



PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

***Sinapis alba* L.**

WHITE MUSTARD

UPOV Code: SINAP_ALB

Adopted on 15/03/2017

Entry into force on 15/03/2017

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CPVO-TP/179/1

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1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to all varieties of *Sinapis alba* 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/export/sites/upov/resource/en/tg_1_3.pdf), its associated TGP documents (<http://www.upov.int/tgp/en/>) and the relevant UPOV Test Guideline TG/179/1 dated 04/04/2001 (<http://www.upov.int/edocs/tgdocs/en/tg179.pdf>) for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on **15.03.2017**. Any ongoing 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://cpvo.europa.eu/applications-and-examinations/technical-examinations/submission-of-plant-material-s2-publication> 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/edocs/tgpdocs/en/tgp_9.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 8.2

3.4 Test design

Each test should be designed to result in a total of at least 300 plants, which should be divided between at least three or more replicates.

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 EO unless special cooperation exists between EOs and the CPVO. The descriptive and pictorial information produced by the EO shall be held and maintained in a form of a database.

3.6.2 Living Plant Material

The EO 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 EO.

3.6.4 Making an inventory of varieties of common knowledge for inclusion in the variety collection

The inventory shall take into account the list of protected varieties and the official, or other, registers of varieties, in particular:

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 EO 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/edocs/tgpdocs/en/tgp_9.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.

Decision standards

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 2% significance level or less ($p < 0.02$) in a test over either two or three years.

If the conditions for the application of the COYD analyses are not fulfilled, distinctness should be assessed using the 2x1% method.

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-tailed-t-test of the difference between variety means with standard errors estimated using the residual mean square from the analysis of the variety x replicate plot means.

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 60 plants or parts taken from each of 60 plants and any other observations made on all plants in the test, disregarding any off-type plants. In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 1.

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/edocs/tgpdocs/en/tgp_10.pdf) prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in this Technical Protocol:

If uniformity is assessed by the combined over years uniformity method (COYU) the candidate variety is sufficiently uniform in the respective characteristic if the relative tolerance limit in relation to comparable varieties does not exceed the 0.1% significance level or less ($p < 0.001$) in a test over two or three years.

If the conditions of the COYU analyses are not fulfilled, uniformity should be assessed by the relative variance method for a sample size of 60 plants the threshold level should be 1.6 x variance of the comparable varieties.

For the assessment of uniformity of visually observed characteristics, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 300 plants, 10 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/edocs/tgpdocs/en/tgp_11.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.

4.3.2 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) Seed: erucic acid (characteristic 1)
- b) Ploidy (characteristic 2)
- c) Time of flowering (characteristic 12)
- d) Plant: height (characteristic 13)
- e) Flower: yellow colour of petals (characteristic 14)

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 EO 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 characteristic. 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.

6.3 Legend

For the CPVO N° column:

G	Grouping characteristic	– see Chapter 5
QL	Qualitative characteristic	
QN	Quantitative characteristic	
PQ	Pseudo-qualitative characteristic	
(+)	See Explanations on the Table of Characteristics in Chapter 8.1 and 8.2	

For the UPOV N° column:

The numbering of the characteristics is provided as a reference to the ad hoc UPOV guideline.

(*) UPOV Asterisked characteristic – Characteristics that are important for the international harmonization of variety descriptions.

For the column "stage, method":

00 – 89	See Explanations on the Table of Characteristics in Chapter 8.3
MG, MS, VG, VS	Method of observation – see Chapter 4.1.5

7. TABLE OF CHARACTERISTICS

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
1.	1.	00	Seed: erucic acid		
(+)	(*)		absent	Martigena	1
QLG			present	Emergo	9
2.	2.	05	Ploidy		
(+)	(*)		diploid	Emergo	2
QLG			tetraploid	Oscar, Silvester	4
3.	3.	11	Cotyledon: length		
(+)		MS	short		3
QN			medium	Carla, Venice	5
			long	Vitaro	7
4.	4.	11	Cotyledon: width		
(+)		MS	narrow	Ludique	3
QN			medium	Indian Summer, Iris	5
			broad	Brilliant, Veto	7
5.	5.	16-59	Leaf: green colour		
	(*)	VG	light	Indian Summer	1
QN			medium	Emergo, Venice	3
			dark	Iris	5
6.		16-59	Leaf: type		
(+)		VG	entire	Pionier	1
PQ			sinuate	Brilliant, Sarah	2
			lobed	Emergo	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
7.	6.	16-59	Only varieties with Leaf: type: lobed: Leaf: number of lobes		
(+)		MS	very few	Pionier	1
QN			few		3
			medium	Emergo	5
			many	Venice, Vitaro	7
8.		16-59	Leaf: dentation of margin		
(+)		VG	weak		1
QN			medium	Oscar, Emergo	3
			strong		5
9.	8.	16-59	Leaf: length		
(+)	(*)	MS	short	Carla	3
QN			medium	Litember, Seco	5
			long	Sirte	7
10.	9.	16-59	Leaf: width		
(+)	(*)	MS	narrow	Brilliant, Sarah	3
QN			medium	Emergo, Venice	5
			broad	Oscar	7
11.	10.	16-59	Leaf: length of petiole		
(+)	(*)	MS	very short	Pionier	1
			short		3
QN			medium	Litember, Topas	5
			long	Sirte	7
12.	11.		Time of flowering		
(+)	(*)	MS	very early	Carla	1
QN			early	Oscar, Carnella	3
			medium	Iris Veto	5
			late	Signo	7
G			very late	Lucida	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
13.	12.	65	Plant: height at full flowering		
(+)	(*)	MG	low	Pionier	3
QN			medium	Iris, Lucida	5
G			tall	Sibelius, Signo	7
14.	13.	65	Flower: yellow colour of petals		
	(*)	VG	light	Figaro	1
QN			medium	Emergo	3
G			dark		5
15.	14.	65	Flower: length of petals		
QN		MS	short	Indian Summer	3
			medium	Emergo, Ludique	5
			long		7
16.	15.	65	Flower: width of petals		
QN		MS	narrow	Sibelius	3
			medium	Emergo, Iris	5
			long		7
17.	QL	79-89	Siliqua: hairiness		
(+)		VG	absent	Indian Summer, Collina	1
			present	Pole Position, Symbol, Veto	9
18.	16.	89	Plant: total length		
	(*)	MS	short	Carnella, Oscar	3
QN			medium	Emergo, Veto	5
			long	Semper	7
19.	17.	89	Siliqua: length		
	(*)	MS	short	Verte	3
a			medium	Sarah, Semper	5
QN			long	Vitaro	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note	
20.	18. (*)	89 MS	Siliqua: length of beak			
			short	Lucida	3	
			medium	Collina, Sito	5	
QN			long	Silvester	7	
21.	19.	89 MS	Siliqua: width			
			narrow	Seco	3	
			medium	Lucida, Signo	5	
QN			broad	Silvester	7	
22.	20.	89 MS	Siliqua: length of peduncle			
			short	Lucida, Sito	3	
			medium	Litember, Collina	5	
QN			long	Silvester	7	
23.	21.	89 MS	Siliqua: number of seeds			
			low	Silvester	3	
			medium	Sarah, Veto	5	
			high	Carla	7	
24.	22.	89 MS	Seed: thousand seed weight			
			low	Carla	3	
			medium	Collina, Venice	5	
QN			high	Oscar	7	
25.	23.	VG	Tendency to form inflorescences in late summer sown trials			
			(+)	absent or very weak	Sibelius, Verte	1
			QN	weak	Topas	3
				medium	Silvester	5
				strong	Litember	7
			very strong	Carla, Carnella	9	

8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS

8.1 Explanations for individual characteristics

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

- a) All observations on the siliqua should be recorded in the mid-part of the inflorescence of the main stem.

8.2 Explanations for individual characteristics

Ad. 1: Seed: erucic acid

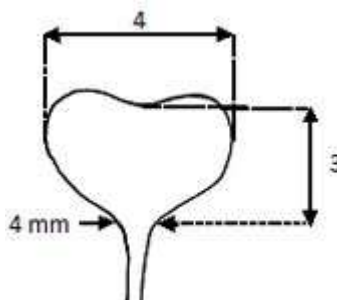
The erucic acid content should be observed on seed sent in by the applicant. It should be expressed as a percentage by mass of methyl esters in accordance with the ISO standard in document 5508, paragraph 6.2.2.1. Seed containing 2% or less of erucic acid will be classified as "absent".

Ad. 2: Ploidy

Ploidy should be assessed by standard cytological methods.

Ad. 3 + 4: Cotyledon: length (3) and width (4)

The measurement should be taken in the glasshouse. If the two cotyledons differ in size, the bigger one should be measured. The length is defined as distance between the inclination at top of the cotyledon and the point where the width of the petiole is about 4 mm. The width of the cotyledon should be measured at the widest point of the cotyledons.



Ad. 6: Leaf: type

Observations should be done on fully developed leaves. Entire leaves have only weak incisions. Sinuate leaves have clearly developed incisions but the incisions do not reach the midrib. If incisions reach the midrib the leaf is considered to be lobed.



1
entire



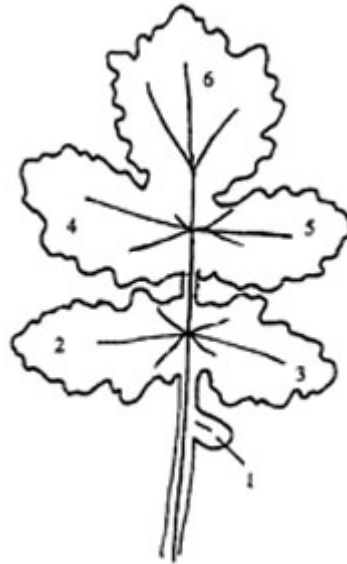
2
sinuate



3
lobed

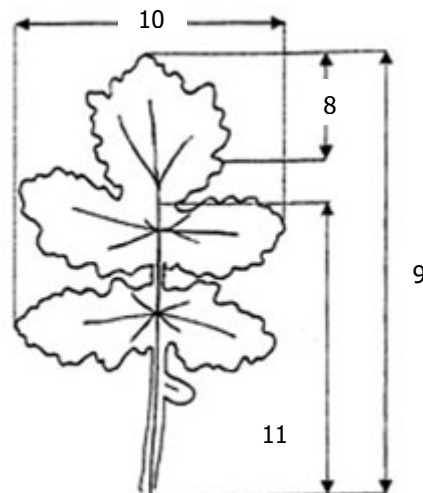
Ad. 7: Only varieties with Leaf: type: lobed: Leaf: number of lobes

Observations should be done on fully developed leaves. Parts of the leaf blade are considered as lobes if their length is at least equivalent to the width of the leaf petiole at their point of attachment and if the upper notch of the blade has at least half the length of the lobe itself.



Ad. 8 - 11: Leaf: dentation (8), length (9), width (10), length of petiole (11)

8 = part on which the dentation should be recorded (characteristic 8)



Ad.12: Time of flowering

The observation should be done at least three times per week and more frequently if there is any need to do so. The date should be calculated - if necessary by interpolation - at which 50% of plants show at least one open flower.

When assessed on the plot as a whole, the recommended percentage is 10%.

Ad.13: Plant: height at full flowering

The height of the plants should be assessed when all normally developed plants have opened at least one flower.

Ad. 24: Seed: thousand seed weight

Per replicate a bulk sample of 20 siliques should be taken.

Ad. 25: Tendency to form inflorescences in late summer sown trials

The observation of the growth stages reached (proportion of plants below bud stage, in bud stage, in flowering stage, in stage of siliqua formation) should be made in autumn, when the development stagnates.

Alternatively the beginning of flowering may be observed in this trial; early flowering would mean strong generative development, late flowering would mean weak development.

8.3 Phenological growth stages according to the BBCH-identification keys of oilseed rape (Meyer, 1997)

Code	Description
Principal growth stage 0: Germination	
00	Dry seed
01	Beginning of seed imbibition
03	Seed imbibition complete
05	Radicle emerged from seed
07	Hypocotyl with cotyledons emerged from seed
08	Hypocotyl with cotyledons growing towards soil surface
09	Emergence: cotyledons emergence through soil surface
Principal growth stage 1: Leaf development	
10	Cotyledons completely unfolded
11	First leaf unfolded
12	2 leaves unfolded
13	3 leaves unfolded
14	4 leaves unfolded
15	5 leaves unfolded
16	6 leaves unfolded
17	7 leaves unfolded
18	8 leaves unfolded
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 visible
22	2 side shoots visible
23	3 side shoots visible
24	4 side shoots visible
25	5 side shoots visible
26	6 side shoots visible
27	7 side shoots visible
28	8 side shoots visible
29	End of side shoot development: 9 or more side shoots visible
Principal growth stage 3: Stem elongation	
30	Beginning of stem elongation: no internodes ('rosette')
31	1 visibly extended internodes
32	2 visibly extended internodes
33	3 visibly extended internodes
34	4 visibly extended internodes
35	5 visibly extended internodes
36	6 visibly extended internodes
37	7 visibly extended internodes
38	8 visibly extended internodes
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	Flower buds visible from above ("green bud")
52	Flower buds free, level with the youngest leaves
53	Flower buds raised above the youngest leaves
55	Individual flower buds (main inflorescence) visible but still closed
57	Individual flower buds (secondary inflorescences) visible but still closed
59	First petals visible, flower buds still closed ("yellow bud")

Code	Description
Principal growth stage 6: Flowering	
60	First flowers open
61	10 % of flowers on main raceme open, main raceme elongating
62	20 % of flowers on main raceme open
63	30 % of flowers on main raceme open
64	40 % of flowers on main raceme open
65	Full flowering: 50 % flowers on main raceme open, older petals falling
67	Flowering declining: majority of petals fallen
69	End of flowering
Principal growth stage 7: Development of fruit	
71	10 % of pods have reached final size
72	20 % of pods have reached final size
73	30 % of pods have reached final size
74	40 % of pods have reached final size
75	50 % of pods have reached final size
76	60 % of pods have reached final size
77	70 % of pods have reached final size
78	80 % of pods have reached final size
79	Nearly all pods have reached final size
Principal growth stage 8: Ripening	
80	Beginning of ripening: seed green, filling pod cavity
81	10 % of pods ripe, seeds dark and hard
82	20 % of pods ripe, seeds dark and hard
83	30 % of pods ripe, seeds dark and hard
84	40 % of pods ripe, seeds dark and hard
85	50 % of pods ripe, seeds dark and hard
86	60 % of pods ripe, seeds dark and hard
87	70 % of pods ripe, seeds dark and hard
88	80 % of pods ripe, seeds dark and hard
89	Fully ripe: nearly all pods ripe, seeds dark and hard

9. LITERATURE

Growth stages of mono- and dicotyledonous plants: BBCH-Monograph. Federal Biological Research Centre of Agriculture and Forestry (ed.) Ed. by Uwe Meier.-Berlin; Wien [u.a.]: Blackwell Wiss.-Verl., 1997

10. TECHNICAL QUESTIONNAIRE

The Technical Questionnaire is available on the CPVO website under the following reference:
CPVO-TQ/179/1