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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-third session, to be held virtually,
from 2022-07-11 to 2022-07-15

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 raised from seed.

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 a single or two separate plantings.

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

3.1.4 The growing cycle is considered to be the 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.

3.1.5 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

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

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

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 8 plants or parts of plants taken from each of 8 plants and any other observations made on all plants in the test, disregarding any off-type plants.

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 and seed-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.

4.3 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 19)
(e) Flower: size of calyx in relation to corolla (characteristic 21)
(f) Petal: color of upper side (characteristic 25)
(g) Fruit: length in relation to diameter (characteristic 26)
(h) Fruit: size (characteristic 27)
(i) Fruit: shape (characteristic 28)
(j) Fruit: color (characteristic 32)
(k) Fruit: position of achenes (characteristic 34)
(l) Fruit: position of calyx attachment (characteristic 37)
(m) Fruit: attitude of sepals (characteristic 38)
(n) Fruit: diameter of calyx in relation to diameter of fruit (characteristic 39)
(o) Time of beginning of flowering (characteristic 42)
(p) Time of beginning of fruit ripening (characteristic 43)
(q) Flowering runners (characteristic 44)

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

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

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

6.1.2 Asterisked Characteristics

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

6.2 States of Expression and Corresponding Notes

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

6.2.2 All relevant states of expression are presented in the characteristic.

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

6.3 Types of Expression

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

6.4 Example Varieties

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

6.5 Legend

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

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

5 (+) See Explanations on the Table of Characteristics in Chapter 8.2

6 (a)-(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				Vibrant	1
		upright to semi-upright				Korona	2
		semi-upright				Senga Sengana	3
		semi-upright to spreading				Weiße Ananas	4
		spreading				Lucida Perfecta	5
2.		**QN** **VG**	**(+)** **(a)**				
		Plant: density of foliage					
		very sparse					1
		very sparse to sparse					2
		sparse				Elista, Pantagruella	3
		sparse to medium				Cirafine, Elvira, Seascape, Sweet Eve	4
		medium				Everest, Florin, Gorella	5
		medium to dense				Darselect, Dream, Florence, MA 65	6
		dense				Sans Rivale, Yamaska	7
		dense to very dense				Fontaine, Pink Extara	8
		very dense				Alexandria	9
3.		**QN** **VG**	**(+)** **(a)**				
		Plant: vigor					
		very weak					1
		very weak to weak				Yael	2
		weak				Serenata, Temptation	3
		weak to medium				CIVRI 30, Drisstrawfive	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				Schwarze Hubertus	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					
		strongly beneath				Lucia	1
		slightly beneath				Senga Sengana	2
		same level				Korona	3
		slightly above				Daroyal	4
		strongly above				Vibrant	5
5.		**QN VG**	**(c)**				
		Plant: number of stolons					
		absent or very few				Durban, Leo Alba, Rügen	1
		very few				Everest, Loran	2
		few				Bolero, Sonata	3
		few to medium				Malling Sunrise, Marionnet 97	4
		medium				Altess, Amandine, NF 633, Vivaldi	5
		medium to many				Ranaissance, Starlette	6
		many				Roseta	7
		many to very many				Mieze Nova	8
		very many				BBB PO 01	9
6.		**QN VG**	**(+)** **(c)**				
		Stolon: intensity of anthocyanin coloration					
		absent or very weak				Leo Alba	1
		weak				Alice, BBB PO 01, Florence, Salsa	2
		medium				Albion, Charlotte, Darselect	3
		strong				Candiss, Wendy	4
		very strong					5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7.	**(*)**	**QN**	**MG/VG**	**(+)**	**(a)**				
		Leaf: size							
		very small							1
		very small to small							2
		small						Fontaine	3
		small to medium						Sans Rivale, Toscana	4
		medium						Gorella, Korona, Senga Sengana	5
		medium to large						Elsanta, Honeoye, Salsa	6
		large						Aprica, Darselect	7
		large to very large						Merkur, Ramir	8
		very large							9
8.		**PQ**	**VG**		**(a)**				
		Leaf: color of upper side							
		yellow green							1
		light green						Junita	2
		medium green						Dream, Malling Centenary	3
		dark green						Marionnet 99, Mieze Schindler	4
		blue green						Mount Everest	5
9.	**(*)**	**QN**	**VG**	**(+)**	**(a)**				
		Leaf: rugosity							
		absent or very weak						Anablanca, Florence, Yamaska	1
		weak						Clery	2
		medium						Cigaline, Everest	3
		strong						Cijosée	4
		very strong						Bogota, Romina, Symphony	5
10	**(*)**	**QN**	**VG**	**(+)**	**(a)**				
		Leaf: glossiness							
		absent or weak						Bogota, White Dream	1
		medium						Irvine, Kamila, Marionnet 86	2
		strong						Aramella, Florence, Sweet Delight, Verity, Vivara	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11	**(*)**	**QN MG/VG**	**(a)**				
		Terminal leaflet: length in relation to width					
		shorter than broad					1
		as short as broad				Cirano, Everest, Salsa	2
		longer than broad				Elsanta, Korona, Symphony	3
		much longer than broad				Anablanca, Cigaline	4
12		**PQ VG**	**(+) (a)**				
		Terminal leaflet: shape of base					
		acute				Aramella	1
		obtuse				Cirano, Verity	2
		rounded				NF 421	3
13		**PQ VG**	**(+) (a)**				
		Terminal leaflet: margin					
		serrate				Chandler, Elsanta, Gariguette, Yamaska	1
		serrate to crenate				Altess, Amandine, Pandora	2
		crenate				Cambridge Favourite, Everest	3
14		**QN VG**	**(+) (a)**				
		Terminal leaflet: depth of incision of margin					
		very shallow				Weiße Ananas	1
		shallow				Senga Sengana	2
		medium				Symphony	3
		deep				Polka	4
		very deep				Cigaline	5
15		**QN VG**	**(+) (a)**				
		Terminal leaflet: shape in cross section					
		concave				MA 65, Malwina, Verity	1
		straight				Aramella, Cigaline	2
		convex				Cirano	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16		**QN MG/VG**	**(+) (a)**				
		Petiole: length					
		very short					1
		very short to short				Fontaine	2
		short				Rosa Perle, Tristan	3
		short to medium				Floriante	4
		medium				Everest, Favori	5
		medium to long				GH 75	6
		long				Malwina	7
		long to very long				Faith	8
		very long					9
17	**(*)**	**QN VG**	**(+) (a)**				
		Petiole: attitude of hairs					
		adpressed				Elianny, Vivara	1
		upwards				Darselect, Elsanta	2
		outwards				Albion, Filicia, Malwina	3
		downwards				to be provided	4
18		**QN VG**	**(b)**				
		Stipule: intensity of anthocyanin coloration					
		absent or very weak				Clery, Hansawhit, Lucida Perfecta, Senga Sengana	1
		weak				Camarosa, Darlisette, Korona, Lambada	2
		medium				Anablanca, Cambridge Favourite, Elsanta, Musica	3
		strong				Darselect, Sonata	4
		very strong				Frugodi	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19	**(*)**	**QN MG/VG**	**(c)**				
		Flower: diameter					
		very small					1
		very small to small				Fontaine	2
		small				Darestivale, Sans Rivale	3
		small to medium				Majestic, Mara des Bois, Senga Sengana, Yamaska	4
		medium				Bogota, Elsanta, Everest, Korona	5
		medium to large				Camarosa, Chandler, Darselect	6
		large				Cambridge Favourite, Ines	7
		large to very large					8
		very large				SG 0203	9
20	**(*)**	**QN VG**	**(+)** **(c)**				
		Flower: arrangement of petals					
		free				Gariguette, Lia	1
		touching				Cijosée, Wendy	2
		overlapping				Gladis, Malling Centenary, Marionnet 86	3
21	**(*)**	**QN VG**	**(+)** **(c)**				
		Flower: size of calyx in relation to corolla					
		smaller				Jussara, Toscana	1
		same size				Filicia, Gladis	2
		larger				Camarosa, Candiss, Everest	3
22	**(*)**	**QL VG**	**(c)**				
		Flower: stamen					
		absent				Pandora, Yamaska	1
		present				Gariguette	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23		**PQ VG**	**(+) (c)**				
		Petal: shape					
		elliptic				Gariguette	1
		circular				Daroyal, Darselect, Weiße Ananas	2
		transverse elliptic				Ines, Portola	3
		ovate				BBB PO 01, Elsanta	4
24		**QN MG/VG**	**(c)**				
		Petal: ratio length / width					
		low (or: shorter than wide)				Ines, Verity	1
		medium (or: as long as wide)				CIR 104, Darselect, Honeoye, Majestic, Osiris	2
		high (or: longer than wide)				Anablanca, BBB PO 01, Ciflorette, Gariguette, Gustine	3
25	**(*)**	**PQ VG**	**(c)**				
		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
26	**(*)**	**QN MG/VG**	**(d)**				
		Fruit: length in relation to diameter					
		very low				Mieze Schindler	1
		low				Lia, Sussette	2
		medium				Gorella, Honeoye	3
		high				Malling Centenary, Osiris	4
		very high				Pantagruella	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27	**(*)**	**QN MG/VG**	**(+) (d)**				
		Fruit: size					
		very small				Rosa Perle, Ulrichsburg	1
		very small to small				Fontaine	2
		small				abz v 32, Linne	3
		small to medium				Toscana, Weiße Ananas	4
		medium				BBB PO 01, Sans Rivale	5
		medium to large				Finesse, MA 65	6
		large				Altess, Lia	7
		large to very large				Albion, Verity	8
		very large					9
28	**(*)**	**PQ VG**	**(+) (d)**				
		Fruit: shape					
		reniform				Jumbo	1
		conical				Albion, Clery, Everest, Matis, Murano, Sweet Charlie	2
		cordate				Malling Champion	3
		ovate				Quarantaine de Prin	4
		oblong					5
		rhombic				Lumotar	6
		oblate				BBB PO 01	7
		circular				Florika	8
		wedged				Konia	9
29		**QN VG**	**(+)**				
		Fruit: position of maximum diameter					
		strongly towards the calyx				Symphony	1
		moderately towards the calyx				Senga Sengana	2
		at middle				Florika, Weiße Ananas	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30		**PQ**	**VG**	**(+)**	**(d)**				
		Fruit: shape of apex							
		truncate							1
		truncate with groove						Camarosa	2
		retuse						Zanta	3
		rounded						Korona, Weiße Ananas	4
		acute							5
31		**PQ**	**VG**	**(+)**	**(d)**				
		Fruit: shape at calyx end							
		obtuse						NF 421	1
		rounded						Florence	2
		flattened						Malwina, Symphony	3
		retuse						Elegance	4
32	**(*)**	**PQ**	**VG**	**(+)**	**(d)**				
		Fruit: color							
		pinkish white						Weiße Ananas	1
		yellowish white						Lucida Perfecta	2
		light orange						Merton Dawn	3
		medium orange						Cambridge Favourite	4
		orange red						Gorella	5
		pink							6
		light red							7
		medium red						Elsanta, Royal Sovereign, Sweet Charlie	8
		dark red						Honeoye, Seascape, Senga Sengana	9
		blackish red						Arista	10

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33		**QN VG**	**(+) (d)**				
		Fruit: width of band without achenes					
		absent or very narrow				Drisstrawfive, Fontaine	1
		very narrow to narrow				Altess, Amandine, Verity	2
		narrow				Elsanta, Everest, Murano, Pandora	3
		narrow to medium				CIR 107, Honeoye, Ines	4
		medium				Dream, Lorette, Salsa	5
		medium to broad				Romina, Yamaska	6
		broad				Frugodi, Valotar	7
		broad to very broad					8
		very broad					9
34	**(*)**	**QN VG**	**(+) (d)**				
		Fruit: position of achenes					
		strongly below surface				Mieze Schindler	1
		slightly below surface				Albion, Kimberley	2
		level with surface				Malling Centenary, Osiris	3
		above surface				Alice, Frugodi, Toscana	4
35		**PQ VG**	**(+)**				
		Fruit: color of achenes					
		greenish				Lucy	1
		yellow				Candiss	2
		red				Weiße Ananas	3
36		**QN MG/VG**	**(+) (d)**				
		Fruit: density of achenes					
		sparse					1
		medium				Elegance, Evita, Red Glory	2
		dense				Lucy, NF 205	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
37	**(*)**	**QN**	**VG**	**(+)**	**(d)**				
		Fruit: position of calyx attachment							
		inserted						Finesse	1
		level with fruit						Lia, Murano, Senga Sengana, Sweet Charlie	2
		raised						Ciflorette, Gariguette, NF 421	3
38	**(*)**	**QN**	**VG**	**(+)**	**(d)**				
		Fruit: attitude of sepals							
		upwards						Gariguette	1
		outwards						Altess, Lia, Osiris	2
		downwards						Pink Extara	3
39	**(*)**	**QN**	**VG**	**(+)**	**(d)**				
		Fruit: diameter of calyx in relation to diameter of fruit							
		much smaller						ct/bb xov170002	1
		slightly smaller						Lia, Tecla, Vivaldi	2
		same size						Avarosa, Candiss, Cirano, Cupid, Daroyal	3
		slightly larger						Gladis, Murano	4
		much larger						ASF 2021, FF 1604	5
40		**PQ**	**VG**	**(+)**	**(d)**				
		Fruit: color of flesh							
		whitish						Anablanca, BBB PO 01, Fontaine	1
		light pink						Jukhyang	2
		orange red						Elegance	3
		light red						Majestic	4
		medium red						Aprica, Malling Sunrise, NF 421	5
		dark red						Cijosée, Daroyal	6

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41		**PQ VG**	**(+) (d)**				
		Fruit: color of core					
		white				BBB PO 01, Pink Extara	1
		light red				Elegance, Figaro, Toscana	2
		medium red				Avarosa, Gladis, Murano	3
		dark red				Malwina	4
42	**(*)**	**QN MG**	**(+)**				
		Time of beginning of flowering					
		very early				Lorette	1
		very early to early				Avarosa, Murano, Starlette	2
		early				Anabelle, Camarillo, Charlotte	3
		early to medium				Evie 3, Sweet Eve	4
		medium				Gorella, Hansawhit, Osiris, Velvet	5
		medium to late				Avamaria, Driscoll Jubilee	6
		late				Laetitia, Rinia	7
		late to very late				Filicia, Finesse, Florin, Sussette	8
		very late				Judibell, Malwina	9
43	**(*)**	**QN MG**	**(+)**				
		Time of beginning of fruit ripening					
		very early				Flair, Lorette, Sweet Charlie	1
		very early to early				Avarosa, Honeoye, Julyana, Murano	2
		early				Altess, CF 4402, Deluxe, Drisstrawfive, Floriante, Verity	3
		early to medium				CF 6821, Cirafine, Evita, Gorella, Pink Extara, Senga Sengana	4
		medium				Cijosée, Cupid, Gladis, Malling Opal, Velvet	5
		medium to late				Bolero, Faith, Laetitia, Marionnet 100	6
		late				Flamenco, Yamaska	7
		late to very late				Finesse, Seascape, Sophie, Sussette	8
		very late				GH 75, Judibell, Malwina	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
44	**(*)**	**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 should be made after the end of bearing. In case of day-neutral varieties the observations should be carried out at the same time, at the end of bearing of the non-remonting varieties.

(d) Observations on the fruit should not be made on terminal fruits 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

3
sparse

5
medium

7
dense

Ad. 3: Plant: vigor

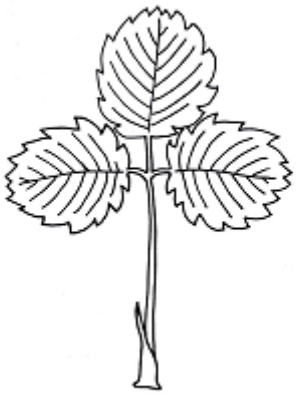
The plant vigor should be considered as the overall abundance of vegetative growth. In particular it is related to height and diameter of the plant.

Ad. 6: Stolon: intensity of anthocyanin coloration

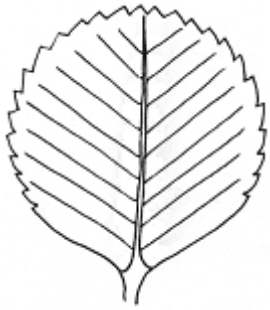
The anthocyanin coloration should be observed on the middle third of the stolon.

Ad. 7: Leaf: size

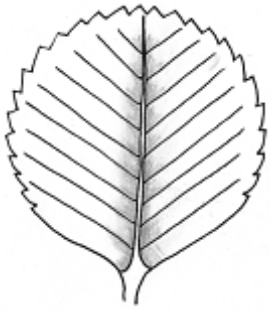
The size of leaf excludes the petiole and stipules.



Ad. 9: Leaf: rugosity



1
absent or very weak



2
weak

3
medium

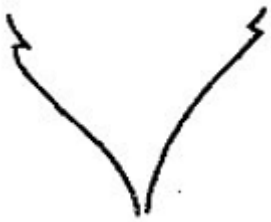
4
strong

5
very strong

Ad. 10: Leaf: glossiness

Observations should be made on the upper side of the leaf.

Ad. 12: Terminal leaflet: shape of base



1
acute

2
obtuse

3
rounded

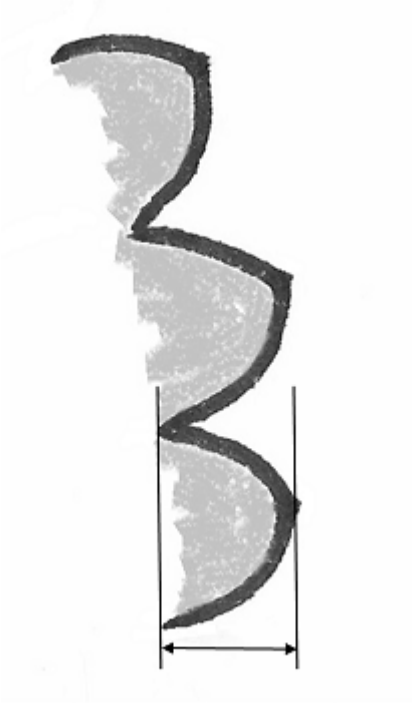
Ad. 13: Terminal leaflet: margin

1
serrate

2
serrate to crenate

3
crenate

Ad. 14: Terminal leaflet: depth of incision of margin



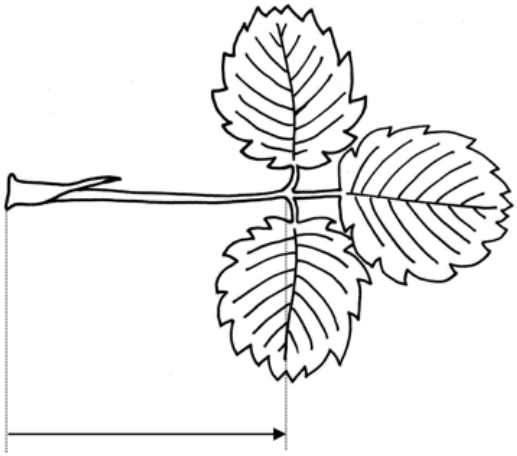
Ad. 15: Terminal leaflet: shape in cross section

1
concave

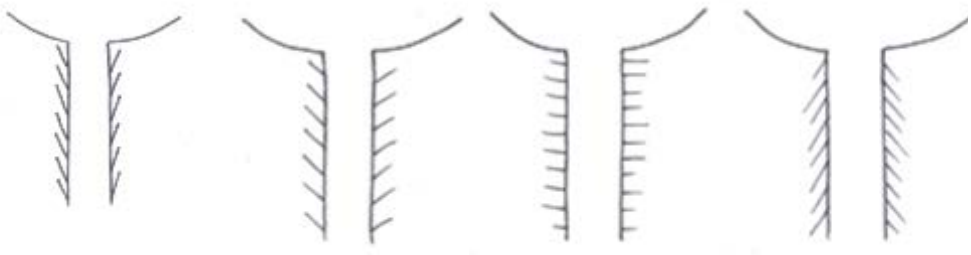
2
straight

3
convex

Ad. 16: Petiole: length

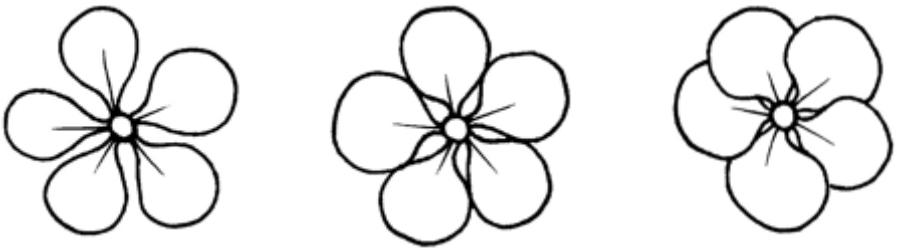


Ad. 17: Petiole: attitude of hairs



1	2	3	4
adpressed	upwards	outwards	downwards

Ad. 20: Flower: arrangement of petals

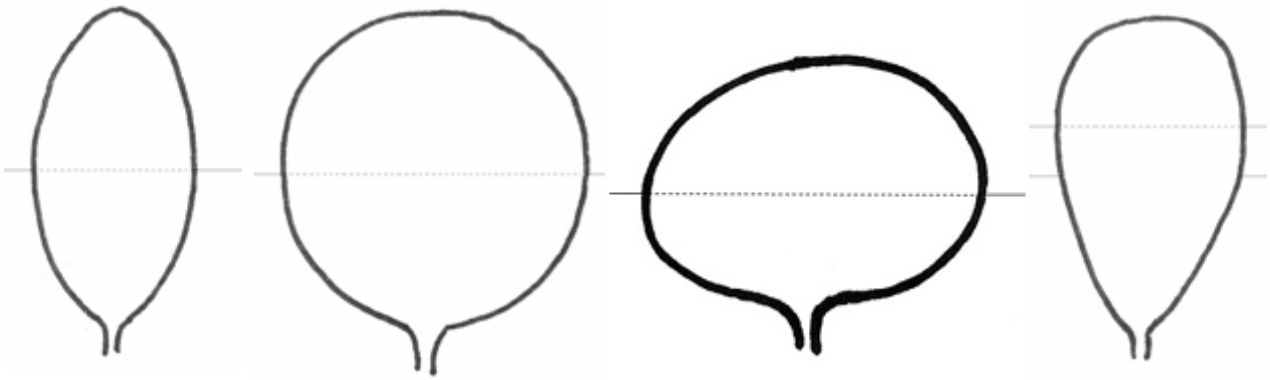


1	2	3
free	touching	overlapping

Ad. 21: Flower: size of calyx in relation to corolla

1	2	3
smaller	same size	larger

Ad. 23: Petal: shape



1
elliptic

2
circular

3
transverse elliptic

4
ovate

Ad. 27: Fruit: size

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

Ad. 28: Fruit: shape

1
reniform

2
conical

3
cordate

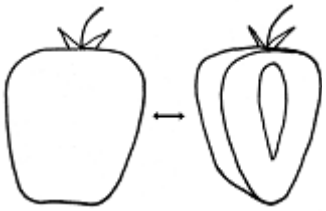
4
ovate

5
oblong

6
rhombic

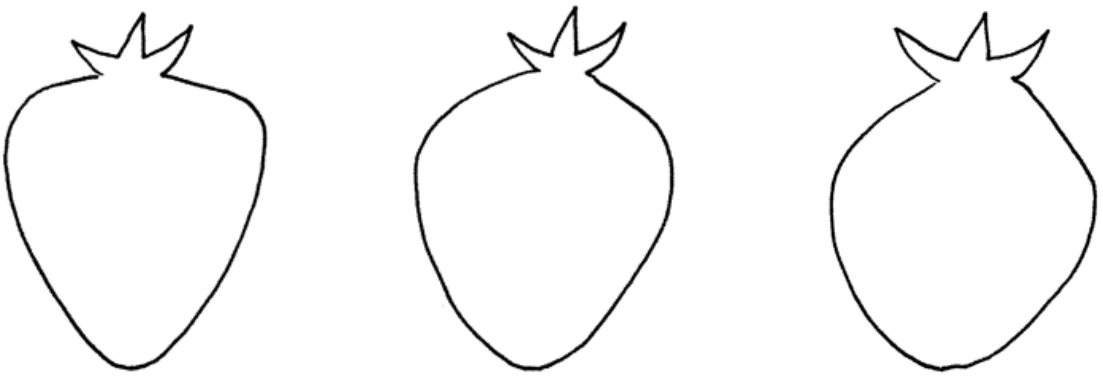
7
oblate

8
circular



9
wedged

Ad. 29: Fruit: position of maximum diameter



1
strongly towards the calyx

2
moderately towards the calyx

3
at middle

Ad. 30: Fruit: shape of apex

1
truncate

2
truncate with groove

3
retuse

4
rounded

5
acute

Ad. 31: Fruit: shape at calyx end

1
obtuse

2
rounded

3
flattened

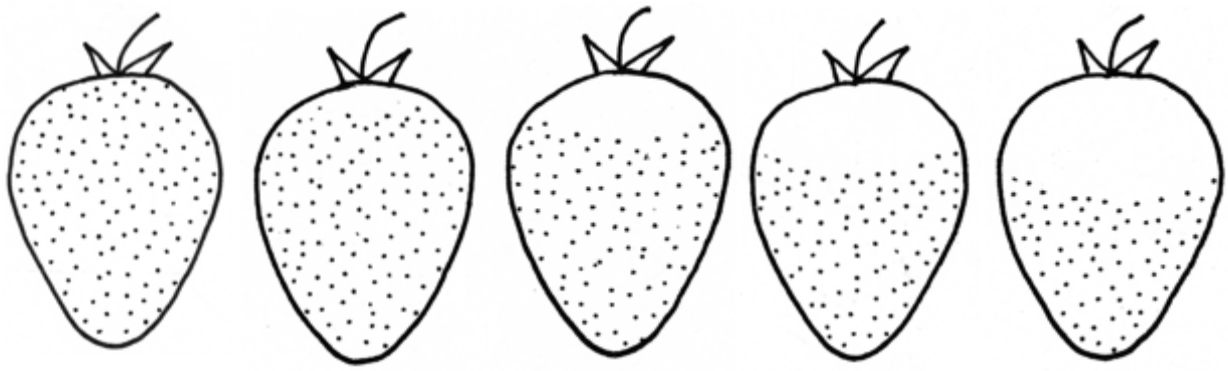
4
retuse

Observations should be made excluding the neck.

Ad. 32: Fruit: color

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

Ad. 33: Fruit: width of band without achenes



1
absent or very narrow

3
narrow

5
medium

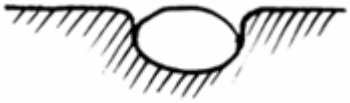
7
broad

9
very broad

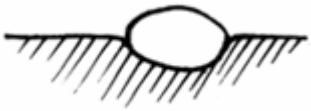
Ad. 34: Fruit: position of achenes

Should be observed at midlength of fruit surface.

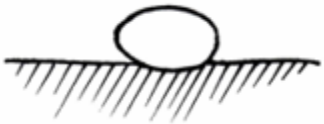
1
strongly below surface



2
slightly below surface



3
level with surface



4
above surface

Ad. 35: Fruit: color of achenes

The color of the achenes should be observed at the sunny side of the fruit.

Ad. 36: 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. 37: Fruit: position of calyx attachment

1
inserted

2
level with fruit

3
raised

Ad. 38: Fruit: attitude of sepals

1
upwards

2
outwards

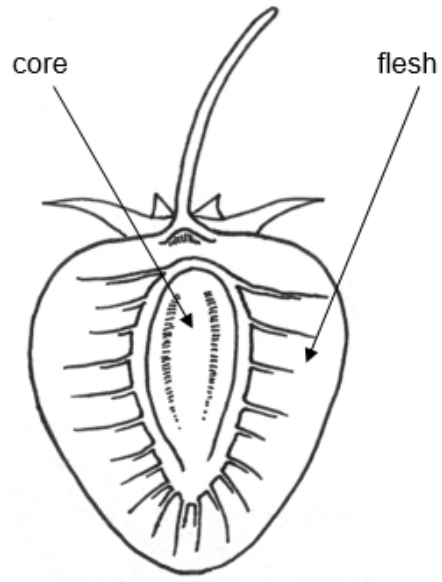
3
downwards

Ad. 39: Fruit: diameter of calyx in relation to diameter of fruit

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

Ad. 40: Fruit: color of flesh

Observations should be made excluding the core.



Ad. 41: Fruit: color of core

See Ad. 40.

Ad. 42: Time of beginning of flowering

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

Ad. 43: 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

Bundessortenamt (ed.), 2015: Beschreibende Sortenliste Erdbeeren. Landbuch Verlag, Hannover, DE, 128 pp.

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

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

Istituto Sperimentale per la Frutticoltura, 2002: Monografia di cultivar di fragola, Roma, 291 pp.

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.

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 Vegetative propagation

(a) *In vitro* propagation [ ]
(b) runners [ ]
(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 (1)	**Plant : growth habit**		
	upright	Vibrant	1 [ ]
	upright to semi-upright	Korona	2 [ ]
	semi-upright	Senga Sengana	3 [ ]
	semi-upright to spreading	Weiße Ananas	4 [ ]
	spreading	Lucida Perfecta	5 [ ]
5.2 (7)	**Leaf: size**		
	very small		1 [ ]
	very small to small		2 [ ]
	small	Fontaine	3 [ ]
	small to medium	Sans Rivale, Toscana	4 [ ]
	medium	Gorella, Korona, Senga Sengana	5 [ ]
	medium to large	Elsanta, Honeoye, Salsa	6 [ ]
	large	Aprica, Darselect	7 [ ]
	large to very large	Merkur, Ramir	8 [ ]
	very large		9 [ ]
5.3 (17)	**Petiole: attitude of hairs**		
	adpressed	Elianny, Vivara	1 [ ]
	upwards	Darselect, Elsanta	2 [ ]
	outwards	Albion, Filicia, Malwina	3 [ ]
	downwards	to be provided	4 [ ]

	Characteristics	Example Varieties	Note
5.4 (19)	**Flower: diameter**		
	very small		1 [ ]
	very small to small	Fontaine	2 [ ]
	small	Darestivale, Sans Rivale	3 [ ]
	small to medium	Majestic, Mara des Bois, Senga Sengana, Yamaska	4 [ ]
	medium	Bogota, Elsanta, Everest, Korona	5 [ ]
	medium to large	Camarosa, Chandler, Darselect	6 [ ]
	large	Cambridge Favourite, Ines	7 [ ]
	large to very large		8 [ ]
	very large	SG 0203	9 [ ]
5.5 (21)	**Flower: size of calyx in relation to corolla**		
	smaller	Jussara, Toscana	1 [ ]
	same size	Filicia, Gladis	2 [ ]
	larger	Camarosa, Candiss, Everest	3 [ ]
5.6 (25)	**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 (26)	**Fruit: length in relation to diameter**		
	very low	Mieze Schindler	1 [ ]
	low	Lia, Sussette	2 [ ]
	medium	Gorella, Honeoye	3 [ ]
	high	Malling Centenary, Osiris	4 [ ]
	very high	Pantagruella	5 [ ]

	Characteristics	Example Varieties	Note
5.8 (27)	**Fruit: size**		
	very small	Rosa Perle, Ulrichsburg	1 [ ]
	very small to small	Fontaine	2 [ ]
	small	abz v 32, Linne	3 [ ]
	small to medium	Toscana, Weiße Ananas	4 [ ]
	medium	BBB PO 01, Sans Rivale	5 [ ]
	medium to large	Finesse, MA 65	6 [ ]
	large	Altess, Lia	7 [ ]
	large to very large	Albion, Verity	8 [ ]
	very large		9 [ ]
5.9 (28)	**Fruit: shape**		
	reniform	Jumbo	1 [ ]
	conical	Albion, Clery, Everest, Matis, Murano, Sweet Charlie	2 [ ]
	cordate	Malling Champion	3 [ ]
	ovate	Quarantaine de Prin	4 [ ]
	oblong		5 [ ]
	rhombic	Lumotar	6 [ ]
	oblate	BBB PO 01	7 [ ]
	circular	Florika	8 [ ]
	wedged	Konia	9 [ ]
5.10 (32)	**Fruit: color**		
	pinkish white	Weiße Ananas	1 [ ]
	yellowish white	Lucida Perfecta	2 [ ]
	light orange	Merton Dawn	3 [ ]
	medium orange	Cambridge Favourite	4 [ ]
	orange red	Gorella	5 [ ]
	pink		6 [ ]
	light red		7 [ ]
	medium red	Elsanta, Royal Sovereign, Sweet Charlie	8 [ ]
	dark red	Honeoye, Seascape, Senga Sengana	9 [ ]
	blackish red	Arista	10 [ ]

	Characteristics	Example Varieties	Note
5.11 (34)	**Fruit: position of achenes**		
	strongly below surface	Mieze Schindler	1 [ ]
	slightly below surface	Albion, Kimberley	2 [ ]
	level with surface	Malling Centenary, Osiris	3 [ ]
	above surface	Alice, Frugodi, Toscana	4 [ ]
5.12 (37)	**Fruit: position of calyx attachment**		
	inserted	Finesse	1 [ ]
	level with fruit	Lia, Murano, Senga Sengana, Sweet Charlie	2 [ ]
	raised	Ciflorette, Gariguette, NF 421	3 [ ]
5.13 (38)	**Fruit: attitude of sepals**		
	upwards	Gariguette	1 [ ]
	outwards	Altess, Lia, Osiris	2 [ ]
	downwards	Pink Extara	3 [ ]
5.14 (39)	**Fruit: diameter of calyx in relation to diameter of fruit**		
	much smaller	ct/bb xov170002	1 [ ]
	slightly smaller	Lia, Tecla, Vivaldi	2 [ ]
	same size	Avarosa, Candiss, Cirano, Cupid, Daroyal	3 [ ]
	slightly larger	Gladis, Murano	4 [ ]
	much larger	ASF 2021, FF 1604	5 [ ]
5.15 (42)	**Time of beginning of flowering**		
	very early	Lorette	1 [ ]
	very early to early	Avarosa, Murano, Starlette	2 [ ]
	early	Anabelle, Camarillo, Charlotte	3 [ ]
	early to medium	Evie 3, Sweet Eve	4 [ ]
	medium	Gorella, Hansawhit, Osiris, Velvet	5 [ ]
	medium to late	Avamaria, Driscoll Jubilee	6 [ ]
	late	Laetitia, Rinia	7 [ ]
	late to very late	Filicia, Finesse, Florin, Sussette	8 [ ]
	very late	Judibell, Malwina	9 [ ]

	Characteristics	Example Varieties	Note
5.16 (43)	**Time of beginning of fruit ripening**		
	very early	Flair, Lorette, Sweet Charlie	1 [ ]
	very early to early	Avarosa, Honeoye, Julyana, Murano	2 [ ]
	early	Altess, CF 4402, Deluxe, Drisstrawfive, Floriante, Verity	3 [ ]
	early to medium	CF 6821, Cirafine, Evita, Gorella, Pink Extara, Senga Sengana	4 [ ]
	medium	Cijosée, Cupid, Gladis, Malling Opal, Velvet	5 [ ]
	medium to late	Bolero, Faith, Laetitia, Marionnet 100	6 [ ]
	late	Flamenco, Yamaska	7 [ ]
	late to very late	Finesse, Seascape, Sophie, Sussette	8 [ ]
	very late	GH 75, Judibell, Malwina	9 [ ]
5.17 (44)	**Flowering runners**		
	absent	Elsanta	1 [ ]
	present	Aromas, Cirafine, Florika	9 [ ]

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

6. Similar varieties and differences from these varieties

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

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Fruit: color of flesh*	*orange red*	*dark red*

Comments:

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

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

[#]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.]

Additional information on the bearing type.

The variety is

not remontant [ ]

partially remontant [ ]

fully remontant [ ]

under the following growing conditions:

- temperature _____ °C
- day length _____ h

Additional information on chilliing requirements

- Indicate the minimum number of chilling hours:
_____ hours

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

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

8. Authorization for release

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

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

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

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

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

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

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

Please provide details for where you have indicated “yes”.

.....

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]