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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-fifth session, to be held virtually
from 2024-06-03 to 2024-06-06

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Corylus avellana L., *Corylus maxima* Mill., *Corylus pontica* K. Koch	Hazelnut	Noisetier	Haselnuss	Avellano
Corylus colurna L., *Corylus iberica* 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), for the latest information.]

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Corylus avellana* L. and *Corylus colurna* L. for fruit production.

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 own-rooted plants.

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

5 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 5.

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 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 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

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**QN VG**	**(a)**				
		Plant: vigor					
		weak				Kargalak, Tombul	1
		weak to medium				Merveille de Bollwiller	2
		medium				Tonda Gentile delle Langhe	3
		medium to strong				Daviana	4
		strong				Fertile de Coutard	5
2.	**(*)**	**QN VG**	**(a)**				
		Plant: growth habit					
		fastigiate				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				Kargalak, Palaz	5
3.		**QN VG**	**(a), (b)**				
		Plant: density of shoots					
		very sparse					1
		sparse				Butler, Tonda Romana	2
		medium				Fertile de Coutard, Negret, Tonda Gentile delle Langhe	3
		dense				Bergeri, Cosford, Ennis	4
		very dense					5
4.		**QN VG**					
		Plant: suckers					
		very few				Balàzs, Tonda Bianca	1
		few				Cosford, Daviana	2
		medium				Segorbe	3
		many				Fertile de Coutard	4
		very many				Kargalak	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.		**QN VG**	**(+)**	**(a), (b), (c)**			
		One-year-old-shoot: density of hairs					
		very sparse					1
		sparse				Mortarella, Segorbe	2
		medium				Fertile de Coutard, Tonda Gentile delle Langhe	3
		dense				Kargalak, Tonda di Giffoni	4
		very dense					5
6.		**QN VG**	**(+)**	**(a), (b), (c)**			
		One-year-old shoot: density of lenticels					
		sparse				Negret, Segorbe	1
		medium				Mortarella	2
		dense				San Giovanni, Tonda Gentile delle Langhe	3
7.		**PQ VG**	**(+)**	**(a), (b)**			
		Bud: shape					
		conical				Cosford, Merveille de Bollwiller	1
		ovoid				Fertile de Coutard, Negret	2
		globular				Lambert's Filbert	3
8.	**(*)**	**PQ VG**					
		Bud: color					
		green				Lambert's Filbert, Segorbe	1
		reddish green				Bergeri, Gunslebener Zellernuss, Negret	2
		red				Merveille de Bollwiller	3
9.		**QN VG**		**(b), (c), (d)**			
		Male inflorescence: length					
		very short					1
		short				Negret	2
		medium				Fertile de Coutard, Tonda Gentile delle Langhe	3
		long				Segorbe	4
		very long					5

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15		**QN VG**	**(b), (c), (e)**				
		Petiole: density of hairs					
		sparse				Segorbe	1
		medium				Merveille de Bollwiller	2
		dense				Fertile de Coutard, Tonda di Giffoni	3
16	**(*)**	**QL VG**	**(+) (f)**				
		Involucre: constriction					
		absent				Fertile de Coutard, Tonda Gentile delle Langhe	1
		present				Kargalak	5
17	**(*)**	**QN MG/VG**	**(+) (c), (f)**				
		Involucre: length in relation to length of nut					
		shorter				Tonda Bianca	1
		same length				Cosford, Fertile de Coutard, Merveille de Bollwiller	3
		longer				Kargalak, Lambert's Filbert, Segorbe, Tombul, Tonda Gentile delle Langhe	5
18	**(*)**	**QN VG**	**(+) (f)**				
		Involucre: depth of indentation					
		shallow				Du Chilly, Tombul	1
		medium				Fertile de Coutard, Tonda Gentile delle Langhe	3
		deep				Gunslebener Zellernuss, Negret	5
19	**(*)**	**QN VG**	**(+) (f)**				
		Involucre: serration of indentation					
		very weak				Lambert's Filbert, Segorbe, Tombul, Tonda Bianca	1
		weak					2
		medium				Fertile de Coutard, Tonda Gentile delle Langhe	3
		strong					4
		very strong				Gunslebert, Morell, Negret	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20		**QL VG**	**(+)**				
		Involucre: size of basal support					
		small				Cosford	1
		medium				Merveille de Bollwiller, Segorbe	2
		large				Fertile de Coutard, Tonda di Giffoni	3
21	**(*)**	**QL VG**		**(f)**			
		Involucre: hairiness					
		absent				Morell, Tonda Bianca	1
		present				Tonda di Giffoni	9
22		**QN VG**		**(f)**			
		Involucre: density of hairs					
		absent or very sparse				Morell, Tonda Bianca	1
		sparse				Cosford, Imperatrice Eugenie, Lambert's Filbert, Segorbe	2
		medium				Fertile de Coutard, Tonda Gentile delle Langhe	3
		dense				Tonda di Giffoni	4
		very dense					5
23		**QN VG**	**(+)**	**(f)**			
		Involucre: jointing of bracts					
		absent				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
24		**QN MG/VG**		**(c), (f)**			
		Infructescence: number of nuts per cluster					
		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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25	**(*)**	**QN MS/VG**	**(c), (g), (h)**				
		Nut: size					
		very small				Sivri	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
26	**(*)**	**PQ VG**	**(+) (h)**				
		Nut: shape in lateral view					
		globose				Clark, Fertile de Coutard, Tonda Gentile delle Langhe	1
		conical				Ennis , Jean`s, Merveille de Bollwiller	2
		ovoid				Imperatrice Eugenie, Negret	3
		obloid				Kargalak	4
		short sub-cylindrical				Butler	5
		long sub-cylindrical				Cosford, Du Chilly	6
27	**(*)**	**PQ VG**	**(+) (h)**				
		Nut: shape in cross-section					
		elliptic				Du Chilly, Negret	1
		circular				Merveille de Bollwiller, Tonda Romana	2
		angular				Tonda Gentile delle Langhe	3
		transverse oblong				Gunslebert	4
28		**PQ VG**	**(h)**				
		Nut: color					
		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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29		**QN** **VG**					
		Nut: presence of stripes on shell					
		absent or weak				Kargalak, Segorbe	1
		medium				Cosford, Daviana	2
		strong				Campanica	3
30	**(*)**	**PQ** **VG**	**(+)** **(h)**				
		Nut: shape of apex					
		narrow acute				Imperatrice Eugenie, Jean`s	1
		broad acute				Merveille de Bollwiller, Negret	2
		obtuse				Fertile de Coutard, Tonda Gentile delle Langhe	3
		truncate				Kargalak	4
31	**(*)**	**QN** **VG**	**(+)** **(h)**				
		Nut: prominence of mucron					
		weak				Cosford, Fertile de Coutard, Tonda di Giffoni	1
		medium				Lambert's Filbert	2
		strong				Tonda Romana	3
32	**(*)**	**QN** **VG**	**(+)** **(h)**				
		Nut: size of pistil scar					
		small				Negret, Tonda Gentile delle Langhe	1
		medium				Fertile de Coutard, Tonda di Giffoni	2
		large				Cosford, Kargalak, San Giovanni	3
33	**(*)**	**QN** **VG**	**(h)**				
		Nut: hairiness at apex					
		absent or weak				Cosford, Kargalak	1
		medium				Fertile de Coutard	2
		strong				Apoldaer Zellernuss, Du Chilly	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
34	**(*)**	**QN** **VG**	**(+)** **(h)**				
		Nut: ratio size of basal scar / size of nut					
		small				Segorbe, Tonda Gentile delle Langhe	1
		medium				Fertile de Coutard	2
		large				Cosford, Imperiale de Trebizonde, Kargalak, Merveille de Bollwiller	3
35	**(*)**	**QN** **VG**	**(+)** **(h)**				
		Nut: curvature of basal scar					
		concave				Tonda Rossa	1
		flat				Kargalak, Merveille de Bollwiller	2
		convex				Cosford, Lambert's Filbert, Negret	3
36	**(*)**	**QN** **MG/VG**		**(h)**			
		Kernel: size					
		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
37	**(*)**	**PQ** **VG**	**(+)** **(h)**				
		Kernel: shape in lateral view					
		globose				Segorbe, Tonda di Giffoni, Tonda Gentile delle Langhe, Tonda Romana	1
		obloid				Kargalak	2
		ovoid				Imperatrice Eugenie, Merveille de Bollwiller	3
		short sub-cylindrical				Daviana, San Giovanni	4
		long sub-cylindrical				Cosford, Gunslebert	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
38		**PQ VG**	**(+)**	**(h)**			
		Kernel: shape of apex					
		pointed				Fertile de Coutard, Negret	1
		rounded				Gunslebener Zellernuss, San Giovanni, Tonda Romana	2
		truncate				Kargalak	3
39		**PQ VG**	**(+)**	**(h)**			
		Kernel: shape in cross-section					
		oblong				Lambert's Filbert	1
		circular				Kargalak, Tonda Romana	2
		obovate				Tonda Gentile delle Langhe	3
40		**PQ VG**	**(+)**	**(h)**			
		Kernel: shape of base					
		pointed				Tombul	1
		rounded				Fertile de Coutard, Merveille de Bollwiller, Negret	2
		truncate				Kargalak, Tonda Gentile delle Langhe, Tonda Romana	3
41	**(*)**	**QL VG**	**(+)**	**(h)**			
		Kernel: lateral groove					
		absent				Fertile de Coutard, Merveille de Bollwiller	1
		present				Imperatrice Eugenie, Lambert's Filbert, Tonda di Giffoni	9
42	**(*)**	**QN VG**	**(+)**	**(h)**			
		Kernel: presence of fiber					
		absent or very weak				Daviana, Kargalak, Lambert's Filbert	1
		medium				Fertile de Coutard, Negret, Segorbe	3
		strong				Cosford	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
43		**QN VG**	**(h)**				
		Kernel: inner cavity					
		absent or small				Kargalak	1
		medium				Cosford, Negret, Tonda Gentile delle Langhe, Tonda Romana	2
		large				Fertile de Coutard, Segorbe, Tonda di Giffoni	3
44	**(*)**	**QN MG/VG**	**(h)**				
		Nut: percentage of kernel					
		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
45	**(*)**	**QN MG**	**(d)**				
		Time of male flowering					
		very early				Tonda Gentile delle Langhe	1
		early				Palaz	2
		medium				Negret	3
		late				Du Chilly, Merveille de Bollwiller	4
		very late					5
46	**(*)**	**QN MG**	**(d)**				
		Time of female flowering					
		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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
47	**(*)**	**QN** **MG**	**(d)**				
		Time of female flowering compared to time of male flowering					
		earlier				Negret, San Giovanni, Tonda Romana	1
		same time				Merveille de Bollwiller, Morell	2
		later				Bergeri, Cosford, Tonda Gentile delle Langhe	3
48	**(*)**	**QN** **MG**	**(b)**				
		Time of beginning of leaf budburst					
		very early				San Giovanni	1
		early				Tonda di Giffoni, Tonda Gentile delle Langhe	2
		medium				Negret, Tonda Romana	3
		late				Bergeri, Cosford, Lambert's Filbert, Merveille de Bollwiller	4
		very late					5
49	**(*)**	**QN** **MG**	**(g)**				
		Time of harvest maturity					
		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				Bergeri	5

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

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

(a) Observation should be made in the dormant period.

(b) Observations should be made in the central third of the branches.

(c) Observations should be made from a minimum sample of 15 typical organs or plant parts.

(d) Observations should be made when 50% of the respective inflorescence are in full flowering (pollen dehiscence or fully developed stigmas).

(e) Observations should be made on fully developed leaves.

(f) Observations on the emission of suckers should be made in early summer.

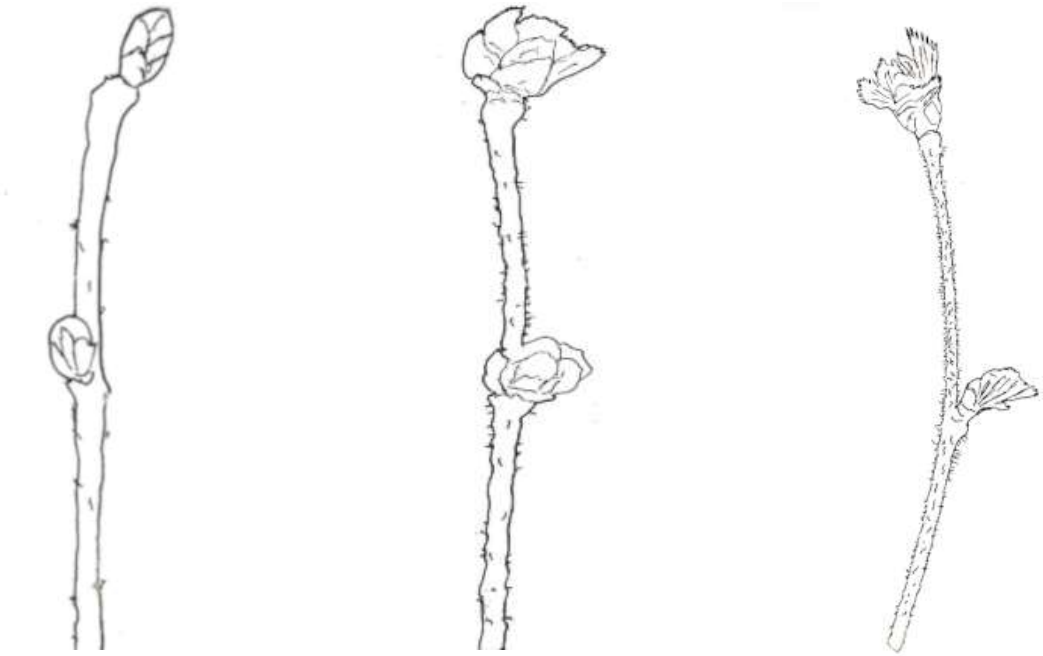
(g) Observations should be made before drying off, on normal developed fruits.

(h) The time of ripening is reached when 50 t of the fruits have fallen off.

(i) Observations should be made at list on 25 fruits with a humidity content of less than 8% (the samples in paper bags shall stored in dry environment for about one month after harvesting).

8.2 Explanations for individual characteristics

Ad. 5: One-year-old-shoot: density of hairs



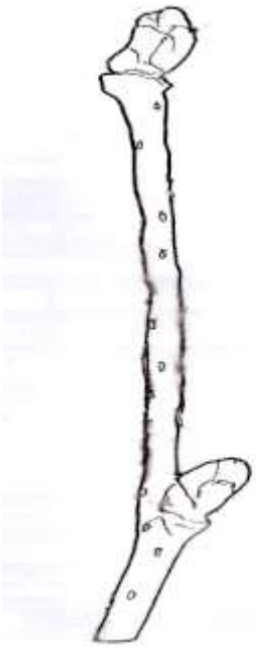
3
weak

5
medium

7
strong

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. 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

3
shorter

5
equal

7
longer

Ad. 18: Involucre: depth of indentation

1
shallow

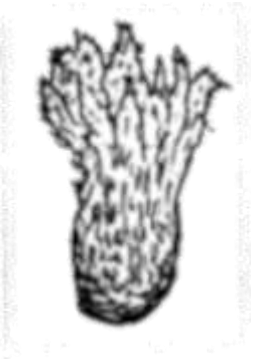
3
medium

5
deep

Ad. 19: Involucre: serration of indentation

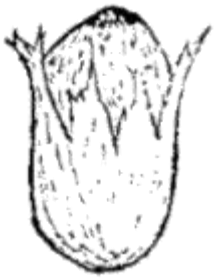
1
very weak

3
medium



5
strong

Ad. 20: Involucre: size of basal support



1
small

2
medium

3
large

Ad. 23: Involucre: jointing of bracts

1
absent

2
on one side

3
on both sides

Ad. 26: Nut: shape in lateral view

broadest part	ratio height/diameter: low		medium	high	
above middle (↑)				 5 short subcylindric	
at middle	 4 obloid		 1 globose		 6 long subcylindric
below middle (↓)			 3 ovoid	 2 conic	

Ad. 27: Nut: shape in cross-section

1
elliptic

2
circular

3
angular

4
transverse oblong

Ad. 30: Nut: shape of apex

1
narrow acute

2
broad acute

3
obtuse

4
truncate

Ad. 31: Nut: prominence of mucron

3
weak

5
medium

7
strong

Ad. 32: Nut: size of pistil scar

3
small

5
medium

7
large

Ad. 34: Nut: ratio size of basal scar / size of nut

3
small

5
medium

7
large

Ad. 35: Nut: curvature of basal scar

1
concave

2
flat

3
convex

Ad. 37: Kernel: shape in lateral view

broadest part	ratio height/diameter ← low	ratio height/diameter medium	ratio height/diameter high	ratio height/diameter →
↑ above middle			 2 obloid	 4 short-subcylindrical
at middle		 1 globose		 5 long-subcylindric
↓ below middle	 3 ovoid			

Ad. 38: Kernel: shape of apex

1
pointed

2
rounded

3
truncate

Ad. 39: Kernel: shape in cross-section

1
oblong

2
circular

3
obovate

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
strong

8.3 Example varieties and their synonyms

Example variety	Synonym(s)
Bergeri	Bergère, Bergers Zellernuss; La Berger; Lois Berger
Gunslebener Zellernuss	Grosse Gunslebener Zellernuss; Gunslebener Riesennuss; Gunslebert
Kargalak	Imperialr de Trapezunt; Inperialre de Trèbizonde; Trapezunski; Trapezunter Kaiserhasel; Karidaty
Lambert's Filbert	Longa de Spagnsa; DuChilly; FilbertCop; Ketish Cob; Korthaset Zellernuss; Lambert Filbert
Merveille de Bollwiller	Bollwiller; WissmannsZellernuss; Wunder aus Bollweiler; Zàzrak z Bollwilleru
Fertile de Coutard	Barcelona; Castanyera.

9. Literature

Manzo, P., Tamponi,G., 1982: "Monografia di cultivar di nocciuolo", Istituto Sperimentale per la Frutticoltura, Rome, IT.

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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, Turin, IT.

Cristoferi, V., Pica, A.L., Silestri C., Bizzarri, S., 2018: "Phenology and yield evaluatation of hazelnut cultivars in Latium Region",Acta Hortic. 1226 pp 20-130, Viterbo, IT.

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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, Rome, IT.

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Rovira, M., 1997: "Genetic variability among hazelnut (Corylus avellana L.) cultivars". Acta Horticulturae. 445: 45-50Rheus, ES.

Tombesi, A., Limongelli, F., 2002: "Varietà e miglioramento genetico del nocciolo", 2° Convegno Nazionale sul nocciolo, Giffoni V.P., ottobre 2002, 11:27, Rome, IT

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

1.1.1	Botanical name	*Corylus avellana* L.	[ ]
1.1.2	Common name	Hazelnut	
1.2.1	Botanical name	*Corylus colurna* L.	[ ]
1.2.2	Common name	Turkish Hazel	

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

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

#4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]

(please state parent 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)

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:

4.2 Method of propagating the variety

4.2.1 Other [ ]
(Please provide details)

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
5.1 (12)	**Leaf blade: shape**		
	elliptic	Merveille de Bollwiller	1 [ ]
	ovate	Du Chilly	2 [ ]
	obovate	Tonda di Giffoni	3 [ ]
	circular	Segorbe	4 [ ]
5.2 (17)	**Involucre: length in relation to length of nut**		
	shorter	Tonda Bianca	1 [ ]
	same length	Cosford, Fertile de Coutard, Merveille de Bollwiller	3 [ ]
	longer	Kargalak, Lambert's Filbert, Segorbe, Tombul, Tonda Gentile delle Langhe	5 [ ]
5.3 (18)	**Involucre: depth of indentation**		
	shallow	Du Chilly, Tombul	1 [ ]
	medium	Fertile de Coutard, Tonda Gentile delle Langhe	3 [ ]
	deep	Gunslebener Zellernuss, Negret	5 [ ]
5.4 (25)	**Nut: size**		
	very small	Sivri	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 [ ]
5.5 (26)	**Nut: shape in lateral view**		
	globose	Clark, Tonda Gentile delle Langhe	1 [ ]
	conical	Ennis, Jean`s, Merveille de Bollwiller	2 [ ]
	ovoid	Imperatrice Eugenie, Negret	3 [ ]
	obloid	Kargalak	4 [ ]
	short sub-cylindrical	Butler	5 [ ]
	long sub-cylindrical	Cosford, Du Chilly	6 [ ]

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

6. Similar varieties and differences from these varieties

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Nut size: small*	*Tonda Gentile delle Langhe*	*Nut shape in lateral view: globose (Fertile de Coutard)*

Comments:

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

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

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

Yes [ ] No [ ]

(If yes, please provide details)

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

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

A representative color photograph of the variety 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]