

UPOV

TG/PECAN (proj.7)

ORIGINAL: English

DATE: 2010-08-30

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

DRAFT

PECAN NUT

UPOV Code: CARYA_ILL

Carya illinoensis (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 forty-first session, to be held in Cuernavaca, Morelos State, Mexico,
from September 27 to October 1, 2010*

Alternative Names: *

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Carya illinoensis</i> (Wangenh.) K. Koch	Pecan nut	Pacancier	Pekan, PekannuB	Nuez pecán, Pecan, Nogal Pecanero

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 ("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.]

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
1. SUBJECT OF THESE TEST GUIDELINES.....	3
2. MATERIAL REQUIRED	3
3. METHOD OF EXAMINATION.....	3
3.1 Number of Growing Cycles	3
3.2 Testing Place	3
3.3 Conditions for Conducting the Examination.....	3
3.4 Test Design	3
3.5 Additional Tests	4
4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY	4
4.1 Distinctness	4
4.2 Uniformity.....	5
4.3 Stability	5
4.4 Method of propagating the variety	6
5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL.....	8
6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS	9
6.1 Categories of Characteristics.....	9
6.2 States of Expression and Corresponding Notes.....	9
6.3 Types of Expression.....	10
6.4 Example Varieties	10
6.5 Legend.....	10
7. TABLE OF CHARACTERISTICS/TABLEAU DES CARACTÈRES/MERKMALSTABELLE/TABLA DE CARACTERES.....	11
8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS	20
8.1 Explanations covering several characteristics	20
8.2 Explanations for individual characteristics	20
9. LITERATURE	26
10. TECHNICAL QUESTIONNAIRE	27

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Carya illinoensis* (Wangenh.) K. Koch. (*Juglandaceae*).

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 budstick.

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

8 dormant budsticks.

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

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 *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 / Parts of Plants to be Examined

Unless otherwise indicated, all observations for the purposes of distinctness should be made on 5 trees or parts taken from each of 5 trees, disregarding any off-type trees. In the case of parts of trees, the number to be taken from each of the trees 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 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-type is allowed.

4.3 *Stability*

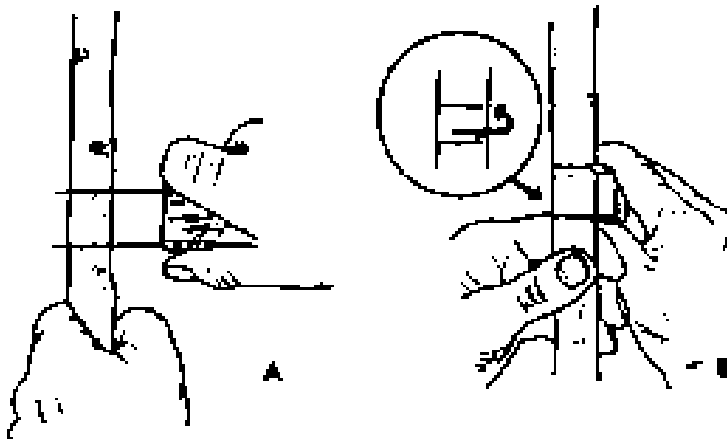
4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

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.

4.4 *Method of propagating the variety*

The patch bud method of propagating pecans are made in the spring using mature buds that are not growing and are on wood that grew last year. The patch bud method is also done during the summer use current season's wood.

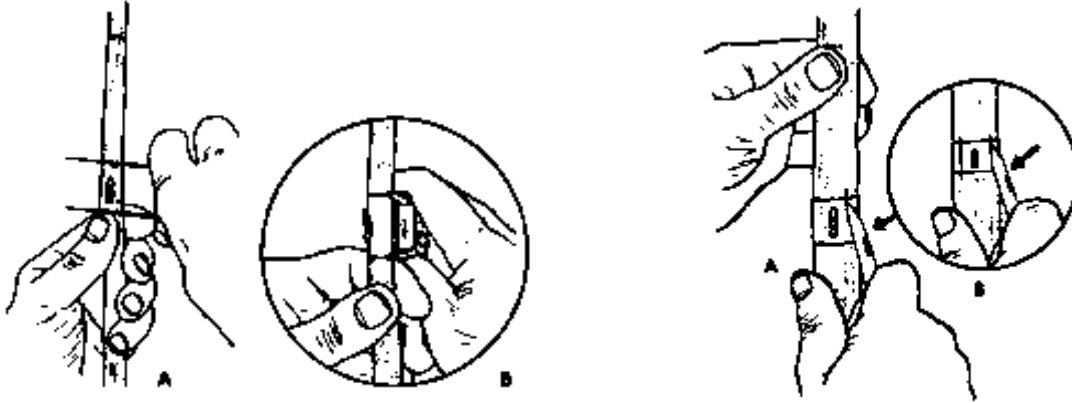
Select a smooth clean place on the stock between the two-bladed budding knife at a right angle to the stock, insert the tip end of blades through the bark down to the wood. Apply only enough pressure to cut through the bark and rotate the knife to the right as shown in B, until two parallel cuts 1,5 inches have been made.



Connect the two parallel cuts with one perpendicular cut. Make this cut with a single-bladed knife. Begin slightly above the top parallel cut on the right side and slightly back from the end of the cut to insure a free corner. Place right thumb on the stock just below the two parallel cuts to serve as a guide in securing a straight line. With the knife held at a flat (acute) angle to the stock, apply enough pressure to cut through bark and draw a straight line from the top cut to the bottom cut. Continue the single connecting cut until it comes slightly below the bottom cut and slightly back from the end of this cut.

Center a set of buds (one node) between the two blades of the budding knife (See A.). Hold the knife at a right angle to bud stick. Start on the left side of the bud stick and, with firm pressure, insert the tip of the blades through the bark and rotate the knife to the right, as in B. Make the two parallel cuts about 1,5 inches long.

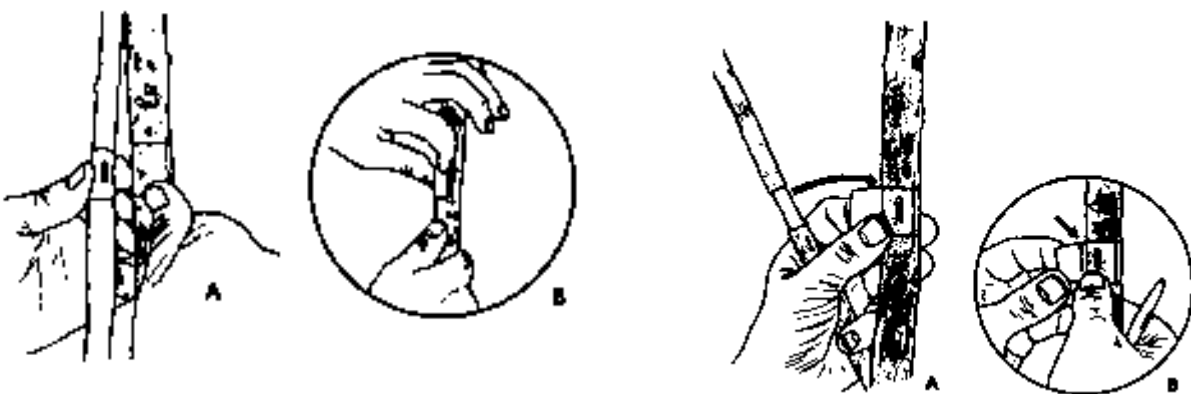
With a single-bladed knife, connect the two parallel cuts on the budstick with two perpendicular cut the patch of bark around the set of the bud patch is slightly above and back from the end of the top parallel cut. Again, with the right thumb firmly against the budstick and with the knife at a flat angle, insert the knife through the bark and draw the knife downward to make a straight connecting cut. This cut should extend below and back of the end of the bottom parallel cut. Turn the budstick upside down and make the same type of connecting cut on the other side of the bud patch.



A. Insert the single knife blade at each of the four corners of the bud patch. Hold the right thumb on the bud patch and against the side of the knife blade. Apply pressure to the center of the patch, with the knife blade “buckling” the corner of the patch against the thumb. This insures that each corner is clearly cut and prepares the bud patch for removal.

B. Place the top of the right index finger on the bud patch so that the second knuckle fits right below and slightly to the right of the groups of buds. Place the right thumb just to the left of the buds. Twist the right hand to the left or toward the body and, with the left hand, turn the budstick in the opposite direction. This will cause a clean separation of the bud patch from the budstick and will prevent creasing the patch. Leave the separated bud patch in place on the budstick to prevent drying.

Insert the single knife blade at each corner of the connecting cut on the stock. Buckle the flap of bark against the right thumb to eliminate any “hangnail” of bark, which will prevent the flap from peeling back. Note that the separated bud patch still is in place on the budstick. (See A.) The flap of bark between the two parallel cuts is peeled to the left as shown in B, exposing the location on the stock where the bud patch will be inserted.



Remove the bud patch quickly from the bud stick and insert it in the spot where the flap of the bark on the stock is peeled back. (See A.) Place the bud patch so that the right side meshes exactly against the right side of the connecting cut on the stock. The patch will go precisely between the two parallel cuts on the stock. As in B, the flap of bark on the stock is creased and then torn to leave a slight overlap on top of the left side of the bud patch

Tie the bud patch securely into place with polyethylene plastic budding tape or with rubber budding strips. Hold the bud patch in place with the left thumb until the tie has secured the patch. The tie may begin just above the top of the bud patch and the wraps should overlap slightly to seal out excessive air and water and to prevent drying. Apply firm pressure in wrapping the bud patch, but leave some “stretch” in the tying material to prevent a girdling effect on the stock.



Forcing the bud is the next step. Two or three weeks after insertion of the bud, check to see if the bud patch is green by nicking it slightly with the sharp point of a knife blade. If it is green, cut off the stock 6 to 8 inches above the patch bud location. (See A.) Shave off all buds on the stock above the patch bud. This section of stock above the patch prevents loss of the bud by drying out and serves as a stake to tie the young tender shoot that develops from the patch bud. (See B.)

Cut off the stock immediately above the shoot growing from the patch bud at the end of the first growing season

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 20)
- (b) Nut: width in lateral view (characteristic 21)
- (c) Nut: width in ventral view (characteristic 22)

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*

(*) Asterisked characteristic – see Chapter 6.1.2

QL: Qualitative characteristic – see Chapter 6.3

QN: Quantitative characteristic – see Chapter 6.3

PQ: Pseudo-qualitative characteristic – see Chapter 6.3

MG, MS, VG, VS – see Chapter 4.1.5

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

(+) See Explanations on the Table of Characteristics in Chapter 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	weak	faible	gering	débil		3
	medium	moyenne	mittel	medio		5
	strong	forte	stark	fuerte		7
2.	Tree: density of crown	Arbre : densité de la courone	Baum: kronendichte	Árbol: densidad de la copa		
QN	sparse	faible	locker	laxa		3
	medium	moyenne	mittel	media		5
	dense	dense	dicht	densa		7
3.	Tree: growth habit			Árbol: hábito de crecimiento		
(+)						
QL	upright	dressé	aufrecht	erecto		1
	semi-upright	demi-dressé	halbaufrecht	semierecto		2
	spreading			horizontal		3
4.	One year old shoot: color			Rama de un año: color		
PQ	greenish brown			castaño verdoso		1
	medium brown			castaño medio		2
	reddish brown			castaño rojizo		3
5.	Leaf: intensity of green color			Hoja: intensidad del color verde		
QN	light			claro		1
	medium			medio		2
	dark			oscuro		3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. (+)	Leaf: length of terminal leaflet			Hoja: longitud del folíolo terminal		
QN	short			corta		3
	medium			media		5
	long			larga		7
7. (+)	Leaf: width of terminal leaflet			Hoja: ancho del folíolo terminal		
QN	narrow			angosto		3
	medium			medio		5
	broad			ancho		7
8. (+)	Leaf: ratio length/width of terminal leaflet			Hoja: relación largo/ancho del folíolo terminal		
QN	slightly elongated			ligeramente alongada		3
	moderately elongated			moderadamente alongada		5
	very elongated			muy elongada		7
9. (+)	Leaf: length of petiole			Hoja: largo del pecíolo		
QN	short			corto		3
	medium			medio		5
	long			largo		7
10. (+)	Lateral leaflet: curvature along longitudinal axis			Folíolo lateral: curvatura a lo largo de eje longitudinal		
QN	weak			débil		3
	medium			media		5
	strong			fuerte		7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11.	Lateral leaflet: presence of petiolule			Folíolo lateral: presencia de peciólulo		
(+)						
QL	absent			ausente		1
	present			presente		9
12.	Lateral leaflet: asymmetry at base			Folíolo lateral: irregularidad		
(+)						
QN	absent or weak			ausente o débil		1
	moderate			media		5
	strong			fuerte		7
13.	<u>Only varieties with irregular lateral leaflets:</u> Lateral leaflet: position of broadest part			<u>Sólo variedades con folíolos laterales irregulares:</u> Folíolo lateral: posición del lado más ancho de los folíolos		
(+)						
QN	towards apex			hacia el ápice de la hoja		1
	at middle			hacia el medio		2
	towards			hacia la base de la hoja		3
14.	Catkin: length			Amento: largo		
QN	short			corto		3
	medium			medio		5
	long			largo		7
15.	Female inflorescence: number of flowers			Inflorescencia femenina: número de flores		
QN	very few			muy escaso		1
	few			escaso		2
	medium			medio		3
	many			abundante		4
	very many			muy abundante		5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16.	Stigma: bifurcation			Estigma: bifurcación		
(+)						
QL	absent or weak			ausente o débil		1
	moderate			moderada		2
	strong			fuerte		3
17.	Stigma: anthocyanin coloration			Estigma: coloración antociánica		
(*)						
QN	absent or weak			ausente o débil		1
	moderate			moderada		2
	strong			fuerte		3
18.	Shuck: intensity of green color			Valva: intensidad del color verde		
QN	light			claro		1
	medium			medio		2
	dark			oscuro		3
19.	Shuck: prominence of ribs			Valva: prominencia de costillas		
(+)						
QN	absent or very weak			ausente o muy débil		1
	weak			débil		3
	medium			medio		5
	strong			fuerte		7
20.	Nut: length			Nuez: largo		
(*)						
(+)						
QN	short			corto	Desirable, Success	3
	medium			medio	Harris Super	5
	long			largo	Mahan	7

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25. (+)	Nut: shape in cross section with suture at top			Nuez: forma en sección transversal con la sutura en posición vertical		
QN	elliptic			elíptico	Kernoodle	1
	circular			circular	Desirable, Shoshoni	2
	oblate			comprimido/aplanado	Mahan	3
26. (+)	Nut: shape of apex in lateral view			Nuez: forma del ápice en vista lateral		
PQ	acute			agudo	Desirable, Stuart	1
	obtuse			obtuso	Success	2
	rounded			redondeado		3
27. (+)	Nut: length of tip			Nuez: longitud del punto apical		
QN	short			corto		1
	medium			medio		2
	long			largo		3
28. (+)	Nut: intensity of ground color			Nuez: intensidad del color de fondo		
QN	light			claro	Desirable, Mahan, Success	3
	medium			medio	Harris Super, Stuart	5
	dark			oscuro	Kernoodle, Shoshoni	7
29.	Nut: area covered by spots			Nuez: área cubierta con manchas		
QN	small			pequeña	Desirable, Harris Super, Kernoodle, Shoshoni	3
	medium			media	Mahan	5
	large			grande	Stuart	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30.	Nut: thickness of shell			Nuez: grosor de la cáscara		
QN	thin			delgado		3
	medium			medio		5
	thick			grueso		7
31.	Nut: thickness of partition of wall			Nuez: grosor del tabique central		
(+)						
QN	thin			delgado		1
	medium			medio		2
	thick			grueso		3
32.	Kernel: adherence to shell			Semilla: adherencia a la cáscara		
QN	weak			débil		1
	medium			media		2
	strong			fuerte		3
33.	Kernel: weight			Semilla: peso		
(+)						
QN	light			liviano		3
	medium			medio		5
	heavy			pesado		7
34.	Kernel: intensity of color			Semilla: intensidad del color		
	light			claro		1
	medium			medio		2
	dark			oscuro		3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35.	Time of leaf bud burst			Época de brotación		
QN	early			temprana		3
	medium			media		5
	late			tardía		7
36.	Time of leaf fall			Época de caída de las hojas		
QN	early			temprana		3
	medium			media		5
	late			tardía		7
37. (+)	Persistence of rachis on tree			Persistencia del raquis en el árbol		
QN	absent or weak			ausente o débil		1
	moderate			moderada		2
	strong			fuerte		3
38. (+)	Time of beginning of receptivity of stigma			Época de comienzo de la receptividad del estigma		
QN	early			temprana	Shoshoni	3
	medium			media	Desirable, Mahan	5
	late			tardía	Caddo, Oklahoma	7
39.	Time of beginning of anther dehiscence			Época de comienzo de la dehiscencia de las anteras		
QN	early			temprana		3
	medium			media		5
	late			tardía		7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
40.	Time of opening of shuck			Época de apertura de la valva		
(+)						
QN	early			temprana		3
	medium			media		5
	late			tardía		7
41.	Tree: persistence of shuck after nut fall	Arbre: persistance du brou après la chute de la noix		Árbol: persistencia de la valva luego de la caída de la nuez		
(+)						
QN	not persistent	non persistant	nicht anhanftend	no persistente		1
	partially persistent	partiellement persistant	teilweise anhanftend	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:

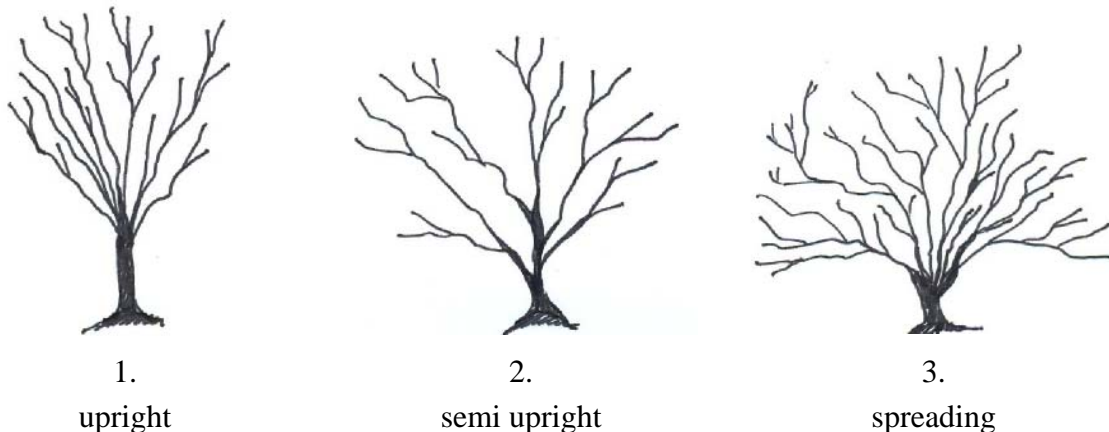
- (a) Ad. 6 to 13: Phenological state (V9) – end of leaflet expansion – fully developed leaflets. Leaves on the middle section of a year shoot.
- (b) Ad. 16 to 17: Phenological state (R6) – fully receptivity of stigma – Stigma is turgescient with brilliant aspect. Observation must be done on the terminal section of a year shoot.
- (c) Ad. 20 to 24: Phenological state (R14) – shuck opening – 24 weeks after pollination. Full development of nut. Observation must be done on the terminal section of a year shoot.

8.2 *Explanations for individual characteristics*

Ad. 1: Tree: vigor

The vigor of the plant should be considered as the overall abundance of vegetative growth.

Ad. 3: Tree: growth habit



Ad. 6: Leaf: length of terminal leaflet

Ad. 7: Leaf: width of terminal leaflet

Ad. 8: Leaf: ratio length/width of terminal leaflet

Ad. 9: Leaf: length of petiole

Ad. 10: Lateral leaflet: curvature along longitudinal axis

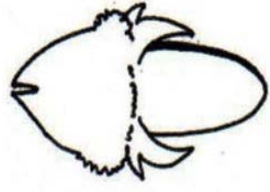
Ad. 11: Lateral leaflet: presence of petiolule

Ad. 12: Lateral leaflet: assymetry at base

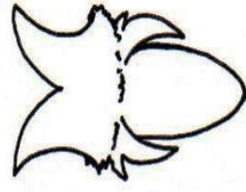
Ad. 13: Only varieties with irregular lateral leaflets: Lateral leaflet: position of broadest part

To observe on fully developed leaves on the middle third of branches growing in the currently year.

Ad. 16: Stigma: bifurcation



1
entire



2
bifurcate

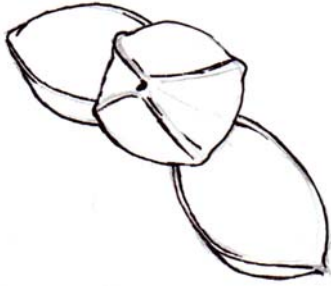


1
entire



2
bifurcate

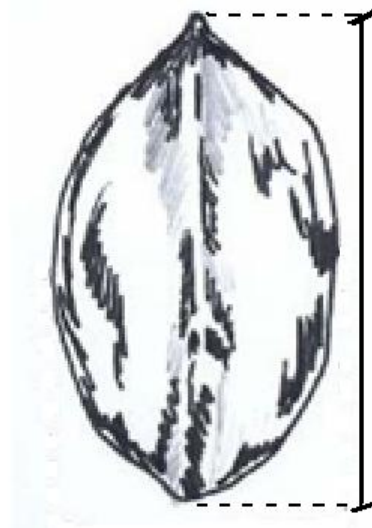
Ad. 19: Shuck: prominence of ribs



Ad. 20: Nut: length

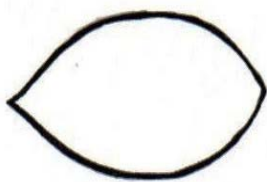


length in lateral view



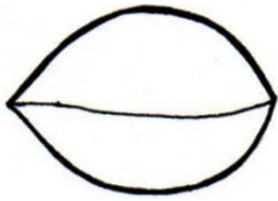
length in ventral view

Ad. 21: Nut: width in lateral view



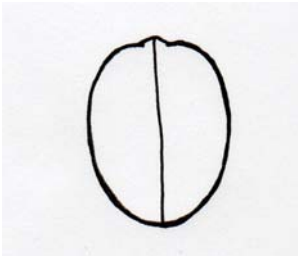
Nut: width in lateral view

Ad. 22: Nut: width in ventral view

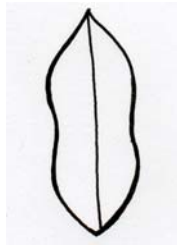


Nut: width in ventral view

Ad. 23: Nut: shape in ventral view



2
elliptic



3
oblong

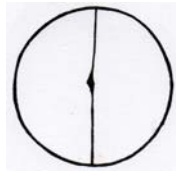
Ad. 24: Nut: shape in lateral view

	muy alargada	moderadamente alargada
oblonga	A line drawing of a very elongated, oblong pecan nut in lateral view. The nut is significantly longer than it is wide, with a pointed tip and a rounded base.	
oval		A line drawing of a moderately elongated, oval pecan nut in lateral view. The nut is wider than it is tall, with a pointed tip and a rounded base.
eliptica		A line drawing of an elliptical pecan nut in lateral view. The nut is wider than it is tall, with a pointed tip and a rounded base.

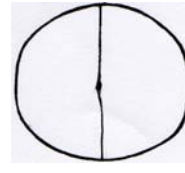
Ad. 25: Nut: shape in cross section with suture in vertical position



1
elliptic



2
circular



3
oblate

Ad. 26: Nut: shape of apex in lateral view



1
acute



2
obtuse

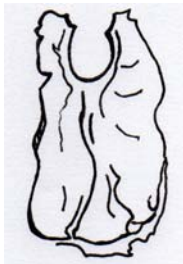


3
rounded

Ad. 28: Nut: intensity of ground color

The brown color intensity is observed on the surface of the nut, without considering the area covered by spots.

Ad. 30: Nut: thickness of shell



Ad. 33: Kernel: weight

Crack 10 nuts and then remove and weigh the kernel. Then take the average weight of kernel per nut.

Ad. 37: Persistence of rachis on tree

The degree of persistence of the leaf rachis in the shoot after the fall of the leaflets. The time of observation is made in late autumn and early winter.

Ad. 40: Time of opening of shuck

The time of opening of the shuck is when 75% of shucks are split. Individual valves of the shuck are separated to allow visibility of the nut.

Ad. 41: Tree: persistence of shuck after nut fall

Indicates the degree of persistence of the shuck on the infrutescence in the shoot after the fall of the nuts. The observation is made late winter.

PECAN NUT: PHENOLOGICAL STAGES

- V1: sleeping bud
- V2: inflated bud
- V3: external splited bud
- V4: internal splited bud
- V5: developing leaves
- V6 – V9: developing leaflets
- R1: catkin prolonging
- R2: pollen liberation start.
- R3: pollen liberation fullness
- R4: end of pollen liberation
- R5: stigma receptivity starts
- R6: stigma receptivity fullness
- R7: end of stigma receptivity
- R8: early nut development
- R9: quick nut development
- R10: late nut development
- R11: starts the nut fill
- R12: nut fill
- R13: end of nut fill
- R14: opening husk
- S1: yellowing leaves starts
- S2: fully yellowing leaves
- S3: end of yellowing leaves
- S4: start downfall leaves
- S5: fully downfall leaves
- S6: end of downfall leaves

9. Literature

Aldred, W.H., et al, 1997: Texas Pecan Handbook. Texas Agricultural Extension Service (Texas A&M University) Texas. US, pp. 305.

Frusso, E., 1997: Aspectos del cultivo del nogal pecan, Estación Experimental Agropecuaria INTA Delta del Paraná (INTA), Buenos Aires, AR, pp. 11.

INSTITUTO NACIONAL DE SEMILLAS (INASE), 2004: Descriptor morfológico, fisiológico, fenológico, para el Registro y protección de cultivares de PECAN (*Carya illinoensis* (Wangenh.) K. Koch), Buenos Aires, AR, pp. 11.

Grauke, L.J., 1985: The Scientific Name of the Pecan. HortScience 20: 629-630.

Grauke, L.J., Thompson, T., 1992: Patterns of pollination in pecans. Proc. Texas Pecan Growers 71: 41-49.

Grauke, L.J., Thompson, T., 1996: Pecan and hickories, Fruit breeding.vol III , New York, US, pp 185-239.

Goff, W.D., Mc Vay J.R., Gazaway, W.S., 1996: Pecan: Production in the southeast – A guide for growers. Alabama Cooperative Extension System (Auburn University) Alabama, US, pp. 222.

Madero E., Frusso E., 2002: Desarrollo del Cultivo de la Nuez Pecan en la Argentina, Estación Experimental Agropecuaria INTA Delta del Paraná (INTA), Buenos Aires, AR, pp.32.

Madero E., Frusso E., Cajaravilla P., 1997: La nuez pecan, Estación Experimental Agropecuaria INTA Delta del Paraná (INTA), Buenos Aires, AR, pp. 16.

Thompson T. E., y Young F., Pecan Cultivars- Past and Present.

Wesley Rice, G. ,1994: Pecans: popular varieties, propagation, culture & more, PecanQuest Publications, Ponca City, Oklahoma, US, pp.168.

Worley,R. E. Compendium of Pecan Production and Research. Ann Arbor, Michigan US, pp.479.

Wood, B. W., 1996: Canopy Morphology of Pecan Cultivars. HortScience 31: pp. 139-142.

Wood, B. W., Smith, M.W., Worley, R.E., Anderson, P.C., Thompson, T.T., Grauke, L.J.,1997: HortScience 32: pp. 1028-1033.

Worley R. E., Mullinixy B. G. Pecan cultivar performance at the coastal plain experiment station 1921-1994. 1997: The University of Georgia, Tifton, Georgia, US, pp. 34

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="Carya illinoensis (Wangenh.) K Koch"/>	
1.2 Common name	<input type="text" value="PECAN NUT"/>	
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"/>	

#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)

--

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
<p>4.2.1 Vegetative propagation</p>		
(a) cuttings	[]	
(b) <i>in vitro</i> propagation	[]	
(c) other (state method)	[]	
<div style="border: 1px solid black; height: 50px; width: 100%;"></div>		
4.2.2 Seed	[]	
4.2.3 Other	[]	
<p>(please provide details)</p>		
<div style="border: 1px solid black; height: 50px; width: 100%;"></div>		

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
<p>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).</p>		
Characteristics	Example Varieties	Note
<p>5.1 Nut: length (20)</p>		
very short		1[]
very short to short		2[]
short		3[]
short to medium		4[]
medium		5[]
medium to long		6[]
long		7[]
long to very long		8[]
very long		9[]
<p>5.3 Nut: width in lateral view (21)</p>		
very narrow		1[]
very narrow to narrow		2[]
narrow		3[]
narrow to medium		4[]
medium		5[]
medium to broad		6[]
broad		7[]
broad to very broad		8[]
very broad		9[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics		Example Varieties	Note
5.2	Nut: width in ventral view		
(22)			
	very narrow		1[]
	very narrow to narrow		2[]
	narrow		3[]
	narrow to medium		4[]
	medium		5[]
	medium to broad		6[]
	broad		7[]
	broad to very broad		8[]
	very broad		9[]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:	
<p>6. Similar varieties and differences from these varieties</p> <p><i>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.</i></p>			
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>			
<p>Comments:</p>			

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:												
<p>9. Information on plant material to be examined or submitted for examination.</p> <p>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.</p> <p>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:</p> <table data-bbox="284 801 1406 1066"><tr><td>(a) Microorganisms (e.g. virus, bacteria, phytoplasma)</td><td>Yes []</td><td>No []</td></tr><tr><td>(b) Chemical treatment (e.g. growth retardant, pesticide)</td><td>Yes []</td><td>No []</td></tr><tr><td>(c) Tissue culture</td><td>Yes []</td><td>No []</td></tr><tr><td>(d) Other factors</td><td>Yes []</td><td>No []</td></tr></table> <p>Please provide details for where you have indicated “yes”.</p> <p>.....</p>			(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 []
(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 []												
<p>10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:</p> <table data-bbox="284 1357 1442 1491"><tr><td>Applicant's name</td><td colspan="3"><input type="text"/></td></tr><tr><td>Signature</td><td><input type="text"/></td><td>Date</td><td><input type="text"/></td></tr></table>			Applicant's name	<input type="text"/>			Signature	<input type="text"/>	Date	<input type="text"/>				
Applicant's name	<input type="text"/>													
Signature	<input type="text"/>	Date	<input type="text"/>											

[End of document]