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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:*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Juglans regia</i> 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 7)
 - (b) Female flower: intensity of yellow color of stigma (characteristic 8)
 - (c) Infructescence: type (characteristic 9)
 - (d) Nut: shape in lateral view (characteristic 11)
 - (e) Nut: thickness of shell (characteristic 25)
 - (f) Kernel: color of endopleura (characteristic 26)
 - (g) Time of male flowering compared to female flowering (characteristic 31)
- 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:

<i>State</i>	<i>Note</i>
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:

<i>State</i>	<i>Note</i>
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, Lugu 2, Parisienne, Shaanhe 1, Xiangling, Xifu 2, Xilin 2, Zhonglin 1, Zhonglin 5	7
3. (*)	PQ	VG	(+)					
	Tree: predominant location of fruit buds		Arbre: localisation prédominante des bourgeons à fruit		Baum: vorwiegende Position der Fruchtknospen	Árbol: localización predominante de las yemas fructíferas		
	at apex of one year old shoot		à l'apex du rameau d'un an		am Apex einjähriger Triebe	en el ápice de la rama de un año	Corne, Franquette, Marbot	1
	in clusters at apical part of two years or older branches		en bouquet sur la partie apicale des rameaux de deux ans ou plus		in Büscheln am apikalen Teil von zweijährigen oder älteren Zweigen	en racimos en la parte apical de las ramas de dos o más años	Hartley	2
	on lateral brindilles along the entire one year old shoot		sur les brindilles latérales le long de tout le rameau d'un an		an kleinen Seitenzweigen entlang des gesamten einjährigen Zweiges	en brindillas laterales a lo largo de la rama de un año	Chico, Payne, Serr	3

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4. (*)	PQ	VG	(+)				
	Bud: shape	Bourgeon : forme	Knospe: Form	Yema: forma			
	circular	circulaire	kreisförmig	circular	Daixiang, Jinlong 1, Luguang, Luguang 2, Milotai 10, Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1	1	
	flabellate	flabelliforme	fächerförmig	flabelliforme	Fenghui	2	
	triangular	triangulaire	dreieckig	triangular	Chuanhe 2, Liaoning 4, Zhenzhuhetao	3	
5. (*)	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	Come, Franquette, Marbot	5	
	broad elliptic	elliptique large	breit elliptisch	elíptico ancho	Adam 10, Chase D 9	7	
6.	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	
7. (*)	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	
8. (*)	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
9. (*)	PQ	VG	(+)				
	Infructescence: type	Infructescence : type	Fruchtstand: Typ	Infrutescencia: tipo			
	solitary	solitaire	einzel	aislada	Milotai 10	1	
	binate	par deux	doppelt	en pares	Daifeng, Daixiang, Fenghui, Jinlong 1, Liaoning 1, Liaoning 4, Luguang, Luguang 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	
10.	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, Luguang 2, Milotai 10, Sunland, Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1, Zhonglin 5	7	
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	broad ovate	breit eiförmig	oval ancha	Marbot, Payne, Serr	2	
	ovate	ovale	eiförmig	oval	Gustine, Jinfeng	3	
	oblong	oblongue	breitrund	oblonga	Milotai bötermő, 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	Parisiennne, Luguang	7	

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12. (*)	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		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
13. (*)	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
14. (*)	PQ	VG	(+)	(b)				
	Nut: shape of base in ventral view		Noix: forme de la base en vue ventrale		Nuß: Form der Basis in Bauchansicht	Nuez: forma de la base en vista ventral		
	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
15. (*)	PQ	VG	(+)	(b)				
	Nut: shape of apex in ventral view		Noix : forme du sommet en vue ventrale		Nuß: Form der Spitze in Bauchansicht	Nuez: forma del ápice en ventral		
	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
16. (*)	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	
17. (*)	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	
18. (*)	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	
19.	QN	VG	(+)	(b)				
	Nut: width of pad on suture in ventral view	Noix : largeur du bourrelet de suture en vue ventrale	Nuß: Breite des Wulstes auf der Naht in Bauchansicht	Nuez: anchura del almohadillado de la sutura en vista ventral				
	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
20.	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	
21.	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	
22.	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	
23.	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, Luguang 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
24.	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, Lugu 2, Xiangling, Zhonglin 1, Zhonglin 5	1
	coriaceous		comme du cuir		lederartig	coriácea	Xinzaofeng	2
	ligneous		ligneuse		holzig	leñosa	Baipihetao	3
25. (*)	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, Lugu 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
26. (*)	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
27.	QN	MG	(c)				
	Kernel: percentage of weight relative to total weight of nut	Carneau : 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, Lugu 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	
28.	QN	VG	(+) (c)				
	Kernel: ease of removal from shell	Carneau : 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	
29.	QN	MG/VG					
	Time of vegetative bud burst	Époque de débourrement végétatif	Zeitpunkt des Aufbruchs der vegetativen Knospe	Época de brotación de las yemas vegetativas			
	very early	très précoce	sehr früh	muy temprana		1	
	very early to early	très précoce à précoce	sehr früh bis früh	muy temprana a temprana	Ashley, Chico, Payne	2	
	early	précoce	früh	temprana	Chase D 9, Vina	3	
	early to medium	précoce à moyenne	früh bis mittel	temprana a media	Adams 10, Hartley, Pedro	4	
	medium	moyenne	mittel	media	Chandler, Howard	5	
	medium to late	moyenne à tardive	mittel bis spät	media a tardía	Grandjean, Marbot, Mayette	6	
	late	tardive	spät	tardía	Franquette, Parisienne	7	
	late to very late	tardive à très tardive	spät bis sehr spät	tardía a muy tardía	Ronde de Montignac	8	
	very late	très tardive	sehr spät	muy tardía		9	

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30.	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, Lugu 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	
31. (*)	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	
32.	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, Lugu 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

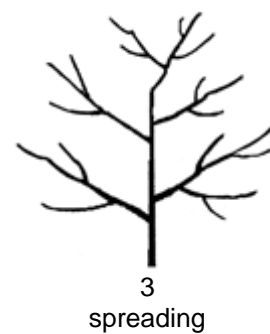
8.1 *Explanations covering several characteristics*

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

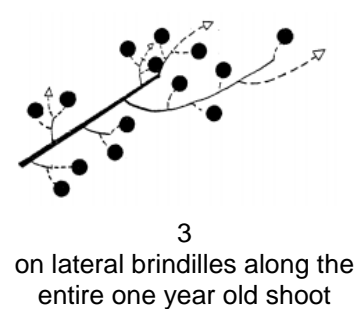
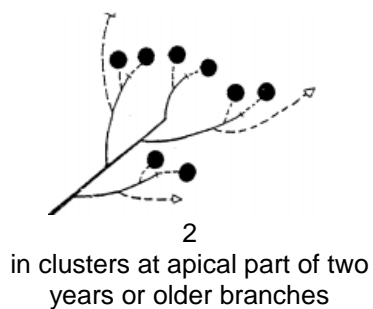
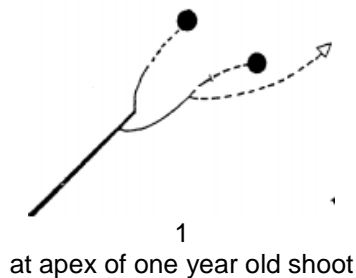


Ad. 2: Tree: branching

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: 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.



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

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

Ad. 8: Female flower: intensity of yellow color of stigma

See Ad. 7

Ad. 9: Infructescence: type



1
solitary

2
binate

3
fascicled







4
bunched

Ad. 11: Nut: shape in lateral view

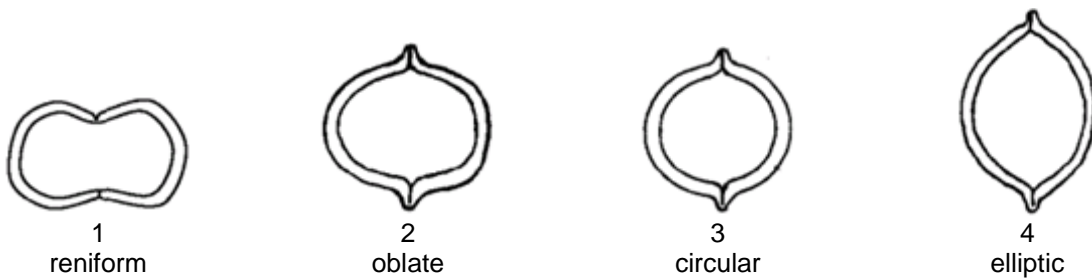
		← broadest part →	
		below middle	at middle
width (ratio length/width)			
narrow (high)			 5 elliptic
medium (medium)	 1 triangular	 3 ovate	 4 oblong
broad (low)		 2 broad ovate	 7 broad elliptic

Ad. 12: Nut: shape in ventral view

Observations should be made facing the suture.

		← broadest part →	
		below middle	at middle
width (ratio length/width)			
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



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

Observations should be made facing the suture.



Ad. 15: Nut: shape of apex in ventral 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



3
on upper 2/3



3
on whole length

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



1
narrow

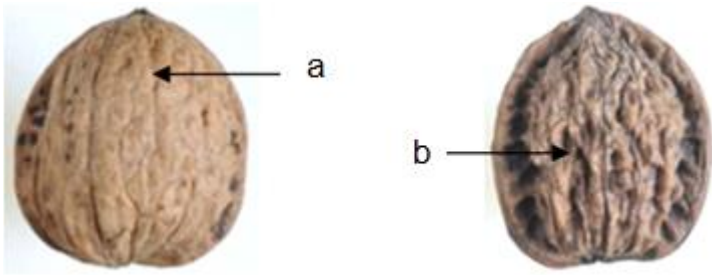


3
medium



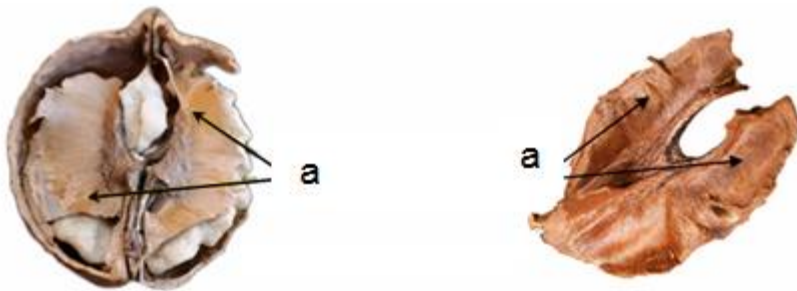
5
broad

Ad. 21: Nut: structure of surface of shell



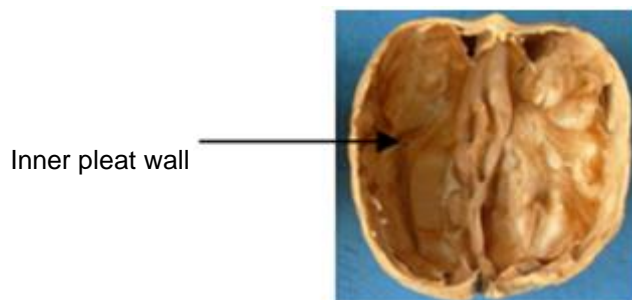
a = grooved
b = embossed

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 measured.

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

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	<input type="text" value="Juglans regia L."/>
1.2	Common name	<input type="text" value="Walnut, English Walnut"/>
2. Applicant		
	Name	<input type="text"/>
	Address	<input type="text"/>
	Telephone No.	<input type="text"/>
	Fax No.	<input type="text"/>
	E-mail address	<input type="text"/>
	Breeder (if different from applicant)	<input type="text"/>
3. Proposed denomination and breeder's reference		
	Proposed denomination (if available)	<input type="text"/>
	Breeder's reference	<input type="text"/>

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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#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:
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4.2	Method of propagating the variety	
4.2.1	Vegetative propagation	
(a)	grafting (budding)	[]
(b)	other (state method)	[]
	<input type="text"/>	
4.2.2	Other (Please provide details)	[]
	<input type="text"/>	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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 Tree: growth habit (1)		
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 Bud: shape (4)		
circular	Daixiang, Jinlong 1, Luguang, Luguang 2, Milotai 10, Xiangling, Xilin 2, Xinzaofeng, Zhonglin 1	1 []
flabellate	Fenghui	2 []
triangular	Chuanhe 2, Liaoning 4, Zhenzhuhetao	3 []
5.3 Leaflet: shape (5)		
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 Female flower: number per cluster (7)		
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:
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Characteristics	Example Varieties	Note
5.5 Female flower: intensity of yellow color of stigma (8)		
light	Daifeng, Daixiang, Milotai 10	1 []
medium	Jinlong 1, Jinlong 2, Xiangling, Xinzaofeng, Zhonglin 1, Zhonglin 5	2 []
dark	Xifu 2	3 []
5.6 Infructescence: type (9)		
solitary	Milotai 10	1 []
binate	Daifeng, Daixiang, Fenghui, Jinlong 1, Liaoning 1, Liaoning 4, Luguang, Luguang 2, Xiangling, Xilin 2, Zhonglin 5	2 []
fascicled	Shaanhe 1	3 []
bunched	Chuanzihetao	4 []
5.7 Nut: shape in lateral view (11)		
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 Nut: shape in ventral view (12)		
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 Nut: shape in cross section (13)		
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:
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Characteristics	Example Varieties	Note
5.10 Nut: shape of base in ventral view (14)		
cuneate	Corne, Milotai bõtermõ	1 []
rounded	Chico, Franquette, Payne, Serr, Xiangling	2 []
truncate	Parisienne	3 []
emarginate	Hartley	4 []
5.11 Nut: shape of apex in ventral view (15)		
obtuse	Vina	1 []
rounded	Zhonglin 1	2 []
truncate	Milotai bõtermõ, Zhonglin 5	3 []
emarginate	Xiangling	4 []
5.12 Nut: length of tip (16)		
absent or short	Grandjean, Milotai 10, Xiangling	1 []
medium	Chico, Corne, Hartley, Hexuan	2 []
long	Franquette, Marbot, Payne, Serr, Victoria	3 []
5.13 Nut: extent of pad around suture (17)		
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 Nut: prominence of pad on suture (18)		
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 Nut: thickness of shell (25)		
very thin	Daifeng, Fenghui, Liaoning 1, Liaoning 4, Luguang, Luguang 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:
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Characteristics	Example Varieties	Note
5.16 Kernel: color of endopleura (26)		
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 Time of male flowering compared to female flowering (31)		
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:
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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
<i>Example</i>	<i>Nut: thickness of shell</i>	<i>thick</i>	<i>medium</i>

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<p>Comments:</p>

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