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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
GENEVA

<p><b>HAWTHORN</b> *</p> <p>UPOV Code: CRATA</p> <p><i>Crataegus</i> L.</p>
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**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>Crataegus</i> L.	Hawthorn	Aubépine	Weißdorn	Espino, Espinero, Manzanilla, Marjoleto, Marzoleto, Tejocote

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](http://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 *Crataegus* L., of the family *Rosaceae*.

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 graft sticks, grafted plants or plants on their own roots.

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

8 graft sticks or 5 plants.

In the case of grafted plants, the rootstock to be used is specified by the competent authority.

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.

The growing cycle is considered to be the duration of a single growing season, beginning with bud burst (flowering and vegetative), growth 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. In particular, it is essential that the plants produce a satisfactory crop of fruit in each of the two growing cycles.

### 3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least five 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 *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.

4.2.2 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-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) Plant: growth type (characteristic 1);
- (b) Plant: habit (characteristic 2);
- (c) Shoot: presence of thorns (characteristic 6);
- (d) Leaf blade: lobes (characteristic 15);
- (e) Petiole: length (characteristic 22);
- (f) Fruit: color (characteristic 32).

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.

### 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

(a) – (e) 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
<b>1.</b> (* (+)	<b>Plant: growth type</b>	<b>Plante: type de croissance</b>	<b>Pflanze: Wuchstyp</b>	<b>Planta: hábito de crecimiento</b>		
<b>PQ (a)</b>	shrub	arbrisseau	Strauch	arbusto	Calpantino, Candelaria, Compacta, Mitzi	1
	semi-shrub	demi-arbrisseau	Halbstrauch	semiarbusto	Azucena, Paul's Scarlet	2
	tree	arbre	Baum	árbol	Calpan Gold, Plena	3
<b>2.</b> (* (+)	<b>Plant: habit</b>	<b>Plante: port</b>	<b>Pflanze: Wuchsform</b>	<b>Planta: porte</b>		
<b>PQ (a)</b>	fastigiata	très dressé	sehr aufrecht	fastigiado	Ergo, Gaca, Pingo	1
	upright	dressé	aufrecht	erguido	Azucena, Calpar, Stricta	2
	spreading	étalé	breitwüchsig	rastrero	Atexcac	3
	semi drooping	demi-retombant	halbüberhängend	semicolgante	Candelaria, Chico	4
	drooping	retombant	überhängend	colgante		5
	weeping	pleureur	lang überhängend	llorón	Pendula	6
<b>3.</b> (+)	<b>Plant: shape</b>	<b>Plante : forme</b>	<b>Pflanze: Form</b>	<b>Planta: forma</b>		
<b>PQ (b)</b>	semi-circular	semi-circulaire	halbrund	semi-circular	Ara	1
	ovate	ovale	eiförmig	oval	Edgar, Epi, Pingo	2
	oblong	oblongue	rechteckig	oblonga	Gloria	3
	circular	circulaire	rund	circular	Erick	4
	transverse elliptic	elliptique transverse	quer elliptisch	elíptica transversal	Chela, Poblano	5
	obovate	obovale	verkehrt eiförmig	oboval	Ade	6
<b>4.</b>	<b>Plant: height</b>	<b>Plante: hauteur</b>	<b>Pflanze: Höhe</b>	<b>Planta: altura</b>		
<b>QN (a)</b>	short	courte	niedrig	baja	Belén, Gloria	3
	medium	moyenne	mittel	media	Epi, Mutabilis, Robelo	5
	tall	haute	hoch	alta	Compacta, Tequex	7

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>5.</b>	<b>Plant: density of foliage</b>	<b>Plante: densité du feuillage</b>	<b>Pflanze: Dichte des Laubes</b>	<b>Planta: densidad del follaje</b>		
<b>QN (b)</b>	sparse	faible	locker	escasa	Superior	3
	medium	moyenne	mittel	media	Epi, Paul's Scarlet	5
	dense	dense	dicht	densa	Carrieri	7
<b>6. (*)</b>	<b>Shoot: presence of thorns</b>	<b>Rameau: présence d'épines</b>	<b>Trieb: Vorhandensein von Dornen</b>	<b>Rama: presencia de espinas</b>		
<b>QL (a)</b>	absent	absentes	fehlend	ausente	Compacta, Edgar, Epi	1
	present	présentes	vorhanden	presente	Chela, Mutabilis, Pingo	9
<b>7.</b>	<b>Shoot: number of thorns</b>	<b>Rameau: nombre d'épines</b>	<b>Trieb: Anzahl Dornen</b>	<b>Rama: número de espinas</b>		
<b>QN (a)</b>	few	petit	gering	pocas	Salicifolia, Tequex	1
	medium	moyen	mittel	medio	Chela, Mutabilis, Pingo	2
	many	grand	groß	abundantes	Carrieri, Tempranero	3
<b>8.</b>	<b>Shoot: length of thorns</b>	<b>Rameau: longueur d'épines</b>	<b>Trieb: Länge der Dornen</b>	<b>Rama: longitud de espinas</b>		
<b>QN (a)</b>	short	courtes	kurz	corta	Chapinguero, Gloria	3
	medium	moyennes	mittel	media	Ara	5
	long	longues	lang	larga		7
<b>9.</b>	<b>Shoot: length</b>	<b>Rameau: longueur</b>	<b>Trieb: Länge</b>	<b>Rama: longitud</b>		
<b>QN (a)</b>	short	court	kurz	corta	Karen	3
	medium	moyen	mittel	media	Tempranero	5
	long	long	lang	larga	Elena	7
<b>10.</b>	<b>Shoot: growth type</b>	<b>Rameau: type de croissance</b>	<b>Trieb: Wuchstyp</b>	<b>Rama: tipo de crecimiento</b>		
<b>QL (a)</b>	straight	droit	gerade	recto	Ara, Elena, Stricta	1
	zig zag	en forme de zigzag	zickzackförmig	en zigzag	Carrieri, Flexuosa	2



	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>11.</b>	<b>Leaf blade: length</b>	<b>Limbe: longueur</b>	<b>Blattspreite: Länge</b>	<b>Limbo: longitud</b>		
<b>QN</b> (c)	short	court	kurz	corta	Belén, Mutabilis	3
	medium	moyen	mittel	media	Epi	5
	long	long	lang	larga	Carrierei, Edgar	7
<b>12.</b>	<b>Leaf blade: width</b>	<b>Limbe: largeur</b>	<b>Blattspreite: Breite</b>	<b>Limbo: anchura</b>		
<b>QN</b> (c)	narrow	étroit	schmal	estrecho	Epi, Flexuosa, Mutabilis	3
	medium	moyen	mittel	medio	Aurora, Edgar, Paul's Scarlet	5
	broad	large	breit	ancho	Wattiana	7
<b>13.</b> (*)	<b>Leaf blade: ratio length/width</b>	<b>Limbe: rapport longueur/largeur</b>	<b>Blattspreite: Verhältnis Länge/Breite</b>	<b>Limbo: relación longitud/anchura</b>		
<b>QN</b> (c)	small	faible	klein	pequeña	Flexuosa, Toba, Wattiana	3
	medium	moyen	mittel	media	Azucena, Carrierei	5
	large	élevé	groß	grande	Poblano, Stipulacea	7
<b>14.</b> (+)	<b>Leaf blade: margin</b>	<b>Limbe: bord</b>	<b>Blattspreite: Rand</b>	<b>Limbo: borde</b>		
<b>PQ</b> (c)	entire	entier	ganzrandig	entero	Flexuosa	1
	crenate	crénelé	gekerbt	crenado	Karen	2
	bicrenate	bicrénelé	doppelt gekerbt	bicrenado	Tempranero	3
	serrate	dentelé	gesägt	serrado	Compacta, Tzapingo	4
	biserrate	bidentelé	doppelt gesägt	biserrado	Ade, Pingo, Toba	5
<b>15.</b> (*) (+)	<b>Leaf blade: lobes</b>	<b>Limbe: lobes</b>	<b>Blattspreite: Lappen</b>	<b>Limbo: lóbulos</b>		
<b>QL</b> (c)	absent	absents	fehlend	ausente	Ade, Mago	1
	present	présents	vorhanden	presente	Compacta, Flexuosa, Stricta	9

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>16.</b>	<b>Leaf blade: depth of lobes</b>	<b>Limbe: profondeur des lobes</b>	<b>Blattspreite: Tiefe der Lappen</b>	<b>Limbo: profundidad de los lóbulos</b>		
(+)						
<b>QN</b>	(c) shallow	peu profonds	flach	poco profunda	Stipulacea	3
	medium	moyens	mittel	media	Punicea	5
	deep	profonds	tief	profunda	Major, Toba	7
<b>17.</b>	<b>Leaf blade: variegation</b>	<b>Limbe: panachure</b>	<b>Blattspreite: Panaschierung</b>	<b>Limbo: variegación</b>		
<b>QL</b>	(d) absent	absente	fehlend	ausente	Carrieri	1
	present	présente	vorhanden	presente	Gireoudii	9
<b>18.</b>	<b>Leaf blade: anthocyanin coloration</b>	<b>Limbe: pigmentation anthocyanique</b>	<b>Blattspreite: Anthocyanfärbung</b>	<b>Limbo: pigmentación antociánica</b>		
<b>QN</b>	(c) absent or weak	absente ou faible	fehlend oder gering	ausente o débil		1
	medium	moyenne	mittel	media		2
	strong	forte	stark	fuerte		3
<b>19.</b>	<b>Leaf blade: glossiness</b>	<b>Limbe: brillance</b>	<b>Blattspreite: Glanz</b>	<b>Limbo: brillo</b>		
<b>QN</b>	(c) absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Tzapingo	1
	medium	moyenne	mittel	medio	Mago, Nitida	2
	strong	forte	stark	fuerte	Carrierei	3
<b>20.</b>	<b>Leaf blade: pubescence on upper side</b>	<b>Limbe: pilosité de la face supérieure</b>	<b>Blattspreite: Behaarung der Oberseite</b>	<b>Limbo: pubescencia del lado superior</b>		
(+)						
<b>QL</b>	(c) absent	absente	fehlend	ausente	Calpantino, Toba	1
	present	présente	vorhanden	presente	Calpan Gold, Chapeado, Erick (Major)	9
<b>21.</b>	<b>Leaf blade: surface</b>	<b>Limbe: surface</b>	<b>Blattspreite: Oberfläche</b>	<b>Limbo: superficie</b>		
<b>QL</b>	(c) smooth	lisse	glatt	lisa	Aby, Toba	1
	wrinkled	ridée	runzlig	arrugada	Chela, Flexuosa	2

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>22.</b> (*)	<b>Petiole: length</b>	<b>Pétiole: longueur</b>	<b>Blattstiel: Länge</b>	<b>Pecíolo: longitud</b>		
<b>QN</b> (c)	short	court	kurz	corta	Tzapingo	3
	medium	moyen	mittel	media	Paul's Scarlet, Plena	5
	long	long	lang	larga	Toba, Wattiana	7
<b>23.</b> (+)	<b>Flower: calyx length</b>	<b>Fleur: longueur du calice</b>	<b>Blüte: Länge des Kelches</b>	<b>Flor: longitud del cáliz</b>		
<b>QN</b> (d)	short	court	kurz	corta	Alex	3
	medium	moyen	mittel	media	San José	5
	long	long	lang	larga	Lupita	7
<b>24.</b> (*)	<b>Flower: pedicel length</b>	<b>Fleur: longueur du pédoncule</b>	<b>Blüte: Länge des Blütenstiels</b>	<b>Flor: longitud del pedicelo</b>		
<b>QN</b> (d)	short	court	kurz	corta	Alex	3
	medium	moyen	mittel	media	Cris	5
	long	long	lang	larga	San José	7
<b>25.</b> (+)	<b>Flower: type</b>	<b>Fleur: type</b>	<b>Blüte: Typ</b>	<b>Flor: tipo</b>		
<b>QL</b> (d)	single	simple	einfach	simple	Carrieri, Edgar, Gloria, Punicea	1
	double	double	gefüllt	doble	Masekii, Paul's Scarlet	2
<b>26.</b> (+)	<b>Flower: diameter</b>	<b>Fleur: diamètre</b>	<b>Blüte: Durchmesser</b>	<b>Flor: diámetro</b>		
<b>QN</b> (d)	small	petit	klein	pequeño	Aby, Poblano	3
	medium	moyen	mittel	medio	Chela, Pingo	5
	large	grand	groß	grande	Superior, Tequex	7

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>27.</b>	<b>Flower: color of petals</b>	<b>Fleur: couleur des pétales</b>	<b>Blüte: Farbe der Blütenblätter</b>	<b>Flor: color de los pétalos</b>		
<b>PQ (d)</b>	white	blanche	weiß	blanco	Chapeada, Chela, Plena	1
	light pink	rose clair	hellrosa	rosa claro	Masekii, Toba	2
	medium pink	rose moyen	mittelrosa	rosa medio	Pink Corkscrew, Rubra Plena	3
	dark pink	rose foncée	dunkelrosa	rosa oscuro		4
	red	rouge	rot	rojo	Paul's Scarlet	5
<b>28.</b>	<b>Flower: shape of anther</b>	<b>Fleur: forme des anthères</b>	<b>Blüte: Form der Anthere</b>	<b>Flor: forma de la antera</b>		
<b>(+)</b>						
<b>PQ (d)</b>	circular	rondes	kreisförmig	circular	Betty	1
	elliptic	elliptiques	elliptisch	elíptica	Aby, San José	2
	ovate	ovales	eiförmig	oval	Carla	3
<b>29.</b>	<b>Flower: color of base of anther stalks</b>	<b>Fleur: couleur de la base des pédoncules des anthères</b>	<b>Blüte: Farbe des Unterteils der Filamente der Antheren</b>	<b>Flor: color de la base de los filamentos de las anteras</b>		
<b>PQ (d)</b>	green	verte	grün	verde	Poblano, Superior	1
	yellow	jaune	gelb	amarilla	Edgar, Gloria	2
	pink	rose	rosa	rosa	Centenario	3
	red pink	rosée	rotrosa	rosa rojizo	San José	4
	medium purple	pourpre moyenne	mittelpurpurn	púrpura medio	Chela	5
	dark purple	pourpre foncé	dunkelpurpurn	púrpura oscuro	San Cristóbal	6
	brown	brune	braun	marrón	Tempranero, Teques	7
<b>30.</b>	<b>Flower: attitude of petals</b>	<b>Fleur: port des pétales</b>	<b>Blüte: Haltung der Blütenblätter</b>	<b>Flor: porte de los pétalos</b>		
<b>(+)</b>						
<b>QN (d)</b>	erect	dressé	aufrecht	erecto	Poblano, Tempranero	1
	semi erect	demi-dressé	halbaufrecht	semierecto	Chela	2
	horizontal	horizontal	waagrecht	horizontal	Edgar, Pingo, Superior	3

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota	
<b>31.</b> (+)	<b><u>Only varieties with flower type: single:</u> Flower: arrangement of petals</b>	<b><u>Variétés à capitule: simple:</u> Fleur: disposition des pétales</b>	<b><u>Nur Sorten mit einfachem Blütenstand:</u> Blüte: Anordnung der Blütenblätter</b>	<b><u>Sólo variedades con capítulo tipo:</u> sencillo: Flor: disposición de los pétalos</b>			
<b>QN</b>	<b>(d)</b>	free	ouverts	freistehend	libre	Edgar, Superior	1
		touching	tangents	sich berührend	en contacto	Natzi	2
		overlapping	se recouvrant	überlappend	solapados	San Cristóbal	3
<b>32.</b> (*)	<b>Fruit: color</b>	<b>Fruit: couleur</b>	<b>Frucht: Farbe</b>	<b>Fruto: color</b>			
<b>PQ</b>	<b>(e)</b>	light green	vert clair	hellgrün	verde claro	Epi, San Nicolás	1
		medium green	vert moyen	mittelgrün	verde medio		2
		yellow	jaune	gelb	amarillo	Aurora, Tzapingo	3
		yellow and orange	jaune et orange	gelb und orange	amarillo y naranja	Alex, Chapeado	4
		yellow and red	jaune et rouge	gelb und rot	amarillo y rojo	Carrierei, Elena	5
		orange	orange	orange	naranja	Ade, Huejo	6
		orange and red	orange et rouge	orange und rot	naranja y rojo	Poblano	7
		medium red	rouge moyen	mittelrot	rojo medio	Ara	8
		dark red	rouge foncé	dunkelrot	rojo oscuro	Eli	9
		purple	pourpre	purpurn	púrpura		10
		black	noir	schwarz	negro		11
<b>33.</b> (*)	<b>Fruit: glossiness of skin</b>	<b>Fruit: brillance de la peau</b>	<b>Frucht: Glanz der Haut</b>	<b>Fruto: brillo de la epidermis</b>			
<b>QL</b>	<b>(e)</b>	absent	absente	fehlend	ausente	Cas, Eli	1
		present	présente	vorhanden	presente	Ara	9

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>34.</b>	<b>Fruit: density of lenticels</b>	<b>Fruit: densité des lenticelles</b>	<b>Frucht: Dichte der Lentizellen</b>	<b>Fruto: densidad de lenticelas</b>		
<b>QN</b>	(e) very sparse	très lâche	sehr locker	muy baja	Robelo	1
	sparse	lâche	locker	baja	Mago	3
	medium	moyenne	mittel	media		5
	dense	dense	dicht	alta	Iracema	7
	very dense	très dense	sehr dicht	muy alta	Paola	9
<b>35.</b>	<b>Fruit: texture of surface</b>	<b>Fruit: texture de la surface</b>	<b>Frucht: Textur der Oberfläche</b>	<b>Fruto: textura de la superficie</b>		
<b>QN</b>	(e) smooth or slightly rough	lisse ou légèrement rugueuse	glatt oder leicht blasig	lisa o ligeramente rugosa	Dany	1
	moderately rough	modérément rugueuse	mäßig blasig	moderadamente rugosa	San Nicolás	2
	very rough	très rugueuse	sehr blasig	muy rugosa	Tzingo	3
<b>36.</b>	<b>Fruit: aroma</b>	<b>Fruit: arôme</b>	<b>Frucht: Aroma</b>	<b>Fruto: aroma</b>		
<b>QN</b>	(e) absent or weak	absent ou faible	fehlend oder gering	ausente o débil	Chela	1
	medium	moyen	mittel	medio	Elvia	2
	strong	fort	stark	fuerte	Orem	3
<b>37.</b>	<b>Fruit: general shape</b>	<b>Fruit: forme générale</b>	<b>Frucht: allgemeine Form</b>	<b>Fruto: forma general</b>		
(+)						
<b>PQ</b>	(e) conical	conique	kegelförmig	cónica	Ela	1
	elliptic	elliptique	elliptisch	elíptica	Santa Cata	2
	circular	circulaire	kreisförmig	circular	Pingo	3
	oblate	aplatis	breitrund	achatada	Dany	4
	obovate	obovale	verkehrt eiförmig	oboval	Erick (Pedillelata)	5
<b>38.</b>	<b>Fruit: presence of neck</b>	<b>Fruit : présence du collet</b>	<b>Frucht: Vorhandensein eines Halses</b>	<b>Fruto: cuello</b>		
(+)						
<b>QL</b>	(e) absent	absent	fehlend	ausente	Carla	1
	present	présent	vorhanden	presente	Lupita	9

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>39.</b>	<b>Fruit: length</b>	<b>Fruit: longueur</b>	<b>Frucht: Länge</b>	<b>Fruto: longitud</b>		
(+)						
<b>QN</b>	(e) short	court	kurz	corta	Dany, Tzapingo	3
	medium	moyen	mittel	media	Epi	5
	long	long	lang	larga	Calpan Gold	7
<b>40.</b>	<b>Fruit: width</b>	<b>Fruit: largeur</b>	<b>Frucht: Breite</b>	<b>Fruto: anchura</b>		
<b>QN</b>	(e) narrow	étroit	schmal	estrecha	Yesenia	3
	medium	moyen	mittel	media	Tequex	5
	broad	large	breit	ancha	Carla	7
<b>41.</b>	<b>Fruit: length/width ratio</b>	<b>Fruit: rapport longueur/largeur</b>	<b>Frucht: Verhältnis Länge/Breite</b>	<b>Fruto: relación longitud/anchura</b>		
<b>QN</b>	(e) small	petit	klein	pequeña	Ela	3
	medium	moyen	mittel	media	Erick, Robelo	5
	large	grand	groß	grande	Alex, Natzi	7
<b>42.</b>	<b>Fruit: cavity of eye basin</b>	<b>Fruit : cavité de la cuvette de l'œil</b>	<b>Frucht: Kelchgrube</b>	<b>Fruto: cavidad del ojo</b>		
(+)						
<b>QL</b>	(e) closed	fermée	geschlossen	cerrada	Dany, Robelo	1
	open	ouverte	offen	abierta	Karen	2
<b>43.</b>	<b>Fruit: depth of eye basin</b>	<b>Fruit: profondeur de la cuvette de l'œil</b>	<b>Frucht: Tiefe der Kelchgrube</b>	<b>Fruto: profundidad de la cavidad del ojo</b>		
(+)						
<b>QN</b>	(e) very shallow	très peu profonde	sehr flach	muy poco profunda	Candelaria, Mago	1
	shallow	peu profonde	flach	poco profunda	Rob	3
	medium	moyenne	mittel	media	Gloria	5
	deep	profonde	tief	profunda	Chapeado	7
	very deep	très profonde	sehr tief	muy profunda	Elvia	9

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>44.</b>	<b>Fruit: main color of flesh</b>	<b>Fruit: couleur principale de la chair</b>	<b>Frucht: Hauptfarbe des Fleisches</b>	<b>Fruto: color principal de la pulpa</b>		
(+)						
<b>PQ</b>	(e)					
	green	verte	grün	verde	San Nicolás	1
	white	blanche	weiß	blanco	Epi	2
	light yellow	jaune clair	hellgelb	amarillo claro	Superior	3
	medium yellow	jaune moyen	mittelgelb	amarillo medio	Belén	4
	dark yellow	jaune foncé	dunkelgelb	amarillo oscuro	Azucena	5
	orange	orange	orange	naranja	Chela, Cris, Poblano	6
	red	rouge	rot	rojo	Dany	7
<b>45.</b>	<b>Endocarp: number</b>	<b>Endocarpe: nombre</b>	<b>Endokarp: Anzahl</b>	<b>Endocarpo: número</b>		
<b>QN</b>	(e)					
	few	faible	gering	bajo	Natzi, Santa Cata	1
	medium	moyen	mittel	medio	Edgar	2
	many	élevé	groß	alto	Centenario	3
<b>46.</b>	<b>Endocarp: length</b>	<b>Endocarpe: longueur</b>	<b>Endokarp: Länge</b>	<b>Endocarpo: longitud</b>		
(+)						
<b>QN</b>	(e)					
	short	court	kurz	corta	Pingo	3
	medium	moyen	mittel	media	Natzi	5
	long	long	lang	larga	Chela	7
<b>47.</b>	<b>Endocarp: width</b>	<b>Endocarpe: largeur</b>	<b>Endokarp: Breite</b>	<b>Endocarpo: anchura</b>		
(+)						
<b>QN</b>	(e)					
	narrow	étroit	schmal	estrecha	Ade	3
	medium	moyen	mittel	media	San Cristóbal	5
	broad	large	breit	ancha	Carla	7



	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>48.</b> (*)	<b>Endocarp: width/length ratio</b>	<b>Endocarpe: rapport longueur/largeur</b>	<b>Endokarp: Verhältnis Länge/Breite</b>	<b>Endocarpo: relación longitud/anchura</b>		
<b>QN</b> (e)	small	petit	klein	pequeña	Belén, Lila, Yesenia	3
	medium	moyen	mittel	media	Calpar, Candelaria, Yash	5
	large	grand	groß	grande	Ixayoc	7
<b>49.</b>	<b>Time of flowering</b>	<b>Époque de floraison</b>	<b>Zeitpunkt der Blüte</b>	<b>Época de la floración</b>		
<b>QN</b>	early	précoce	früh	temprana	Eli	3
	medium	moyenne	mittel	media	Centenario	5
	late	tardive	spät	tardía	Chapeado	7
<b>50.</b>	<b>Time of harvest</b>	<b>Époque de récolte</b>	<b>Zeitpunkt der Ernte</b>	<b>Época de cosecha</b>		
<b>QN</b>	very early	très précoce	sehr früh	muy temprana	Tempranero	1
	early	précoce	früh	temprana	Adela	3
	medium	moyenne	mittel	media	Ara, Mago	5
	late	tardive	spät	tardía	Nati	7
	very late	très tardive	sehr spät	muy tardía	Mitzi	9

## 8. Explanations on the Table of Characteristics

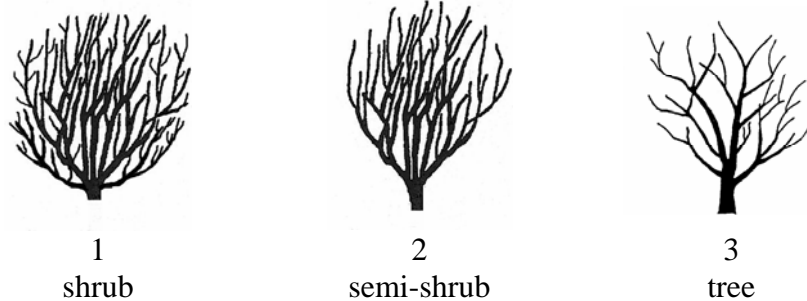
### 8.1 *Explanations covering several characteristics*

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

- (a) Observations on the plant stem and branch which should be made on the vegetative current season's shoots after growth.
- (b) Observations on the plant which should be made on foliated plants in the spring.
- (c) Leaf: Observations on the leaf should be made on mature leaves from branches on the outside of the tree which are neither bearing fruit nor showing signs of new flush. Leaves should be taken from the middle third of the current season's growth.
- (d) Flower: Observations on the flower which should be made during the first flower opening, at the start of anther dehiscence.
- (e) Fruit and endocarp: Observations on the fruit and endocarp which should be made on 10 typical fruits taken from each of 5 plants, at the time of fruit ripening.

### 8.2 *Explanations for individual characteristics*

#### Ad. 1: Plant: growth type



Shrub: multiple stems arising close to the grafting point, relatively low height.

Semi-shrub: multiple stems arising generally from the same point but not close to the graft point, with a main stem, not tall.

Tree: having a main trunk, with branches arising from different points and usually a distinct crown.

Ad. 2: Plant: habit



1  
fastigate



2  
upright



3  
spreading



4  
semi drooping



5  
drooping



6  
weeping

Ad. 3: Plant: shape



1  
semi-circular



2  
ovate



3  
oblong



4  
circular



5  
transverse elliptic



6  
obovate

Ad. 14: Leaf blade: margin



1  
entire



2  
crenate



3  
bicrenate



4  
serrate



5  
biserrate

Ad. 15: Leaf blade: lobes

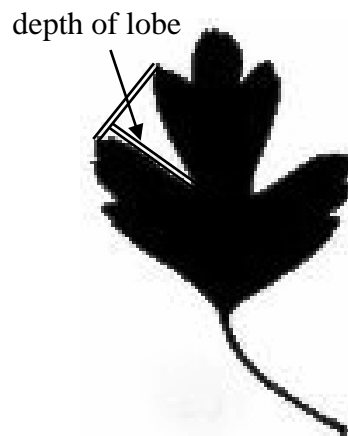


1  
absent



9  
present

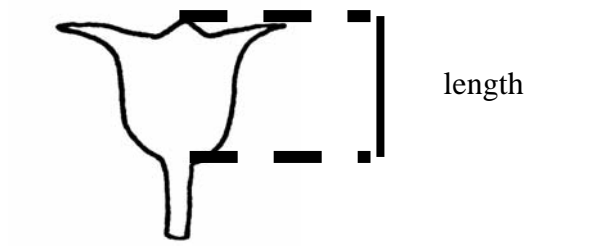
Ad. 16: Leaf blade: depth of lobes



Ad. 20: Leaf blade: pubescence on upper side

Pubescence should be observed with the aid of a magnifying glass.

Ad. 23: Flower: calyx length



Ad. 25: Flower type

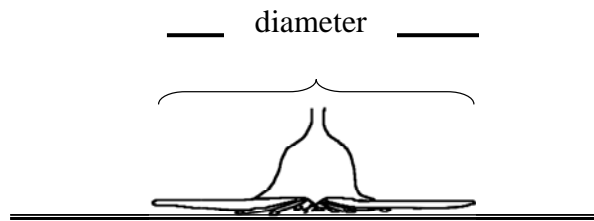


1  
single



2  
double

Ad. 26: Flower: diameter



The flower diameter should be observed with the petals pressed into a horizontal position.

Ad. 28: Flower: shape of anther



1  
circular

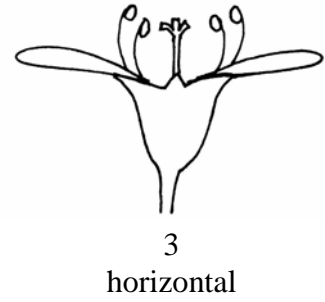
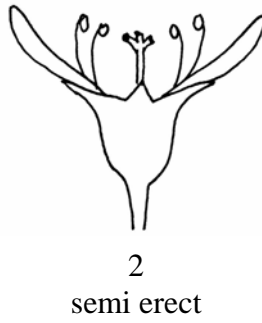
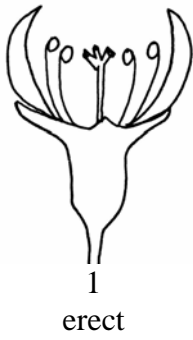


2  
elliptic



3  
ovate

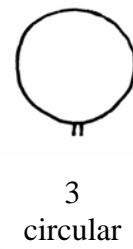
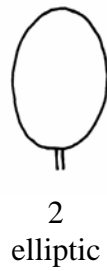
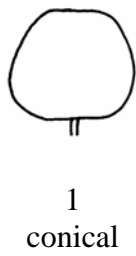
Ad. 30: Flower: attitude of petals



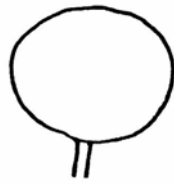
Ad. 31: Only varieties with flower type: single: Flower: arrangement of petals



Ad. 37: Fruit: general shape



Ad. 38: Fruit: presence of neck



1  
absent



9  
present

Ad. 39: Fruit: length

The length of fruit includes the neck (if present).

Ad. 42: Fruit: cavity of eye basin



1  
closed



2  
open

Ad. 43: Fruit: depth of eye basin

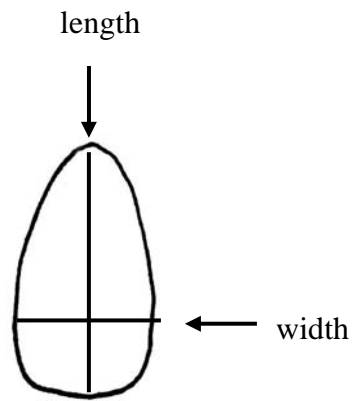


Ad. 44: Fruit: main color of flesh

The main color is the color with the largest surface area.

Ad. 46: Endocarp: length

Ad. 47: Endocarp: width





9. Literature

Borys, M. W., Leszczyńska-Borys, H., 1994: Tejocote (*Crataegus* spp.) – planta para solares, macetas e interiores. *Revista Chapingo Serie Horticultura* 1(2): 95-107.

Hillier, H.G., 1992: *Hillier's Manual of Trees and Shrubs*. 6<sup>th</sup> ed. Romsey, GB, 575 pp.

Phipps, J.B., 1997: *Monography of Northern Mexican Crataegus* (Rosaceae, subfam. Maloideae). The University of Western Ontario, Department of Plant Science, London, Ontario, CA, 93 pp.

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
		Application date: (not to be filled in by the applicant)
<b>TECHNICAL QUESTIONNAIRE</b> 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="Crataegus L."/>	
1.2 Common Name	<input type="text" value="Hawthorn"/>	
	Species (please complete)	
	<input type="text"/>	
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)

(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

(a) grafted [ ]

(b) shoot cuttings [ ]

(c) root cuttings [ ]

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# 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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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
<b>5.1 Plant: growth type</b> (1)		
shrub	Calpantino, Candelaria, Compacta, Mitzi	1[ ]
semi-shrub	Azucena, Paul's Scarlet	2[ ]
tree	Calpan Gold, Plena	3[ ]
<b>5.2 Plant: habit</b> (2)		
fastigate	Ergo, Gaca, Pingo	1[ ]
upright	Azucena, Calpar, Stricta	2[ ]
spreading	Atexcac	3[ ]
semi drooping	Candelaria, Chico	4[ ]
drooping		5[ ]
weeping	Pendula	6[ ]
<b>5.3 Shoot: presence of thorns</b> (6)		
absent	Compacta, Edgar, Epi	1[ ]
present	Chela, Mutabilis, Pingo	9[ ]
<b>5.4 Leaf blade: length</b> (11)		
short	Belén, Mutabilis	3[ ]
medium	Epi	5[ ]
long	Carrierei, Edgar	7[ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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	Characteristics	Example Varieties	Note
<b>5.5</b>	<b>Petiole: length</b>		
<b>(22)</b>			
	short	Tzapingo	3[ ]
	medium	Paul's Scarlet, Plena	5[ ]
	long	Toba, Wattiana	7[ ]
<b>5.6</b>	<b>Fruit: color</b>		
<b>(32)</b>			
	light green	Epi, San Nicolás	1[ ]
	medium green		2[ ]
	yellow	Aurora, Tzapingo	3[ ]
	yellow and orange	Alex, Chapeado	4[ ]
	yellow and red	Carrierei, Elena	5[ ]
	orange	Ade, Huejo	6[ ]
	orange and red	Poblano	7[ ]
	medium red	Ara	8[ ]
	dark red	Eli	9[ ]
	purple		10[ ]
	black		11[ ]
<b>5.7</b>	<b>Fruit: length/width ratio</b>		
<b>(41)</b>			
	small	Ela	3[ ]
	medium	Erick, Robelo	5[ ]
	large	Alex, Natzi	7[ ]

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 <b>similar</b> variety(ies)	Describe the expression of the characteristic(s) for <b>your</b> candidate variety
<i>Example</i>	<i>Leaf blade: lobes</i>	<i>note 1 absent</i>	<i>note 9 present</i>

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

7.3.1 Type

- (a) fruit [ ]  
(b) ornamental [ ]

7.3.2 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 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	<input type="text"/>		
Signature	<input type="text"/>	Date	<input type="text"/>

[End of document]