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WORKING PAPER ON TEST GUIDELINES FOR BROAD BEAN

Document prepared by experts from the United Kingdom

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I. Subject of these Guidelines

These Test Guidelines apply to all varieties of Broad Bean *Vicia faba* L. var. *major*

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the seed required for testing the variety is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must make sure that all customs formalities are complied with. The minimum quantity of seed to be supplied by the applicant in one or several samples should be:

2kg (or at least 2000 seeds)

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing standard or certified seed in the country in which the application is made. The germination capacity should be as high as possible.

2. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

1. The minimum duration of tests should normally be two similar growing periods.
2. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.
3. The tests should be carried out under conditions ensuring normal growth. The size of the plots should be such that plants or parts of plants may be removed for measurement and counting without prejudice to the observations which must be made up to the end of the growing period. As a minimum, each test should include a total of 160 plants which should be divided between 2 or more replicates. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions.
4. Additional tests for special purposes may be established.

IV. Methods and Observations

1. All observations determined by measurement or counting should be made on 40 plants or parts of 40 plants.
2. All plants indicated under Chapter III above should be used for the testing of uniformity. Relative uniformity standards should be applied.

3. Unless otherwise indicated, all observations on the foliage and the pod should be made before green harvest maturity.
4. All observations on the seed should be made on dry seed and the seed weight should be measured by weighing the largest seed from the largest pod for each plant sampled.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. Characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.
2. It is recommended that the competent authorities use the following characteristics for grouping varieties:
 - i) Plant: growth type (characteristic 2)
 - ii) Wing: melanin spot (characteristic 17)
 - ii) Dry seed: color of testa (characteristic 33)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the 3 UPOV working languages in the Table of Characteristics should be used. Additional information on the characteristics can be found in the Annex to this document.
2. Notes (1 to 9), for the purposes of electronic data processing, are given opposite the states of expression for each characteristic.
3. Legend:
 - (*) Characteristics that should be used on all varieties in every growing period over which the examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristics or regional environmental conditions render this impossible.
 - (+) See Explanations on the Table of Characteristics in chapter VIII.
- 1) The optimum stage of development for the assessment of each characteristic is indicated by a number in the second column. The stages of development denoted by each number are described at the end of chapter VIII.

VII. Table of Characteristics/Tableau des caracteres/Merkmalstabelle

Characteristics Caracteres Merkmale		Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(+) 1.	Seed: tannin	00	absent or very weak	absent	fehlend	Driemaal Wit, Feligreen	1
	Grain: tannin		present	présent	vorhanden	Gruno	9
	Samen: Tannin						
(*) 2.	Plant: growth type	300 - 399	determinate			(Signal),(Pronto)?	1
			indeterminate			Metissa	2
(*) 3.	Plant: height	200 - 299	very short			The Sutton	1
	Plante: hauteur		short			Arbo, Reina Mora	3
	Prianze: Höhe		medium			Multigreen	5
			tall				7
			very tall				9
(*) 4.	Plant: number of stems (including tillers more than half the length of the main stem)	200 - 299	few	faible	gering	The Sutton	3
			medium	moyen	mittel		5
	Plante: nombre de tiges (tiges dépassant la moitié de la longueur de la tige principale)		many	élevé	gross	Arbo, Reina Blanca	7
	Pflanze: Anzahl der Triebe (einschliesslich der Triebe mit mehr als der halben Länge der Haupttriebe)						
	5. Stem: number of nodes (up to and including first flowering node)	200 - 299	few	faible	gering	Driemaal Wit, Metissa	3
			medium	moyen	mittel	Futura	5
	Tige: nombre de noeuds (Jusqu'au premier noeud florifère inclus)		many	élevé	gross	Ite	7
	Trieb: Anzahl Knoten (bis einschliesslich des ersten blühenden knotens, einschliess- lich Schuppenknoten)						

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
6. Stem: anthocyanin coloration	300 - 399	absent or very weak			Driemaal Wit, Metissa	1
		weak	faible	gering	Futura	3
Tige: pigmentation anthocyanique		medium	moyenne	mittel	Multigreen	5
		strong	forte	stark		7
Trieb: Stärke der Anthocyanfärbung		very strong				9
7. Foliage: color	100 - 399	green	vert	grün	Metissa	1
Feuillage: couleur		bluish green	vert bleuâtre	bläulichgrün		2
Laub: Farbe		greyish green	vert grisâtre	gräulichgrün	Osnaweiss	3
8. Foliage: intensity of green color (before flowering)	100 - 399	light	clair	hell	Driemaal Wit	3
Feuillage: intensité de la couleur verte (avant floraison)		medium	moyen	mittel	Express,Futura	5
Laub: Intensität der Grüntönung (vor der Blüte)		dark	foncé	dunkel	Gruno	7
(*) 9. Leaflet: length (basal pair of leaflets at second flowering node)	220 - 240	short	courte	kurz	Metissa	3
Foliole: longueur (paire basale de folioles)		medium	moyenne	mittel	Superaguadulce Tézier, Futura	5
Fiederblatt: Länge (Basisfieder- blattpaar)		long	longue	lange	Lange Hangers, Osnabrücker Markt	7
(*) 10. Leaflet: width (as for 10)	220 - 240	narrow	étroite	schmal	The Sutton	3
Foliole: largeur (comme pour 10)		medium	moyenne	mittel		5
		broad	large	breit	Signal, Ite, Osnabrücker Markt	7

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 11. Leaflet: position of maximum width (as for 10)	220 - 240	towards tip				1
		at middle				2
		towards base				3
12. Leaflet: folding (along the main vein, terminal pair of leaflets at second fertile node) Feuille: plissure (le long de la nervure principale, paire de folioles terminale) Fiederblatt: Faltung (entlang der Mittelrippe, Endfiederpaar)	220 - 240	weak	faible	gering	Metissa	3
		medium	moyenne	mittel		5
		strong	forte	stark	Minica	7
(*) 13. Raceme: number of flowers (at 2nd flowering node) Etage: nombre de fleurs (au 2è noeua florif ère) Blütenstand: Anzahl blüten (am zweiten oder dritten blühenden Knoten)	220 - 240	few	faible	gering	Aguadulce Claudia	3
		medium	moyen	mittel		5
		many	élevé	gross		7
(*) 14. Time of flowering (50% of the plants with at least one flower) Epoque de floraison (50% des plantes avec au moins une fleur) Blünzeitpunkt (50% der Pflanzen zeigen wenigstens eine Blüte)	210	early	précoce	früh	Minica, Optica	3
		medium	moyenne	mittel	Futura	5
		late	tardive	spät	Osnabrücker Markt	7
(+) 15. Flower: length Fleur: longueur Blüte: Länge	220 - 230	short	courte	kurz	Aguadulce Claudia, The Sutton	3
		medium	moyenne	mittel	Minica	5
		long	longue	lang	Giant Four Seeded Green Windsor	7

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 16. Wing: melanin spot	210 - 299	absent	absente	fehlend	Driemaal Wit, Feligreen, Metissa	1
Aile: tache de mélanine		present	présente	vorhanden	Gruno, Futura	9
Flügel: Melaninfleck						
(*) 17. Wing: colour of melanin spot	210 - 299	brown			Goldrush	1
		black				2
		greenish yellow			Golda	3
18. Standard: melanin spot	210 - 299	absent	absente	fehlend	Driemaal Wit, Futura	1
Etendard: tache de mélanine		present	présente	vorhanden	Felix	9
Fahne: Melaninfleck						
(*) 19. Standard: anthocyanin coloration	210 - 299	absent	absent	fehlend	Driemaal Wit	1
Etendard: pigmentation anthocyannique		present	présent	vorhanden		9
Fahne: Anthocyanfärbung						
(+) 20. Standard: extent of anthocyanin coloration	210 - 299	small			The Sutton, Osnabrücker Markt	3
Etendard: extension de la pigmentation anthocyannique		medium				5
Fahne: Ausmass der Anthocyanfärbung		large				7
(*) 21. Truss: number of pods	350 -360	few	petit	gering	Aguadulce Claudia, Muchamiel	3
Etage: nombre de gousses		medium	moyen	mittel	Ite, Metissa	5
Fruchtstand: Anzahl Hülsen		many	grand	gross		7

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(*) 22. Pod: attitude	320 - 399	erect	dressé	aufrecht	Optica	1
Gousse: port		semi-erect	demi-dressé	halbaufrecht	Statissa, The Sutton	3
Hülse: Stellung		horizontal	horizontal	waagrecht	Trio	5
		semi-pendulous	demi-retombant	halbhängend	Cavalier	7
		pendulous	retombant	hängend	Lange Hangers, Futura	9
(*) 23. Pod: length (without beak)	350 - 370	very short	très courte	sehr kurz		1
Gousse: longueur (sans le bec)		short	courte	kurz		3
Hülse: Länge (ohne Zahn)		medium	moyenne	mittel	Arbo, Futura,	5
		long	longue	lang	Imperial Green Longpod,	7
		very long	très longue	sehr lang	Hangdown Grunkernig	9
24. Pod: beak length	350 - 370	short				3
		medium				5
		long				7
(*) 25. Pod: width (from suture to suture)	350 - 370	very narrow	très étroite	sehr schmal	Ite	1
Gousse: largeur médiane		narrow	étroite	schmal	Felix, Minica	3
Hülse: mediane Breite		medium	moyenne	mittel	Trio	5
		broad	large	breit	Con Amore	7
		very broad	très large	sehr breit	Aguadulce Claudia, Giant Four Seeded Green Windsor	9

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(+) 26. Pod: degree of curvature at green shell stage	350 - 370	absent or very weak	nulie our très faible	fehlend oder sehr gering	Optica	1
Grouse: intensité de la courbure au stage gousses vertes		weak	faible	gering	Metissa	3
Hülse: Stärke der Krümmung im Grünhülsen-stadium		medium	moyenne	mittel	Witkiem	5
		strong	forte	stark	Groene Hangers, Futura	7
		very strong	très forte	sehr stark		9
27. Pod: intensity of green color	350 - 370	light	faible	hell	Futura	3
Gousse: intensité de la couleur verte		medium	moyenne	mittel		5
Hülse: Intensität der Grünfärbung		dark	forte	dunkel	Statussa	7
(*) 28. Pod: total number of ovules	350 - 370	few	faible	gering	Witkiem	3
		medium	moyen	mittel	Masterpiece Green Longpod	5
Gousse: nombre d'ovules (y compris les semences)		many	élevé	gross	Imperial Green Longpod	7
Hülse: Anzahl Samenanlagen (einschliesslich Samen)						
29. Pod: thickness of pod wall	350 - 370	thin	fine	dünn	Statissa	3
Gousse: épaisseur de la cosse		medium	moyenne	mittel		5
Hülse: Dicke der Hülsenwand		thick	épaisse	dick	Aguadulce Claudia, Futura	7

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 30. Dry seed: shape of median (+) longitudinal section	500	narrow elliptic			Metissa	1
Grain: forme de la section longitudinale mediane		elliptic			Futura	2
		broad elliptic				3
Samen: Form des medianen Langsschnitts		circular	circulaire	rund		4
		square	rectangulaire	rechteckig		5
		ovate	ovale	eiförmig		6
31. Dry seed: shape of cross section	500	narrow elliptic	elliptique étroite	schmal elliptisch	Aguadulce Claudia,, Futura	1
Grain: forme de la section transversale		elliptic	elliptique	elliptisch		2
Samen: Form des Querschnitts		broad elliptic	elliptique large	breit elliptisch	Ite	3
(*) 32. Dry Seed: weight	500	very low	très faible	sehr niedrig	Ite	1
		low	faible	niedrig	Minica, Optica, Metissa	3
		medium	moyen	mittel		5
		high	élevé	hoch	Express, Futura	7
		very high	très élevé	sehr hoch	Griant Four Seeded Green Windsor	9
(*) 33. Dry seed: color of testa (+) (immediately after harvest)	500	beige	beiges	beige	Driemaal Wit, Trio,	1
Grain: couleur des téguments (immédiatement après la récolte)		green	verts	grün	Gruno, Staygreen	2
		red	rouges	rot	Red Epicure	3
Samen: Farbe der Samenschale (gleich nach Ernte)		violet	violets	violett	Reina Mora	4
		black	noirs	schwarz	(Vesuvio)	5

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
34. Dry seed: black pigmentation of hilum	500	absent	absente	fehlend	Driemaal Wit	1
Grain: pigmentation noire du hile		present	présente	vorhanden		9
Samen: schwarze Pigmentierung des Nabels						
35. Time of full development of pod (first fully developed pods)	500	early	précoce	früh	Reina Mora, Futura	3
Epoque de développement complet de la gousse (premières gousses complètement développées)		medium	moyenne	mittel	Aguadulce Claudia	5
Zeitpunkt der vollen Entwicklung der Hulse (erste vollentwickelte Hülsen)		late	tardive	spät	Gruno, Ite	7

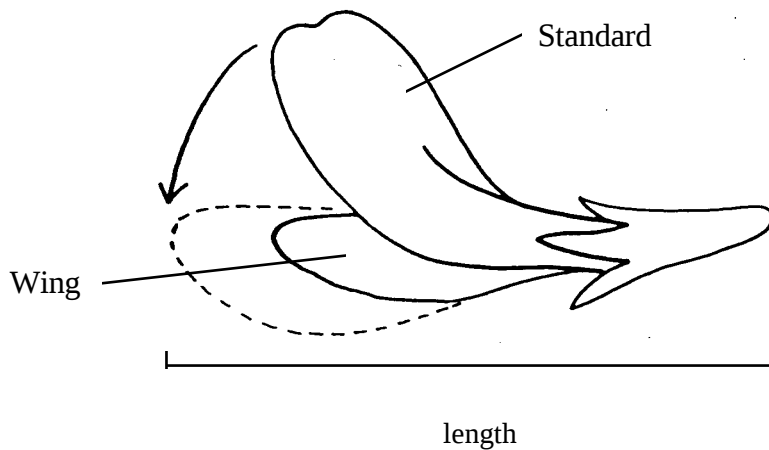
VIII. Explanations on the Table of Characteristics

Ad. 1, 16, 33 Seed: tannin; wing: melanin spot and seed: color of testa

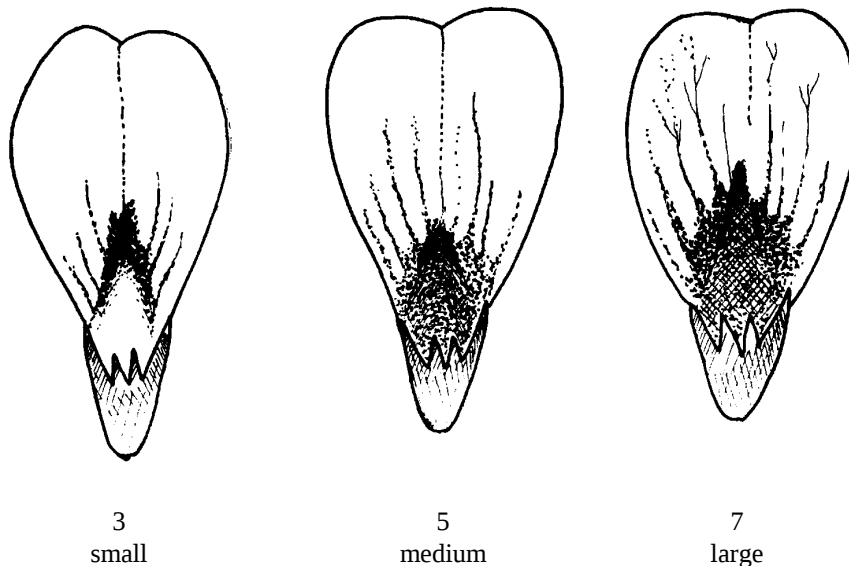
Tannin content of testa correlates with melanin spot on the flower wing. Maintaining both characteristics is necessary, as observations are made at very different stages and different times. The content of tannin should be tested by removing a piece of the testa from the seed and placing 1 or 2 drops of the test reagent upon its inner surface. A bright pink colour will develop within 1 or 2 minutes in the presence of tannins (Reagent: A 50% ethanol; B 1% vanillin in conc. HCl; A and B mixed 1:1 for use).

Seeds that are yellowish grey immediately after harvest will turn brown after ageing if they contain tannin.

Ad. 15 Flower: length



Ad. 20 Standard: extent of anthocyanin colouration



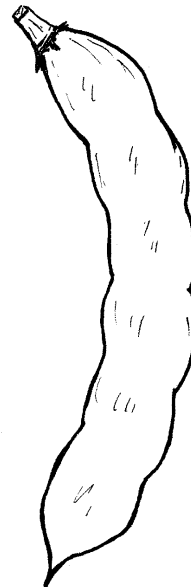
Ad. 26 Pod: degree of curvature at green shell stage



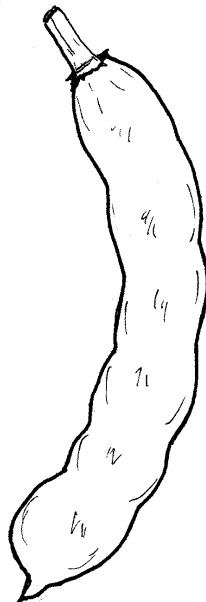
1
absent or very weak



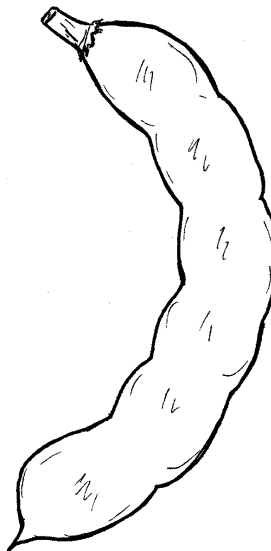
3
weak



5
medium

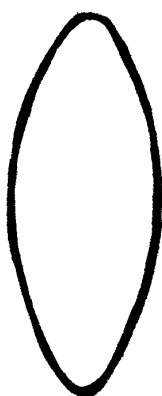


7
strong

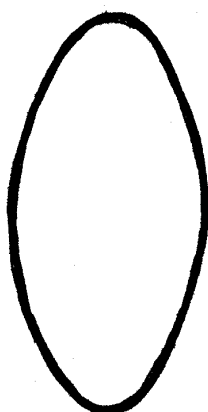


9
very strong

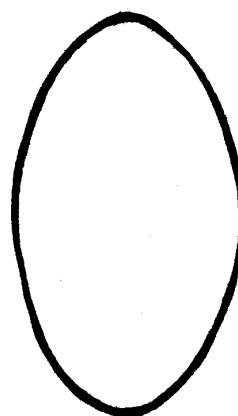
Ad. 30 Seed: shape of median longitudinal section



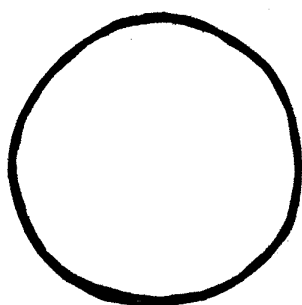
1
narrow
elliptic



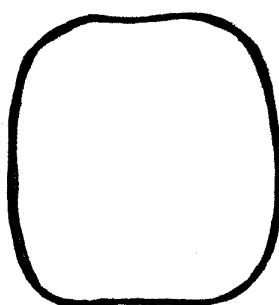
2
elliptic



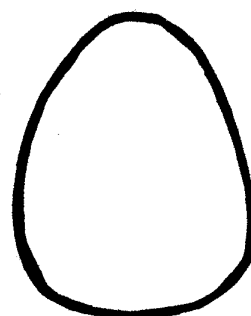
3
broad
elliptic



4
circular



5
square



6
ovate

Ad. 35 Dry seed: black pigmentation of hilum

Certain varieties, which by their genetic structure show segregation in respect of this characteristic, are admissible provided that the breeder is able to ensure stability. However, this characteristic cannot be used for establishing distinctness of varieties mentioned in the previous sentence. For varieties which show segregation, the characteristic should be described in the state “present” and the proportions of the two states of expression should, in each individual case, be included in the description.

IX. Growth Key

<u>Key</u>	<u>General Description of growth Stage</u>
00	Dry seed

01 - 09 Germination to emergence from soil

Seedling Growth

10	First scale leaf fully developed (first node)
15	Second scale leaf fully developed (second node)
20	First true leaf developing at the third node
25	First true leaf partially opened, but not fully developed
30	First true leaf fully developed and opened
40	Second true leaf fully developed and opened
50	Third true leaf fully developed and opened

Vegetative growth from seedling to flowering

60	Fourth true leaf fully developed and opened
70	Fifth true leaf fully developed and opened
80	Sixth true leaf fully developed and opened
90	Seventh true leaf fully developed and opened
100	Eighth true leaf fully developed and opened
110	Ninth true leaf fully developed and opened
120	Tenth true leaf fully developed and opened
130	Eleventh true leaf fully developed and opened
140	Twelfth true leaf fully developed and opened
150	Thirteenth true leaf fully developed and opened
160	Fourteenth true leaf fully developed and opened
170	Fifteenth true leaf fully developed and opened
180	Sixteenth true leaf fully developed and opened

Reproductive growth from flowering to podding

200	Flower buds visible on the first flowering node
205	Flower open, but not fully open
210	First fully open flower on the first raceme
220	Second fully open flower on the first raceme
230	Third fully open flower on the first raceme
240	Fourth fully open flower on the first raceme
250	Fifth fully open flower on the first raceme

Reproductive growth from podset to full pod development

300	First pod set
320	First pod well formed with immature seeds
330	First pod fully formed with seeds at maximum size
340	First pod with seeds becoming starchy
360	Second pod with seeds becoming starchy
370	Third pod with seeds becoming starchy
380	Fourth pod with seeds becoming starchy

Pod senescence to seed ripening

400	Pods beginning to dry out and turn black
425	25% of pods dry and black, seeds at lowest nodes becoming rubbery
450	50% of pods dry and black, seeds at lowest nodes becoming dry and hard
475	75% of pods dry and black, seeds at lowest nodes dry and hard
500	All pods dry and black, seeds dry and hard

X. Literature

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X. Technical Questionnaire

Reference Number
(not to be filled in by the applicant)

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

1. Species *Vicia faba* L. var. *major*
Broad Bean

2. Applicant (Name and address)

3. Proposed denomination or breeder's reference

4. Information on origin, maintenance and reproduction of the variety

4.1 Variety type

Open pollinated variety ☐

Synthetic hybrid ☐

4.2 Genetic origin and breeding method

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

Yes ☐ No ☐

(b) Has such authorisation been obtained?

Yes ☐ No ☐

If the answer to that question is “yes”, please attach a copy of such authorisation.

4.3 Other information

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

Characteristics Caracteres Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
5.1 Plant: growth habit (2)	determinate			Signal, Pronto	1 []
	indeterminate			Alfred	2 []
5.2 Plant: height (3)	very short			The Sutton	1 []
Plante: hauteur	short			Arbo, Reina Mora	3 []
Pflanze: Höhe	medium			Multigreen	5 []
	tall				7 []
	very tall			Merkar	9 []
5.3 Wing: melanin spot (16, 17)	absent	absente	fehlend	Driemaal Wit, Feligreen	1 []
Aile: tache de mélanine	brown			Goldrush	2 []
Flügel: Melaninfleck	black			Alfred, Gruno, Trio	3 []
5.4 Pod: length (without beak) (23)	very short	très courte	sehr kurz		1 []
Gousse: longueur (sans le bec)	short	courte	kurz	i	3 []
	medium	moyenne	mittel		
Hülse: Länge (ohne Zahn)				Arbo, Futura, Multigreen	5 []
	long	longue	lang	Imperial Green Longpod	7 []
(*) 5.5. Dry seed: weight (32)	very small	très faible	sehr niedrig		1 []
Grain:	small	faible	niedrig	Minica, Optica	3 []
Samen:	medium	moyen	mittel	Felix	5 []
	large	élevé	hoch	Express, Relon	7 []
	very large	très élevé	sehr hoch	Griant Four Seeded Green Windsor, Histal	9 []

Characteristics Caracteres Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 5.6 Seed: color of testa (33) (immediately after harvest)	beige	beiges	beige	Driemaal Wit, Trio	1 []
Grain: couleur des téguments (immédiatement après la récolte)	green	verts	grün	Gruno, Staygreen	2 []
	red	rouges	rot	Red Epicure	3 []
	violet	violets	violett	Reina Mora	4 []
Samen: Farbe der Samenschale (gierch nach Ernte)	black	noirs	schwarz	Vesuvio	5 []

6. Similar varieties and differences from these varieties

Denomination of similar variety	Characteristic in which the similar variety is different ^o	State of expression of similar variety	State of expression of candidate variety
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^o In the case of identical states of expression of both varieties, please indicate the size of the difference

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases

7.2 Use of variety

Processing	[]
Fresh market	[]

7.3 Other information

[End of document]