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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

PECAN NUT

UPOV Code: CARYA_ILL

Carya illinoinensis (Wangenh.) K. Koch *

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from Argentina

to be considered by the
Technical Working Party for Fruit Crops at its thirty-fifth session,
to be held in Marquardt (Potsdam), Germany, from July 19 to 23, 2004

Alternative Names:*

Latin	*English*	*French*	*German*	*Spanish*
Carya illinoinensis (Wangenh.) K. Koch	Pecan Nut	Pacanier	Pekan, Pekannuß	Nuez pecan, Pecan, Nogal pacanero

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 guidelines ("Test Guidelines") should be read in conjunction with document TG/1/3, "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants" (hereinafter referred to as 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 *Carya illinoinensis* (Wangenh.) K. Koch.

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 plants (one year of grafting) or dormant graftwood (15 cm long and 1-1.5 of diameter with 3 groups of buds) to be sent at grafting time.

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

8 grafted plants or,
10 dormant graftwoods

The rootstocks to be used is specified by the competent authorities.

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

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

3. Method of Examination

3.1 Number of Growing Cycles

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

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

3.3.1 Stage of development for the assessment

The optimum stage of development for the assessment of each characteristic is indicated by a number in the second column of the Table of Characteristics. The stages of development denoted by each number are described at the end of Chapter 8.

3.3.2 Type of observation-visual or measurement

The recommended method of observing the characteristic is indicated by the following key in the second column of the Table 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

3.4 Test Design

3.4.1 Each test should be designed to result in a total of, at least, 5 trees.

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 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations should be made on 5 plants or parts taken from each of 5 plants. In the case of parts of plants, the number to be taken from each of the plants should be 2.

3.6 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.

4.2 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:

4.2.1 For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 5 plants, no off-types are allowed.

4.3 Stability

4.3.1 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 tested, either by growing a further generation, or by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the previous 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) Nut: length (characteristic 19)

(b) Nut: width in lateral view (characteristic 20)

(c) Nut: width in ventral view (characteristic 21)

(d) Time of receptivity of stigma compared to pollen liberation (characteristic 43).

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

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

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.

6.3 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. [The state of expression of the example varieties provided in these test Guidelines are states expressed when the example varieties are grown on wild rootstock.]

6.5 Legend

(*) Asterisked characteristic – see Section 6.1.2

QL Qualitative characteristic – see Section 6.3
QN Quantitative characteristic – see Section 6.3
PQ Pseudo-qualitative characteristic – see Section 6.3

(a)–(x) See Explanations on the Table of Characteristics in Chapter 8, Section 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8, Section 8.2

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**Tree: vigor**	**Arbre: vigueur**	**Baum: Wuchsstärke**	**Árbol: vigor**		
(+)							
QN	**VG**	weak	faible	gering	débil		3
		medium	moyenne	mittel	medio		5
		strong	forte	stark	fuerte		7
2.		**Tree: density of crown**	**Arbre: densité de la couronne**	**Baum: kronendichte**	**Árbol: densidad de la copa**		
QN	**VG**	sparse	faible	locker	laxa		3
		medium	moyenne	mittel	media		5
		dense	dense	dicht	densa		7
3.		**Tree: attitude of branches**			**Árbol: actitud de las ramas**		
(+)							
PQ	**VG**	erect	dressé	aufrecht	erecto		1
		semi erect	demi-dressé	halbaufrecht	semierecto		2
		spreading			extendido		3
4.		**One-year-old shoot: color**			**Rama de un año: color**		
PQ	**VG**	greenish brown			castaño verdoso		1
		brown			castaño		2
		reddish brown			castaño rojizo		3
5.		**One-year-old shoot: intensity of color**			**Rama de un año: intensidad del color**		
QN	**VG**	light			claro		3
		medium			medio		5
		dark			oscuro		7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6.		**Leaf: intensity of green color**			**Hoja: intensidad del color verde**		
QN	**VG**	light			claro		3
		medium			medio		5
		dark			oscuro		7
7. **(+)**		**Leaf: ratio length/ width of terminal leaflet**			**Hoja: relación largo/ ancho del folíolo terminal**		
QN	**MG**	small	faible	klein	pequeña		3
		medium	moyen	mittel	media		5
		large	élevé	groß	grande		7
8. **(+)**		**Leaf: length of petiole**			**Hoja: largo del pecíolo**		
QN	**MG**	short			corto		3
		medium			medio		5
		long			largo		7
9. **(+)**		**Leaf: presence of petiole in lateral leaflets**			**Hoja: presencia de pecíolo en los folíolos laterales**		
QN	**VG**	absent			ausente		1
		present			presente		9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. **(+)**		**Leaf: asymmetry of lateral leaflets**			**Hoja: asimetría de los folíolos laterales**		
QN	**VG**	absent or very weak			ausente o muy débil		1
		weak			débil		3
		medium			media		5
		strong			fuerte		7
11. **(+)**		**Leaf: position of asymmetry of lateral leaflets**			**Hoja: posición de la asimetría de los folíolos laterales**		
QL	**VG**	inferior			inferior		1
		superior			superior		2
12. **(+)**		**Lateral leaflet: curvature of central nervature**			**Folíolo lateral: curvatura de la nervadura central**		
QN	**VG**	weak			débil		3
		medium			media		5
		strong			fuerte		7
13.		**Female inflorescence: number of flowers**			**Inflorescencia femenina: número de flores**		
QN	**VG**	few			pocas		3
		medium			medio		5
		many			muchas		7
14. **(+)**		**Stigma: type**			**Estigma: tipo**		
QL	**VG**	entire			entero		1
		divided			bífido		2
15.		**Stigma: color**			**Estigma: tipo**		
QL	**VG**	green			verde		1
		reddish			rojizo		2

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16.		**Catkin: length**			**Amento: largo**		
QN	**MG**	short			corto		3
		medium			medio		5
		long			largo		7
17.		**Husk: intensity of green color**			**Vaina: intensidad del color verde**		
QN	**VG**	light			claro		3
		medium			medio		5
		dark			oscuro		7
18. **(+)**		**Husk: presence of ribs**			**Vaina: presencia de costillas**		
QN	**VG**	absent or very weak			Ausente o muy débil		1
		weak			débil		3
		medium			medio		5
		strong			fuerte		7
19. **(*)** **(+)**		**Nut: length**			**Nuez: largo**		
QN	**MG**	short			corto	Success, Desirable	3
		medium			medio	Harris Super	5
		long			largo	Mahan	7
20. **(*)** **(+)**		**Nut: width in lateral view**			**Nuez: ancho en vista lateral**		
QN	**MG**	narrow			angosto	Mahan	3
		medium			medio	Stuart	5
		broad			ancho	Shoshoni	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21. **(*)** **(+)**		**Nut: width in ventral view**			**Nuez: ancho en vista ventral**		
QN	**MG**	narrow			angosto	Mahan, Kernoodle	3
		medium			medio	Stuart	5
		broad			ancho	Shoshoni	7
22. **(+)**		**Nut: shape in lateral view**			**Nuez: forma en vista lateral**		
PQ	**VG**	orbicular			orbicular		1
		ovate			ovado		2
		oval elliptic			oval elíptico	Shoshoni, Success	3
		obovate			obovado		4
		elliptic			elíptico		5
		oblong elliptic			oblongo elíptico	Stuart, Starking, Kernoodle	6
		oblong			oblongo	Harris Super, Mahan	7
23. **(+)**		**Nut: shape in ventral view**			**Nuez: forma en vista ventral**		
PQ	**VG**	orbicular			orbicular		1
		ovate			ovado		2
		oval elliptic			oval elíptico	Success	3
		obovate			obovado		4
		elliptic			elíptico	Shoshoni	5
		oblong elliptic			oblongo elíptico	Stuart, Kernoodle, Desirable	6
		oblong			oblongo	Mahan, Harris Super	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24.		**Nut: shape in cross section**			**Nuez: forma en sección transversal**		
(+)							
PQ	**VG**	laterally compressed/ oblate			lateralmente comprimido	Kernoodle	1
		circular			circular	Desirable, Shoshoni, Mahan	2
		flattened			aplanado		3
25.		**Nut: shape of apex**			**Nuez: forma del ápice**		
(+)							
PQ	**VG**	acute			agudo	Stuart, Desirable	1
		acuminate			acuminado	Harris Super, Mahan	2
		apiculate			apiculado	Kernoodle	3
		obtuse			obtuso	Success	4
		rounded			redondeado		5
26.		**Nut: shape of base**			**Nuez: forma de la base**		
(+)							
PQ	**VG**	caudate			caudada		1
		acuminate			acuminada	Starking	2
		apiculate			apiculada	Mahan	3
		obtuse			obtusa	Harris Super	4
		rounded			redondeada	Stuart, Success, Shoshoni	5
27.		**Nut: intensity of color of shell**			**Nuez: intensidad del color de la cáscara**		
QN	**VG**	light brown			castaño claro	Success, Mahan, Desirable	3
		medium brown			castaño	Harris Super, Stuart	5
		dark brown			castaño oscuro	Shoshoni, Kernoodle	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28.		**Nut: relative area of spotting**			**Nuez: área relativa cubierta con manchas**		
QN	**VG**	small			pequeña	Shoshoni, Harris Super	3
		medium			media	Desirable, Kernoodle, Mahan	5
		large			grande	Stuart	7
29.		**Nut: thickness of shell**			**Nuez: grosor de la cáscara**		
QN	**MG**	very thin			muy delgada		1
		thin			delgada		3
		medium			media		5
		thick			gruesa		7
30. **(+)**		**Nut: adherence of the two halves along suture**			**Nuez: adherencia de las dos mitades a lo largo de la sutura**		
QN		weak			débil		3
		medium			media		5
		strong			fuerte		7
31.		**Nut: thickness of central partition wall**			**Nuez: grosor del tabique central**		
QN		thin			delgado		3
		medium			medio		5
		thick			grueso		7
32.		**Nut: ratio weight of kernel/weight of nut**			**Nuez: relación peso de la semilla/ peso de la nuez**		
QN	**MG**	low			baja		3
		medium			media		5
		high			alta		7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33.		**Kernel: size**			**Semilla: tamaño**		
QN	**MG**	small			pequeño		3
		medium			medio		5
		large			grande		7
34.		**Kernel: intensity of ground color**			**Semilla: intensidad del color de fondo**		
QN	**VG**	very light brown			muy claro		1
		light brown			claro		3
		medium brown			medio		5
35. **(+)**		**Kernel: adherence to shell**			**Semilla: adherencia a la cáscara**		
QN		weak			débil		3
		medium			media		5
		strong			fuerte		7
36.		**Time of leaf bud burst**			**Época de brotación**		
QN	**VG**	early			temprana		3
		medium			media		5
		late			tardía		7
37.		**Time of leaf fall**			**Época de defoliación**		
QN	**VG**	early			temprana		3
		medium			media		5
		late			tardía		7
38. **(+)**		**Tree: persistence of rachis**	**Arbre: persistance du rachis**		**Árbol: persistencia del raquis**		
QL	**VG**	not persistent	non persistant	nicht anhaftend	no persistente		1
		persistent	persistant	anhaftend	persistente		2

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
39.		**Time of receptivity of stigma**			**Época de receptividad del estigma**		
QN	**VG**	early			temprana	Shoshoni	3
		medium			media	Mahan, Desirable	5
		late			tardía	Caddo, Oklahoma	7
40.		**Duration of receptivity of stigma**			**Duración de la receptividad del estigma**		
QN	**VG**	short			corta		3
		medium			media		5
		long			larga		7
41.		**Time of pollen liberation**			**Época de liberación del polen**		
QN	**VG**	early			temprana		3
		medium			media		5
		late			tardía		7
42.		**Duration of pollen liberation**			**Duración de la liberación del polen**		
QN	**VG**	short			corta		3
		medium			media		5
		long			larga		7
43. (*)		**Time of receptivity of stigma compared to pollen liberation**			**Época de floración femenina comparada con la floración masculina**		
QL		before (protogyny)			Anterior (protoginia)	Mahan, Mahan-Stuart, Shoshoni, Kernoodle	1
		simultaneous			simultáneo	Cheyenne, Harris Super, Starking	2
		after (protandry)			posterior (protandro)	Caddo, Oconee, Oklahoma	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
44.		**Time of maturity for harvest**			**Época de madurez para cosecha**		
QN	**VG**	early			temprana		3
		medium			media		5
		late			tardía		7
45. **(+)**		**Tree: persistence of husk after nut fall**	**Arbre: persistance du brou après la chute de la noix**		**Árbol: persistencia de la vaina luego de la caída de la nuez**		
QL	**VG**	not persistent	Non persistant	nicht anhaftend	no persistente		1
		partially persistent	partiellement persistant	teilweise anhaftend	parcialmente persistente		2
		fully persistent	totalement persistant	vollständig anhaftend	completamente persistente		3

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)

(b)

8.2 Explanations for individual characteristics

9. Literature

{xx}

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*	*Carya illinoinensis* (Wangenh.) K. Koch
1.2 Common name	PECAN NUT

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)

(b) partially known cross [ ]
(please state known parent variety(ies))

(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)

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

(a) cuttings [ ]

(b) other (state method) [ ]

4.2.2 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:

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

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)			

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 should accompany the Technical Questionnaire.

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.

[#] 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:

9. Information on plant material to be examined.

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 or pesticide) Yes [ ] No [ ]

(c) Tissue culture Yes [ ] No [ ]

(d) Other factors Yes [ ] No [ ]

Please provide details of 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]