short				SWEET271	2
		short				ECHOR273	3
		short to medium					4
		medium				Mistral	5
		medium to tall					6
		tall				Hot Papaya	7
		tall to very tall					8
		very tall					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
19	**(*)**	**QN MS/VG**	**(+) (b)**				
		Flower head: number of ray florets					
		very few					1
		very few to few					2
		few				Tiki Torch	3
		few to medium					4
		medium				Mistral	5
		medium to many					6
		many				Fatal Attraction	7
		many to very many					8
		very many					9
20	**(*)**	**QN VG**	**(+) (b)**				
		Flower head: attitude of ray florets at origin					
		semi-erect					1
		horizontal				Merlot	2
		semi-drooping				Mount Hood	3
		drooping				Hot Papaya	4
21	**(*)**	**QN VG**	**(+)**				
		Flower head: relative number of ligulate ray florets					
		none				All that Jazz	1
		few					2
		medium					3
		many				Sundown	4
		all or almost all				Merlot	5
22	**(*)**	**QN VG**	**(+) (b)**				
		Flower head: relative number of spatulate ray florets					
		none					1
		few				All that Jazz	2
		medium				Sundown	3
		many					4
		all or almost all					5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
23	**(*)**	**QN**	**VG**	**(+)**	**(b)**				
		Flower head: relative number of quilled ray florets							
		none							1
		few						Sundown	2
		medium							3
		many						All that Jazz	4
		all or almost all							5
24	**(*)**	**QN**	**MS/VG**		**(b), (c)**				
		Ray floret: length							
		very short							1
		very short to short							2
		short						Fatal Attraction	3
		short to medium							4
		medium						Merlot	5
		medium to long							6
		long						Tomato Soup	7
		long to very long							8
		very long							9
25	**(*)**	**QN**	**MS/VG**		**(b), (c)**				
		Ray floret: width							
		very narrow							1
		very narrow to narrow							2
		narrow						Fatal Attraction	3
		narrow to medium							4
		medium						Summer Cocktail	5
		medium to broad							6
		broad						Milkshake	7
		broad to very broad							8
		very broad							9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
26	**(*)**	**QN MS/VG**	**(b), (c)**				
		Ray floret: length/width ratio					
		very low					1
		very low to low					2
		low					3
		low to medium				Hilmooocosy	4
		medium				Razzmatazz	5
		medium to high					6
		high				Mount Hood	7
		high to very high					8
		very high				Secret Glow	9
27	**(*)**	**PQ VG**	**(+) (b), (c)**				
		Only varieties with spatulate or quilled ray florets: Ray floret: color of outer side					
		RHS Colour Chart (indicate reference number)					
28	**(*)**	**PQ VG**	**(b), (c), (d)**				
		Ray floret: main color of inner side					
		RHS Colour Chart (indicate reference number)					
29	**(*)**	**PQ VG**	**(b), (c), (d)**				
		Ray floret: secondary color of inner side					
		RHS Colour Chart (indicate reference number)					

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
30	**(*)**	**PQ VG**	**(+) (d)**				
		Ray floret: distribution of secondary color of inner side					
		at base					1
		basal quarter					2
		basal half					3
		distal quarter					4
		at tip					5
31		**QN VG**	**(+) (b), (c)**				
		Ray floret: curvature					
		strongly incurving					1
		weakly incurving				Green Jewel	2
		straight				Mount Hood	3
		weakly reflexing				ECHOR273	4
		strongly reflexing				Hot Papaya	5
32		**QN VG**	**(b), (c)**				
		Ray floret: twisting					
		absent or very weak				Merlot	1
		weak				Hot Papaya	2
		moderate				Noectwo	3
		strong					4
33	**(*)**	**QN VG**	**(+) (b), (c)**				
		Ray floret: profile in cross section					
		strongly concave				Vintage Wine	1
		moderately concave				Green Jewel	2
		weakly concave				Merlot	3
		flat				ECHOR273	4
		weakly convex				Hilmooocosy	5
		moderately convex				Noectwo	6
		strongly convex					7

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
34	**(*)**	**PQ**	**VG**	**(+)**	**(b), (c)**				
		Ray floret: shape of apex							
		pointed						Purity	1
		rounded						Tiki Torch	2
		truncate						Green Jewel	3
35	**(*)**	**QN**	**VG**	**(+)**	**(b), (c)**				
		Ray floret: indentations of tip							
		absent or very shallow							1
		shallow						Hot Summer	2
		medium						Green Jewel	3
		deep						ECHOR273	4
		very deep						Secret Glow	5
36	**(*)**	**QL**	**VG**	**(+)**	**(b)**				
		Disc: type							
		daisy						Merlot	1
		anemone						Hot Papaya	2
37	**(*)**	**QN**	**MS/VG**	**(+)**	**(b)**				
		Only varieties with disc type: daisy: Disc: diameter							
		very small							1
		very small to small							2
		small						Tomato Soup	3
		small to medium							4
		medium						Summer Cocktail	5
		medium to large							6
		large						Merlot	7
		large to very large							8
		very large							9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
38	**(*)**	**QN** **MS/VG**	**(b)**				
		<u>Only varieties with disc type: anemone</u>: Disc: diameter					
		very small					1
		very small to small				SWEET271	2
		small					3
		small to medium				Secret Glow	4
		medium				Razzmatazz	5
		medium to large					6
		large				Hot Papaya	7
		large to very large					8
		very large					9
39	**(*)**	**QN** **MS/VG**	**(+)** **(b)**				
		<u>Only varieties with disc type: daisy</u>: Disc: height					
		very short					1
		very short to short					2
		short				Fatal Attraction	3
		short to medium					4
		medium				Purity	5
		medium to tall					6
		tall				After Midnight	7
		tall to very tall					8
		very tall					9
40	**(*)**	**QN** **MS/VG**	**(b)**				
		<u>Only varieties with disc type: anemone</u>: Disc: height					
		very short					1
		very short to short					2
		short				Meringue	3
		short to medium					4
		medium					5
		medium to tall				Secret Glow	6
		tall				Catharina	7
		tall to very tall					8
		very tall				Noectwo	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
41	**(*)**	**QN MS/VG**	**(+) (b)**				
		<u>Only varieties with disc type: daisy</u>: Disc: ratio height/diameter					
		very low					1
		very low to low					2
		low				Green Jewel	3
		low to medium					4
		medium				Purity	5
		medium to high					6
		high				Tiki Torch	7
		high to very high					8
		very high					9
42	**(*)**	**QN MS/VG**	**(b)**				
		<u>Only varieties with disc type: anemone</u>: Disc: ratio height/diameter					
		very low					1
		very low to low					2
		low				Meringue	3
		low to medium					4
		medium					5
		medium to high					6
		high				Hot Papaya	7
		high to very high					8
		very high					9
43	**(*)**	**QN VG**	**(+) (b)**				
		Disc: diameter in relation to flower head					
		very small					1
		very small to small					2
		small				Tomato Soup	3
		small to medium					4
		medium				Green Jewel	5
		medium to large					6
		large				Milkshake	7
		large to very large					8
		very large					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
44	**(*)**	**PQ VG**	**(+) (b)**				
		Disc: color of tip of paleae (spikes)					
		none				Meringue	1
		green					2
		yellowish green				Green Jewel	3
		yellow					4
		orange				Mount Hood, Purity	5
		red orange					6
		red brown				Hot Summer, Merlot	7
		purple brown				Fatal Attraction	8
45	**(*)**	**PQ VG**	**(+) (b)**				
		Disc: second color of paleae (spikes)					
		none				Meringue	1
		green				Green Jewel, Purity	2
		yellow				Hot Summer	3
		orange				Mount Hood	4
		red orange				Fatal Attraction, Merlot	5
		red brown					6
46	**(*)**	**PQ VG**					
		<u>Only varieties with disc type: anemone</u>: Disc: color before disc florets open					
		RHS Colour Chart (indicate reference number)					
47	**(*)**	**PQ VG**					
		<u>Only varieties with disc type: anemone</u>: Disc: color after disc florets open					
		RHS Colour Chart (indicate reference number)					

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
48	**(*)**	**QL**	**VG**	**(+)**	**(b)**				
		<u>Only varieties with disc type: daisy</u>: Disc: presence of ray florets within the disc							
		absent						Merlot	1
		present						Mount Hood	9
49	**(*)**	**QN**	**MS/VG**	**(+)**	**(b)**				
		<u>Only varieties with disc type: daisy: with ray florets within the disc</u>: Disc: number of ray florets within the disc							
		very few							1
		very few to few							2
		few						Mount Hood	3
		few to medium							4
		medium						Double Decker	5
		medium to many							6
		many						Pink Poodle	7
		many to very many							8
		very many							9
50	**(*)**	**QN**	**MS/VG**						
		<u>Only varieties with disc type: anemone</u>: Disc floret: length							
		very short							1
		short						Milkshake	2
		medium							3
		long						Hot Papaya	4
		very long							5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/
51		**QN MS/VG**	**(b)**				
		Only varieties with disc type: anemone: Disc floret: width					
		very narrow				Milkshake	1
		narrow				SWEET271	2
		medium					3
		broad				Hot Papaya	4
		very broad					5
52		**QN VG**	**(+) (b)**				
		Only varieties with disc type: anemone: Disc floret: curvature					
		straight				Milkshake	1
		weakly reflexed				Secret Glow	2
		strongly reflexed				Hot Papaya	3
53	**(*)**	**QN VG**	**(+) (b)**				
		Only varieties with disc type: anemone: Disc floret: length of tube					
		very short					1
		short				Hot Papaya	2
		medium					3
		long				Milkshake	4
		very long					5
54	**(*)**	**QN VG**	**(b)**				
		Only varieties with disc type: anemone: Disc floret: depth of indentations of tip					
		absent or very shallow					1
		shallow					2
		medium				SWEET271	3
		deep				Hot Papaya	4
		very deep				Secret Glow	5

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

All characteristics should be observed at the time of full flowering.

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

(a) Characteristics should be observed on stem leaves taken from the middle third of the flowering stem, and on the upper surface unless otherwise indicated.

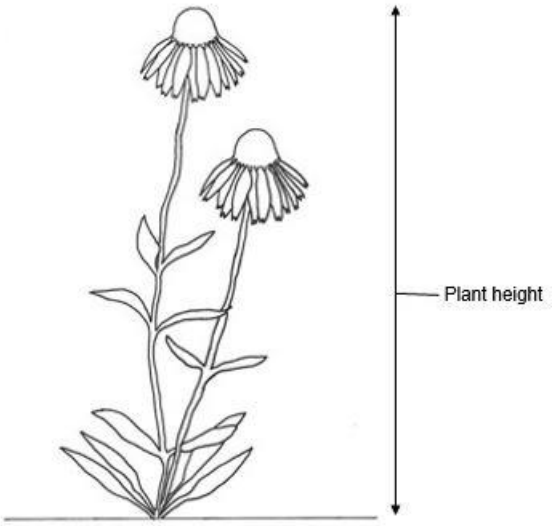
(b) Unless otherwise indicated, characteristics should be observed when half the disc florets in the flower head have dehisced/opened.

(c) Characteristics should be observed on ray florets of the predominant type.

(d) The main color is the color with the largest surface area. In cases where the areas of the main and secondary color are too similar to reliably decide which color has the largest area, the darkest color is considered to be the main color.

8.2 Explanations for individual characteristics

Ad. 2: Plant: height



Ad. 3: Plant: floriferousness

The number of flowers should be observed as the number of flowers open at the same time on the plant.

Ad. 4: Stem: color

The color should be observed on the middle third of the stem, excluding the peduncle.

Ad. 14: Leaf: indentations of margin

1
absent or very few

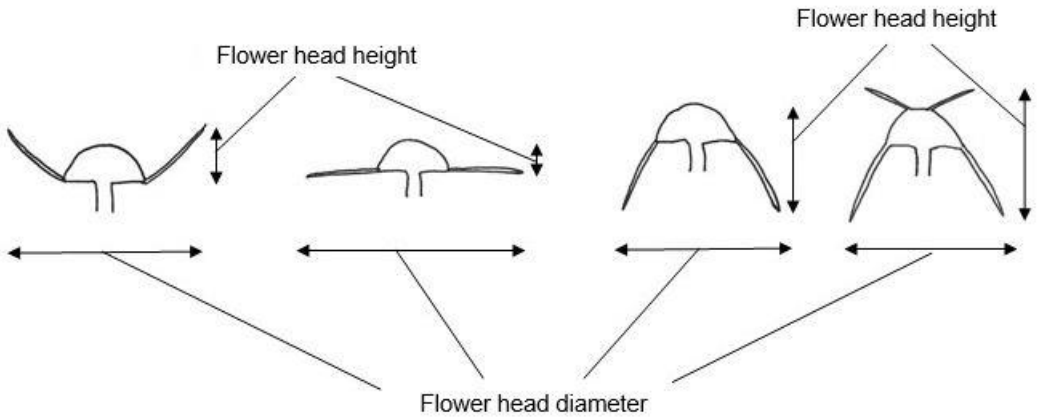
2
few

3
medium

4
many

Ad. 17: Flower head: diameter

It is the natural flower head diameter and height which is recorded.



Ad. 18: Flower head: height

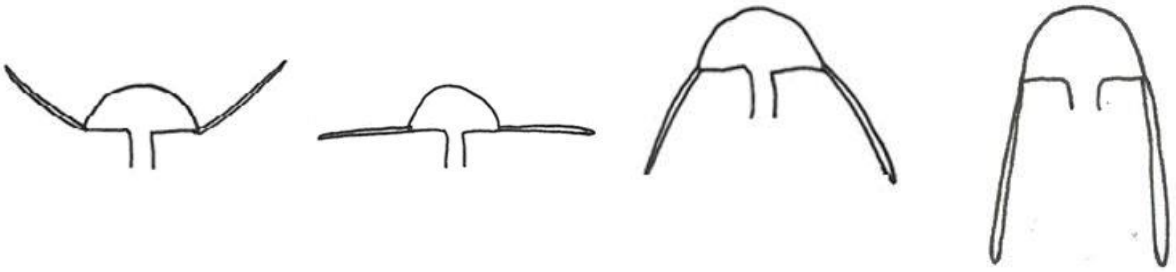
See explanation Ad. 17

Ad. 19: Flower head: number of ray florets

This excludes any ray florets within the disc (see characteristic 49).

Ad. 20: Flower head: attitude of ray florets at origin

The origin is the base of the ray floret as it emerges from the involucre.



1	2	3	4
semi-erect	horizontal	semi-drooping	drooping

Ad. 21: Flower head: relative number of ligulate ray florets

“Relative” means the number of ligulate ray florets as a proportion of the overall number of ray florets. It is this which is assessed, not the absolute number of ligulate ray florets.

Ligulate florets are flat.

Ad. 22: Flower head: relative number of spatulate ray florets

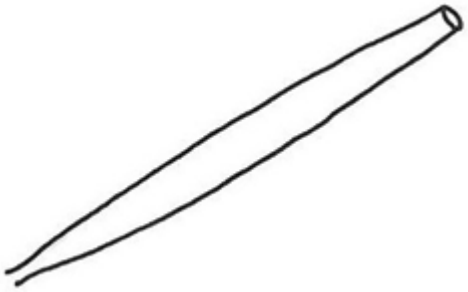
“Relative” means the number of spatulate ray florets as a proportion of the overall number of ray florets. It is this which is assessed, not the absolute number of spatulate ray florets.

Spatulate ray florets are where part of the floret is tubular and part is flat.

Ad. 23: Flower head: relative number of quilled ray florets

“Relative” means the number of quilled ray florets as a proportion of the overall number of ray florets. It is this which is assessed, not the absolute number of quilled ray florets.

Quilled florets are where the whole length of the floret is tubular.



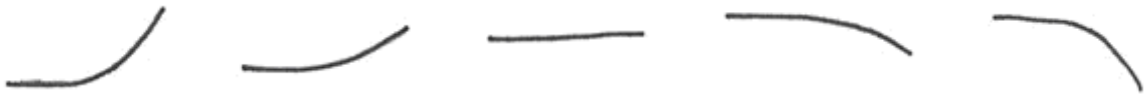
Ad. 27: Only varieties with spatulate or quilled ray florets: Ray floret: color of outer side

To be record on the quilled part of the floret, on the area facing upwards

Ad. 30: Ray floret: distribution of secondary color of inner side

1	2	3	4	5
at base	basal quarter	basal half	distal quarter	at tip

Ad. 31: Ray floret: curvature



1	2	3	4	5
strongly incurving	weakly incurving	straight	weakly reflexing	strongly reflexing

Ad. 33: Ray floret: profile in cross section

To be observed at the midpoint of the floret.

inner side

1	2	3	4	5	6	7
strongly concave	moderately concave	weakly concave	flat	weakly convex	moderately convex	strongly convex

Ad. 34: Ray floret: shape of apex

1	2	3
pointed	rounded	truncate

Ad. 35: Ray floret: indentations of tip

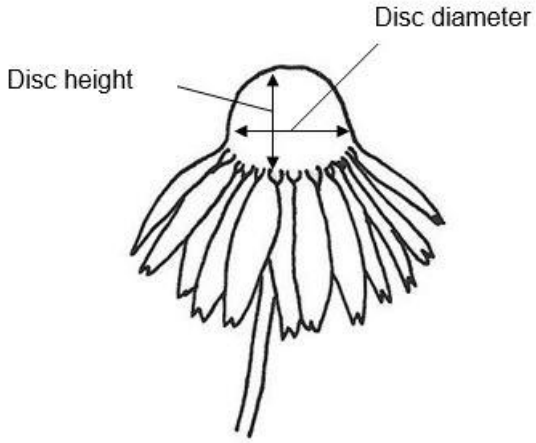
2	3	4	5
shallow	medium	deep	very deep

Ad. 36: Disc: type

1
daisy

2
anemone

Ad. 37: Only varieties with disc type: daisy: Disc: diameter



Ad. 39: Only varieties with disc type: daisy: Disc: height

See explanation Ad. 37

Ad. 41: Only varieties with disc type: daisy: Disc: ratio height/diameter

3
low

5
medium

7
high

Ad. 43: Disc: diameter in relation to flower head

The disc diameter is assessed relative to the natural flower head diameter.

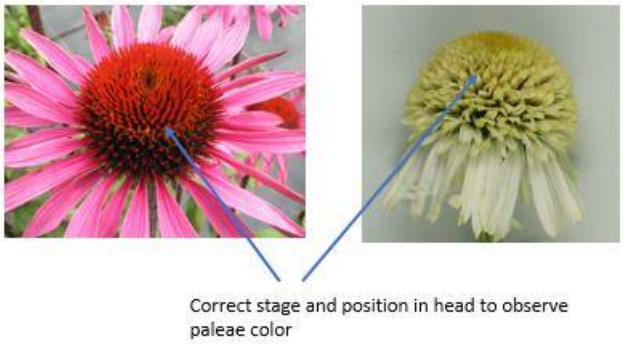
3
small

5
medium

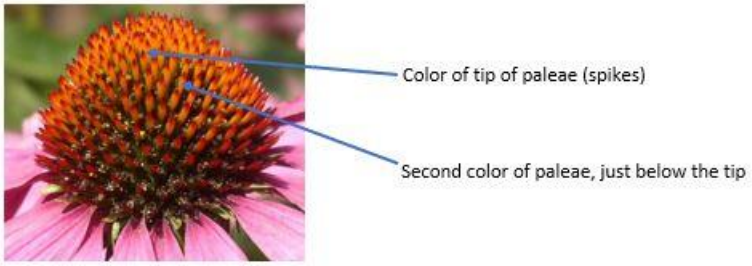
7
large

Ad. 44: Disc: color of tip of paleae (spikes)

To be observed on paleae half way between the base and the top of the disc, just before the disc florets associated with the paleae have dehisced/opened.



The color of tip of paleae (spikes) (characteristic 44) is observed irrespective of area covered.
The second color (characteristic 45) is the color directly below the tip (if different from the tip color). Any further colors should be ignored.



In some varieties with anemone disc type (characteristic 36) paleae are not visible in the head, in these varieties both characteristic 44 and 45 should be observed as none, note 1.

Example of variety where paleae are observed as 'none'.

Ad. 45: Disc: second color of paleae (spikes)

See Ad. 55

Ad. 48: Only varieties with disc type: daisy: Disc: presence of ray florets within the disc

1
absent

9
present

Ad. 49: Only varieties with disc type: daisy: with ray florets within the disc: Disc: number of ray florets within the disc

3
few

7
many

Ad. 52: Only varieties with disc type: anemone: Disc floret: curvature

1
straight

2
weakly reflexed

3
strongly reflexed

Ad. 53: Only varieties with disc type: anemone: Disc floret: length of tube

3
short

5
medium

7
long

9. Literature

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Seidler-Łożykowska, K., Kaźmierczak, K. 2004: Breeding program on purple coneflower (*Echinacea purpurea* Moench) III. Comparative experiment, Herba Polonica 50 (2): 17-20

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

1.1	Botanical name	*Echinacea* Moench.
1.2	Common name	Echinacea, Cone Flower
1.3	Species (please indicate):	

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 variety)

(……..……..…) 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)

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

4.2.1 Seed-propagated varieties

(a) Self-pollination [ ]
(b) Cross-pollination [ ]
(c) Other (please provide details) [ ]

4.2.2 Vegetative propagation

(a) Cuttings [ ]
(b) *In vitro* propagation [ ]
(c) Division [ ]
(d) Other (state method) [ ]

4.2.3 Other [ ]
(Please provide details)

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

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (2)	**Plant: height**		
	very short	SWEET271	1 [ ]
	very short to short		2 [ ]
	short	ECHOR273	3 [ ]
	short to medium		4 [ ]
	medium	Noectwo	5 [ ]
	medium to tall		6 [ ]
	tall	Razzmatazz	7 [ ]
	tall to very tall		8 [ ]
	very tall		9 [ ]
5.2 (11)	**Leaf: variegation**		
	absent	ECHOR273	1 [ ]
	present	Prairie Frost	9 [ ]
5.3(i) (28)	**Ray floret: main color of inner side**		
	RHS Colour Chart (indicate reference number)		
5.3(ii) (28)	**Ray floret: main color of inner side**		
	green	Green Jewel	1 [ ]
	white	Purity	2 [ ]
	yellow	Harvest Moon	3 [ ]
	orange	Tiki Torch	4 [ ]
	red	Tomato Soup	5 [ ]
	pink		6 [ ]
	purple	Magnus	7 [ ]

	Characteristics	Example Varieties	Note
5.4(i) (29)	**Ray floret: secondary color of inner side**		
	RHS Colour Chart (indicate reference number)		
5.4(ii) (29)	**Ray floret: secondary color of inner side**		
	green		1 [ ]
	white		2 [ ]
	yellow		3 [ ]
	orange		4 [ ]
	red		5 [ ]
	pink		6 [ ]
	purple		7 [ ]
5.5 (36)	**Disc: type**		
	daisy	Merlot	1 [ ]
	anemone	Hot Papaya	2 [ ]
5.6 (44)	**Disc: color of tip of paleae (spikes)**		
	none	Meringue	1 [ ]
	green		2 [ ]
	yellowish green	Green Jewel	3 [ ]
	yellow		4 [ ]
	orange	Mount Hood, Purity	5 [ ]
	red orange		6 [ ]
	red brown	Hot Summer, Merlot	7 [ ]
	purple brown	Fatal Attraction	8 [ ]

	Characteristics	Example Varieties	Note
5.7(i) (47)	**<u>Only varieties with disc type: anemone</u>: Disc: color after disc florets open**		
	RHS Colour Chart (indicate reference number)		
5.7(ii) (47)	**<u>Only varieties with disc type: anemone</u>: Disc: color after disc florets open**		
	green	Milkshake	1 [ ]
	white	Meringue	2 [ ]
	yellow	Noectwo	3 [ ]
	orange	Hot Papaya	4 [ ]
	red		5 [ ]
	pink	Razzmatazz	6 [ ]
	purple	Catherina	7 [ ]
5.8 (48)	**<u>Only varieties with disc type: daisy</u>: Disc: presence of ray florets within the disc**		
	absent	Merlot	1 [ ]
	present	Mount Hood	9 [ ]

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	*Ray floret color*	*pink*	*purple*

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 photograph of the variety displaying its main distinguishing feature(s), should accompany the Technical Questionnaire. The photograph will provide a visual illustration of the candidate variety which supplements the information provided in the Technical Questionnaire.

The key points to consider when taking a photograph of the candidate variety are:

- Indication of the date and geographic location
- Correct labeling (breeder's reference)
- Good quality printed photograph (minimum 10 cm x 15 cm) and/or sufficient resolution electronic format version (minimum 960 x 1280 pixels)"

Further guidance on providing photographs with the Technical Questionnaire is available in document TGP/7 "Development of Test Guidelines", Guidance Note 35 (http://www.upov.int/tgp/en/).

[The link provided may be deleted by members of the Union when developing authorities' own test guidelines.]

Main use of the variety

(a) garden plant [ ]
(b) cut flower [ ]
(c) herbal/pharmaceutical [ ]
(d) other (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:

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.

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]