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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

FRENCH BEAN *

UPOV code: PHASE_VUL

(*Phaseolus vulgaris* L.)

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from France

to be considered by the Technical Committee at its forty-first session,
to be held in Geneva, Switzerland, from April 4 to 6, 2005

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.]

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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 of dwarf beans, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 150 plants, 4 off-types are allowed.

4.2.3 For the assessment of uniformity of climbing beans, 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.

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 of cross section (through seed) (characteristic 22)
(d) Pod: ground color (characteristic 24)
(e) Pod: stringiness on ventral suture (characteristic 29)
(f) Seed: number of colors (characteristic 43)
(g) Seed: main color (largest area) (characteristic 44)
(h) Seed: predominant secondary color (characteristic 45)
(i) Resistance to Bean Common Mosaic Virus (BCMV) (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	mata trepadora	Phenomene (C), Bacle (C)	2
4.	**VG**	**Climbing beans only: Plant: architecture**	**Haricot à rames seulement: Plante: architecture**	**Nur Stangenbohnen: Pflanze: Struktur**	**Sólo matas trepadoras: Planta: forma**		
PQ		pyramidal	pyramidale	pyramidenförmig	piramidal	Haricot maïs (C)	1
		rectangular	rectangulaire	rechteckig	rectangular	Hilda (C)	2
5.	**VG**	**Dwarf beans only: Plant: dwarf type**	**Haricot nain seulement: Plante: type nain**	**Nur Buschbohnen: Pflanze: Buschtyp**	**Sólo matas bajas: Planta: mata baja**		
PQ		non-vining	non-filant	nicht rankend	enana	Callide (D), Capitole (D)	1
		vining	filant	rankend	semienrame	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 matas bajas: Planta: altura**		
QN		low	basse	niedrig	baja	Goldfish (D)	3
		medium	moyenne	mittel	media	Fori (D)	5
		high	haute	hoch	alta	Nerina (D), Rote von Paris (D)	7
7. **(+)**	**MG/ VG/ VS**	**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 matas trepadoras: 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 matas trepadoras: Planta: velocidad a la que trepa**		
QN		slow	lente	langsam	lenta		3
		medium	moyenne	mittel	media	Meicy (C)	5
		rapid	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	Goldfisch (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**	**Endfiederblatt: 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**	**Endfiederblatt: 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	rundlich	circular	Acarli (D), Felix (D), Niver (D)	3
		circular to quadrangular	circulaire à quadrangulaire	rundlich bis viereckig	circular a cuadrangular	Calas (D), Capitole (D), Dorabel (D)	4
		quadrangular	quadrangulaire	viereckig	cuadrangular	Ace (D), Carlyn (D), Madrigal (D)	5

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
13. **(+)**	**VG**	**Terminal leaflet: apex**	**Foliole terminale: sommet**	**Endfiederblatt: Spitze**	**Folíolo terminal: ápice**		
QN	**(a)**	short acuminate	à pointe courte	kurz zugespitzt	acuminado corto		3
		medium acuminate	à pointe moyenne	mittel zugespitzt	acuminado medio	Goldfish (D), Tuf (D)	5
		long acuminate	à pointe longue	lang zugespitzt	acuminado largo	Flo (D), Nerina (D), Prelude (D)	7
14.	**VG**	**Dwarf beans only: Inflorescences: location (at full flowering)**	**Haricot nain seulement: Inflorescences: position (à pleine floraison)**	**Nur Buschbohnen: Blütenstände: Sitz (in voller Blüte)**	**Sólo matas bajas: Inflorescencias: posición (en plena floración)**		
QN		in foliage	dans le feuillage	im Laub	en el follaje	Perola (C), Ryco (D)	1
		partly in foliage	partiellement dans le feuillage	teilweise im Laub	en parte en el follaje	IPRI Juriti (C), Tuf (D), Valja (D)	2
		above foliage	au-dessus du feuillage	über dem Laub	por encima del follaje	Daisy (D), Goldetta (D), IPR Chopin (C)	3
15.	**VG**	**Flower: size of bract**	**Fleur: taille de la bractée florale**	**Blüte: Größe der Braktee**	**Flor: tamaño de la bractea**		
QN		small	petite	klein	pequeño	Fanion (D), Fidel (C), Markant (C), Nerina (D), Ryco (D)	3
		medium	moyenne	mittel	medio	Meicy (C), Torrina (D)	5
		large	grande	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		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 matas bajas: Vaina: longitud (excluida la punta)**		
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 matas trepadoras: 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 at maximum point**	**Gousse: largeur au point maximal**	**Hülse: Breite an maximaler Stelle**	**Vaina: anchura en el punto máximo**		
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: transversal width**	**Gousse: largeur transversale**	**Hülse: Breite des Querschnitts**	**Vaina: anchura transversal**		
QN	**(b)**	very narrow	très étroite	sehr schmal	muy estrecha	Booster (D)	1
		narrow	étroite	schmal	estrecha	Bergamo (D), Rentegevers (C)	3
		medium	moyenne	mittel	media	Impact (D), Flagrano (D), Donna (C)	5
		broad	large	breit	ancha	Emerite (C), Mondiam (D), Maxidor (D)	7
		very broad	très large	sehr breit	muy ancha	Kerprim (D), Hilda (C)	9
22. **(*)** **(+)**	**VG**	**Pod: shape of cross section (through seed)**	**Gousse: forme de la section transversale (au niveau d'un grain)**	**Hülse: Form des Querschnitts (durch den Samen)**	**Vaina: forma de la sección transversal (a nivel de una semilla)**		
PQ	**(b)**	narrow elliptic	elliptique étroite	schmal elliptisch	elíptica estrecha		1
		elliptic to ovate	elliptique à ovale	elliptisch bis eiförmig	elíptica a 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 8 (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 transverse width/median width**	**Gousse: rapport largeur transversale/largeur médiane**	**Hülse: Verhältnis transversale Breite/ mediane Breite**	**Vaina: relación anchura transversal/anchura central**		
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**		
QL	**(b)**	yellow	jaune	gelb	amarillo	Gold fish (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: secondary color**	**Gousse: couleur secondaire**	**Hülse: Nebenfarbe**	**Vaina: color secundario**		
QL	**(c)**	absent	absente	fehlend	ausente	Tuf (D)	1
		present	présente	vorhanden	presente	Marbel (D)	9
27. (*)	**VG**	**Pod: hue of secondary color**	**Gousse: teinte de la couleur secondaire**	**Hülse: Ton der Nebenfarbe**	**Vaina: tonalidad del color secundario**		
QL	**(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 on ventral suture**	**Gousse: fil sur la suture ventrale**	**Hülse: Fädigkeit an der Bauchnaht**	**Vaina: filamento en 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	Goldfisch (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 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 (excluida la punta)**		
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 de la punta**		
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 de la punta**		
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	Goldfisch (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: Struktur der Oberfläche**	**Vaina: textura de la superficie**		
QN	**(b)**	smooth	lisse	glatt	lisa	Prelude (D), Tuf (D)	3
		moderately rough	moyennement rugueuse	mäßig rauh	moderadamente rugosa	Blauhilde (C), Daisy (D), Longking (D)	5
		very rough	très rugueuse	sehr rauh	muy rugosa		7
36.	**VS**	**Pod: constrictions (at dry stage)**	**Gousse: étranglements (au stade sec)**	**Hülse: Einschnürungen (zum Zeitpunkt der Trockenreife)**	**Vaina: estrangulamientos (al estado de vaina seca)**		
QN	**(b)**	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. (*) (+)	**MS**	**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 of median longitudinal section**	**Grain: forme de la section longitudinale médiane**	**Samen: Form des medianen Längsschnitts**	**Semilla: forma de la sección longitudinal central**		
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	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 of median cross section**	**Grain: forme de la section transversale médiane**	**Samen: Form des medianen Querschnitts**	**Semilla: forma de la sección transversal central**		
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 (größter gefärbter Teil)**	**Semilla: color principal (mayor superficie)**		
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		3
		yellow	jaune	gelb	amarillo	Gele Citroen (D)	4
		beige	chamois	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		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: predominant secondary color**	**Grain: couleur secondaire prédominante**	**Samen: vorherrschende Nebenfarbe**	**Semilla: color secundario predominante**		
PQ	**(d)**	grey	grise	grau	gris		1
		yellow	jaune	gelb	amarillo		2
		beige	chamois	beige	beige		3
		brown	brune	braun	marrón		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 Nabelring	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. (*)	**VS**	**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 Bean anthracnose (*Colletotrichum lindemuthianum*)**	**Résistance à l'anthracnose du Haricot (*Colletotrichum lindemuthianum*)**	**Resistenz gegen Brennflecken-krankheit (*Colletotrichum lindemuthianum*)**	**Resistencia a la antracnosis de la judía (*Colletotrichum lindemuthianum*)**		
49.1	**VG**	**Race Lambda**	**Pathotype Lambda**	**Pathotyp Lambda**	**Patotipo Lambda**		
QL		absent	absente	fehlend	ausente	Daisy (D), Tuf (D)	1
		present	présente	vorhanden	presente	Belfin (D), Label (D), Reskia (D)	9
49.2	**VG**	**Race Kappa**	**Pathotype Kappa**	**Pathotyp Kappa**	**Patotipo Kappa**		
QL		absent	absente	fehlend	ausente	Belfin (D), Label (D)	1
		present	présente	vorhanden	presente	Reskia (D)	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
50. (*) (+)	**VG**	**Resistance to Bean Common Mosaic Virus (BCMV)**	**Résistance au virus de la mosaïque commune du Haricot (BCMV)**	**Resistenz gegen Gewöhnliches Bohnenmosaikvirus (BCMV)**	**Resistencia al virus del mosaico común de la judía (BCMV)**		
QL		not resistant to mosaic, no blackroot development	non résistant à la mosaïque, pas de développement du blackroot	nicht resistent gegen Bohnenmosaik, keine Entwicklung von Schwarzbeinigkeit	no resistente al mosaico; no se desarrolla el pie negro	Michelite (D), Rapier (D), Spinel (C)	1
		resistant to mosaic, but developing blackroot	Résistant à la mosaïque, mais développant le blackroot	resistent gegen Bohnenmosaik, aber Schwarzbeinigkeit entwickelnd	resistente al mosaico; se desarrolla el pie negro	Arena (D), Masai (D), Odessa (D), Topcrop (D)	2
		resistant to mosaic and no blackroot development	résistant à la mosaïque et pas de développement du blackroot	resistent gegen Bohnenmosaik, und keine Entwicklung von Schwarzbeinigkeit	resistente al mosaico; no se desarrolla el pie negro	Felspar (C), Great Northern 31 (D)	3
51. (+)		**Resistance to Halo Blight (*Pseudomonas syringae* pv. *phaseo licola*)**	**Résistance à la graisse à halo (*Pseudomonas syringae* pv. *phaseolicola*)**	**Resistenz gegen Fettflecken-krankheit (*Pseudomonas syringae* pv. *phaseolicola*)**	**Resistencia a la grasa (*Pseudomonas syringae* pv. *phaseolicola*)**		
51.1	**VG**	**US Race 1**	**US Pathotype 1**	**US Pathotyp 1**	**US Patotipo 1**		
QL		absent	absente	fehlend	ausente	Amboy (D), Michelite (D)	1
		present	présente	vorhanden	presente	RM UI-3 (D), RM UI-34 (D), Forum (D), Masai (D)	9
51.2	**VG**	**US Race 2**	**US Pathotype 2**	**US Pathotyp 2**	**US Patotipo 2**		
QL		absent	absente	fehlend	ausente	RM UI-3 (D), RM UI-34 (D)	1
		present	présente	vorhanden	presente	Forum (D), Masai (D)	9
52. (+)	**VG**	**Resistance to Common Blight (*Xanthomonas campestris* pv. *phaseoli*), Isolate 422**	**Résistance à la graisse commune (*Xanthomonas campestris* pv. *phaseoli*), Isolate 422**	**Resistenz gegen Bohnenbrand (*Xanthomonas campestris* pv. *phaseoli*), Isolat 422**	**Resistencia a la grasa común (*Xanthomonas campestris* pv. *phaseoli*), Isolate 422**		
QL		absent	absente	fehlend	ausente	Echo (D), Keygold (D)	
		present	présente	vorhanden	presente	Walley (US line) (D)	

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).

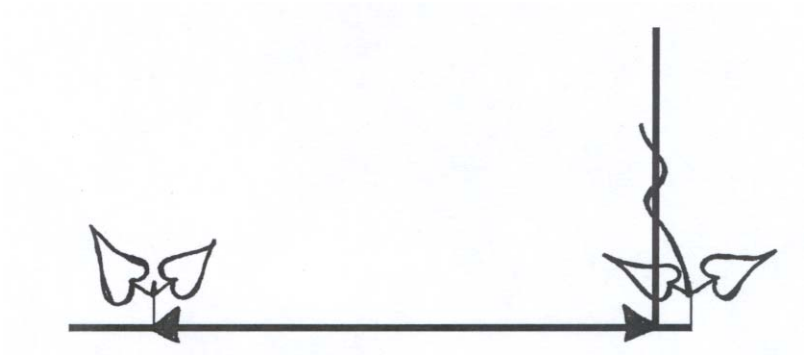
(b) Pod: All observations on the pod should be made at the time of fresh market maturity.

(c) Pod: Observations on the secondary color of the pod 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. 7: Climbing beans only: Plant: start of climbing (80% of plants)

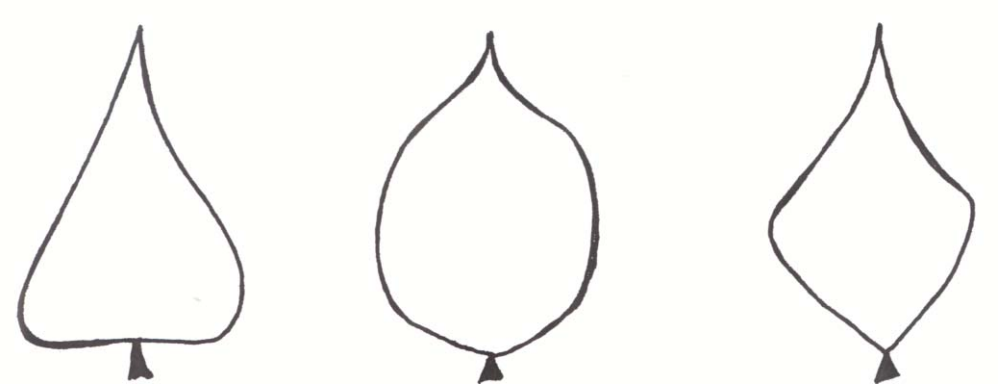


Number of days

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

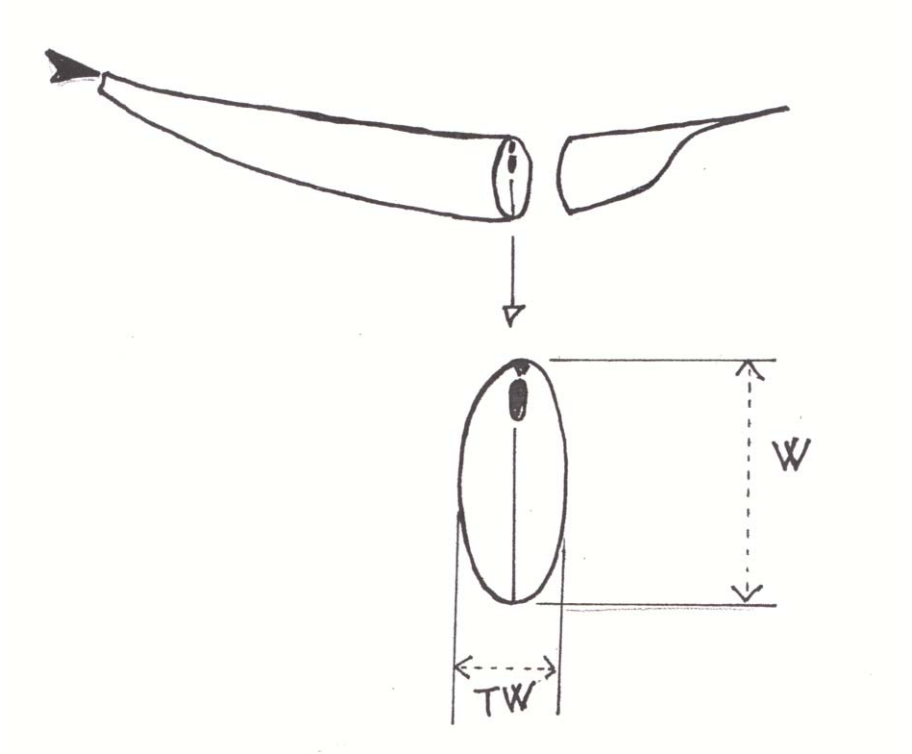


1	3	5
triangular	circular	quadrangular

Ad. 13: Terminal leaflet: apex

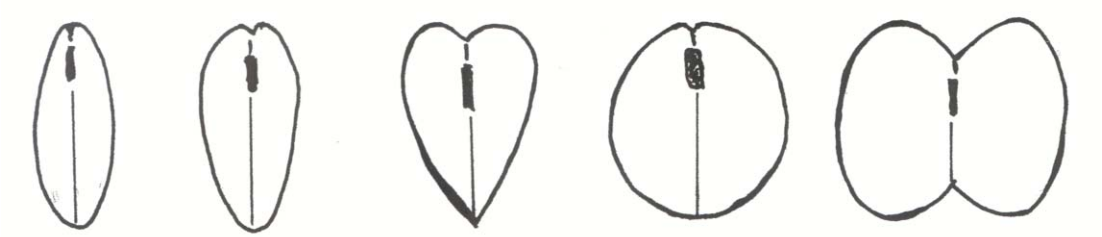
3	5	7
short acuminate	medium acuminate	long acuminate

Ad. 20: Pod: width at maximum point
Ad. 21: Pod: transversal width



W: width at maximum point (characteristic 20)
TW: transversal width (characteristic 21)

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



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

Ad. 23: Pod: ratio transverse width/median width

= TW/W (see characteristics 20 and 21)

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

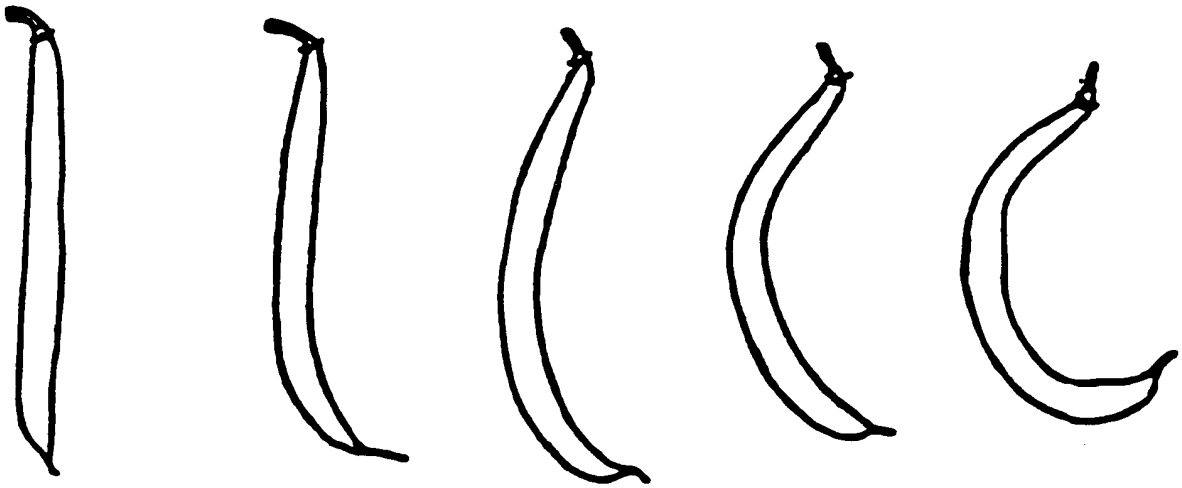
	Characteristic 24: Pod: ground color		
Characteristic 25: Pod: intensity of ground color	yellow (1)	green (2)	violet (3)
light (3)	Erato (D), Frühe dickfleischige Wachs (D), Goldmarie (C),	Fortissima (C), Rabl (D), Ragalla (D), Ryco (D)	
medium (5)	Gabriella (D), Goldelfe (C), Goldfish (D)	Filetty (D), 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 on 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.

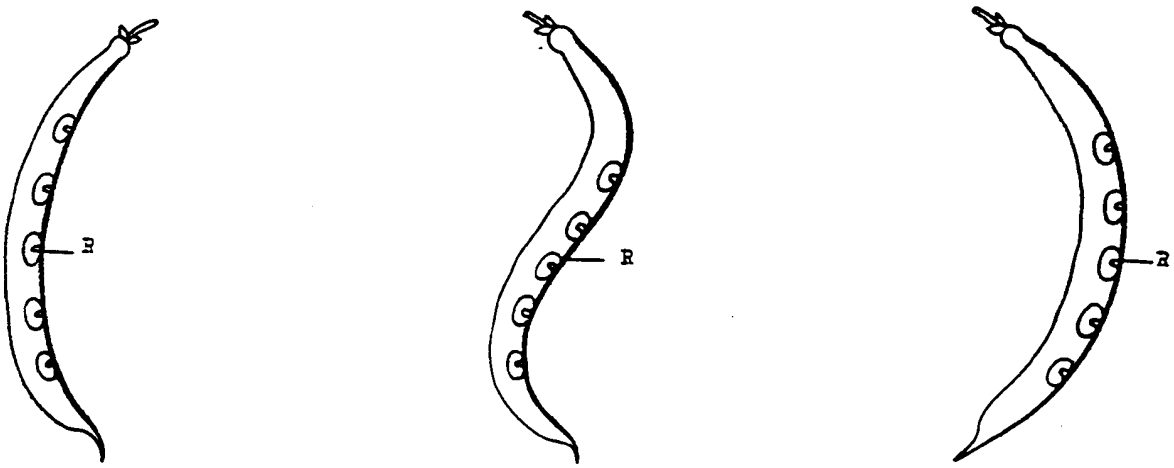
The strings are very strong and should not be confused with the oakum, for example, which has a weaker structure.

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

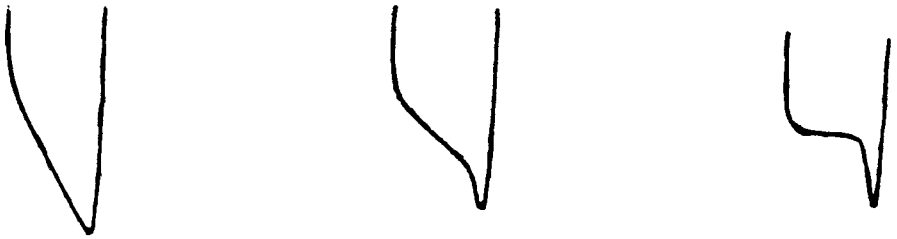


1
concave

2
s-shaped

3
convex

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



1
acute

2
acute to truncate

3
truncate

Ad. 37: Seed: weight

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

Ad. 38: Seed: shape of median longitudinal section

1
circular

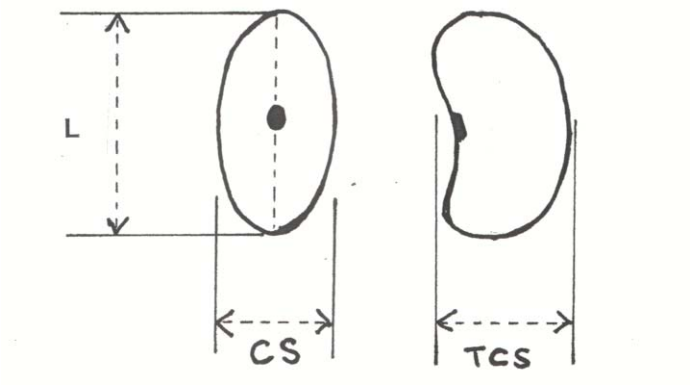
2
circular to elliptic

3
elliptic

4
kidney-shaped

5
rectangular

Ads. 40, 41, 42: Seed: shape of median cross section (40), width in cross section (41), length (42)



CS: Seed: shape of median cross section (characteristic 40)
TCS: Seed: width in cross section (characteristic 41)
L: Seed: length (characteristic 42)

Ads. 45: Seed: predominant secondary color

The predominant 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 Bean anthracnose (*Colletotrichum lindemuthianum*)

Maintenance of races	In a test tube on glucose-peptone agar
Pre-germination of seed (about 4 to 5 days)	At least twice, 10 seeds are placed at 20°C in petri-dishes on moist vermiculite. After the start of germination (1 to 2 cm root length) the seed coat is removed.
Inoculum and inoculation	Growth on GPA in 1 liter glass bottles for 12 to 14 days. Removal of inoculum with a scraper. The germinated seeds are dipped in a suspension of spores of *Colletotrichum lindemuthianum* for 2 minutes. The concentration of spores should be 1 million spores per ml
Sowing:	Sowing in pots with sand, covering of seed with sand to 1 cm.
Culture of plants:	The pots are placed in a Phytotron at 20°C with 16 hours of daylight. Regular watering is needed, no special air humidity requirements.
Observation:	The symptoms are visible during sprouting of the plants or up to 10 days thereafter. The observations can be made after 10 to 14 days.
Scheme of observation:	Resistance present: healthy plants with no symptoms, or weak reaction with small superficial necroses in the form of dots or stripes Resistance absent: reaction with up to 5 necrotic flecks on stem, or strong reaction with necroses larger than 3 mm, sunk deeply into the tissue, or dying plants with strong formation of necroses during sprouting or thereafter.

Ad. 50: Resistance to Bean Common Mosaic Virus (BCMV)

Production of infection material	
Nature of medium:	Plants or dry leaves
Special conditions:	Glasshouse culture (plants) or deep-frozen leaves
Identification:	Use of virus strain "NL 3"
Conduct of trials	
Plant stage:	Two-leaf
Temperature:	Culture at 20 to 25°C, following inoculation 30°C for a period of 8 days
Light:	Normal daylight, if necessary shaded
Culture:	Glasshouse
Type of inoculation:	Mechanical, by rubbing the inoculum on the leaves
Duration of trials	
- Sowing to inoculation:	8 to 9 days
- Inoculation to observation:	6 to 21 days
Number of plants tested:	60 (20 pots with 3 plants each)

Description of the Method

(1) Obtaining the inoculation material.- The virus strain "NL 3" is used for the tolerance testing since it covers practically all the groups of strains of Bean Common Mosaic Virus. To begin with, dwarf bean plants of the variety "Dufrix" or of another variety highly sensitive to the virus are infected, around the beginning of April, by rubbing with pressed juice containing the virus, obtained from own maintenance culture or from freeze-dried leaves (provided for instance by the Institute for Biochemistry and Virus Diseases of the Federal Biological Institute in Brunswick (= strain "NL 3")). These infected plants are then used, at the beginning of June, for producing pressed juice containing the virus with which the test plants are inoculated.

(2) Inoculation.- The pressed juice containing the virus is diluted for inoculation (approximately one part juice to two parts water). After the two leaves have been strewn with carborundum or celite, the diluted juice is lightly rubbed on using a firm sponge. The leaves are then rinsed with water some 15 to 20 minutes later using a watering can with a fine spout.

(3) Incubation.- Following inoculation, the air temperature in the glasshouse must be kept at 30°C for at least one week. (Important!!! The temperature must be maintained throughout the day and also at night). First lesions may already occur after 3 to 4 days. Top necrosis will already become visible one week after inoculation. Varieties with tolerance absent demonstrate the typical mosaic symptoms after approximately two weeks. The final observations can be made some three weeks after inoculation.

(4) Observation: The first assessment should be made on the sixth day following the day of innoculation. The mosaic symptoms and the necrotic symptoms can be distinguished as follows:

(i) Mosaic symptoms: pale-colored leaves; light and dark green mosaic; dark green areas between veins blistered; narrow chlorotic bands along veins and leaf margin rolling downwards. Various symptoms may be expressed in various degrees. The mosaic symptoms may be recorded using a scale from 1 to 9 to assess the reaction of the candidate variety (1 = no symptoms, 9 = strongest stage of expression). If a candidate variety does not show any mosaic symptoms, while the susceptible standard varieties do so, that candidate variety should be regarded as being resistant to mosaic.

(ii) Blackroot symptoms: there are two types of necrosis (especially when tested with strain "NL3"), which are to be classified as "Blackroot."

Local necrosis (local hypersensitivity): characterized by brown necrotic netting (the veins) localized on a part of the leaf blade;

Systemic necrosis (top necrosis): characterized by a rapid development of necrosis through out the stem, the petiole and the roots, resulting in top necrosis or even complete necrosis of the plant. (The vascular bundles of the stem, the petiole and finally the roots, if innoculated at a young plant stage, turn brown, hence the term "Blackroot").

Varieties or strains showing blackroot symptoms (both local hypersensitivity and top necrosis) generally prove to be resistant to mosaic in the field.

During the resistance testing most local necroses develop into top necroses.

Remarks:

The genetics of resistance to Bean Common Mosaic Virus (BCMV) and/or Blackroot is based on a number of a-specific and specific recessive genes of which some are allelic. Drijfhout found at least 4 genes; e.g.:

bc-u
bc-1/bc-1^2
bc-2/bc-2^2
and bc-3.

A dominant necrosis gene 'I' interferes with these resistance genes. The recessive form 'I^+' in combination with bc-3 and bc-2^2 gives complete resistance to both BCMV and Blackroot (Example variety: Great Northern 31).

(for more details, see Drijfhout (1978))

Ad. 51: Resistance to Halo Blight (*Pseudomonas syringae* pv. *phaseolicola*)

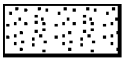
Maintenance of strains	
Type of medium	Infected, dry leaves
Identification:	On the basis of preliminary trials, the European strains (which probably belong to the African race- by J.D. Taylor, H.R.I. Wellesbourne) have a higher level of virulence than the US race 1 and race 2. The aggressivity of the pathogen is measured by the spot size of the pod of sensitive varieties. The isolates used for the test should cause a grease spot with a minimum diameter of 3 mm.
Execution of test	
Growth stage of plants:	When the first and second trifoliate leaves are 2 to 3 cm in length
Temperature:	Day: 24°C; night: 18°C
Humidity:	100% relative humidity until inoculated leaves are fully developed
Growing method:	In the glasshouse
Inoculum:	Bacterial suspension with a concentration of 10^8 bacterial cells/ml.
Method of inoculation:	Mechanical, using a camel-hair brush
Duration of test	
- from inoculation to reading:	Until infected leaves are fully developed
Number of plants to be tested:	10-20 plants
Multiplication/propagation of bacteria:	Bouillon-Agar (2 g Na_2 HPO_4, 2 g NaH_2PO_4, 3 g NaCl, 25 g Bouillon-Agar/1000 ml distilled water)

Remarks:

- Leaf reaction is very commonly studied nowadays. The reaction of the pod is of polygenic character, and there is no genetic linkage between leaf and pod reaction. There are as yet no varieties with pod resistance.
- Resistance means, genetically, that this host has the recessive gene with or without the presence of the modifiers; in the case where the modifiers are present the sources of these genes are: PI 150 414 (USA), CNRA-HW5A (Fr.).

It is possible to evaluate the lesions at the stage of the fully developed leaf. The different types of symptom are shown below.

Legend of illustration following hereafter


healthy tissue


toxically chlorotic tissue

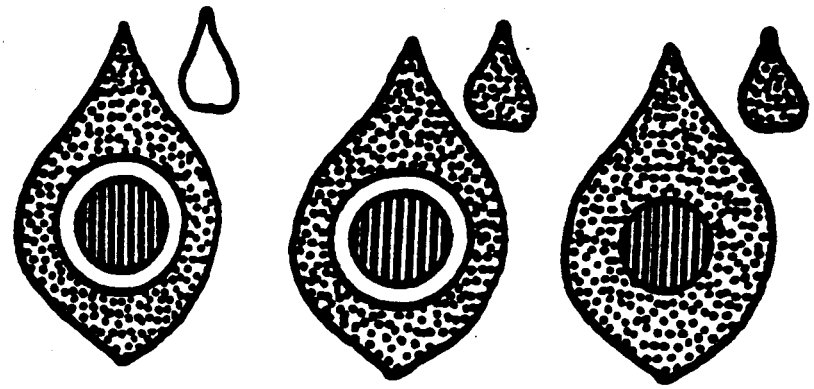

water-soaked lesion without discoloration


water-soaked lesion with discoloration

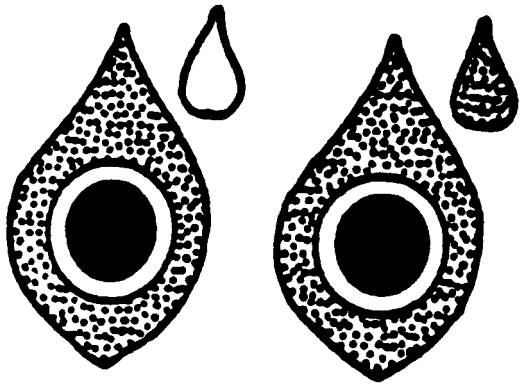

some cell-size brownish red necrotic spots

Scheme of observation

Resistance absent

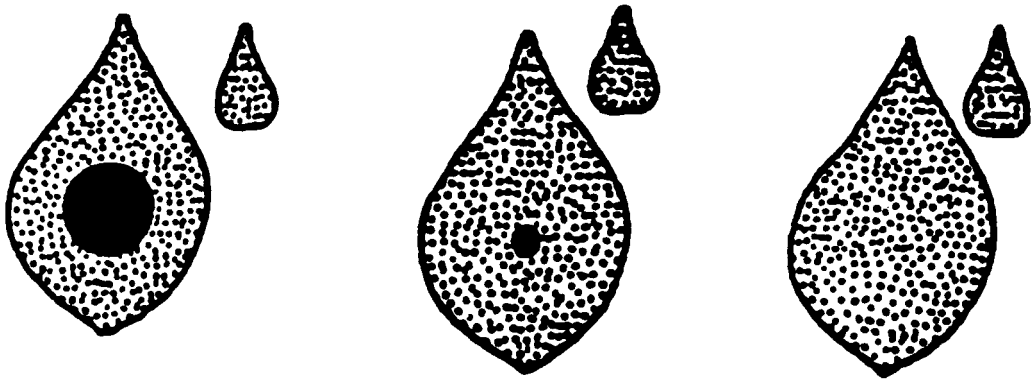


water-soaked lesion with toxically chlorotic halo, systemic chlorosis;
water-soaked lesion with halo, no systemic chlorosis;
water-soaked lesion without halo, no systemic chlorosis



discoloration of water-soaked lesions with halo, systemic chlorosis;
discoloration of water-soaked lesions halo, no systemic chlorosis

Resistance present

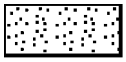


necrotic spots of 1-2 mm diameter, no systemic chlorosis or some cell-size brownish-red hypersensitive necrotic spots or healthy, uninfected plant

Ad. 52: Resistance to Common Blight (*Xanthomonas campestris* pv. *phaseoli*), Isolate 422

Maintenance of races	
Type of medium:	Infected, dry leaves
Execution of test	
Growth stage of plants:	When the first and second trifoliate leaves are 2 to 3 cm in length
Temperature:	Day: 26°C; night: 20°C
Humidity:	100% relative humidity during, and 1 to 2 days after, inoculation, thereafter normal relative humidity
Growing method:	In the glasshouse
Inoculum:	Bacterial suspension with a concentration of 10^8 bacterial cells/ml.
Method of inoculation:	Mechanical, using a camel-hair brush
Duration of test	
- from inoculation to reading:	Until infected leaves are fully developed
Number of plants tested:	10-20 plants
Multiplication/propagation of bacteria:	20 g extract of yeast powder, 20 g glucose, 20 g $CaCO_3$, 20 g agar-agar/1000 ml distilled water)
Remarks:	- Isolate 422 can be obtained from the Vegetable Research Institute, 1775 Budapest, P.O. Box 95, Hungary. - The reaction of pods to *X. phaseoli* is not yet clear enough today.

Legend of illustration following hereafter


healthy tissue


(1) chlorotic tissue


(2) dying tissues


(3) some cell-size brownish red hypersensitive necrotic spots

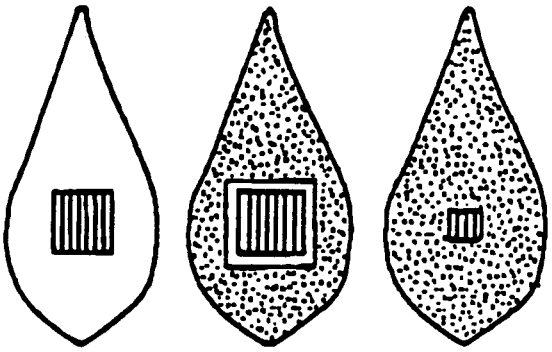
Scheme of observation

If chlorotic tissues (1) and/or dying tissue (2) are observed, the variety should be regarded as non-resistant.

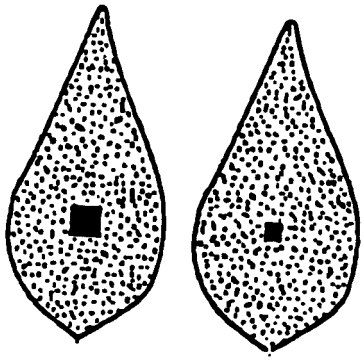
If only some cell-size brownish red hypersensitive necrotic spots (3) are observed, the variety should be regarded as resistant.

Possible combinations of symptoms

Resistance absent



Resistance present



9. Literature

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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)

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

3. Proposed denomination and breeder's reference

Proposed denomination (if available) [ ]

Breeder's reference [ ]

[#]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		2[ ]
	pink	Maxi (D), Vilbel (D)	3[ ]
	violet	Delinel (D), Purple Teepee (D)	4[ ]
5.3 (18)	**Dwarf beans only: 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)	**Climbing beans only: 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 of cross section (through seed)**		
	narrow elliptic		1[ ]
	elliptic to 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		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		8[ ]
	black	Delinel (D), Vilbel (D)	9[ ]
5.10 (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
5.11 (49)	**Resistance to Bean anthracnose (*Colletotrichum lindemuthianum*)**		
	Race Lambda		
	absent	Daisy (D), Tuf (D)	1[ ]
	present	Belfin (D), Label (D), Reskia (D)	9[ ]
	Race Kappa	Belfin (D), Label (D)	1[ ]
	absent	Reskia (D)	9[ ]
	present		
5.12 (51)	**Resistance to Halo Blight (*Pseudomonas syringae* pv. *phaseo licola*)**		
	US Race 1		
	absent	Amboy (D), Michelite (D)	1[ ]
	present	RM UI-3 (D), RM UI-34 (D), Forum (D), Masai (D)	9[ ]
	US Race 2		
	absent	RM UI-3 (D), RM UI-34 (D)	1[ ]
	present	Forum (D), Masai (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]