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## INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

## HAZELNUT

UPOV Code(s): CRYLS\_AVE;  
CRYLS\_COL*Corylus avellana* L.;  
*Corylus colurna* L.

## GUIDELINES

## FOR THE CONDUCT OF TESTS

## FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*prepared by experts from Italy  
to be considered by the  
Technical Working Party for Fruit Crops  
at its fifty-fourth session, to be held in Nîmes, France,  
from 2023-07-03 to 2023-07-07*

*Disclaimer: this document does not represent UPOV policies or guidance*

Alternative names:\*

Botanical name	English	French	German	Spanish
<i>Corylus avellana</i> L., <i>Corylus maxima</i> Mill., <i>Corylus pontica</i> K. Koch	Hazelnut	Noisetier	Haselnuss	Avellano
<i>Corylus colurna</i> L., <i>Corylus iberica</i> Wittm. ex Bobrov	Turkish Hazel	Noisetier de Byzance, Noisetier de Turquie	Baumhasel, Türkische Baumhasel	Avellano de Turquía

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.]

TABLE OF CONTENTS	PAGE
1. SUBJECT OF THESE TEST GUIDELINES.....	<a href="#">4</a>
2. MATERIAL REQUIRED.....	<a href="#">4</a>
3. METHOD OF EXAMINATION.....	<a href="#">4</a>
3.1 Number of Growing Cycles.....	<a href="#">4</a>
3.2 Testing Place.....	<a href="#">5</a>
3.3 Conditions for Conducting the Examination.....	<a href="#">5</a>
3.4 Test Design.....	<a href="#">6</a>
3.5 Additional Tests.....	<a href="#">6</a>
4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY.....	<a href="#">6</a>
4.1 Distinctness.....	<a href="#">6</a>
4.2 Uniformity.....	<a href="#">7</a>
4.3 Stability.....	<a href="#">7</a>
5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL.....	<a href="#">8</a>
6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS.....	<a href="#">9</a>
6.1 Categories of Characteristics.....	<a href="#">9</a>
6.2 States of Expression and Corresponding Notes.....	<a href="#">9</a>
6.3 Types of Expression.....	<a href="#">9</a>
6.4 Example Varieties.....	<a href="#">9</a>
6.5 Legend.....	<a href="#">10</a>
7. TABLE OF CHARACTERISTICS/TABLEAU DES CARACTÈRES/MERKMALSTABELLE/TABLA DE CARACTERES.....	<a href="#">11</a>
8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS.....	<a href="#">27</a>
8.1 Explanations covering several characteristics.....	<a href="#">27</a>
8.2 Explanations for individual characteristics.....	<a href="#">28</a>
9. LITERATURE.....	<a href="#">41</a>
10 TECHNICAL QUESTIONNAIRE.....	<a href="#">42</a>

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Corylus avellana* L. and *Corylus colurna* L. excluding ornamental varieties.

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 one or two year old own rooted plants.

The tests should be carried under conditions ensuring normal growth and should normally be conducted at one place.

If certain important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

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

plants.

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

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

3. Method of Examination

3.1 *Number of Growing Cycles*

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

3.1.2 The two independent growing cycles may be observed from a single planting, examined in two separate growing cycles.

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

3.1.4 The growing cycle is considered to be the duration of a single growing season, beginning with bud burst (flowering and/or vegetative), flowering and fruit harvest and concluding when the following dormant period ends with the swelling of new season buds.

3.1.5 The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

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*

3.3.1 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.

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

### 3.4 *Test Design*

Each test should be designed to result in a total of at least 5 plants.

### 3.5 *Additional Tests*

Additional tests, for examining relevant characteristics, may be established.

## 4. Assessment of Distinctness, Uniformity and Stability

### 4.1 *Distinctness*

#### 4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

#### 4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

#### 4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

#### 4.1.4 Number of Plants or Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 3 plants or parts of plants taken from each of 3 plants and any other observations made on all plants in the test, disregarding any off-type plants.

In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 2.

#### 4.1.5 Method of Observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the Table of Characteristics (see document TGP/9 "Examining Distinctness", Section 4 "Observation of characteristics"):

MG: single measurement of a group of plants or parts of plants

MS: measurement of a number of individual plants or parts of plants

VG: visual assessment by a single observation of a group of plants or parts of plants

VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

#### 4.2 *Uniformity*

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

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

4.2.3 The off-types are observed visually and considering 5 plants no off-type are admitted.

#### 4.3 *Stability*

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

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

### 5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

- (a) Leaf blade: shape (characteristic 12)
- (b) Involucre: length in relation to length of nut (characteristic 17)
- (c) Involucre: depth of indentation (characteristic 18)
- (d) Involucre: size of basal support (characteristic 20)
- (e) Nut: size (characteristic 25)
- (f) Nut: shape in lateral view (characteristic 26)
- (g) Nut: shape in cross section (characteristic 27)
- (h) Nut: percentage of kernel (characteristic 44)
- (i) Time of male flowering (characteristic 45)
- (j) Time of female flowering (characteristic 46)
- (k) Time of harvest maturity (characteristic 49)

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 All relevant states of expression are presented in the characteristic.

6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 "Development of Test Guidelines".

## 6.3 *Types of Expression*

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

## 6.4 *Example Varieties*

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 Legend

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1	2	3	4	5	6	7	
		Name of characteristics in English	Nom du caractère en français	Name des Merkmals auf Deutsch	Nombre del carácter en español		
		states of expression	types d'expression	Ausprägungsstufen	tipos de expresión		

- 1 Characteristic number
- 2 (\*) Asterisked characteristic – see Chapter 6.1.2
- 3 Type of expression  
 QL Qualitative characteristic – see Chapter 6.3  
 QN Quantitative characteristic – see Chapter 6.3  
 PQ Pseudo-qualitative characteristic – see Chapter 6.3
- 4 Method of observation (and type of plot, if applicable)  
 MG, MS, VG, VS – see Chapter 4.1.5
- 5 (+) See Explanations on the Table of Characteristics in Chapter 8.2
- 6 (a)-(h) See Explanations on the Table of Characteristics in Chapter 8.1
- 7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8.3

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>QN</b>	<b>VG</b>	<b>(a)</b>	<b>1</b>			
	<b>Plant: vigor</b>						
	weak					Negret, Tonda Romana	1
	weak to medium						2
	medium					Tonda Gentile delle Langhe	3
	medium to strong						4
	strong					Fertile de Coutard	5
<b>2. (*)</b>	<b>QN</b>	<b>VG</b>	<b>(a)</b>	<b>1</b>			
	<b>Plant: growth habit</b>						
	fastigate					Corylus columna, Daviana	1
	upright					Butler, San Giovanni, Segorbe	2
	semi upright					Fertile de Coutard, Negret, Tonda Gentile delle Langhe, Tonda Romana	3
	spreading					Morell, Tombul	4
	drooping					Imperiale de Trebizonde, Palaz	5
<b>3.</b>	<b>QN</b>	<b>VG</b>	<b>(a), (b)</b>	<b>1</b>			
	<b>Plant: density of shoots</b>						
	very sparse						1
	very sparse to sparse						2
	sparse						3
	sparse to medium						4
	medium					Fertile de Coutard, Negret, Tonda Gentile delle Langhe	5
	medium to dense						6
	dense						7
	dense to very dense						8
	very dense						9



	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>4.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>3</b>		
	<b>Plant: tendency to produce suckers</b>					
	very few				Tonda Bianca	1
	few				Cosford, Daviana	2
	medium				Segorbe	3
	many				Fertile de Coutard	4
	very many				Imperiale de Trebizonde	5
<b>5.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(a), (b), (c)</b>	<b>1</b>	
	<b>One year old shoot: density of hairs</b>					
	very sparse					1
	sparse				Mortarella, Segorbe	2
	medium				Fertile de Coutard, Tonda Gentile delle Langhe	3
	dense				Imperiale de Trebizonde, Tonda di Giffoni	4
	very dense					5
<b>6.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(a), (b), (c)</b>	<b>1</b>	
	<b>One-year-old shoot: density of lenticels</b>					
	sparse				Negret, Segorbe	1
	medium				Mortarella	2
	dense				San Giovanni, Tonda Gentile delle Langhe	3
<b>7.</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(a), (b), (c)</b>	<b>1</b>	
	<b>Bud: shape</b>					
	conical				Cosford, Merveille de Bollwiller	1
	ovoid				Fertile de Coutard, Negret	2
	globular				Du Chilly	3
<b>8. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(b)</b>	<b>1</b>	
	<b>Bud: color</b>					
	green				Du Chilly, Segorbe	1
	reddish green				Bergeri, Gunslebert, Negret	2
	red				Merveille de Bollwiller	3

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>9.</b>	<b>QN</b>	<b>VG</b>	<b>(b), (c), (e)</b>	<b>2</b>			
	<b>Male inflorescence: length</b>						
	very short						1
	short					Negret	2
	medium					Fertile de Coutard, Tonda Gentile delle Langhe	3
	long					Segorbe	4
	very long						5
<b>10. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(e)</b>	<b>2</b>			
	<b>Male inflorescence: color</b>						
	green					Fertile de Coutard, Segorbe, Tonda Gentile delle Langhe	1
	pink brown					Bergeri, Cosford, Merveille de Bollwiller	2
	red						3
<b>11. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(e)</b>	<b>2</b>			
	<b>Stigma: color</b>						
	light yellow					OSU 899.010 Oregon selection	1
	pink					San Giovanni	2
	red					Fertile de Coutard	3
	purple red					Merveille de Bollwiller	4
<b>12. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(b), (c), (d)</b>	<b>3</b>		
	<b>Leaf blade: shape</b>						
	elliptic					Merveille de Bollwiller	1
	ovate					Du Chilly	2
	obovate					Tonda di Giffoni	3
	circular					Segorbe	4
<b>13. (*)</b>	<b>QN</b>	<b>MG/VG</b>	<b>(b), (c), (d)</b>	<b>3</b>			
	<b>Leaf blade: size</b>						
	very small						1
	small					Cosford, Imperatrice Eugenie, Merveille de Bollwiller	2
	medium					Fertile de Coutard	3
	large					Segorbe, Tonda di Giffoni	4
	very large						5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>14.</b>	<b>QN</b>	<b>MG/VG</b>	<b>(b), (c), (d)</b>	<b>3</b>		
	<b>Petiole: length</b>					
	very short					1
	short				Fertile de Coutard, Tonda di Giffoni	2
	medium				Segorbe	3
	long				Cosford, Tonda Gentile delle Langhe	4
	very long					9
<b>15. (*)</b>	<b>QN</b>	<b>VG</b>	<b>(b), (c), (d)</b>	<b>3</b>		
	<b>Petiole: density of hairs</b>					
	sparse				Segorbe	1
	medium				Merveille de Bollwiller	2
	dense				Fertile de Coutard, Tonda di Giffoni	3
<b>16. (*)</b>	<b>QL</b>	<b>VG</b>	<b>(+)</b>	<b>(f)</b>	<b>4</b>	
	<b>Involucre: constriction</b>					
	absent				Fertile de Coutard, Tonda Gentile delle Langhe	1
	present				Imperiale de Trebizonde	9
<b>17. (*)</b>	<b>QN</b>	<b>MG/VG</b>	<b>(+)</b>	<b>(c), (f)</b>	<b>4</b>	
	<b>Involucre: length in relation to length of nut</b>					
	much shorter					1
	shorter				Tonda Bianca	2
	equal				Cosford, Fertile de Coutard, Merveille de Bollwiller	3
	longer				Du Chilly, Imperiale de Trebizonde, Segorbe, Tombul, Tonda Gentile delle Langhe	4
	much longer					5

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>18.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(f)</b>	<b>4</b>		
		<b>Involucre: depth of indentation</b>						
		shallow to medium					Du Chilly, Tombul	1
		weak to medium						2
		medium					Fertile de Coutard, Tonda Gentile delle Langhe	3
		medium to strong						4
		strong					Gunslebert, Negret	5
<b>19.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(f)</b>	<b>4</b>		
		<b>Involucre: serration of indentation</b>						
		very weak					Du Chilly, Segorbe, Tombul, Tonda Bianca	1
		weak						2
		medium					Fertile de Coutard, Tonda Gentile delle Langhe	3
		strong						4
		very strong					Gunslebert, Morell, Negret	5
<b>20.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(f)</b>	<b>4</b>		
		<b>Involucre: size of basal support</b>						
		thin					Cosford	1
		medium					Merveille de Bollwiller, Segorbe	2
		thick					Fertile de Coutard, Tonda di Giffoni	3
<b>21.</b>	<b>(*)</b>	<b>QL</b>	<b>VG</b>		<b>(f)</b>	<b>4</b>		
		<b>Involucre: hairiness</b>						
		absent					Morell, Tonda Bianca	1
		present					Tonda di Giffoni	9

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>22.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(f)</b>	<b>4</b>			
	<b>Involucre: density of hairs</b>							
		absent or very sparse					Morell, Tonda Bianca	1
		sparse					Cosford, Du Chilly, Imperatrice Eugenie, Segorbe	2
		medium					Fertile de Coutard, Tonda Gentile delle Langhe	3
		dense					Tonda di Giffoni	4
		very dense						5
<b>23.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(f)</b>	<b>4</b>			
	<b>Involucre: jointing of bracts</b>							
		not present					Gunslebert	1
		on one side only					Fertile de Coutard, Negret, Tonda di Giffoni, Tonda Gentile delle Langhe	2
		on both sides					Imperiale de Trebizonde, Tombul	3
<b>24.</b>	<b>QN</b>	<b>VG</b>	<b>(c), (f)</b>		<b>4</b>			
	<b>Infructescence: number of nuts per cluster</b>							
		only one					Daviana, Tonda Bianca	1
		one or two					Cosford, Merveille de Bollwiller	2
		two or three					Fertile de Coutard, Tonda di Giffoni	3
		three or four					Negret, Segorbe	4
		more than four					Tombul	5
<b>25. (*)</b>	<b>QN</b>	<b>MS/VG</b>	<b>(g), (h)</b>		<b>4</b>			
	<b>Nut: size</b>							
		very small						1
		small					Negret, Tombul, Tonda Gentile delle Langhe	2
		medium					Morell, Segorbe, Tonda di Giffoni	3
		large					Fertile de Coutard, Merveille de Bollwiller	4
		very large					Apoldaer Zellernuss, Bergeri, Ennis	5

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>26. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Nut: shape in lateral view</b>							
	globose						Clark, Fertile de Coutard, Tonda Gentile delle Langhe	1
	conical						Ennis , Jean's, erveille de Bollwiller	2
	ovoid						Imperatrice Eugenie, Negret	3
	obloid						Imperiale de Trebizonde	4
	short sub-cylindrical						Butler	5
	long sub-cylindrical						Cosford, Du Chilly	6
<b>27. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Nut: shape in cross section</b>							
	elliptic						Du Chilly, Negret	1
	circular						Merveille de Bollwiller, Tonda Romana	2
	triangular						Tonda Gentile delle Langhe	3
	rectangular						Gunsiebert	4
<b>28.</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Nut: color</b>							
	greenish yellow						Tonda Bianca	1
	light brown						Cosford, Daviana, Imperiale de Trebizonde, Morell, Tonda Gentile delle Langhe	2
	brown						Ennis, Fertile de Coutard, Negret, Tonda Romana	3
<b>29.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Nut: presence of stripes on shell</b>							
	weak						Imperiale de Trebizonde, Segorbe	1
	medium						Cosford, Daviana	2
	strong						Campanica	3

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>30.</b>	<b>(*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Nut: shape of apex</b>						
		narrow acute					Imperatrice Eugenie, Jean's	1
		broad acute					Merveille de Bollwiller, Negret	2
		obtuse					Fertile de Coutard, Tonda Gentile delle Langhe	3
		truncate					Imperiale de Trebizonde	4
<b>31.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Nut: prominence of mucron</b>						
		weak					Cosford, Fertile de Coutard, Tonda di Giffoni	1
		medium					Du Chilly	2
		strong					Tonda Romana	3
<b>32.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Nut: size of pistil scar</b>						
		small					Negret, Tonda Gentile delle Langhe	1
		medium					Fertile de Coutard, Tonda di Giffoni	2
		large					Cosford, Imperiale de Trebizonde, San Giovanni	3
<b>33.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Nut: hairiness at apex</b>						
		weak					Cosford, Imperiale de Trebizonde	1
		medium					Fertile de Coutard	2
		strong					Apoldaer Zellernuss, Du Chilly	3
<b>34.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Nut: relation of basal scar size to nut size</b>						
		small					Segorbe, Tonda Gentile delle Langhe	1
		medium					Fertile de Coutard	2
		large					Cosford, Imperiale de Trebizonde, Merveille de Bollwiller	3

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>35.</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Nut: curvature of basal scar</b>						
		concave					Tonda Rossa	1
		flat					Imperiale de Trebizonde, Merveille de Bollwiller	2
		convex					Cosford, Du Chilly, Negret	3
<b>36.</b>	<b>(*)</b>	<b>QN</b>	<b>MG/VG</b>		<b>(h)</b>	<b>4</b>		
		<b>Kernel: size</b>						
		very small					Sivri, Tombul	1
		small					Negret, Tonda Gentile delle Langhe	2
		medium					Segorbe, Tonda di Giffoni, Tonda Romana	3
		large					Daviana, Fertile de Coutard, Merveille de Bollwiller	4
		very large					Pallagrossa	5
<b>37.</b>	<b>(*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Kernel: shape in lateral view</b>						
		globose					Segorbe, Tonda di Giffoni, Tonda Gentile delle Langhe, Tonda Romana	1
		obloid					Imperiale de Trebizonde	2
		ovoid					Imperatrice Eugenie, Merveille de Bollwiller	3
		short sub-cylindrical					Daviana, San Giovanni	4
		long sub-cylindrical					Cosford, Gunslebert	5
<b>38.</b>		<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>		
		<b>Kernel: shape of apex</b>						
		pointed					Du Chilly, Fertile de Coutard, Negret	1
		obtuse					Gunslebert, San Giovanni, Tonda Romana	2
		truncate					Imperiale de Trebizonde	3



	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>39.</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Kernel: shape in cross section</b>							
	elliptic						Du Chilly	1
	circular						Imperiale de Trebizonde, Tonda Romana	2
	triangular						Tonda Gentile delle Langhe	3
<b>40.</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Kernel: shape of base</b>							
	pointed						Tombul	1
	rounded						Fertile de Coutard, Merveille de Bollwiller, Negret	2
	truncate						Imperiale de Trebizonde, Tonda Gentile delle Langhe, Tonda Romana	3
<b>41. (*)</b>	<b>QL</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Kernel: lateral groove</b>							
	absent						Fertile de Coutard, Merveille de Bollwiller	1
	present						Du Chilly, Imperatrice Eugenie, Tonda di Giffoni	9
<b>42. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>(h)</b>	<b>4</b>			
	<b>Kernel presence of fiber</b>							
	absent or very weak						Daviana, Du Chilly, Imperiale de Trebizonde	1
	weak							2
	medium						Cosford, Fertile de Coutard, Negret, Segorbe	3
	strong							4
	very strong						Campanica, Ennis	5
<b>43.</b>	<b>QN</b>	<b>VG</b>		<b>(h)</b>	<b>4</b>			
	<b>Kernel: inner cavity</b>							
	absent or very small						Imperiale de Trebizonde	1
	medium						Cosford, Negret, Tonda Gentile delle Langhe, Tonda Romana	2
	large						Fertile de Coutard, Segorbe, Tonda di Giffoni	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>44. (*)</b>	<b>QN</b>	<b>MG/VG</b>	<b>(h)</b>	<b>4</b>		
	<b>Nut: percentage of kernel</b>					
	very low				Merveille de Bollwiller	1
	low				Fertile de Coutard, Segorbe	2
	medium				Negret, Tonda Gentile delle Langhe	3
	high				Daviana, Imperatrice Eugenie	4
	very high				Cosford, Tombul	5
<b>45. (*)</b>	<b>QN</b>	<b>MG</b>	<b>(e)</b>	<b>2</b>		
	<b>Time of male flowering</b>					
	very early					1
	early					2
	medium				Negret	3
	late				Du Chilly, Merveille de Bollwiller	4
	very late					5
<b>46. (*)</b>	<b>QN</b>	<b>MG</b>	<b>(e)</b>	<b>2</b>		
	<b>Time of female flowering</b>					
	very early				San Giovanni	1
	early				Fertile de Coutard, Negret, Tonda di Giffoni	2
	medium				Tonda Gentile delle Langhe	3
	late				Daviana, Du Chilly, Merveille de Bollwiller, Morell, Segorbe	4
	very late				Bergeri, Gunslebert, Tonda Bianca	5
<b>47. (*)</b>	<b>QN</b>	<b>MG</b>	<b>(e)</b>	<b>2</b>		
	<b>Time of female flowering compared to time of male flowering</b>					
	earlier				Negret, San Giovanni, Tonda Romana	1
	same time				Merveille de Bollwiller, Morell	2
	later				Bergeri, Cosford, Tonda Gentile delle Langhe	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>48</b>	<b>(*) QN MG</b>	<b>(b)</b>	<b>1</b>			
	<b>Time of beginning of leaf budburst</b>					
	very early				San Giovanni	1
	early				Tonda di Giffoni, Tonda Gentile delle Langhe	2
	medium				Negret, Tonda Romana	3
	late				Bergeri, Cosford, Du Chilly, Merveille de Bollwiller	4
	very late					5
<b>49</b>	<b>(*) QN MG</b>	<b>(g)</b>	<b>4</b>			
	<b>Time of harvest maturity</b>					
	very early				San Pere	1
	early				Tonda Gentile delle Langhe	2
	medium				Daviana, Morell, Tonda Romana	3
	late				Merveille de Bollwiller, Negret	4
	very late					5



Ad. 6: One-year-old shoot: density of lenticels



1  
sparse



2  
medium



3  
dense

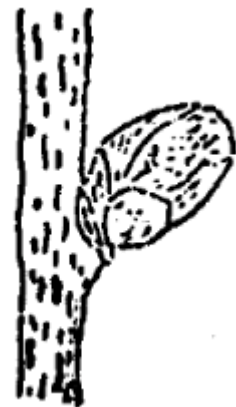
Ad. 7: Bud: shape



1  
conical



2  
ovoid



3  
globular

Ad. 8: Bud: color



1  
green



2  
reddish green



3  
red

Ad. 12: Leaf blade: shape



1  
elliptic



2  
ovate



3  
obovate



4  
circular

Ad. 16: Involucre: constriction



1  
absent



9  
present

Ad. 17: Involucre: length in relation to length of nut



2  
shorter

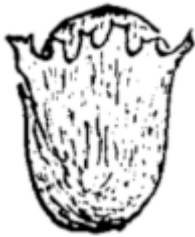


3  
equal



4  
longer

Ad. 18: Involucre: depth of indentation



1  
shallow to medium



3  
medium

5  
strong

Ad. 19: Involucre: serration of indentation



1  
very weak

3  
medium



5  
very strong

Ad. 20: Involucre: size of basal support



1  
thin



3  
medium



5  
thick

Ad. 22: Involucre: density of hairs



1  
absent or very sparse



2  
sparse



3  
medium



4  
dense

Ad. 23: Involucre: jointing of bracts



1  
not present



2  
on one side



3  
on both sides

Ad. 26: Nut: shape in lateral view



1  
globose



2  
conical



3  
ovoid



4  
obloid



5  
short sub-  
cylindrical



6  
long sub-  
cylindrical



Ad. 27: Nut: shape in cross section



1  
elliptical



2  
circular



3  
triangular



4  
rectangular

Ad. 28: Nut: color



1  
greenish yellow



2  
light brown



3  
brown

Ad. 29: Nut: presence of stripes on shell



1  
weak



2  
medium



3  
strong

Ad. 30: Nut: shape of apex



1  
narrow acute



2  
broad acute



3  
obtuse



4  
truncate

Ad. 31: Nut: prominence of mucron



1  
weak



2  
medium



3  
strong

Ad. 32: Nut: size of pistil scar



1  
small



2  
medium



3  
large

Ad. 33: Nut: hairiness at apex



1  
weak



2  
medium



3  
strong

Ad. 34: Nut: relation of basal scar size to nut size



1  
small



2  
medium



3  
large

Ad. 35: Nut: curvature of basal scar



1  
concave



2  
flat



3  
convex

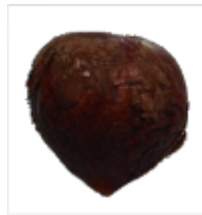
Ad. 37: Kernel: shape in lateral view



1  
globose



2  
obloid



3  
ovoid



4  
short sub-cylindrical



5  
long sub-cylindrical

Ad. 38: Kernel: shape of apex



1  
pointed



2  
obtuse



3  
truncate

Ad. 39: Kernel: shape in cross section



1  
elliptical



2  
circular



3  
triangular



Ad. 40: Kernel: shape of base



1  
pointed



2  
rounded



3  
truncate

Ad. 41: Kernel: lateral groove



1  
absent



9  
present

Ad. 42: Kernel presence of fiber



1  
absent or very weak



3  
medium



5  
very strong

8.3 *Growth stage key*

Phenological phases are indicated as follows:

- 1 Dormant season
- 2 During flowering
- 3 On fully developed leaves
- 4 At the time of harvest maturity

## 9. Literature

- Bignami C., De Salvador R.F., Strabbioli G., 1999. Aspetti agronomici e prospettive di valorizzazione della corilicoltura nel Lazio. *Frutticoltura*, n.11. 16-27.
- Botta R., Akkak A., Boccacci P., 2005. DNA-typing of hazelnut: a universal methodology for describing cultivars and evaluating genetic relatedness. *Acta Horticulturae* 686:117-124.
- Cristoferi V., A.L.Pica, Silestri C., Bizzarri S. 2018. Phenology and yield evaluation of hazelnut cultivars in the Lazio region. *Acta Hort.* 1226 pp 20-130.
- De Salvador, F.R., Giorgioni M., Massari D., Bizzarri S., Onorati P., Kaswalder F., 2002. La collezione di Vico Matrino (VT) per il rinnovo varietale ed il miglioramento qualitativo del nocciolo. 2° Convegno Nazionale sul nocciolo, Giffoni V.P., 171-177.
- De Salvador, F.R., Bignami, C., Bizzarri, S., Cristoferi, V., 2005. Monografia di cultivar di nocciolo. Regione Lazio - Area D20 Servizi di sviluppo Agricolo e Informazione Socio-economica. Stampato da Tipolitografia C.S.R. - Centro Stampa e Riproduzione-Roma - IT
- P. Manzo, G. Tamponi, Monografia di cultivar di nocciolo, 1982. Istituto Sperimentale per la Frutticoltura – Roma - IT
- Mehlenbacher S.A., 1994. Genetic improvement of the hazelnut. *Acta Horticulturae* 351, 23-38.
- Rovira M., 1997. Genetic variability among hazelnut (*Corylus avellana* L.) cultivars. *Acta Horticulturae*. 445: 45-50.
- Tombesi A., Limongelli F., 2002. Varietà e miglioramento genetico del nocciolo. 2° Convegno Nazionale sul nocciolo, Giffoni V.P., ottobre 2002, 11:27.

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		
1.1.1 Botanical name	<input type="text" value="Corylus avellana L."/>	[ ]
1.1.2 Common name	<input type="text" value="Hazelnut"/>	
1.2.1 Botanical name	<input type="text" value="Corylus colurna L."/>	[ ]
1.2.2 Common name	<input type="text" value="Turkish Hazel"/>	
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 variety)

(.....) 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:
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4.2	Method of propagating the variety	
4.2.1	Other (Please provide details)	[ ]
	<input type="text"/>	

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
<b>5.1 Leaf blade: shape (12)</b>		
elliptic	Merveille de Bollwiller	1 [ ]
ovate	Du Chilly	2 [ ]
obovate	Tonda di Giffoni	3 [ ]
circular	Segorbe	4 [ ]
<b>5.2 Involucre: length in relation to length of nut (17)</b>		
much shorter		1 [ ]
shorter	Tonda Bianca	2 [ ]
equal	Cosford, Fertile de Coutard, Merveille de Bollwiller	3 [ ]
longer	Du Chilly, Imperiale de Trebizonde, Segorbe, Tombul, Tonda Gentile delle Langhe	4 [ ]
much longer		5 [ ]
<b>5.3 Involucre: depth of indentation (18)</b>		
shallow to medium	Du Chilly, Tombul	1 [ ]
weak to medium		2 [ ]
medium	Fertile de Coutard, Tonda Gentile delle Langhe	3 [ ]
medium to strong		4 [ ]
strong	Gunslebert, Negret	5 [ ]
<b>5.4 Involucre: size of basal support (20)</b>		
thin	Cosford	1 [ ]
medium	Merveille de Bollwiller, Segorbe	2 [ ]
thick	Fertile de Coutard, Tonda di Giffoni	3 [ ]
<b>5.5 Nut: size (25)</b>		
very small		1 [ ]
small	Negret, Tombul, Tonda Gentile delle Langhe	2 [ ]
medium	Morell, Segorbe, Tonda di Giffoni	3 [ ]
large	Fertile de Coutard, Merveille de Bollwiller	4 [ ]
very large	Apoldaer Zellernuss, Bergeri, Ennis	5 [ ]

Characteristics	Example Varieties	Note
<b>5.6 Nut: shape in lateral view (26)</b>		
globose	Clark, Fertile de Coutard, Tonda Gentile delle Langhe	1 [ ]
conical	Ennis , Jean's, Merveille de Bollwiller	2 [ ]
ovoid	Imperatrice Eugenie, Negret	3 [ ]
obloid	Imperiale de Trebizonde	4 [ ]
short sub-cylindrical	Butler	5 [ ]
long sub-cylindrical	Cosford, Du Chilly	6 [ ]

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>			
<p>Comments:</p>			

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

#7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes  No

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes  No

(If yes, please provide details)

7.3 Other information

A representative color photograph of the variety displaying its main distinguishing feature(s), should accompany the Technical Questionnaire. The photograph will provide a visual illustration of the candidate variety which supplements the information provided in the Technical Questionnaire.

The key points to consider when taking a photograph of the candidate variety are:

- Indication of the date and geographic location
- Correct labeling (breeder's reference)
- Good quality printed photograph (minimum 10 cm x 15 cm) and/or sufficient resolution electronic format version (minimum 960 x 1280 pixels)

Further guidance on providing photographs with the Technical Questionnaire is available in document TGP/7 "Development of Test Guidelines", Guidance Note 35 (<http://www.upov.int/tgp/en/>).

[The link provided may be deleted by members of the Union when developing authorities' own test guidelines.]

# Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

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

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

9. Information on plant material to be examined or submitted for examination

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a) Microorganisms (e.g. virus, bacteria, phytoplasma)	Yes [ ]	No [ ]
(b) Chemical treatment (e.g. growth retardant, pesticide)	Yes [ ]	No [ ]
(c) Tissue culture	Yes [ ]	No [ ]
(d) Other factors	Yes [ ]	No [ ]

Please provide details for where you have indicated "yes".

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature  Date

[End of document]