CPVO · OCVV
Community Plant Variety Office
Office Communautaire des Variétés Végétales

PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Juglans regia L.

WALNUT

UPOV Code: JUGLA_REG

Adopted on 07/10/2021

Entry into force on 07/10/2021

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CPVO-TP/125/1

1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to all fruit varieties of ***Juglans regia* 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/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/125/7 dated 05/04/2017 (https://www.upov.int/edocs/tgdocs/en/tg125.pdf) for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on 07/10/2021. Any ongoing DUS examination of candidate varieties for which the first growing cycle for the purpose of observations has started (following the adequate period of establishment) 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 first growing cycle for the purpose of observations following the adequate period of establishment starts.

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 first growing cycle for the purpose of observations following the adequate period of establishment 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.

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

3.1.1 The duration of tests should be two independent growing cycles for the purpose of observation of characteristics following an adequate number of growing cycles for establishment of plants; at the end of each growing cycle for the purpose of observation of characteristics the competent authority will determine whether or not the following growing cycle is required.

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.

3.1.3 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" 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.

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 Special tests for additional characteristics

In accordance with Article 23 of Implementing Rules N° 874/2009 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, a special test may be undertaken providing that a technically acceptable test procedure can be devised.

Special tests will be undertaken, with the agreement of the President of CPVO, where distinctness is unlikely to be shown using the characteristics 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.

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.

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

3.6.2 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.

3.6.3 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 (where such catalogues exist) 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.

3.6. 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 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

4.2.1 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 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:

4.2.2 This Technical Protocol has been developed for the examination of vegetatively propagated varieties. For varieties with other types of propagation the recommendations in the UPOV-General Introduction to DUS and document TGP/13 "Guidance for new types and species", Section 4.5 "Testing Uniformity" should be followed.

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-type is allowed.

4.3 Stability

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.pd)

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.

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 ORGANISATION 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 organise the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

a) Tree: predominant location of fruit buds (characteristic 3)

b) Female flower: number per cluster (characteristic 7)

c) Infructescence: type (characteristic 9)

d) Nut: shape in ventral view (characteristic 11)

e) Nut: thickness of shell (characteristic 25)

f) Kernel: colour of endopleura (characteristic 26)

g) Time of leaf bud burst (characteristic 29)

h) Time of male flowering compared to female flowering (characteristic 31)

i) Time of harvest maturity (characteristic 32)

5.4 If other characteristics than those from the Technical Protocol 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.

5.5 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the UPOV-General Introduction to DUS and document TGP/9 "Examining Distinctness".

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.

6.2. 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

Further explanation of the presentation of states of expression and notes is provided in UPOV document TGP/7 "Development of Test Guidelines".

6.3 Example Varieties

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

6.4 Legend

For column 'CPVO N°':

G	Grouping characteristic	-see Chapter 5
QL	Qualitative characteristic	
QN	Quantitative characteristic	
PQ	Pseudo-qualitative characteristic	
(+)	Explanations for individual characteristics	-see Chapter 8.2

For column 'UPOV N°':

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

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

For column 'Stage, method':

MG, MS, VG, VS		-see Chapter 4.1.5
(a)-(c)	Explanations covering several Characteristics	-see Chapter 8.1

7. TABLE OF CHARACTERISTICS

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
1. (+)	**1. (*)**	**VG**	**Tree: growth habit**		
QN		**(a)**	upright	Corne, Fernor	1
			semi-upright	Alsószentiváni 117, Franquette, Hartley, Liaoning 1, Marbot	2
			spreading	Gustine, Milotai 10, Payne, Serr, Vina	3
2. (+)		**VG**	**Tree: branching**		
QN		**(a)**	weak	Apollo, Broadview, Vina	3
			medium	Franquette, Hartley, Jupiter, Lübo, Marbot, Victoria	5
			strong	Corne, Parisienne, Saturn	7
3. (+)		**VG**	**Tree: predominant location of fruit buds**		
QN			at tip of one-year old shoot (fruiting on outer side of tree)	Corne, Franquette, Marbot	1
			mainly on the top of long shoots bound on branches of 2 years or older (fruiting in clusters)	Hartley	2
G			all along the one-year old shoot (fruiting on lateral brindilles)	Chico, Payne, Serr	3
4. (+)	**3. (*)**	**VG**	**Bud: shape**		
PQ			circular	Chico, Milotai 10, Payne	1
			flabellate		2
			triangular	Franquette, Ronde de Montignac, Sibisel 39	3
5. (+)	**4. (*)**	**VG**	**Leaflet: shape**		
QN			narrow elliptic	Payne, Vina	3
			medium elliptic	Corne, Franquette, Marbot	5
			broad elliptic	Adam 10, Chase D 9	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
6. (+)	**5.**	**VG**	**Plant: second flowering**		
QL			absent	Milotai 10	1
			present		9
7.	**6. (*)**	**MG**	**Female flower: number per cluster**		
QN			1-2		1
			3-4		2
			5-10		3
			11-20	Tisa	4
G			more than 20		5
8. (+)	**7. (*)**	**VG**	**Female flower: intensity of yellow colour of stigma**		
QN			light	Milotai 10	1
			medium		2
			dark		3
9. (+)	**8. (*)**	**VG**	**Infructescence: type**		
PQ			solitary	Franquette, Milotai 10	1
			binate	Chandler	2
			fascicled	Howard	3
G			bunched	Grosvert	4
10.	**9.**	**VG**	**Nut: size**		
QN		**(b)**	small	Chico, Grandjean	3
			medium	Franquette, Payne, Serr	5
			large	Hartley, Lübo, Milotai 10, Sunland	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
11. (+)	**10. (*)**	**VG**	**Nut: shape in ventral view**		
PQ		**(b)**	triangular	Hartley	1
			broad ovate	Marbot, Payne, Serr	2
			ovate	Gustine	3
			oblong	Milotai bőtermő, Sunland	4
			elliptic	Corne, Franquette	5
			circular	Milotai 10, Meylannaise	6
G			broad elliptic	Parisienne	7
12. (+)	**11. (*)**	**VG**	**Nut: shape in lateral view**		
PQ		**(b)**	triangular	Hartley	1
			broad ovate	Payne, Serr	2
			ovate	Gustine	3
			circular	Meylannaise, Milotai 10	4
			broad elliptic	Franquette	5
			oblate		6
13. (+)	**12. (*)**	**VG**	**Nut: shape in cross section**		
PQ		**(b)**	reniform		1
			oblate	Chico, Franquette, Jupiter	2
			circular	Milotai 10, Payne, Victoria	3
			elliptic	Corne, Hartley, Serr	4
14. (+)	**13. (*)**	**VG**	**Nut: shape of base in lateral view**		
PQ		**(b)**	cuneate	Corne, Milotai bőtermő	1
			rounded	Chico, Franquette, Payne, Serr	2
			truncate	Parisienne	3
			emarginate	Hartley	4

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
15. (+)	**14. (*)**	**VG**	**Nut: shape of apex in lateral view**		
PQ		**(b)**	obtuse	Vina	1
			rounded	Chico	2
			truncate	Milotai bőtermő, Pedro	3
			emarginate	Parisienne	4
16. (+)	**15. (*)**	**VG**	**Nut: length of tip**		
QN		**(b)**	absent or short	Grandjean, Milotai 10	1
			medium	Chico, Corne, Hartley	2
			long	Franquette, Marbot, Payne, Serr, Victoria	3
17. (+)	**16. (*)**	**VG**	**Nut: extent of pad around suture**		
QN		**(b)**	on upper half	Chico, Hartley, Marbot, Parisienne	1
			on upper 2/3	Franquette, Gustine, Jupiter, Payne, Pedro	2
			on whole length	Serr	3
18.	**17. (*)**	**VG**	**Nut: predominance of pad on suture**		
QN		**(b)**	very weak		1
			weak		2
			medium	Chico, Grandjean	3
			strong	Franquette, Hartley, Marbot, Payne, Serr	4
			very strong		5
19. (+)	**18.**	**VG**	**Nut: width of pad on suture in lateral view**		
QN		**(b)**	narrow	Chico, Grandjean, Parisienne	1
			medium	Gustine, Hartley	3
			broad	Corne, Marbot, Payne, Serr	5

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
20.	**19.**	**VG**	**Nut: depth of groove along pad on suture**		
QN		**(b)**	shallow	Chico, Grandjean, Parisienne	1
			medium	Gustine, Hartley	3
			deep	Corne, Marbot, Payne, Serr	5
21. (+)	**20.**	**VG**	**Nut: structure of surface of shell**		
PQ		**(b)**	slightly grooved	Meylannaise	1
			moderately grooved	Chandler, Chico, Lübo, Milotai intenzív	2
			strongly grooved	Hartley, Marbot, Tiszacsécsi 83	3
			embossed	Erbazi, Fernor, Howard	4
22.	**21.**	**VG**	**Nut: colour of shell**		
PQ		**(b)**	yellow		1
			light brown	Chandler, Milotai 10	2
			medium brown	Šampion	3
23. (+)	**22.**	**VG**	**Nut: thickness of dividing membranes**		
QN		**(b)**	very thin	Lübo, Luguo 2, Milotai 10	1
			thin	Chico, Payne, Serr	2
			medium	Franquette, Marbot	3
			thick	Corne	4
			very thick		5
24. (+)	**23.**	**VG**	**Nut: inner pleat wall of shell**		
PQ		**(b)**	papery		1
			coriaceous		2
			ligneous		3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
25. (+)	**24. (*)**	**MG/VG**	**Nut: thickness of shell**		
QN		**(b)**	very thin	Lübo, Pedro	1
			thin	Chico, Payne, Serr	2
			medium	Franquette, Hartley, Marbot, Milotai 10	3
			thick	Corne	4
G			very thick		5
26.	**25. (*)**	**VG**	**Kernel: colour of endopleura**		
PQ		**(c)**	white		1
			yellowish white	Chandler, Eszterhazy II	2
			yellow	Milotai 10	3
			red	Robert Livermore	4
			purple	Sychrov	5
			yellow brown		6
			light brown	Alsószentiváni 117, Mars, Pedro	7
			medium brown	Jupiter	8
G			dark brown		9
27.	**26.**	**MG**	**Kernel: percentage of weight relative to total weight of nut**		
QN		**(c)**	very low	Corne	1
			low	Marbot	3
			medium	Franquette, Hartley, Pedro	5
			high	Chase D 9, Lübo, Milotai 10, Payne, Vina	7
			very high	Serr	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
28. (+)	**27.**	**VG**	**Kernel: ease of removal from shell**		
QN		**(c)**	very easy	Milotai 10, Pedro	1
			easy	Franquette, Hartley, Marbot	2
			medium	Meylannaise	3
			difficult	Corne	4
			very difficult		5
29.		**MG/VG**	**Time of leaf bud burst**		
QN			very early		1
			very early to early	Ashley, Chico, Payne	2
			early	Chase D 9, Vina	3
			early to medium	Adams 10, Hartley, Pedro	4
			medium	Chandler, Howard	5
			medium to late	Grandjean, Marbot, Mayette	6
			late	Franquette, Parisienne	7
			late to very late	Ronde de Montignac	8
G			very late		9
30. (+)	**28.**	**MG/VG**	**Time of beginning of female flowering**		
QN			early	Chase D 9, Lübo, Payne, Serr	3
			medium	Marbot, Milotai 10	5
			late	Bonifác, Franquette, Milotai kései	7
31.	**29. (*)**	**MG/VG**	**Time of male flowering compared to female flowering**		
QN			before	Franquette, Marbot, Payne	1
			simultaneous	Meylannaise	2
G			after	Amigo, Chico, Lübo, Milotai 10	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
32.	**30.**	**MG/VG**	**Time of harvest maturity**		
QN			very early	Érdió 1	1
			very early to early	Alsószentiváni 117	2
			early	Lübo, Milotai 10, Payne, Serr	3
			early to medium		4
			medium	Chico, Grandjean, Howard, Pedro, Tiszacsécsi 83	5
			medium to late	Milotai bőtermő	6
			late	Fernette, Franquette, Milotai kései	7
			late to very late	Bonifác	8
G			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) Observations on tree should be made in dormant season.

b) Observations on nuts should be made on physiologically ripe nuts excluding the pericarp immediately after 25% of the pericarp cracked. Take 30 nuts randomly from each tree.

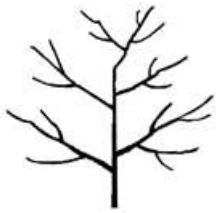
c) Observations on the kernel should be made when the water content is less than 8%. 10 g of kernels should be randomly taken and the water content should be determined at 100 °C (±2 °C) in a stove until constant weight is reached.

8.2 Explanations for individual characteristics

Ad. 1: Tree: growth habit

1
upright

2
semi-upright



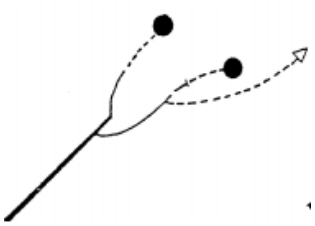
3
spreading

Ad. 2: Tree: branching

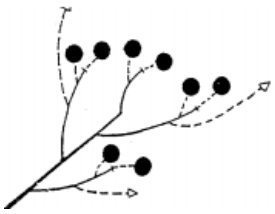
Observations should relate to the number of branches with the degree of branching being indicated by the density of lateral branches and shoots, including fruiting shoots.

Ad. 3: Tree: predominant location of fruit buds

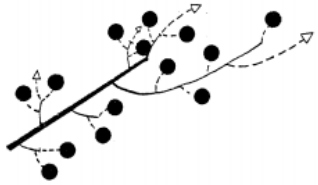
The type of fruiting (predominant location of fruit buds) should be observed at the time of full bloom of the female flowers.



1
at tip of one-year old shoot (fruiting on outer side of tree)



2
mainly on the top of long shoots bound on branches of 2 years or older (fruiting in clusters)



3
all along the one-year old shoot (fruiting on lateral brindilles)

Ad. 4: Bud: shape

Observations on buds should be made on terminal buds of branches.

1
circular

2
flabellate

3
triangular

Ad. 5: Leaflet: shape

Observations on leaflets should be made on lateral leaves from the middle part of the canopy on the sunny side.

3
narrow elliptic

5
medium elliptic

7
broad elliptic

Ad. 6: Plant: second flowering

Ad. 7: Female flower: number per cluster
Ad. 8: Female flower: intensity of yellow colour of stigma

Observations on flowers should be made during full-blossom period.

Ad. 9: Infructescence: type

1
solitary

2
binate

3
fascicled

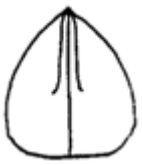
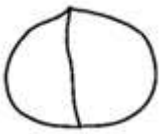
4
bunched

Ad. 11: Nut: shape in ventral view

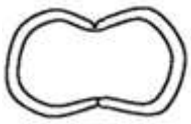
width (ratio length/width)	← broadest part →	
	below middle	at middle
narrow (high)		5 elliptic
medium (medium)	1 triangular	3 ovate; 4 oblong; 7 broad elliptic
broad (low)	2 broad ovate	6 circular

Ad. 12: Nut: shape in lateral view

Observations should be made facing the suture.

width (ratio length/width)	← broadest part →	
	below middle	at middle
medium (medium)	 1 triangular	 3 ovate
		 5 broad elliptic
broad (low)		 2 broad ovate
		 4 circular
		 6 oblate

Ad. 13: Nut: shape in cross section


1
reniform


2
oblate


3
circular


4
elliptic

Ad. 14: Nut: shape of base in lateral view

Observations should be made facing the suture.


1
cuneate


2
rounded


3
truncate


4
emarginate

Ad. 15: Nut: shape of apex in lateral view

Observations should be made facing the suture, excluding tip.


1
obtuse


2
rounded


3
truncate


4
emarginate

Ad. 16: Nut: length of tip

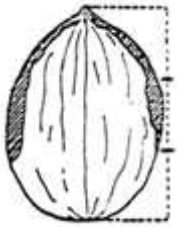
1
absent or short

2
medium

3
long

Ad. 17: Nut: extent of pad around suture

1
on upper half



2
on upper 2/3

3
on whole length

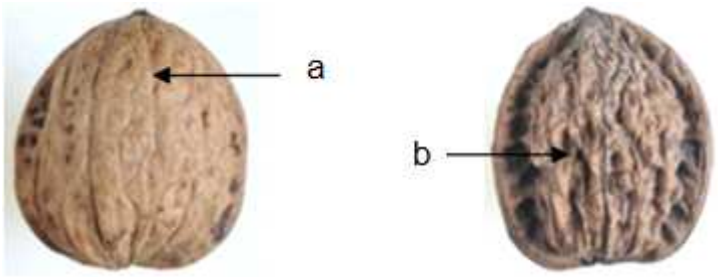
Ad. 19: Nut: width of pad on suture in lateral view

1
narrow

3
medium

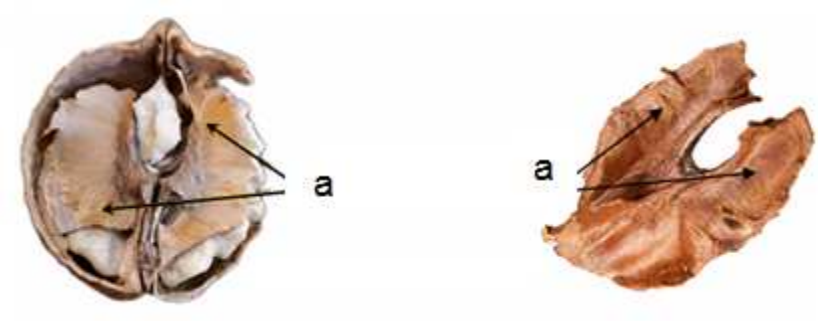
5
broad

Ad. 21: Nut: structure of surface of shell



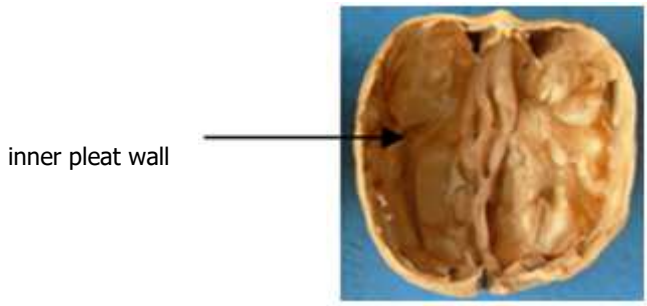
a = grooved
b = embossed

Ad. 23: Nut: thickness of dividing membranes



a = dividing membranes

Ad. 24: Nut: inner pleat wall of shell



Ad. 25: Nut: thickness of shell

The thickness of the mid part of the shell should be assessed.

Ad. 28: Kernel: ease of removal from shell

Crack the shell and assess the ease of removal of the kernel.

Ad. 30: Time of beginning of female flowering

The time of beginning of female flowering should be observed when 5% of the female flowers are in full bloom (at full development of stigmas).

9. LITERATURE

IPGRI, 1994: descriptors for walnut (*Juglans* spp.). International Plant Genetic Resource Institute, Rome, IT.

Liu, Q.Z., Zhang, L.S., 2007: Descriptors and Data Standard for walnut (*Juglans regia* L.). China Agriculture Press. Beijing, CN.

Pei, D., Lu, X.Z., 2011: Walnut germplasm resources in China. China forestry publishing house. Beijing, CN.

10. TECHNICAL QUESTIONNAIRE

The Technical Questionnaire is available on the CPVO website under the following reference:
CPVO-TQ/125/1 – *Juglans regia* L. - walnut

e-TQ: https://applyfor.plantvarieties.eu/mypvr.oa/#!/en/oa/show/questionnaire/TQ/12478/en