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| DRAFT |

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| --- | --- | --- |
|  | JAPANESE PEAR  UPOV Code(s): PYRUS\_PYR;  PYRUS\_USS, PYRUS\_PUS  *Pyrus pyrifolia* (Burm. f.) Nakai;  *Pyrus ussuriensis* Maxim. & Rupr.;  Hybrids between *Pyrus pyrifolia* and *Pyrus ussuriensis* | \* |

GUIDELINESFOR THE CONDUCT OF TESTS  
FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from Japan

to be considered by the

Technical Working Party for Fruit Crops at its fifty-sixth session,

to be held in Bursa, Türkiye, from 2025-06-23 to 2025-06-26

Disclaimer: this document does not represent UPOV policies or guidance

Alternative Names:\*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Botanical name* | *English* | *French* | *German* | *Spanish* |
| |  | | --- | | *Pyrus pyrifolia* (Burm. f.) Nakai | | |  | | --- | | Asian pear, Chinese pear, Chinese sand pear, Japanese pear, Nashi, Nashi pear, Oriental pear, Sand pear | | |  | | --- | | poirier japonais | | |  | | --- | | China-Birne, Nashi-Birne, Sandbirnbaum | | |  | | --- | | pera | |
| |  | | --- | | *Pyrus ussuriensis* Maxim. & Rupr. | | |  | | --- | | Harbin pear, Ussurian pear | | |  | | --- | |  | | |  | | --- | | Ussuri-Birne | | |  | | --- | |  | |
| Hybrids between *Pyrus pyrifolia* and *Pyrus ussuriensis, Pyrus pyrifolia* (Burm. f.) Nakai *× Pyrus ussuriensis* Maxim. |  |  |  |  |

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.

Other associated UPOV documents : TG/169/3 + Corr. Pyrus Rootstocks

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# Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Pyrus pyrifolia* (Burm. f.) Nakai, *Pyrus ussuriensis* Maxim. & Rupr. and hybrids between *Pyrus pyrifolia* and *Pyrus ussuriensis,* except for varieties used only as rootstock vatieties (see TG/169/3 + Corr.).

# 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 trees grafted on rootstocks specified by the competent authority.

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

(a) varieties resulting from crossing: 5  
(b) varieties resulting from mutation: 10

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.

# 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 trees 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 the dormancy period, followed by bud burst (flowering and/or vegetative), flowering and fruit harvest and concluding when the following dormant period starts.

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 Because daylight varies, color determinations made against a color chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform with the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background. The color chart and version used should be specified in the variety description.

## 3.4  Test Design

3.4.1 In the case of varieties resulting from crossing, each test should be designed to result in a total of at least 5 plants.

3.4.2 In the case of varieties resulting from mutation, each test should be designed to result in a total of at least 10 plants.

## 3.5  Additional Tests

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

# 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. 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 varieties resulting from crossing, 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.

4.2.4 For the asseement of uniformity of varieties resulting from mutation, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 10 plants, 1 off-type is allowed.

## 4.3  Stability

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

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

# 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) Fruit: weight (characteristic 30)

(b) Fruit: shape in lateral view (characteristic 34)

(c) Fruit: ground color of skin (characteristic 35)

(d) Fruit: relative area of over color (characteristic 36)

(e) Fruit: over color  (characteristic 37)

(f) Fruit: relative area of russet (characteristic 38)

(g) Time of beginning of flowering (characteristic 61)

(h) Time for harvest maturity (characteristic 62)

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”.

# 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)-(x) See Explanations on the Table of Characteristics in Chapter 8.1

7 Growth stage key (if applicable) See Explanations on the Table of Characteristics in Chapter 8.3

# Table of Characteristics/Tableau des caracteres/Merkmalstabelle/Tabla de caracteres

|  | | English | | français | | deutsch | español | Example Varieties  Exemples  Beispielssorten  Variedades ejemplo | Note/  Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1.** | **(\*)** | **QN** | **VG** |  |  |  |  |  |  |
|  | | **Tree: vigor** | |  | |  |  |  |  |
| very weak | |  | |  |  |  | 1 |
| weak | |  | |  |  | Yakumo | 2 |
| medium | |  | |  |  | Hosui, Kosui, Shinseiki | 3 |
| strong | |  | |  |  | Shinsui | 4 |
| very strong | |  | |  |  |  | 5 |
| **2.** | **(\*)** | **PQ** | **VG** | **(+)** | **(a)** |  |  |  |  |
|  | | **Tree: growth habit** | |  | |  |  |  |  |
| fastigiate | |  | |  |  |  | 1 |
| upright | |  | |  |  | Shinsui | 2 |
| spreading | |  | |  |  | Niitaka | 3 |
| drooping | |  | |  |  | Chojuro | 4 |
| weeping | |  | |  |  |  | 5 |
| **3.** |  | **QN** | **MS/VG** | **(+)** | **(a)** |  |  |  |  |
|  | | **One-year-old shoot: length of internodes** | |  | |  |  |  |  |
| short | |  | |  |  |  | 1 |
| short to medium | |  | |  |  | Nijisseiki, Shinsui | 2 |
| medium | |  | |  |  | Hosui | 3 |
| medium to long | |  | |  |  | Kosui | 4 |
| long | |  | |  |  |  | 5 |
| **4.** | **(\*)** | **PQ** | **VG** |  | **(a)** |  |  |  |  |
|  | | **One-year-old shoot: color on sunny side** | |  | |  |  |  |  |
| dark purple | |  | |  |  | Oharabeni | 1 |
| brown | |  | |  |  | Chojuro, Niitaka | 2 |
| orange brown | |  | |  |  |  | 3 |
| greenish brown | |  | |  |  | Gold Nijisseiki | 4 |
| blackish brown | |  | |  |  | Hosui | 5 |
| **5.** | **(\*)** | **QN** | **VG** |  | **(a)** |  |  |  |  |
|  | | **One-year-old shoot: density of lenticels** | |  | |  |  |  |  |
| very few | |  | |  |  |  | 1 |
| few | |  | |  |  | Choju | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui, Kosui, Niitaka | 3 |
| many | |  | |  |  | Shinko, Shinseiki | 4 |
| very many | |  | |  |  |  | 5 |
| **6.** | **(\*)** | **QN** | **VG** |  | **(a)** |  |  |  |  |
|  | | **One-year-old shoot: size of lenticels** | |  | |  |  |  |  |
| small | |  | |  |  | Chojuro, Shinseiki | 1 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui, Kosui | 2 |
| large | |  | |  |  | Niitaka, Shinsui | 3 |
| **7.** |  | **QN** | **VG** |  | **(a)** |  |  |  |  |
|  | | **One-year-old shoot: pubescence** | |  | |  |  |  |  |
| absent or very weak | |  | |  |  | Hosui, Kosui | 1 |
| weak | |  | |  |  |  | 2 |
| medium | |  | |  |  | Shinko | 3 |
| strong | |  | |  |  |  | 4 |
| very strong | |  | |  |  | Gold Nijisseiki | 5 |
| **8.** | **(\*)** | **QN** | **VG** |  |  |  |  |  |  |
|  | | **Branch: number of spurs** | |  | |  |  |  |  |
| few | |  | |  |  | Kosui | 1 |
| few to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Hosui | 3 |
| medium to many | |  | |  |  |  | 4 |
| many | |  | |  |  | Gold Nijisseiki, Shinko, Shinsui | 5 |
| **9.** | **(\*)** | **PQ** | **VG** | **(+)** |  |  |  |  |  |
|  | | **Vegetative bud: position relative to shoot** | |  | |  |  |  |  |
| adpressed | |  | |  |  | Kosui, Shinsui | 1 |
| slightly held out | |  | |  |  | Chojuro, Hosui, Nijisseiki | 2 |
| markedly held out | |  | |  |  | Niitaka, Shinko | 3 |
| **10.** |  | **PQ** | **VG** | **(+)** |  |  |  |  |  |
|  | | **Vegetative bud: shape of apex** | |  | |  |  |  |  |
| pointed | |  | |  |  | Gold Nijisseiki, Kosui | 1 |
| slightly rounded | |  | |  |  | Hosui, Shinko | 2 |
| strongly rounded | |  | |  |  | Shinsui | 3 |
| **11.** | **(\*)** | **QN** | **VG** |  | **(a)** |  |  |  |  |
|  | | **One-year-old shoot: number of axillary flower buds** | |  | |  |  |  |  |
| very few | |  | |  |  |  | 1 |
| few | |  | |  |  | Gold Nijisseiki, Shinsui | 2 |
| medium | |  | |  |  | Kosui, Shinseiki | 3 |
| many | |  | |  |  | Chojuro, Hosui | 4 |
| very many | |  | |  |  |  | 5 |
| **12.** | **(\*)** | **PQ** | **VG** |  |  |  |  |  |  |
|  | | **Flower bud: shape** | |  | |  |  |  |  |
| ovate | |  | |  |  | Chojuro, Gold Nijisseiki, Kosui | 1 |
| narrow elliptic | |  | |  |  | Hosui | 2 |
| broad elliptic | |  | |  |  | Shinsui | 3 |
| round | |  | |  |  | Aikansui, Shinseiki | 4 |
| **13.** | **(\*)** | **PQ** | **VG** |  |  |  |  |  |  |
|  | | **Young leaf: color of upper side** | |  | |  |  |  |  |
| yellow green | |  | |  |  | Chikusui, Shinseiki | 1 |
| greenish brown | |  | |  |  | Yakumo | 2 |
| brown | |  | |  |  | Gold Nijisseiki, Hosui, Kosui | 3 |
| red brown | |  | |  |  | Shinko, Shinsui | 4 |
| **14.** | **(\*)** | **QN** | **VG** |  |  |  |  |  |  |
|  | | **Young leaf: pubescence on lower side** | |  | |  |  |  |  |
| absent or very weak | |  | |  |  |  | 1 |
| weak | |  | |  |  | Hosui, Kosui, Shinsui | 2 |
| medium | |  | |  |  | Aikansui, Chojuro, Niitaka | 3 |
| strong | |  | |  |  | Gold Nijisseiki, Shinseiki | 4 |
| very strong | |  | |  |  |  | 5 |
| **15.** | **(\*)** | **QN** | **MS/VG** |  | **(b)** |  |  |  |  |
|  | | **Leaf blade: length** | |  | |  |  |  |  |
| very short | |  | |  |  |  | 1 |
| very short to short | |  | |  |  |  | 2 |
| short | |  | |  |  | Hosui, Shinsui | 3 |
| short to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  | Gold Nijisseiki, Kosui | 5 |
| medium to long | |  | |  |  |  | 6 |
| long | |  | |  |  |  | 7 |
| long to very long | |  | |  |  |  | 8 |
| very long | |  | |  |  |  | 9 |
| **16.** | **(\*)** | **QN** | **MS/VG** |  | **(b)** |  |  |  |  |
|  | | **Leaf blade: width** | |  | |  |  |  |  |
| very narrow | |  | |  |  |  | 1 |
| very narrow to narrow | |  | |  |  |  | 2 |
| narrow | |  | |  |  | Hosui, Shinko | 3 |
| narrow to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  | Shinsui | 5 |
| medium to broad | |  | |  |  |  | 6 |
| broad | |  | |  |  | Niitaka | 7 |
| broad to very broad | |  | |  |  |  | 8 |
| very broad | |  | |  |  |  | 9 |
| **17.** | **(\*)** | **QN** | **MS/VG** |  | **(b)** |  |  |  |  |
|  | | **Leaf blade: ratio length/width** | |  | |  |  |  |  |
| very low | |  | |  |  |  | 1 |
| very low to low | |  | |  |  |  | 2 |
| low | |  | |  |  | Niitaka | 3 |
| low to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  | Hosui | 5 |
| medium to high | |  | |  |  |  | 6 |
| high | |  | |  |  |  | 7 |
| high to very high | |  | |  |  |  | 8 |
| very high | |  | |  |  |  | 9 |
| **18.** |  | **PQ** | **VG** | **(+)** | **(b)** |  |  |  |  |
|  | | **Leaf blade: incisions of margin** | |  | |  |  |  |  |
| serrate | |  | |  |  |  | 1 |
| dentate | |  | |  |  |  | 2 |
| crenate | |  | |  |  |  | 3 |
| **19.** | **(\*)** | **QN** | **MS/VG** |  | **(b)** |  |  |  |  |
|  | | **Petiole: length** | |  | |  |  |  |  |
| very short | |  | |  |  |  | 1 |
| very short to short | |  | |  |  |  | 2 |
| short | |  | |  |  | Niitaka, Shinko | 3 |
| short to medium | |  | |  |  | Gold Nijisseiki | 4 |
| medium | |  | |  |  | Tama | 5 |
| medium to long | |  | |  |  |  | 6 |
| long | |  | |  |  | Yakumo | 7 |
| long to very long | |  | |  |  |  | 8 |
| very long | |  | |  |  |  | 9 |
| **20.** |  | **QN** | **MS/VG** |  | **(b)** |  |  |  |  |
|  | | **Petiole: ratio petiole length / leaf blade length** | |  | |  |  |  |  |
| very low | |  | |  |  |  | 1 |
| low | |  | |  |  | Kikusui, Niitaka | 2 |
| medium | |  | |  |  | Hosui, Kosui | 3 |
| high | |  | |  |  | Yakumo | 4 |
| very high | |  | |  |  |  | 5 |
| **21.** | **(\*)** | **QN** | **MS/VG** |  |  |  |  |  |  |
|  | | **Inflorescence: number of flowers** | |  | |  |  |  |  |
| few | |  | |  |  |  | 1 |
| few to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Chojuro, Hosui, Shinsui | 3 |
| medium to many | |  | |  |  |  | 4 |
| many | |  | |  |  | Gold Nijisseiki, Kosui | 5 |
| **22.** | **(\*)** | **PQ** | **VG** |  |  |  |  |  |  |
|  | | **Petal: color of outer side just before opening of flower** | |  | |  |  |  |  |
| white | |  | |  |  | Niitaka, Shinko, Shinseiki | 1 |
| light pink | |  | |  |  | Hosui, Kosui, Shinsui | 2 |
| medium pink | |  | |  |  | Choju | 3 |
| light red | |  | |  |  | Oharabeni | 4 |
| **23.** | **(\*)** | **QN** | **MS/VG** |  | **(c)** |  |  |  |  |
|  | | **Flower: diameter** | |  | |  |  |  |  |
| small | |  | |  |  | Atago | 1 |
| small to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Chojuro, Gold Nijisseiki, Shinsui | 3 |
| medium to large | |  | |  |  |  | 4 |
| large | |  | |  |  | Hosui, Kosui | 5 |
| **24.** | **(\*)** | **PQ** | **VG** | **(+)** | **(c)** |  |  |  |  |
|  | | **Petal: shape** | |  | |  |  |  |  |
| ovate | |  | |  |  | Hosui, Shinko | 1 |
| elliptic | |  | |  |  | Kosui | 2 |
| round | |  | |  |  | Chojuro, Gold Nijisseiki, Niitaka | 3 |
| **25.** |  | **QN** | **VG** | **(+)** | **(c)** |  |  |  |  |
|  | | **Petal: number of notches on margin** | |  | |  |  |  |  |
| absent or few | |  | |  |  | Aikansui, Niitaka | 1 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui, Kosui, Shinsui | 2 |
| many | |  | |  |  | Chojuro, Shinseiki | 3 |
| **26.** | **(\*)** | **QN** | **MS/VG** |  | **(c)** |  |  |  |  |
|  | | **Flower: number of stamens** | |  | |  |  |  |  |
| very few | |  | |  |  |  | 1 |
| few | |  | |  |  | Chojuro | 2 |
| medium | |  | |  |  | Hosui, Niitaka | 3 |
| many | |  | |  |  | Kikusui, Kosui | 4 |
| very many | |  | |  |  |  | 5 |
| **27.** |  | **QN** | **VG** | **(+)** |  |  |  |  |  |
|  | | **Anther: intensity of red color** | |  | |  |  |  |  |
| light | |  | |  |  | Kosui, Niitaka | 1 |
| medium | |  | |  |  | Hosui, Shinsui | 2 |
| dark | |  | |  |  | Gold Nijisseiki, Shinko | 3 |
| **28.** | **(\*)** | **QL** | **VG** |  |  |  |  |  |  |
|  | | **Anther: pollen** | |  | |  |  |  |  |
| absent | |  | |  |  | Ishiiwase, Kumoi, Niitaka | 1 |
| present | |  | |  |  | Chojuro, Hosui, Kosui, Nijisseiki, Shinsui | 9 |
| **29.** |  | **QN** | **VG** |  | **(c)** |  |  |  |  |
|  | | **Pedicel: pubescence** | |  | |  |  |  |  |
| very weak | |  | |  |  |  | 1 |
| weak | |  | |  |  |  | 2 |
| medium | |  | |  |  | Hosui, Kosui | 3 |
| strong | |  | |  |  | Nijisseiki, Shinko, Shinseiki | 4 |
| very strong | |  | |  |  |  | 5 |
| **30.** | **(\*)** | **QN** | **MG/MS** |  | **(d)** |  |  |  |  |
|  | | **Fruit: weight** | |  | |  |  |  |  |
| very low | |  | |  |  |  | 1 |
| very low to low | |  | |  |  |  | 2 |
| low | |  | |  |  | Shinsui | 3 |
| low to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  | Chojuro, Gold Nijisseiki, Kosui | 5 |
| medium to high | |  | |  |  |  | 6 |
| high | |  | |  |  | Hosui, Shinko | 7 |
| high to very high | |  | |  |  | Niitaka | 8 |
| very high | |  | |  |  | Atago | 9 |
| **31.** | **(\*)** | **QN** | **MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: height** | |  | |  |  |  |  |
| very short | |  | |  |  |  | 1 |
| very short to short | |  | |  |  |  | 2 |
| short | |  | |  |  | Shinsui | 3 |
| short to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  | Kosui | 5 |
| medium to tall | |  | |  |  | Gold Nijisseiki, Hosui | 6 |
| tall | |  | |  |  | Niitaka, Shinko | 7 |
| tall to very tall | |  | |  |  | Atago | 8 |
| very tall | |  | |  |  |  | 9 |
| **32.** | **(\*)** | **QN** | **MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: diameter** | |  | |  |  |  |  |
| very small | |  | |  |  |  | 1 |
| very small to small | |  | |  |  |  | 2 |
| small | |  | |  |  |  | 3 |
| small to medium | |  | |  |  | Shinsui | 4 |
| medium | |  | |  |  | Gold Nijisseiki, Kosui | 5 |
| medium to large | |  | |  |  |  | 6 |
| large | |  | |  |  | Hosui, Shinko | 7 |
| large to very large | |  | |  |  | Niitaka | 8 |
| very large | |  | |  |  | Atago | 9 |
| **33.** | **(\*)** | **QN** | **MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: ratio height/diameter** | |  | |  |  |  |  |
| very low | |  | |  |  |  | 1 |
| very low to low | |  | |  |  |  | 2 |
| low | |  | |  |  | Shinsui | 3 |
| low to medium | |  | |  |  | Atago, Hosui, Kosui, Niitaka | 4 |
| medium | |  | |  |  | Gold Nijisseiki, Shinko | 5 |
| medium to high | |  | |  |  |  | 6 |
| high | |  | |  |  |  | 7 |
| high to very high | |  | |  |  |  | 8 |
| very high | |  | |  |  |  | 9 |
| **34.** | **(\*)** | **PQ** | **VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: shape in lateral view** | |  | |  |  |  |  |
| ovate | |  | |  |  |  | 1 |
| narrow elliptic | |  | |  |  |  | 2 |
| broad elliptic | |  | |  |  | Yakumo | 3 |
| circular | |  | |  |  | Hosui | 4 |
| oblate | |  | |  |  | Shinsui | 5 |
| obovate | |  | |  |  | Yasato | 6 |
| **35.** | **(\*)** | **PQ** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: ground color of skin** | |  | |  |  |  |  |
| not visible | |  | |  |  | Hosui, Niitaka, Shinko | 1 |
| yellow | |  | |  |  |  | 2 |
| green | |  | |  |  |  | 3 |
| light yellow green | |  | |  |  | Yakumo | 4 |
| dark yellow green | |  | |  |  | Gold Nijisseiki | 5 |
| **36.** | **(\*)** | **PQ** | **VG** |  |  |  |  |  |  |
|  | | **Fruit: relative area of over color** | |  | |  |  |  |  |
| absent or very small | |  | |  |  |  | 1 |
| very small to small | |  | |  |  |  | 2 |
| small | |  | |  |  |  | 3 |
| small to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  |  | 5 |
| medium to large | |  | |  |  |  | 6 |
| large | |  | |  |  |  | 7 |
| large to very large | |  | |  |  |  | 8 |
| very large | |  | |  |  |  | 9 |
| **37.** | **(\*)** | **PQ** | **VG** |  |  |  |  |  |  |
|  | | **Fruit: over color** | |  | |  |  |  |  |
| orange | |  | |  |  |  | 1 |
| orange red | |  | |  |  |  | 2 |
| pink red | |  | |  |  | PremP109 | 3 |
| light red | |  | |  |  |  | 4 |
| deep red | |  | |  |  |  | 5 |
| **38.** | **(\*)** | **PQ** | **VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: relative area of russet** | |  | |  |  |  |  |
| absent or very small | |  | |  |  | Gold Nijisseiki | 1 |
| small | |  | |  |  |  | 2 |
| medium | |  | |  |  | Chikusui | 3 |
| large | |  | |  |  | Kosui | 4 |
| very large | |  | |  |  | Hosui, Niitaka, Shinko | 5 |
| **39.** | **(\*)** | **PQ** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: color of russet** | |  | |  |  |  |  |
| yellow brown | |  | |  |  | Chikusui | 1 |
| yellowish red brown | |  | |  |  | Hosui, Kosui, Shinko | 2 |
| red brown | |  | |  |  | Chojuro | 3 |
| **40.** | **(\*)** | **QN** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: texture of russet** | |  | |  |  |  |  |
| very smooth | |  | |  |  |  | 1 |
| smooth | |  | |  |  | Shinsui | 2 |
| medium | |  | |  |  | Kosui, Niitaka, Shinko | 3 |
| rough | |  | |  |  | Hosui | 4 |
| very rough | |  | |  |  |  | 5 |
| **41.** | **(\*)** | **QN** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: size of lenticels** | |  | |  |  |  |  |
| small | |  | |  |  | Shinseiki, Yakumo | 1 |
| small to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui, Kosui, Niitaka | 3 |
| medium to large | |  | |  |  |  | 4 |
| large | |  | |  |  | Kimizuka Wase | 5 |
| **42.** | **(\*)** | **QN** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: density of lenticels** | |  | |  |  |  |  |
| very sparse | |  | |  |  |  | 1 |
| sparse | |  | |  |  |  | 2 |
| medium | |  | |  |  | Kosui, Shinko | 3 |
| dense | |  | |  |  | Gold Nijisseiki, Hosui, Niitaka | 4 |
| very dense | |  | |  |  |  | 5 |
| **43.** | **(\*)** | **QN** | **MG/MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: depth of stalk cavity** | |  | |  |  |  |  |
| shallow | |  | |  |  |  | 1 |
| shallow to medium | |  | |  |  | Gold Nijisseiki | 2 |
| medium | |  | |  |  | Kosui | 3 |
| medium to deep | |  | |  |  |  | 4 |
| deep | |  | |  |  |  | 5 |
| **44.** | **(\*)** | **QN** | **MG/MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: depth of calyx basin** | |  | |  |  |  |  |
| shallow | |  | |  |  |  | 1 |
| shallow to medium | |  | |  |  | Aikansui | 2 |
| medium | |  | |  |  | Hosui | 3 |
| medium to deep | |  | |  |  | Shinsui | 4 |
| deep | |  | |  |  |  | 5 |
| **45.** | **(\*)** | **QN** | **MG/MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: width of stalk cavity** | |  | |  |  |  |  |
| narrow | |  | |  |  |  | 1 |
| narrow to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui | 3 |
| medium to broad | |  | |  |  | Shinko | 4 |
| broad | |  | |  |  | Aikansui | 5 |
| **46.** | **(\*)** | **QN** | **MG/MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: width of calyx basin** | |  | |  |  |  |  |
| narrow | |  | |  |  |  | 1 |
| narrow to medium | |  | |  |  | Chikusui | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui | 3 |
| medium to broad | |  | |  |  |  | 4 |
| deep | |  | |  |  | Kosui, Niitaka, Shinsui | 5 |
| **47.** |  | **QN** | **VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: tendency to form fruits with persistent calyx** | |  | |  |  |  |  |
| absent or weak | |  | |  |  | Gold Nijisseiki, Hosui, Kosui | 1 |
| medium | |  | |  |  | Yasato | 2 |
| strong | |  | |  |  | Akizuki | 3 |
| **48.** | **(\*)** | **QN** | **MS/VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: length of stalk** | |  | |  |  |  |  |
| short | |  | |  |  | Chikusui | 1 |
| short to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui, Kosui | 3 |
| medium to long | |  | |  |  |  | 4 |
| long | |  | |  |  | Okusankichi | 5 |
| **49.** | **(\*)** | **QN** | **MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: thickness of stalk** | |  | |  |  |  |  |
| thin | |  | |  |  | Hosui | 1 |
| thin to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Kosui, Niitaka | 3 |
| medium to thick | |  | |  |  |  | 4 |
| thick | |  | |  |  | Gold Nijisseiki | 5 |
| **50.** | **(\*)** | **QL** | **VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: swelling of stalk** | |  | |  |  |  |  |
| absent | |  | |  |  | Hosui, Niitaka, Shinko | 1 |
| present | |  | |  |  | Gold Nijisseiki, Kosui | 9 |
| **51.** | **(\*)** | **PQ** | **VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: shape of core** | |  | |  |  |  |  |
| narrow ovate | |  | |  |  | Yakumo | 1 |
| broad ovate | |  | |  |  | Kosui | 2 |
| narrow spindle-shaped | |  | |  |  | Kumoi | 3 |
| broad spindle-shaped | |  | |  |  | Gold Nijisseiki, Hosui, Niitaka | 4 |
| **52.** | **(\*)** | **QN** | **MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: ratio width of core/diameter of fruit** | |  | |  |  |  |  |
| very small | |  | |  |  |  | 1 |
| small | |  | |  |  | Kosui | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui | 3 |
| large | |  | |  |  | Shinko | 4 |
| very large | |  | |  |  |  | 5 |
| **53.** | **(\*)** | **QL** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: number of locules** | |  | |  |  |  |  |
| only 5 | |  | |  |  | Gold Nijisseiki, Hosui, Niitaka | 1 |
| more than 5 | |  | |  |  | Kosui | 2 |
| **54.** | **(\*)** | **PQ** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: color of flesh** | |  | |  |  |  |  |
| white | |  | |  |  | Hosui, Niitaka | 1 |
| yellowish white | |  | |  |  | Gold Nijisseiki | 2 |
| whitish yellow | |  | |  |  | Shinko | 3 |
| pinkish | |  | |  |  |  | 4 |
| **55.** | **(\*)** | **QN** | **MS/VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: firmness of flesh** | |  | |  |  |  |  |
| soft | |  | |  |  | Gold Nijisseiki, Kosui | 1 |
| soft to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Niitaka | 3 |
| medium to firm | |  | |  |  |  | 4 |
| firm | |  | |  |  | Chojuro | 5 |
| **56.** |  | **QN** | **VG** |  | **(d)** |  |  |  |  |
|  | | **Fruit: texture of flesh** | |  | |  |  |  |  |
| fine | |  | |  |  | Hosui, Kosui | 1 |
| fine to medium | |  | |  |  |  | 2 |
| medium | |  | |  |  | Shinko, Shinsui | 3 |
| medium to coarse | |  | |  |  |  | 4 |
| coarse | |  | |  |  | Chojuro | 5 |
| **57.** |  | **QN** | **MG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: sweetness** | |  | |  |  |  |  |
| very low | |  | |  |  |  | 1 |
| low | |  | |  |  | Kumoi | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Shinko | 3 |
| high | |  | |  |  | Hosui, Shinsui | 4 |
| very high | |  | |  |  |  | 5 |
| **58.** |  | **QN** | **MG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Fruit: acidity** | |  | |  |  |  |  |
| very low | |  | |  |  |  | 1 |
| low | |  | |  |  | Kosui | 2 |
| medium | |  | |  |  | Shinsui | 3 |
| high | |  | |  |  | Hosui | 4 |
| very high | |  | |  |  |  | 5 |
| **59.** |  | **QN** | **MS/VG** |  | **(d)** |  |  |  |  |
|  | | **Seed: size** | |  | |  |  |  |  |
| small | |  | |  |  |  | 1 |
| small to medium | |  | |  |  | Chikusui | 2 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui, Kosui | 3 |
| medium to large | |  | |  |  | Niitaka | 4 |
| large | |  | |  |  |  | 5 |
| **60.** |  | **PQ** | **VG** | **(+)** | **(d)** |  |  |  |  |
|  | | **Seed: shape** | |  | |  |  |  |  |
| broad ovate | |  | |  |  | Gold Nijisseiki, Hosui, Niitaka | 1 |
| narrow ovate | |  | |  |  | Shinko | 2 |
| sickle shaped | |  | |  |  |  | 3 |
| **61.** | **(\*)** | **QN** | **VG** | **(+)** |  |  |  |  |  |
|  | | **Time of beginning of flowering** | |  | |  |  |  |  |
| very early | |  | |  |  |  | 1 |
| very early to early | |  | |  |  |  | 2 |
| early | |  | |  |  | Niitaka | 3 |
| early to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui, Shinsui | 5 |
| medium to late | |  | |  |  |  | 6 |
| late | |  | |  |  | Kosui, Okusankichi | 7 |
| late to very late | |  | |  |  |  | 8 |
| very late | |  | |  |  |  | 9 |
| **62.** | **(\*)** | **QN** | **VG** | **(+)** |  |  |  |  |  |
|  | | **Time for harvest maturity** | |  | |  |  |  |  |
| very early | |  | |  |  |  | 1 |
| very early to early | |  | |  |  | Aikansui | 2 |
| early | |  | |  |  | Shinsui | 3 |
| early to medium | |  | |  |  |  | 4 |
| medium | |  | |  |  | Gold Nijisseiki, Hosui | 5 |
| medium to late | |  | |  |  |  | 6 |
| late | |  | |  |  | Niitaka | 7 |
| late to very late | |  | |  |  | Shinko | 8 |
| very late | |  | |  |  | Okusankichi | 9 |
| **63.** |  | **QL** | **VG** | **(+)** |  |  |  |  |  |
|  | | **Self-compatibility** | |  | |  |  |  |  |
| absent | |  | |  |  | Gold Nijisseiki, Hosui, Kosui, Niitaka | 1 |
| present | |  | |  |  | Osa Gold, Osa Nijisseiki | 9 |
| **64.** |  | **QL** | **VG** | **(+)** |  |  |  |  |  |
|  | | **Resistance to black spot (*Alternaria alternata* Japanese pear pathotype)** | |  | |  |  |  |  |
| absent | |  | |  |  | Nansui, Nijisseiki, Osa Nijisseiki, Shinsui | 1 |
| present | |  | |  |  | Hosui, Kosui, Niitaka | 9 |

# 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) Observations should be made during winter on trees that have fruited at least once.

(b) Observations should be made on fully developed leaves from the middle third of current season shoot.

(c) Observations should be made on fully developed flowers at the beginning of anther dehiscence.

(d) Observations should be made on fruits at harvest maturity.

## 8.2  Explanations for individual characteristics

Ad. 2: Tree: growth habit

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A black tree branch with no leaves  AI-generated content may be incorrect. |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 |
| fastigiate | upright | spreading | drooping | weeping |

Ad. 3: One-year-old shoot: length of internodes

Observation should be made on the middle third of the shoot.

Ad. 9: Vegetative bud: position relative to shoot

|  |  |  |
| --- | --- | --- |
| A black and white drawing of a finger  AI-generated content may be incorrect. |  |  |
| 1 | 2 | 3 |
| adpressed | slightly held out | markedly held out |

Ad. 10: Vegetative bud: shape of apex

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 1 | 2 | 3 |
| pointed | slightly rounded | strongly rounded |

Ad. 18: Leaf blade: incisions of margin

|  |  |  |
| --- | --- | --- |
| A black line with a white background  AI-generated content may be incorrect. |  |  |
| 1 | 2 | 3 |
| serrate | dentate | crenate |

Ad. 24: Petal: shape

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 1 | 2 | 3 |
| elliptic | round | ovate |

Ad. 25: Petal: number of notches on margin

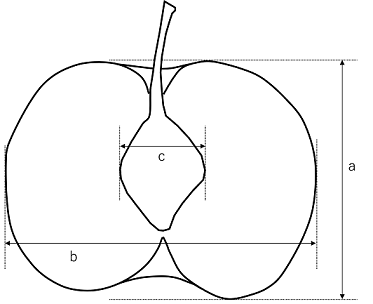
|  |  |  |
| --- | --- | --- |
| A black outline of a fruit  AI-generated content may be incorrect. |  |  |
| 1 | 2 | 3 |
| absent or few | medium | many |

Ad. 27: Anther: intensity of red color

Observations should be made before dehiscence.

Ad. 31: Fruit: height

a= Fruit: height  
b= Fruit: diameter  
a/b= Fruit: ratio height/diameter  
c/b= Fruit: ratio width of core/diameter of fruit



Ad. 32: Fruit: diameter

See Ad. 31

Ad. 33: Fruit: ratio height/diameter

See Ad. 31

Ad. 34: Fruit: shape in lateral view

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  | ←           broadest part        → | | | |  |  | below middle | at middle | above middle | | ratio length/width |  |  |  |  | | high |  |  | 2 narrow elliptic |  | | medium |  |  | 3  broad elliptic |  | |  | 1 ovate | 4 round | 6 obovate | | low |  |  | 5 oblate |  | |

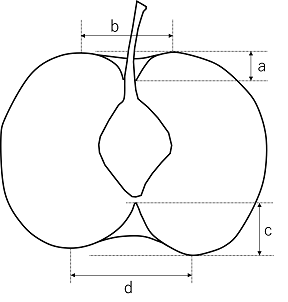
Ad. 38: Fruit: relative area of russet

|  |  |  |
| --- | --- | --- |
| A green apple on a white surface  AI-generated content may be incorrect. |  |  |
| 1 | 2 | 3 |
| absent or small | intermediate | whole surface |

(1) absent or small: The part of the skin that is covered with russet is either not at all or only partially.  
(2) intermediate: Approximately half or more of the skin is covered with russet, but not the entire surface.  
(3) whole surface: The entire surface of the skin is covered with russet.

Ad. 43: Fruit: depth of stalk cavity

a= Fruit: depth of stalk cavity  
b= Fruit: width of stalk cavity  
c= Fruit: depth of calyx basin  
d= Fruit: width of calyx basin



Ad. 44: Fruit: depth of calyx basin

See Ad. 42

Ad. 45: Fruit: width of stalk cavity

See Ad. 42

Ad. 46: Fruit: width of calyx basin

See Ad. 42

Ad. 47: Fruit: tendency to form fruits with persistent calyx

(1) absent or weak: Fruits with persistent calyx are none or very few.  
(2) medium: Fruits with persistent calyx are sometimes present.  
(3) strong: All or most of the fruits have persistent calyx.

Ad. 49: Fruit: thickness of stalk

Observation should be made on the middle of the stalk.

Ad. 50: Fruit: swelling of stalk

Observations should be made on the base of the stalk.

|  |  |
| --- | --- |
| A close up of a stem of an apple  AI-generated content may be incorrect. |  |
| 1 | 9 |
| absent | present |

Ad. 51: Fruit: shape of core

|  |  |  |  |
| --- | --- | --- | --- |
| A drawing of a fruit  AI-generated content may be incorrect. |  |  |  |
| 1 | 2 | 3 | 4 |
| narrow ovate | broad ovate | narrow spindle-shaped | broad spindle-shaped |

Ad. 52: Fruit: ratio width of core/diameter of fruit

See Ad. 31

Ad. 55: Fruit: firmness of flesh

Observation can be made by measurement using penetrometer.

Ad. 57: Fruit: sweetness

Sweetness can be determined by measurement using a refractometer.

Ad. 58: Fruit: acidity

The acidity can be determined by titration, pH meter, or tasting.

Ad. 60: Seed: shape

|  |  |  |
| --- | --- | --- |
| A black background with a black square  AI-generated content may be incorrect. |  |  |
| 1 | 2 | 3 |
| broad ovate | narrow ovate | sickle shaped |

Ad. 61: Time of beginning of flowering

The time of beginning of flowering is reached when 10% of the flowers are fully open.

Ad. 62: Time for harvest maturity

Japanese pear fruits ripen on the tree and do not require post-harvest ripening. The time of harvest maturity is reached when the fruit has reached its optimum flavor.

Ad. 63: Self-compatibility

Many of Japanese pear varieties are self-incompatible, and require artificial pollination with pollen from other varieties.  
Self-compatibility can be determined by the ratio of fruit set by self-pollination.  
Just after opening, the flowers should be self-pollinated artificially, and bagged.  
After 90 days, observe the ratio shown below.  
(Number of fruit set / Number of flowers artificially self-pollinated)  
Self-compatible varieties show a fruiting ratio of 30% or more, and self-incompatible varieties set fruits less than 30%.

Ad. 64: Resistance to black spot (*Alternaria alternata* Japanese pear pathotype)

|  |  |  |
| --- | --- | --- |
| 1. | Pathogen | *Alternaria alternata* Japanese pear pathotype |
| 2. | Quarantine status |  |
| 3. | Host species | Japanese Pear - *Pyrus pyrifolia* (Burm. f.) Nakai var. *culta* (Mak.) Nakai |
| 4. | Source of inoculum | MAFF (JP) |
| 5. | Isolate | (To be added) |
| 6. | Establishment isolate identity | resistant and susceptible controls |
| 7. | Establishment pathogenicity | Test on susceptible plants |
| 8. | Multiplication inoculum |  |
| 8.1 | Multiplication medium | Potato dextrose agar |
| 9. | Format of the test |  |
| 9.1 | Number of plants per genotype | 3 |
| 9.2 | Number of replicates | See 10.4 |
| 9.3 | Control varieties | Susceptible controls: Nansui, Njisseiki, Osa Nijisseiki, Shinsui Resistant controls: Hosui, Niitaka |
| 9.5 | Test facility | Petri dishes in an incubator |
| 9.6 | Temperature | 25°C all day |
| 10. | Inoculation |  |
| 10.2 | Quantification inoculum | 2.5 x 104 spores/ml |
| 10.3 | Plant stage at inoculation | Sampling from the second to the fourth leaf on the shoot towards the base (three leaves) per plant. The first leaf is determined as the leaf that has just unfolded at the top of a new shoot. |
| 10.4 | Inoculation method | Two filter papers are moistened in petri dishes with distilled and sterilized water. Leaf disks are detachedly arranged on the papers. 4-6 drops of the spore suspension (about 40 ul per drop) are placed on each leaf. |
| 10.7 | Final observations | 4 days after inoculation |
| 11. | Observations |  |
| 11.1 | Method | Visual |
| 11.2 | Observation scale | resistant = no symptoms susceptible = necrosis on the marginal zone or whole surface |
| 11.3 | Validation of test | Evaluation of variety resistance should be calibrated with results of resistant and susceptible controls. |
| 12. | Interpretation of data in terms of UPOV characteristic states | Absent (susceptible) [1]  Present (resistant) [9] |

# Literature

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# 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 | *Pyrus pyrifolia* (Burm. f.) Nakai | |  |
|  |  | |  |
| 1.1.2 Common name | Japanese Pear | |  |
| 1.2.1 Botanical name | *Pyrus ussuriensis* Maxim. & Rupr. | |  |
|  |  | |  |
| 1.2.2 Common name | Ussurian Pear | |  |
|  | Hybrids between *Pyrus pyrifolia* and *Pyrus ussuriensis*. | |  |
| 1.3.1 Botanical name |  | |  |
|  |  | |  |
| 1.3.2 Common name |  | |  |
|  | Species (please indicate) | |  |
| 1.4.1 Botanical name |  | |  |
|  |  | |  |
| 1.4.2 Common name |  | |  |
|  |  | |  |
| 2. Applicant | | | |
| Name |  | |  |
|  |  | |  |
| Address |  | |  |
|  |  | |  |
| Telephone No. |  | |  |
|  |  | |  |
| Fax No. |  | |  |
|  |  | |  |
| E-mail address |  | |  |
|  |  | |  |
| Breeder (if different from  applicant) |  | |  |
|  |  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
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|  | | | |
| 3. Proposed denomination and breeder's reference | | | |
| Proposed denomination  (if available) |  | |  |
|  |  | |  |
| Breeder's reference |  | |  |

|  |  |  |
| --- | --- | --- |
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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 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) |

|  |  |  |
| --- | --- | --- |
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|  |
| --- |
| 4.2 Method of propagating the variety  4.2.1 Vegetative propagation  (a) In vitro propagation [ ]  (b) Budding or grafting [ ]  (c) Other (state method) [ ]  4.2.2 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**  **(2)** | **Tree: growth habit** | |  | |  |
|  | fastigiate | |  | | 1 [ ] |
|  | upright | | Shinsui | | 2 [ ] |
|  | spreading | | Niitaka | | 3 [ ] |
|  | drooping | | Chojuro | | 4 [ ] |
|  | weeping | |  | | 5 [ ] |
| **5.2**  **(8)** | **Branch: number of spurs** | |  | |  |
|  | few | | Kosui | | 1 [ ] |
|  | few to medium | |  | | 2 [ ] |
|  | medium | | Hosui | | 3 [ ] |
|  | medium to many | |  | | 4 [ ] |
|  | many | | Gold Nijisseiki, Shinko, Shinsui | | 5 [ ] |
| **5.3**  **(11)** | **One-year-old shoot: number of axillary flower buds** | |  | |  |
|  | very few | |  | | 1 [ ] |
|  | few | | Gold Nijisseiki, Shinsui | | 2 [ ] |
|  | medium | | Kosui, Shinseiki | | 3 [ ] |
|  | many | | Chojuro, Hosui | | 4 [ ] |
|  | very many | |  | | 5 [ ] |
| **5.4**  **(13)** | **Young leaf: color of upper side** | |  | |  |
|  | yellow green | | Chikusui, Shinseiki | | 1 [ ] |
|  | greenish brown | | Yakumo | | 2 [ ] |
|  | brown | | Gold Nijisseiki, Hosui, Kosui | | 3 [ ] |
|  | red brown | | Shinko, Shinsui | | 4 [ ] |
|  |  | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TECHNICAL QUESTIONNAIRE | | Page {x} of {y} | | Reference Number: | |
|  | |  | |  | |
|  | Characteristics | | Example Varieties | | Note |
| **5.5**  **(15)** | **Leaf blade: length** | |  | |  |
|  | very short | |  | | 1 [ ] |
|  | very short to short | |  | | 2 [ ] |
|  | short | | Hosui, Shinsui | | 3 [ ] |
|  | short to medium | |  | | 4 [ ] |
|  | medium | | Gold Nijisseiki, Kosui | | 5 [ ] |
|  | medium to long | |  | | 6 [ ] |
|  | long | |  | | 7 [ ] |
|  | long to very long | |  | | 8 [ ] |
|  | very long | |  | | 9 [ ] |
| **5.6**  **(30)** | **Fruit: weight** | |  | |  |
|  | very low | |  | | 1 [ ] |
|  | very low to low | |  | | 2 [ ] |
|  | low | | Shinsui | | 3 [ ] |
|  | low to medium | |  | | 4 [ ] |
|  | medium | | Chojuro, Gold Nijisseiki, Kosui | | 5 [ ] |
|  | medium to high | |  | | 6 [ ] |
|  | high | | Hosui, Shinko | | 7 [ ] |
|  | high to very high | | Niitaka | | 8 [ ] |
|  | very high | | Atago | | 9 [ ] |
| **5.7**  **(34)** | **Fruit: shape in lateral view** | |  | |  |
|  | ovate | |  | | 1 [ ] |
|  | narrow elliptic | |  | | 2 [ ] |
|  | broad elliptic | | Yakumo | | 3 [ ] |
|  | circular | | Hosui | | 4 [ ] |
|  | oblate | | Shinsui | | 5 [ ] |
|  | obovate | | Yasato | | 6 [ ] |
|  |  | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TECHNICAL QUESTIONNAIRE | | Page {x} of {y} | | Reference Number: | |
|  | |  | |  | |
|  | Characteristics | | Example Varieties | | Note |
| **5.8**  **(35)** | **Fruit: ground color of skin** | |  | |  |
|  | not visible | | Hosui, Niitaka, Shinko | | 1 [ ] |
|  | yellow | |  | | 2 [ ] |
|  | green | |  | | 3 [ ] |
|  | light yellow green | | Yakumo | | 4 [ ] |
|  | dark yellow green | | Gold Nijisseiki | | 5 [ ] |
| **5.9**  **(36)** | **Fruit: relative area of over color** | |  | |  |
|  | absent or very small | |  | | 1 [ ] |
|  | very small to small | |  | | 2 [ ] |
|  | small | |  | | 3 [ ] |
|  | small to medium | |  | | 4 [ ] |
|  | medium | |  | | 5 [ ] |
|  | medium to large | |  | | 6 [ ] |
|  | large | |  | | 7 [ ] |
|  | large to very large | |  | | 8 [ ] |
|  | very large | |  | | 9 [ ] |
| **5.10**  **(37)** | **Fruit: over color** | |  | |  |
|  | orange | |  | | 1 [ ] |
|  | orange red | |  | | 2 [ ] |
|  | pink red | | PremP109 | | 3 [ ] |
|  | light red | |  | | 4 [ ] |
|  | deep red | |  | | 5 [ ] |
| **5.11**  **(38)** | **Fruit: relative area of russet** | |  | |  |
|  | absent or very small | | Gold Nijisseiki | | 1 [ ] |
|  | small | |  | | 2 [ ] |
|  | medium | | Chikusui | | 3 [ ] |
|  | large | | Kosui | | 4 [ ] |
|  | very large | | Hosui, Niitaka, Shinko | | 5 [ ] |
| **5.12**  **(39)** | **Fruit: color of russet** | |  | |  |
|  | yellow brown | | Chikusui | | 1 [ ] |
|  | yellowish red brown | | Hosui, Kosui, Shinko | | 2 [ ] |
|  | red brown | | Chojuro | | 3 [ ] |
|  |  | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
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|  | |  | |  | |
|  | Characteristics | | Example Varieties | | Note |
| **5.13**  **(61)** | **Time of beginning of flowering** | |  | |  |
|  | very early | |  | | 1 [ ] |
|  | very early to early | |  | | 2 [ ] |
|  | early | | Niitaka | | 3 [ ] |
|  | early to medium | |  | | 4 [ ] |
|  | medium | | Gold Nijisseiki, Hosui, Shinsui | | 5 [ ] |
|  | medium to late | |  | | 6 [ ] |
|  | late | | Kosui, Okusankichi | | 7 [ ] |
|  | late to very late | |  | | 8 [ ] |
|  | very late | |  | | 9 [ ] |
| **5.14**  **(62)** | **Time for harvest maturity** | |  | |  |
|  | very early | |  | | 1 [ ] |
|  | very early to early | | Aikansui | | 2 [ ] |
|  | early | | Shinsui | | 3 [ ] |
|  | early to medium | |  | | 4 [ ] |
|  | medium | | Gold Nijisseiki, Hosui | | 5 [ ] |
|  | medium to late | |  | | 6 [ ] |
|  | late | | Niitaka | | 7 [ ] |
|  | late to very late | | Shinko | | 8 [ ] |
|  | very late | | Okusankichi | | 9 [ ] |
| **5.15**  **(63)** | **Self-compatibility** | |  | |  |
|  | absent | | Gold Nijisseiki, Hosui, Kosui, Niitaka | | 1 [ ] |
|  | present | | Osa Gold, Osa Nijisseiki | | 9 [ ] |
|  | not tested | |  | |  |
| **5.16**  **(64)** | **Resistance to black spot (*Alternaria alternata* Japanese pear pathotype)** | |  | |  |
|  | absent | | Nansui, Nijisseiki, Osa Nijisseiki, Shinsui | | 1 [ ] |
|  | present | | Hosui, Kosui, Niitaka | | 9 [ ] |
|  | not tested | |  | |  |
|  |  | |  | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
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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 **similar** variety(ies) | | Describe the expression of the characteristic(s) for **your** candidate variety |
| *Example* | *One-year-old shoot: number of lenticels* | | *few* | | *many* |
|  | | | | | | |
|  | | | | | | |
|  | | | | | | |
| Comments | | | | | | |

|  |  |  |
| --- | --- | --- |
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|  | | | |
| #7. Additional information which may help in the examination of the variety  7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?  Yes [ ] No [ ]  (If yes, please provide details)  7.2 Are there any special conditions for growing the variety or conducting the examination?  Yes [ ] No [ ]  (If yes, please provide details)  7.3 Other information  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.]  -    Pollinizer:     Good pollinizers are the following varieties:  .......................................................................................  absent        present             not tested  -    Self-compatibility (62) [ ] [ ] [ ]   -    Resistance to pests and diseases  absent        present             not tested i) *Erwinia amylovora* [ ] [ ] [ ] ii) *Physalospora piricola* Nose [ ] [ ] [ ] iii) *Phomopsis fukushii* Tanaka et Endo [ ] [ ] [ ] iv) *Corynespora melonis* [ ] [ ] [ ] | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| 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”.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  9.3 Has the plant material to be examined been tested for the presence of virus or other pathogens?  Yes [ ]  (please provide details as specified by the Authority)  No [ ] | | | |
| 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] | | |