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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

ORNAMENTAL APPLE *

UPOV Code(s): MALUS

Malus Mill.
except *Malus domestica* (Suckow) Borkh.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from China

to be considered by the

Technical Working Party for Ornamental Plants and Forest Trees at its fifty-eighth session, to be held virtually from 2026-07-06 to 2026-07-09

Disclaimer: this document does not represent UPOV policies or guidance

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Malus Mill.	Ornamental Apple	Pommier ornemental	Zierapfel	Manzano ornamental

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.

Other associated UPOV documents:

TG/14 Apple
TG/163 Apple Rootstocks

* 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 *Malus* Mill. except for varieties used only as fruit varieties (see TG/14) or only as rootstock varieties (see TG/163).

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 at least three-year-old trees grafted on a rootstock prescribed by the competent authority.

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

5 trees.

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 two independent growing cycles.

3.1.2 The two independent growing cycles may be observed from a single planting, examined in two separate growing cycles.

3.1.3 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 The optimum stage of development for the assessment of each characteristic is indicated by a reference in the Table of Characteristics. The stages of development denoted by each reference are described in Chapter 8.

3.3.3 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 Each test should be designed to result in a total of at least 5 trees.

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 or Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 3 plants or parts taken from each of 3 plants and any other observations 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 2.

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 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 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 5 plants, no 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 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) Tree: habit (characteristic 2)
(b) Flower: type (characteristic 7)
(c) Flower: color of marginal zone of inner side of petal (characteristic 18)
(d) Leaf blade: color of expanding leaves (characteristic 22)
(e) Fruit: diameter (characteristic 38)
(f) Fruit: predominant color (characteristic 45)

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/ Nota
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 (*) sterisked 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 Growth stage key See Explanations on the Table of Characteristics in Chapter 8.3

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

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**QN**	**MG/VG**	**(+)**		**00 or 39**			
		Tree: vigor							
		very weak							1
		very weak to weak							2
		weak						Dorothea	3
		weak to medium							4
		medium						Dolgo	5
		medium to strong							6
		strong						Jackii	7
		strong to very strong							8
		very strong							9
2.	**(*)**	**PQ**	**VG**	**(+)**	**(a)**	**00**			
		Tree: habit							
		columnar						Maypole	1
		fastigiate						Laura	2
		upright						Van Eseltine	3
		spreading						Red Glow	4
		drooping						Elise Rathke	5
		weeping						Oekonomierat Echtermeyer, Royal Beauty	6
3.		**QN**	**MG/VG**	**(+)**		**00**			
		One-year-old shoot: length of internode							
		very short						Coralcole	1
		very short to short							2
		short						Strawberry Parfait	3
		short to medium							4
		medium						Spring Snow	5
		medium to long							6
		long						Branzam	7
		long to very long							8
		very long						Red Jade	9

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4.	**(*)**	**PQ**	**VG**	**(+)**		**56**			
		Unopened flower: color (balloon stage)							
		white						Spring Snow	1
		light pink						Red Jade	2
		medium pink						Coralcole	3
		dark pink						Selkirk	4
		red						Radiant	5
		purple						Royalty	6
5.		**QN**	**VG**			**61**			
		Time of beginning of flowering (10% open flowers)							
		very early							1
		very early to early							2
		early						Hopa, Pink Spires	3
		early to medium							4
		medium						Jewelberry, Lemoinei	5
		medium to late							6
		late						Branzam, Wynema	7
		late to very late							8
		very late							9
6.		**PQ**	**VG**		**(b)**	**60-65**			
		Flower: color of calyx							
		green						Spring Snow	1
		green red						Red Jade	2
		red						Coralcole	3
		purple						Royalty	4
7.	**(*)**	**PQ**	**VG**	**(+)**	**(b)**	**60-65**			
		Flower: type							
		single						Profusion	1
		semi-double						Coralcole	2
		double						Branzam, Nieuwlandiana	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8.	**(*)**	**QN**	**MG/VG**	**(+)**	**(b)**	**60-65**			
		Flower: diameter							
		very small							1
		very small to small							2
		small						Jewelberry, Winter Gold	3
		small to medium							4
		medium						Profusion, Royalty	5
		medium to large							6
		large						Coppurple, Montreal Beauty	7
		large to very large							8
		very large							9
9.	**(*)**	**PQ**	**VG**	**(+)**	**(b)**	**60-65**			
		Flower: shape							
		flat						Jewelberry	1
		shallow cup						Courtarou, Snowdrift	2
		deep cup						Indian Magic, Van Eseltine	3
10.	**(*)**	**PQ**	**VG**	**(+)**	**(b)**	**60-65**			
		Flower: petal shape							
		oblong						Charlottae	1
		narrow elliptic							2
		elliptic						Makamik	3
		broad elliptic						Wynema	4
		circular						Veitchii	5
		narrow ovate						Katherine	6
		ovate						Profusion	7
11.		**QN**	**MG/VG**		**(b)**	**60-65**			
		Flower: petal claw length							
		very short							1
		short							2
		medium							3
		long							4
		very long							5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12.	**(*)**	**QL**	**VG**	**(+)**	**(b)**	**60-65**			
		<u>Only varieties with Flower: type: single</u>: Flower: arrangement of petals							
		free						Makamik	1
		touching						John Downie	2
		overlapping						Butterball	3
13.		**PQ**	**VG**	**(+)**	**(b)**	**60-65**			
		Flower: petal attitude							
		flat							1
		undulate							2
		sinuate							3
14.		**QN**	**VG**		**(b)**	**60-65**			
		Flower: petal veins							
		weakly expressed						John Downie	1
		moderately expressed							2
		strongly expressed						Almey	3
15.		**QL**	**VG**	**(+)**	**(b)**	**60-65**			
		Flower: petal stripes							
		absent						Snowdrift	1
		present						Selkirk	9
16.		**PQ**	**VG**	**(+)**	**(b)**	**60-65**			
		<u>Only varieties with Flower: petal stripes: present:</u> Flower: stripe distribution							
		disperse							1
		central						Selkirk	2
		margin							3
		irregular							4
17.		**PQ**	**VG**		**(b)**	**60-65**			
		<u>Only varieties with Flower: petal stripes: present:</u> Flower: stripe color							
		white						Selkirk	1
		light pink							2
		medium pink							3
		dark pink							4
		red							5
		purple							6

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18.	**(*)**	**PQ**	**MG/VG**	**(+)**	**(b)**	**60-65**			
		Flower: color of marginal zone of inner side of petal							
		white						Snowdrift	1
		light pink						Pink Spires	2
		medium pink						Strawberry Parfait	3
		dark pink						Profusion	4
		purple						Coppurple	6
		dark purple						Royalty	7
19.	**(*)**	**PQ**	**MG/VG**	**(+)**	**(b)**	**60-65**			
		Flower: color of middle zone of inner side of petal (if different)							
		light pink							1
		medium pink						Strawberry Parfait	2
		dark pink							3
20.	**(*)**	**PQ**	**MG/VG**	**(+)**	**(b)**	**60-65**			
		Flower: color of basal zone of inner side of petal							
		white							1
		light pink							2
		medium pink							3
		dark pink							4
21.	**(*)**	**PQ**	**MG/VG**		**(b)**	**60-65**			
		Flower: color of outer side							
		white						Snowdrift	1
		light pink						Louisa	2
		medium pink						Selkirk	3
		dark pink						Radiant	4
		purple						Royalty	5
22.	**(*)**	**PQ**	**VG**			**11-15**			
		Leaf blade: color of expanding leaves							
		green						Snowdrift	1
		yellow green						Cinzam	2
		yellow							3
		brown red						Branzam	4
		purple red						Coppurple	5
		purple						Royalty	6

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23.		**PQ**	**VG**	**(+)**		**71-77**			
		Current year shoot: color							
		green						Cinzam, Red Sentinel	1
		brown green						Winter Gold	2
		brown						Red Jade, Van Eseltine	3
		red brown						Henry F. Dupont, Red Splendor	4
		dark red						Coralcole, Evereste	5
		purple						Royalty	6
24.	**(*)**	**QN**	**VG**	**(+)**	**(c)**	**71-77**			
		<u>Only varieties with lobed leaves</u>: Leaf blade: depth of lobing							
		shallow							1
		medium							2
		deep							3
25.	**(*)**	**PQ**	**VG**	**(+)**	**(c)**	**71-77**			
		Leaf blade: incisions of margin							
		serrate						Scarlett	1
		serrate to crenate							2
		crenate						Courtabri	3
26.	**(*)**	**QN**	**MG/VG**	**(+)**	**(c)**	**71-77**			
		Leaf blade: length							
		very short to short							
		very short							1
		short						Jewelberry	3
		short to medium							4
		medium						Royalty	5
		medium to long							6
		long						Red Splendor	7
		long to very long							8
		very long							9

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27.	**(*)**	**QN**	**MG/VG**	**(+)**	**(c)**	**71-77**			
		Leaf blade: width							
		very narrow							1
		very narrow to narrow							2
		narrow						Jewelberry	3
		narrow to medium							4
		medium						Snowdrift	5
		medium to broad							6
		broad						Coppurple	7
		broad to very broad							8
		very broad							9
28.		**QN**	**MG/VG**	**(+)**	**(c)**	**71-77**			
		Leaf blade: ratio length/width							
		very low to low							
		very low							1
		low							3
		low to medium							4
		medium							5
		medium to high							6
		high							7
		high to very high							8
		very high							9
29.		**PQ**	**VG**	**(+)**	**(c)**	**71-77**			
		Leaf blade: shape							
		broad ovate							1
		medium ovate							2
		narrow ovate							3
		circular							4
		broad eliptic							5
		medium eliptic							6
		narrow eliptic							7
30.	**(*)**	**QN**	**MG/VG**		**(c)**	**71-77**			
		Petiole: length							
		very short							1
		short						Snowdrift	2
		medium						Coppurple	3
		long						Branzam	4
		very long							5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.	**(*)**	**PQ**	**VG**		**(c)**	**71-77**			
		Leaf blade: glossiness of upper side							
		very weak							1
		weak						Laura	2
		medium							3
		strong						Scarlett	4
		very strong							5
32.	**(*)**	**PQ**	**VG**		**(c)**	**71-77**			
		Leaf blade: color of upper side of expanded leaves							
		light green						Spring Snow	1
		medium green						Snowdrift	2
		dark green						Pink Spires	3
		yellow							4
		purple						Coppurple	5
33.	**(*)**	**QN**	**VG**		**(c)**	**71-77**			
		Leaf blade: anthocyanin coloration of upper side							
		absent or very weak						Courtabri, Snowdrift	1
		weak						Profusion	2
		medium						Royalty	3
		strong						Coppurple	4
34.	**(*)**	**QN**	**VG**		**(c)**	**71-77**			
		Leaf blade: intensity of anthocyanin coloration of upper side							
		very weak							1
		weak						Cowichan	2
		medium						Baskatong	3
		strong						Royalty	4
		very strong							5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35.		**PQ**	**VG**			**93**			
		Leaf blade: main color just before leaf fall							
		yellow						Malus sargentii, Snowdrift	1
		orange						Branzam, Scarlett	2
		red						Red Splendor, Rosseau	3
		brown						Royalty	4
		orange brown							5
		purple							6
36.		**QN**	**MG/VG**			**89**			
		Tree: fruit setting							
		none or very few						Spring Snow	1
		few						Malus x magdeburgensis	2
		medium						Makamik	3
		many						John Downie	4
		very many						Golden Hornet	5
37.	**(*)**	**QN**	**MG/VG**	**(+)**	**(d)**	**89**			
		Fruit: height							
		very short							1
		very short to short							2
		short							3
		short to medium							4
		medium							5
		medium to tall							6
		tall							7
		tall to very tall							8
		very tall							9
38.	**(*)**	**QN**	**MG/VG**	**(+)**	**(d)**	**89**			
		Fruit: diameter							
		very small							1
		very small to small							2
		small							3
		small to medium							4
		medium							5
		medium to large							6
		large							7
		large to very large							8
		very large							9

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
39.	**(*)**	**QN**	**MG/VG**		**(d)**	**89**			
		Fruit: ratio height/diameter							
		very low							1
		very low to low							2
		low							3
		low to medium							4
		medium							5
		medium to high							6
		high							7
		high to very high							8
		very high							9
40.	**(*)**	**PQ**	**VG**	**(+)**	**(d)**	**89**			
		Fruit: shape							
		flat obloid						Branzam	1
		broad globose conical							2
		obloid						Profusion	3
		truncate conical						Malus x arnoldiana	4
		globose conical						Scarlett	5
		globose						Winter Gold	6
		conical						Eleyi	7
		oblong conical							8
		oblong						Veitchii	9
		ellipsoid							10
		ellipsoid conical (ovoid)						Dolgo	11
		pyriform							12
		narrow conical						John Downie	13
41.		**QN**	**MG/VG**	**(+)**	**(d)**	**89**			
		Fruit: length of stalk							
		very short						Redflesh	1
		short						Strathmore	2
		medium						John Downie	3
		long						Evereste	4
		very long						Aldenhamensis	5
42.	**(*)**	**PQ**	**VG**		**(d)**	**89**			
		Fruit: calyx							
		absent						Scarlett	1
		sometimes present						Golden Hornet	2
		always present						John Downie	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
43.		**PQ**	**VG**		**(d)**	**89**			
		Fruit: bloom of skin							
		absence or weakly expressed						Courtabri	1
		moderately expressed							2
		strongly expressed						Dartmouth	3
44.		**PQ**	**VG**		**(d)**	**89**			
		Fruit: glossiness of skin							
		absence or weakly expressed							1
		moderately expressed							2
		strongly expressed						Selkirk	3
45.	**(*)**	**PQ**	**VG**		**(d)**	**89**			
		Fruit: predominant color							
		whitish green							1
		medium green						Malus trilobata	2
		green yellow						White Cascade	3
		whitish yellow							4
		medium yellow						Golden Hornet	5
		dark yellow							6
		orange						Evereste, Snowdrift	7
		light red						Radiant	8
		medium red						Red Jade	9
		dark red						Pink Spires, Profusion	10
		purple						Coppurple, Purple Prince	11
		brownish						Louisa	12
46.	**(*)**	**QN**	**MG/VG**						
		Fruit: persistence							
		very short						John Downie	1
		very short to short							2
		short						Dolgo	3
		short to medium							4
		medium						Dorothea	5
		medium to long							6
		long						Makamik	7
		long to very long							8
		very long						Evereste	9

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

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

(a) Observations should be made in dormancy period (leaf fall to pre-bud break) .

(b) Observations should be made on second or subsequent flowers, at the start of anther dehiscence.

(c) Observations should be made on fourth to sixth fully expanded leaves from the vigorous vegetative current season shoot.

(d) Observations should be made on fruits when they are ripe. 10 typical fruits should be selected. The terminal fruits should be excluded. The fruits should be examined before they are affected by any damage due to weather, birds etc.

8.2 Explanations for individual characteristics

Ad. 1: Tree: vigor

The vigor of the tree should be considered as the overall abundance of vegetative growth, after at least one satisfactory crop of fruit. It can either be assessed at the peak of vegetative growth in summer (growth stage 39), or during the dormant season before pruning (stage 00), considering shoot length and thickness, and trunk diameter.

Ad. 2: Tree: habit

1	2	3	4	5	6
columnar	fastigiate	upright	spreading	drooping	weeping

Ad. 3: One-year-old shoot: length of internode

Observations should be made in the middle third of lateral dormant shoots using a vernier caliper gauge.

Ad. 4: Unopened flower: color (balloon stage)

All observations on the unopened flower should be made on the second or third flower bud when the terminal flower is opening.

Ad. 7: Flower: type

1	Single:	5 to 7 petals
2	Semi-double:	8 to 15 petals
3	Double:	more than 15 petals

Ad. 8: Flower: diameter

Observations should be made with petals pressed into horizontal position.

Ad. 9: Flower: shape

1
flat

2
shallow cup

3
deep cup

Ad. 10: Flower: petal shape

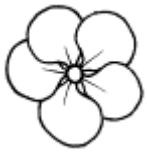
Observations should be made excluding the claw.

	← broadest part →	
	below middle	at middle
narrow (high)	 2 narrow ovate	 6 narrow eliptic
medium (medium)	 1 ovate	 5 eliptic
broad (low)		 4 broad eliptic
		 3 circular

Ad. 12: Only varieties with Flowertype: single: Flower: arrangement of petals

1
free

2
intermediate



3
overlapping

Ad. 13: Flower: petal attitude

1
flat

2
undulate

3
sinuate

Ad. 15: Flower: petal stripes

1
absent

9
present

Ad. 16: Only varieties with Flower: petal stripes: present: Flower: stripe distribution

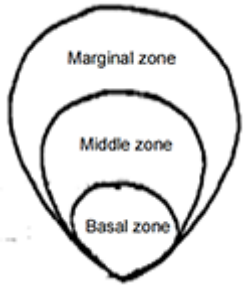
1
disperse

2
central

3
margin

4
irregular

Ad. 18: Flower: color of marginal zone of inner side of petal



Ad. 19: Flower: color of middle zone of inner side of petal (if different)

See Ad. 19

Ad. 20: Flower: color of basal zone of inner side of petal

See Ad. 7

Ad. 23: Current year shoot: color

Observations should be made in the middle third of vigorous vegetative summer shoot.

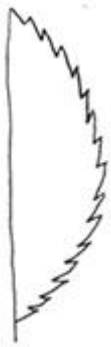
Ad. 24: Only varieties with lobed leaves: Leaf blade: depth of lobing

1
absent or weak

2
medium

3
strong

Ad. 25: Leaf blade: incisions of margin

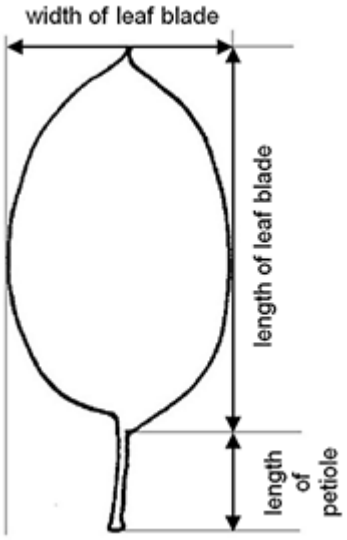


1
serrate

2
serrate to crenate

3
crenate

Ad. 26: Leaf blade: length



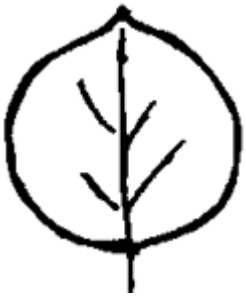
Ad. 27: Leaf blade: width

See Ad. 26

Ad. 28: Leaf blade: ratio length/width

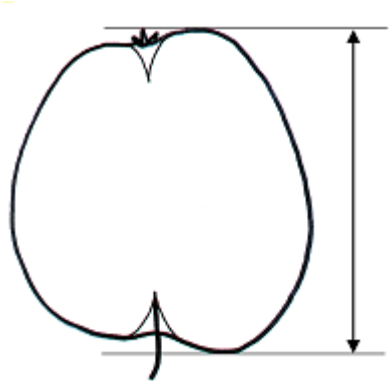
See Ad. 26

Ad. 29: Leaf blade: shape

width (ratio length/width)	← broadest part →	
	below middle	at middle
narrow (high)	 3 narrow ovate	 7 narrow eliptic
medium (medium)	 2 medium ovate	 6 medium eliptic
broad (low)	 1 broad ovate	 5 broad eliptic
		 4 circular

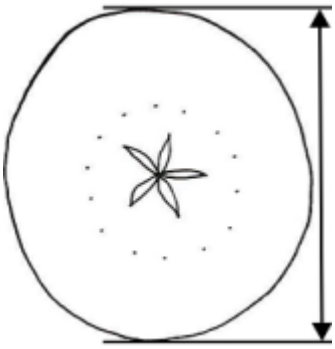
Ad. 37: Fruit: height

The maximum height should be observed.

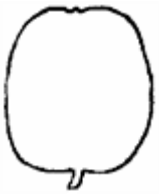
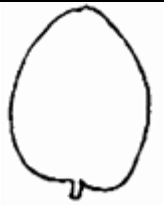


Ad. 38: Fruit: diameter

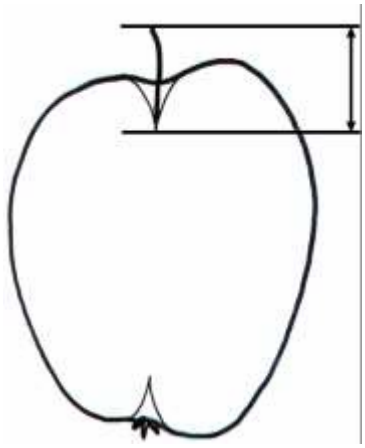
The maximum diameter should be observed.



Ad. 40: Fruit: shape

		← ratio height / diameter →					
		low		medium		high	
← broadest part →	above middle					 12 pyriform	
	at middle	 1 flat obloid	 3 obloid	 6 globose	 9 oblong	 11 ellipsoid	
			 2 broad globose conical	 5 globose conical	 8 oblong conical	 10 ellipsoid conical (ovoid)	
	below middle			 4 truncate conical	 7 conical		 13 narrow conical

Ad. 41: Fruit: length of stalk



8.3 Additional Explanations on the Table of Characteristic

BBCH-Scale for the description of the phenological growth stages of ornamental apple

Stage	Explanation
Principal growth stage 0: Bud development	
00	Dormancy: leaf buds and the thicker inflorescence buds closed and covered by dark brown scales
01	Beginning of bud swelling (leaf buds); buds visibly swollen, bud scales elongated, with light colored patches
03	End of leaf bud swelling: bud scales light colored with some parts densely covered by hairs
07	Beginning of bud break: first green leaf tips just visible
09	Green leaf tips about 5 mm above bud scales
Principal growth stage 1: Leaf development	
10	Green leaf tips 10 mm above the bud scales; first leaves separating (mouse-ear stage)
11	First leaves unfolded (others still unfolding)
15	More leaves unfolded, not yet at full size
19	First leaves fully expanded
Principal growth stage 2: (not applicable)	
Principal growth stage 3: Shoot development[1)] **1) From terminal buds**	
31	Beginning of shoot growth: axes of developing shoots visible
32	Shoots about 20 % of final length
39	Shoots about 90 % of final length
Principal growth stage 4: (not applicable)	
Principal growth stage 5: Inflorescence emergence	
51	Inflorescence buds swelling: Inflorescence buds swelling: bud scales elongated, with light buds closed, light brown scales colored patches visible
52	End of bud swelling: light colored bud scales visible with parts densely covered by hairs
53	Bud burst: green leaf tips enclosing flowers visible
54	Mouse-ear stage: green leaf tips 10 mm above bud scales; first leaves separating Flower buds visible (still closed)
55	Flower buds visible (still closed)
56	Green bud stage: single flowers separating (still closed)
57	Red bud stage: flower petals elongating; sepals slightly open; petals just visible
59	Most flowers with petals forming a hollow ball
Principal growth stage 6: Flowering	
60	First flowers open
61	Beginning of flowering: about 10 % of flowers open
65	Full flowering: at least 50 % of flowers open, first petals falling
67	Flowers fading: majority of Flowers fading: majority of petals fallen
69	End of flowering: all petals fallen
Principal growth stage 7: Development of fruit	
71	Fruit fall after flowering
73	Second fruit fall
75	Fruit about half final size
77	Fruit about 70 % of final size
Principal growth stage 8: Maturity of fruit and seed	
81	Beginning of ripening: lightening of cultivar-specific fruit color
85	Advanced ripening: increase in intensity of cultivar-specific color
89	Fruit fully ripe: fruit have typical color and firmness
Principal growth stage 9: Senescence, beginning of dormancy	
91	Shoot growth completed; terminal bud developed; foliage still fully green
92	Leaves begin to discolor
93	Beginning of leaf fall
97	All leaves fallen
99	All fruits fallen

9. Literature

Bärtels, A., 2020: Wild- und Zieräpfel - Üppige Pracht für Gärten und Parks, Quelle & Meyer, Wiebelsheim (DE), pp. 528.

Fiala, J. L., 1995: Flowering Crabapples - The Genus Malus, Timber press, Portland Oregon (US), pp. 340.

LISANDRU, T.T.; FÜSTÖS, A.; DUMITRAŞ, A.; MITRE, V., 2017: Flower Development of Ornamental Crabapple According to BBCH Scale.Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Horticulture, Cluj-Napoca, Romania, pp. 147.

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	*Malus* Mill.
1.2 Common name	Ornamental Apple

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 varieties)

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 Vegetative propagation

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

4.2.2 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 (7)	**Flower: type**		
	single	Profusion	1 [ ]
	semi-double	Coralcole	2 [ ]
	double	Branzam, Nieuwlandiana	3 [ ]
5.2 (18)	**Flower: color of marginal zone of inner side of petal**		
	white	Snowdrift	1 [ ]
	light pink	Pink Spires	2 [ ]
	medium pink	Strawberry Parfait	3 [ ]
	dark pink	Profusion	4 [ ]
	purple	Coppurple	6 [ ]
	dark purple	Royalty	7 [ ]
5.3 (22)	**Leaf blade: color of expanding leaves**		
	green	Snowdrift	1 [ ]
	yellow green	Cinzam	2 [ ]
	yellow		3 [ ]
	brown red	Branzam	4 [ ]
	purple red	Coppurple	5 [ ]
	purple	Royalty	6 [ ]
5.4 (29)	**Leaf blade: shape**		
	broad ovate		1 [ ]
	medium ovate		2 [ ]
	narrow ovate		3 [ ]
	circular		4 [ ]
	broad eliptic		5 [ ]
	medium eliptic		6 [ ]
	narrow eliptic		7 [ ]

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

	Characteristics	Example Varieties	Note
5.5 (36)	**Tree: fruit setting**		
	none or very few	Spring Snow	1 [ ]
	few	Malus x magdeburgensis	2 [ ]
	medium	Makamik	3 [ ]
	many	John Downie	4 [ ]
	very many	Golden Hornet	5 [ ]
5.6 (40)	**Fruit: shape**		
	flat obloid	Branzam	1 [ ]
	broad globose conical		2 [ ]
	obloid	Profusion	3 [ ]
	truncate conical	Malus x arnoldiana	4 [ ]
	globose conical	Scarlett	5 [ ]
	globose	Winter Gold	6 [ ]
	conical	Eleyi	7 [ ]
	oblong conical		8 [ ]
	oblong	Veitchii	9 [ ]
	ellipsoid		10 [ ]
	ellipsoid conical (ovoid)	Dolgo	11 [ ]
	pyriform		12 [ ]
	narrow conical	John Downie	13 [ ]

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

	Characteristics	Example Varieties	Note
5.7 (45)	**Fruit: predominant color**		
	whitish green		1 [ ]
	medium green	Malus trilobata	2 [ ]
	green yellow	White Cascade	3 [ ]
	whitish yellow		4 [ ]
	medium yellow	Golden Hornet	5 [ ]
	dark yellow		6 [ ]
	orange	Evereste, Snowdrift	7 [ ]
	light red	Radiant	8 [ ]
	medium red	Red Jade	9 [ ]
	dark red	Pink Spires, Profusion	10 [ ]
	purple	Coppurple, Purple Prince	11 [ ]
	brownish	Louisa	12 [ ]

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			

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

[#] 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".

_____

9.3 Has the plant material to be examined been tested for the presence of virus or other pathogens?

Yes [ ]

(please provide details as specified by the Authority)

No [ ]

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]