CPVO · OCVV
Community Plant Variety Office
Office Communautaire des Variétés Végétales

PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Linum usitatissimum L.

FLAX, LINSEED

UPOV Code: LINUM_USI

Adopted on 19/03/2014

Entry into force on 01/03/2014

TABLE OF CONTENTS

CPVO-TP/057/2

1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to all varieties of ***Linum usitatissimum*** **L.**

The protocol describes the technical procedures to be followed in order to meet the requirements of Council Regulation 2100/94 on Community Plant Variety Rights. The technical procedures have been agreed by the Administrative Council and are based on documents agreed by the International Union for the Protection of New Varieties of Plants (UPOV), such as the General Introduction to DUS (UPOV Document TG/1/3 http://www.upov.int/en/publications/intro_dus.htm), its associated TGP documents (http://www.upov.int/en/publications/tgp/) and the relevant UPOV Test Guideline TG/57/7 dated 20/10/2011 http://www.upov.int/edocs/tgdocs/en/tg057.pdf for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on **01/03/2014**. Any on-going DUS examination of candidate varieties started before the aforesaid date will not be affected by the approval of the Technical Protocol. Technical examinations of candidate varieties are carried out according to the TP in force when the DUS test starts. The starting date of a DUS examination is considered to be the due date for submitting of plant material for the first test period.

In cases where the Office requests to take-over a DUS report for which the technical examination has either been finalized or which is in the process to be carried out at the moment of this request, such report can only be accepted if the technical examination has been carried out according to the CPVO TP which was in force at the moment when the technical examination started.

1.3 Reporting between Examination Office and CPVO and Liaison with Applicant

1.3.1 Reporting between Examination Office and CPVO

The Examination Office shall deliver to the CPVO a preliminary report ("the preliminary report") no later than two weeks after the date of the request for technical examination by the CPVO.

The Examination Office shall also deliver to the CPVO a report relating to each growing period ("the interim report") and, when the Examination Office considers the results of the technical examination to be adequate to evaluate the variety or the CPVO so requests, a report relating to the examination ("the final report").

The final report shall state the opinion of the Examination Office on the distinctness, uniformity and stability of the variety. Where it considers those criteria to be satisfied, or where the CPVO so requests, a description of the variety shall be added to the report. If a report is negative the Examination Office shall set out the detailed reasons for its findings.

The interim and the final reports shall be delivered to the CPVO as soon as possible and no later than on the deadlines as laid down in the designation agreement.

1.3.2 Informing on problems in the DUS test

If problems arise during the course of the test the CPVO should be informed immediately so that the information can be passed on to the applicant. Subject to prior permanent agreement, the applicant may be directly informed at the same time as the CPVO particularly if a visit to the trial is advisable.

1.3.3 Sample keeping in case of problems

If the technical examination has resulted in a negative report, the CPVO shall inform the Examination Office as soon as possible in case that a representative sample of any relevant testing material shall be kept.

2. MATERIAL REQUIRED

2.1 Plant material requirements

Information with respect to the agreed closing dates and submission requirements of plant material for the technical examination of varieties can be found on http://www.cpvo.europa.eu/main/en/home/documents-and-publications/s2-gazette in the special issue S2 of the Official Gazette of the Office. General requirements on submission of samples are also to be found following the same link.

2.2 Informing the applicant of plant material requirements

The CPVO informs the applicant that

- he is responsible for ensuring compliance with any customs and plant health requirements.
- the plant material supplied should be visibly healthy, not lacking in vigour, nor affected by any important pest or disease.
- 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.

2.3 Informing about problems on the submission of material

The Examination Office shall report to the CPVO immediately in cases where the test material of the candidate variety has not arrived in time or in cases where the material submitted does not fulfil the conditions laid down in the request for material issued by the CPVO.

In cases where the examination office encounters difficulties to obtain plant material of reference varieties the CPVO should be informed.

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"
http://www.upov.int/export/sites/upov/en/publications/tgp/documents/tgp_9_1.pdf.

3.3 Conditions for Conducting the Examination

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.

The optimum stage of development for the assessment of each characteristic is indicated by a number in the third column of the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.3

3.4 Test design

3.4.1 Each test should be designed to result in a total of at least 1000 plants, which should be divided between at least two replicates.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Additional tests

In accordance with Article 83(3) of Council Regulation No. 2100/94 an applicant may claim either in the Technical Questionnaire or during the test that a candidate has a characteristic which would be helpful in establishing distinctness. If such a claim is made and is supported by reliable technical data, an additional test may be undertaken providing that a technically acceptable test procedure can be devised.

Additional tests will be undertaken, with the agreement of the President of CPVO, where distinctness is unlikely to be shown using the characters listed in the protocol.

3.6 Constitution and maintenance of a variety collection

The process for the constitution and the maintenance of a variety collection can be summarized as follows:

Step 1: Making an inventory of the varieties of common knowledge

Step 2: Establishing a collection ("variety collection") of varieties of common knowledge which are relevant for the examination of distinctness of candidate varieties

Step 3: Selecting the varieties from the variety collection which need to be included in the growing trial or other tests for the examination of distinctness of a particular candidate variety.

3.6.1 Forms of variety collection
The variety collection shall comprise variety descriptions and living plant material, thus a living reference collection. The variety description shall be produced by the examination office unless special cooperation exists between examination offices and the CPVO. The descriptive and pictorial information produced by the examination office shall be held and maintained in a form of a database

3.6.2 Living Plant Material
The examination office shall collect and maintain living plant material of varieties of the species concerned in the variety collection.

3.6.3 Range of the variety collection
The living variety collection shall cover at least those varieties that are suitable to climatic conditions of a respective examination office.

3.6.4 Making an inventory of varieties of common knowledge for inclusion in the variety collection
The inventory shall include varieties protected under National PBR (UPOV contracting parties) and Community PBR, varieties registered in the Common Catalogue, the OECD list, the Conservation variety list and varieties in trade or in commercial registers for those species not covered by a National or the Common Catalogue.

3.6.5 Maintenance and renewal/update of a living variety collection
The examination office shall maintain seeds in conditions which will ensure germination and viability, periodical checks, and renewal as required. For the renewal of existing living material the identity of replacement living plant material shall be verified by conducting side-by-side plot comparisons between the material in the collection and the new material.

4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY

The prescribed procedure is to assess distinctness, uniformity and stability in a growing trial.

4.1 Distinctness

4.1.1 General recommendations
It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 9 'Examining Distinctness' (http://www.upov.int/export/sites/upov/en/publications/tgp/documents/tgp_9_1.pdf) prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in this Technical Protocol.

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 Technical Protocols are familiar with the recommendations contained in the UPOV-General Introduction to DUS prior to making decisions regarding distinctness.

If distinctness is assessed using the 2 x 1% criterion, the varieties need to be significantly different in the same direction at the 1% level in at least two out of three years in one or more measured characteristics. The tests in each year are based on Student's two-tiled t-test of the differences between variety means with standard errors estimated using the residual mean square from the analysis of the variety x replicate plot means.

If distinctness is assessed by the combined over years distinctness analysis (COYD) the difference between two varieties is clear if the respective characteristics are different at the 1% significance level or less ($p<0.01$) in a test over either two or three years.

If the significance level or statistical methods proposed are not appropriate the method used should be clearly described.

4.1.4 Number of plants/parts of plants to be examined
Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 40 plants or parts taken from each of 40 plants and any other observations made on all plants in the test, disregarding any off-type plants.

4.1.5 Method of observation
The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the third column of the Table of Characteristics (see document TGP/9 "Examining Distinctness", Section 4 "Observation 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

Type of observation: visual (V) or measurement (M)
"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. colour charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)
For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness."

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 10 'Examining Uniformity' (http://www.upov.int/export/sites/upov/en/publications/tgp/documents/tgp_10_1.pdf) prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in this Technical Protocol:

For the assessment of uniformity, a population standard of 1 % and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 1000 plants, 15 off-types are allowed.
For the characteristic 4 "Corolla: colour", when assessing white/coloured varieties, a population standard of 0.1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 1000 plants, 3 off-types are allowed.

4.3 Stability

4.3.1 It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 11 'Examining Stability' (http://www.upov.int/export/sites/upov/en/publications/tgp/documents/tgp_11_1.pdf)
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.

Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the initial 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) Corolla: colour (characteristic 4)

(b) Boll: ciliation of false septa (characteristic 17)

(c) Stem: length from cotyledon scar to first branch (characteristic 21)

(d) Seed: colour (characteristic 24)

5.4 If other characteristics than those from the TP are used for the selection of varieties to be included into the growing trial, the examination office shall inform the CPVO and seek the prior consent of the CPVO before using these characteristics.

6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS

6.1 Characteristics to be used

The characteristics to be used in DUS tests and preparation of descriptions shall be those referred to in the table of characteristics. All the characteristics shall be used, providing that observation of a characteristic is not rendered impossible by the expression of any other characteristic, or the expression of a characteristic is prevented by the environmental conditions under which the test is conducted or by specific legislation on plant health. In the latter case, the CPVO should be informed.
The Administrative Council empowers the President, in accordance with Article 23 of Commission Regulation N°874/2009, to insert additional characteristics and their expressions in respect of a variety.

States of expression and corresponding notes
In the case of qualitative and pseudo-qualitative characteristics, all relevant states of expression are presented in the Table of Characteristics. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

State	Note
small	3
medium	5
large	7

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

State	Note
very small	1
very small to small	2
small	3
small to medium	4
medium	5
medium to large	6
large	7
large to very large	8
very large	9

6.2 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.
Type of example varieties:
(F) Fibre variety
(O) Oil variety

6.3 Legend

G	Grouping characteristic	– see Chapter 5
(*)	Asterisked characteristic	– see Chapter 6.1.2 of UPOV guideline
MG, MS, VG, VS		– see Chapter 4.1.5
QL	Qualitative characteristic	
QN	Quantitative characteristic	
PQ	Pseudo-qualitative characteristic	

(a)-(d)	See Explanations on the Table of Characteristics in Chapter 8.1
(+)	See Explanations on the Table of Characteristics in Chapter 8.
55 – 99	See Explanations on the Table of Characteristics in Chapter 8.3
(F)	Fibre variety: see Chapter 6.2
(O)	Oil variety: see Chapter 6.2

7. TABLE OF CHARACTERISTICS

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
1.	**1.**	**VG**	**Petal: colour of crown at bud stage**		
(+)		**55-61**	white	Chantal (F), Laser (O)	1
PQ			pink	Hella (O)	2
			blue violet	Suzanne (F), Oural (O)	3
			violet	Violin (F), Aries (O)	4
2.	**2.**	**MG**	**Time of beginning of flowering**		
(+)	**(*)**		very early	Comtess (O)	1
QN			early	Eole (O)	3
			medium	Melina (F), Juliet (O)	5
			late	Aretha (F), Aries (O)	7
			very late	Drakkar (F), Bilton (O)	9
3.	**3.**	**VG**	**Corolla: arrangement of petals**		
(+)		**61-65**	free	Alizee (F), Antello (O)	1
QN		**(a)**	intermediate	Andréa (F), Oural (O)	2
			overlapping	Artemida (F), Altess (O)	3
4.	**4.**	**VG**	**Corolla : colour**		
PQ	**(*)**	**61-65**	white	Chantal (F), Laser (O)	1
G		**(a)**	light pink	-	2
			medium pink	Petra (O)	3
			red violet	-	4
			violet	Violin (F), Hungarian Gold (O)	5
			blue violet	Artemida (F), Niagara (O)	6
			medium blue	Suzanne (F), Alaska (O)	7
			light blue	Melina (F), Barbara (O)	8
5.	**5.**	**MS/VG**	**Flower: size of corolla**		
(+)		**61-65**	small	Eden (F), Laser (O)	3
QN		**(a)**	medium	Suzanne (F), Ingot (O)	5
			large	Juliet (O)	7

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
6.		**VG**	**Flower: corolla's heart**		
(+)		**61-65**	absent	Chantal (F), Laser (O)	1
QL		**(a)**	present	Andrea (O), Eole (F)	9
7.	**6.**	**VG 61-65**	**Flower: shape of corolla heart**		
(+)		**(a)**	circular	Barbara (O)	1
QN			circular to pentagonal	Agatha (F), Eole (O)	2
			pentagonal	Violin (F), Baikal (O)	3
8.	**7.**	**MS**	**Petal: length**		
(+)		**61-65**	very short	Lorea (F)	1
QN		**(a)**	short	Nathalie (F)	3
		(b)	medium	Lisette (F)	5
			long	Aretha (F)	7
			very long	Jan (F)	9
9.	**8.**	**MS**	**Petal: width**		
(+)		**61-65**	very narrow	Lorea (F)	1
QN		**(a)**	narrow	Jan (F)	3
		(b)	medium	Agatha (F)	5
			broad	Ariane (F)	7
			very broad	Violin (F)	9
10.	**9.**	**MS**	**Petal: ratio length/width**		
QN		**61-65**	very compressed	Violin (F)	1
		(a)	moderately compressed	Venica (F)	3
		(b)	medium	Alizee (F)	5
			moderately elongated	Artemida (F)	7
			very elongated	Vega 2 (F)	9

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
11.	**10**	**VG 61-65**	**Stamen: colour of distal part of filament**		
PQ		**(a)**	white	Chantal (F), Valoal (O)	1
			blue	Artemida (F), Aries (O)	2
			violet	Petra (O)	3
12.	**11**	**VG 61-65**	**Stamen: colour of basal part of filament**		
PQ		**(a)**	white	Chantal (F), Valoal (O)	1
			blue	Selena (F), Aries (O)	2
			violet	Petra (O)	3
13.	**12.**	**VG**	**Anther: colour**		
PQ	**(*)**	**61-65**	yellowish	Laser (O)	1
		(a)	pinkish	Aardvark (O)	2
			greyish	Selena (F)	3
			bluish	Vega 2 (F), Barbara (O)	4
14.	**13.**	**VG**	**Style: colour**		
PQ	**(*)**	**61-65**	white	Vega 2 (F), Abacus (O)	1
		(a)	white with a yellow dot at base	Laura (F)	2
			yellow	-	3
			white with a blue dot at base	Melina (F), Banquise (O)	4
			blue	Violin (F), Hivernal (O)	5
15.	**14.**	**MG**	**Plant: height**		
(+)		**65-69**	very short	Comtess (O)	1
QN			short	Germini (O)	3
			medium	Violin (F), Aries (O)	5
			tall	Andréa (F)	7
			very tall	Drakkar (F)	9

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
16.	**15.**	**VG**	**Boll: size**		
QN	**(*)**	**89-99**	very small	Jitka (F), Mac Gregor (O)	1
			small	Melina (F), Hivernal (O)	2
			medium	Agatha (F), Kaolin (O)	3
			large	Barbara (O)	4
			very large	Biltstar (O)	5
17. (+)	**16. (*)**	**VG**	**Boll: ciliation of false septa**		
QL		**99**	absent	Violin (F), Hivernal (O)	1
G			present	Heljä (F), Barbara (O)	9
18.	**17.**	**MS**	**Boll: length**		
(+)		**99**	very short	Drakkar (F)	1
QN		**(b)**	short	Jan (F)	3
		(c)	medium	Marylin (F)	5
			long	Violin (F)	7
			very long	Eden (F)	9
19.	**18.**	**MS**	**Boll: width**		
(+)		**99**	very narrow	Violin (F)	1
QN		**(b)**	narrow	Andrea (F)	3
		(c)	medium	Artemida (F)	5
			broad	Agatha (F)	7
			very broad	Temida (F)	9
20.	**19.**	**MS**	**Boll: ratio length/width**		
QN		**99**	very compressed	Drakkar (F)	1
		(b)	moderately compressed	Suzanne (F)	3
		(c)	medium	Marylin (F)	5
			moderately elongated	Agatha (F)	7
			very elongated	Violin (F)	9

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
21.	**20.**	**MS**	**Stem: length from cotyledon scar to first branch**		
(+)	**(*)**	**99**	very short	Abacus (O)	1
QN			short	Eole (O)	3
G			medium	Mac Gregor (O)	5
			long	Agatha (F)	7
			very long	Drakkar (F)	9
22.	**21.**	**MS**	**Stem: length from cotyledon scar to top boll**		
(+)		**99**	very short	Banquise (O)	1
QN			short	Birdseye (O)	3
			medium	Violin (F), Bilton (O)	5
			long	Jan (F)	7
			very long	Drakkar (F)	9
23.	**22.**	**MG**	**1000 seed weight**		
QN	**(*)**	**99**	very low	Violin (F), Ingot (O)	1
			low	Agatha (F), Banquise (O)	3
			medium	Barbara (O)	5
			high	Astral (O)	7
			very high	Master (O)	9
24.	**23.**	**VG**	**Seed: colour**		
PQ	**(*)**	**99**	white	Zhang Bei white linseed (O)	1
G			yellow	Aardvark (O)	2
			brown	Lisette (F), Barbara (O)	3
25.	**24.**	**MS**	**Seed: length**		
QN		**99**	very short	Suzanne (F)	1
		(b)	short	Marylin (F)	2
		(d)	medium	Agatha (F)	3
			long	Alizee (F)	4
			very long	-	5

CPVO N°	UPOV N°	Stage Method	Characteristics	Examples	Note
26.	**25.**	**MS**	**Seed: width**		
QN		**99**	very narrow	Sofie (F)	1
		(b)	narrow	Suzanne (F)	2
		(d)	medium	Marylin (F)	3
			broad	-	4
			very broad	-	5
27.	**26.**	**MS**	**Seed: ratio length/width**		
QN		**99**	very compressed	Lucie (F)	1
		(b)	moderately compressed	Marylin (F)	2
		(d)	medium	Avian (F)	3
			moderately elongated	Sofie (F)	4
			very elongated	-	5

8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS

8.1 Explanations covering several characteristics

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

(a) To be observed on fresh fully opened flowers

(b) To be observed for long and medium type varieties with brown seed colour only. The observation is not useful for short type varieties and for varieties with yellow seed colour.

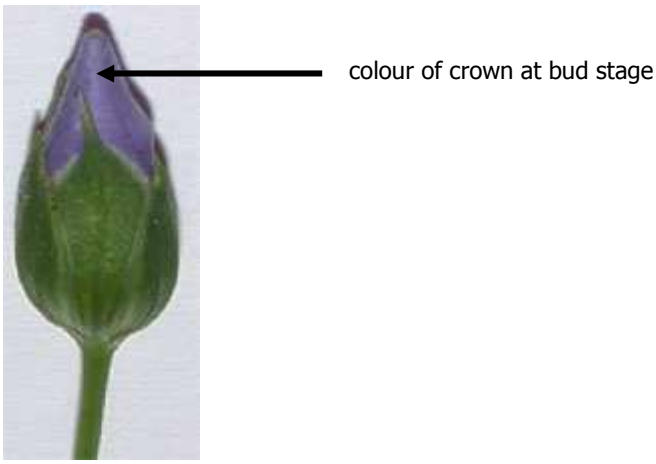
Varieties are classified in short type varieties (Note 1-4), medium type varieties (Note 5) and long type varieties (Note 6-9) based on characteristic 21 (Stem: length from cotyledon scar to first branch).

(c) Should be observed on the top boll.

(d) Should be observed on single seed taken from top boll. Seeds should be extracted by hand. Seed width and seed length are measured on the same sample of 20 seeds.

8.2 Explanations for individual characteristics

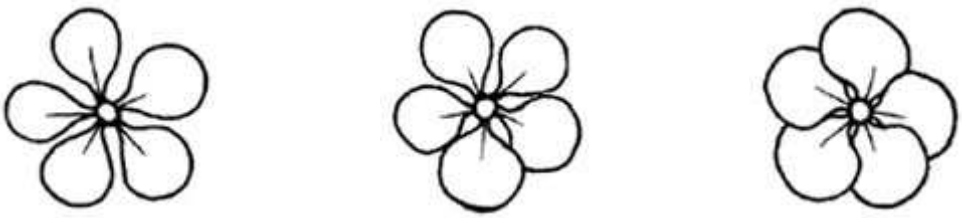
Ad 1: Petal: colour of crown at bud stage



Ad 2: Time of beginning of flowering

Time of flowering is reached when the first flower is open in 10% of plants.

Ad 3: Corolla: arrangement of petals

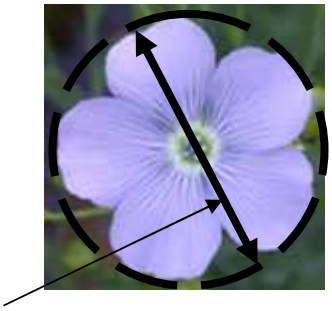


1
free

2
intermediate

3
overlapping

Ad 5: Flower: size of corolla



The size is the diameter of the corolla observed in the natural position (not with corolla held flat).

Ad. 6: Flower: corolla's heart

1
absent

2
present

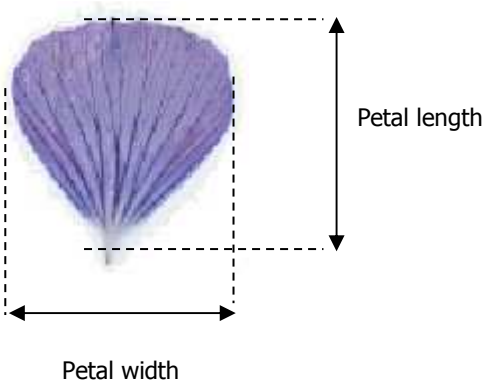
Ad. 7: Flower: shape of corolla heart

1
circular

2
circular to pentagonal

3
pentagonal

Ad 8: Petal: length
Ad 9: Petal: width



Ad. 15: Plant: height

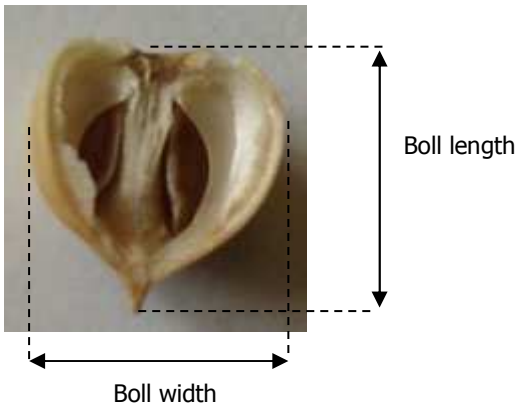
Should be measured on the plot including lateral branches (at time of flowering) (see Ad. 22).

Ad. 17: Boll: ciliation of false septa

1
absent

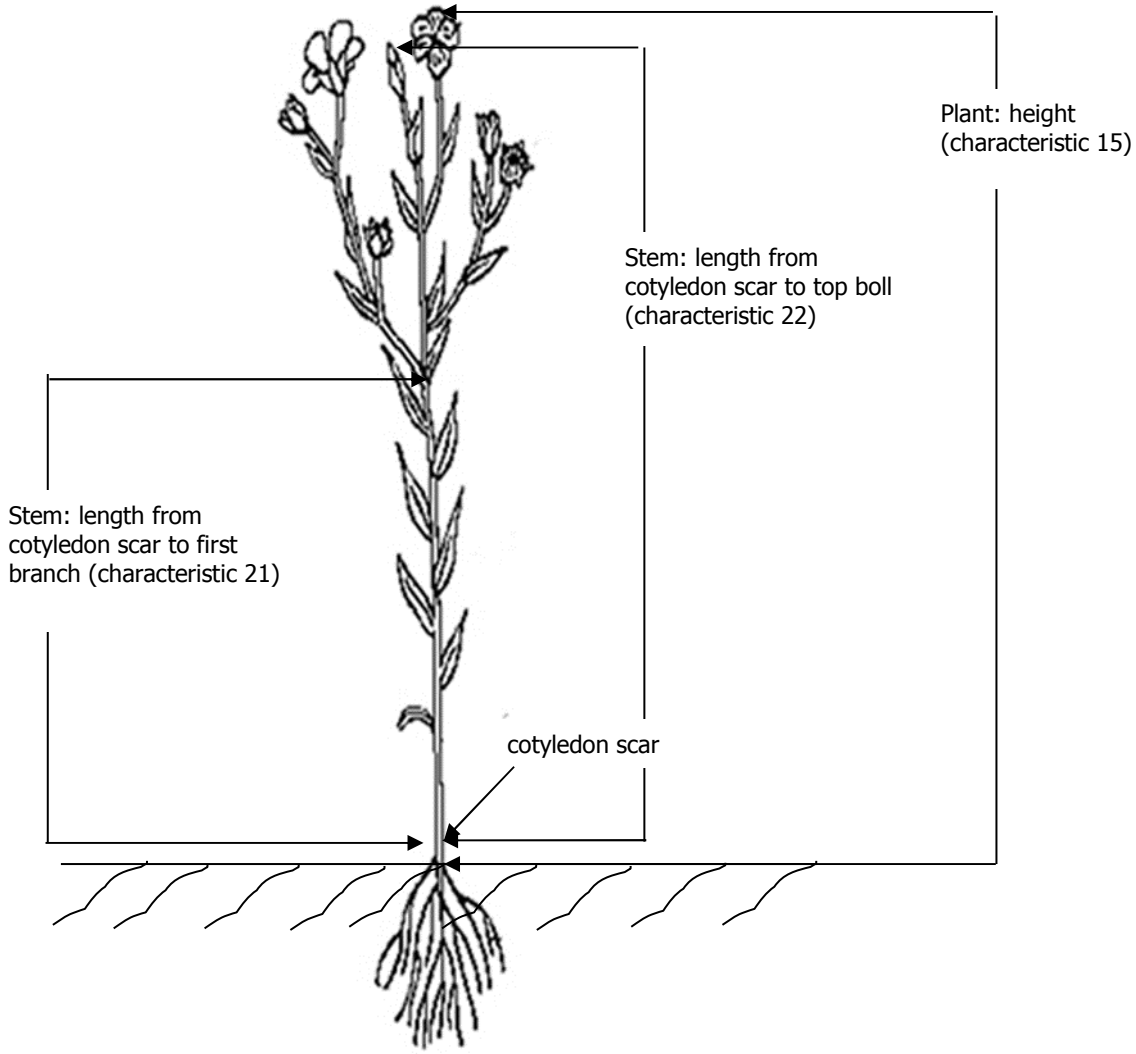
9
present

Ad. 18: Boll: length
Ad. 19: Boll: width



Ad. 21: Stem: length from cotyledon scar to first branch
Ad. 22: Stem: length from cotyledon scar to top boll

Characteristics should be observed on the main stem (exclude tillers)



8.3 Growth stage of Linum usitatissimum L. adopted to the BBCH (Meier U., 1997) scale applicable to individual plant

Stage 0 Germination
00 Dry seed
01 Beginning of seed imbibition
05 Radicle (root) emerged from seed
09 Emergence, Coleoptiles breaks through soil surface

Stage 1 Leaf development (main shoot)
11 First true leaf unfolded
12 Two true leaves unfolded
15 Five true leaves unfolded
.. Stages continuous till stage 19

Stage 5 Inflorescence emergence (main shoot)/heading
51 Flower buds visible
55 First individual flowers visible (still closed)
59 First flower petals visible

Stage 6 Flowering (main shoot)
60 First flowers open (sporadically)
61 Beginning of flowering: 10% of flowers open
65 Full flowering: 50% of flowers open
69 End of flowering: fruit set visible

Stage 7 Development of bolls
71 10% of bolls have reached final size
75 50% of bolls have reached final size
79 Nearly all bolls have reached final size

Stage 8 Ripening or maturity of fruit and seed
81 Beginning of ripening or boll colouration
85 Sepals and bolls yellow coloured
89 Fully ripe, boll and seed show fully ripe colour

Stage 9 Senescence
99 Harvested plants and/or seeds

9. LITERATURE

Anonyme, 1969: Le lin au service des hommes, sa vie, ses techniques, son histoire. Editions J-B Baillière et Fils. Paris, FR.

Anselme, CI, 1956: Les variétés de lin, leurs principales maladies cryptogamiques. INRA, (Institut National de la Recherche Agronomique). Paris, FR.

Keefe, P.D., 1999: Measurement of linseed (*Linum usitatissimum* L.) seed characters distinctness, uniformity and stability testing using image analysis, Plant Varieties and Seeds, Cambridge, GB.

Marshall, G., Editor, 1988: "Flax: Breeding and utilisation" Proceedings of the EEC Flax Workshop held in Brussels, Belgium, May 4-5 1998, sponsored by the Commission of the European Communities, Directorate-General for agriculture, Kluwer Academic Publishers, BE.

Meier U., 1997: Growth stages of mono- and dicotyledonous plants: BBCH-Monograph. Wien Federal Biological Research Center for Agriculture and Forestry, Blackwell Wissenschafts-Verlag, Berlin, DE.

Plonka, F., 1956: Les variétés de lin. INRA (Institut National de la Recherche Agronomique). Paris, FR.

10. TECHNICAL QUESTIONNAIRE

The Technical Questionnaire is available on the CPVO website under the following reference: CPVO-TQ/057/2