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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

TECHNICAL WORKING PARTY FOR ORNAMENTAL PLANTS AND FOREST TREES

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WORKING PAPER ON DRAFT TEST GUIDELINES FOR ORNAMENTAL APPLE

Document prepared by experts from the United Kingdom

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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

Ornamental Apple*

Malus Mill.*

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative Names:*

Latin	English	French	German	Spanish
Malus Mill.*	Ornamental Apple			

ASSOCIATED DOCUMENTS

These 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.

* 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 Guidelines

1.1 These Test Guidelines apply to all varieties of ornamental apple, *Malus* Mill., of the family Rosaceae.

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 three-year old trees on a rootstock.

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

Five three-year old trees on a rootstock.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease. A rootstock should be named when the plant material is supplied. The competent authorities may prescribe the rootstock on which the variety should be grafted.

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 Duration of Tests

The minimum duration of tests should normally be

{ ASW 2 (Section 3.1) – number of growing cycles }

3.2 Testing Place

The tests should normally be conducted at one place. If any characteristics of the variety, which are relevant for the examination of DUS, cannot be seen at that place, the variety may be tested at an additional place.

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

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

(b) All observations on the flower should be made at the start of anther dehiscence on second or third flowers with intact pedicel.

(c) All observations on the current season's shoot should be made on shoots from the outside of the tree in summer while the tree is still in active growth.

(d) Unless otherwise indicated all observations on the leaf should be made on mature leaves taken in summer from the middle third of a vigorous shoot of the current season on the outside of the tree.

(e) Unless otherwise indicated, for the observations on the fruit, 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.

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.

3.4 Test Design

3.4.1 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.

3.4.2 Each test should be designed to result in a total of at least five trees.

3.5 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations determined by measuring or counting should be made on two plant parts taken from each of five trees.

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 minimum duration of tests recommended in section 3.1 reflects, in general, the need to ensure that any differences in a characteristic are sufficiently consistent.

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 acceptable number of off-types tolerated in a sample size of 5 plants is 0 on the basis of a population standard of 1% and an acceptance probability of 95%.

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.

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 is 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) Flower: type (characteristic 6)

(b) Petal: color of marginal zone of inner side (characteristic 12)

(c) Expanding leaf: color of blade (characteristic 16)

(d) Fruit: size (characteristic 29)

(e) Fruit: predominant colour (characteristic 35).

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 Section 6.1.2

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

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

(a)-(e) Method of observation – See section 3.3.2

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

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**Tree: vigor**					
		weak				Dorothea	3
		medium				Dolgo	5
		strong				*Malus baccata* Jackii	7
2. **(*)** **(+)**		**Tree: habit**					
		columnar				Maypole	1
		fastigiate				Laura	2
		upright				Van Eseltine	3
		spreading				Red Glow	4
		drooping				Elise Rathke	5
		weeping				Oekonomierat Echtermeyer	6
3.	**(c)**	**Shoot: color**					
		grey green				Red Sentinel	1
		brown green				Wintergold	2
		brown				Van Eseltine	3
		red brown				Henry F. Dupont	4
		dark red				Evereste	5
4.		**Inflorescence: type**					
		umbellate				Golden Hornet	1
		corymbiform				*Malus coronaria* Charlottae	2

* MoE = Method of Observation

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. (*)	**(a)**	**Unopened flower: color (balloon stage)**					
		white				*Malus toringoides*	1
		light pink				*Malus coronaria* Charlottae	2
		medium pink				Cowichan	3
		dark pink				*Malus floribunda*	4
		red				Red Glow	5
		purple					6
6. (*)	**(b)**	**Flower: type**					
		single				Profusion	1
		semi-double				*Malus* x *scheideckeri*	2
		double				*Malus coronaria* Nieuwlandiana	3
7. (*)	**(b)**	**Flower: diameter with petals pressed into horizontal position**					
		small				Wintergold	3
		medium				Profusion	5
		large				Montreal Beauty	7
8. (*)	**(b)**	**Flower: shape**					
		flat					1
		shallow cup				Courtarou	2
		deep cup				Van Eseltine	3

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9. (*)	**(b)**	**Petal: shape (excluding claw)**					
		oblong				*Malus coronaria* Charlottae	1
		narrow elliptic					2
		elliptic				Makamik	3
		broad elliptic				Wynema	4
		circular				*Malus yunnanensis* Veitchii	5
		narrow ovate				Katherine	6
		ovate				Profusion	7
10. (*)	**(b)**	**Petals: relative position of margins**					
		free				Makamik	1
		touching				John Downie	2
		overlapping				Butterball	3
11.	**(b)**	**Petal: veins**					
		not prominent				John Downie	1
		prominent				Almey	2
12. (*)	**(b)**	**Petal: color of marginal zone of inner side** RHS-Colour Chart (indicate reference number)					
13. (*)	**(b)**	**Petal: color of middle zone of inner side (if different)** RHS-Colour Chart (indicate reference number)					

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14. (*)	**(b)**	**Petal: color of basal zone of inner side (if different)** RHS-Colour Chart (indicate reference number)					
15. (*)	**(b)**	**Petal: color of outer side** RHS-Colour Chart (indicate reference number)					
16. (*)	**(d)**	**Expanding leaf: color of blade**					
		green				John Downie	1
		reddish green				Winter Gold	2
		red					3
		reddish brown				Laura	4
		bronze				Indian Magic	5
		purple				Royalty	6
17. (*)	**(d)**	**Leaf blade: length**					
		short				*Malus floribunda*	3
		medium				*Malus* x *purpurea* Lemoinei	5
		long				Simcoe	7
18. (*)	**(d)**	**Leaf blade: width**					
		narrow				Hopa	3
		medium				John Downie	5
		broad				Montreal Beauty	7

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19.	**(d)**	**Leaf blade: ratio length/width (from fourth to sixth fully expanded leaf)**					
		small					3
		medium					5
		large					7
20. (*)	**(d)**	**Petiole: length**					
		short					3
		medium					5
		long					7
21. (*)	**(d)**	**Leaf blade: lobes**					
		absent				Dolgo	1
		sometimes present				Wynema	2
		always present				*Malus coronaria* Nieuwlandiana	3
22. (*)	**(d)**	**Leaf blade: incisions of margin**					
		crenate				Courtabri	1
		serrate				Scarlett	2
23. (*)	**(d)**	**Leaf blade: glossiness of upper side**					
		weak				Laura	3
		medium					5
		strong				Scarlett	7

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24. (*)	**(d)**	**Leaf blade: green color of upper side**					
		light				Red Jade	3
		medium					5
		dark				Red Jewel	7
25. (*)	**(d)**	**Leaf blade: anthocyanin coloration of upper side**					
		absent				Courtabri	1
		present				Royalty	9
26 (*)	**(d)**	**Leaf blade: intensity of anthocyanin coloration of upper side**					
		weak				Cowichan	3
		medium				Baskatong	5
		strong				Royalty	7
27.	**(d)**	**Leaf blade: main color just before leaf fall**					
		yellow				*Malus sargentii*	1
		orange				Scarlett	2
		red				Rosseau	3
		brown				Royalty	4
		bronze					5
		purple					6

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28.		**Tree: fruit setting**					
		none or very few				*Malus* x *atrosanguinea*	1
		few				*Malus* x *magdeburgensis*	3
		medium				Makamik	5
		many				John Downie	7
		very many				Golden Hornet	9
29. (*)	**(e)**	**Fruit: size**					
		very small				*Malus sargentii*	1
		small				Profusion	3
		medium				John Downie	5
		large				Wynema	7
		very large				Niedzwetzkyana	9

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30. (*) (+)	**(e)**	**Fruit: shape**					
		globose				Winter Gold	1
		globose conical				Scarlett	2
		broad globose conical					3
		flat obloid				*Malus* x *schiedeckeri*	4
		obloid				Profusion	5
		conical				Eleyi	6
		narrow conical				John Downie	7
		truncate conical				*Malus* x *arnoldiana*	8
		ellipsoid				*Malus baccata* var. *mandshurica*	9
		ellpsoid conical (ovoid)				Dolgo	10
		oblong				*Malus yunnanensis* Veitchii	11
		oblong conical					12
		pyriform				*Malus toringoides*	13
31. (*)	**(e)**	**Fruit: calyx**					
		absent				Scarlett	1
		sometimes present				Golden Hornet	2
		always present				John Downie	3

Char. No.	* MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
32.	**(e)**	**Fruit: length of stalk**					
		very short				Redflesh	1
		short				Strathmore	3
		medium				John Downie	5
		long				Evereste	7
		very long				*Malus* x *purpurea* Aldenhamensis	9
33.	**(e)**	**Fruit: bloom of skin**					
		absent				Courtabri	1
		weakly expressed					2
		strongly expressed				Dartmouth	3
34.	**(e)**	**Fruit: glossiness of skin**					
		absent					1
		weakly expressed					2
		strongly expressed				Selkirk	3

Char. No.	MoE*	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35. (*)	**(e)**	**Fruit: predominant color**					
		yellow				Golden Hornet	1
		whitish yellow					2
		green yellow				White Cascade	3
		whitish green					4
		medium green				*Malus trilobata*	5
		orange				Evereste	6
		light red					7
		medium red				Red Jade	8
		dark red				Profusion	9
		purple				Purple Prince	10
		brownish					11
36.	**(e)**	**Fruit: color of flesh**					
		white					1
		yellowish white				Elise Rathke	2
		greenish				*Malus coronaria* Charlottae	3
		yellowish				Dolgo	4
		pink					5
		red				Laura	6
37. (*)	**(e)**	**Fruit: persistence**					
		very short				John Downie	1
		short				Dolgo	3
		medium				Dorothea	5
		long				Makamik	7
		very long				Evereste	9

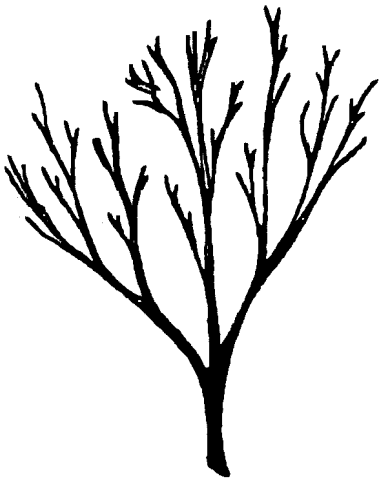
Char. No.	* MoE	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
38.		**Time of beginning of flowering (10% open flowers**					
		early				Hopa	3
		medium				*Malus* x *purpurea* Lemoinei	5
		late				Wynema	7

8. Explanations on the Table of Characteristics

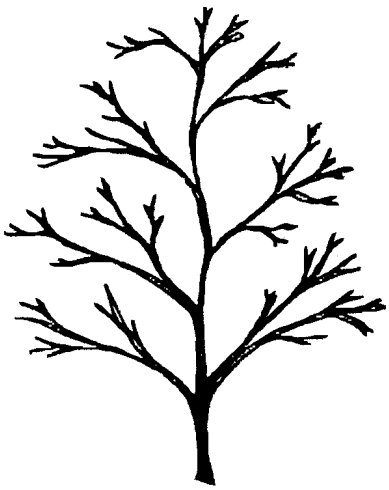
Ad 2: Tree: habit

1
columnar

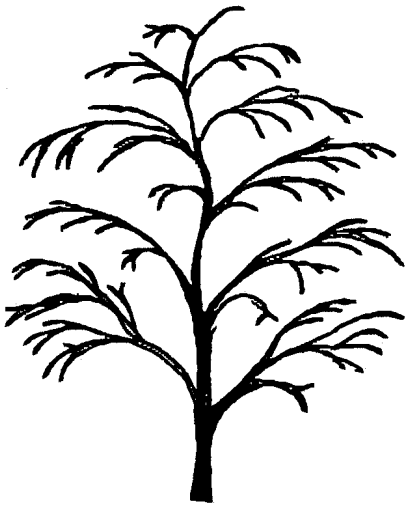
2
fastigiate



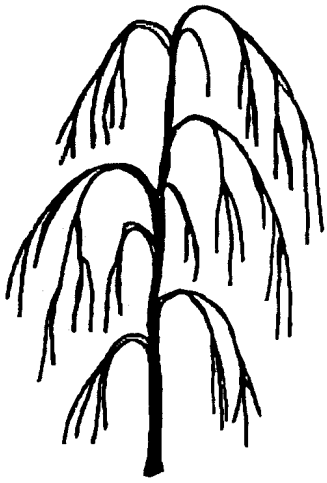
3
upright



4
spreading

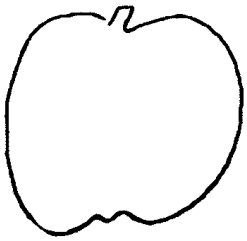


5
drooping

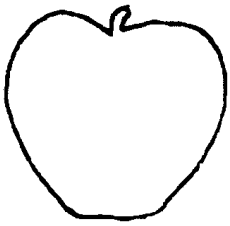


6
weeping

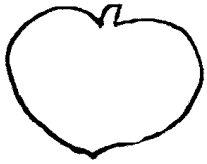
Ad 30: Fruit: shape



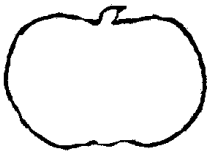
1
globose



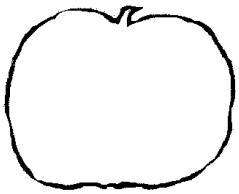
2
globose conical



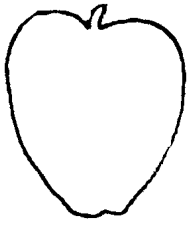
3
broad globose conical



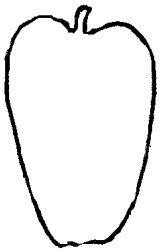
4
flat obloid



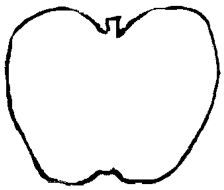
5
obloid



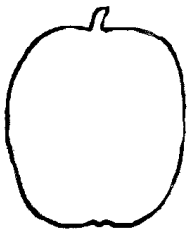
conical



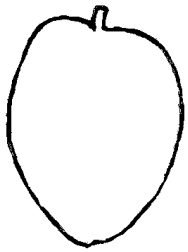
7
narrow conical



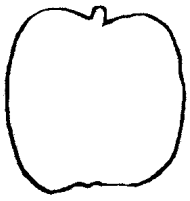
8
truncate conical



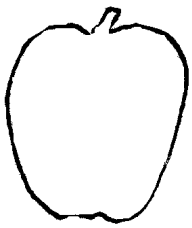
9
ellipsoid



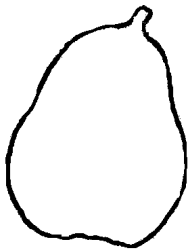
10
ellipsoid conical (ovoid)



11
oblong



12
oblong conical



13
pyriform

9. Literature

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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 Genus

1.1.1 *Latin Name*	*Malus* Mill.
1.1.2 Common Name	Ornamental apple

1.2 Species (please complete)

1.2.1 *Latin Name*	
1.2.2 Common Name	

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	

Breeder (if different from applicant)

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

3. Proposed denomination and breeder's reference

Proposed denomination (if available) [ ]

Breeder's reference [ ]

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

4.1 Breeding Scheme

4.1.1 Variety resulting from:

(a) controlled cross [ ]
(please state parent varieties)
(b) partially unknown cross [ ]
(please state known parent variety(ies))
(c) totally unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

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

4.1.4 Other [ ]
(please provide details)

4.2 Method of Propagating the Variety

(a) cuttings [ ]

(b) *in vitro* propagation [ ]

(c) other (state method) [ ]

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 (6)	Flower: type		
	single	Profusion	1[ ]
	semi-double	*Malus* x *scheideckeri*	2[ ]
	double	*Malus coronaria* Nieuwlandiana	3[ ]
5.2i (12)	**Petal: color of marginal zone of inner side**		
	RHS-Colour Chart (indicate reference number)		
5.2ii (12)	**Petal: color of marginal zone of inner side**		
	white		1[ ]
	light pink		2[ ]
	dark pink		3[ ]
	red		4[ ]
	purple		5[ ]
5.3 (16)	**Expanding leaf: color of blade**		
	green	John Downie	1[ ]
	reddish green	Winter Gold	2[ ]
	red		3[ ]
	reddish brown	Laura	4[ ]
	bronze	Indian Magic	5[ ]
	purple	Royalty	6[ ]

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

	Characteristics	Example Varieties	Note
5.4 (29)	**Fruit: size**		
	very small	*Malus sargentii*	1[ ]
	small	Profusion	3[ ]
	medium	John Downie	5[ ]
	large	Wynema	7[ ]
	very large	Niedzwetzkyana	9[ ]
5.5 (35)	**Fruit: predominant color**		
	yellow	Golden Hornet	1[ ]
	whitish yellow		2[ ]
	green yellow	White Cascade	3[ ]
	whitish green		4[ ]
	medium green	*Malus trilobata*	5[ ]
	orange	Evereste	6[ ]
	light red		7[ ]
	medium red	Red Jade	8[ ]
	dark red	Profusion	9[ ]
	purple	Purple Prince	10[ ]
	brownish		11[ ]

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

6. Similar varieties and differences from these varieties

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)	*Plant: height*	*e.g. note 3*	*note 7*
		e.g. short	*tall*
		e.g. 90 cm	*130 cm*

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 Special conditions for the examination of the variety

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

Yes [ ] No [ ]

7.2.2 If yes, please give details:

7.3 Other information

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. 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]