CHESTNUT

UPOV Code(s):
CASTA_CRE; CASTA_MOL;
CASTA_SAT

Castanea mollissima Blume;
Castanea crenata Siebold & Zucc.;
Castanea sativa Mill.

GUIDELINES
FOR THE CONDUCT OF TESTS
FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative names:*

<table>
<thead>
<tr>
<th>Nom botanique</th>
<th>anglais</th>
<th>français</th>
<th>allemand</th>
<th>espagnol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castanea mollissima Blume</td>
<td>Chinese Chestnut</td>
<td>Châtaignier de Chine</td>
<td>Chinesische Kastanie</td>
<td>Castaño chino</td>
</tr>
<tr>
<td>Castanea sativa Mill., Castanea vesca Gaertn., Castanea vulgaris, Fagus castanea L.</td>
<td>Chestnut</td>
<td>Chataignier</td>
<td>Kastanie</td>
<td>Castaño</td>
</tr>
</tbody>
</table>

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 *Castanea mollissima* Blume, *Castanea sativa* Mill and *Castanea crenata* Siebold & Zucc. and hybrids between these species.

2. **Material Required**

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of dormant shoots for grafting or two-year-old trees grafted on a rootstock selected by the testing authority.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:
   - 10 dormant shoots or
   - 6 two-year-old trees.

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 growing cycle is considered to be the duration of a single growing season, beginning with bud burst, flowering 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.

3.4 **Test Design**

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

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 **Additional Tests**

Additional tests, for examining relevant characteristics, may be established.
4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

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

4.1.2 Consistent Differences

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

4.1.3 Clear Differences

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

4.1.4 Number of plants or parts of plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 5 plants or parts of plants taken from each of 5 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 second column of the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation of characteristics”):

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

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

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

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

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, “G” provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.
In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

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

4.2.2 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 of vegetatively propagated varieties, 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 seed or 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) Nut: shape (characteristic 31)
(b) Nut: color of skin (characteristic 37)
(c) Nut: size (characteristic 38)
(d) Time of maturity for consumption (characteristic 45)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 “Examining Distinctness”.

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.2.2 In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

<table>
<thead>
<tr>
<th>State</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>small</td>
<td>3</td>
</tr>
<tr>
<td>medium</td>
<td>5</td>
</tr>
<tr>
<td>large</td>
<td>7</td>
</tr>
</tbody>
</table>

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

<table>
<thead>
<tr>
<th>State</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>very small</td>
<td>1</td>
</tr>
<tr>
<td>very small to small</td>
<td>2</td>
</tr>
<tr>
<td>small</td>
<td>3</td>
</tr>
<tr>
<td>small to medium</td>
<td>4</td>
</tr>
<tr>
<td>medium</td>
<td>5</td>
</tr>
<tr>
<td>medium to large</td>
<td>6</td>
</tr>
<tr>
<td>large</td>
<td>7</td>
</tr>
<tr>
<td>large to very large</td>
<td>8</td>
</tr>
<tr>
<td>very large</td>
<td>9</td>
</tr>
</tbody>
</table>

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.

The different species are indicated with (A), (B), (C) after the example varieties.

(A): *Castanea sativa* Mill.
(B): *Castanea crenata* Siebold & Zucc.
(C): *Castanea mollissima* Blume

6.5 **Legend**

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>français</th>
<th>deutsch</th>
<th>español</th>
<th>Example Varieties</th>
<th>Note/Nota</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name of characteristics in English</td>
<td>Nom du caractère en français</td>
<td>Name des Merkmals auf Deutsch</td>
<td>Nombre del carácter en español</td>
<td>Exemples Beispielssorten Variedades ejemplo</td>
<td>Nota/Nota</td>
</tr>
<tr>
<td>2</td>
<td>states of expression</td>
<td>types d’expression</td>
<td>Ausprägungsstufen</td>
<td>tipos de expresión</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Type of expression</td>
<td>Qualitative characteristic</td>
<td>Quantitative characteristic</td>
<td>Pseudo-qualitative characteristic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Method of observation (and type of plot, if applicable)</td>
<td>MG, MS, VG, VS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>(+)</td>
<td>See Explanations on the Table of Characteristics in Chapter 8.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>(a)-(e)</td>
<td>See Explanations on the Table of Characteristics in Chapter 8.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Characteristic number**
2. (*) Asterisked characteristic – see Chapter 6.1.2
3. **Type of expression**
   - QL
   - QN
   - PQ
4. **Method of observation (and type of plot, if applicable)**
   - MG, MS, VG, VS
5. (+) See Explanations on the Table of Characteristics in Chapter 8.2
6. (a)-(e) See Explanations on the Table of Characteristics in Chapter 8.1
7. Not applicable
<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>français</th>
<th>deutsch</th>
<th>español</th>
<th>Example Varieties</th>
<th>Note/Nota</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>QN</td>
<td>VG</td>
<td>(+)</td>
<td>(a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Tree: vigor</strong></td>
<td><strong>Arbre : vigueur</strong></td>
<td><strong>Baum: Wuchsstärke</strong></td>
<td><strong>Árbol: vigor</strong></td>
<td>Hong Mao Zao (C), Toyotamawase(B)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>weak</td>
<td>faible</td>
<td>schwach</td>
<td>débil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>medium</td>
<td>moyenne</td>
<td>mittel</td>
<td>medio</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>strong</td>
<td>forte</td>
<td>stark</td>
<td>fuerte</td>
<td>Da Hong Pao (C), Ganne (B), Tsukuba (B)</td>
<td>7</td>
</tr>
<tr>
<td>2.</td>
<td>QN</td>
<td>VG</td>
<td>(+)</td>
<td>(a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Tree: growth habit</strong></td>
<td><strong>Arbre : port</strong></td>
<td><strong>Baum: Wuchsform</strong></td>
<td><strong>Árbol: hábito de crecimiento</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>upright</td>
<td>dressé</td>
<td>aufrecht</td>
<td>erguido</td>
<td>Akatyu (B), Arima (B), Bouche rouge (A), Song Jia Zao (C), Tsukuba (B)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>semi-upright</td>
<td>demi-dressé</td>
<td>halbaufrecht</td>
<td>semierguido</td>
<td>Maraval (A), Otomune (B), Rihei (B), Yan Hong (C)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>spreading</td>
<td>étalé</td>
<td>breitwüchsig</td>
<td>extendido</td>
<td>Belle Epine (A), Ibuki (B), Zhong Chi Li (C)</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>QN</td>
<td>MS/VG</td>
<td>(b)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Current season's shoot: thickness</strong></td>
<td><strong>Rameau en croissance : grosseur</strong></td>
<td><strong>Jahrestrieb: Dicke</strong></td>
<td><strong>Rama del año en curso: grosor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>thin</td>
<td>fin</td>
<td>dünn</td>
<td>delgada</td>
<td>Arima (B), Ginrei (B), Marsol (A)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>medium</td>
<td>moyen</td>
<td>mittel</td>
<td>media</td>
<td>Ginyose (B), Ishizuchi (B), Marron de Chevanceaux (A), Tanzawa (B)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>thick</td>
<td>épais</td>
<td>dick</td>
<td>gruesa</td>
<td>Belle Epine (A), Ibuki (B), Tsukuba (B)</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>QN</td>
<td>MS/VG</td>
<td>(b)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Current season's shoot: length of internodes</strong></td>
<td><strong>Rameau en croissance : longueur des entre-nœuds</strong></td>
<td><strong>Jahrestrieb: Länge der Internodien</strong></td>
<td><strong>Rama del año en curso: longitud de los entrenudos</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>short</td>
<td>courts</td>
<td>kurz</td>
<td>cortos</td>
<td>Ibuki (B), Marigoule (A), Yanshan Duan Zhi (C)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>medium</td>
<td>moyens</td>
<td>mittel</td>
<td>medios</td>
<td>Ganne (B), Kui Li (C), Maraval (A), Shihou (B)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>long</td>
<td>longs</td>
<td>lang</td>
<td>largos</td>
<td>Jiu Yue Han (C), Marsol (A), Rihei (B)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>français</td>
<td>deutsch</td>
<td>español</td>
<td>Example Varieties</td>
<td>Note/Nota</td>
</tr>
<tr>
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<td>---------</td>
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<td>-----------</td>
</tr>
<tr>
<td>5.</td>
<td>(*)</td>
<td>QL</td>
<td>VG</td>
<td>(+)</td>
<td>(b)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current season’s shoot: arrangement of leaves</td>
<td>Rameau en croissance : disposition des feuilles</td>
<td>Jahrestrieb: Anordnung der Blätter</td>
<td>Rama del año en curso: disposición de las hojas</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>opposite</td>
<td>opposées</td>
<td>gegenständig</td>
<td>opuestas</td>
<td>Marsol (A)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>alternate</td>
<td>alternées</td>
<td>abwechselnd</td>
<td>alternas</td>
<td>Belle Epine (A)</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>(*)</td>
<td>PQ</td>
<td>VG</td>
<td>(b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current season’s shoot: color of upper side of stem</td>
<td>Rameau en croissance : couleur de la face supérieure de la tige</td>
<td>Jahrestrieb:</td>
<td>Rama del año en curso: color de la cara superior del tallo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yellow brown</td>
<td>brun-jaune</td>
<td>gelbraun</td>
<td>marrón amarillento</td>
<td>Ganne (B), Ishizuchi (B), Okkwang (B), Shen Ci Da Ban Li (C)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>brown</td>
<td>brune</td>
<td>braun</td>
<td>marrón</td>
<td>Ginyose (B), Tsukuba (B)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>red brown</td>
<td>brun-rouge</td>
<td>rotbraun</td>
<td>marrón rojizo</td>
<td>Arima (B), Hong Guang You Li (C), Imakita (B), Tamatsukuri (B)</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>(*)</td>
<td>QN</td>
<td>VG</td>
<td>(b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current season’s shoot: density of lenticels</td>
<td>Rameau en croissance : densité des lenticelles</td>
<td>Jahrestrieb: Dichte der Lentizellen</td>
<td>Rama del año en curso: densidad de las lenticelas</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>sparse</td>
<td>faible</td>
<td>locker</td>
<td>laxa</td>
<td>Marsol (A), Yan Kui (B)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>medium</td>
<td>moyenne</td>
<td>mittel</td>
<td>media</td>
<td>Da Ban Hong (C), Ginyose (B), Ibuki (B), Rousse de Nay (A), Tanzawa (B), Tsukuba (B)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>dense</td>
<td>dense</td>
<td>dicht</td>
<td>densa</td>
<td>Bournette (A), Ginrei (B), Tamatsukuri (B), Taziriginyose (B), Yin Feng (C)</td>
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<td>8.</td>
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<td>(+)</td>
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<tr>
<td></td>
<td>Shoot: number of female flowers</td>
<td>Rameau : nombre de fleurs femelles</td>
<td>Trieb: Anzahl der weiblichen Blüten</td>
<td>Tallo: número de flores femeninas</td>
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<tr>
<td></td>
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<td>wenige</td>
<td>bajo</td>
<td>Moriwase (B)</td>
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<td>mittel</td>
<td>medio</td>
<td>Tanzawa (B), Tsukuba (B)</td>
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<td>viele</td>
<td>alto</td>
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### Example Varieties

<table>
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<th>español</th>
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<tr>
<td>Male flower: length of filament</td>
<td>Fleur mâle : longueur du filament</td>
<td>Männliche Blüte: Länge des Filaments</td>
<td>Flor masculina: longitud del filamento</td>
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<tr>
<td>very short</td>
<td>très court</td>
<td>sehr kurz</td>
<td>muy corto</td>
<td>Bouche rouge (A)</td>
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<td>kurz</td>
<td>corto</td>
<td>Marron d’Olargues (A)</td>
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<td>medio</td>
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<td>long</td>
<td>long</td>
<td>lang</td>
<td>largo</td>
<td>Belle Epine (A)</td>
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<tr>
<td>very long</td>
<td>très long</td>
<td>sehr lang</td>
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### Catkin: length

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<tr>
<td>Young leaf: bronze coloration</td>
<td>Jeune feuille : coloration bronze</td>
<td>Junges Blatt: Bronzelärbung</td>
<td>Hoja joven: coloración bronceada</td>
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<td>absent</td>
<td>absente</td>
<td>fehlend</td>
<td>ausente</td>
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<td>présente</td>
<td>vorhanden</td>
<td>presente</td>
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### Leaf: size

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<td>klein</td>
<td>pequeña</td>
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<td>moyenne</td>
<td>mittel</td>
<td>media</td>
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<td>large</td>
<td>grande</td>
<td>groß</td>
<td>grande</td>
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<td>deutsch</td>
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<td>13.</td>
<td>QN</td>
<td>VG</td>
<td>(+)</td>
<td>(c)</td>
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<td>Leaf: profile in cross section</td>
<td>Feuille : profil en section transversale</td>
<td>Blatt: Profil im Querschnitt</td>
<td>Hoja: perfil en sección transversal</td>
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<tr>
<td>straight</td>
<td>droit</td>
<td>gerade</td>
<td>recto</td>
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<td>slightly concave</td>
<td>légèrement concave</td>
<td>leicht konkav</td>
<td>ligeramente cóncavo</td>
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<td>fortement concave</td>
<td>stark konkav</td>
<td>muy cóncavo</td>
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<td>Feuille : symétrie</td>
<td>Blatt: Symmetrie</td>
<td>Hoja: simetría</td>
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<td>symétrique ou légèrement asymétrique</td>
<td>symmetrisch bis leicht asymmetrisch</td>
<td>simétrica a ligeramente asimétrica</td>
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<td>Leaf: length/width ratio</td>
<td>Feuille : rapport longueur/largeur</td>
<td>Blatt: Verhältnis Länge/Breite</td>
<td>Hoja: relación longitud/anchura</td>
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<td>mittel</td>
<td>media</td>
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<td>groß</td>
<td>alta</td>
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<td>16.</td>
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<td>Leaf: attitude in relation to shoot</td>
<td>Feuille : port par rapport au rameau</td>
<td>Blatt: Haltung im Verhältnis zum Trieb</td>
<td>Hoja: porte en relación con la rama</td>
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<tr>
<td>upwards</td>
<td>vers le haut</td>
<td>aufwärts gerichtet</td>
<td>ascendente</td>
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<tr>
<td>outwards</td>
<td>vers l’extérieur</td>
<td>abstehend</td>
<td>orientado hacia el exterior</td>
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<tr>
<td>downwards</td>
<td>vers le bas</td>
<td>abwärts gerichtet</td>
<td>orientado hacia abajo</td>
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<td>17. (*)</td>
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<td>VG</td>
<td>(c)</td>
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<tr>
<td>Leaf blade: intensity of green color of upper side</td>
<td>Limbe : intensité de la couleur verte de la face supérieure</td>
<td>Blattspreite: Intensität der grünen Farbe auf der Oberseite</td>
<td>Limbo: intensidad del color verde en el haz</td>
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<tr>
<td>light</td>
<td>claire</td>
<td>hell</td>
<td>claro</td>
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<td>moyenne</td>
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<td>medio</td>
<td>Er Xin Zao (C), Ganne (B), Ginyose (B), Rousse de Nay (A), Tsukuba (B)</td>
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<td>dunkel</td>
<td>oscuro</td>
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<td>QL</td>
<td>VG</td>
<td>(c)</td>
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<tr>
<td><strong>Leaf: color of lower side</strong></td>
<td>Feuille : couleur de la face inférieure</td>
<td>Blatt: Farbe der Unterseite</td>
<td>Hoja: color del envés</td>
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<td>weißlich</td>
<td>blanquecino</td>
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<td>vert clair</td>
<td>hellgrün</td>
<td>verde claro</td>
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<table>
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<th>19. (*)</th>
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<tbody>
<tr>
<td><strong>Leaf: shape</strong></td>
<td>Feuille : forme</td>
<td>Blatt: Form</td>
<td>Hoja: forma</td>
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<td>lanzettlich</td>
<td>lanceolada</td>
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<td>elliptique étroite</td>
<td>schmal elliptisch</td>
<td>elíptica estrecha</td>
<td>Dae han (B), Ganne (B), Ginyose (B), Mipung (B), Qian Ci Da Ban Li (C), Tsukuba (B)</td>
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<tr>
<td>broad elliptic</td>
<td>elliptique large</td>
<td>breit elliptisch</td>
<td>elíptica ancha</td>
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<table>
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<th>20. (*)</th>
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<tr>
<td><strong>Leaf: shape of apex</strong></td>
<td>Feuille : forme du sommet</td>
<td>Blatt: Form der Spitze</td>
<td>Hoja: forma del ápice</td>
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<td>schmal zugespitzt</td>
<td>acuminado estrecho</td>
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<td>acuminée large</td>
<td>breit zugespitzt</td>
<td>acuminado ancho</td>
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<td>aigué</td>
<td>spitz</td>
<td>agudo</td>
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<tr>
<td><strong>Leaf: shape of base</strong></td>
<td>Feuille : forme de la base</td>
<td>Blatt: Form der Basis</td>
<td>Hoja: forma de la base</td>
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<td>aigué</td>
<td>spitz</td>
<td>agudo</td>
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<td>obtusa</td>
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<td>herzförmig</td>
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<td>Feuille : forme du bord</td>
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<td>Hoja: forma del margen</td>
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<td>Blatt: Symmetrie der Basis</td>
<td>Hoja: simetría de la base</td>
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<td>symmetric or slightly asymmetric</td>
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<td>symmetrisch bis leicht asymmetrisch</td>
<td>simétrica o ligeramente asimétrica</td>
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<td>24. (*) QL</td>
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<td>Leaf: color of petiole</td>
<td>Feuille : couleur du pétiole</td>
<td>Blatt: Farbe des Blattstiels</td>
<td>Hoja: color de pecíolo</td>
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<td>gelb</td>
<td>amarillo</td>
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<td>grün</td>
<td>verde</td>
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<td>MS/VG</td>
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<td>Leaf: ratio length of leaf blade/length of petiole</td>
<td>Feuille : rapport longueur du limbe/longueur du pétiole</td>
<td>Blatt: Verhältnis Länge der Blattspreite/Länge des Blattstiels</td>
<td>Hoja: relación longitud del limbo/longitud del pecíolo</td>
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<td>mittel</td>
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<td>26. (*) PQ</td>
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<td>Bur: shape</td>
<td>Bogue : forme</td>
<td>Fruchtbecher: Form</td>
<td>Zurrón: forma</td>
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<td>globuleuse</td>
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<td>globoso</td>
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<td>obloide</td>
<td>abgeplattet kugelförmig</td>
<td>obloide</td>
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<td>guer zylindrisch</td>
<td>cilíndrico transversal</td>
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<td>27. (*) QN</td>
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<td>Bur: density of prickles</td>
<td>Bogue : densité des épines</td>
<td>Fruchtbecher: Dichte der Stacheln</td>
<td>Zurrón: densidad de las espinas</td>
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<td>locker</td>
<td>laxa</td>
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<td>Noix : importance de la pénétration du tegument dans l’embryon</td>
<td>Nuß: Grad des Eindringens der Samenschale in den Embryo</td>
<td>Castaña: grado de penetración del tegumento en el embrión</td>
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<td>oval ancha</td>
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<td>Noix : surface de la pilosité sur la partie supérieure</td>
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<td>Castaña: superficie pubescente en la parte superior</td>
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<td>Noix : taille du hile</td>
<td>Nuß: Nabelfläche</td>
<td>Castaña: zona del hilo</td>
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<td>Nut: shape of border line of hilum and pericarp</td>
<td>Noix : forme de la limite entre le hile et le péricarpe</td>
<td>Nuß: Form der Grenze zwischen Nabel und Perikarp</td>
<td>Castaña: forma de la línea divisoria entre el hilo y el pericarpio</td>
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<td>Nut: conspicuousness of hilum</td>
<td>Noix : netteté du hile</td>
<td>Nuß: Ausprägung des Nabels</td>
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<td>Noix : brillance</td>
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<td>Noix : couleur du péricarpe</td>
<td>Nuß: Farbe der Haut</td>
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<td>schwärzlich braun</td>
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<td><strong>Kernel: color of flesh</strong></td>
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<td><strong>Kern: Farbe des Fleisches</strong></td>
<td><strong>Semilla: color de la pulpa</strong></td>
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<td>Época de la floración masculina</td>
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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) Plant: Observations on the plant should be made in the dormant season.

(b) Current season's shoot: Observations on the current season's shoot should be made on the middle third of the shoot in the dormant season.

(c) Leaf: Observations on the leaf should be made on fully developed leaves. Leaves should be taken from the middle third of bearing shoots.

(d) Bur: Observations on the bur should be made just before dehiscence.

(e) Nut: Observations on the nut should be made on nuts mature for consumption. In case of bur containing three nuts, the middle one should be disregarded.
8.2 Explanations for individual characteristics

Ad. 1: Tree: vigor

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

Ad. 2: Tree: growth habit

- upright
- semi-upright
- spreading

Ad. 5: Current season's shoot: arrangement of leaves

- opposite
- alternate

View from top on the shoot:

- = leaf position
Ad. 8: Shoot: number of female flowers

The number of female flowers should be observed on the bearing shoots at full flowering time.

Ad. 9: Male flower: length of filament

The length of the filament of the male flower should be observed on the longest filament on the middle third of the catkin at full flowering time.

Ad. 10: Catkin: length

The longest catkin on a fully developed inflorescence should be observed.

Ad. 11: Young leaf: bronze coloration

Bronze coloration of young leaf should be observed at distal part of current shoot.

Ad. 12: Leaf: size

The total area of the leaf should be observed.

Ad. 13: Leaf: profile in cross section

1. straight
2. slightly concave
3. strongly concave
Ad. 15: Leaf: length/width ratio

![Length and Width Diagram]

Ad. 16: Leaf: attitude in relation to shoot

The attitude should be observed on upright shoots.

1. upwards
2. outwards
3. downwards

Ad. 19: Leaf: shape

1. lanceolate
2. narrow elliptic
3. broad elliptic
Ad. 20: Leaf: shape of apex

1. narrow acuminate
2. broad acuminate
3. acute

Ad. 21: Leaf: shape of base

1. acute
2. obtuse
3. cordate

Ad. 22: Leaf: shape of margin

1. needle shape
2. acute
3. flare shape

Ad. 25: Leaf: ratio length of leaf blade/length of petiole

See Ad. 15
Ad. 26: Bur: shape

front view

lateral view

1 globose

2 obloid

3 transverse cylindric

Ad. 28: Nut: embryony

1 mono-embryonic

2 poly-embryonic
### Ad. 31: Nut: shape

<table>
<thead>
<tr>
<th>width (ratio length/width)</th>
<th>→ broadest part →</th>
<th>← below middle ←</th>
<th>→ at middle →</th>
</tr>
</thead>
<tbody>
<tr>
<td>narrow</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>(high)</td>
<td>medium ovate</td>
<td>broad ovate</td>
<td>medium oblate</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>medium</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>(medium)</td>
<td>circular</td>
<td>broad oblate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>broad</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>(low)</td>
<td>medium oblate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Ad. 32: Nut: area of pubescence on upper part

1. small
2. medium
3. large
Ad. 33: Nut: area of hilum

![Images showing small, medium, and large areas of hilum]

Ad. 34: Nut: shape of border line of hilum and pericarp

![Images showing straight, curved, and wavy border lines]

Ad. 36: Nut: glossiness

The glossiness of nut should be observed immediately after opening of the involucre.

Ad. 39: Seed coat: adherence to kernel

The adherence to kernel should be determined by observation of the ease of peeling the seed coat by hand following steaming or roasting. Nuts should be cut in half before steaming or roasting.

Ad. 42: Time of leaf bud burst

The time of leaf bud burst is when 20% of buds show green color at the top of the bud.
Ad. 43: Time of male flowering

The time of male flowering is when 50% of the flowers are fully open.

Ad. 44: Time of female flowering

The time of female flowering is when 50% of the flowers are fully open.

Ad. 45: Time of maturity for consumption

The time of maturity for consumption is when 50% of the nuts are harvested.
9. Literature


Chapa, J.- INRA, 1982: Situation de la castaneiculture francaise. Convegno internazionale di Frutticoltura montana, Saint – Vincent d’Aoste, IT


Congreso International Sobre el Castano: Lourizan Pontevedra, Espagna, 1-5 octobre 1984, parution 1986, Xunta de Galicai, pp.429

INRA. CTPS., 1986 + 1987: Premier catalogue officiel des varietes de chataignes et marrons, Documents GEVES, pp. 31-33, FR


Solignat, G., Chapa, J., 1978: La Biologie florale du chataignier, Invuelec, pp. 35
10. **Technical Questionnaire**

**TECHNICAL QUESTIONNAIRE**

<table>
<thead>
<tr>
<th>Page (x) of (y)</th>
<th>Reference Number:</th>
</tr>
</thead>
</table>

| 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**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1.1</strong> Botanical name</td>
<td><em>Castanea crenata</em> Siebold &amp; Zucc.</td>
<td>[ ]</td>
</tr>
<tr>
<td><strong>1.1.2</strong> Common name</td>
<td>Japanese chestnut</td>
<td></td>
</tr>
<tr>
<td><strong>1.2.1</strong> Botanical name</td>
<td><em>Castanea mollissima</em> Blume</td>
<td>[ ]</td>
</tr>
<tr>
<td><strong>1.2.2</strong> Common name</td>
<td>Chinese Chestnut</td>
<td></td>
</tr>
<tr>
<td><strong>1.3.1</strong> Botanical name</td>
<td><em>Castanea sativa</em> Mill.</td>
<td>[ ]</td>
</tr>
<tr>
<td><strong>1.3.2</strong> Common name</td>
<td>Chestnut</td>
<td></td>
</tr>
<tr>
<td><strong>1.4.1</strong> Botanical name</td>
<td><em>Castanea x Castanea</em></td>
<td>[ ]</td>
</tr>
<tr>
<td><strong>1.4.2</strong> Common name</td>
<td>Chestnut (in case of interspecific hybrid)</td>
<td></td>
</tr>
</tbody>
</table>

2. **Applicant**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Telephone No.</td>
<td></td>
</tr>
<tr>
<td>Fax No.</td>
<td></td>
</tr>
<tr>
<td>E-mail address</td>
<td></td>
</tr>
<tr>
<td>Breeder (if different from applicant)</td>
<td></td>
</tr>
</tbody>
</table>

3. **Proposed denomination and breeder's reference**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed denomination</td>
<td></td>
</tr>
<tr>
<td>(if available)</td>
<td></td>
</tr>
<tr>
<td>Breeder's reference</td>
<td></td>
</tr>
</tbody>
</table>
### #4. Information on the breeding scheme and propagation of the variety

#### 4.1 Breeding scheme

Variety resulting from:

#### 4.1.1 Crossing

(a) controlled cross

(please state parent varieties)

(………………………………) x (………………………………)
female parent male parent

(b) partially known cross

(please state known parent variety(ies))

(………………………………) x (………………………………)
female parent male parent

(c) unknown cross

#### 4.1.2 Mutation

(please state parent variety)

#### 4.1.3 Discovery and development

(please state where and when discovered and how developed)

#### 4.1.4 Other

(please provide details)

---

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

4.2.1 Vegetative propagation

(a) cuttings [ ]
(b) grafting [ ]
(c) other (state method) [ ]

4.2.2 Other [ ]
(Please provide details)
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).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Example Varieties</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5.1 Nut: shape</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(31)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>broad ovate</td>
<td>Marsol (A)</td>
<td>1[ ]</td>
</tr>
<tr>
<td>medium ovate</td>
<td>Jian Ding You Li (C), Marki (A)</td>
<td>2[ ]</td>
</tr>
<tr>
<td>circular</td>
<td>Arima (B), Da Hong Pao (C), Ishizuchi (B), Marron de Chevanceaux (A)</td>
<td>3[ ]</td>
</tr>
<tr>
<td>medium oblate</td>
<td>Laguepie (A)</td>
<td>4[ ]</td>
</tr>
<tr>
<td>broad oblate</td>
<td>Izumo (B), Marigoule (A), Qian Ci Da Ban Li (C), Riheiguri (B)</td>
<td>5[ ]</td>
</tr>
<tr>
<td><strong>5.2 Nut: color of skin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>light brown</td>
<td>Comballe (A), Hangawii (B), Hong Guang (C), Otomune (B), Tanzawa (B)</td>
<td>1[ ]</td>
</tr>
<tr>
<td>medium brown</td>
<td>Arima (B), Belle Epine (A), Mipung (B), Okkwang (B), Tazriginyose (B), Zhong Chi Li (C)</td>
<td>2[ ]</td>
</tr>
<tr>
<td>dark brown</td>
<td>Akatu (B), Ishizuchi (B), Jiao Zha (C), Tsukuba (B)</td>
<td>3[ ]</td>
</tr>
<tr>
<td>reddish brown</td>
<td>Daekwang (B), Ganne (B), Ginyose (B), Ibuki (B), Liu Yue Pu (C), Marron de Var (A)</td>
<td>4[ ]</td>
</tr>
<tr>
<td>blackish brown</td>
<td>Marigoule (A), Riheiguri (B), WuKe Li (C)</td>
<td>5[ ]</td>
</tr>
<tr>
<td><strong>5.3 Nut: size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>very small</td>
<td></td>
<td>1[ ]</td>
</tr>
<tr>
<td>very small to small</td>
<td></td>
<td>2[ ]</td>
</tr>
<tr>
<td>small</td>
<td>Hangang Tie Dan Li (C), Imakita (B), Roussette de Montpazier (A), Toyotamawase (B)</td>
<td>3[ ]</td>
</tr>
<tr>
<td>small to medium</td>
<td></td>
<td>4[ ]</td>
</tr>
<tr>
<td>medium</td>
<td>Arima (B), Ibuki (B), Laguepie (A), Tanzawa (B), Yan Hong (C)</td>
<td>5[ ]</td>
</tr>
<tr>
<td>medium to large</td>
<td></td>
<td>6[ ]</td>
</tr>
<tr>
<td>large</td>
<td></td>
<td>7[ ]</td>
</tr>
<tr>
<td>large to very large</td>
<td></td>
<td>8[ ]</td>
</tr>
<tr>
<td>very large</td>
<td></td>
<td>9[ ]</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Example Varieties</td>
<td>Note</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td><strong>5.4 Time of maturity for consumption</strong> (45)</td>
<td><strong>very early</strong> Bouche de Belizac (A), Eli1 (C), Moriwase (B), Toyotamawase (B)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>very early to early</strong> Izumo (B), Precoce Migoule (A), Song Jia Zao (C), Tamatsukuri (B), Tanzawa (B)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>early</strong> Izumo (B), Precoce Migoule (A), Song Jia Zao (C), Tamatsukuri (B), Tanzawa (B)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>early to medium</strong> Arima (B), Hua Guang (C), Marigoule (A), Tsukuba (B)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>medium</strong> Arima (B), Hua Guang (C), Marigoule (A), Tsukuba (B)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>late</strong> Bouche rouge (A), Ganne (B), Ishizuchi (B), Qing Mao Ruan Ci (C)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><strong>medium to late</strong></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><strong>very late</strong> Banseki (B), Verdale (A)</td>
<td>9</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Denomination(s) of variety(ies) similar to your candidate variety</th>
<th>Characteristic(s) in which your candidate variety differs from the similar variety(ies)</th>
<th>Describe the expression of the characteristic(s) for the similar variety(ies)</th>
<th>Describe the expression of the characteristic(s) for your candidate variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Tree: growth habit</td>
<td>upright</td>
<td>semi-upright</td>
</tr>
</tbody>
</table>

Comments:
**Technical Questionnaire**

<table>
<thead>
<tr>
<th>#7.</th>
<th>Additional information which may help in the examination of the variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?</td>
</tr>
<tr>
<td></td>
<td>Yes [ ] No [ ] (If yes, please provide details)</td>
</tr>
<tr>
<td>7.2</td>
<td>Are there any special conditions for growing the variety or conducting the examination?</td>
</tr>
<tr>
<td></td>
<td>Yes [ ] No [ ] (If yes, please provide details)</td>
</tr>
<tr>
<td>7.3</td>
<td>Other information</td>
</tr>
</tbody>
</table>

---

 Authorities may allow certain of this information to be provided in a confidential section of 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.

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]