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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

WALNUT

UPOV Code(s):

JUGLA_REG

Juglans regia L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from China
to be considered by the
Technical Working Party for Fruit Crops
at its forty-seventh session, to be held in Angers, France,
from 2016-11-14 to 2016-11-18

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Juglans regia L.	Walnut, English Walnut	Noyer	Walnuß	Nogal

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Juglans regia* L. for fruit use.

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of dormant shoots sufficient for grafting 5 plants or in the form of grafted plants on a rootstock specified by the testing authority.

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

10 dormant shoots for grafting or 5 one-year-old grafted plants.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 Number of Growing Cycles

The minimum duration of tests should normally be two independent 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”.

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 Additional Tests

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.1.4 Number of plants or parts of plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 5 plants or parts of plants 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 second 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. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, “G” provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 The assessment of uniformity should be according to the recommendations for cross-pollinated varieties in the General Introduction.

4.3 Stability

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

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

4.3.3 Where appropriate, or in cases of doubt, the stability of a hybrid variety may, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity and stability of its parent lines.

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) Female flower: number per cluster (characteristic 6)
(b) Female flower:intensity of yellow color of stigma (characteristic 7)
(c) Fruit: setting type (characteristic 8)
(d) Nut: shape in lateral view (characteristic 10)
(e) Nut: thickness of shell (characteristic 24)
(f) Kernel: color of endopleura (characteristic 25)
(g) Time of male flowering compared to female flowering (characteristic 30)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 “Examining Distinctness”.

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.2.2 In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), 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

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

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

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

6.5 Legend

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1 2	**3 4**	**5 6**	**7**			
	Name of characteristics in English	**Nom du caractère en français**	**Name des Merkmals auf Deutsch**	**Nombre del carácter en español**		
	states of expression	types d'expression	Ausprägungsstufen	tipos de expresión		

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

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

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

7 Not applicable

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	**(*)**	**QN VG**	**(+) (a)**				
		Tree: growth habit					
		upright				Corne, Daifeng, Daixiang, Fenghui, Sorrento, Xinzaofeng, Zhonglin 1	1
		semi-upright				Alsószentiváni 117 (EUR), Chuanhe 2, Franquette, Hartley, Liaoning 1, Liaoning 4, Marbot, Shaanhe 1	2
		spreading				Gustine, Jinfeng, Jinlong 1, Jinlong 2, Luguang, Milotai 10 (EUR), Payne, Shangsong 6, Vina, Xilin 2, Zhonglin 5	3
2.		**QN VG**	**(+) (a), (b)**				
		Tree: branching					
		weak	faible	gering	débil	Chico, Huashan 5, Shangluo 3, Vina, Xisiyu 1	3
		medium	moyen	mittel	media	Chuanhe 2, Franquette, Hartley, Lübo, Marbot, Qinyou 1, Shangsong 6, Xinzaofeng	5
		strong	fort	stark	fuerte	Corne, Daixiang, Jinfeng, Liaoning 1, Liaoning 4, Luguang, Luguo 2, Parisienne, Shaanhe 1, Xiangling, Xifu 2, Xilin 2, Zhonglin 1, Zhonglin 5	7
3.	**(*)**	**PQ VG**	**(+) (b)**				
		Bud: shape					
		circular				Daixiang, Jinlong 1, Luguang, Luguo 2, Milotai 10 (EUR), Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1	1
		semi-circular				Fenghui	2
		triangular				Chuanhe 2, Liaoning 4, Zhenzhuhetao	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4.	**(*)**	**PQ VG**	**(+) (c)**				
		Lateral leaflet: shape					
		lanceolate				Hartley, Payne, Vina	1
		ovate				Corne, Franquette, Marbot, Zhenzhuhetao	2
		narrow elliptic				Chase D 9, Daifeng, Daixiang, Liaoning 1, Shangsong 6	3
		medium elliptic					4
		broad elliptic					5
5.	**(*)**	**QL VG**	**(+)**				
		Plant: second flowering					
		absent				Jinlong 1, Milotai 10 (EUR)	1
		present				Liaoning 4	9
6.	**(*)**	**QN MG**	**(d)**				
		Female flower: number per cluster					
		1-2				Jinlong 1, Luguang, Xiangling, Xilin 2	1
		3-4				Shaanhe 1	2
		5-10					3
		11-20				Qinyou 1, Tisa (EUR)	4
		more than 20				Chuanhetao	5
7.	**(*)**	**QN VG**	**(d)**				
		Female flower:intensity of yellow color of stigma					
		light				Daifeng, Daixiang, Milotai 10 (EUR)	1
		medium				Jinlong 1, Jinlong 2, Xiangling, Xinzaofeng, Zhonglin 1, Zhonglin 5	2
		dark				Xifu 2	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8.	**(*)**	**PQ VG**	**(+)**				
		Fruit: setting type					
		solitary				Jinlong 1, Milotai 10 (EUR)	1
		binate				Daifeng, Daixiang, Fenghui, Jinlong 1, Liaoning 1, Liaoning 4, Luguang, Luguo 2, Xiangling, Xilin 2, Zhonglin 5	2
		fascicled				Shaanhe 1	3
		bunchy				Chuanzihetao	4
9.		**QN MG/VG**		**(e)**			
		Nut: size					
		small				Chico, Grandjean, Zhenzhuhetao	3
		medium				Franquette, Honghetao, Liaoning 4, Shaanhe 1	5
		large				Daifeng, Daixiang, Fenghui, Hartley, Jinlong 1, Jinlong 2, Lübo, Luguang, Luguo 2, Milotai 10 (EUR), Sunland, Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1, Zhonglin 5	7
10.	**(*)**	**PQ VG**	**(+)**	**(e)**			
		Nut: shape in lateral view					
		elliptic				Corne, Daifeng, Franquette, Sorrento, Xilin 2	1
		broad elliptic				Luguang, Parisienne	2
		oblong				Milotai bőtermő (EUR), Mumahetao, Sunland	3
		circular				Jinlong 1, Jinlong 2, Liaoning 4, Meylannaise, Milotai 10 (EUR), Xiangling, Zhonglin 1, Zhonglin 5	4
		ovate				Gustine, Jinfeng	5
		broad ovate				Marbot, Payne, Serr	6
		triangular				Hartley	7
		trapezium				Liaoning 1	8

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11. **(*)**	**PQ** **VG**	**(+)** **(e)**				
	Nut: shape in lateral view (facing the suture)					
	circular				Meylannaise, Milotai 10 (EUR)	1
	oblate				Yuanbao	2
	ovate				Gustine, Jinfeng	3
	broad ovate				Payne, Serr, Xiangling	4
	broad elliptic				Franquette	5
	triangular				Hartley	6
12. **(*)**	**PQ** **VG**	**(+)** **(e)**				
	Nut: shape in cross section					
	reniform					1
	oblate				Chico, Franquette, Liaoning 1	2
	elliptic				Corne, Hartley, Serr	3
	circular				Marbot, Milotai 10 (EUR), Payne, Xiangling	4
13. **(*)**	**PQ** **VG**	**(+)** **(e)**				
	Nut: shape of base in lateral view (facing the suture)					
	cuneate				Corne, Milotai bőtermő (EUR)	1
	rounded				Chico, Franquette, Payne, Serr, Xiangling	2
	truncate				Parisienne	3
	emarginate				Hartley	4
14. **(*)**	**PQ** **VG**	**(+)** **(e)**				
	Nut: shape of apex in lateral view (facing the suture, excluding tip)					
	obtuse				Vina	1
	rounded				Zhonglin 1	2
	truncate				Milotai bőtermő (EUR), Zhonglin 5	3
	emarginate				Xiangling	4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. (*)	**QN VG**	**(+) (e)**				
	Nut: length of tip					
	absent or short				Grandjean, Milotai 10 (EUR), Xiangling	1
	medium				Chico, Corne, Hartley, Hexuan	2
	long				Franquette, Marbot, Payne, Serr	3
16. (*)	**QN VG**	**(+) (e)**				
	Nut: extent of pad around suture					
	on upper half				Chico, Hartley, Marbot, Parisienne, Xiangling	1
	on upper 2/3				Franquette, Gustine, Liaoning 1, Liaoning 4, Payne, Pedro	2
	on whole length				Honghuadian 1	3
17. (*)	**QN VG**	**(e)**				
	Nut: prominence of pad on suture					
	very weak				Luguang	1
	weak				Chuanhe 2, Jinlong 2	2
	medium				Chico, Grandjean	3
	strong				Franquette, Hartley, Marbot, Payne, Serr	4
	very strong				Xifu 2	5
18.	**QN VG**	**(+) (e)**				
	Nut: width of pad on suture in lateral view					
	narrow				Chico, Grandjean, Parisienne, Xiangling	1
	medium				Gustine, Hartley	3
	broad				Corne, Marbot, Payne, Serr	5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19.	**QN VG**	**(e)**				
	Nut: depth of groove along pad on suture					
	shallow				Chico, Grandjean, Parisienne, Xiangling	1
	medium				Gustine, Hartley	3
	deep				Corne, Marbot, Payne, Serr	5
20.	**PQ VG**	**(+) (e)**				
	Nut: structure of surface of shell					
	slightly grooved				Liaoning 1, Liaoning 4, Luguang	1
	moderately grooved				Chico, Fenghui, Jinlong 1, Jinlong 2, Lübo, Milotai intenzív (EUR), Xiangling, Xinzaofeng	2
	strongly grooved				Hartley, Milotai intenzív (EUR), Xilin 2	3
	embossed				Erbazi, Tiszacsécsi 83 (EUR)	4
21.	**PQ VG**	**(e)**				
	Nut: color of shell					
	yellow				Xiangling	1
	light brown				Milotai 10 (EUR), Zhonglin 1	2
	medium brown				Honghetao	3
22.	**QN VG**	**(+) (e)**				
	Nut: thickness of dividing membranes					
	very thin				Daifeng, Daixiang, Fenghui, Liaoning 1, Liaoning 4, Lübo, Luguo 2, Milotai 10 (EUR), Shaanhe 1, Xiangling, Xilin 2, Zhonglin 1, Zhonglin 5	1
	thin				Chico, Luguang, Payne, Serr	2
	medium				Franquette, Honghetao, Marbot, Xinzaofeng	3
	thick				Corne	4

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23.		**PQ VG**	**(+) (e)**				
		Nut: inner pleat wall of shell					
		papery				Daifeng, Daixiang, Fenghui, Liaoning 1, Liaoning 4, Luguang, Luguo 2, Xiangling, Zhonglin 1, Zhonglin 5	1
		leathery				Xinzaofeng	2
		bony				Baipihetao	3
24.	**(*)**	**QN MG/VG**	**(+) (e)**				
		Nut: thickness of shell					
		very thin				Daifeng, Fenghui, Liaoning 1, Liaoning 4, Lübo, Luguang, Luguo 2, Pedro, Serr, Xiangling	1
		thin				Chico, Daixiang, Jinlong 1, Jinlong 2, Payne, Serr, Xilin 2, Xinzaofeng, Zhonglin 1, Zhonglin 5	2
		medium				Chahetao, Franquette, Hartley, Marbot, Milotai 10 (EUR)	3
		thick				Corne, Shitou	4
		very thick					5
25.	**(*)**	**PQ VG**	**(f)**				
		Kernel: color of endopleura					
		white				Jinmian 2	1
		yellowish white				Eszterhazy II (EUR), Liaoning 1	2
		yellow				Daifeng, Milotai 10 (EUR)	3
		red				Honghetao, Hongranghetao	4
		purple				Chuanhe 2	5
		yellow brown				Baipihetao	6
		light brown				Alsószentiváni 117 (EUR), Shangsong 6	7
		medium brown				Zhonglin 5	8
		dark brown					9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26.	**QN MG**	**(f)**				
	Kernel: percentage of weight relative to total weight of nut					
	very low				Corne	1
	low				Marbot	3
	medium				Franquette, Hartley, Pedro, Sorrento	5
	high				Chase D 9, Daifeng, Daixiang, Fenghui, Jinlong 2, Liaoning 1, Liaoning 4, Lübo, Luguang, Luguo 2, Milotai 10 (EUR), Payne, Vina, Xinzaofeng, Zhonglin 1, Zhonglin 5	7
	very high				Jinlong 1, Serr, Shaanhe 1, Xiangling, Xilin 2	9
27.	**QN VG**	**(+)** **(f)**				
	Kernel: ease of removal from shell					
	very easy				Milotai 10 (EUR), Payne, Pedro, Serr	1
	easy				Franquette, Hartley, Marbot, Milotai 10 (EUR)	2
	medium				Jinlong 2, Meylannaise	3
	difficult				Corne	4
28.	**QN MG**	**(+)**				
	Time of beginning of female flowering					
	early				Chase D 9, Lübo, Luguo 2, Sorrento, Xilin 2	3
	medium				Daifeng, Daixiang, Fenghui, Luguang, Marbot, Milotai 10 (EUR)	5
	late				Bonifác (EUR), Jinlong 1, Jinlong 2, Liaoning 1, Liaoning 4, Milotai kései (EUR)	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29.		**QN MG**	**(+)**				
		Time of beginning of male flowering					
		early				Chase D 9, Fenghui, Gustine, Luguang, Luguo 2, Milotai 10 (EUR), Sorrento, Xiangling, Xilin 2, Xinzaofeng	3
		medium				Lübo, Marbot, Shaanhe 1	5
		late				Franquette, Jinlong 1, Jinlong 2, Liaoning 1, Liaoning 4, Parisienne, Zhonglin 1, Zhonglin 5	7
30.	**(*)**	**QN MG**		**(d)**			
		Time of male flowering compared to female flowering					
		before (protandry)				Franquette, Liaoning 1, Liaoning 4, Marbot, Payne, Xiangling	1
		simultaneous (homogamy)				Chico, Meylannaise, Xilin 2	2
		after (protogyny)				Lübo, Milotai 10 (EUR)	3
31.		**QN MG**					
		Time of harvest maturity					
		early				Fenghui, Lübo, Luguang, Luguo 2, Milotai 10 (EUR), Xiangling, Zhonglin 5	3
		medium				Chico, Daifeng, Daixiang, Grandjean, Payne, Serr, Xinzaofeng, Zhonglin 1	5
		late				Jinlong 1, Jinlong 2, Liaoning 1, Liaoning 4, Milotai kései (EUR), Xilin 2	7

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

Characteristics containing the following key in the second 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 branch should be made on vegetative branches from the middle part of the canopy in dormant season.

(c) Observations on leaflets should be made on latteral leaves from the middle part of the canopy on the sunny side.

(d) Observations on flowers should be carried out during full-blossom period.

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

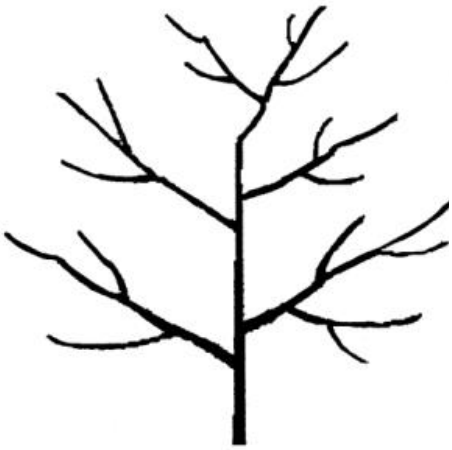
(f) Observations on the kernel should be made when the water content is less than 8%.

8.2 Explanations for individual characteristics

Ad. 1: Tree: growth habit

1
upright

2
semi-upright



3
spreading

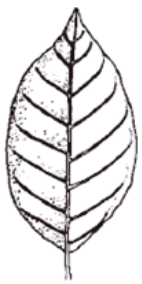
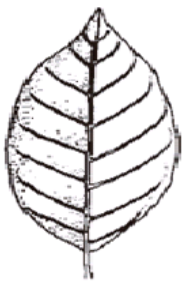
Ad. 2: Tree: branching

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

Ad. 3: Bud: shape

Observations on buds should be made on terminal buds of branches

Ad. 4: Lateral leaflet: shape

		← broadest part →		
		below middle	at middle	above middle
width (ratio length/width)				
narrow (high)		 1 lanceolate	 3 narrow elliptic	
medium (medium)		 2 ovate	 4 medium elliptic	 5 broad elliptic
broad (low)				

Ad. 5: Plant: second flowering

Ad. 8: Fruit: setting type

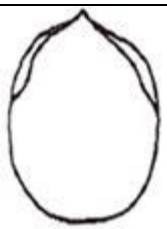
1
solitary

2
binate

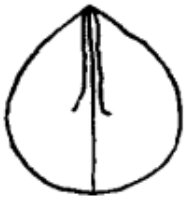
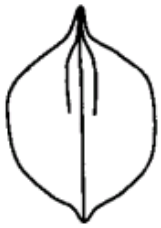
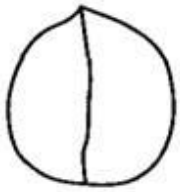
3
fascicled

4
bunchy

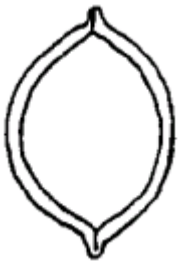
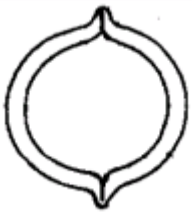
Ad. 10: Nut: shape in lateral view

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

Ad. 11: Nut: shape in lateral view (facing the suture)

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

Ad. 12: Nut: shape in cross section

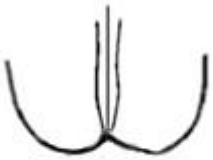
width (ratio length/width)		← broadest part →		
		at middle		
narrow (high)				
medium (medium)			 3 elliptic	
broad (low)		 1 reniform	 2 oblate	 4 circular

Ad. 13: Nut: shape of base in lateral view (facing the suture)

1
cuneate

2
rounded

3
truncate



4
emarginate

Ad. 14: Nut: shape of apex in lateral view (facing the suture, excluding tip)

1
obtuse

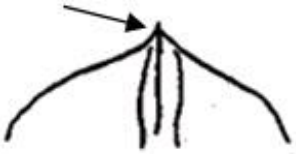
2
rounded

3
truncate

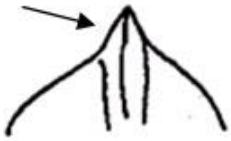
4
emarginate

Ad. 15: Nut: length of tip

1
absent or short

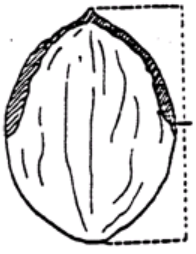


2
medium

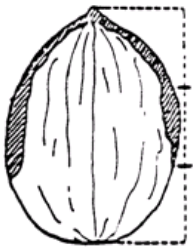


3
long

Ad. 16: Nut: extent of pad around suture



1
on upper half



2
on upper 2/3

3
on whole length

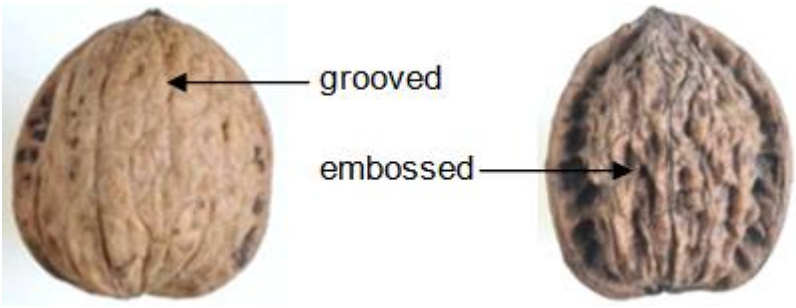
Ad. 18: Nut: width of pad on suture in lateral view

1
narrow

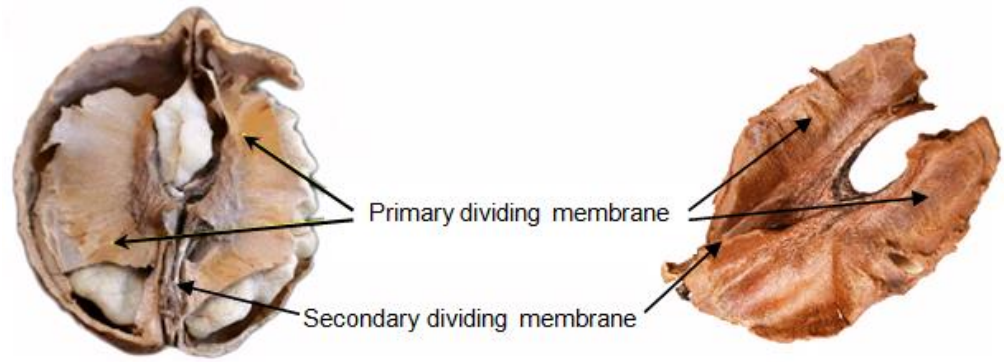
3
medium

5
broad

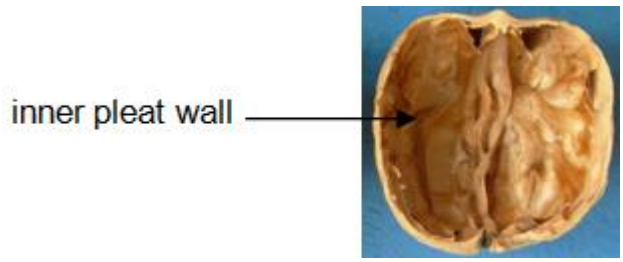
Ad. 20: Nut: structure of surface of shell



Ad. 22: Nut: thickness of dividing membranes



Ad. 23: Nut: inner pleat wall of shell



Ad. 24: Nut: thickness of shell

Thickness of the mid part of the shell should be measured and take the average value (accurate to 0.1 mm) as the thickness of shell.

Ad. 27: Kernel: ease of removal from shell

Crack the shell and remove the kernel. Assess the easy of removal according to the situation of the kernel: 1: whole or a half of the kernel, 2: a quarter of the kernel, 3: smashed kernel, 4: unable to take out the kernel normally.

Ad. 28: 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).

Ad. 29: Time of beginning of male flowering

The time of beginning of male flowering should be observed when 10% of the catkins are in full bloom (at dehiscence of pollen).

9. Literature

IPGRI, 1994: descriptors for walnut (*Juglans* spp.). International Plant Genetic Resource Institute, Rome, Italy.
Liu Q.Z. and Zhang L.S., 2007: Descriptors and Data Standard for walnut (*Juglans regia* L.). China Agriculture Press. Beijing, China.
Pei D. and Lu X.Z., 2011: Walnut germplasm resources in China. China forestry publishing house. Beijing, China.

10. Technical Questionnaire

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

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 Botanical name	*Juglans regia* L.
1.2 Common name	Walnut

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

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

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

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]

(please state parent varieties)

(……..……..…) x (……..……..…)

female parent male parent

(b) partially known cross [ ]

(please state known parent variety(ies))

(……..……..…) x (……..……..…)

female parent male parent

(c) unknown cross [ ]

4.1.2 Mutation [ ]

(please state parent variety)

4.1.3 Discovery and development [ ]

(please state where and when discovered and how developed)

4.1.4 Other [ ]

(please provide details)

Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

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

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

(a) grafting(budding) [ ]

(b) Other (state method) [ ]

4.2.2 Other [ ]
(Please provide details)

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

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (1)	**Tree: growth habit**		
	upright	Corne, Daifeng, Daixiang, Fenghui, Sorrento, Xinzaofeng, Zhonglin 1	1 [ ]
	semi-upright	Alsószentiváni 117 (EUR), Chuanhe 2, Franquette, Hartley, Liaoning 1, Liaoning 4, Marbot, Shaanhe 1	2 [ ]
	spreading	Gustine, Jinfeng, Jinlong 1, Jinlong 2, Luguang, Milotai 10 (EUR), Payne, Shangsong 6, Vina, Xilin 2, Zhonglin 5	3 [ ]
5.2 (3)	**Bud: shape**		
	circular	Daixiang, Jinlong 1, Luguang, Luguo 2, Milotai 10 (EUR), Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1	1 [ ]
	semi-circular	Fenghui	2 [ ]
	triangular	Chuanhe 2, Liaoning 4, Zhenzhuhetao	3 [ ]
5.3 (4)	**Lateral leaflet: shape**		
	lanceolate	Hartley, Payne, Vina	1 [ ]
	ovate	Corne, Franquette, Marbot, Zhenzhuhetao	2 [ ]
	narrow elliptic	Chase D 9, Daifeng, Daixiang, Liaoning 1, Shangsong 6	3 [ ]
	medium elliptic		4 [ ]
	broad elliptic		5 [ ]
5.4 (5)	**Plant: second flowering**		
	absent	Jinlong 1, Milotai 10 (EUR)	1 [ ]
	present	Liaoning 4	9 [ ]
5.5 (6)	**Female flower: number per cluster**		
	1-2	Jinlong 1, Luguang, Xiangling, Xilin 2	1 [ ]
	3-4	Shaanhe 1	2 [ ]
	5-10		3 [ ]
	11-20	Qinyou 1, Tisa (EUR)	4 [ ]
	more than 20	Chuanhetao	5 [ ]

	Characteristics	Example Varieties	Note
5.6 (7)	**Female flower:intensity of yellow color of stigma**		
	light	Daifeng, Daixiang, Milotai 10 (EUR)	1 [ ]
	medium	Jinlong 1, Jinlong 2, Xiangling, Xinzaofeng, Zhonglin 1, Zhonglin 5	2 [ ]
	dark	Xifu 2	3 [ ]
5.7 (8)	**Fruit: setting type**		
	solitary	Jinlong 1, Milotai 10 (EUR)	1 [ ]
	binate	Daifeng, Daixiang, Fenghui, Jinlong 1, Liaoning 1, Liaoning 4, Luguang, Luguo 2, Xiangling, Xilin 2, Zhonglin 5	2 [ ]
	fascicled	Shaanhe 1	3 [ ]
	bunchy	Chuanzihetao	4 [ ]
5.8 (10)	**Nut: shape in lateral view**		
	elliptic	Corne, Daifeng, Franquette, Sorrento, Xilin 2	1 [ ]
	broad elliptic	Luguang, Parisienne	2 [ ]
	oblong	Milotai bőtermő (EUR), Mumahetao, Sunland	3 [ ]
	circular	Jinlong 1, Jinlong 2, Liaoning 4, Meylannaise, Milotai 10 (EUR), Xiangling, Zhonglin 1, Zhonglin 5	4 [ ]
	ovate	Gustine, Jinfeng	5 [ ]
	broad ovate	Marbot, Payne, Serr	6 [ ]
	triangular	Hartley	7 [ ]
	trapezium	Liaoning 1	8 [ ]
5.9 (11)	**Nut: shape in lateral view (facing the suture)**		
	circular	Meylannaise, Milotai 10 (EUR)	1 [ ]
	oblate	Yuanbao	2 [ ]
	ovate	Gustine, Jinfeng	3 [ ]
	broad ovate	Payne, Serr, Xiangling	4 [ ]
	broad elliptic	Franquette	5 [ ]
	triangular	Hartley	6 [ ]
5.10 (12)	**Nut: shape in cross section**		
	reniform		1 [ ]
	oblate	Chico, Franquette, Liaoning 1	2 [ ]
	elliptic	Corne, Hartley, Serr	3 [ ]
	circular	Marbot, Milotai 10 (EUR), Payne, Xiangling	4 [ ]

	Characteristics	Example Varieties	Note
5.11 (13)	**Nut: shape of base in lateral view (facing the suture)**		
	cuneate	Corne, Milotai bőtermő (EUR)	1 [ ]
	rounded	Chico, Franquette, Payne, Serr, Xiangling	2 [ ]
	truncate	Parisienne	3 [ ]
	emarginate	Hartley	4 [ ]
5.12 (14)	**Nut: shape of apex in lateral view (facing the suture, excluding tip)**		
	obtuse	Vina	1 [ ]
	rounded	Zhonglin 1	2 [ ]
	truncate	Milotai bőtermő (EUR), Zhonglin 5	3 [ ]
	emarginate	Xiangling	4 [ ]
5.13 (15)	**Nut: length of tip**		
	absent or short	Grandjean, Milotai 10 (EUR), Xiangling	1 [ ]
	medium	Chico, Corne, Hartley, Hexuan	2 [ ]
	long	Franquette, Marbot, Payne, Serr	3 [ ]
5.14 (16)	**Nut: extent of pad around suture**		
	on upper half	Chico, Hartley, Marbot, Parisienne, Xiangling	1 [ ]
	on upper 2/3	Franquette, Gustine, Liaoning 1, Liaoning 4, Payne, Pedro	2 [ ]
	on whole length	Honghuadian 1	3 [ ]
5.15 (17)	**Nut: prominence of pad on suture**		
	very weak	Luguang	1 [ ]
	weak	Chuanhe 2, Jinlong 2	2 [ ]
	medium	Chico, Grandjean	3 [ ]
	strong	Franquette, Hartley, Marbot, Payne, Serr	4 [ ]
	very strong	Xifu 2	5 [ ]
5.16 (24)	**Nut: thickness of shell**		
	very thin	Daifeng, Fenghui, Liaoning 1, Liaoning 4, Luguang, Luguo 2, Lübo, Pedro, Serr, Xiangling	1 [ ]
	thin	Chico, Daixiang, Jinlong 1, Jinlong 2, Payne, Serr, Xilin 2, Xinzaofeng, Zhonglin 1, Zhonglin 5	2 [ ]
	medium	Chahetao, Franquette, Hartley, Marbot, Milotai 10 (EUR)	3 [ ]
	thick	Corne, Shitou	4 [ ]
	very thick		5 [ ]

	Characteristics	Example Varieties	Note
5.17 (25)	**Kernel: color of endopleura**		
	white	Jinmian 2	1 [ ]
	yellowish white	Eszterhazy II (EUR), Liaoning 1	2 [ ]
	yellow	Daifeng, Milotai 10 (EUR)	3 [ ]
	red	Honghetao, Hongranghetao	4 [ ]
	purple	Chuanhe 2	5 [ ]
	yellow brown	Baipihetao	6 [ ]
	light brown	Alsószentiváni 117 (EUR), Shangsong 6	7 [ ]
	medium brown	Zhonglin 5	8 [ ]
	dark brown		9 [ ]
5.18 (30)	**Time of male flowering compared to female flowering**		
	before (protandry)	Franquette, Liaoning 1, Liaoning 4, Marbot, Payne, Xiangling	1 [ ]
	simultaneous (homogamy)	Chico, Meylannaise, Xilin 2	2 [ ]
	after (protogyny)	Lübo, Milotai 10 (EUR)	3 [ ]

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

6. Similar varieties and differences from these varieties

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Nut: thickness of shell*	*thick*	*medium*

Comments:

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

#7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

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

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

A representative color photograph of the variety displaying its main distinguishing feature(s), should accompany the Technical Questionnaire. The photograph will provide a visual illustration of the candidate variety which supplements the information provided in the Technical Questionnaire.

The key points to consider when taking a photograph of the candidate variety are:

- Indication of the date and geographic location
- Correct labeling (breeder's reference)
- Good quality printed photograph (minimum 10 cm x 15 cm) and/or sufficient resolution electronic format version (minimum 960 x 1280 pixels)"

Further guidance on providing photographs with the Technical Questionnaire is available in document TGP/7 "Development of Test Guidelines", Guidance Note 35 (http://www.upov.int/tgp/en/).

[The link provided may be deleted by members of the Union when developing authorities' own test guidelines.]

Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

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

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

9. Information on plant material to be examined or submitted for examination

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a)	Microorganisms (e.g. virus, bacteria, phytoplasma)	Yes [ ]	No [ ]
(b)	Chemical treatment (e.g. growth retardant, pesticide)	Yes [ ]	No [ ]
(c)	Tissue culture	Yes [ ]	No [ ]
(d)	Other factors	Yes [ ]	No [ ]

Please provide details for where you have indicated “yes”.

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant’s name

Signature Date

[End of document]