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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

STRAWBERRY

UPOV Code(s): FRAGA

Fragaria L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from Germany
to be considered by the
Technical Working Party for Fruit Crops
at its fifty-first session, to be held in Nîmes, France,
from 2020-07-06 to 2020-07-10

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Fragaria L.	Strawberry	Fraisier	Erdbeere	Fresa, Frutilla

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 *Fragaria* L.

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 young plants or seed..

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

Vegetatively propagated varieties: 20 young plants
Seed propagated varieties: sufficient seed to produce 20 plants, or 20 young plants

In the case of seed, the seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority.

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

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

3. Method of Examination

3.1 Number of Growing Cycles

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

3.1.2 The two independent growing cycles should be in the form of two separate plantings.

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

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

3.1.5 The growing cycle is considered to be the period ranging from the beginning of active vegetative growth or flowering, continuing through active vegetative growth or flowering and fruit development and concluding with the harvesting of fruit.

3.1.6 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

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 In the case of vegetatively propagated varieties, each test should be designed to result in a total of at least 20 plants.

3.4.2 In the case of seed-propagated varieties, each test should be designed to result in a total of at least 20 plants.

3.5 Additional Tests

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

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

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

4.1.2 Consistent Differences

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

4.1.3 Clear Differences

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

4.1.4 Number of Plants or Parts of Plants to be Examined

In the case of vegetatively propagated varieties, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observation 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 1.

In the case of seed-propagated varieties, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observation 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 1.

4.1.5 Method of Observation

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

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

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

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

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

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

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

4.2 Uniformity

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

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

4.2.3 The assessment of uniformity for cross-pollinated should be according to the recommendations for cross-pollinated varieties in the General Introduction.

4.2.4 The assessment of uniformity for hybrid varieties depends on the type of hybrid and should be according to the recommendations for hybrid varieties in the General Introduction.

4.2.5 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 20 plants, 1 off-type is allowed.

4.2.6 For the assessment of uniformity of seed-propagated propagated varieties, a relative uniformity standard should be applied.

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) Plant : growth habit (characteristic 1)
(b) Leaf: size (characteristic 7)
(c) Petiole: attitude of hairs (characteristic 17)
(d) Flower: diameter (characteristic 20)
(e) Flower: size of calyx in relation to corolla (characteristic 22)
(f) Petal: color of upper side (characteristic 26)
(g) (Wording amended) Fruit: ratio length / diameter (characteristic 27)
(h) Fruit: size (characteristic 28)
(i) Fruit: shape (characteristic 29)
(j) Fruit: color (characteristic 33)
(k) Fruit: position of achenes (characteristic 35)
(l) Fruit: position of calyx attachment (characteristic 38)
(m) Fruit: attitude of sepals (characteristic 39)
(n) Fruit: diameter of calyx in relation to diameter of fruit (characteristic 40)
(o) Time of beginning of flowering (characteristic 43)
(p) Time of beginning of fruit ripening (characteristic 44)
(q) Flowering runners (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:

State	*Note*
small	3
medium	5
large	7

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

State	*Note*
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

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

7 Not applicable

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*)	**QN VG**	**(+) (a)**				
	Plant: growth habit					
	upright				Darselect, Gorella	1
	upright to semi-upright					2
	semi-upright				Cirafine, Senga Sengana	3
	semi-upright to spreading					4
	spreading				Irvine, Selva, Splendor	5
2.	**QN VG**	**(+) (a)**				
	Plant: density of foliage					
	very sparse					1
	very sparse to sparse					2
	sparse				Elista	3
	sparse to medium				Clery, Sweet Eve	4
	medium				Everest, Florin, Gorella	5
	medium to dense				Gariguette, MA 65	6
	dense				F 62, Yamaska	7
	dense to very dense				Malwina, Pink Extara	8
	very dense				Weitgasserii I Nivális	9
3.	**QN VG**	**(+) (a)**				
	Plant: vigor					
	very weak					1
	very weak to weak					2
	weak				Serenata, Temptation	3
	weak to medium				CIVRI 30	4
	medium				Clery, Everest, Pandora	5
	medium to strong				Korona, Salsa	6
	strong				Florence, Yamaska	7
	strong to very strong				BBB PO 01, Pink Extara	8
	very strong					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4.	**(*)**	**QN VG**	**(b)**				
		Plant: position of inflorescence in relation to foliage					
		clearly beneath				Crusader	1
		slightly beneath					2
		same level				Astino, Cambridge Favourite, Gariguette, Sweet Charlie	3
		slightly above					4
		clearly above				Direktor Paul Wallbaum	5
5.	**(*)**	**QN VG**	**(c)**				
		Plant: number of stolons					
		absent or very few				Rügen, Weitgasserii I Nivális	1
		very few				Gladis, Jive	2
		few				CIVRI 30, Sonata	3
		few to medium				Polka, Symphony	4
		medium				Anabelle, Gorella, Korona, Rubis des Jardins	5
		medium to many				Starlette, Suzana	6
		many				CT 1, Roseta	7
		many to very many				Mietze Nova	8
		very many				BBB PO 01, Pink Extara	9
6.		**QN VG**	**(+) (c)**				
		Stolon: anthocyanin coloration					
		absent or very weak				Suvetar	1
		very weak				Arosa, Faith	2
		weak				Avarosa, Cijosée, Weiße Ananas	3
		weak to medium				Daroyal, Rubis des Jardins	4
		medium				Darselect, Dream, Gorella	5
		medium to strong				Matis	6
		strong				Sans Rivale, Wendy	7
		strong to very strong				Arking, Frel, Pink Extara	8
		very strong					9

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7.	**(*)**	**QN**	**MG/MS/VG**	**(+)**	**(a)**				
		Leaf: size							
		very small							1
		very small to small							2
		small						Frel	3
		small to medium						Sans Rivale, Toscana	4
		medium						Gorella, Korona, Senga Sengana	5
		medium to large						CIR 129, Honeoye	6
		large						Aprica, Darselect	7
		large to very large						Jukhyang	8
		very large							9
8.		**PQ**	**VG**		**(a)**				
		Leaf: color of upper side							
		yellow green							1
		light green							2
		light to medium green							3
		medium green						Camarosa, Darselect, Gorella	4
		medium to dark green							5
		dark green							6
		blue green							7
9.	**(*)**	**QN**	**VG**	**(+)**	**(a)**				
		Leaf: blistering							
		absent or very weak						Anabelle, Bemanil, Marmion	1
		weak						Clery	2
		medium						Cigaline, Everest, Senga Precosa	3
		strong						Cijosée, Jamil, Marie France	4
		very strong							5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10.	**(*)**	**QN VG**	**(a)**				
		Leaf: glossiness					
		absent or weak				Aptos, Bogota, Mrak, Ventana	1
		medium				Darestivale, Irvine	2
		strong				Florence, Malwina, Mara des Bois, Sweet Delight, Tioga	3
11.	**(*)**	**QN MG/MS/VG**	**(a)**				
		Terminal leaflet: ratio length / width					
		low				Siabelle	1
		medium				Chandler, Crusader	2
		high				Elsanta, Monstrose, Redgauntlet	3
		very high				Macherauchs Frühernte	4
12.		**PQ VG**	**(+) (a)**				
		Terminal leaflet: shape of base					
		acute				Gariguette, Gorella, Regina	1
		obtuse				Darselect, Senga Sengana	2
		rounded				Crusader, Florika, Marie France	3
13.		**PQ VG**	**(+) (a)**				
		Terminal leaflet: margin					
		serrate				Gariguette	1
		serrate to crenate					2
		crenate					3
14.		**QN VG**	**(+) (a)**				
		Terminal leaflet: depth of incision of margin					
		very shallow					1
		shallow					2
		medium					3
		deep					4
		very deep					5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15.		**QN VG**	**(+) (a)**				
		Terminal leaflet: shape in cross section					
		concave				Camarosa, Hapil, Ostara, Senga Sengana	1
		straight				Georg Soltwedel, Mara des Bois	2
		convex				Cambridge Favourite, Domanil, Madame Moutot	3
16.		**QN MG/MS/VG**	**(+) (a)**				
		Petiole: length					
		very short					1
		very short to short				Fontaine, Tarpan	2
		short				Frel, Tristan	3
		short to medium				Charlotte, Floriante	4
		medium				Clery, Jana, Sweet Eve	5
		medium to long				Dream, GH 75	6
		long				Sussette, Verity	7
		long to very long				Faith	8
		very long					9
17.	**(*)**	**QN VG**	**(+) (a)**				
		Petiole: attitude of hairs					
		adpressed				Elista, Georg Soltwedel	1
		upwards				Darselect, Elsanta	2
		horizontal				Cambridge Favourite, Clery, Direktor Paul Wallbaum, Gariguette, Mara des Bois	3
		downwards					4
18.		**QN VG**	**(+) (c)**				
		Petiole: leaflets					
		none or short				Portola, Seascape	1
		medium				Camarosa, Diamante, Selva	2
		long				Albion, Endurance, Premier, Valor	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19.		**QN VG**	**(c)**				
		Stipule: anthocyanin coloration					
		absent or very weak				Clery, Senga Sengana	1
		very weak to weak				Verity	2
		weak				Darlisette, Sans Rivale, Vivara	3
		weak to medum				Sussette	4
		medium				Musica	5
		medium to srong				Asia, Malwina, Pink Extara	6
		strong				Darselect, Sonata	7
		strong to very strong				Aramella, Frugodi	8
		very strong					9
20.	**(*)**	**QN MG/VG**	**(b)**				
		Flower: diameter					
		very small					1
		very small to small					2
		small				Rapella, Redgauntlet	3
		small to medium					4
		medium				Gorella, Mara des Bois	5
		medium to large					6
		large				Darselect, Domanil	7
		large to very large					8
		very large					9
21.	**(*)**	**QN VG**	**(+)** **(b)**				
		Flower: arrangement of petals					
		free				Gariguette, Lia	1
		touching				Cijosée, Wendy	2
		overlapping				Faith, Sussette	3
22.	**(*)**	**QN VG**	**(+)** **(b)**				
		Flower: size of calyx in relation to corolla					
		smaller				Arking, Jussara	1
		same size				Filicia, Gladis	2
		larger				Camarosa, Everest, Janiss, Murano	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23.	**(*)**	**QL**	**VG**		**(b)**				
		Flower: stamen							
		absent						Pandora, Yamaska	1
		present						Gariguette	9
24.		**PQ**	**VG**	**(+)**	**(b)**				
		Petal: shape							
		elliptic							1
		circular							2
		ovate							3
25.		**QN**	**MG/VG**		**(b)**				
		Petal: ratio length / width							
		low						Ines, Velvet, Verity	1
		medium						CIR 104, Darselect, Honeoye, Majestic, Osiris	2
		high						Anablanca, BBB PO 01, Ciflorette, Gariguette, Gustine	3
26.	**(*)**	**PQ**	**VG**		**(b)**				
		Petal: color of upper side							
		greenish white							1
		white						Gariguette	2
		light pink						Marajox, Pikan	3
		medium pink						Frel	4
		dark pink						Tarpan	5
		red							6
27.	**(*)**	**QN**	**MG/VG**		**(d)**				
		Fruit: ratio length / diameter							
		very low							1
		low						Lia, Sussette	2
		meduim						Gorella, Honeoye	3
		high						Malling Centenary, Osiris	4
		very high						Brilla, Starlette	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28.	**(*)**	**QN MG/VG**	**(+) (d)**				
		Fruit: size					
		very small				Hansafont	1
		very small to small				Frel, Pink Extara	2
		small				CT 1	3
		small to medium				Julyana, Tarpan	4
		medium				BBB PO 01, Sans Rivale	5
		medium to large				F 62, Finesse, MA 65	6
		large				Altess, Lia	7
		large to very large				NF 633, SG 134	8
		very large				Asia	9
29.	**(*)**	**PQ VG**	**(+) (d)**				
		Fruit: shape					
		reniform				Early Dawn, Favette	1
		conical				Albion, Clery, Everest, Gorella, Matis, Murano, Sweet Charlie	2
		cordate				Direktor Paul Wallbaum	3
		ovoid				Florika, Macherauchs Frühernte	4
		cylindrical (to amend drawing)				Chandler, Marie France	5
		rhomboid				Gariguette, Pantagruella	6
		obloid				Elista	7
		globose				Grande, Madame Moutot	8
		wedged				Camarosa, Georg Soltwedel	9
30.		**QN VG**	**(+)**				
		Fruit: position of maximum diameter					
		strongly towards the calyx					1
		moderately towards the calyx					2
		at middle					3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.		**PQ VG**	**(+) (d)**				
		Fruit: shape of apex					
		truncate					1
		truncate with groove					2
		retuse					3
		rounded					4
		acute					5
32.		**PQ VG**	**(+) (d)**				
		Fruit: shape at calyx end					
		obtuse					1
		rounded					2
		flattened					3
		retuse					4
33.	**(*)**	**PQ VG**	**(+) (d)**				
		Fruit: color					
		whitish				Weiße Ananas	1
		light orange				Merton Dawn	2
		medium orange				Cambridge Favourite	3
		orange red				Gorella	4
		pink				Mannyeonseol	5
		light red					6
		medium red				Elsanta, Royal Sovereign, Sweet Charlie	7
		dark red				Seascape, Senga Sengana	8
		blackish red				Honeoye, Rubina	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
34.		**QN VG**	**(+) (d)**				
		Fruit: width of band without achenes					
		absent or very narrow				CT 1, Drisstrawfive	1
		very narrow to narrow				Altess, Amandine	2
		narrow				Elsanta, Everest, Murano, Pandora, Premy	3
		narrow to medium				CIR 107, Honeoye	4
		medium				Dream, Lorette	5
		medium to broad				Lambada, Romina	6
		broad					7
		broad to very broad				Frugodi, Valotar	8
		very broad					9
35.	**(*)**	**QN VG**	**(+) (d)**				
		Fruit: position of achenes					
		below surface				Albion, Mieze Schindler	1
		level with surface				Malling Centenary, Osiris	2
		above surface				Alice, Frugodi, Toscana, Weitgasserii I Nivális	3
36.		**PQ VG**					
		Fruit: color of achenes on sunny side					
		greenish					1
		yellow					2
		red					3
37.		**QN VG**	**(+) (d)**				
		Fruit: density of achenes					
		sparse					1
		medium					2
		dense					3
38.	**(*)**	**QN VG**	**(+) (d)**				
		Fruit: position of calyx attachment					
		inserted				Finesse	1
		level with fruit				Lia, Murano, Senga Sengana, Sweet Charlie	2
		raised				Asia, Ciflorette, Gariguette	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
39.	**(*)**	**QN VG**	**(+) (d)**				
		Fruit: attitude of sepals					
		upwards				Asia, Gariguette	1
		outwards				Altess, Lia, Osiris	2
		downwards				Pink Extara, Senga Sengana	3
40.	**(*)**	**QN VG**	**(+) (d)**				
		Fruit: diameter of calyx in relation to diameter of fruit					
		much smaller					1
		slightly smaller				Brilla, Lia, Tecla, Vivaldi	2
		same size				Gorella, Laetitia, Senga Sengana, Tenira	3
		slightly larger				Ciflorette, Darselect, Deluxe, Gladis, Linosa	4
		much larger				Rubinociv	5
41.		**PQ VG**	**(+) (d)**				
		Fruit: color of flesh					
		whitish				Madame Moutot, Regina	1
		light pink				Direktor Paul Wallbaum, Senga Precosa	2
		orange red				Elsanta, Talisman	3
		light red				Cambridge Favourite, Ciflorette	4
		medium red				Elista, Gariguette, Murano	5
		dark red				Senga Tigaiga	6
42.		**PQ VG**	**(+) (d)**				
		Fruit: color of core					
		white				Orly	1
		light red				Figaro	2
		medium red				Drisstrawnine, Everest, Marvel	3
		dark red				Malwina	4

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
43.		**QN MG**	**(+)**				
		Time of beginning of flowering					
		very early				Frel, Sans Rivale	1
		very early to early				Avarosa, Murano, Starlette	2
		early				Jussara, MA 65	3
		early to medium				Brilla, Marionnet 97, Verity, Wendy	4
		medium				Gorella, Hansawhite, Osiris	5
		medium to late				Faith, Gladis, Musica	6
		late				F 62, Laetitia	7
		late to very late				Filicia, Sussette	8
		very late				Judibell, Malwina	9
44.		**QN MG**	**(+)**				
		Time of beginning of fruit ripening					
		very early				Flair, Ischia, Sweet Charlie	1
		very early to early				Avarosa, Honeoye, Murano	2
		early				Altess, CF 4402, Deluxe, Verity	3
		early to medium				CF 6821, Gorella, Pink Extara, Senga Sengana	4
		medium				Cupid, Gladis	5
		medium to late				Faith, Laetitia	6
		late				Isaura, Yamaska	7
		late to very late				Sophie, Sussette	8
		very late				Judibell, Laura, Malwina	9
45.	**(*)**	**QL VG**					
		Flowering runners					
		absent				Elsanta	1
		present				Aromas, Cirafine, Florika	9

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

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

(a) Observations on the plant and leaf should be made on plants shortly before the beginning of fruit ripening. Observations on the leaf should be made on fully-developed leaves.

(b) Observations of the inflorescence (including the flower) should be made on plants when they are in full flower. Unless otherwise indicated, observations on the flower should not be made on the terminal flower. In the case of remontant varieties, the characteristics should be observed on the first flush of flowers.

(c) Observations on the stipule and the stolon which should be made after the end of bearing (excluding day-neutral varieties).

(d) Observations on the fruit should not be made on terminal fruits.
(Proposal to add: "...should be made on one-year-old plants when picking ripe.")

8.2 Explanations for individual characteristics

Ad. 1: Plant : growth habit

1
upright

3
semi-upright

5
spreading

Ad. 2: Plant: density of foliage

1
sparse

3
medium

5
dense

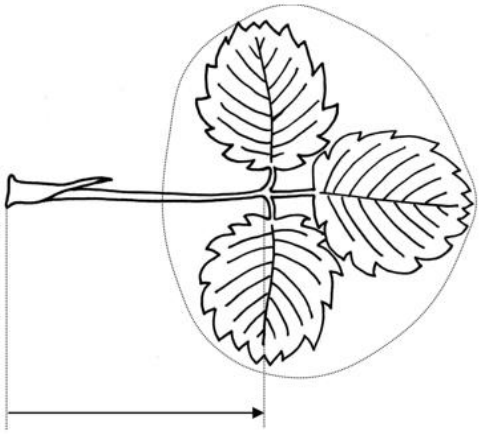
Ad. 3: Plant: vigor

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

Ad. 6: (Stolon: anthocyanin coloration

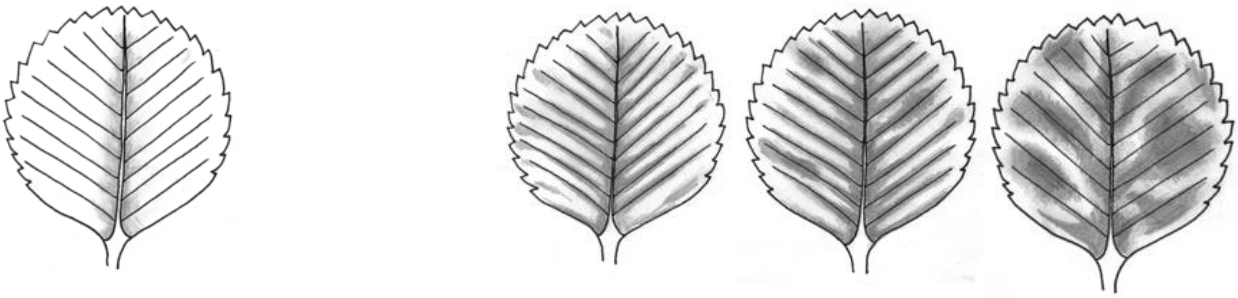
The anthocyanin coloration should be observed on the middle third of the stolon.

Ad. 7: Leaf: size



The size of leaf excludes the petiole an stipules.

Ad. 9: Leaf: blistering



1	2	3	4	5
absent or very weak	weak	medium	strong	very strong

Ad. 12: Terminal leaflet: shape of base

1	2	3
acute	obtuse	rounded

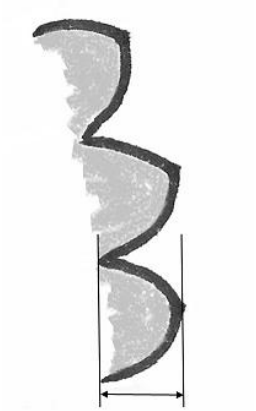
Ad. 13: Terminal leaflet: margin

1
serrate

2
serrate to crenate

3
crenate

Ad. 14: (Consider to reduce to 1-3 scale) Terminal leaflet: depth of incision of margin



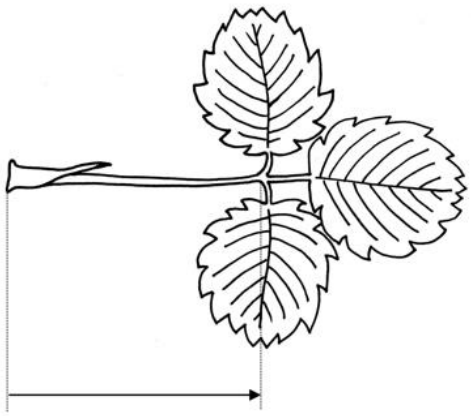
Ad. 15: Terminal leaflet: shape in cross section

1
concave

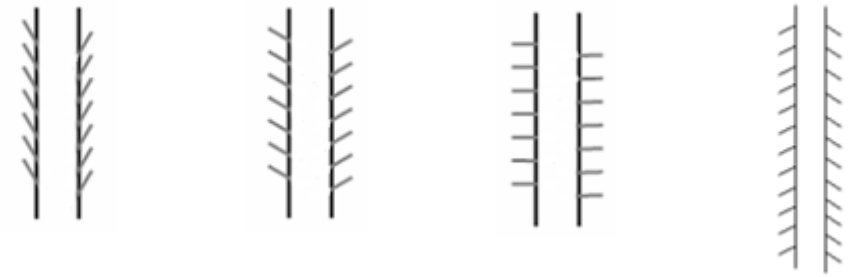
2
straight

3
convex

Ad. 16: Petiole: length

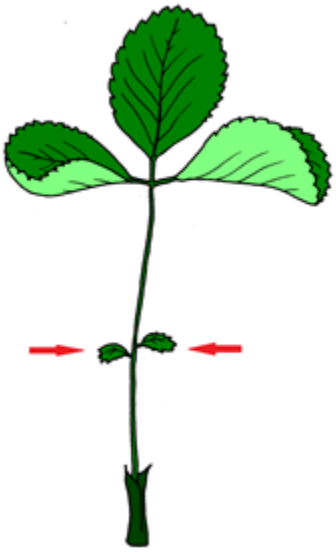


Ad. 17: Petiole: attitude of hairs

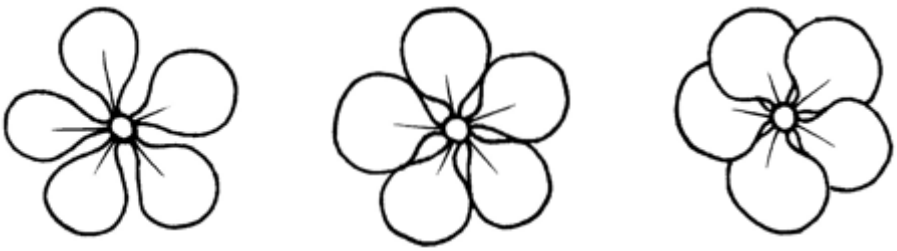


1	2	3	4
upwards	slightly outwards	horizontal	downwards

Ad. 18: Petiole: leaflets



Ad. 21: Flower: arrangement of petals



1	2	3
free	touching	overlapping

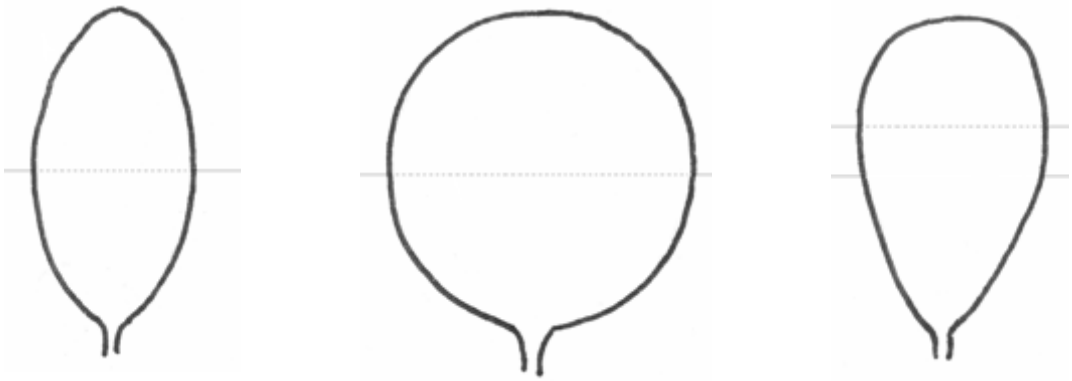
Ad. 22: Flower: size of calyx in relation to corolla

1
smaller

2
same size

3
larger

Ad. 24: Petal: shape



1
elliptial

2
circular

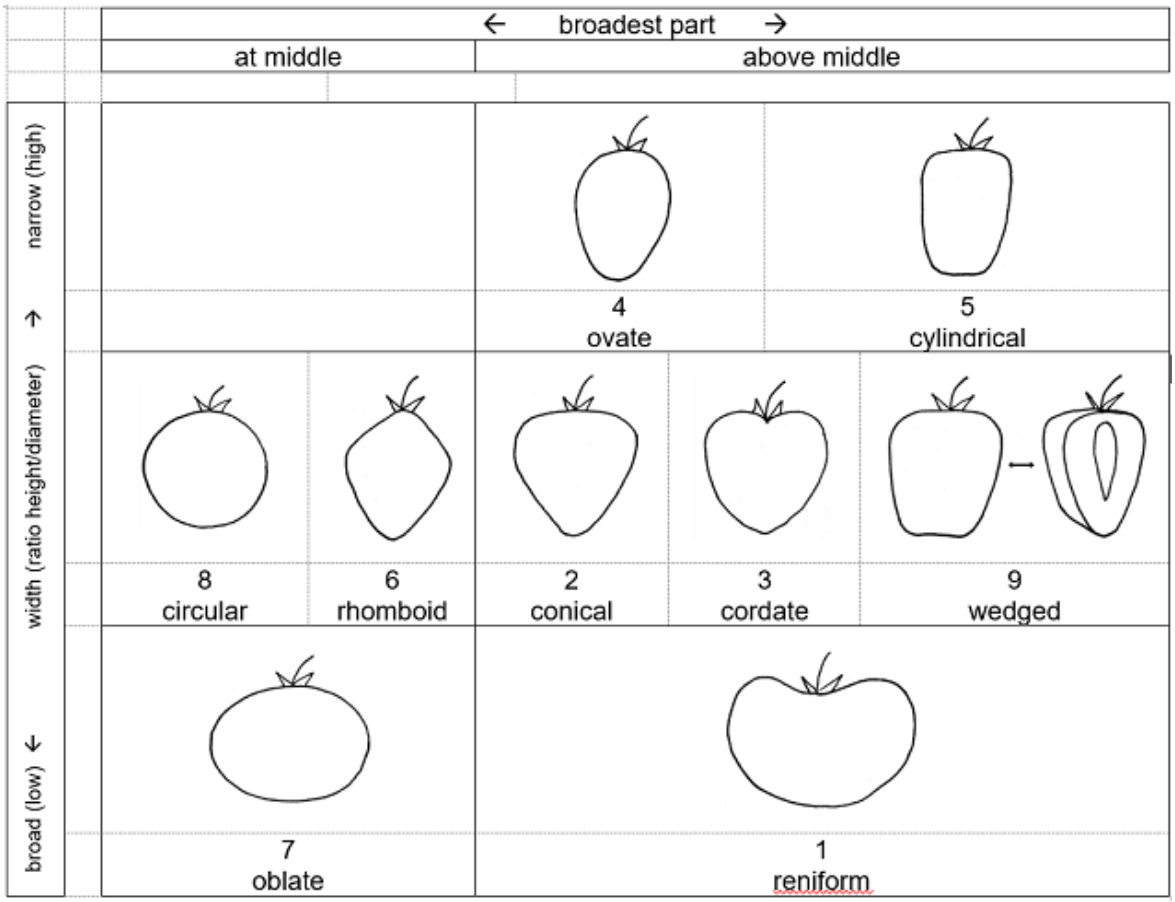
3
ovate

Ad. 28: Fruit: size

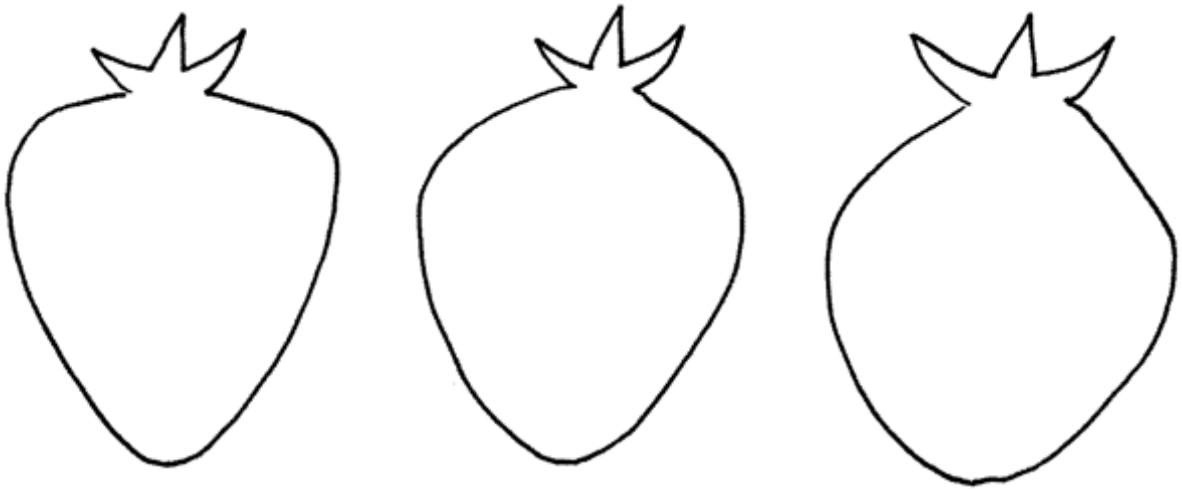
The fruit size is determined visually, or by assessing the fruit weight.

Ad. 29: Fruit: shape

The shape of the fruit is he shape most frequently occurring in the sample.



Ad. 30: Fruit: position of maximum diameter



1
clearly above middle

2
moderately above middle

3
at middle

Ad. 31: Fruit: shape of apex

1	2	3	4	5
truncate	truncate with groove	indented	rounded	acute

Ad. 32: Fruit: shape at calyx end

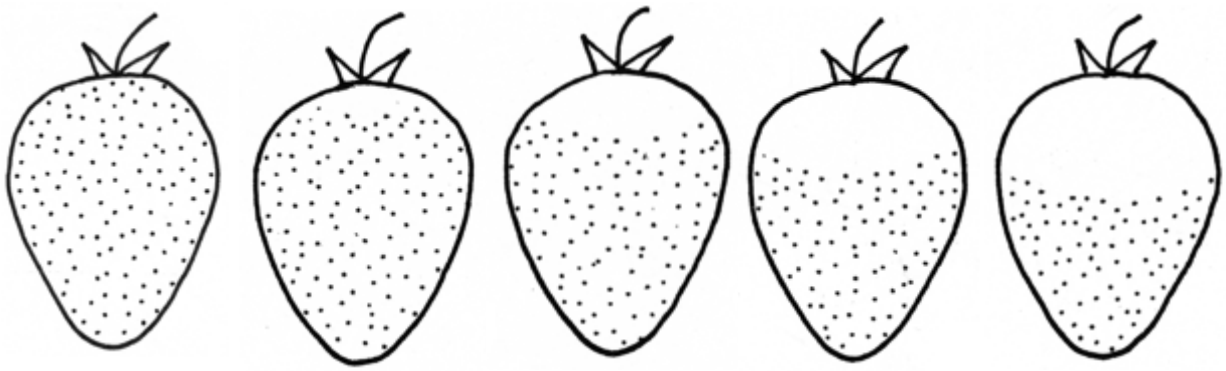
1	2	3	4
obtuse	rounded	flat	indented

Observations should be made excluding the neck.

Ad. 33: Fruit: color

Should be assessed on the side of the fruit which is exposed to the sun.

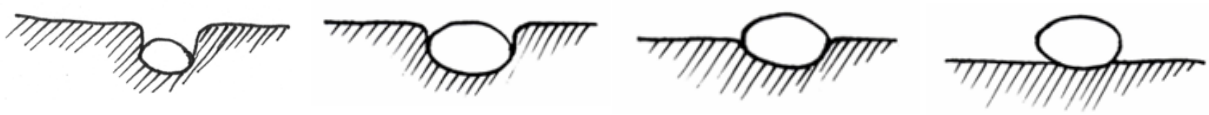
Ad. 34: Fruit: width of band without achenes



1	3	5	7	9
absent or very narrow	narrow	medium	broad	very broad

Ad. 35: Fruit: position of achenes

Should be observed at midlength of fruit surface.



1	2	3	4
strongly below surface	slightly below surface	level with surface	above surface

Ad. 37: Fruit: density of achenes

Should be assessed at midlength of fruit, by counting (in a defined area [e.g. a window of 1 cm^2] or by visual assessment of the density of achenes on the skin.

Ad. 38: Fruit: position of calyx attachment

1
inserted

2
level with fruit

3
raised

Ad. 39: Fruit: attitude of sepals

1
upwards

2
outwards

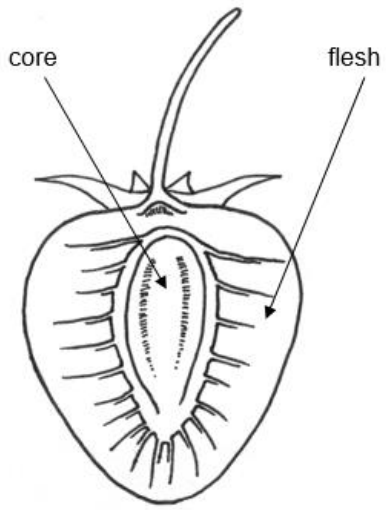
3
downwards

Ad. 40: Fruit: diameter of calyx in relation to diameter of fruit

The diameter of calyx is assessed with the sepals held flat.

Ad. 41: Fruit: color of flesh

Observations should be made excluding the core.



Ad. 42: Fruit: color of core

See Ad. 46

Ad. 43: Time of beginning of flowering

The time of beginning of flowering is when 50% of plants show at least 1 open flower.

Ad. 44: Time of beginning of fruit ripening

The time of beginning of fruit ripening is when 50 % of plants provide of at least one fully colored fruit.

9. Literature

(to be updated:)

Baldini, E., Branzanti, E.C., 1964: Monografia delle principali cultivar di fragola non rifiorenti. Ist, Coltiv. Arboree, Università, Bologna, IT, 240 pp.

Bazzocchi, R., Branzanti, E.C., Cristoferi, G., Rosati, P., 1972: Monografia delle principali cultivar di fragola non rifiorenti, (2°), C.N.R., Bologna, IT, 226 pp.

Brossier, J.-O., 1962: Variétés de fraisiers non remontantes inscrites au catalogue des espèces et variétés, leur détermination et leur description. Institut national de la recherche agronomique (INRA), Paris, FR.

Bundessortenamt (ed.), 1995: Beschreibende Sortenliste Beerenobst. Landbuch Verlag, Hannover, DE, 131 pp.

Centre technique interprofessionnel des fruits et légumes (ed.), 1997: La fraise - Plant et variétés. Paris, FR, 103 pp.

Dale, A.; Luby, J.J., 1990: The strawberry into the 21st century - Proceedings of the Third North American Strawberry Conference. Houston, Texas. Timber Press, Portland, Oregon, US.

Fischer, M., 1995: Farbatlas Obstsorten. Eugen Ulmer Verlag, Stuttgart, DE.

Götz, G., Silbereisen, R., 1989: Obstsorten-Atlas Kernobst, Steinobst, Beerenobst, Schalenobst. Eugen Ulmer GmbH & Co.

Groupe d'Étude de contrôle des variétés et des Semences (GEVES), 2003: Les Variétés de Fraisier - anciennes, actuelles, nouvelles (CD-ROM). La Miniére, FR.

Japan Seed Trade Association, 1978: The report on the characterization and classification of strawberry varieties, Japan Seed Trade Association, Tokyo (by consignment of the MAFF), JP, 20 pp.

Müllier, Bissmann, Poenicke, Rosenthal, Schindler: Deutschlands Obstsorten. Bd. 7, Fachhandel für Gartenbau, Kötzschenbroda-Dresden, Winzerstr. 55, DE.

Naumann, W.-D; Seipp, D.; 1989: Erdbeeren. Ulmer Verlag, Stuttgart, DE, 256 pp.

Sorge, P., 1984: Beerenobstsorten. Neumann Verlag, Leipzig-Radebeul, DE, 259 pp.

10. Technical Questionnaire

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

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 Botanical name	*Fragaria* L.
1.2 Common name	Strawberry

2. Applicant

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

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

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

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

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]

(please state parent variety)

(……..……..…) x (……..……..…)

female parent male parent

(b) partially known cross [ ]

(please state known parent variety(ies))

(……..……..…) x (……..……..…)

female parent male parent

(c) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.4 Other [ ]
(Please provide details)

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

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

4.2 Method of propagating the variety

4.2.1 Other [ ]
(Please provide details)

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

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (1)	**Plant : growth habit**		
	upright	Darselect, Gorella	1 [ ]
	upright to semi-upright		2 [ ]
	semi-upright	Cirafine, Senga Sengana	3 [ ]
	semi-upright to spreading		4 [ ]
	spreading	Irvine, Selva, Splendor	5 [ ]
5.2 (7)	**Leaf: size**		
	very small		1 [ ]
	very small to small		2 [ ]
	small	Frel	3 [ ]
	small to medium	Sans Rivale, Toscana	4 [ ]
	medium	Gorella, Korona, Senga Sengana	5 [ ]
	medium to large	CIR 129, Honeoye	6 [ ]
	large	Aprica, Darselect	7 [ ]
	large to very large	Jukhyang	8 [ ]
	very large		9 [ ]
5.3 (17)	**Petiole: attitude of hairs**		
	adpressed	Elista, Georg Soltwedel	1 [ ]
	upwards	Darselect, Elsanta	2 [ ]
	horizontal	Cambridge Favourite, Clery, Direktor Paul Wallbaum, Gariguette, Mara des Bois	3 [ ]
	downwards		4 [ ]

	Characteristics	Example Varieties	Note
5.4 (20)	**Flower: diameter**		
	very small		1 [ ]
	very small to small		2 [ ]
	small	Rapella, Redgauntlet	3 [ ]
	small to medium		4 [ ]
	medium	Gorella, Mara des Bois	5 [ ]
	medium to large		6 [ ]
	large	Darselect, Domanil	7 [ ]
	large to very large		8 [ ]
	very large		9 [ ]
5.5 (22)	**Flower: size of calyx in relation to corolla**		
	smaller	Arking, Jussara	1 [ ]
	same size	Filicia, Gladis	2 [ ]
	larger	Camarosa, Everest, Janiss, Murano	3 [ ]
5.6 (26)	**Petal: color of upper side**		
	greenish white		1 [ ]
	white	Gariguette	2 [ ]
	light pink	Marajox, Pikan	3 [ ]
	medium pink	Frel	4 [ ]
	dark pink	Tarpan	5 [ ]
	red		6 [ ]
5.7 (27)	**Fruit: ratio length / diameter**		
	very low		1 [ ]
	low	Lia, Sussette	2 [ ]
	meduim	Gorella, Honeoye	3 [ ]
	high	Malling Centenary, Osiris	4 [ ]
	very high	Brilla, Starlette	5 [ ]

	Characteristics	Example Varieties	Note
5.8 (28)	**Fruit: size**		
	very small	Hansafont	1 [ ]
	very small to small	Frel, Pink Extara	2 [ ]
	small	CT 1	3 [ ]
	small to medium	Julyana, Tarpan	4 [ ]
	medium	BBB PO 01, Sans Rivale	5 [ ]
	medium to large	F 62, Finesse, MA 65	6 [ ]
	large	Altess, Lia	7 [ ]
	large to very large	NF 633, SG 134	8 [ ]
	very large	Asia	9 [ ]
5.9 (29)	**Fruit: shape**		
	reniform	Early Dawn, Favette	1 [ ]
	conical	Albion, Clery, Everest, Gorella, Matis, Murano, Sweet Charlie	2 [ ]
	cordate	Direktor Paul Wallbaum	3 [ ]
	ovoid	Florika, Macherauchs Frühernte	4 [ ]
	cylindrical (to amend drawing)	Chandler, Marie France	5 [ ]
	rhomboid	Gariguette, Pantagruella	6 [ ]
	obloid	Elista	7 [ ]
	globose	Grande, Madame Moutot	8 [ ]
	wedged	Camarosa, Georg Soltwedel	9 [ ]
5.10 (33)	**Fruit: color**		
	whitish	Weiße Ananas	1 [ ]
	light orange	Merton Dawn	2 [ ]
	medium orange	Cambridge Favourite	3 [ ]
	orange red	Gorella	4 [ ]
	pink	Mannyeonseol	5 [ ]
	light red		6 [ ]
	medium red	Elsanta, Royal Sovereign, Sweet Charlie	7 [ ]
	dark red	Seascape, Senga Sengana	8 [ ]
	blackish red	Honeoye, Rubina	9 [ ]
5.11 (35)	**Fruit: position of achenes**		
	below surface	Albion, Mieze Schindler	1 [ ]
	level with surface	Malling Centenary, Osiris	2 [ ]
	above surface	Alice, Frugodi, Toscana, Weitgasserii I Nivális	3 [ ]

	Characteristics	Example Varieties	Note
5.12 (38)	**Fruit: position of calyx attachment**		
	inserted	Finesse	1 [ ]
	level with fruit	Lia, Murano, Senga Sengana, Sweet Charlie	2 [ ]
	raised	Asia, Ciflorette, Gariguette	3 [ ]
5.13 (39)	**Fruit: attitude of sepals**		
	upwards	Asia, Gariguette	1 [ ]
	outwards	Altess, Lia, Osiris	2 [ ]
	downwards	Pink Extara, Senga Sengana	3 [ ]
5.14 (40)	**Fruit: diameter of calyx in relation to diameter of fruit**		
	much smaller		1 [ ]
	slightly smaller	Brilla, Lia, Tecla, Vivaldi	2 [ ]
	same size	Gorella, Laetitia, Senga Sengana, Tenira	3 [ ]
	slightly larger	Ciflorette, Darselect, Deluxe, Gladis, Linosa	4 [ ]
	much larger	Rubinociv	5 [ ]
5.15 (43)	**Time of beginning of flowering**		
	very early	Frel, Sans Rivale	1 [ ]
	very early to early	Avarosa, Murano, Starlette	2 [ ]
	early	Jussara, MA 65	3 [ ]
	early to medium	Brilla, Marionnet 97, Verity, Wendy	4 [ ]
	medium	Gorella, Hansawhite, Osiris	5 [ ]
	medium to late	Faith, Gladis, Musica	6 [ ]
	late	F 62, Laetitia	7 [ ]
	late to very late	Filicia, Sussette	8 [ ]
	very late	Judibell, Malwina	9 [ ]
5.16 (44)	**Time of beginning of fruit ripening**		
	very early	Flair, Ischia, Sweet Charlie	1 [ ]
	very early to early	Avarosa, Honeoye, Murano	2 [ ]
	early	Altess, CF 4402, Deluxe, Verity	3 [ ]
	early to medium	CF 6821, Gorella, Pink Extara, Senga Sengana	4 [ ]
	medium	Cupid, Gladis	5 [ ]
	medium to late	Faith, Laetitia	6 [ ]
	late	Isaura, Yamaska	7 [ ]
	late to very late	Sophie, Sussette	8 [ ]
	very late	Judibell, Laura, Malwina	9 [ ]

	Characteristics	Example Varieties	Note
5.17 (45)	**Flowering runners**		
	absent	Elsanta	1 [ ]
	present	Aromas, Cirafine, Florika	9 [ ]
5.18	**Remonting ability**		
	not remontant	Cambridge Favourite, Gariguette	1 [ ]
	partially remontant	Redgauntlet	2 [ ]
	fully remontant	Brighton, Cirafine, Mara des Bois	3 [ ]
	day neutral	Florika	4 [ ]

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

6. Similar varieties and differences from these varieties

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

Denomination(s) of variety(ies) similar to your	Characteristic(s) in which your candidate variety differs	Describe the expression of the characteristic(s) for the	Describe the expression of the characteristic(s) for **your**
Example			

Comments:

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

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

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

Yes [ ] No [ ]

(If yes, please provide details)

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

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

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

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

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

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

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

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

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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]