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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

WALNUT

UPOV Code(s):

JUGLA_REG

Juglans regia L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

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.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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1. Subject of these 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

3.1.1 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 These Test Guidelines have been developed for the examination of vegetatively propagated varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species", Section 4.5 "Testing Uniformity" should be followed.

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

4.2.4 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-types are allowed.

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.

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) Infructescence: type (characteristic 8)
(d) Nut: shape in ventral 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 29)

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)-(c) 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	**Arbre : port**	**Baum: Wuchsform**	**Árbol: hábito de crecimiento**		
		upright	dressé	aufrecht	erecto	Corne, Daifeng, Daixiang, Fenghui, Sorrento, Xinzaofeng, Zhonglin 1	1
		semi-upright	demi-dressé	halbaufrecht	semierecto	Alsószentiváni 117, Chuanhe 2, Franquette, Hartley, Liaoning 1, Liaoning 4, Marbot, Shaanhe 1	2
		spreading	étalé	breitwüchsig	extendido	Gustine, Jinfeng, Jinlong 1, Jinlong 2, Luguang, Milotai 10, Payne, Shangsong 6, Vina, Xilin 2, Zhonglin 5	3
2.		**QN VG**	**(+) (a)**				
		Tree: branching	**Arbre : ramification**	**Baum: Verzweigung**	**Árbol: ramificación**		
		weak	faible	gering	escasa	Chico, Huashan 5, Shangluo 3, Vina, Xisiyu 1	3
		medium	moyenne	mittel	media	Chuanhe 2, Franquette, Hartley, Lübo, Marbot, Qinyou 1, Shangsong 6, Xinzaofeng	5
		strong	forte	stark	abundante	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**	**(+)**				
		Bud: shape	**Bourgeon : forme**	**Knospe: Form**	**Yema: forma**		
		circular	circulaire	kreisförmig	circular	Daixiang, Jinlong 1, Luguang, Luguo 2, Milotai 10, Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1	1
		flabellate	flabelliforme	fächerförmig	flabeliforme	Fenghui	2
		triangular	triangulaire	dreieckig	triangular	Chuanhe 2, Liaoning 4, Zhenzhuhetao	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4.	**(*)**	**QN VG**	**(+)**				
		Leaflet: shape	**Foliole : forme**	**Fiederblatt: Form**	**Folíolo: forma**		
		narrow elliptic	elliptique étroite	schmal elliptisch	elíptico estrecho	Daifeng, Daixiang, Hartley, Liaoning 1, Payne, Shangsong 6, Vina	3
		medium elliptic	elliptique moyenne	mittel elliptisch	elíptico medio	Corne, Franquette, Marbot	5
		broad elliptic	elliptique large	breit elliptisch	elíptico ancho	Adam 10, Chase D 9	7
5.		**QL VG**	**(+)**				
		Plant: second flowering	**Plante : deuxième floraison**	**Pflanze: zweite Blüte**	**Planta: segunda floración**		
		absent	absente	fehlend	ausente	Jinlong 1, Milotai 10	1
		present	présente	vorhanden	presente	Liaoning 4	9
6.	**(*)**	**QN MG**					
		Female flower: number per cluster	**Fleur femelle : nombre par bouquet**	**Weibliche Blüte: Anzahl pro Gruppe**	**Flor femenina: número por grupo**		
		1-2	1-2	1-2	1-2	Jinlong 1, Luguang, Xiangling, Xilin 2	1
		3-4	3-4	3-4	3-4	Shaanhe 1	2
		5-10	5-10	5-10	5-10		3
		11-20	11-20	11-20	11-20	Qinyou 1, Tisa	4
		more than 20	plus de 20	mehr als 20	más de 20	Chuanhetao	5
7.	**(*)**	**QN VG**					
		Female flower: intensity of yellow color of stigma	**Fleur femelle : intensité de la couleur jaune du stigmate**	**Weibliche Blüte: Intensität der gelben Farbe der Narbe**	**Flor femenina: intensidad del color amarillo del estigma**		
		light	claire	hell	claro	Daifeng, Daixiang, Milotai 10	1
		medium	moyenne	mittel	medio	Jinlong 1, Jinlong 2, Xiangling, Xinzaofeng, Zhonglin 1, Zhonglin 5	2
		dark	foncée	dunkel	oscuro	Xifu 2	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8.	**(*)**	**PQ VG**	**(+)**				
		Infructescence: type	**Infructescence : type**	**Fruchtstand: Typ**	**Infrutescencia: tipo**		
		solitary	solitaire	einzeln	aislada	Milotai 10	1
		binate	par deux	doppelt	en pares	Daifeng, Daixiang, Fenghui, Jinlong 1, Liaoning 1, Liaoning 4, Luguang, Luguo 2, Xiangling, Xilin 2, Zhonglin 5	2
		fascicled	en paquet	in Bündeln	en fascículos	Shaanhe 1	3
		bunched	en grappe	in Trauben	en racimos	Chuanzihetao	4
9.		**QN MG/VG**		**(b)**			
		Nut: size	**Noix : grosseur**	**Nuß: Größe**	**Nuez: tamaño**		
		small	petite	klein	pequeña	Chico, Grandjean, Zhenzhuhetao	3
		medium	moyenne	mittel	media	Franquette, Honghetao, Liaoning 4, Shaanhe 1	5
		large	grosse	groß	grande	Daifeng, Daixiang, Fenghui, Hartley, Jinlong 1, Jinlong 2, Lübo, Luguang, Luguo 2, Milotai 10, Sunland, Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1, Zhonglin 5	7
10.	**(*)**	**PQ VG**	**(+)**	**(b)**			
		Nut: shape in ventral view	**Noix : forme en vue ventrale**	**Nuß: Form in Bauchansicht**	**Nuez: forma en vista ventral**		
		triangular	triangulaire	dreieckig	triangular	Hartley	1
		broad ovate	broad ovate	breit eiförmig	oval ancha	Marbot, Payne, Serr	2
		ovate	ovale	eiförmig	oval	Gustine, Jinfeng	3
		oblong	oblongue	breitrund	oblonga	Milotai bőtermő, Mumahetao, Sunland	4
		elliptic	elliptique	elliptisch	elíptica	Corne, Daifeng, Franquette, Sorrento, Xilin 2	5
		circular	circulaire	kreisförmig	circular	Jinlong 1, Jinlong 2, Liaoning 4, Milotai 10, Meylannaise, Xiangling, Zhonglin 1, Zhonglin 5,	6
		broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Parisienne, Luguang	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11.	**(*)**	**PQ VG**	**(+) (b)**				
		Nut: shape in lateral view	**Noix : forme en vue latérale**	**Nuß: Form in Seitenansicht**	**Nuez: forma en vista lateral**		
		triangular	triangulaire	dreieckig	triangular	Hartley	1
		broad ovate	ovale large	breit eiförmig	oval ancha	Payne, Serr, Xiangling	2
		ovate	ovale	eiförmig	oval	Gustine, Jinfeng	3
		circular	circulaire	kreisförmig	circular	Meylannaise, Milotai 10	4
		broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Franquette	5
		oblate	arrondie aplatie	breitrund	achatada	Yuanbao	6
12.	**(*)**	**PQ VG**	**(+) (b)**				
		Nut: shape in cross section	**Noix : forme en section transversale**	**Nuß: Form im Querschnitt**	**Nuez: forma en sección transversal**		
		reniform	réniforme	nierenförmig	reniforme		1
		oblate	arrondie aplatie	breitrund	achatada	Chico, Franquette, Jupiter, Liaoning 1	2
		circular	circulaire	kreisförmig	circular	Marbot, Milotai 10, Payne, Victoria, Xiangling	3
		elliptic	elliptique	elliptisch	elíptica	Corne, Hartley, Serr	4
13.	**(*)**	**PQ VG**	**(+) (b)**				
		Nut: shape of base in lateral view	**Noix : forme de la base en vue latérale**	**Nuß: Form der Basis in Seitenansicht**	**Nuez: forma de la base en vista lateral**		
		cuneate	cunée	keilförmig	cuneada	Corne, Milotai bőtermő	1
		rounded	arrondie	abgerundet	redondeada	Chico, Franquette, Payne, Serr, Xiangling	2
		truncate	tronquée	gerade	truncada	Parisienne	3
		emarginate	récurrente	eingekerbt	emarginada	Hartley	4
14.	**(*)**	**PQ VG**	**(+) (b)**				
		Nut: shape of apex in lateral view	**Noix : forme du sommet en vue latérale**	**Nuß: Form der Spitze in Seitenansicht**	**Nuez: forma del ápice en vista lateral**		
		obtuse	obtus	stumpf	obtuso	Vina	1
		rounded	arrondi	abgerundet	redondeado	Zhonglin 1	2
		truncate	tronqué	gerade	truncado	Milotai bőtermő, Zhonglin 5	3
		emarginate	récurrent	eingekerbt	emarginado	Xiangling	4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. (*)	**QN VG**	**(+) (b)**				
	Nut: length of tip	**Noix : longueur de la pointe**	**Nuß: Länge der Spitze**	**Nuez: longitud de la punta**		
	absent or short	absente ou courte	fehlend oder kurz	ausente o corta	Grandjean, Milotai 10, Xiangling	1
	medium	moyenne	mittel	media	Chico, Corne, Hartley, Hexuan	2
	long	longue	lang	larga	Franquette, Marbot, Payne, Serr, Victoria	3
16. (*)	**QN VG**	**(+) (b)**				
	Nut: extent of pad around suture	**Noix : étendue du bourrelet autour de la suture**	**Nuß: Ausdehnung des Wulstes um die Naht herum**	**Nuez: extensión del almohadillado a lo largo de la sutura**		
	on upper half	sur la moitié supérieure	an der oberen Hälfte	en la mitad superior	Chico, Hartley, Marbot, Parisienne, Xiangling	1
	on upper 2/3	sur les deux tiers supérieurs	am oberen zweiten Drittel	en los dos tercios superiores	Franquette, Gustine, Jupiter, Liaoning 1, Liaoning 4, Payne, Pedro	2
	on whole length	sur la totalité de la longueur	über die gesamte Länge	a todo lo largo	Honghuadian 1	3
17. (*)	**QN VG**	**(b)**				
	Nut: prominence of pad on suture	**Noix : importance du bourrelet de suture**	**Nuß: Ausprägung des Wulstes auf der Naht**	**Nuez: prominencia del almohadillado de la sutura**		
	very weak	très faible	sehr gering	muy débil	Luguang	1
	weak	faible	gering	débil	Chuanhe 2, Jinlong 2	2
	medium	moyenne	mittel	medio	Chico, Grandjean	3
	strong	forte	stark	fuerte	Franquette, Hartley, Marbot, Payne, Serr	4
	very strong	très forte	sehr stark	muy fuerte	Xifu 2	5
18.	**QN VG**	**(+) (b)**				
	Nut: width of pad on suture in lateral view	**Noix : largeur du bourrelet de suture en vue latérale**	**Nuß: Breite des Wulstes auf der Naht in Seitenansicht**	**Nuez: anchura del almohadillado de la sutura en vista lateral**		
	narrow	étroit	schmal	estrecho	Chico, Grandjean, Parisienne, Xiangling	1
	medium	moyen	mittel	medio	Gustine, Hartley	3
	broad	large	breit	ancho	Corne, Marbot, Payne, Serr	5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19.	**QN** **VG**	**(b)**				
	Nut: depth of groove along pad on suture	**Noix : profondeur des anfractuosités le long du bourrelet de suture**	**Nuß: Tiefe der Furche entlang dem Wulst auf der Naht**	**Nuez: profundidad del surco a lo largo del almohadillado de la sutura**		
	shallow	peu profondes	flach	poco profundo	Chico, Grandjean, Parisienne, Xiangling	1
	medium	moyennes	mittel	medio	Gustine, Hartley	3
	deep	profondes	tief	profundo	Corne, Marbot, Payne, Serr	5
20.	**PQ** **VG**	**(+)** **(b)**				
	Nut: structure of surface of shell	**Noix : structure de la surface de la coque**	**Nuß: Oberflächenstruktur der Schale**	**Nuez: estructura de la superficie de la cáscara**		
	slightly grooved	peu sillonnée	kaum gerieft	ligeramente acanalada	Liaoning 1, Liaoning 4, Luguang	1
	moderately grooved	moyennement sillonnée	mäßig gerieft	moderadamente acanalada	Chico, Fenghui, Jinlong 1, Jinlong 2, Lübo, Milotai intenzív, Xiangling, Xinzaofeng	2
	strongly grooved	fortement sillonnée	stark gerieft	intensamente acanalada	Hartley, Tiszacsécsi 83, Xilin 2	3
	embossed	bosselée	höckerig	protuberancias irregulares	Erbazi	4
21.	**PQ** **VG**	**(b)**				
	Nut: color of shell	**Noix : couleur de la coque**	**Nuß: Farbe der Schale**	**Nuez: color de la cáscara**		
	yellow	jaune	gelb	amarillo	Xiangling	1
	light brown	marron clair	hellbraun	marrón claro	Milotai 10, Zhonglin 1	2
	medium brown	marron moyen	mittelbraun	marrón medio	Honghetao	3
22.	**QN** **VG**	**(+)** **(b)**				
	Nut: thickness of dividing membranes	**Noix : épaisseur des cloisons**	**Nuß: Dicke der Trennmembranen**	**Nuez: grosor de las membranas divisorias**		
	very thin	très minces	sehr dünn	muy delgadas	Daifeng, Daixiang, Fenghui, Liaoning 1, Liaoning 4, Lübo, Luguo 2, Milotai 10, Shaanhe 1, Xiangling, Xilin 2, Zhonglin 1, Zhonglin 5	1
	thin	minces	dünn	delgadas	Chico, Luguang, Payne, Serr	2
	medium	moyennes	mittel	medias	Franquette, Honghetao, Marbot, Xinzaofeng	3
	thick	épaisses	dick	gruesas	Corne	4
	very thick	très épaisses	sehr dick	muy gruesas	Aodidaguanmao, Jilong	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23.		**PQ VG**	**(+) (b)**				
		Nut: inner pleat wall of shell	**Noix : valve ridée de la coque**	**Nuß: Faltigkeit der Innenwand der Schale**	**Nuez: pared rugosa interna de la cáscara**		
		papery	fine comme du papier	papierähnlich	papirácea	Daifeng, Daixiang, Fenghui, Liaoning 1, Liaoning 4, Luguang, Luguo 2, Xiangling, Zhonglin 1, Zhonglin 5	1
		coriaceous	comme du cuir	lederartig	coriácea	Xinzaofeng	2
		ligneous	ligneuse	holzig	leñosa	Baipihetao	3
24.	**(*)**	**QN MG/VG**	**(+) (b)**				
		Nut: thickness of shell	**Noix : épaisseur de la coquille**	**Nuß: Dicke der Schale**	**Nuez: grosor de la cáscara**		
		very thin	très mince	sehr dünn	muy delgada	Daifeng, Fenghui, Liaoning 1, Liaoning 4, Lübo, Luguang, Luguo 2, Pedro, Serr, Xiangling	1
		thin	mince	dünn	delgada	Chico, Daixiang, Jinlong 1, Jinlong 2, Payne, Serr, Xilin 2, Xinzaofeng, Zhonglin 1, Zhonglin 5	2
		medium	moyenne	mittel	media	Chahetao, Franquette, Hartley, Marbot, Milotai 10	3
		thick	épaisse	dick	gruesa	Corne, Shitou	4
		very thick	très épaisse	sehr dick	muy gruesa		5
25.	**(*)**	**PQ VG**	**(c)**				
		Kernel: color of endopleura	**Cerneau : couleur du tégument**	**Kern: Farbe der inneren Samenhaut**	**Semilla: color de la endopleura**		
		white	blanc	weiß	blanco	Jinmian 2	1
		yellowish white	blanc jaunâtre	gelblich weiß	blanco amarillento	Eszterhazy II, Liaoning 1	2
		yellow	jaune	gelb	amarillo	Daifeng, Milotai 10	3
		red	rouge	rot	rojo	Honghetao, Hongranghetao	4
		purple	violet	purpurn	púrpura	Chuanhe 2, Sychrov	5
		yellow brown	marron jaune	gelbbraun	marrón amarillento	Baipihetao	6
		light brown	marron clair	hellbraun	marrón claro	Alsószentiváni 117, Shangsong 6	7
		medium brown	marron moyen	mittelbraun	marrón medio	Zhonglin 5	8
		dark brown	marron foncé	dunkelbraun	marrón oscuro		9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26.	**QN** **MG**	**(c)**				
	Kernel: percentage of weight relative to total weight of nut	**Cerneau : pourcentage du poids par rapport au poids total du fruit**	**Kern: relativer Anteil am Gesamtgewicht der Nuß**	**Semilla: porcentaje del peso en relación con el peso total de la nuez**		
	very low	très faible	sehr gering	muy bajo	Corne	1
	low	faible	gering	bajo	Marbot	3
	medium	moyen	mittel	medio	Franquette, Hartley, Pedro, Sorrento	5
	high	élevé	hoch	alto	Chase D 9, Daifeng, Daixiang, Fenghui, Jinlong 2, Liaoning 1, Liaoning 4, Lübo, Luguang, Luguo 2, Milotai 10, Payne, Vina, Xinzaofeng, Zhonglin 1, Zhonglin 5	7
	very high	très élevé	sehr hoch	muy alto	Jinlong 1, Serr, Shaanhe 1, Xiangling, Xilin 2	9
27.	**QN** **VG**	**(+)** **(c)**				
	Kernel: ease of removal from shell	**Cerneau : facilité d'extraction de la coquille**	**Kern: Leichtigkeit des Entfernens von der Schale**	**Semilla: facilidad con que se extrae de la cáscara**		
	very easy	très aisée	sehr leicht	muy fácil	Milotai 10, Payne, Pedro, Serr	1
	easy	aisée	leicht	fácil	Franquette, Hartley, Marbot	2
	medium	moyenne	mittel	media	Jinlong 2, Meylannaise	3
	difficult	difficile	schwer	difícil	Corne	4
	very difficult	très difficile	sehr schwer	muy difícil	Aodidaguanmao, Jilong	5
28.	**QN** **MG**	**(+)**				
	Time of beginning of female flowering	**Époque de début de floraison femelle**	**Zeitpunkt des Beginns der weiblichen Blüte**	**Época de inicio de la floración femenina**		
	early	précoce	früh	temprana	Chase D 9, Lübo, Luguo 2, Sorrento, Xilin 2	3
	medium	moyenne	mittel	media	Daifeng, Daixiang, Fenghui, Luguang, Marbot, Milotai 10	5
	late	tardive	spät	tardía	Bonifác, Jinlong 1, Jinlong 2, Liaoning 1, Liaoning 4, Milotai kései	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29.	**(*)**	**QN** **MG**					
		Time of male flowering compared to female flowering	**Époque de début de floraison mâle par rapport à l'époque de début de floraison femelle**	**Zeitpunkt der männlichen Blüte im Vergleich zur weiblichen Blüte**	**Época de la floración masculina en relación con la floración femenina**		
		before	avant	früher	anterior	Franquette, Liaoning 1, Liaoning 4, Marbot, Payne, Xiangling	1
		simultaneous	simultanée	gleichzeitig	simultánea	Chico, Meylannaise, Xilin 2	2
		after	après	später	posterior	Lübo, Milotai 10	3
30.		**QN** **MG**					
		Time of harvest maturity	**Époque de maturité de récolte**	**Zeitpunkt der Erntereife**	**Época de madurez para la cosecha**		
		early	précoce	früh	temprana	Fenghui, Lübo, Luguang, Luguo 2, Milotai 10, Xiangling, Zhonglin 5	3
		medium	moyenne	mittel	media	Chico, Daifeng, Daixiang, Grandjean, Payne, Serr, Xinzaofeng, Zhonglin 1	5
		late	tardive	spät	tardía	Jinlong 1, Jinlong 2, Liaoning 1, Liaoning 4, Milotai kései, 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 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.

(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, excluding fruiting shoots.

Ad. 3: Bud: shape

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

1
circular

2
flabellate

3
triangular

Ad. 4: 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. 5: Plant: second flowering

Ad. 6: Female flower: number per cluster

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

Ad. 7: Female flower: intensity of yellow color of stigma

See Ad. 6

Ad. 8: Infructescence: type

1
solitary

2
binate

3
fascicled

4
bunched

Ad. 10: Nut: shape in ventral view

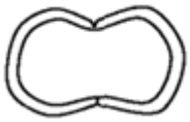
width (ratio length/width)	← broadest part →			
	below middle		at middle	
narrow (high)			 5 elliptic	
medium (medium)	 1 triangular	 3 ovate	 4 oblong	 7 broad elliptic
broad (low)		 2 broad ovate		 6 circular

Ad. 11: 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. 12: Nut: shape in cross section


1
reniform


2
oblate


3
circular


4
elliptic

Ad. 13: Nut: shape of base in lateral view

Observations should be made facing the suture.


1
cuneate


2
rounded


3
truncate


4
emarginate

Ad. 14: 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. 15: Nut: length of tip

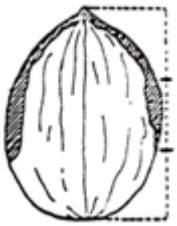
1
absent or short

2
medium

3
long

Ad. 16: Nut: extent of pad around suture

1
on upper half



3
on upper 2/3

3
on whole length

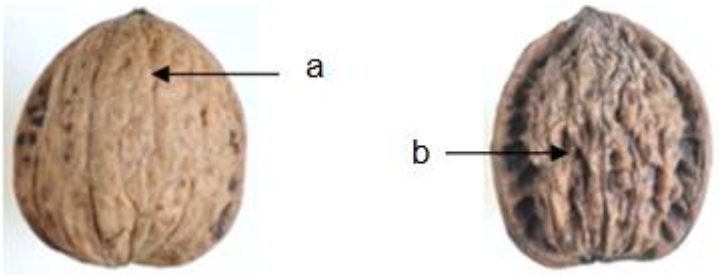
Ad. 18: Nut: width of pad on suture in lateral view

1
narrow

3
medium

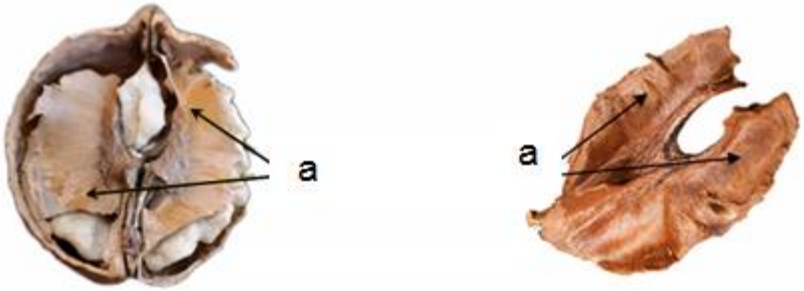
5
broad

Ad. 20: Nut: structure of surface of shell



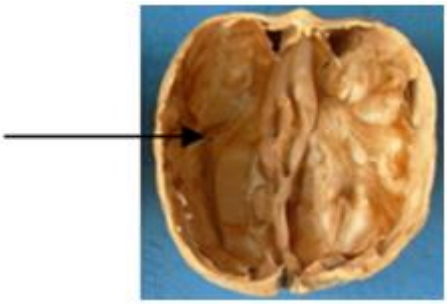
a = grooved
b = embossed

Ad. 22: Nut: thickness of dividing membranes



a = dividing membranes

Ad. 23: Nut: inner pleat wall of shell



Ad. 24: Nut: thickness of shell

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

Ad. 27: Kernel: ease of removal from shell

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

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).

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

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, English 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, Chuanhe 2, Franquette, Hartley, Liaoning 1, Liaoning 4, Marbot, Shaanhe 1	2 [ ]
	spreading	Gustine, Jinfeng, Jinlong 1, Jinlong 2, Luguang, Milotai 10, Payne, Shangsong 6, Vina, Xilin 2, Zhonglin 5	3 [ ]
5.2 (3)	**Bud: shape**		
	circular	Daixiang, Jinlong 1, Luguang, Luguo 2, Milotai 10, Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1	1 [ ]
	flabellate	Fenghui	2 [ ]
	triangular	Chuanhe 2, Liaoning 4, Zhenzhuhetao	3 [ ]
5.3 (4)	**Leaflet: shape**		
	very narrow elliptic		1 [ ]
	very narrow elliptic to narrow elliptic		2 [ ]
	narrow elliptic	Daifeng, Daixiang, Hartley, Liaoning 1, Payne, Shangsong 6, Vina	3 [ ]
	narrow elliptic to medium elliptic		4 [ ]
	medium elliptic	Corne, Franquette, Marbot	5 [ ]
	medium elliptic to broad elliptic		6 [ ]
	broad elliptic	Adam 10, Chase D 9	7 [ ]
	broad elliptic to very broad elliptic		8 [ ]
	very broad elliptic		9 [ ]
5.4 (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	4 [ ]
	more than 20	Chuanhetao	5 [ ]

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

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

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

	Characteristics	Example Varieties	Note
5.10 (13)	**Nut: shape of base in lateral view**		
	cuneate	Corne, Milotai bőtermő	1 [ ]
	rounded	Chico, Franquette, Payne, Serr, Xiangling	2 [ ]
	truncate	Parisienne	3 [ ]
	emarginate	Hartley	4 [ ]
5.11 (14)	**Nut: shape of apex in lateral view**		
	obtuse	Vina	1 [ ]
	rounded	Zhonglin 1	2 [ ]
	truncate	Milotai bőtermő, Zhonglin 5	3 [ ]
	emarginate	Xiangling	4 [ ]
5.12 (15)	**Nut: length of tip**		
	absent or short	Grandjean, Milotai 10, Xiangling	1 [ ]
	medium	Chico, Corne, Hartley, Hexuan	2 [ ]
	long	Franquette, Marbot, Payne, Serr, Victoria	3 [ ]
5.13 (16)	**Nut: extent of pad around suture**		
	on upper half	Chico, Hartley, Marbot, Parisienne, Xiangling	1 [ ]
	on upper 2/3	Franquette, Gustine, Jupiter, Liaoning 1, Liaoning 4, Payne, Pedro	2 [ ]
	on whole length	Honghuadian 1	3 [ ]
5.14 (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 [ ]
5.15 (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	3 [ ]
	thick	Corne, Shitou	4 [ ]
	very thick		5 [ ]

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

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