

**TWA/29/3****ORIGINAL:** English**DATE:** May 5, 2000**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**

GENEVA

**TECHNICAL WORKING PARTY
FOR
AGRICULTURAL CROPS****Twenty-Ninth Session
Uppsala, Sweden, June 27 to 30, 2000****WORKING PAPER ON DRAFT TEST GUIDELINES FOR FIELD BEAN
(*Vicia faba* L. var. *minor*)***Document prepared by experts from Germany*

<u>TABLE OF CONTENTS</u>	PAGE
I. Subject of these Guidelines	3
II. Material Required	3
III. Conduct of Tests	3
IV. Methods and Observations	3
V. Grouping of Varieties	4
VI. Characteristics and Symbols	4
VII. Table of Characteristics	5
VIII. Explanations on the Table of Characteristics	10
IX. Literature	17
X. Technical Questionnaire	18

I. Subject of these Guidelines

These Test Guidelines apply to all varieties of Field Bean *Vicia faba L. var. minor*

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the plant material 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 sample should be:

3 kg resp. 6000 seeds

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing 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 field 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 60 plants or parts of 60 plants.

2. For the assessment of uniformity relative uniformity standards should be applied. The variability within the variety should not exceed the variability of comparable varieties already known.

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:
 - (a) Wing: melanin spot (characteristic 9)
 - (b) Dry seed: color of testa (characteristic 20)

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.
2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of expression for each characteristic. For each characteristic it is indicated whether actual measurements (M), visual assessments by a single observation of a group of plants or parts of plants (VG) or visual assessments by observations of a number of individual plants or plant parts (VS) should be used. For certain characteristics, different example varieties, separated by a semicolon, are indicated for spring types and winter types of field bean. Where winter varieties are indicated they follow the semicolon.
3. Legend:
 - (*) Characteristics that should be used on all varieties in every growing period over which examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic 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.

M: actual measurement

VG: visual assessment by a single observation of a group of plants or parts of plants

VS: visual assessment by observations of a number of individual plants or plant parts

S: special test

VII. Table of Characteristics

	Stage 1) Stade 1) Stadium 1) Estado 1)	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	00	Seed: tannin					
(+)	S	absent				Caspar;	1
		present				Victor;	9
2.	19-61	Foliage: color					
	VG	light green				Tista; Hiverna	1
		medium green				Gloria;	2
		dark green					3
		bluish green					4
		greyish green				Columbo;	5
3.	61	Time of flowering (50% of the plants with at least one flower)					
(*)	M	very early					1
		early				Pistache;	3
		medium				Victor;	5
		late				Vasco;	7
		very late				Hiverna *)	9
4.	61-71	<u>Only varieties with melanin spot:</u> Stem: anthocya- nin coloration					
	VG	very weak				Pistache;	1
		weak				Divina;	3
		medium				Victor;	5
		strong					7
		very strong					9

*) in spring sown trial

	Stage 1) Stade 1) Stadium 1) Estado 1)	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.	61-65	Leaflet: length (basal pair of leaf- lets at second flowering node)					
(*)	M						
		very short					1
		short				Pistache; Delta	3
		medium				Victor;	5
		long				Limbo;	7
		very long				Divine;	9
6.	61-65	Leaflet: width (as for 5)					
(*)	M						
		narrow				Castel	3
		medium				Columbo; Karl	5
		broad				Condor;	7
7.	61-65	Leaflet: position of maximum width (as for 5)					
(+)	VS						
		towards tip				Pistache;	1
		at middle				Signal;	2
		towards base				Victor;	3
8.	61-65	Flower: length					
(+)	M						
		short				Pistache;	3
		medium				Caspar;	5
		long				Victor;	7
9.	61-65	Wing: melanin spot					
(*)	VG						
		absent				Caspar;	1
		present				Victor;	9

	Stage 1) Stade 1) Stadium 1) Estado 1)	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10.	61-65	Wing: color of melanin spot					
	VG	brown				Goldrush;	1
		black				Condor;	2
		greenish yellow					3
11.	61-65	Standard: antho-cyanin coloration					
(*)	VG	absent				Caspar;	1
		present				Condor;	9
12.	61-65	Standard: extent of anthocyanin coloration					
(+)	VG	small				Pistache;	3
		medium				; Hiverna	5
		large					7
13.	71-81	Plant: growth type					
(+)	VG	determinate				Tista;	1
		indeterminate				Condor;	2
14.	71-81	Plant: height					
(*)	M	short				Pistache;	1
		medium				Columbo;	5
		tall				Condor;	7

	Stage 1) Stade 1) Stadium 1) Estado 1)	English	français	deutsch	español	Example Varieties Exemples Beispielsorten Variedades ejemplo	Note/ Nota
15.	71-81	Stem: number of nodes (up to and including first flowering node)					
	M	few				Columbo;	3
		medium				Caspar;	5
		many				Vasco;	7
16.	71-81	Pod: length (without beak)					
(*)	M	very short				Maris Bead;	1
		short				Condor;	3
		medium				Gloria;	5
		long				Caspar, Vasco;	7
17.	71-81	Pod: width (from suture to suture)					
	M	narrow				Condor;	3
		medium				Pistache;	5
		broad				Victor;	7
18.	89	Dry seed: shape of median longitudinal section					
(+)	VS	circular				Maris Bead;	1
		elliptic				Condor;	2
		irregular				Columbo;	2

	Stage 1) Stade 1) Stadium 1) Estado 1)	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19.	89	Dry seed: weight					
(*)	M	low				Condor, Gloria;	3
		medium				Victor;	5
		high				Pistache;	7
20.	89	Dry seed: color of testa (immediately after harvest)					
(*)	VS	beige				Condor;	1
		grey beige				Caspar;	2
		green				Palacio;	3
		red					4
		violet					5
		black				Tyrol;	6
21.	89	Dry seed: black pigmentation of hilum					
(+)	VS	absent				Victor;	1
		present				Condor;	9

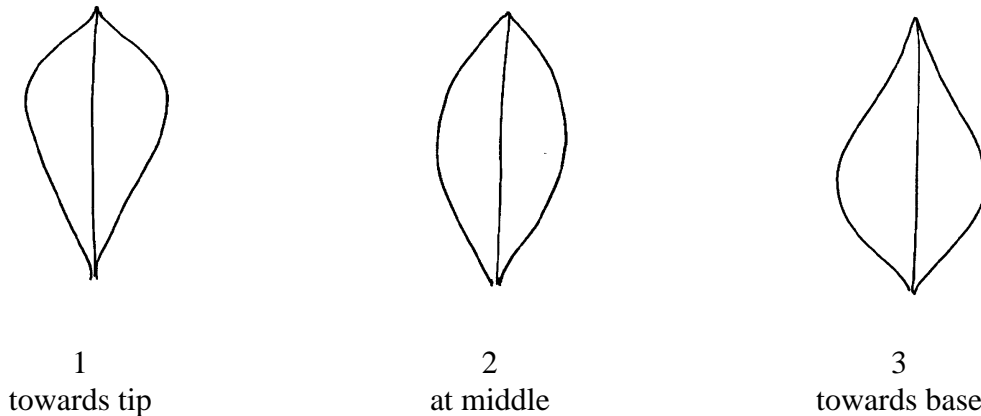
VIII. Explanation on the Table of Characteristics

Ad 1, 9, 20: Seed: tannin; wing: melanin spot and seed: color of testa

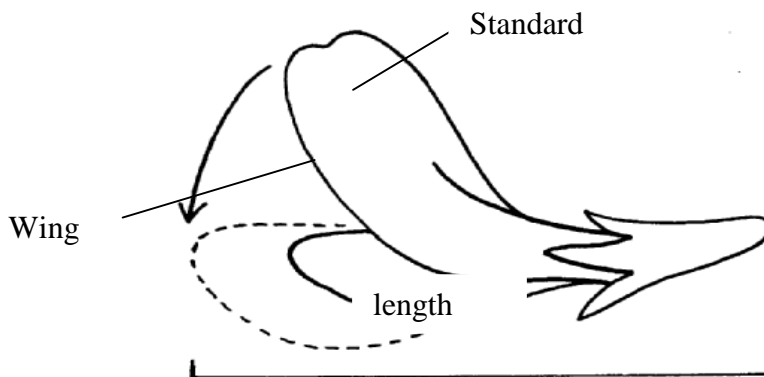
Tannin content of testa correlates with melanin spot on the flower wing. Maintaining both characteristics is necessary, as observations are made at very different stages and different times. The content of tannin should be tested by removing a piece of the testa from the seed and placing 1 or 2 drops of the test reagent upon its inner surface. A bright pink color 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.

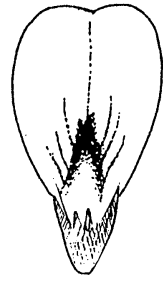
Ad 7: Leaflet: position of maximum width



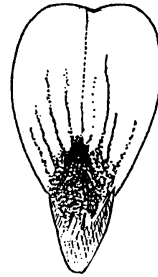
Ad 8: Flower: length



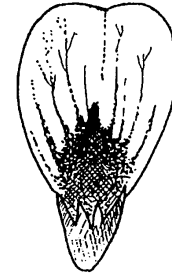
Ad 12: Standard: extent of anthocyanin coloration



3
small



5
medium



7
large

Ad 13: Plant: growth type

Determinate growth type is characterized by terminal inflorescence, whereas indeterminate growth type shows vegetative growth above the uppermost flowers.

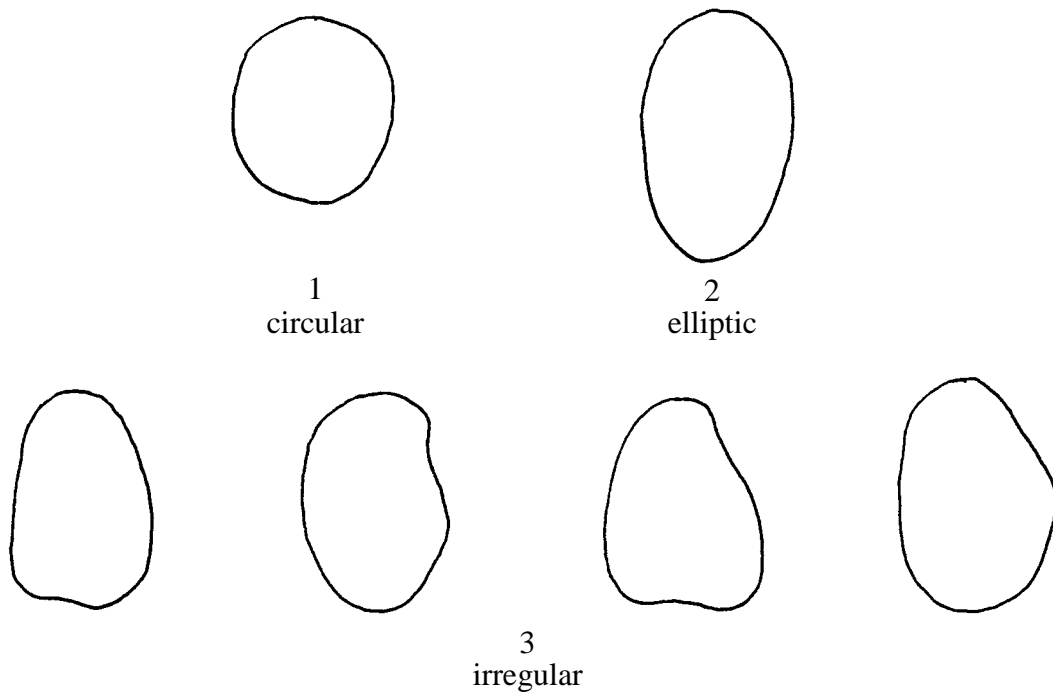


1
determinate



2
indeterminate

Ad 18: Dry seed: shape of median longitudinal section



Ad 21: Dry seed: black pigmentation of hilum

A population standard of 5% with an acceptance probability of at least 95% is recommended for the assessment of uniformity. 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.

Phenological growth stages and BBCH-identification keys of faba bean

Code	Description
Principal growth stage 0: Germination	
00	Dry seed
01	Beginning of seed imbibition
02	–
03	Seed imbibition complete
04	–
05	Radicle emerged from seed
06	–
07	Shoot emerged from seed (plumule apparent)
08	Shoot growing towards soil surface
09	Emergence shoot emerges through soil surface
Principal growth stage 1: Leaf development ¹	
10	Pair of scale leaves visible (may be eaten or lost)
11	First leaf unfolded
12	2 leaves unfolded
13	3 leaves unfolded
1 .	Stages continuous till
19	9 or more leaves unfolded
Principal growth stage 2: Formation of side shoots	
20	No side shoots
21	Beginning of side shoot development: first side shoot detectable
22	2 side shoots detectable
23	3 side shoots detectable
2 .	Stages continuous till
29	End of side shoot development: 9 or more side shoots detectable

¹ Stem elongation may occur earlier than stage 19; in this case continue with the principal stage 3

Code	Description
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Principal growth stage 3: Stem elongation

30	Beginning of stem elongation
31	One visibly extended internode ²
32	2 visibly extended internodes
33	3 visibly extended internodes
3 .	Stages continuous till
39	9 or more visibly extended internodes

Principal growth stage 4: -----

Principal growth stage 5: Inflorescence emergence

50	Flower buds present, still enclosed by leaves
51	First flower buds visible outside leaves
52	–
53	–
54	–
55	First individual flower buds visible outside leaves but still closed
56	–
57	–
58	–
59	First petals visible, many individual flower buds, still closed

Principal growth stage 6: Flowering

60	First flowers open
61	Flowers open on first raceme
62	–
63	Flowers open 3 racemes per plant
64	–
65	Full flowering: flowers open on 5 racemes per plant

² First internode extends from the scale leaf node to the first true leaf node

Code	Description
Principal growth stage 6: Flowering (contd.)	
66	–
67	Flowering declining
68	–
69	End of flowering
Principal growth stage 7: Development of fruit	
70	First pods have reached final length ("flat pod")
71	10 % of pods have reached final length
72	20 % of pods have reached final length
73	30 % of pods have reached final length
74	40 % of pods have reached final length
75	50 % of pods have reached final length
76	60 % of pods have reached final length
77	70 % of pods have reached final length
78	80 % of pods have reached final length
79	Nearly all pods have reached final length
Principal growth stage 8: Ripening	
80	Beginning of ripening: seed green, filling pod cavity
81	10 % of pods ripe, seeds dry and hard
82	20 % of pods ripe, seeds dry and hard
83	30 % of pods ripe and dark, seeds dry and hard
84	40 % of pods ripe and dark, seeds dry and hard
85	50 % of pods ripe and dark, seeds dry and hard
86	60 % of pods ripe and dark, seeds dry and hard
87	70 % of pods ripe and dark, seeds dry and hard
88	80 % of pods ripe and dark, seeds dry and hard
89	Fully ripe: nearly all pods dark, seeds dry and hard

Code	Description
Principal growth stage 9: Senescence	
90	–
91	–
92	–
93	Stems begin to darken
94	–
95	50 % of stems brown or black
96	–
97	Plant dead and dry
98	–
99	Harvested product

IX Literature

- Bould, A., Crofton, G.R.A. 1987. Variability in expression of hilum colour in field bean varieties in relation to seed certification standards. *Seed Science and Technology* 15, 657-662.
- Crofton, G.R.A. 1997. The principal seed characters of field beans (*Vicia faba* L. (partim)) in relation to variety classification. *Plant Varieties and Seeds* 10, 81-94.
- Crofton, G.R.A. 1998. A review of the genetics of seed coat colour and hilum colour in field beans (*Vicia faba* L. (partim)) with comments on some implications for national listing and certification. *Plant Varieties and Seeds* 11, 97-106.
- Higgins, J., Evans, J.L. and Law, J.R. 1988. A revised classification and descriptions of faba bean cultivars (*Vicia faba* L.). *Plant Varieties and Seeds* 1, 27-35.
- Link, W., Stelling, D. and Ebmeyer, E. 1994. Factors determining the performance of synthetics in *Vicia faba* L. 1. Heterogeneity, heterozygosity, and degree of cross-fertilization. *Euphytica* 75, 77-84.
- Meier, U. (Editor), 1997. *Growth Stages of Mono- and Dicotyledonous Plants*. BBCH-Monograph, Blackwell Wissenschafts-Verlag Berlin-Wien (quatrilingual version: English, français, deutsch, español)
- Mudzana, G., Pickett, A.A., Jarman, R.J., Cooke, R.J. and Keefe, P.D. 1995. Variety discrimination in faba beans (*Vicia faba* L.): an integrated approach. *Plant Varieties and Seeds* 8, 135-145.
- Sirks, M.J. 1931. Beiträge zu einer genotypischen Analyse der Ackerbohne (*Vicia faba* L.). *Genetica* 13, 210-631.

X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)
<p>TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights</p>	
1. Species	<p style="text-align: center;"><i>Vicia faba L. var. minor</i> FIELD BEAN</p>
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		[]
Other type		[]
(to be indicated)		
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	Example Varieties	Note
5.1 Plant: height (14)		
short	Pistache	3 []
medium	Columbo	5 []
tall	Condor	7 []
5.2 Wing: melanin spot (9)		
absent	Caspar	1 []
present	Victor	9 []
5.3 Time of flowering (3) (50% of the plants with at least one flower)		
very early		1 []
early	Pistache	3 []
medium	Victor	5 []
late	Vasco	7 []
very late	Hiverna *)	9 []

*) in spring sown trial

	Characteristics	Example Varieties	Note
5.4	Dry seed: weight		
(19)			
	low	Condor, Gloria	3 []
	medium	Victor	5 []
	high	Pistache	7 []
5.5	Dry seed: color of		
(20)	testa		
	(immediately after harvest)		
	beige	Condor	1 []
	grey beige	Caspar	2 []
	green	Palacio	3 []
	red		4 []
	violet		5 []
	black	Tyrol	6 []

6. Similar varieties and differences from these varieties

Denomination of similar variety	Characteristic in which the similar variety is different °)	State of expression of similar variety	State of expression of candidate variety
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° 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 Special conditions for the examination of the variety

Type of development: spring type []
winter type []

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 that question is "yes", please attach a copy of such authorization.

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