E

TG/12/9 Rev. 2
ORIGINAL: English
DATE: 2005-04-06 + 2012-03-28 + 2015-03-25

UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

[*]

FRENCH BEAN

UPOV code: PHASE_VUL

Phaseolus vulgaris L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative Names:[*]

Botanical name	*English*	*French*	*German*	*Spanish*
Phaseolus vulgaris L.	French Bean	Haricot	Gartenbohne	Judía común, Alubia

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.]

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Phaseolus vulgaris* 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 seed.

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

1.5 kg or 15,000 seeds.

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should, be stated by the applicant.

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

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

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

3.3 Conditions for Conducting the Examination

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 The recommended method of observing the characteristic is indicated by the following key in the second column of the Table 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

3.4 Test Design

3.4.1 For dwarf beans, each test should be designed to result in a total of at least 150 plants, which should be divided between two or more replicates.

3.4.2 For climbing beans, each test should be designed to result in a total of at least 60 plants, which should be divided between two or more replicates.

3.5 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations should be made on 20 plants or parts taken from each of 20 plants.

3.6 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.

4.2 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 For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 60 plants, 2 off-types are allowed. In the case of a sample size of 150 plants, 4 off-types are allowed.

4.3 Stability

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

4.3.2 Where appropriate, or in cases of doubt, stability may be tested, either by growing a further generation, or by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the previous 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 type (characteristic 3)
(b) Flower: color of standard (characteristic 16)
(c) Pod: shape in cross section (through seed) (characteristic 22)
(d) Pod: ground color (characteristic 24)
(e) Pod: stringiness of ventral suture (characteristic 29)
(f) Seed: number of colors (characteristic 43)
(g) Seed: main color (largest area) (characteristic 44)
(h) Seed: secondary color (characteristic 45)
(i) Resistance to *Bean common mosaic necrosis virus* (BCMNV) (characteristic 50)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

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

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.

6.3 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

(*) Asterisked characteristic

QL Qualitative characteristic
QN Quantitative characteristic
PQ Pseudo-qualitative characteristic

MG: single measurement of a group of plants or parts of plants – see Chapter 3.3.2
MS: measurement of a number of individual plants or parts of plants – see Chapter 3.3.2
VG: visual assessment by a single observation of a group of plants or parts of plants – see Chapter 3.3.2
VS: visual assessment by observation of individual plants or parts of plants – see Chapter 3.3.2

(+) See Explanations on the Table of Characteristics in Chapter 8.

(C)/(D) Growth type of example variety: C = climbing variety
D = dwarf variety.

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

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1.	**VG**	**Plant: anthocyanin coloration of hypocotyl**	**Plante: pigmentation anthocyanique de l'hypocotyle**	**Pflanze: Anthocyan-färbung des Hypokotyls**	**Planta: pigmentación antociánica del hipocótilo**		
QL		absent	absente	fehlend	ausente	Tuf (D)	1
		present	présente	vorhanden	presente	Delinel (D), Vilbel (D)	9
2.	**VG**	**Plant: intensity of anthocyanin coloration of hypocotyl**	**Plante: intensité de la pigmentation anthocyanique de l'hypocotyle**	**Pflanze: Intensität der Anthocyanfärbung des Hypokotyls**	**Planta: intensidad de la pigmentación antociánica del hipocótilo**		
QN		weak	faible	gering	débil	Kentucky Wonder (C)	3
		medium	moyenne	mittel	media	Haibushi (C)	5
		strong	forte	stark	fuerte	Kurokinugasa (C)	7
3. (*)	**VG**	**Plant: growth type**	**Plante: type de croissance**	**Pflanze: Wuchstyp**	**Planta: tipo de crecimiento**		
QL		dwarf	nain	Buschform	mata baja	Callide (D), Capitole (D)	1
		climbing	à rames	Stangenform	de enrame	Phenomene (C), Bacle (C)	2
4.	**VG**	**Climbing beans only: Plant: architecture**	**Haricot à rames seulement: Plante: architecture**	**Nur Stangenbohnen: Pflanze: Wuchsform**	**Sólo varieadades de enrame: Planta: forma**		
QL		pyramidal	pyramidale	pyramidenförmig	piramidal	Haricot maïs (C)	1
		rectangular	rectangulaire	rechteckig	rectangular	Hilda (C)	2
5.	**VG**	**Dwarf beans only: Plant: type**	**Haricot nain seulement: Plante: type**	**Nur Buschbohnen: Pflanze: Typ**	**Sólo variadades de mata baja: Planta: tipo**		
PQ		non-trailing	non grimpant	keine Ausläufer bildend	no rastrero	Callide (D), Capitole (D)	1
		trailing	grimpant	Ausläufer bildend	rastrero	Great Northern (D), Felspar (D), Spinel (D)	2

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
6.	**MG/ MS/ VG**	**Dwarf beans only: Plant: height**	**Haricot nain seulement: Plante: hauteur**	**Nur Buschbohnen: Pflanze: Höhe**	**Sólo variadades de mata baja: Planta: altura**		
QN		short	petite	niedrig	baja	Goldfish (D)	3
		medium	moyenne	mittel	media	Fori (D)	5
		tall	grande	hoch	alta	Nerina (D), Rote von Paris (D)	7
7.	**MG/ VG**	**Climbing beans only Plant: start of climbing (80% of plants)**	**Haricot à rames seulement: Plante: précocité d'enroulement (80% des plantes)**	**Nur Stangenbohnen: Pflanze: Rankbeginn (80 % der Pflanzen)**	**Sólo variadades de enrame: Planta: época en que empieza a trepar (80% de las plantas)**		
QN		early	précoce	früh	temprana	Perle von Marbach (C)	3
		medium	moyenne	mittel	media	Trebona (C)	5
		late	tardive	spät	tardía	Record (C)	7
8. **(+)**	**VG**	**Climbing beans only: Plant: speed of climbing**	**Haricot à rames seulement: Plante: vitesse de croissance**	**Nur Stangenbohnen: Pflanze: Geschwindigkeit des Emporrankens**	**Sólo variadades de enrame: Planta: velocidad a la que trepa**		
QN		slow	lente	langsam	lenta		3
		medium	moyenne	mittel	media	Meicy (C)	5
		fast	rapide	schnell	rápida	Perle von Marbach (C)	7
9. **(*)**	**VG**	**Leaf: intensity of green color**	**Feuille: intensité de couleur verte**	**Blatt: Intensität der Grünfärbung**	**Hoja: intensidad del color verde**		
QN	**(a)**	very light	très claire	sehr hell	muy clara		1
		light	claire	hell	clara	Goldelfe (C), Rote von Paris (D)	3
		medium	moyenne	mittel	media	Fori (D), Valja (D)	5
		dark	foncée	dunkel	oscura	Dubra (D), Goldfish (D), Silvia (C)	7
		very dark	très foncée	sehr dunkel	muy oscura	Diva (D)	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
10.	**VG**	**Leaf: rugosity**	**Feuille: rugosité**	**Blatt: Wölbung zwischen den Nerven**	**Hoja: rugosidad**		
QN	**(a)**	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	IPR Gruana (C), IPR Uirapuru (C) ,	
		weak	faible	gering	débil	Goldfish (D), Groffy (D), Record (C), Valja (D)	3
		medium	moyenne	mittel	media	Butterzart (D), Filetty (D), Fori (D), Neckarkönigin (C)	5
		strong	forte	stark	fuerte	Loma (D)	7
		very strong	très forte	sehr stark	muy fuerte	Brede Z.dr (D)	9
11.	**VG**	**Terminal leaflet: size**	**Foliole terminale: taille**	**Endblattfieder: Größe**	**Folíolo terminal: tamaño**		
QN	**(a)**	small	petite	klein	pequeño	Goldfish (D)	3
		medium	moyenne	mittel	medio	Prelude (D)	5
		large	grande	groß	grande	Facta (D), Longking (D), Rote von Paris (D)	7
12. **(+)**	**VG**	**Terminal leaflet: shape**	**Foliole terminale: forme**	**Endblattfieder: Form**	**Folíolo terminal: forma**		
PQ	**(a)**	triangular	triangulaire	dreieckig	triangular	Aber (D), Candide (D)	1
		triangular to circular	triangulaire à circulaire	dreieckig bis rundlich	triangular a circular	Facta (D)	2
		circular	circulaire	rund	circular	Acarli (D), Felix (D), Niver (D)	3
		circular to rhombic	circulaire à losangique	rund bis rautenförmig	circular a rómbica	Calas (D), Capitole (D), Dorabel (D)	4
		rhombic	losangique	rautenförmig	rómbica	Ace (D), Carlyn (D), Madrigal (D)	5

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
13. **(+)**	**VG**	**Terminal leaflet: length of tip**	**Foliole terminale: longueur du sommet**	**Endblattfieder: Länge der Spitze**	**Folíolo terminal: longitud del ápice**		
QN	**(a)**	short	court	kurz	corto		1
		medium	moyen	mittel	medio	Goldfish (D), Tuf (D)	2
		long	long	lang	largo	Flo (D), Nerina (D), Prelude (D)	3
14.	**VG**	**Dwarf beans only: Inflorescences: position (at full flowering)**	**Haricot nain seulement: Inflorescences: position (à pleine floraison)**	**Nur Buschbohnen: Blütenstände: Sitz (in voller Blüte)**	**Sólo variedades de mata baja: Inflorescencias: ubicación (en plena floración)**		
QN		predominantly in foliage	principalement dans le feuillage	vorwiegend im Laub	predominantemente en el follaje	Ryco (D)	1
		intermediate	intermédiaire	intermediär	intermedio	Tuf (D), Valja (D)	2
		predominantly above foliage	principalement au-dessus du feuillage	vorwiegend über dem Laub	predominantemente por encima del follaje	Daisy (D), Goldetta (D),	3
15.	**VG**	**Flower: size of bracts**	**Fleur: taille des bractées florales**	**Blüte: Größe der Brakteen**	**Flor: tamaño de las bracteas**		
QN		small	petites	klein	pequeño	Fanion (D), Fidel (C), Markant (C), Nerina (D), Ryco (D)	3
		medium	moyennes	mittel	medio	Meicy (C), Torrina (D)	5
		large	grandes	groß	grande	Juni (D), Label (D), Pfälzer Toplong (C)	7
16. **(*)**	**VG**	**Flower: color of standard**	**Fleur: couleur de l'étendard**	**Blüte: Farbe der Fahne**	**Flor: color del estandarte**		
PQ		white	blanc	weiß	blanco	Tuf (D)	1
		pinkish white	rosâtre blanc	zartrosa weiß	blanco rosáceo	Mira (D)	2
		pink	rose	rosa	rosa	Maxi (D), Vilbel (D)	3
		violet	violet	violett	violeta	Delinel (D), Purple Teepee (D)	4

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
17. (*)	**VG**	**Flower: color of wing**	**Fleur: couleur de l'aile**	**Blüte: Farbe des Flügels**	**Flor: color del ala**		
PQ		white	blanche	weiß	blanco	Tuf (D)	1
		pinkish white	rosâtre blanc	zartrosa weiß	blanco rosáceo	Signal (D)	2
		pink	rose	rosa	rosa	Maxi (D), Vilbel (D)	3
		violet	violette	violett	violeta	Delinel (D), Purple Teepee (D)	4
18. (*)	**MS**	**Dwarf beans only: Pod: length (excluding beak)**	**Haricot nain seulement: Gousse: longueur (style exclu)**	**Nur Buschbohnen Hülse: Länge (ohne Zahn)**	**Sólo variedades de mata baja: Vaina: longitud (excluida el pico)**		
QN	**(b)**	very short	très courte	sehr kurz	muy corta		1
		short	courte	kurz	corta	Prelude (D), Tuf (D)	3
		medium	moyenne	mittel	media	Amity (D), Lusia (D)	5
		long	longue	lang	larga	Dubra (D), Loma (D)	7
		very long	très longue	sehr lang	muy larga	Daisy (D), Longking (D), Maja (D)	9
19. (*)	**MS**	**Climbing beans only: Pod: length (as for 18)**	**Haricot à rames seulement: Gousse: longueur (comme pour 18)**	**Nur Stangenbohnen: Hülse: Länge (wie unter 18)**	**Sólo variedades de enrame: Vaina: longitud (como en 18)**		
QN	**(b)**	very short	très courte	sehr kurz	muy corta		1
		short	courte	kurz	corta	Juwagold (C)	3
		medium	moyenne	mittel	media		5
		long	longue	lang	larga	Fidel (C)	7
		very long	très longue	sehr lang	muy larga	Toplong (C)	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
20.	**MS**	**Pod: width**	**Gousse: largeur**	**Hülse: Breite**	**Vaina: anchura**		
(+)							
QN	**(b)**	narrow	étroite	schmal	estrecha	Cabri (D), Necores (C), Tuf (D)	3
		medium	moyenne	mittel	media	Meicy (C), Regulex (D)	5
		broad	large	breit	ancha	Perle von Marbach (C), Pfälzer Juni (D)	7
21.	**MS**	**Pod: thickness**	**Gousse: épaisseur**	**Hülse: Dicke**	**Vaina: espesor**		
(+)							
QN	**(b)**	very thin	très fine	sehr dünn	muy fina	Booster (D)	1
		thin	fine	dünn	fina	Bergamo (D), Rentegevers (C)	3
		medium	moyenne	mittel	media	Impact (D), Flagrano (D), Donna (C)	5
		thick	épaisse	dick	gruesa	Emerite (C), Mondiam (D), Maxidor (D)	7
		very thick	très épaisse	sehr dick	muy gruesa	Kerprim (D), Hilda (C)	9
22. **(*)** **(+)**	**VG**	**Pod: shape in cross section (through seed)**	**Gousse: forme en section transversale (au niveau d'un grain)**	**Hülse: Form im Querschnitt (durch den Samen)**	**Vaina: forma en sección transversal (a nivel de una semilla)**		
PQ	**(b)**	elliptic	elliptique	elliptisch	elíptica		1
		ovate	ovale	eiförmig	oval	Pascal (D), Pfälzer Juni (D), Regulex (D)	2
		cordate	cordiforme	herzförmig	cordiforme	Daisy (D)	3
		circular	circulaire	rund	circular	Tuf (D)	4
		eight-shaped	en huit	Form einer liegenden Acht (breitrund)	en forma de ocho	Tendercrop White Seeded (D)	5

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
23. **(+)**	**MS**	**Pod: ratio thickness/width**	**Gousse: rapport épaisseur/largeur**	**Hülse: Verhältnis Dicke/Breite**	**Vaina: relación espesor/anchura**		
QN	**(b)**	small	petit	klein	pequeña	Pascal (D), Pfälzer Juni (D), Regulex (D)	3
		medium	moyen	mittel	mediana	Tuf (D)	5
		large	grand	groß	grande	Tendercrop White Seeded (D)	7
24. **(*)** **(+)**	**VG**	**Pod: ground color**	**Gousse: couleur de fond**	**Hülse: Grundfarbe**	**Vaina: color de base**		
PQ	**(b)**	yellow	jaune	gelb	amarillo	Goldfish (D), Golddukat (D), Goldmarie (C)	1
		green	verte	grün	verde	Diva (D), Filetty (D), Fortissima (C)	2
		violet	violette	violett	violeta	Purpiat (D), Purple Teepee (D)	3
25. **(+)**	**VG**	**Pod: intensity of ground color**	**Gousse: intensité de la couleur de fond**	**Hülse: Intensität der Grundfarbe**	**Vaina: intensidad del color de base**		
QN	**(b)**	light	faible	hell	débil	Erato (D), Fortissima (C)	3
		medium	moyenne	mittel	media	Gabriella (D), Fillety (D) Prelude (D)	5
		dark	forte	dunkel	fuerte	Goldukat (D), Decibel (D), Purpiat (D)	7

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
26. (*)	**VG**	**Pod: presence of secondary color**	**Gousse: présence d'une couleur secondaire**	**Hülse: Vorhanden-sein der Nebenfarbe**	**Vaina: presencia de un color secundario**		
QL	**(c)**	absent	absente	fehlend	ausente	Tuf (D)	1
		present	présente	vorhanden	presente	Marbel (D)	9
27. (*)	**VG**	**Pod: secondary color**	**Gousse: couleur secondaire**	**Hülse: Nebenfarbe**	**Vaina: color secundario**		
PQ	**(c)**	pink	rose	rosa	rosa	IPR Juriti (C)	1
		red	rouge	rot	roja	Borlotto lingua di fuoco 2 (C)	2
		violet	violette	violett	violeta	Marbel (D)	3
28.	**VG**	**Pod: density of flecks of secondary color**	**Gousse: densité des taches de la couleur secondaire**	**Hülse: Dichte der Flecken der Nebenfarbe**	**Vaina: densidad de las manchas del color secundario**		
QN	**(c)**	sparse	faible	locker	escasa		3
		medium	moyenne	mittel	media		5
		dense	forte	dicht	densa		7
29. (*) (+)	**VG**	**Pod: stringiness of ventral suture**	**Gousse: fil de la suture ventrale**	**Hülse: Fädigkeit der Bauchnaht**	**Vaina: filamento de la sutura ventral**		
QL	**(b)**	absent	absent	fehlend	ausente	Cabri (D), Tuf (D)	1
		present	présent	vorhanden	presente	Facta (D), Marbel (D)	9
30. (+)	**VG**	**Pod: degree of curvature**	**Gousse: degré de la courbure**	**Hülse: Stärke der Krümmung**	**Vaina: grado de curvatura**		
QN	**(b)**	absent or very slight	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil		1
		weak	faible	gering	débil	Nerina (D)	3
		medium	moyenne	mittel	medio		5
		strong	forte	stark	fuerte	Goldfish (D), Groffy (D), Ryco (D)	7
		very strong	très forte	sehr stark	muy fuerte		9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
31. (+)	**VG**	**Pod: shape of curvature**	**Gousse: forme de la courbure**	**Hülse: Art der Krümmung**	**Vaina: forma de la curvatura**		
PQ	**(b)**	concave	concave	konkav	cóncava	Admires (D)	1
		s-shaped	en S	s-förmig	en forma de S	Ideaal (D)	2
		convex	convexe	konvex	convexa	Calima (D)	3
32. (+)	**VG**	**Pod: shape of distal part (excluding beak)**	**Gousse: forme de la partie distale (style exclu)**	**Hülse: Form des Hülsenendes (ohne Zahn**	**Vaina: forma de la parte distal (excluido el pico)**		
PQ	**(b)**	acute	aiguë	spitz	aguda	Aiguillon (D), Calas (D), Cesar (D)	1
		acute to truncate	aiguë à tronquée	leicht abgestumpft	aguda a truncada	Faria (D), Aiguille vert (D)	2
		truncate	tronquée	stumpf	truncada	Afrio (D), Alcade (D), Divel (D)	3
33. (*)	**MS/ VG**	**Pod: length of beak**	**Gousse: longueur du style**	**Hülse: Zahnlänge**	**Vaina: longitud del pico**		
QN	**(b)**	short	court	kurz	corta	Amity (D), Ryco (D)	3
		medium	moyen	mittel	media	Goldfish (D), Optimus (D)	5
		long	long	lang	larga	Facta (D), Golddukat (D), Vilbel (D)	7
34.	**VG**	**Pod: curvature of beak**	**Gousse: courbure du style**	**Hülse: Zahnkrümmung**	**Vaina: curvatura del pico**		
QN	**(b)**	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil		1
		weak	faible	gering	débil	Nerina (D)	3
		medium	moyenne	mittel	media		5
		strong	forte	stark	fuerte	Goldfish (D), Groffy (D), Ryco (D)	7
		very strong	très forte	sehr stark	muy fuerte		9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
35.	**VG**	**Pod: texture of surface**	**Gousse: texture de la surface**	**Hülse: Beschaffenheit der Oberfläche**	**Vaina: textura de la superficie**		
QN	**(b)**	smooth or slightly rough	lisse ou légérement rugueuse	glatt oder etwas rauh	lisa o ligeramente rugosa	Prelude (D), Tuf (D)	1
		moderately rough	moyennement rugueuse	mäßig rauh	moderadamente rugosa	Blauhilde (C), Daisy (D), Longking (D)	2
		very rough	très rugueuse	sehr rauh	muy rugosa		3
36.	**VS**	**Pod: constrictions (at dry stage)**	**Gousse: étranglements (au stade sec)**	**Hülse: Einschnürungen (zur Trockenreife)**	**Vaina: estrangulamientos (estado de vaina seca)**		
QN	**(c)**	absent or very weak	absents ou très faibles	fehlend oder sehr gering	ausentes o muy débiles	Pascal (D), Regulex (D)	1
		moderate	moyens	mäßig	medios		2
		strong	forts	stark	fuertes	Mechelse Tros (C)	3
37. (*) (+)	**MG**	**Seed: weight**	**Grain: poids**	**Samen: Gewicht**	**Semilla: peso**		
QN	**(d)**	very low	très petit	sehr niedrig	muy ligero	Cabri (D), Decibel (D), Label (D)	1
		low	petit	niedrig	ligero	Belfin (D), Ingo (D)	3
		medium	moyen	mittel	medio	Duplika (D), Juwagold (C), Konservenstolz (D)	5
		high	élevé	hoch	elevado	Fidel (C), Regulex (D)	7
		very high	très élevé	sehr hoch	muy elevado	Facta (D), Precores (C), Rote von Paris (D)	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
38.	**VG**	**Seed: shape in longitudinal section**	**Grain: forme en section longitudinale**	**Samen: Form im Längsschnitt**	**Semilla: forma en la sección longitudinal**		
(+)							
PQ	**(d)**	circular	circulaire	rund	circular	Coblan (D), Coco nain blanc précoce (D), Rapsani (D)	1
		circular to elliptic	circulaire à elliptique	rund bis elliptisch	circular a elíptica	Coco noir (D)	2
		elliptic	elliptique	elliptisch	elíptica	Nerina (D), Pros (D), Tuf (D)	3
		kidney-shaped	réniforme	nierenförmig	reniforme	Orex (D), Palmares (D), Re Mida (D), Rubico (D)	4
		rectangular	rectangulaire	rechteckig	rectangular	Polanka (D)	5
39.	**VG**	**Varieties with kidney shaped seed only: Seed: degree of curvature**	**Variétés à grain réniforme seulement: Grain: degré de courbure**	**Nur Sorten mit nierenförmigen Samen: Samen: Grad der Krümmung**	**Sólo variedades de semilla reniforme: semilla: grado de curvatura**		
QN	**(d)**	weak	faible	gering	débil	Farcybel (D), Janus (D), Jakar (D),	3
		medium	moyenne	mittel	medio	Faria (D), Farno (D), Niver (D)	5
		strong	forte	stark	fuerte	Chevrier vert (D), Hador(D)	7
40.	**VG**	**Seed: shape in cross section**	**Grain: forme en section transversale**	**Samen: Form im Querschnitt**	**Semilla: forma en sección transversal**		
(+)							
PQ	**(d)**	flat	aplatie	flach	plana	Soisson nain hatif (D)	1
		narrow elliptic	elliptique étroite	schmal elliptisch	elíptica estrecha	Roi de Belges (D), Samurai (D)	2
		medium elliptic	elliptique moyen	mittel elliptisch	elíptica media	Orlinel (D), Pluto (D), Rachel (D)	3
		broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Obélisque (D), Odessa (D), Primanor (D)	4
		circular	circulaire	rund	circular	Pactol (D), Romulus (D), Starnel (D)	5

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
41. (+)	**MS/ VG**	**Seed: width in cross section**	**Grain: largeur en coupe transversale**	**Samen: Breite im Querschnitt**	**Semilla: anchura en sección transversal**		
QN	**(d)**	narrow	étroit	schmal	estrecha	Cabri (D), Golddukat (D)	3
		medium	moyen	mittel	mediana		5
		broad	large	breit	ancha	Pfälzer Juni (D), Rote von Paris (D)	7
42. (+)	**MS/ VG**	**Seed: length**	**Grain: longueur**	**Samen: Länge**	**Semilla: longitud**		
QN	**(d)**	short	courte	kurz	corta	Raba (D)	3
		medium	moyenne	mittel	media	Igolomska (D)	5
		long	longue	lang	larga	Nigeria (D)	7
43. (*)	**VG**	**Seed: number of colors**	**Grain: nombre de couleurs**	**Samen: Anzahl Farben**	**Semilla: número de colores**		
QL	**(d)**	one	une	eine	uno		1
		two	deux	zwei	dos		2
		more than two	plus de deux	mehr als zwei	más de dos		3
44. (*)	**VG**	**Seed: main color (largest area)**	**Grain: couleur principale (surface la plus grande)**	**Samen: Hauptfarbe (größte Fläche)**	**Semilla: color principal (superficie mayor)**		
PQ	**(d)**	white	blanche	weiß	blanco	Goldfish (D), Tuf (D)	1
		green or greenish	verte ou verdâtre	grün oder grünlich	verde o verdoso	Muriel (D), Pascal (D)	2
		grey	grise	grau	gris	Centaure (D), Opal (D)	3
		yellow	jaune	gelb	amarillo	Gele Citroen (D)	4
		beige	beige	beige	beige	Blauhilde (C), Purple Teepee (D)	5
		brown	brune	braun	marrón	Primel (D), Sunray (D)	6
		red	rouge	rot	rojo	Flageolet rouge (D)	7
		violet	violette	violett	violeta	Garrafal enana (D), Surpasse phenix (D)	8
		black	noire	schwarz	negro	Delinel (D), Vilbel (D)	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
45. (*) (+)	**VG**	**Seed: secondary color**	**Grain: couleur secondaire**	**Samen: Nebenfarbe**	**Semilla: color secundario**		
PQ	**(d)**	grey	grise	grau	gris		1
		yellow	jaune	gelb	amarillo		2
		beige	beige	beige	beige	Abonder (D), Tarot (D)	3
		brown	brune	braun	marrón	Talisman (D)	4
		red	rouge	rot	rojo	Fori (D)	5
		violet	violette	violett	violeta	Marbel (D)	6
		black	noire	schwarz	negro	Brittle Wax (D)	7
46. (+)		**Seed: distribution of secondary color**	**Grain: répartition de la couleur secondaire**	**Samen: Verteilung der Nebenfarbe**	**Semilla: distribución del color secundario**		
	(d)	around hilum	autour du hile	um den Nabel	alrededor del hilo	Brittle Wax (D)	1
QL		on half of grain	sur la moitié du grain	auf der Hälfte des Samens	en la mitad de la semilla		2
		on entire grain	sur tout le grain	auf dem ganzen Samen	en toda la semilla		3
47.	**VG**	**Seed: veining**	**Grain: veinure**	**Samen: Aderung**	**Semilla: venación**		
QN	**(d)**	weak	faible	gering	débil	Prelude (D), Ryco (D)	3
		medium	moyenne	mittel	media	Loma (D)	5
		strong	forte	stark	fuerte	Daisy (D), Flo (D)	7

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
48. (*)	**MG**	**Time of flowering (50% of the plants with at least one flower)**	**Epoque de floraison (50% des plantes avec au moins une fleur)**	**Zeitpunkt der Blüte (50 % der Pflanzen zeigen mindestens eine Blüte)**	**Época de floración (50% de las plantas con al menos una flor)**		
QN		very early	très précoce	sehr früh	muy temprana	Pfälzer Juni (D)	1
		early	précoce	früh	temprana	Fortissima (C), Perle von Marbach (C), Prelude (D)	3
		medium	moyenne	mittel	media	Fanion (D), Groffy (D), Hilda (C), Precores (C)	5
		late	tardive	spät	tardía	Necores (C)	7
		very late	très tardive	sehr spät	muy tardía		9
49. (+)		**Resistance to *Colletotrichum lindemuthianum* (Cl)**	**Résistance à *Colletotrichum lindemuthianum* (Cl)**	**Resistenz gegen *Colletotrichum lindemuthianum* (Cl)**	**Resistencia a *Colletotrichum lindemuthianum* (Cl)**		
49.1 (*)	**VS/ VG**	**Race 6**	**Pathotype 6**	**Pathotyp 6**	**Patotipo 6**		
QL		absent	absente	fehlend	ausente	Goldrush, Masai, Michelet à longue cosse	1
		present	présente	vorhanden	presente	Booster, Pastoral	9
49.2	**VS/ VG**	**Race Kappa**	**Pathotype Kappa**	**Pathotyp Kappa**	**Patotipo Kappa**		
QL		absent	absente	fehlend	ausente	Goldrush, Masai, Michelet à longue cosse	1
		present	présente	vorhanden	presente	Booster, Pastoral	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
50. (*) (+)	**VS/ VG**	**Resistance to *Bean common mosaic necrosis virus* (BCMNV)**	**Résistance au *Bean common mosaic necrosis virus* (BCMNV)**	**Resistenz gegen *Bean common mosaic necrosis virus* (BCMNV)**	**Resistencia al *Bean common mosaic necrosis virus* (BCMNV)**		
PQ		absent	absente	fehlend	ausente	Dufrix, Flandria	1
		present with necrosis	présente avec nécroses	vorhanden mit Nekrose	presente con necrosis	Booster, Odessa	2
		present without symptoms	présente sans symptômes	vorhanden ohne Symptome	presente sin síntomas	Bizet	3
51. (+)	**VS/ VG**	**Resistance to *Pseudomonas savastanoi* pv. *phaseolicola* (Psp)**	**Résistance à *Pseudomonas savastanoi* pv. *phaseolicola* (Psp)**	**Resistenz gegen *Pseudomonas savastanoi* pv. *phaseolicola* (Psp)**	**Resistencia a *Pseudomonas savastanoi* pv. *phaseolicola* (Psp)**		
		Race 6	**Pathotype 6**	**Pathotyp 6**	**Patotipo 6**		
QL		absent	absente	fehlend	ausente	Michelet à longue cosse (D)	1
		present	présente	vorhanden	presente	Masai (D), Vaillant (D)	9
52. (+)	**VG**	**Resistance to *Xanthomonas axonopodis* pv. *phaseoli* (Xap)**	**Résistance à *Xanthomonas axonopodis* pv. *phaseoli* (Xap)**	**Resistenz gegen *Xanthomonas axonopodis* pv. *phaseoli* (Xap)**	**Resistencia a *Xanthomonas axonopodis* pv. *phaseoli* (Xap)**		
QL		absent	absente	fehlend	ausente	Echo (D), Keygold (D)	1
		present	présente	vorhanden	presente	Walley (US line) (D)	9

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

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

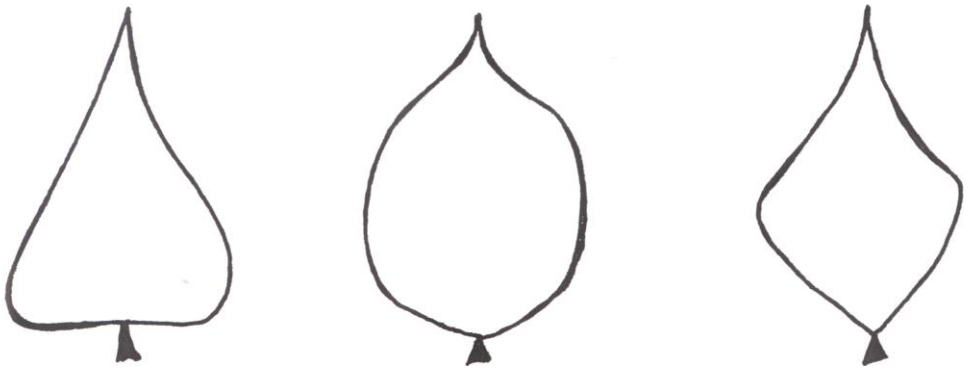
(a) Leaf: All observations on the leaf should be made at the time of full flowering (all plants with flowers in bloom).
(b) Pod: All observations on the pod should be made at the time of fresh market maturity.
(c) Pod: Observations which should be made at the dry seed stage.
(d) Seed: All observations on the seed should be made on dry seed harvested from the plots

8.2 Explanations for individual characteristics

Ad. 8: Climbing beans only: Plant: speed of climbing

Number of days between the cotyledon leaf stage and reaching a height of 1.5 meters.

Ad. 12: Terminal leaflet: shape

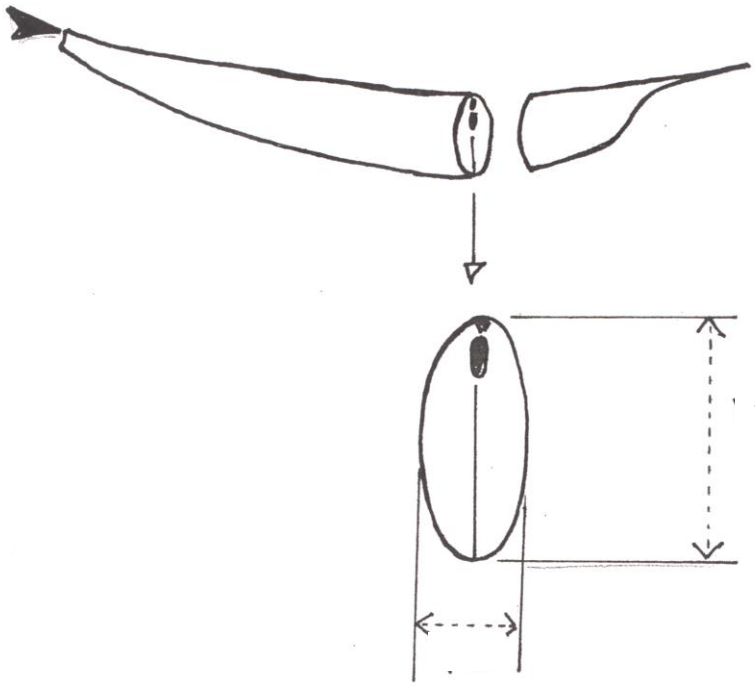


1	3	5
triangular	circular	quadrangular

Ad. 13: Terminal leaflet: lenght of tip

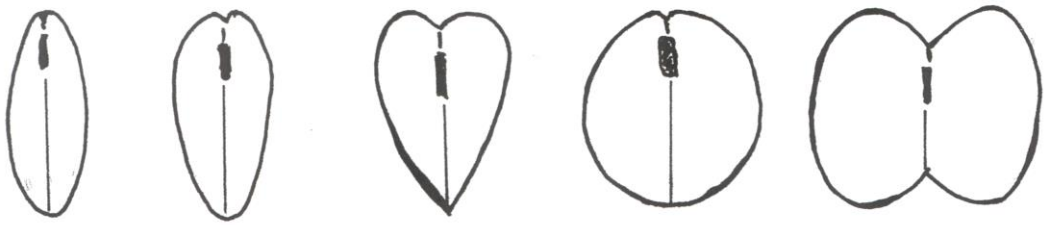
1	2	3
short	medium	long

Ad. 20: Pod: width
Ad. 21: Pod: thickness



thickness (characteristic 21)

Ad. 22: Pod: shape in cross section (through seed)



1	2	3	4	5
elliptic	ovate	cordate	circular	eight-shaped

Ad. 23: Pod: ratio thickness/width

= thickness/width
(see characteristics 21 and 20)

Ads. 24, 25: Pod: ground color (24) and intensity of ground color (25)

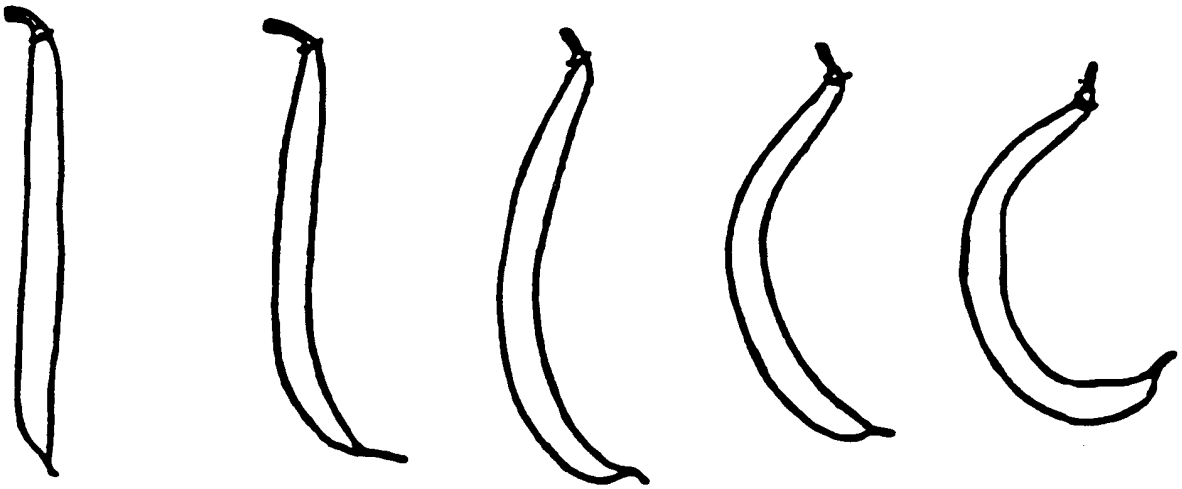
	Characteristic 24: Pod: ground color		
Characteristic 25: Pod: intensity of ground color	yellow (1)	green (2)	violet (3)
light (3)	Erato (D), Frühe dickfleischige Wachs (D), Goldmarie (C),	Fortissima (C), Rabl (D), Ragalla (D), Ryco (D)	
medium (5)	Gabriella (D), Goldelfe (C), Goldfish (D)	Filetty (D), Prelude (D), Tuf (D)	
dark (7)	Golddukat (D)	Decibel (D), Diva (D), Verona (D), Vilbel (D),	Blauhilde (C), Purpiat (D), Purple Teepee (D)

Ad. 29: Pod: stringiness of ventral suture

This characteristic should be observed just after the fresh market stage, by breaking the beak and pulling it from the pod. The stringiness emerges from the ventral suture of the pod.

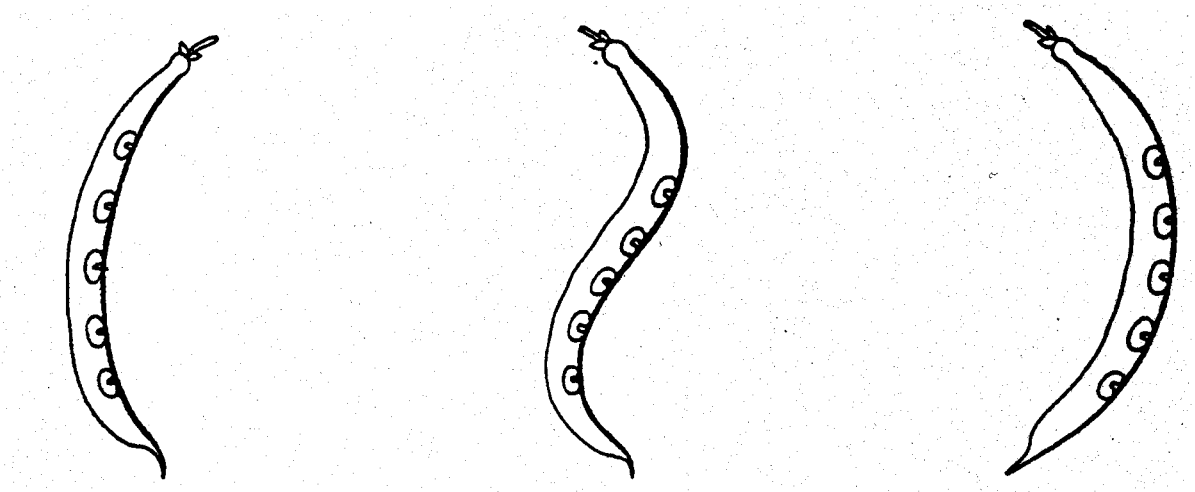
The strings are very strong and should not be confused with the oakum, for example, which has a weaker structure.

Ad. 30: Pod: degree of curvature



1	3	5	7	9
absent or very slight	weak	medium	strong	very strong

Ad. 31: Pod: shape of curvature



1	2	3
concave	s-shaped	convex

Ad. 32: Pod: shape of distal part (excluding beak)

1	2	3
acute	acute to truncate	truncate

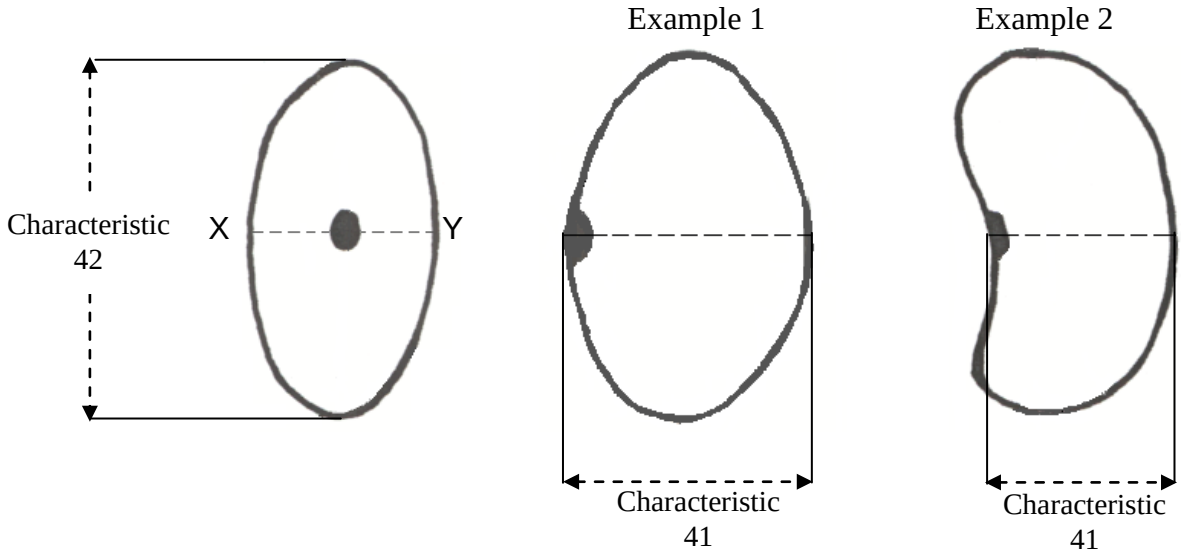
Ad. 37: Seed: weight

The seed weight should be measured on four samples of 100 seeds.

Ad. 38: Seed: shape in longitudinal section

1	2	3	4	5
circular	circular to elliptic	elliptic	kidney-shaped	rectangular

Ad. 40, 41, 42: Seed: shape in cross section (40), width in cross section (41), length (42)



Characteristic 40: shape in cross section (X-Y = cross section)
Characteristic 41: width in cross section
Characteristic 42: length

Ad. 45: Seed: secondary color

The secondary color is the color with the second largest area. If several secondary colors exist, the competent authorities will add one or more characteristics as necessary.

Ad. 46: Seed: distribution of secondary color

1	2	3
around hilum	on half of grain	on entire grain

Ad. 49: Resistance to Resistance to *Colletotrichum lindemuthianum* (Cl)

1.	Pathogen	*Colletotrichum lindemuthianum* (Cl)
2.	Quarantine status	No
3.	Host species	*Phaseolus vulgaris*
4.	Source of inoculum	GEVES (FR), Naktuinbouw (NL), INIA (ES)
5.	Isolate	6, Kappa
6.	Establishment isolate identity	On differentials:

Old race name: Binary race name:			-	(no longer in TG) Lambda	Kappa
			6	55	31
Differential	Gene	Binary			
A Michelite		1	R	S	S
B Michigan Dark Red Kidney	Co-1	2	S	S	S
C Perry Marrow	Co-1^3	4	S	S	S
D Cornell 49242	Co-2 (Are)	8	R	R	S
E Widusa	Co-1^5	16	R	S	S
F Kaboon	Co-1^2	32	R	S	R
G Mexico 222	Co-3	64	R	R	R
H PI 207262		128	R	R	R
I TO	Co-4	256	R	R	R
J TU	Co-5	512	R	R	R
K AB 136	Co-6	1024	R	R	R
L G 2333	Co-4-2/5/7	2048	R	R	R

7.	Establishment pathogenicity	On susceptible variety
8.	Multiplication inoculum	
8.1	Multiplication medium	PDA (Potato Dextose Agar) or Mathur medium (20-25°C)
8.2	Multiplication variety	-
8.3	Plant stage at inoculation	Seed for soaking 5 days old seedlings for spraying
8.4	Inoculation medium	-
8.5	Inoculation method	Soaking or spraying seedlings
8.6	Harvest of inoculum	Scrape spores with scraper from 7-20 days old plates grown at 20-25°C
8.7	Check of harvested inoculum	Count spores and adjust to 10^6 spores per mL
8.8	Shelflife/viability inoculum	About 4 hours Long term storage of strains: at -80°C in 20% glycerol
9.	Format of the test	
9.1	Number of plants per genotype	At least 20 plants
9.2	Number of replicates	-

9.3	Control varieties	
	Susceptible:	Goldrush, Michelet à longue cosse, Masai
	Resistant for race 6 and race Lambda:	Booster, Pastoral
9.4	Test design	-
9.5	Test facility	Climate cell
9.6	Temperature	20-22°C
9.7	Light	-
9.8	Season	-
9.9	Special measures	Plants are placed in high humidity
10.	Inoculation	
10.1	Preparation inoculum	Culture on PDA or Mathur medium
10.2	Quantification inoculum	Count spores and adjust to 10^6 spores per mL
10.3	Plant stage at inoculation	Pre-germinated seed for soaking 5 days old seedlings for spraying
10.4	Inoculation method	One of two methods may be applied: - Soaking pre-germinated seeds in a spore suspension for 2 minutes. Seeds are planted in soil after inoculation - Spraying cotyledons with inoculum suspension 5 days after sowing
10.5	First observation	7 days after inoculation
10.6	Second observation	12 days after inoculation
10.7	Final observations	14 days after inoculation
11.	Observations	
11.1	Method	Visual observation of symptoms
11.2	Observation scale	0: no symptoms 1: weak reaction with small superficial necrosis (dots or stripes) 2: necrotic lesions larger than 3 mm and/or deeply sunk into the tissue of hypocotyls and/or stems 3: dying plants
11.3	Validation of test	Control varieties must show expected symptoms
11.4	Off-types	-
12.	Interpretation of data in terms of UPOV characteristic states	-
	For soaking seeds:	Resistant [9]: class 0 and 1 Susceptible [1]: class 2 and 3
	For spraying cotyledons:	Some flecks of necrosis can occur in the stem and some in the cotyledons of resistant varieties
13.	Critical control points	Monitor the inoculation pressure with a suitable variety e.g. with Pastoral. This variety has a weaker resistance and can give an indication of aggressiveness of the test.

Ad. 50: Resistance to *Bean common mosaic necrosis virus* (BCMNV)

1.	Pathogen	*Bean common mosaic necrosis virus* (BCMNV)
2.	Quarantine status	No
3.	Host species	*Phaseolus vulgaris*
4.	Source of inoculum	GEVES (FR), Naktuinbouw (NL), INIA (ES)
5.	Isolate	NL3 or NL5 (Pathogenicity group VI)
6.	Establishment isolate identity	On differentials Widusa and Top Crop; Widusa (I) must show top or vein necrosis; Top Crop (bc-1, I) must show only local necrosis
7.	Establishment pathogenicity	On susceptible variety
8.	Multiplication inoculum	
8.1	Multiplication medium	-
8.2	Multiplication variety	Dufrix or Flandria
8.3	Plant stage at inoculation	First leaf expanded (8-12 days)
8.4	Inoculation medium	PBS (Phosphate Buffer Saline) and carborundum
8.5	Inoculation method	Rubbing
8.6	Harvest of inoculum	Pick leaves with mosaic and/or leaf rolling 14 days after inoculation on susceptible variety
8.7	Check of harvested inoculum	-
8.8	Shelflife/viability inoculum	Very long in dry or freeze dried leaves
9.	Format of the test	
9.1	Number of plants per genotype	20
9.2	Number of replicates	2
9.3	Control varieties	
	Susceptible:	Dufrix, Flandria
	Resistant with necrosis:	Booster, Odessa
	Resistant without necrosis:	Bizet
9.4	Test design	Glasshouse or climatic chamber
9.5	Test facility	Glasshouse
9.6	Temperature	Initial 5-7 days after inoculation: 25° day / 18°C night or 30°C day and night After 5-7 days: 25°C day and night
9.7	Light	See remark 13.
9.8	Season	-
9.9	Special measures	Rinse leaves after inoculation to reduce damage by carborundum
10.	Inoculation	
10.1	Preparation inoculum	Maceration in PBS
10.2	Quantification inoculum	-
10.3	Plant stage at inoculation	First leaf expanded (8-12 days after sowing)
10.4	Inoculation method	Rubbing

10.5	First observation	6 days after inoculation
10.6	Second observation	9 days after inoculation
10.7	Final observations	14 days after inoculation
11.	Observations	
11.1	Method	Visual observation
11.2	Observation scale	1: mosaic and/or leaf rolling 2: top necrosis, vein necrosis and/or small necrotic lesions 3: no symptoms
11.3	Validation of test	Control varieties must show expected symptoms
11.4	Off-types	-
12.	Interpretation of data in terms of UPOV characteristic states	Classify in three classes corresponding with observation scale: 1: resistant absent 2: resistant present with necrosis 3: resistant present without necrosis
13.	Critical control points	Temperature-dependent expression of symptoms in some varieties, necrosis increasing with temperature. Light may also enhance symptom development.

Ad. 51: Resistance to *Pseudomonas savastanoi* pv. *phaseolicola* (Psp)

1.	Pathogen	*Pseudomonas savastanoi* pv. *phaseolicola* (Psp)
2.	Quarantine status	No
3.	Host species	*Phaseolus vulgaris*
4.	Source of inoculum	GEVES (FR), Naktuinbouw (NL), HRI (GB), INIA (ES)
5.	Isolate	Race 6
6.	Establishment isolate identity	All differentials should be susceptible (Canadian Wonder, A52, Red Mexican UI3, Mesunka, A53, A43, Guatemala 196-B)
7.	Establishment pathogenicity	On susceptible variety
8.	Multiplication inoculum	
8.1	Multiplication medium	King's B or Yeast Dextrose Agar at 27°C
8.2	Multiplication variety	-
8.3	Plant stage at inoculation	First leaf (9-14 days after sowing)
8.4	Inoculation medium	Tap water or saline solution (0.85% NaCl)
8.5	Inoculation method	-
8.6	Harvest of inoculum	4 days after start of pure culture
8.7	Check of harvested inoculum	-
8.8	Shelflife/viability inoculum	The number of subculturing before inoculation shall not exceed 2 and the inoculation shall be done within 2-3 days.
9.	Format of the test	
9.1	Number of plants per genotype	20
9.2	Number of replicates	2

9.3	Control varieties	
	Susceptible	Michelet à longue cosse
	Resistant	Masai, Vaillant
9.4	Test design	-
9.5	Test facility	Glasshouse or climate cell
9.6	Temperature	22/20°C day/night or 20°C day and night
9.7	Light	-
9.8	Season	-
9.9	Special measures	High humidity required during first 1-3 days after inoculation
10.	Inoculation	
10.1	Preparation inoculum	Rinse bacteria from plate with tap water and add 2 g carborundum per 100 ml or rinse bacteria with saline solution (0.85% NaCl).
10.2	Quantification inoculum	10^8 cfu/ ml or 1-2 full-grown plates per 100 ml water for 100 plants
10.3	Plant stage at inoculation	First pair of leaves spreading (9-14 days after sowing)
10.4	Inoculation method	Rubbing with sponge or inoculation by spraying leaves with pressure (2 bars) until runoff. For this purpose several types of equipment may be used: atomizer or paint brush with a pressure supplier.
10.5	First observation	7 days after inoculation
10.6	Second observation	14 days after inoculation
10.7	Final observations	-
11.	Observations	
11.1	Method	Visual observation
11.2	Observation scale	
	Resistant [9]	No symptoms or necrotic pinpoints
	Susceptible [1]	Light green halo around minute lesions Water soaked (“oily”) lesions (few or many) Water soaked lesions, later turning necrotic Deformation and chlorosis on first trifoliate leaves Necrosis on stems Dying plants
11.3	Validation of test	Control varieties must show expected symptoms
11.4	Off-types	-
12.	Interpretation of data in terms of UPOV characteristic states	11.2
13.	Critical control points	Inoculation may produce some damage on susceptible and resistant plants. Maintenance of isolate: beware that the colony may die after keeping 3 weeks on plate.

Ad. 52: Resistance to *Xanthomonas axonopodis* pv. *phaseoli* (Xap)

1.	Pathogen	*Xanthomonas axonopodis* pv. *phaseoli* (Xap)
2.	Quarantine status	yes
3.	Host species	*Phaseolus vulgaris*
4.	Source of inoculum	Vegetable Research Institute, Budapest (HU)
5.	Isolate	Isolate 422
6.	Establishment isolate identity	-
7.	Establishment pathogenicity	-
8.	Multiplication inoculum	
8.1	Multiplication medium	Yeast Glucose Agar (20 g yeast extract powder, 20 g glucose, 20 g $CaCO_3$, 20 g agar/ 1000 ml distilled water)
8.2	Multiplication variety	-
8.3	Plant stage at inoculation	First leaf pair 2-3 cm long
8.4	Inoculation medium	-
8.5	Inoculation method	100% relative humidity during 2 days after inoculation, later normal humidity
8.6	Harvest of inoculum	-
8.7	Check of harvested inoculum	-
8.8	Shelflife/viability inoculum	-
9.	Format of the test	
9.1	Number of plants per genotype	-
9.2	Number of replicates	-
9.3	Control varieties	-
9.4	Test design	-
9.5	Test facility	
9.6	Temperature	26/20°C day/night or 28/25°C day/night
9.7	Light	-
9.8	Season	-
9.9	Special measures	100% relative humidity during 2 days after inoculation, later normal humidity
10.	Inoculation	
10.1	Preparation inoculum	-
10.2	Quantification inoculum	10^8 cfu/ml
10.3	Plant stage at inoculation	-
10.4	Inoculation method	Mechanical, with camel hair brush or inoculation by spraying leaves with pressure (2 bars) until run-off. For this purpose several types of equipment may be used: atomizer or paint brush with a pressure supplier.
10.5	First observation	7 days after inoculation
10.6	Second observation	14 days after inoculation
10.7	Final observations	When infected leaves are fully developed

11.	Observations	
11.1	Method	-
11.2	Observation scale	Visual
	Susceptible [1]	Extensive necrosis sometimes surrounded by an increasing ring of chlorotic tissue
	Resistant [9]	Cell-sized brownish or red necrotic spots
11.3	Validation of test	-
11.4	Off-types	-
12.	Interpretation of data in terms of UPOV characteristic states	11.2
13.	Critical control points	-

9. Literature

Anonymous, 1931: "Beans of New York" in "Vegetables of New York," Vol. I, Part 2 (Hedrick, U.P., a.o.), State of New York Educational Department, pp. 110

Anonymous, 1983: "Description et essai de classification des variétés de haricot nain" (jusqu'au 30-11-81), Institut national de la recherche agronomique (INRA-GEVES), Mons, 80200 Peronne, France, pp. 232

Chopinet, R., Trebuchet, G., Drouzy, J.: "Essai de Classification et d'Identification des principales variétés de haricots cultivées en France," Vilmorin

Coyne, D.P., Schuster, M.L., Shaugnessy, L., 1966: "Inheritance of resitance to Halo Blight and Common Blight bacteria in Phaseolus vulgaris variety cross," Plant Dis.Reg., 50: 1: pp. 29-32.

Diaz, G., Nunez, R., 1971: "Descripción morfológica de 18 variedades de judia de verdeo," Instituto Nacional de Semillas y Plantas de Vivero, Zaragoza, Spain

Drijfhout, E., 1978: "Genetic interaction between Phaseolus vulgaris and bean common mosaic virus with implications for strain identification and breeding for resistance," Agricultural Research Report 872, Centre for Agricultural Publishing and Documentation, Wageningen, NL

INVULFEC, 1970: "Le haricot vert," Paris, France

Mckern, N.M., Mintz, G.I., Burnett, O.W., Mishra, A., Whittaker, L.A., Silbernagel, M.J., Ward, C.W., Shulala, D.P., 1992: "Isolates of Bean Common Mosaic Virus Comprising Two Distinct Potyviruses, Etiology Vol. 82, No. 9, pp. 923-929

Patel, P.N., Walker, J.C., 1966: Inheritance of tolerance to Halo Blight in bean," Phytopath., 56: pp. 681-682

Puerto Romero, J., 1961: "Variedades de judia cultivadas en España," Ministerio de Agricultura, Madrid, Spain

Szarka, J., Velich, I., 1978: " Survey of bacterium species causing disease of bean in Hungary," Test Methods, Bulletin of the Vegetable Crops Research Institute Kecskemét, Hungary, 13: pp. 17-23

Szarka, J., Velich, I., 1978: "Leaf reactions of bean lines and varieties to Pseudomonas phaseolicola (Burk) Dowson," Annual Report Bean Improvement Cooperative, Fort Collins, USA, 21: pp. 57-58

Szarka, J., Velich, I., 1979: "Study of the aggressivity of isolates belonging to the Pseudomonas phaseolicola (Burkh.) Dowson," Annual Report Bean Improvement cooperative, Fort Collins, USA. 22: pp. 64-65

Szarka, J., 1986: "Pathogenicity spectrum in the species Xanthomonas phaseoli within the species Phaseolus vulgaris," Bulletin of the Vegetable Crops Research Institute Kecskemét, Hungary 22: pp. 123-127

Szarka, J., 1993: "Testing new sources of resistance to Xanthomonas campestris pv. phaseoli in bean breeding," Bulletin of the Vegetable Crops Research Institute Kecskemét, Hungary 25: pp. 75-79

Velich, I., Szarka, J., Neda, P., Toth, V., 1991: "Iallel analysis of reaction of bean to Pseudomonas and Xanthomonas," Annual Report Bean Impr. Coop., Fort Colling, USA, 34: pp. 31-32

Velich, I., Szarka, J., Neda, P., Csizmadia, L., 1991: "New possibilities in the resistance breeding for bacterial diseases in bean," Bulletin of the Vegetable Crops Research Institute Kecskemét, Hungary, 24: pp. 57-64

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	*Phaseolus vulgaris* L.
1.2 Common Name	French Bean

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 varieties)

(b) partially known cross [ ]
(please state known parent variety(ies))

(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)

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Self-pollination [ ]

(b) 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:

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 (3)	**Plant: growth type**		
	dwarf	Callide (D), Capitole (D)	1[ ]
	climbing	Phenomene (C), Bacle (C)	2[ ]
5.2 (16)	**Flower: color of standard**		
	white	Tuf (D)	1[ ]
	pinkish white	Mira (D)	2[ ]
	pink	Maxi (D), Vilbel (D)	3[ ]
	violet	Delinel (D), Purple Teepee (D)	4[ ]
5.3 (18)	**<u>Dwarf beans only</u>: Pod: length (excluding beak)**		
	very short		1[ ]
	short	Prelude (D), Tuf (D)	3[ ]
	medium	Amity (D), Lusia (D)	5[ ]
	long	Dubra (D), Loma (D)	7[ ]
	very long	Daisy (D), Longking (D), Maja (D)	9[ ]
5.4 (19)	**<u>Climbing beans only</u>: Pod: length (as for 18)**		
	very short		1[ ]
	short	Juwagold (C)	3[ ]
	medium		5[ ]
	long	Fidel (C)	7[ ]
	very long	Toplong (C)	9[ ]

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

	Characteristics	Example Varieties	Note
5.5 (22)	**Pod: shape in cross section (through seed)**		
	narrow elliptic		1[ ]
	ovate	Pascal (D), Pfälzer Juni (D), Regulex (D)	2[ ]
	cordate	Daisy (D)	3[ ]
	circular	Tuf (D)	4[ ]
	eight shaped	Tendercrop White Seeded (D)	5[ ]
5.6 (24)	**Pod: ground color**		
	yellow	Gold fish (D), Golddukat (D), Goldmarie (C)	1[ ]
	green	Fortissima (C), Filetty (D), Diva (D)	2[ ]
	violet	Purpiat (D), Purple Teepee (D)	3[ ]
5.7 (29)	**Pod: stringiness on ventral suture**		
	absent	Cabri (D), Tuf (D)	1[ ]
	present	Facta (D), Marbel (D)	9[ ]
5.8 (43)	**Seed: number of colors**		
	one		1[ ]
	two		2[ ]
	more than two		3[ ]

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

	Characteristics	Example Varieties	Note
5.9 (44)	**Seed: main color (largest area)**		
	white	Goldfish (D), Tuf (D)	1[ ]
	green or greenish	Muriel (D), Pascal (D)	2[ ]
	grey	Centaure (D), Opal (D)	3[ ]
	yellow	Gele Citroen (D)	4[ ]
	beige	Blauhilde (C), Purple Teepee (D)	5[ ]
	brown	Primel (D), Sunray (D)	6[ ]
	red	Flageolet rouge (D)	7[ ]
	violet	Garrafal enana (D), Surpasse phenix (D)	8[ ]
	black	Delinel (D), Vilbel (D)	9[ ]
5.10 (45)	**Seed: secondary color**		
	grey		1[ ]
	yellow		2[ ]
	beige	Abonder (D), Tarot (D)	3[ ]
	brown	Talisman (D)	4[ ]
	red	Fori (D)	5[ ]
	violet	Marbel (D)	6[ ]
	black	Brittle Wax (D)	7[ ]
5.11 (48)	**Time of flowering (50% of the plants with at least one flower)**		
	very early	Pfälzer Juni (D)	1[ ]
	early	Fortissima (C), Perle von Marbach (C), Prelude (D)	3[ ]
	medium	Fanion (D), Groffy (D), Hilda (C), Precores (C)	5[ ]
	late	Necores (C)	7[ ]
	very late		9[ ]

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

	Characteristics	Example Varieties	Note
5.12 (49.1)	**Resistance to *Colletotrichum lindemuthianum* (Cl)**		
	Race 6		
	absent	Goldrush, Masai, Michelet à longue cosse	1[ ]
	present	Booster, Pastoral	9[ ]
5.13 (49.2)	**Resistance to *Colletotrichum lindemuthianum* (Cl)**		
	Race Kappa		
	absent	Goldrush, Masai, Michelet à longue cosse	1[ ]
	present	Booster, Pastoral	9[ ]
5.14 (50)	**Resistance to *Bean common mosaic necrosis virus* (BCMNV)**		
	absent	Dufrix, Flandria	1[ ]
	present with necrosis	Booster, Odessa	2[ ]
	present without symptoms	Bizet	3[ ]
5.15 (51)	**Resistance to *Pseudomonas savastanoi* pv. *phaseolicola* (Psp)**		
	Race 6		
	absent	Michelet à longue cosse (D)	1[ ]
	present	Masai (D), Vaillant (D)	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	*Terminal leaflet: size*	*medium*	*small*

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

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.

[#] 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:

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 of 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]