



PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Punica granatum L.

POMEGRANATE

UPOV Code: PUNIC_GRA

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CPVO-TP/284/1

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1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to all varieties of *Punica granatum L.*

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/en/publications/intro_dus.htm), its associated TGP documents (<http://www.upov.int/en/publications/tgp/>) and the relevant UPOV Test Guideline TG/284/1 dated 20/03/2013 (<http://www.upov.int/edocs/tgdocs/en/tg284.pdf>) for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on **01.01.2013**. Any on-going 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://www.cpvo.europa.eu/main/en/home/documents-and-publications/s2-gazette> 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

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

In particular, it is essential that the plants produce a satisfactory crop of fruit in each of the two growing cycles.

3.1.2 The growing cycle is considered to be the duration of a single growing season, beginning with bud burst (flowering and/or vegetative), 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/export/sites/upov/en/publications/tgp/documents/tgp_9_1.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 5 plants.

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 examination office unless special cooperation exists between examination offices and the CPVO. The descriptive and pictorial information produced by the examination office shall be held and maintained in a form of a database.

3.6.2 Living Plant Material

The examination office 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 examination office.

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 for fruit species 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 examination office 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/export/sites/upov/en/publications/tgp/documents/tgp_9_1.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 on single plants should be made on 5 plants or parts taken from each of 5 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 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/export/sites/upov/en/publications/tgp/documents/tgp_10_1.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

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.

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/export/sites/upov/en/publications/tgp/documents/tgp_11_1.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) Corolla: colour (characteristic 17)
- b) Fruit: width (characteristic 23)
- c) Fruit: over colour (characteristic 26)
- d) Aril: main colour (characteristic 35)
- e) Seed: hardness (characteristic 38)
- f) Time of maturity for consumption (characteristic 40)

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 examination office 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)-(e) 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)	weak		3
QN			medium	Wonderful	5
			strong	Mollar de Elche	7
2.	2.	VG	Plant: growth habit		
(+)		(a)	upright		1
PQ			spreading		3
			weeping		5
3.	3.	VG	Plant: intensity of grey colour of main branches		
QN		(a)	light		1
			medium		2
			dark		3
4.	4.	VG	Plant: number of one-year-old shoots ending in thorns		
(+)		(a)	none or very few		1
QN			few		2
			medium		3
			many		4
5.	5.	VG	Young shoot: predominant number of leaves per node		
(+)			two	Mollar de Elche	1
QN			three		2
			more than three	Porfianca	3
6.	6.	VG/MS	Leaf blade: length		
QN		(b)	short	Mollar de Elche, Porfianca	3
			medium	Valenciano	5
			long	Borde, Wonderful	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
7. QN	7.	VG/MS (b)	Leaf blade: width		
			narrow	Wonderful	3
			medium		5
			broad	Borde, Mollar de Elche	7
8. (+) QN	8.	VG/MS (b)	Leaf blade: ratio length/width		
			low	Mollar de Albatera	3
			medium	Borde	5
			high	Tendral	7
9. (+) QN	9.	VG (b)	Leaf blade: shape of apex excluding tip		
			strongly acute		1
			moderately acute	Wonderful	2
			right angled	Acco, Tendral	3
			moderately obtuse	Mollar de Elche	4
			strongly obtuse		5
10. QN	10.	VG (b)	Leaf blade: intensity of green colour		
			light		3
			medium		5
			dark		7
11. QN	11. (*)	VG/MS (b)	Petiole: length		
			short	Borde	3
			medium	Wonderful	5
			long	Tendral	7
12. QN	12. (*)	VG (b)	Petiole: anthocyanin coloration		
			weak	Acco	3
			medium	Mollar de Elche	5
			strong	Borde, Tendral	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
13.	13.	VG/MS	Calyx: length		
(+)		(c)	short	Malisi	3
QN			medium	Hicaz Nar	5
			long		7
14.	14. (*)	VG/MS	Calyx: width		
(+)		(c)	narrow	Malisi	3
QN			medium	Mollar de Elche, Porfianca, Valenciana	5
			broad	Wonderful	7
15.	15.	VG/MS	Calyx: ratio length/width		
(+)		(c)	low	Wonderful	3
QN			medium	Black	5
			high	Bhagwa	7
16.	16.	VG	Calyx: colour		
(+)		(c)	orange	Mollar de Elche, Valenciana	1
PQ			orange red	Wonderful	2
			medium red		3
			dark red		4
17.	17. (*)	VG	Corolla: colour		
(+)		(c)	white		1
PQ			pink		2
			light orange	Borde	3
			medium orange	Mollar de Elche, Wonderful	4
			orange red		5
G			medium red		6

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
18.	18. (*)	VG/MS	Petal: length		
(+)		(c)	short	Mollar de Elche, Valenciana	3
QN			medium	Hicaz Nar	5
			long		7
19.	19.	VG/MS	Petal: width		
(+)		(c)	narrow	Black, Hicaz Nar	3
QN			medium	Rosh Hapered, Tendral	5
			broad		7
20.	20.	VG	Petal: surface		
QN		(c)	smooth or slightly wrinkled		1
			moderately wrinkled	Bahgwa, Mollar de Elche	3
			strongly wrinkled	Malisi, Rosh Hapered	5
21.	21.	VG	One-year-old shoot: predominant number of flowers per node		
(+)			one		1
QN			two		2
			three		3
			more than three		4
22.	22. (*)	VG/MS	Fruit: length		
(+)		(d)	short		3
QN			medium	Borde	5
			long	Wonderful	7
23.	23. (*)	VG/MS	Fruit: width		
(+)		(d)	narrow		3
QN			medium	Borde	5
G			broad	Mollar de Elche, Wonderful	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
24.	24.	VG/MS	Fruit: ratio length/width		
(+)		(d)	low	Rosh Hapered	3
QN			medium	Wonderful	5
			high	Valenciana	7
25.	25. (*)	VG/MS	Fruit: length of crown		
(+)		(d)	short		3
QN			medium	Mollar de Elche	5
			long	Wonderful	7
26.	26. (*)	VG	Fruit: over colour		
PQ		(d)	orange	Mollar de Albaterra, Mollar de Elche	1
			orange red		2
			pink		3
			pink red	Valenciano	4
			medium red	Acco	5
			red purple		6
			purple	Kamel	7
G			dark purple		8
27.	27.	VG	Fruit: extent of over colour		
QN		(d)	very small		1
			small	Wonderful	3
			medium	Tendral, Valenciano	5
			large		7
			very large	Acco, Bhagwa, Black	9
28.	28. (*)	VG	Fruit: shape in cross section		
(+)		(d)	circular	Borde, Wonderful	1
QN			circular to angular	Malisi	2
			angular	Bhagwa, Valenciano	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
29.	29.	VG/MS	Fruit: thickness of skin		
(+)		(d)	thin	Acco, Valenciano, Wonderful	3
QN			medium		5
			thick	Kamel	7
30.	30. (*)	VG/MS	Fruit: sweetness		
(+)		(d)	low		3
QN			medium	Rosh Hapered, Valenciano	5
			high		7
31.	31.	VG/MS	Fruit: acidity		
(+)		(d)	low	Mollar de Elche, Valenciano	3
QN			medium	Acco, Wonderful	5
			high		7
32.	32. (*)	VG/MS	Fruit: juiciness		
(+)		(d)	low	Wonderful	3
QN			medium	Mollar de Elche	5
			high	Valenciano	7
33.	33.	VG/MS	Aril: length		
(+)		(e)	short		1
QN			medium	Acco	2
			long	Mollar de Elche	3
34.	34.	VG/MS	Aril: width		
(+)		(e)	narrow		1
QN			medium	Acco, Wonderful	2
			broad	Piñón tierno de Ojós	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
35.	35. (*)	VG	Aril: main colour		
(+)		(e)	white	Mollar de Elche	1
PQ			light pink	Valenciano	2
			medium pink	Tendral	3
			dark pink		4
			light red		5
			medium red		6
G			dark red	Wonderful	7
36.	36.	VG/MS	Seed: length		
(+)		(e)	short	Valenciano	1
QN			medium	Mollar de Elche	2
			long		3
37.	37.	VG/MS	Seed: width		
(+)		(e)	narrow		1
QN			medium	Mollar de Elche, Wonderful	2
			broad		3
38.	38. (*)	VG	Seed: hardness		
(+)		(e)	soft	Mollar de Elche, Valenciano	1
QN			medium	Wonderful	2
G			hard	Borde	3
39.	39. (*)	VG/MG	Time of beginning of flowering		
(+)			early	Valenciano	3
QN			medium	Mollar de Elche, Wonderful	5
			late		7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
40.	40. (*)	VG/MG	Time of maturity for consumption		
(+)			early	Valenciano	3
QN			medium	Mollar de Elche, Wonderful	5
G			late		7

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) Observations on the plant should be made in the dormant season, when there are no leaves on the tree.
- (b) Observations on the leaf should be made on mature leaves on the middle third of the branch from current season's shoots and on nodes with a low number of leaves.
- (c) Observations on the flower should be made on the hermaphrodite flowers at the time of full flowering and on fully opened flowers. Time of full flowering is when at least 75% of flowers are fully open.
- (d) Observations on the fruit should be made on 10 fruits at full maturity for consumption.
- (e) Observations on the seed should be made on fresh seeds on fruits at full maturity for consumption.

8.2 Explanations for individual characteristics

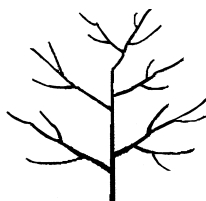
Ad. 1: Plant: vigour

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

Ad. 2: Plant: growth habit



1
upright



3
spreading



5
weeping

Ad. 4: Plant: number of one-year-old shoots ending in thorns

Observations on the one-year old shoot should be made in the dormant season, unless otherwise indicated.

Ad. 5: Young shoot: predominant number of leaves per node

Observations on young shoots should be made on the middle third of the branch.

Ad. 8: Leaf blade: ratio length/width



3
low

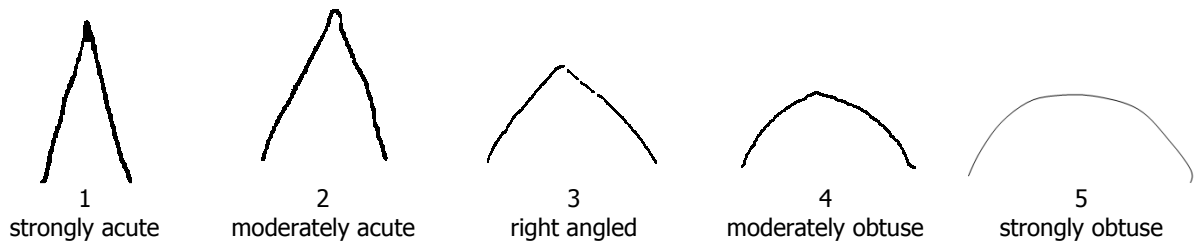


5
medium



7
high

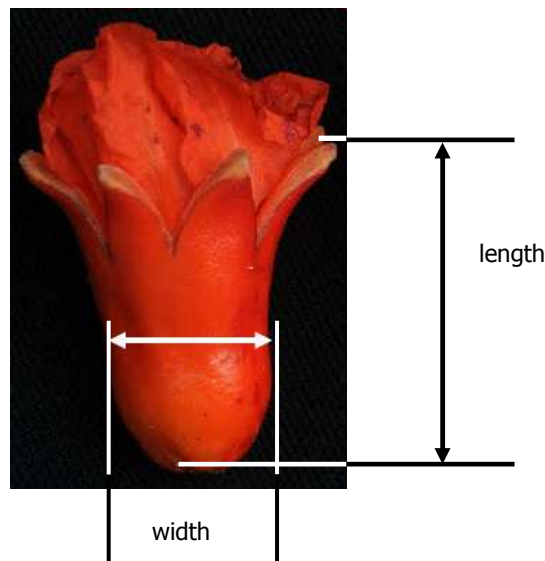
Ad. 9: Leaf blade: shape of apex excluding tip



Ad. 13: Calyx: length

Ad. 14: Calyx: width

Calyx width should be observed approximately in the middle of calyx length.



Ad. 15: Calyx: ratio length/width



3
low



5
medium



7
high

Ad. 16: Calyx: colour

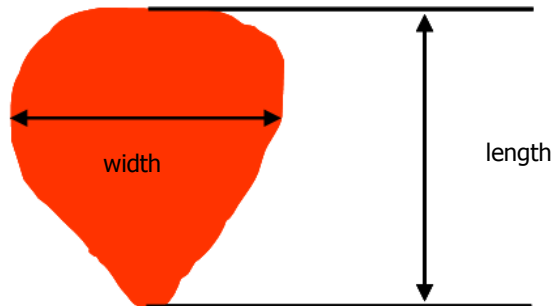
The colour of the calyx should be observed when the sepals are closed.

Ad. 17: Corolla: colour

The colour of the corolla should be observed when the flower is fully open.

Ad. 18: Petal: length

Ad. 19: Petal: width



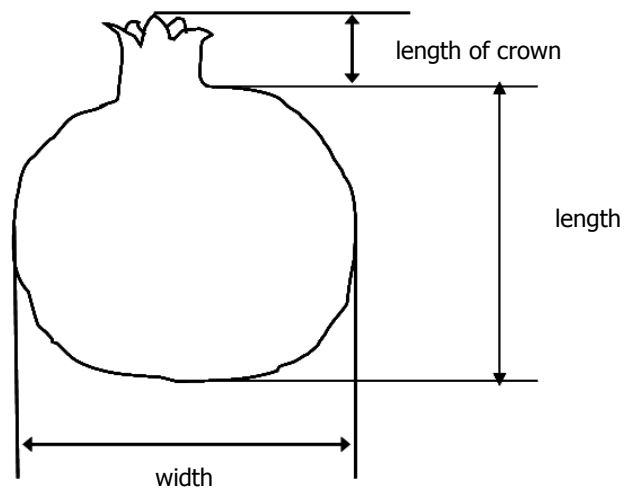
Ad. 21: One-year-old shoot: predominant number of flowers per node

Observations should be made on the hermaphrodite flowers at the time of full flowering.

Ad. 22: Fruit: length

Ad. 23: Fruit: width

Ad. 25: Fruit: length of crown



Ad. 24: Fruit: ratio length/width



3
low



5
medium



7
high

Ad. 28: Fruit: shape in cross section



1
circular



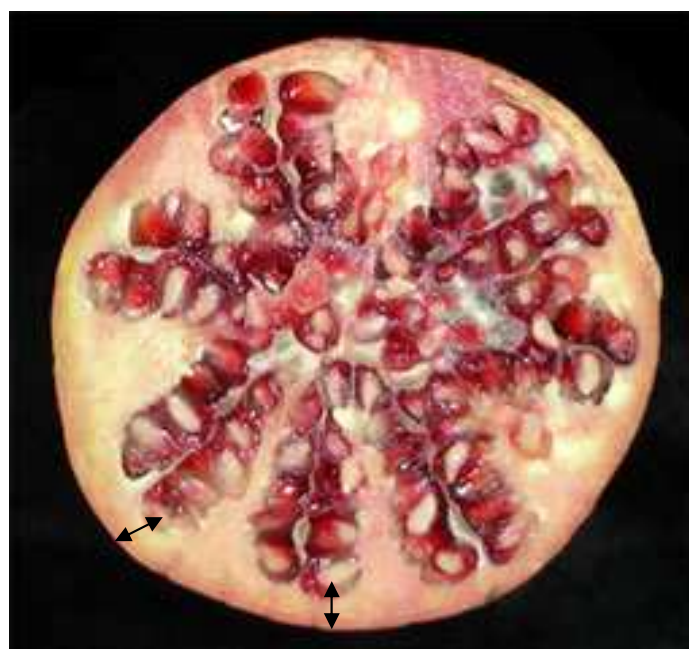
2
circular to angular



3
angular

Ad. 29: Fruit: thickness of skin

Observations should be made at the end of the lobules of arils, see arrows in the picture below.



Ad. 30: Fruit: sweetness

The sweetness is determined by using a refractometer. The measured unit is the degree Brix ($^{\circ}$ Brix).

Ad. 31: Fruit: acidity

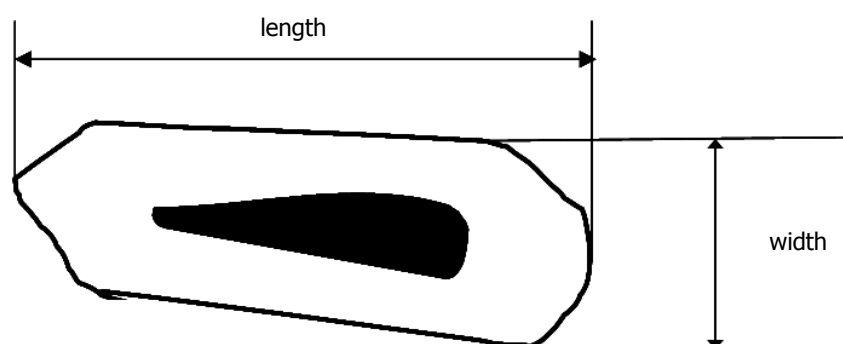
The acidity is considered as free acids content, and is determined by titration of a juice sample.

Ad. 32: Fruit: juiciness

Juiciness is considered as the percentage of juice of total fruit weight.

Ad. 33: Aril: length

Ad. 34: Aril: width

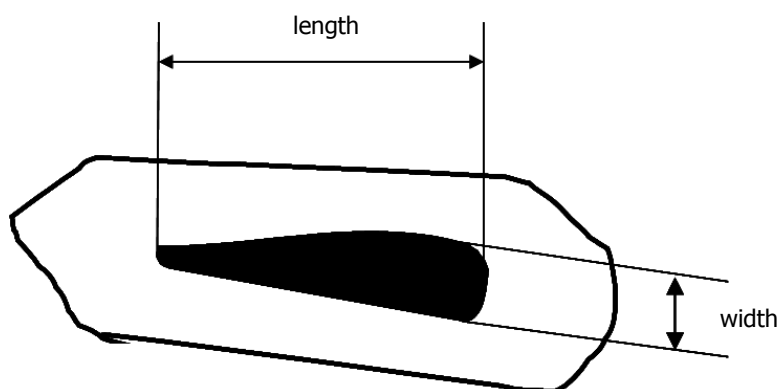


Ad. 35: Aril: main colour

The main colour is the colour with the largest surface area.

Ad. 36: Seed: length

Ad. 37: Seed: width



Ad. 38: Seed: hardness

Hardness of tegmen is assessed by chewing the arils. Soft means easy to chew. Hard means difficult to chew.

Ad. 39: Time of beginning of flowering

The beginning of flowering is considered as the time when 25% of the flowers are fully open.

Ad. 40: Time of maturity for consumption

The time of maturity is considered as the time when more than 75% of the fruits are fully coloured.

9. LITERATURE

Holland, D., Hatib, K., Bar-Ya'akov, I., 2009: Pomegranate: Botany, Horticulture, Breeding. In: Horticultural Reviews. Volume 35. Ed. Janick, J. John Wiley and Sons, Inc. Hoboken. New Jersey, US, pp. 127-191.

Melgarejo, P., Salazar, D., 2003: Tratado de fruticultura para zonas áridasy semiáridas. Volumen II. Algarrobo, grandado y jinjolo. AMV. Ediciones Mundiprensa.

Morton, J., 1987: Pomegranate. In: Fruits of warm climates. Ed. Morton, J. Miami FL. pp. 352-355.

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10. TECHNICAL QUESTIONNAIRE

The Technical Questionnaire is available on the CPVO website under the following reference: CPVO-TQ/284/1