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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

TECHNICAL WORKING PARTY FOR VEGETABLES

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WORKING PAPER ON TEST GUIDELINES FOR BROAD BEAN
(*Vicia faba* L. var. *major*)

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*

Comment: criteria for distinguishing other non-broad bean varieties of this species to be discussed at meeting.

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 for marketing standard or certified seed in the country in which the application is made. The germination capacity should be as high a s 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 independent growing cycles.

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. Leaf, flower and pod measurements should be made at the 2nd flowering node.

4. All observations on the seed should be made on harvested 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) Wing: melanin spot (characteristic 15)
ii) Dry seed: color of testa (characteristic 32)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given 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	francais	deutsch	Example Varieties Exemples Beispielssorten	Note
(+)	1. Seed: tannin	00	absent or very weak	absent	fehlend	Driemaal Wit	1
	Grain: tannin		present	présent	vorhanden	Trio	9
	Samen: Tannin						
(*)	2. Plant: height	200 - 299	very short			The Sutton	1
	Plante: hauteur		short			Arbo, Reina Mora	3
	Prianze: Höhe		medium			Aquadulce Claudia	5
			tall			Dreadnought	7
			very tall			Imperial White Windsor	9
(*)	3. 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	Albinette, Arbo	5
	Plante: nombre de tiges (tiges dépassant la moitié de la longueur de la tige principale)		many	élevé	gross	Reina Blanca	7
	Pflanze: Anzahl der Triebe (einschliesslich der Triebe mit mehr als der halben Länge der Haupttriebe)						
	4. Stem: number of nodes up to and including first flowering node	200 - 299	few	faible	gering	Driemaal Wit, Metissa	3
			medium	moyen	mittel	Futura, Hedosa	5
	Tige: nombre de noeuas (Jusgu'au premier noeua floritère inclus)		many	éleveé	gross	(Ite)	7
	Trieb: Anzahl Knoten (bis einschliesslich des ersten blühenden knotens, einschliesslich Schuppenknoten)						

	Characteristics Caracteres Merkmale	Growth Key	English	francais	deutsch	Example Varieties Exemples Beispielssorten	Note
	5. Stem: anthocyanin coloration	300 - 399	absent or very weak			Driemaal Wit, Metissa	1
			weak	faible	gering	Futura, Hedosa	3
	Tige: pigmentation anthocyanique		medium	moyenne	mittel		5
			strong	forte	stark		7
	Trieb: Stärke der Anthocyantärbung		very strong				9
	6. 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
	7. 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, Hedosa	5
	Laub: Intensitäat der Grüntärbung (vor der Blüte)		dark	foncé	dunkel	(Gruno)	7
(*)	8. 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
(*)	9. Leaflet: width (as for 10)	220 - 240	narrow	étroite	schmal	The Sutton	3
	Foliole: largeur (comme pour 10)		medium	moyenne	mittel	Optica	5
			broad	large	breit	Osnabrücker Markt	7

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

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

Characteristics Caracteres Merkmale	Growth Key	English	francais	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 21. Pod: attitude	320 - 399	erect	dressé	aufrecht	Optica	1
Gousse: port		semi-erect	demi-dressé	halbaufrecht	Statissa, The Sutton	3
Hülse: Stellung		horizontal	horizontal	waagerecht	Trio	5
		semi-pendulous	demi-retombant	halbhängend	Express	7
		pendulous	retomband	hängend	Lange Hangers, Hedosa	9
(*) 22. Pod: length (without beak)	350 - 370	very short	très courte	sehr kurz	Arbo	1
Gousse: longueur (sans le bec)		short	courte	kurz	Green Windsor, Optica	3
Hülse: Länge (ohne Zahn)		medium	moyenne	mitel	Driemaal Wit, Red Epicure	5
		long	longue	lang	Dreadnought	7
		very long	très longue	sehr lang	Hangdown Grünkernig	9
23. Pod: beak length	350 - 370	short				3
		medium				5
		long				7
(*) 24. Pod: width (from suture to suture)	350 - 370	very narrow	très étroite	sehr schmal		1
Gousse: largeur médiane		narrow	étroite	schmal	Felix, Minica	3
Hülse: mediane Breite		medium	moyenne	mittel	Trio, Express	5
		broad	large	breit	Con Amore	7
		very broad	très large	sehr breit	Aguadulce Claudia	9
(+) 25. 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
		medium	moyenne	mittel	Witkiem	5
Hülse: Stärke der Krummung im Grünhülsen-stadium		strong	forte	stark	Groene Hangers, Hedosa	7
		very strong	très forte	sehr stark		9

Characteristics Caracteres Merkmale	Growth Key	English	francais	deutsch	Example Varieties Exemples Beispielssorten	Note
26. Pod: intensity of green color	350 - 370	light	faible	hell	Hedosa	3
Gousse: intensité de la couleur verte		medium	moyenne	mittel	Driemaal Wit	5
Hülse: Intensität der Grünfärbung		dark	forte	dunkel	Statissa	7
(*) 27. Pod: number of ovules (including seeds)	350 - 370	few	faible	gering	White Windsor	3
		medium	moyen	mittel	Aquadulce Claudia	5
Gousse: nombre d'ovules (y compris les semences)		many	élevé	gross	Imperial Green Longpod	7
Hülse: Anzahl Samenanlagen (einschliesslich Samen)						
28. Pod: thickness of pod wall	350 - 370	thin	fine	dünn	Statissa	3
Gousse: épaisseur de la cosse		medium	moyenne	mittel		5
Hüse: Dicke der Hülsenwand		thick	épaisse	dick	Aguadulce Claudia, Hedosa	7
(*) (+) 29. Dry seed: shape of median longitudinal section	500	narrow elliptic			Metissa	1
Grain: forme de la section longitudinale mediane		elliptic				2
		broad elliptic			Hedosa	3
Samen: Form des medianen Langsschnitts		circular	circulaire	rund		4
		square	rectangulaire	rechteckig		5
		ovate	ovale	eiförmig		6
30. Dry seed: shape of cross section	500	narrow elliptic	elliptique étroite	schmal elliptisch	Aguadulce Claudia, Hedosa	1
Grain: forme de la section trnsfersale		elliptic	elliptique	elliptisch		2
Samen: Form des Querschnitts		broad elliptic	elliptique large	breit elliptisch	(Ite)	3

Characteristics Caracteres Merkmale	Growth Key	English	francais	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 31. Dry Seed: weight	500	very low	très faible	sehr niedrig	Albinette, Minica	1
		low	faible	niedrig	Arbo, Felix	3
		medium	moyen	mittel	The Sutton, Trio	5
		high	élevé	hoch	Futura, Red Epicure	7
		very high	très élevé	sehr hoch	White Windsor	9
(*) 32. Dry seed: color of testa (+) (immediately after harvest) Grain: couleur des téguments (immédiatement après la récoite) Samen: Farbe der Samenschale (gleich nach Ernte)	500	beige	beiges	beige	Driemaal Wit, Trio,	1
		green	verts	grün	Green Windsor	2
		red	rouges	rot	Red Epicure	3
		violet	violets	violett	Reina Mora	4
		black	noirs	schwarz		5
33. Dry seed: black pigmentation (+) of hilum Grain: pigmentation noire du hile Samen: schwarze Pigmentierung des Nabels	500	absent	absente	fehlend	Driemaal Wit	1
		present	présente	vorhanden	Aquadulce Claudia	9
34. Time of full development of pod (first fully developed pods) Epoque de développement complet de la gousse (premières gousses complètement devéloppées) Zeitpunkt der vollen Entwicklung der Hulse (erste vollentwickelte Hülsen)	500	early	précoce	früh	Express	3
		medium	moyenne	mittel	Driemaal Wit	5
		late	tardive	spät	Imperial Green Longpod	7

VIII. Explanations and methods

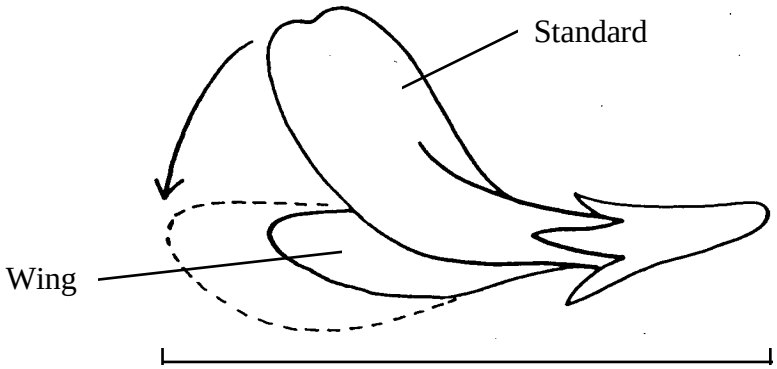
Ad. 1 Seed: tannin

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).

[Comment: concentration to be specified at meeting]

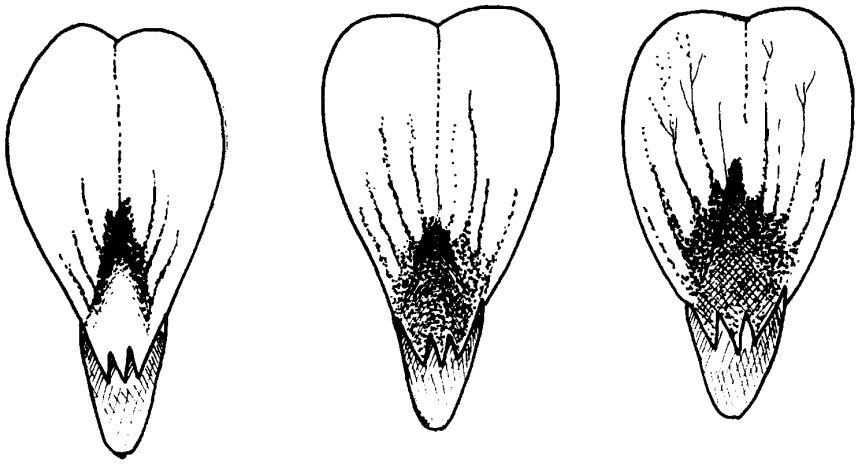
Seeds that are yellowish grey immediately after harvest will turn brown after ageing if they contain tannin.

Ad. 14 Flower: length



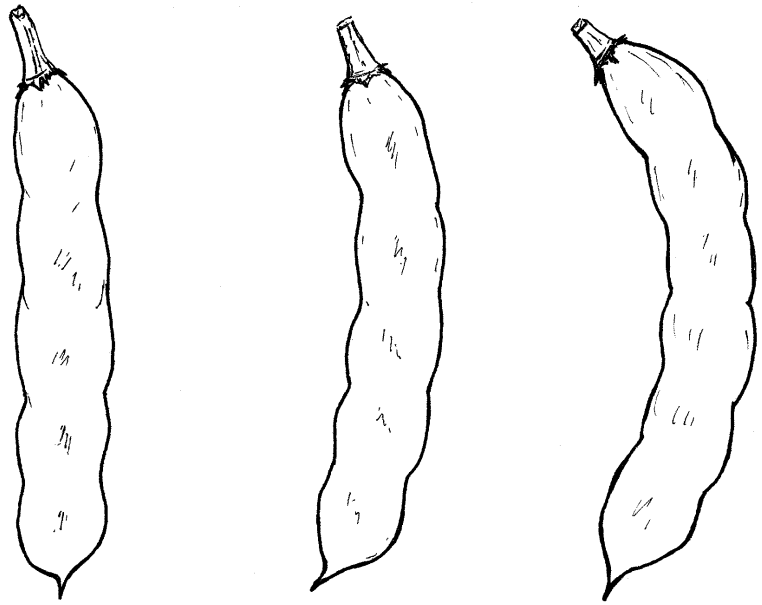
length

Ad. 19 Standard: extent of anthocyanin coloration



3	5	7
small	medium	large

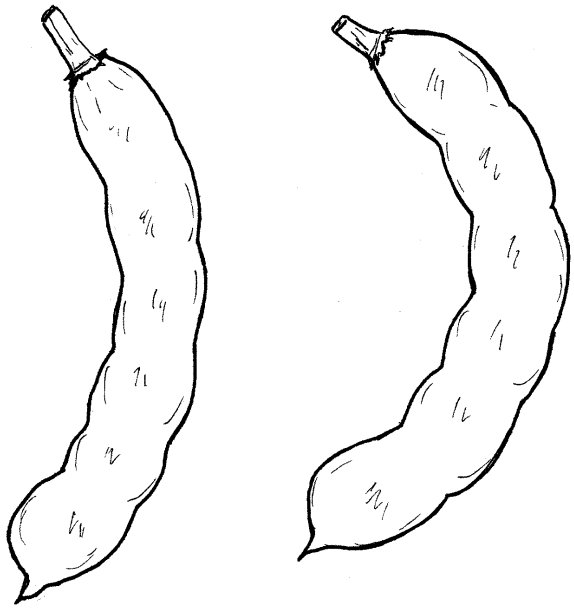
Ad. 25 Pod: degree of curvature at green shell stage



1
absent or very weak

3
weak

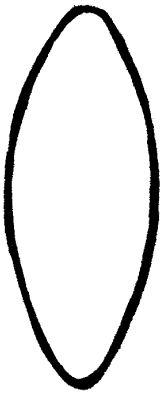
5
medium



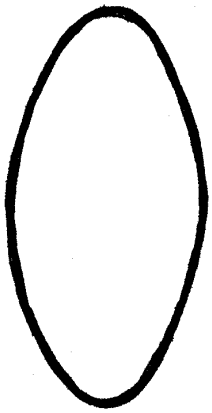
7
strong

9
very strong

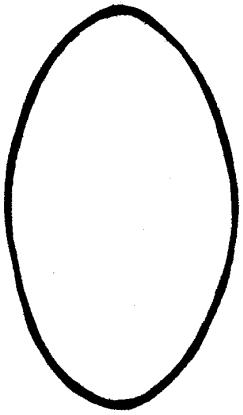
Ad 29. Seed: shape of median longitudinal section



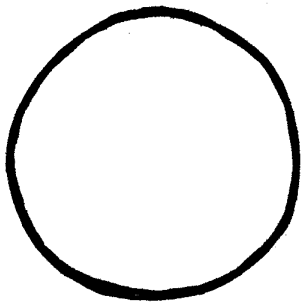
1
narrow
elliptic



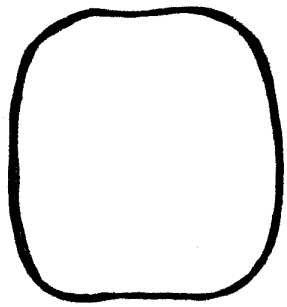
2
elliptic



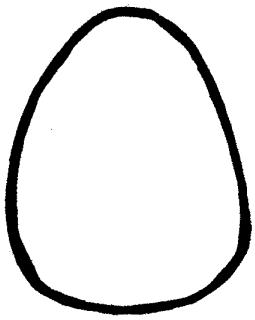
3
broad
elliptic



4
circular



5
square



6
ovate

Ad. 33 Dry seed: black pigmentation of hilum

Certain varieties, which by their genetic structure show segregation in respect of this characteristic, are admissable 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.

Growth Key

Key	General Description of growth Stage
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 turrn 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

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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 Broad Bean types of *Vicia faba* L. var. *major*

_____

2. Applicant (Name and address)

_____

3. Proposed denomination or breeder's reference

_____

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

4.1 Variety type

Open pollinated variety [ ]

Synthetic hybrid [ ]

4.2 Genetic origin and breeding method

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**	**francais**	**deutsch**	**Example Varieties** **Exemples** **Beispielssorten**	**Note**
(*) 5.1 (2) Plant: height Plante: hauteur Pflanze: Höhe	very short			The Sutton	1 [ ]
	short			Arbo, Reina Mora	3 [ ]
	medium			Aquadulce Claudia	5 [ ]
	tall			Dreadnought	7 [ ]
	very tall			Imperial White WIndsor	9 [ ]
(*) 5.2 (15, 16) Wing: melanin spot Aile: tache de mélanine Flügel: Melaninfleck	absent	absente	fehlend	Driemaal Wit, Metissa	1 [ ]
	greenish yellow			Gold	2 [ ]
	brown				3 [ ]
	black			Hedosa, Trio	4 [ ]
(*) 5.3 (22) Pod: length (without beak) Gousse: longueur (sans le bec) Hülse: Länge (ohne Zahn)	very short	très courte	sehr kurz	Arbo	1 [ ]
	short	courte	kurz	Green Windsor, optica	3 [ ]
	medium	moyenne	mittel	Driemaal Wit, Red Epicure	5 [ ]
	long	longue	lang	Dreadnought	7 [ ]
	Very long			Hangdown Grünkernig	9 [ ]
(*) 5.4. (31) Dry seed: weight Grain: Samen:	very small	très faible	sehr niedrig	Albinette, Minica	1 [ ]
	small	faible	niedrig	Arbo, Felix	3 [ ]
	medium	moyen	mittel	The Sutton, Trio	5 [ ]
	large	élevé	hoch	Futura, Red Epicure	7 [ ]
	very large	très élevé	sehr hoch	White Windsor	9 [ ]
(*) 5.5 (32) Seed: color of testa (immediately after harvest) Grain: couleur des téguments (immédiatement après la récoite) Samen: Farbe der Samenschale (gierch nach Ernte)	beige	beiges	beige	Driemaal Wit, Trio	1 [ ]
	green	verts	grün	Green Windsor	2 [ ]
	red	rouges	rot	Red Epicure	3 [ ]
	violet	violets	violett	Reina Mora	4 [ ]
	black	noirs	schwarz		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

[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

8. 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.

[End of Annex and of document]