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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

MARIGOLD *

UPOV Code: TAGET_

(*Tagetes* L.)

GUIDELINES
FOR THE CONDUCT OF TESTS
FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from France and Mexico

to be considered by the
Technical Working Party for Ornamental Plants and Forest Trees
at its thirty-seventh session,
to be held in Hanover, Germany, from July 12 to 16, 2004

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Tagetes L.	Marigold	Tagète, Oeillet d'Inde, Rose d'Inde	Sammetblume, Studentenblume	Clavel de las indias, Clavelon, Cempoalxóchitl

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 guidelines ("Test Guidelines") should be read in conjunction with document TG/1/3, "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants" (hereinafter referred to as the "General Introduction") and its associated "TGP" documents.
Other associated UPOV 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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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Tagetes* L. of the family *Asteraceae* (Compositae).

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 seeds or rooted cuttings.

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

Seed-propagated varieties:	3 grams of seed
Vegetatively propagated varieties:	25 rooted cuttings

2.4 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.

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

2.6 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 a single growing cycle.

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

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. In particular, unless otherwise indicated, all observations should be made at the time of full flowering growth.

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.

3.4 Test Design

3.4.1 In the case of seed-propagated varieties, each test should be designed to result in a total of at least 60 plants.

3.4.2 In the case of vegetatively propagated varieties, each test should be designed to result in a total of at least 20 plants.

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 Number of Plants / Parts of Plants to be Examined

3.5.1 For seed-propagated varieties, unless otherwise indicated, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observations made on all plants in the test.

3.5.2 For vegetatively propagated varieties, unless otherwise indicated, 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.

3.6 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.

4.2 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 The assessment of uniformity for seed-propagated varieties should be according to the recommendations for cross-pollinated varieties or hybrid varieties, as appropriate, in the General Introduction.

4.2.3 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 20 plants, 1 off-type is allowed. 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 tested, either by growing a further generation, or by testing a new seed or plant stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

4.3.3 Where appropriate, or in cases of doubt, the stability of a hybrid variety may, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity and stability of its parent lines.

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 3)
(b) Plant: branching (characteristic 5)
(c) Leaf: type (characteristic 8)
(d) Flower head: floret type (characteristic 17)
(e) Flower head: diameter (characteristic 19)
(f) Flower head: number of colors (characteristic 21)
(g) Flower head: color (characteristic 22)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

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

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.

6.3 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 (Section 6.1.2)

(QL) Qualitative characteristic – see Chapter 6 (Section 6.3)
(QN) Quantitative characteristic – see Chapter 6 (Section 6.3)
(PQ) Pseudo-qualitative characteristic – see Chapter 6 (Section 6.3)

(+) See Explanations on the Table of Characteristics in Chapter 8.

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	**Hypocotyl: anthocyanin coloration**					
QL	absent					1
	present					9
2.	**Plant: fragrance**					
QL	absent				Hawaii	1
	present				Cupidon double	9
3.	**Plant: height**					
QN	very short				Cupidon, Golden boy	1
	short				Mistral, Spry	3
	medium				Monsieur Majestic, Golden, Jubilee	5
	tall				Sourire, Jaune supreme	7
	very tall				Orange prince, Lemon queen	9
4.	**Plant: habit**					
(+)	upright				Puebla	1
PQ	semi-upright				Nueva	3
	spreading				Sorpresa	5
5.	**Plant: branching**					
QN	absent or weak				Type *T. lucida*	1
	medium				Chapingo	2
	strong				T. Pumila	3
6.	**Stem: anthocyanin coloration**					
QL	absent				Hidalgo	1
	present				Tlalámac	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7.	**Stem: intensity of anthocyanin coloration**					
QN	weak				Tepoztlán	3
	medium				Chapingo	5
	strong				Itarichen	7
8.	**Leaf: type**					
QL	single				Type *T. lucida*	1
	pinnate				Type *T. erecta, T. patula*	2
	bippinate				Xiquila	3
9. (+)	**Leaf: length**					
QN	short					3
	medium					5
	long					7
10. (+)	**Leaf: width**					
QN	narrow					3
	medium					5
	broad					7
11.	**Leaf: intensity of green color**					
QN	light				Fework jaune	3
	medium					5
	dark				Bonanza gelb	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12.	**Leaflet: width**					
QL	narrow					3
	medium					5
	wide					7
13.	**Leaf: stipule**					
QL	absent					1
	present					9
14.	**Stipule: length**					
QN	short					3
	medium					5
	long					7
15.	**Stipule: anthocyanin coloration**					
QL	absent					1
	present					9
16.	**Flower head: length of peduncle on terminal flower head**					
QN	short					1
	medium					1
	long					9
17.	**Flower head: [floret type] / [type]**					
QL	single				Tepozteco	1
	semi double				Ixayoc	2
	double				Sonora	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. (+)	**Flower head:** **[flower type] /** **[floret type]**					
QL	tubulate and ligulate				Tecuanulco, Little Hero Spry	1
	tubuligulate and ligulate				Ecatzingo	2
	all tubuligulate				Tepecoculco	3
	all ligulate				Tzapinco	4
19.	**Flower head:** **diameter**					
QN	very small				Ornament, Tangerine Gem	1
	small				Disco Orange	3
	medium				Bonanza harmony, Aurora	5
	large				Queen Bee	7
	very large				Red Seven Star	9
20.	**Flower head:** **number of ray floret whorls**					
QN	few				Monsieur Majestic, Disco Orange	3
	medium					5
	many				Little Hero Spry, Bonanza Bee	7
21.	**Flower head:** **number of colors**					
QL	one				Tangerine orange, Vanilla	1
	two				Monsieur Majestic, Bee	2
	more than two					3

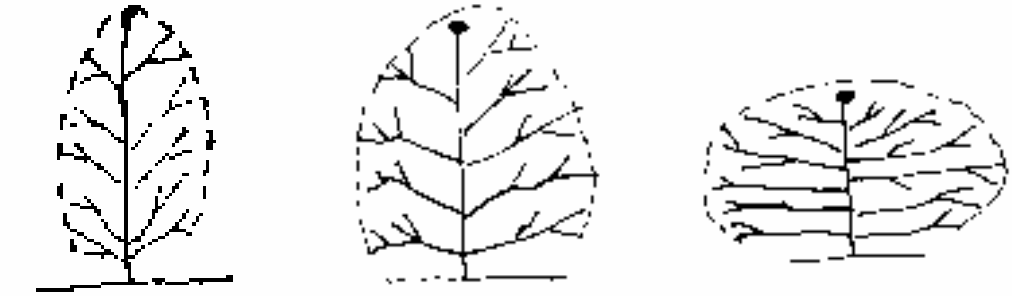
	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
22.	**Flower head: main color of upper side**					
PQ	cream				Vanilla, Blanca	1
	light yellow				Banza gelb	2
	dark yellow				Excel gelb	3
	light orange				Inca orange	4
	orange				Tangerine orange	5
	red				Tequexquinahuac	6
	brown					7
23.	**Ligulate ray floret: main color** RHS colour chart					
24.	**Only varieties with two or more than two flower head colors: Flower head: distribution of color**					
QL	even				Queen Sophia	1
	different between tubuligulate and ligulate flowers				Bonanza spray	2
25.	**Only varieties with two or more than two flower head colors: Ligulate ray floret: secondary color**					
PQ	cream				Vanilla, Blanca	1
	light yellow				Aurora	2
	dark yellow				Granada	3
	light orange					4
	orange					5
	red				Bonanza Harmony	6
	brown					7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26. (+)	**Ligulate ray floret: distribution of color**					
PQ	type 1				Espanared Marietta	1
	type 2				Monsieur Majestic	2
	type 3				Sevilla bicolour ro gelb	3
27. (+)	**Only varieties with type 1 ligulate ray floret color distribution: Ligulate ray floret: size of central color zone**					
QN	very small				Scarlet Sophia Aurora jaune	1
	small				Discoflamme, Red Marietta, Sophia yellow, Granada	3
	medium				Pascal	5
	large				Discoflamme, Red Marietta, Granada, Sophia yellow	7
	very large				Aurora jaune, Scarlet Sophia	9
28.	**Ligule ray floret: incision of margin**					
QL	absent				Teotihuacan	1
	present				Acuexcomac	9
29.	**Ligulate ray floret: depth of incision of margin**					
QN	very shallow					1
	shallow					3
	medium					5
	deep					7
	very deep					9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30.	**Only varieties with incision of margin absent: Ligulate ray floret: shape of apex**					
QL	rounded				Comitan	1
	truncate				Huejutla	2
31.	**Outer ligulate ray floret: length**					
QN	short					3
	medium					5
	long					7
32.	**Outer ligulate ray floret: width**					
QN	narrow					3
	medium					5
	broad					7
33.	**Time of beginning of flowering**					
QN	early				Double Mistral, Heroflame	3
	medium				Cupidon double, Aurora Fold	5
	late				Inca yellow, Discovery Orange	7

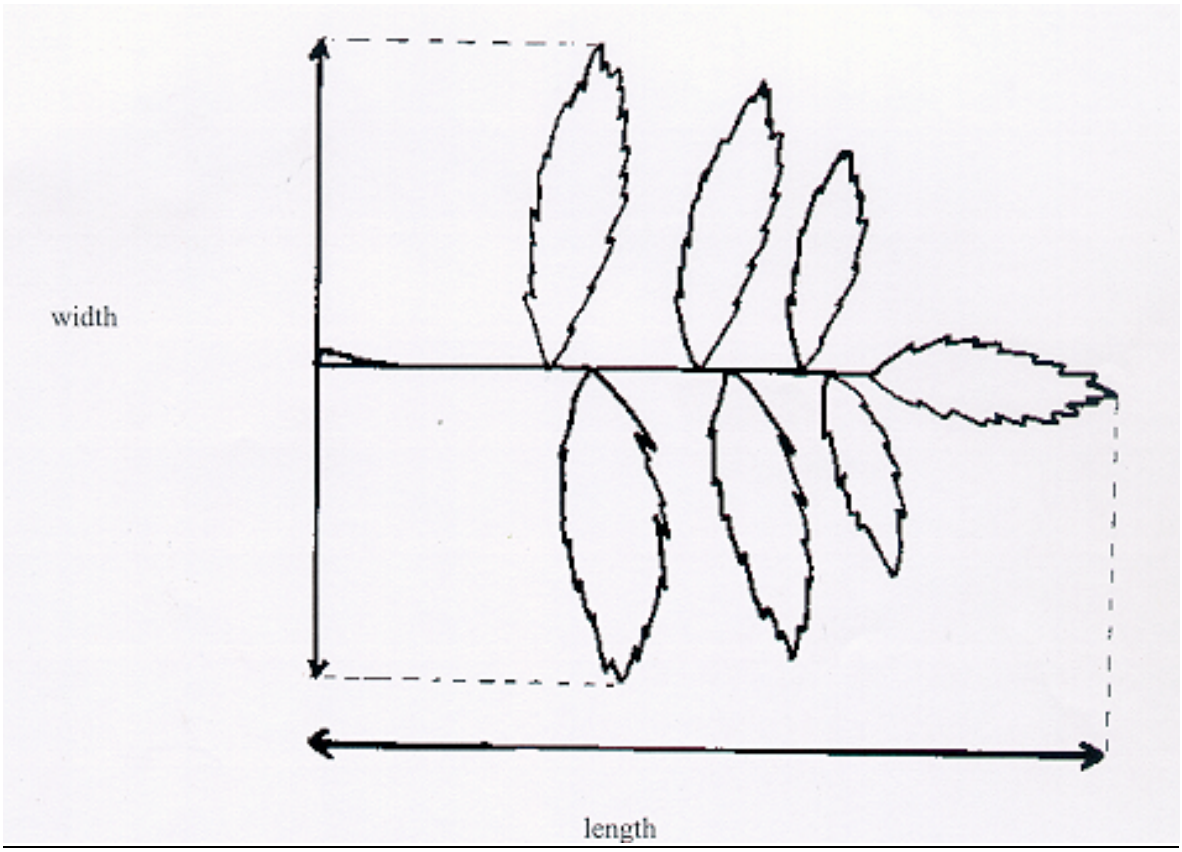
8. Explanations on the Table of Characteristics

Ad. 4: Plant: habit

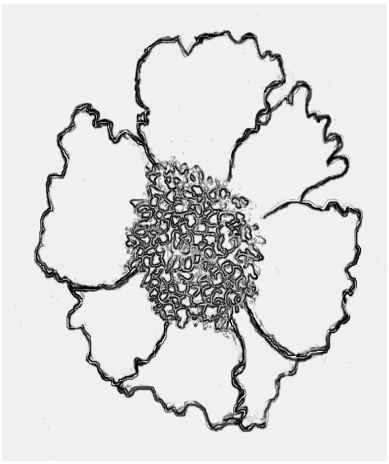


1	2	3
upright	semi-upright	spreading

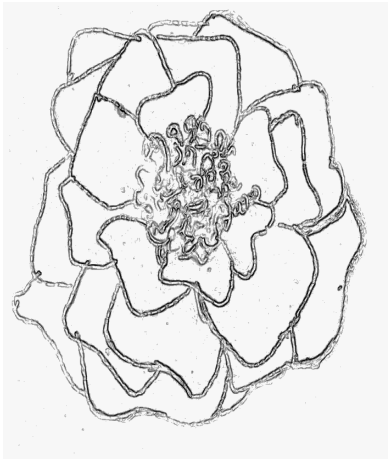
Ad. 9: Leaf: length
Ad. 10: Leaf: width



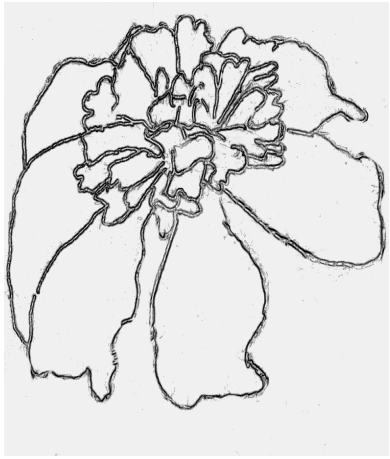
Ad. 18: Flower head: flower type



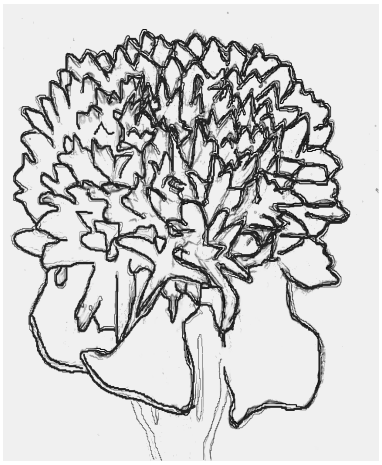
tubulate and ligulate



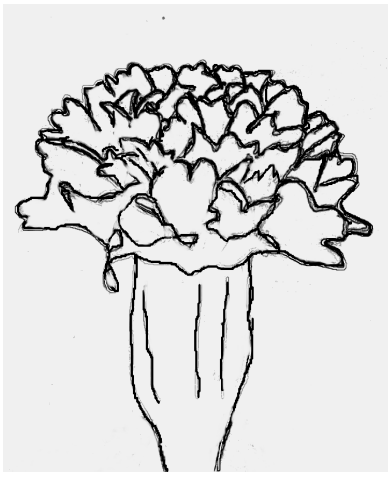
tubulate and ligulate



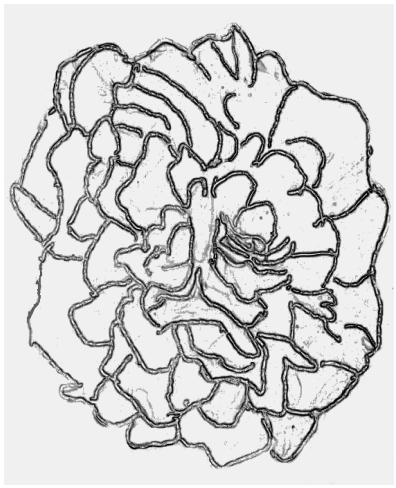
tubuligulate and ligulate



tubuligulate and ligulate

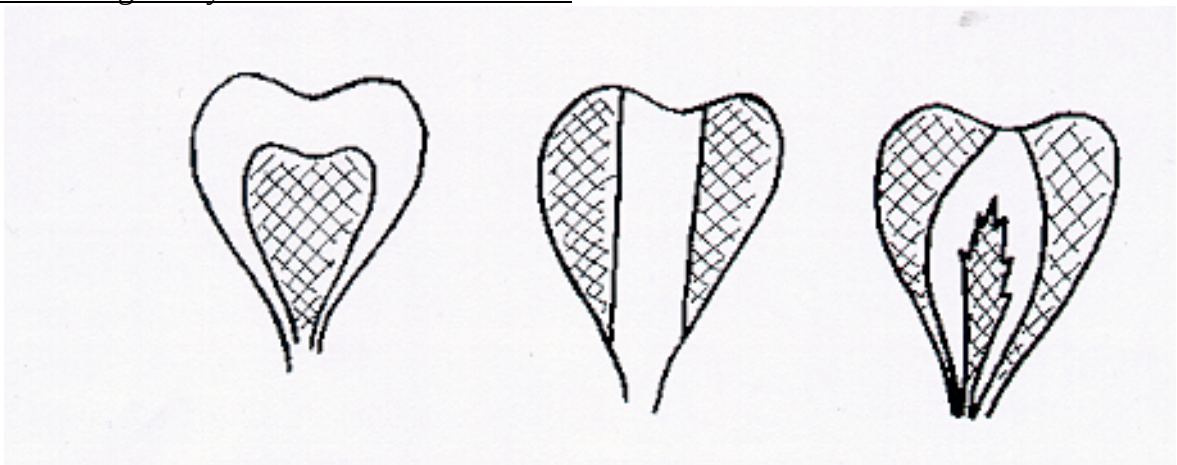


all tubuligulate



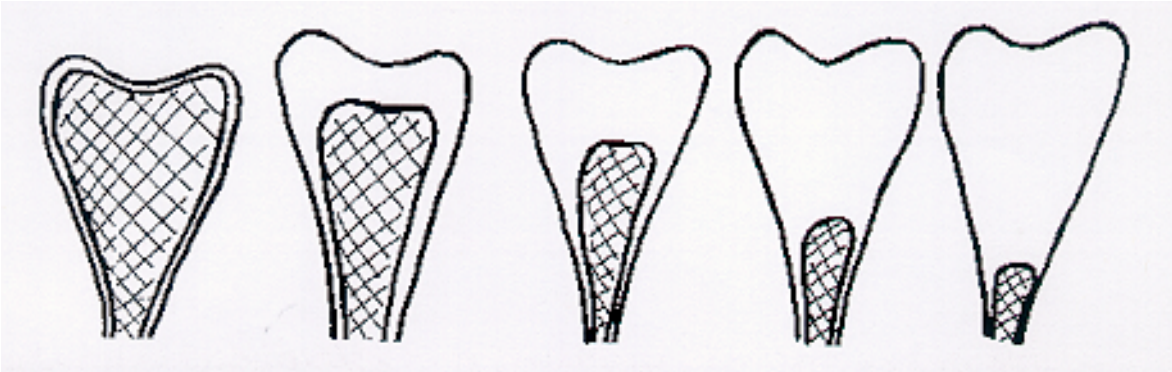
all ligulate

Ad.26: Ligule ray floret: distribution of color



Type 1 Type 2 Type 3

Ad.27: Varieties with type 1: ligule ray floret: size of central color zone



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

9. Literature

Neher, R.T. 1966. Monograph of the genus *Tagetes* (Compositae) . Ph. D. Thesis, Indiana University. Bloomington, Indiana. USA. 306 p.

Serrato C., M. A. 1990. Contribución al conocimiento de las características florales del cempoalxóchitl (*Tagetes* sp.). Rev. Chapingo XV (71-72):151-155.

Serrato C., M. A. y A. Segura M. 1994. Variación fenotípica en progenies a partir de inflorescencias de *Tagetes erecta* L. Rev. Chapingo serie Horticultura 1:159- 161.

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	*Tagetes* L.
1.2 Common name	Marigold
Species (please complete):	

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

.....

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Self-pollination [ ]
(b) Cross-pollination
(i) population [ ]
(ii) synthetic variety [ ]
(c) Hybrid [ ]
(d) Other [ ]
(please provide details)

4.2.2 Vegetatively propagated varieties

(a) cuttings [ ]
(b) *in vitro* propagation [ ]
(c) other (state method) [ ]

4.2.3 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:

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 (3)	**Plant: height**		
	very short	Cupidon, Golden boy	1
	short	Mistral, Spry	3
	medium	Monsieur Majestic, Golden, Jubilee	5
	tall	Sourire, Jaune supreme	7
	very tall	Orange prince, Lemon queen	9
5.2 (4)	**Plant: habit**		
	upright	Puebla	1
	semi upright	Nueva	3
	spreading	Sorpresa	5
5.3 (5)	**Plant: branching**		
	absent or weak		1
	medium		2
	strong		3
5.4 (8)	**Leaf: type**		
	single	Type *T. lucida*	1
	pinnate	Type *T. erecta, T. patula*	2
	bippinate		3

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

5.5 (17)	**Flower head: [floret type] / [type]**		
	single	Tepozteco	1
	semi double	Ixayoc	2
	double	Sonora	3
5.6 (19)	**Flower head: diameter**		
	very small		1
	small		3
	medium		5
	large		7
	very large		9
5.7 (21)	**Flower head: number of colors**		
	one	Tangerine orange, Vanilla	1
	two	Monsieur Majestic, Bee	2
	more than two		3
5.8 (22)	**Flower head: main color of upper side**		
	cream	Vainilla, Blanca	1
	light yellow	Banza gelb	2
	dark yellow	Excel gelb	3
	light orange	Inca orange	4
	orange	Tangerine orange	5
	red		6
	brown		7

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

5.9 (25)	**Only varieties with two or more than two flower head colors: Ligulate ray floret: secondary color**		
	cream	Vanilla, Blanca	1
	light yellow	Aurora	2
	dark yellow	Granada	3
	light orange		4
	orange		5
	red	Bonanza Harmony	6
	brown		7

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	*To be provided*		

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 Use:

Cut flower [ ]

Pot plant [ ]

Bedding plant [ ]

Industrial [ ]

Others (please specify): ……

7.4 Other information

A representative color photograph 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 of 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]