



PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Malus Mill.

APPLE ROOTSTOCKS

UPOV Code: MALUS

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CPVO-TP/163/2

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1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to varieties used as rootstocks of all species of *Malus* Mill.

The protocol describes the technical procedures to be followed in order to meet the requirements of Council Regulation 2100/94 on Community Plant Variety Rights. The technical procedures have been agreed by the Administrative Council and are based on documents agreed by the International Union for the Protection of New Varieties of Plants (UPOV), such as the General Introduction to DUS (UPOV Document TG/1/3 http://www.upov.int/export/sites/upov/resource/en/tg_1_3.pdf), its associated TGP documents (<http://www.upov.int/tgp/en/>) and the relevant UPOV Test Guideline TG/163/4 dated 25/03/2015 (<http://www.upov.int/edocs/tgdocs/en/tg163.pdf>) for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on **01.01.2016**. Any ongoing DUS examination of candidate varieties started before the aforesaid date will not be affected by the approval of the Technical Protocol. Technical examinations of candidate varieties are carried out according to the TP in force when the DUS test starts. The starting date of a DUS examination is considered to be the due date for submitting of plant material for the first test period.

In cases where the Office requests to take-over a DUS report for which the technical examination has either been finalized or which is in the process to be carried out at the moment of this request, such report can only be accepted if the technical examination has been carried out according to the CPVO TP which was in force at the moment when the technical examination started.

1.3 Reporting between Examination Office and CPVO and Liaison with Applicant

1.3.1 Reporting between Examination Office and CPVO

The Examination Office shall deliver to the CPVO a preliminary report ("the preliminary report") no later than two weeks after the date of the request for technical examination by the CPVO.

The Examination Office shall also deliver to the CPVO a report relating to each growing period ("the interim report") and, when the Examination Office considers the results of the technical examination to be adequate to evaluate the variety or the CPVO so requests, a report relating to the examination ("the final report").

The final report shall state the opinion of the Examination Office on the distinctness, uniformity and stability of the variety. Where it considers those criteria to be satisfied, or where the CPVO so requests, a description of the variety shall be added to the report. If a report is negative the Examination Office shall set out the detailed reasons for its findings.

The interim and the final reports shall be delivered to the CPVO as soon as possible and no later than on the deadlines as laid down in the designation agreement.

1.3.2 Informing on problems in the DUS test

If problems arise during the course of the test the CPVO should be informed immediately so that the information can be passed on to the applicant. Subject to prior permanent agreement, the applicant may be directly informed at the same time as the CPVO particularly if a visit to the trial is advisable.

1.3.3 Sample keeping in case of problems

If the technical examination has resulted in a negative report, the CPVO shall inform the Examination Office as soon as possible in case that a representative sample of any relevant testing material shall be kept.

2. MATERIAL REQUIRED

2.1 Plant material requirements

Information with respect to the agreed closing dates and submission requirements of plant material for the technical examination of varieties can be found on <http://cpvo.europa.eu/applications-and-examinations/technical-examinations/submission-of-plant-material-s2-publication> in the special issue S2 of the Official Gazette of the Office. General requirements on submission of samples are also to be found following the same link.

2.2 Informing the applicant of plant material requirements

The CPVO informs the applicant that

- he is responsible for ensuring compliance with any customs and plant health requirements.
- the plant material supplied should be visibly healthy, not lacking in vigour, nor affected by any important pest or disease.
- 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.

2.3 Informing about problems on the submission of material

The Examination Office shall report to the CPVO immediately in cases where the test material of the candidate variety has not arrived in time or in cases where the material submitted does not fulfil the conditions laid down in the request for material issued by the CPVO.

In cases where the examination office encounters difficulties to obtain plant material of reference varieties the CPVO should be informed.

3. METHOD OF EXAMINATION

3.1 Number of growing cycles

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

The growing cycle is considered to be the duration of a single growing season, beginning with bud burst, flowering and fruit harvest and concluding when the following dormant period ends with the swelling of new season buds.

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" http://www.upov.int/edocs/tgpdocs/en/tgp_9.pdf.

3.3 Conditions for Conducting the Examination

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.

The optimum stage of development for the assessment of each characteristic is indicated by a number in the third column of the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.1.

3.4 Test design

3.4.1 Each test should be designed to result in a total of at least:

- (a) 5 plants for vegetatively propagated varieties,
- (b) 10 plants for seed propagated varieties.

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

In accordance with Article 83(3) of Council Regulation No. 2100/94 an applicant may claim either in the Technical Questionnaire or during the test that a candidate has a characteristic which would be helpful in establishing distinctness. If such a claim is made and is supported by reliable technical data, an additional test may be undertaken providing that a technically acceptable test procedure can be devised.

Additional tests will be undertaken, with the agreement of the President of CPVO, where distinctness is unlikely to be shown using the characters listed in the protocol.

3.6 Constitution and maintenance of a variety collection

The process for the constitution and the maintenance of a variety collection can be summarized as follows:

Step 1: Making an inventory of the varieties of common knowledge

Step 2: Establishing a collection ("variety collection") of varieties of common knowledge which are relevant for the examination of distinctness of candidate varieties

Step 3: Selecting the varieties from the variety collection which need to be included in the growing trial or other tests for the examination of distinctness of a particular candidate variety.

3.6.1 Forms of variety collection

The variety collection shall comprise variety descriptions and living plant material, thus a living reference collection. The variety description shall be produced by the EO unless special cooperation exists between EOs and the CPVO. The descriptive and pictorial information produced by the EO shall be held and maintained in a form of a database.

3.6.2 Living Plant Material

The EO shall collect and maintain living plant material of varieties of the species concerned in the variety collection.

3.6.3 Range of the variety collection

The living variety collection shall cover at least those varieties that are suitable to climatic conditions of a respective EO.

3.6.4 Making an inventory of varieties of common knowledge for inclusion in the variety collection

The inventory shall include varieties protected under National and Community PBR, varieties of National Catalogues and varieties in trade or in commercial registers. In addition to the above, the inventory shall be extended to the appropriate to

- any commercial document in which varieties are marketed as propagating or harvested material, especially when there is no official registration system;
- any list including varieties which are publicly available within plant collections (varieties included in genetic resource collections, collection of old varieties, etc.);
- information provided by relevant plant experts;
- relevant example varieties referred to in the technical protocols for the examination of distinctness.

3.6.5 Maintenance and renewal/update of a living variety collection

The EO shall maintain the variety collection under appropriate growing conditions (e.g. glasshouse, orchard, in vitro), where it shall be ensured that the plants are adequately irrigated, fertilised, pruned and protected from harmful pests and diseases. For the renewal of existing living material the identity of replacement living plant material shall be verified by conducting side-by-side plot comparisons between the material in the collection and the new material or by checking the identity of the new material against the variety description.

4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY

The prescribed procedure is to assess distinctness, uniformity and stability in a growing trial.

4.1 Distinctness

4.1.1 General recommendations

It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 9 'Examining Distinctness' (http://www.upov.int/edocs/tgpdocs/en/tgp_9.pdf) prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in this Technical Protocol.

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 Technical Protocols are familiar with the recommendations contained in the UPOV-General Introduction to DUS prior to making decisions regarding distinctness.

4.1.4 Number of plants/parts of plants to be examined

Unless otherwise indicated, for the purposes of distinctness, all observations should be made on 5 plants or parts taken from each of 5 plants for trees and 9 plants for stoolbeds disregarding off-type plants,. In the case of observations of parts of 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 third column of the Table of Characteristics (see document TGP/9 "Examining Distinctness", Section 4 "Observation of characteristics"):

MG:	single measurement of a group of plants or parts of plants
MS:	measurement of a number of individual plants or parts of plants
VG:	visual assessment by a single observation of a group of plants or parts of plants
VS:	visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. colour 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**

It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 10 'Examining Uniformity' (http://www.upov.int/edocs/tgpdocs/en/tgp_10.pdf) prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in this Technical Protocol.

Uniformity assessment by off-types

In the case of vegetatively propagated varieties, for the assessment of uniformity, 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.

In the case of seed propagated varieties, for the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 10 plants, 1 off-type is allowed.

4.3 **Stability**

4.3.1 It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 11 'Examining Stability' (http://www.upov.int/edocs/tgpdocs/en/tgp_11.pdf).

In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed or plant stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL

- 5.1** The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.
- 5.2** Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.
- 5.3** The following have been agreed as useful grouping characteristics:
- a) Plant: vigour (characteristic 1)
 - b) Plant: habit (characteristic 4)
 - c) Young shoot: extent of anthocyanin coloration (characteristic 19)
 - d) Leaf blade: attitude in relation to shoot (characteristic 20)
 - e) Leaf blade: incisions of margin (characteristic 26)
- 5.4** If other characteristics than those from the TP are used for the selection of varieties to be included into the growing trial, the EO shall inform the CPVO and seek the prior consent of the CPVO before using these characteristics.

6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS

6.1 Characteristics to be used

The characteristics to be used in DUS tests and preparation of descriptions shall be those referred to in the table of characteristics. All the characteristics shall be used, providing that observation of a characteristic is not rendered impossible by the expression of any other characteristic, or the expression of a characteristic is prevented by the environmental conditions under which the test is conducted or by specific legislation on plant health. In the latter case, the CPVO should be informed.

The Administrative Council empowers the President, in accordance with Article 23 of Commission Regulation N°874/2009, to insert additional characteristics and their expressions in respect of a variety.

States of expression and corresponding notes

In the case of qualitative and pseudo-qualitative characteristics, all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

State	Note
small	3
medium	5
large	7

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

State	Note
very small	1
very small to small	2
small	3
small to medium	4
medium	5
medium to large	6
large	7
large to very large	8
very large	9

6.2 Example Varieties

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

6.3 Legend

For the CPVO N° column:

G	Grouping characteristic	– see Chapter 5
MG, MS, VG, VS	– see Chapter 4.1.5	
QL	Qualitative characteristic	
QN	Quantitative characteristic	
PQ	Pseudo-qualitative characteristic	

For the UPOV N° column:

The numbering of the characteristics is provided as a reference to the ad hoc UPOV guideline.

(*) UPOV Asterisked characteristic – Characteristics that are important for the international harmonization of variety descriptions.

[A] - Applies only for stoolbeds

[B] - Applies only for fully grown trees

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

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

7. TABLE OF CHARACTERISTICS

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
1.	1.	VG	Plant: vigour		
(+)	(*)	(a)	very weak		1
QN			very weak to weak		2
			weak	M 27	3
			weak to medium	J-TE-F	4
			medium	J-TE-H, Mark	5
			medium to strong	Lancep	6
			strong	Cepiland	7
			strong to very strong		8
G			very strong		9
2.	2.	[B] VG	Plant: number of branches		
QN		(a)	very few		1
			few		2
			medium		3
			many		4
			very many		5
3.	3.	[A] VG	Plant: number of shoots		
QN		(a)	very few		1
			few		2
			medium	Lancep, Last Minute/ P22, Supporter 1	3
			many	Joha	4
			very many		5
4.	4.	VG	Plant: habit		
(+)	(*)	(a)	upright		1
PQ			upright to spreading		2
			spreading	M9	3
G			drooping		4

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
5.	5.	[B] VG	Plant: number of spines		
QN		(a)	absent or few		1
			medium		2
			many		3
6.	6.	VG	One-year-old shoot: growth pattern		
(+)	(*)	(b)	straight	Joha	1
QN			moderately wavy	M 26, M 9, Mark, Supporter 1	2
			strongly weavy		3
7.	7.	VG	One-year-old shoot: pubescence		
(+)	(*)	(b)	absent or very weak		1
QN			weak		2
			medium	B 9, M 27	3
			strong	Joha, M 9	4
			very strong		5
8.	8.	VG	One-year-old shoot: glossiness		
QN	(*)	(b)	absent or weak		1
			medium	M 26	3
			strong		5
9.	9.	VG/MS	One-year-old shoot: thickness		
QN	(*)	(b)	thin		1
			medium	B 9, Mark	2
			strong	Lizzy/ P 16	3
10.	10.	VG/MG	One-year-old shoot: length of internodes		
QN	(*)	(b)	short	J-TE-H	1
			medium	Last Minute/ P22	2
			long		3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
11.	11.	VG	One-year-old shoot: number of lenticels		
QN	(*)	(b)	very few		1
			few	J-TE-F, Lancep	2
			medium	M 26, M 5, Mark, Supporter 1	3
			many	CG 10, M 2	4
			very many		5
12.	12.	VG	One-year-old shoot: size of lenticels		
QN		(b)	small	J-TE-F	1
			medium	B 9, Joha, Lizzy/ P 16	2
			large		3
13.	13.	VG	One-year-old shoot: colour of sunny side		
PQ	(*)	(b)	greenish brown	M 4	1
			reddish brown	Lizzy/ P 16, Mark	2
			medium brown	J-TE-H, M 27, M 26	3
			dark brown	B 9, M 2	4
14.	14.	VG	One-year-old shoot: size of vegetative bud		
QN	(*)	(b)	small	J-TE-H	1
			medium	M 26	2
			large	M 9	3
15.	15.	VG	One-year-old shoot: shape of apex of vegetative bud		
(+)		(b)	acute	CG 10, J-TE-H	1
PQ			obtuse	Last Minute/ P22, Mark, Supporter 1	2
			rounded	M 7	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
16.	16.	[A] VG	One-year-old shoot: position of vegetative bud in relation to shoot		
(+)		(b)	small		1
QN			medium		2
			large	Cepiland, M 4, M 2	3
17.	17.	VG	One-year-old shoot: size of vegetative bud support		
(+)		(b)	small		1
QN			medium	Last Minute/ P22, M 7	2
			large	M 2, Mark	3
18.	18.	VG	Young shoot: colour of upper part		
(+)	(*)	(c)	whitish		1
PQ			greenish		2
			reddish		3
			blackish		4
19.	19.	VG	Young shoot: extent of anthocyanin coloration		
QN	(*)	(c)	absent or very small		1
			small		2
			medium		3
			large		4
G			very large		5
20.	20.	VG	Leaf blade: attitude in relation to shoot		
(+)	(*)	(d)	upwards	M 27	1
QN			outwards	Last Minute/ P22, Mark	2
G			downwards		3
21.	21.	VG/MS	Leaf blade: length		
QN	(*)	(d)	short	M 27, M 26	3
			medium		5
			long	B 9, M 9	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
22.	22.	VG/MS	Leaf blade: width		
QN	(*)	(d)	narrow		3
			medium	M 27	5
			broad		7
23.	23.	VG/MS	Leaf blade: ratio length/width		
(+)	(*)	(d)	very low		1
QN			low	M 27, M 8	2
			medium	Last Minute/ P22, Supporter 1	3
			high		4
			very high		5
24.	24.	VG	Leaf blade: profile in cross section		
(+)		(d)	concave	M 27	1
QN			flat	M 9, M 7	2
			convex		3
25.	25.	VG	Leaf blade: length of tip		
(+)		(d)	short	M 26	1
QN			medium	MM 106	2
			long	Last Minute/ P22, P 1	3
26.	26.	VG	Leaf blade: incisions of margin		
(+)	(*)	(d)	crenate	J 9	1
PQ			bicrenate	J-TE-G	2
			serrate type 1	J-TE-H, M 9	3
			serrate type 2	J-TE-A	4
G			biserrate	MM 112, MM 114	5

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
27.	27.	VG	Leaf blade: depth of incisions of margin		
QN		(d)	very shallow		1
			shallow		2
			medium		3
			deep		4
			very deep		5
28.	28.	VG	Leaf blade: undulation of margin		
QN	(*)	(d)	absent or very weak	MM 105, Pi 80	1
			weak	MM 106	2
			medium	Cepiland, J-TE-H	3
			strong	CG 24, M 18	4
29.	29.	VG	Leaf blade: pubescence on lower side		
QN		(d)	weak	M 7	1
			medium	Lizzy/ P 16, Supporter 1	2
			strong		3
30.	30.	VG	Leaf blade: glossiness of upper side		
QN	(*)	(d)	absent or very weak	M 16, MM 114	1
			weak	MM 111	2
			medium	MM 106	3
			strong	M 9, MM 102, MM 112	4
31.	31.	VG	Leaf blade: intensity of green colour		
QN	(*)	(d)	light	J-TE-G	1
			medium	CG 24, M 9	3
			dark	CG 10, M 26	5
32.	32.	VG/MS	Petiole: length		
QN	(*)	(d)	short		1
			medium	M 27, M 9	3
			long	MM 106	5

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
33.	33.	VG/MS	Petiole: length relative to length of blade		
(+)	(*)	(d)	short		1
QN			medium		3
			long		5
34.	34.	VG	Petiole: extent of anthocyanin coloration		
(+)		(d)	small	J-TE-F	1
QN			medium	M 9	2
			large	CG 10	3
35.	35.	VG	Stipule: size		
QN	(*)	(d)	small	M 27	1
			medium	M 9	2
			large	MM 106	3
36.	36.	[B] VG	Plant: number of flowers		
(+)		(e)	none or few		1
QN			medium		2
			many		3
37.	37.	[B] VG	Flower: colour at balloon stage		
(+)		(e)	light pink	CG 80	1
QN			medium pink	J-TE-F	2
			medium red	Supporter 1	3
			dark red	B 9	4
			purple	J 9	5
38.	38.	[B] VG	Flower: arrangement of petals		
(+)		(e)	free	Cepiland	1
QN			intermediate		2
			overlapping	J-TE-B	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note	
39.	39.	[B] VG	Flower: diameter			
			(+)	very small		1
			QN	small		2
				medium		3
				large		4
40.	40.	[B] VG	Flower: position of stigmas relative to anthers			
			(+)	below		1
			QN	same level	P 92	2
				above	J-TE-B	3
41.	41.	[B] VG	Fruit: size			
			QN	very small		1
				small	J-TE-F	3
				medium	J-TE-H	5
				large	M 9	7
				very small		9
42.	42.	[B] VG	Fruit: ratio length/width			
			(+)	very low		1
			QN	low		2
				medium		3
				high		4

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
43. (+) PQ	43.	[B] VG	Fruit: shape		
		(f)	conic waisted		1
			conic		2
			ovate	Last Minute/ P22	3
			oblate		4
			circular	Bemali	5
			elliptic	M 11	6
			oblong		7
44. QN	44.	[B] VG	Fruit: ribbing		
		(f)	absent or very weak	Bemali	1
			weak	CG 24	2
			medium	CG 80	3
			strong	Lancep	4
45. QN	45.	[B] VG	Fruit: crowning at calyx end		
		(f)	absent or very weak	M 3	1
			weak	J-TE-A	2
			medium	Joha	3
			strong	CG 80	4
46. (+) PQ	46.	[B] VG	Fruit: ground colour		
		(f)	not visible	B 9	1
			whitish yellow	M 8	2
			yellow	P 92	3
			whitish green	CG 24	4
			yellow green	M 1	5
			green	M 5	6

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
47.	47.	[B] VG	Fruit: over colour		
(+)		(f)	orange red	M 26	1
PQ			pink red	P 47	2
			red		3
			purple red	MM 102	4
			brown red	Mark	5
48.	48.	[B] VG	Fruit: relative area of over colour		
QN		(f)	absent or very small	MM 115	1
			small	MM 105	3
			medium	MM 104	5
			large	M 26	7
			very large	B 9	9
49.	49.	[B] VG	Fruit: length at stalk		
QN		(f)	very short	Last Minute/ P22	1
			short	P 92	3
			medium	P 1	5
			long	SU57233	7
			very long	Supporter 1	9
50.	50.	[B] VG	Fruit: aperture of locules in transverse section		
(+)		(f)	closed or slightly open	M 5	1
QN			moderately open	Last Minute/ P22	2
			fully open	J-TE-F	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
51.	51.	MG	Time of beginning of bud burst		
(+)	(*)		very early		1
QN			early	M 4	3
			medium	B 9, Cepiland	5
			late	Last Minute/ P22	7
			very late		9
52.	52.	[B] MG	Time of beginning of flowering		
(+)			very early		1
QN			early		3
			medium		5
			late		7
			very late		9

8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS

8.1 Explanations covering several characteristics

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

- a) Plant: Observations on the plant should be made in the dormant season.
- b) One-year-old shoot: Observations on the shoot should be made on the middle third of the one-year-old shoot in the dormant season.
- c) Young shoot: Observation of the young shoot should be made on the upper third of the one-year-old shoot during rapid growth.
- d) Leaf: Observations on the leaf should be made on fully developed leaves from the middle third of vigorous current season shoots.
- e) Flower: Observations on the flower should be done on fully grown trees. Observations on the flower should be made on the second or subsequent flowers, at the start of dehiscence.
- f) Fruit: Observations on the fruit should be done on fully grown trees. All observations of the fruit should be made on 10 typical fruits taken from a minimum sample of 20 fruits, at time of visual ripeness.

8.2 Explanations for individual characteristics

Ad. 1: Plant: vigour

The vigour of the plant should be considered as the overall abundance of vegetative growth.

Ad. 4: Plant: habit



1
upright



2
upright to spreading



3
spreading



4
drooping

Ad. 6: One-year-old shoot: growth pattern



1
straight



2
moderately wavy



3
strongly wavy

Ad. 7: One-year-old shoot: pubescence

The pubescence should be assessed on the distal half of the shoot.

Ad. 15: One-year-old shoot: shape of apex of vegetative bud



1
acute



2
obtuse



3
rounded

Ad. 16: One-year-old shoot: position of vegetative bud in relation to shoot



1
adpressed



2
slightly held out



3
strongly held out

Ad. 17: One-year-old shoot: size of vegetative bud support



1
small



2
medium

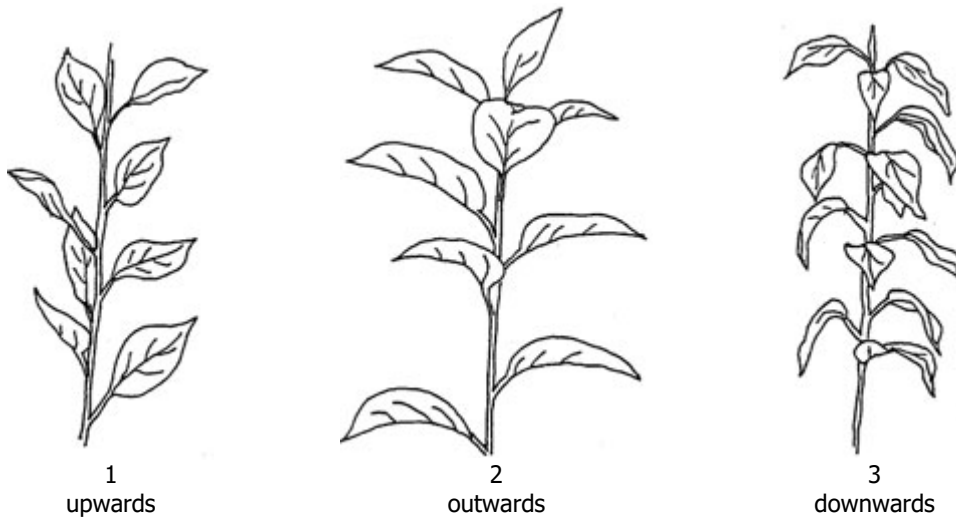


3
large

Ad. 18: Young shoot: colour of upper part

The color observed should be of the underlying skin underneath the pubescence.

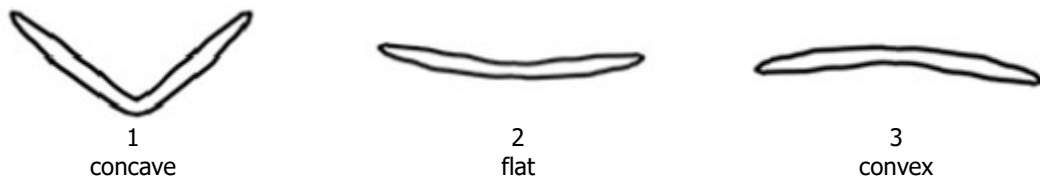
Ad. 20: Leaf blade: attitude in relation to shoot



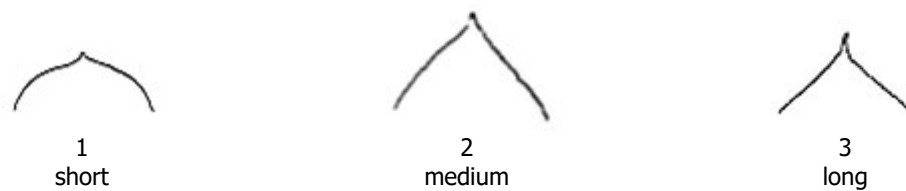
Ad. 23: Leaf blade: ratio length/width



Ad. 24: Leaf blade: profile in cross section

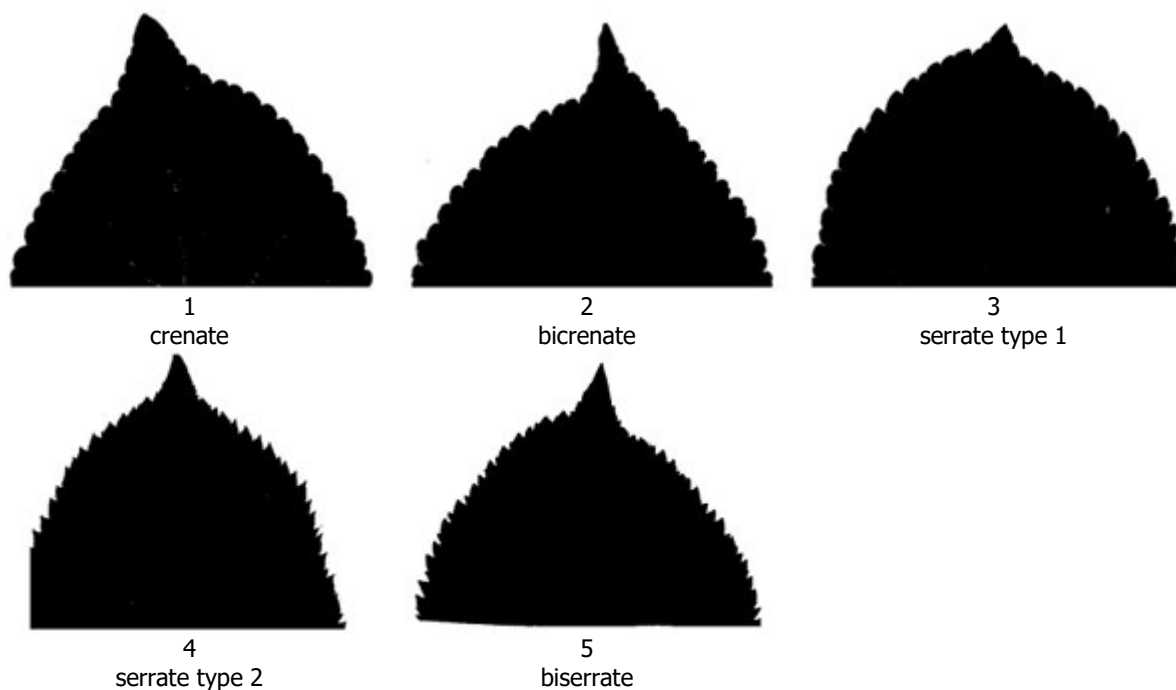


Ad. 25: Leaf blade: length of the tip



Ad. 26: Leaf blade: incisions of margin

Observations should be done on the upper half of the leaf blade.



Ad. 33: Petiole: length relative to length of blade

Should be assessed regarding the length of the petiole compared to the length of the middle vein of the leaf.

Ad. 34: Petiole: extent of anthocyanin coloration

Should be assessed regarding the degree to which the anthocyanin coloration extends from the petiole base towards the base of the leaf.

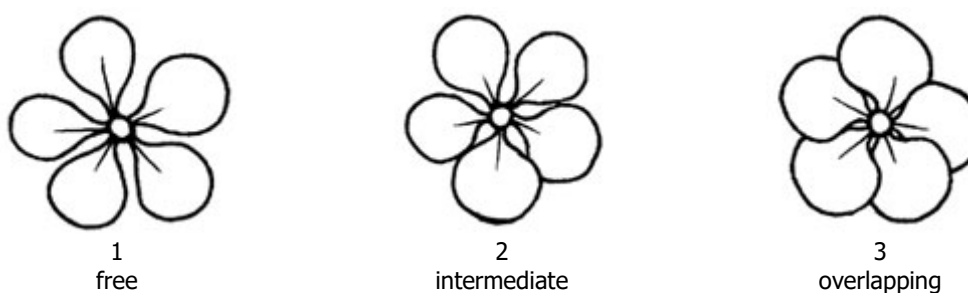
Ad. 36: Plant: number of flowers

Should be assessed as the amount of flowers present during the flowering period.

Ad. 37: Flower: colour at balloon stage

Balloon stage is the phenological stage in the course of the flower development when the calyx is fully expanded and the petals are recognizable, having partially expanded and inflated but are closed, covering the internal organs. Balloon stage is usually 1-2 days before the petals unfold.

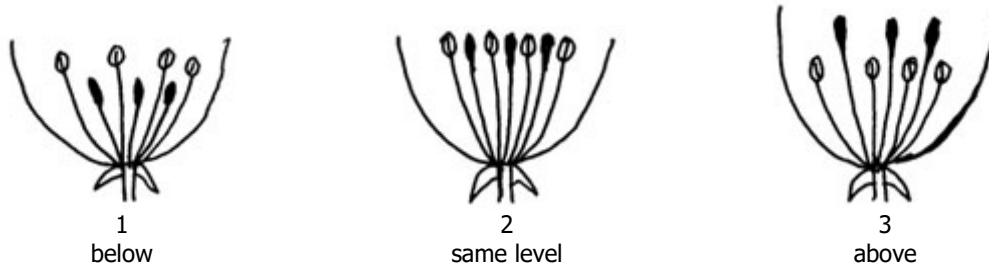
Ad. 38: Flower: arrangement of petals



Ad. 39: Flower: diameter

The observation should be done with the petals pressed into a horizontal position.

Ad. 40: Flower: position of stigmas relative to anthers



Ad. 42: Fruit: ratio length/width

Ad. 43: Fruit: shape

		← broadest part →	
		below middle	at middle
width (ratio length/width) →	narrow (high)		7 oblong
	→	3 ovate	6 elliptic
	←	1 conic waisted	5 circular
	broad (low)	2 conic	4 oblate

Ad. 46: Fruit: ground colour

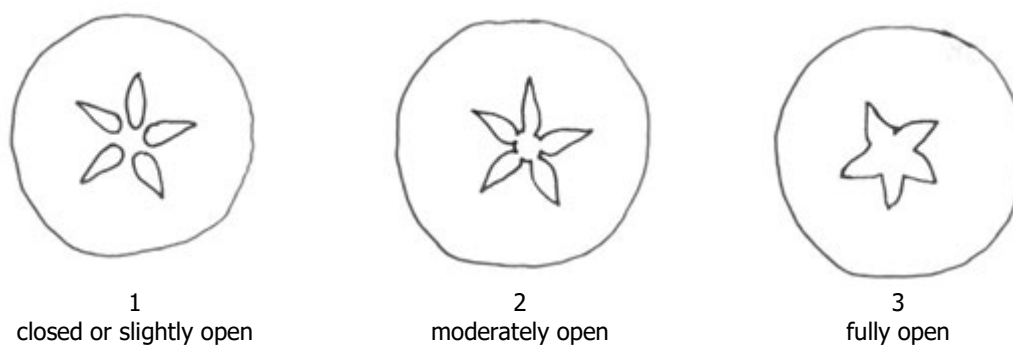
The ground color is the first color to appear chronologically during the development of the fruit. Other colors may develop in time in the form of spots, blotches, or a flush. The ground color is the color which has a continuous dispersion across the surface of the fruit.

Ad. 47: Fruit: over colour

All observation should be done with the bloom removed.

In the case where the fruit has a ground color upon which a second color such as a flush develops over time, the flush is considered the over color. The over color is not always the color occupying the smallest surface area of the fruit concerned.

Ad. 50: Fruit: aperture of locules in transverse section



Ad. 51: Time of beginning of bud burst

The time of beginning of bud burst is when 10% of the buds show green points.

Ad. 52: Time of beginning of flowering

The time of beginning of flowering is when 10% of the flowers on the 5 trees are fully open.

9. LITERATURE

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10. TECHNICAL QUESTIONNAIRE

The Technical Questionnaire is available on the CPVO website under the following reference: CPVO-TQ/163/2.