EUROPEAN UNION

COMMUNITY PLANT VARIETY OFFICE

PROTOCOL FOR DISTINCTNESS, UNIFORMITY AND STABILITY TESTS

***Brassica rapa* L. var. *pekinensis* (Lour.) Kitam.**

CHINESE CABBAGE

UPOV Code: BRASS_RAP_PEK

Adopted on 13/03/2008

I SUBJECT OF THE PROTOCOL

The protocol describes the technical procedures to be followed in order to meet the Council Regulation 2100/94 on Community Plant Variety Rights. The technical procedures have been agreed by the Administrative Council and are based on general UPOV Document TG/1/3 and UPOV Guideline TG/105/4 dated 09/04/2003 for the conduct of tests for Distinctness, Uniformity and Stability. This protocol applies to all varieties of ***Brassica rapa* L. var. *pekinensis* (Lour.) Kitam.**

II SUBMISSION OF SEED AND OTHER PLANT MATERIAL

1. The Community Plant Variety Office (CPVO) is responsible for informing the applicant of

- the closing date for the receipt of plant material;
- the minimum amount and quality of plant material required;
- the examination office to which material is to be sent.

A sub-sample of the material submitted for test will be held in the variety collection as the definitive sample of the candidate variety.

The applicant is responsible for ensuring compliance with any customs and plant health requirements.

2. Final dates for receipt of documentation and material by the Examination Office

The final dates for receipt of requests, technical questionnaires and the final date or submission period for plant material will be decided by the CPVO and each Examination Office chosen.

The Examination Office is responsible for immediately acknowledging the receipt of requests for testing, and technical questionnaires. Immediately after the closing date for the receipt of plant material the Examination Office should inform the CPVO whether acceptable plant material has been received or not. However if unsatisfactory plant material is submitted the CPVO should be informed as soon as possible.

3. Plant material requirements

The current quality and quantity requirements as well as the final dates for submission of the plant material are available on the CPVO website (www.cpvo.europa.eu) and are published in the CPVO gazette 'S2'.

Quality of seed: ..... Should not be less than the standards laid down for certified seed in Annex II of Council Directive 2002/55/EC..

Seed Treatment: ..... The plant material must not have undergone any treatment unless the CPVO and the Examination Office allow or request such treatment. If it has been treated, full details of the treatment must be given.

Special requirements: ..... -

Labelling of sample:..... - Species
- File number of the application allocated by the CPVO
- Breeder's reference
- Examination reference (if known)
- Name of applicant
- The phrase "On request of the CPVO"

III CONDUCT OF TESTS

1. Variety collection

A variety collection will be maintained for the purpose of establishing distinctness of the candidate varieties in test. A variety collection may contain both living material and descriptive information. A variety will be included in a variety collection only if plant material is available to make a technical examination.

Pursuant to Article 7 of Council Regulation No. 2100/94, the basis for a collection should be the following:

- varieties listed or protected at the EU level or at least in one of the EEA Member States;
- varieties protected in other UPOV Member States;
- any other variety in common knowledge.

The composition of the variety collection in each Examination Office depends on the environmental conditions in which the Examination Office is located.

Variety collections will be held under conditions which ensure the long term maintenance of each accession. It is the responsibility of Examination Offices to replace reference material which has deteriorated or become depleted. Replacement material can only be introduced if appropriate tests confirm conformity with the existing reference material. If any difficulties arise for the replacement of reference material Examination Offices must inform the CPVO. If authentic plant material of a variety cannot be supplied to an Examination Office the variety will be removed from the variety collection.

2. Material to be examined

Candidate varieties will be directly compared with other candidates for Community plant variety rights tested at the same Examination Office, and with appropriate varieties in the variety collection. When necessary an Examination Office may also include other candidates and varieties. Examination Offices should therefore make efforts to co-ordinate the work with other Offices involved in DUS testing of Chinese cabbage. There should be at least an exchange of technical questionnaires for each candidate variety, and during the test period, Examination Offices should notify each other and the CPVO of candidate varieties which are likely to present problems in establishing distinctness. In order to solve particular problems Examination Offices may exchange plant material.

3. Characteristics to be used

The characteristics to be used in DUS tests and preparation of descriptions shall be those referred to in the Annex 1. 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. In the latter case, the CPVO should be informed. In addition the existence of some other regulation e.g. plant health, may make the observation of the characteristic impossible.

The Administrative Council empowers the President, in accordance with Article 23 of Commission Regulation N° 1239/95, to insert additional characteristics and their expressions in respect of a variety.

4. Grouping of varieties

The varieties and candidates to be compared will 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 and which in their various states of expression are fairly evenly distributed throughout the collection. In the case of continuous grouping characteristics overlapping states of expression between adjacent groups is required to reduce the risks of incorrect allocation of candidates to groups. The characteristics which may be used for grouping are the following:

(a) Head: shape in longitudinal section (characteristic 24)

(b) Head: type (characteristic 25)

(c) Time of harvest maturity (characteristic 33)

5. Trial designs and growing conditions

The minimum duration of tests will normally be two independent growing cycles. Tests will be carried out under conditions ensuring normal growth. The size of the plots will be such that plants or parts of plants may be removed for measuring and counting without prejudice to the observations which must be made up to the end of the growing period.

The test design is as follows

As a minimum, each test should include a total of 60 plants which should be divided between two or more replicates.

All observations determined by measurements or counting should be made on 20 plants or parts of 20 plants.

6. Special 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, a special test may be undertaken providing that a technically acceptable test procedure can be devised.

Special 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.

7. Standards for decisions

a) **Distinctness**

A candidate variety will be considered to be distinct if it meets the requirements of Article 7 of Council Regulation No. 2100/94.

b) **Uniformity**

For the assessment of uniformity of single-cross hybrid varieties a population standard of 1% with an acceptance probability of 95% should be applied to off-types excluding clearly recognisable inbred plants.

For the assessment of uniformity of other seed propagated varieties, relative uniformity standards should be used.

Table of maximum numbers of off-types allowed for uniformity standards.

Number of plants	off-types allowed
6-35	1
36-82	2

c) **Stability**

A candidate will be considered to be sufficiently stable when there is no evidence to indicate that it lacks uniformity.

IV REPORTING OF RESULTS

After each recording season the results will be summarised and reported to the CPVO in the form of a UPOV model interim report in which any problems will be indicated under the headings distinctness, uniformity and stability. Candidates may meet the DUS standards after two growing periods but in some cases three growing periods may be required. When tests are completed the results will be sent by the Examination Office to the CPVO in the form of a UPOV model final report.

If it is considered that the candidate complies with the DUS standards, the final report will be accompanied by a variety description in the format recommended by UPOV. If not the reasons for failure and a summary of the test results will be included with the final report.

The CPVO must receive interim reports and final reports by the date agreed between the CPVO and the examination office.

Interim reports and final examination reports shall be signed by the responsible member of the staff of the Examination Office and shall expressly acknowledge the exclusive rights of disposal of CPVO.

V LIAISON WITH THE APPLICANT

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 agreement, the applicant may be directly informed at the same time as the CPVO particularly if a visit to the trial is advisable.

The interim report as well as the final report shall be sent by the Examination Office to the CPVO.

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ANNEXES TO FOLLOW

ANNEX I

PAGE

Legend:

Note: For the CPVO numbered characteristics, all characteristics in the table are compulsory; notwithstanding, in the case of disease resistance characteristics, only those resistances marked with an asterisk (*) in the CPVO column are compulsory. The asterisks in the UPOV numbered characteristics are there for information purposes and denote those characteristics which should always be observed when a UPOV guideline is utilised.
In general for the assessment of resistance characteristics, the facilities of other Examination Offices or specialised institutions might be used, subject to previous arrangements.
Some characteristics may be discarded: if there are already phytosanitary restrictions.

(+) See explanations on the Table of characteristics
(a) – (b) See explanations on the table of characteristics
G Grouping characteristic

Types of expression of characteristics:

QL – Qualitative characteristic
QN – Quantitative characteristic
PQ – Pseudo-qualitative characteristic

Type of 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

When a method of observation is attributed to a certain characteristic, the first differentiation is made depending if the action taken is a visual observation (V) or a measurement (M).

The second differentiation deals with the number of observations the expert attributes to each variety, thus the attribution of either G or S.
If a single observation of a group consisting of an undefined number of individual plants is appropriate to assess the expression of a variety, we talk about a visual observation or a measurement made on a group of plants, thus we attribute the letter G (either VG or MG). If the expert makes more than one observation on that group of plants, the decisive part is that we have at the end only one data entry per variety which means that we have to deal with G (e.g. measurement of plant length on a plot – MG, visual observation of green colour of leaves on a plot – VG).
If it is necessary to observe a number of individual plants to assess the expression of a variety, we should attribute the letter S (thus either VS or MS). Single plant data entries are kept per variety for further calculations like the variety mean (e.g. measurement of length of ears – MS, visual observation of growth habit of single plants in grasses – VS). The number of individual plants to be observed in such cases is stated in section III.5.

ANNEX II

Technical Questionnaire

ANNEX I

TABLE OF CHARACTERISTICS TO BE USED IN DUS-TEST AND PREPARATION OF DESCRIPTIONS

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
1.	**1.**	**VG**	**Plant: habit (at the beginning of head formation)**		
(+)	**(+)**	**(a)**	erect	Osiris	1
QN			semi-erect	Muso, Spectrum	2
			spreading	Bando	3
2.	**2.**	**VG/MS**	**Plant: height**		
	(*)	**(a)**	short	Regina	3
QN			medium	Muso	5
			tall	Shousai	7
3.	**3.**	**VG/MS**	**Outer leaf: length**		
QN		**(b)**	short	Salad	3
			medium	Muso	5
			long	Shousai	7
4.	**4.**	**VG/MS**	**Outer leaf: maximum width**		
QN		**(b)**	narrow	Salad	3
			medium	Muso	5
			broad	Bando	7
5.	**5.**	**VG**	**Outer leaf: shape (before harvest maturity)**		
PQ	**(*)**	**(b)**	circular	Kenshin	1
(+)	**(+)**		broad obovate	Kaho	2
			obovate	Muso	3
			narrow obovate	Bando	4
			narrow elliptic	Shousai	5

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
6.	**6.**	**VG**	**Outer leaf: apex**		
(+)	**(+)**	**(b)**	obtuse	Shousai	1
PQ			rounded	Muso	2
			truncated	Ousho	3
7.	**7.**	**VG**	**Outer leaf: number of blisters on upper side**		
QN	**(*)**	**(b)**	few	Kinap, Sprinter	3
			medium	Hopkin, Muso	5
			many	Bando, Ming	7
8.	**8.**	**VG**	**Outer leaf: size of blisters on upper side**		
QN		**(b)**	small	Granat	3
			medium	Regina	5
			large		7
9.	**9.**	**VG**	**Outer leaf: colour**		
	(*)	**(b)**	yellow green	Regina	1
PQ			green	Hayamidori, Kaho, Muso	2
			grey green		3
10.	**10.**	**VG**	**Varieties with green outer leaves only: Intensity of green colour**		
QN		**(b)**	light	Kaho	3
			medium	Muso	5
			dark	Hayamidori	7
11.	**11.**	**VG**	**Outer leaf: anthocyanin coloration**		
QL		**(b)**	absent	Muso	1
			present	Harumaki 1 go	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
12.	**12.**	**VG**	**Outer leaf: glossiness**		
QN		**(b)**	weak	Kaho, Kinap	3
			medium	Hopkin, Muso	5
			strong	Shunjyu	7
13.	**13.**	**VG**	**Outer leaf: hairiness (at lower side)**		
QN		**(b)**	absent or very weak	Salad	1
			weak	Cream, Kinap	3
			medium	Shunjyu, Tardisto	5
			strong	Muso	7
			very strong		9
14.	**14.**	**VG**	**Outer leaf: profile in longitudinal section (excluding leaf base)**		
QN		**(b)**	concave	Hopkin	1
			straight	Tardisto	2
			convex	Chiko	3
15.	**15.**	**VG**	**Outer leaf: undulation of margin**		
QN		**(b)**	weak	Kaho, Sixtyres	3
			medium	Spectrum	5
			strong	Chiko, Shin-azuma	7
16.	**16.**	**VG**	**Outer leaf: incisions of margin (at distal part)**		
QN		**(b)**	absent	Kenshin	1
			intermediate	Kasumi, Regina	2
			strong	Muso	3
17.	**17.**	**VG**	**Outer leaf: serration of margin (at base)**		
QN		**(b)**	weak	Kinap	3
			medium	Tardisto	5
			strong		7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
18.	**18.**	**VG**	**Outer leaf: midrib in cross section (at mid-point)**		
QN		**(b)**	concave	Regina	1
			flat	Kinap	2
19.	**19.**	**VG/MS**	**Outer leaf: length of midrib**		
(+)	**(+)**	**(b)**	short	Hamamidori	3
QN			medium	Muso	5
			long	Shosai	7
20.	**20.**	**VG/MS**	**Outer leaf: width of midrib (at base)**		
QN		**(b)**	narrow	Shousai	3
			medium	Jade Pagoda	5
			broad	Harumaki 1 go	7
21.	**21.**	**VG**	**Outer leaf: colour of midrib**		
PQ		**(b)**	white	Muso	1
			light green		2
			green		3
22.	**22.**	**VG/MS**	**Head: height**		
QN		**(a)**	short	Senda	3
			medium	Jade Pagoda, Muso	5
			tall	Monument, Shousai	7
23.	**23.**	**VG/MS**	**Head: maximum width**		
QN		**(a)**	narrow	Granat	3
			medium	Jade Pagoda, Muso	5
			broad		7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
24.	**24.**	**VG**	**Head: shape in longitudinal section**		
	(*)	**(a)**	circular	Kenshin	1
(+)	**(+)**		elliptic	Hayamidori	2
PQ			ovate	Shinjyu	3
			obovate	Hamamidori	4
			oblong	Chushu	5
G			narrow oblong	Shousai	6
25.	**25.**	**VG**	**Head: type**		
	(*)	**(a)**	open	Monument	1
QN			half-open	Spectrum	2
G			closed	Kinap, Muso	3
26.	**26.**	**VG**	**Closed head variety only: Head: degree of overlapping leaf**		
	(*)	**(a)**	low	Shousai	3
PQ			medium	Shinjyu	5
			high	Kaho	7
27.	**27.**	**VG**	**Head: colour of top**		
PQ		**(a)**	white		1
			yellow		2
			yellow green	Kasumi	3
			green	Bando, Muso, Salad	4
28.	**28.**	**VG**	**Varieties with green top only: Head: intensity of green colour of wrapper leaf**		
	(*)	**(a)**	light	Salad	3
QN			medium	Muso	5
			dark	Bando	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
29.	**29.**	**VG**	**Head: blistering of wrapper leaf**		
QN		**(a)**	absent or very weak		1
			weak	Granat	3
			medium	Regina	5
			strong		7
			very strong		9
30.	**30.**	**VG**	**Head: internal colour**		
	(*)	**(a)**	whitish		1
PQ			yellow	Muso	2
			orange	Orange Queen	3
31.	**31.**	**VG**	**Head: firmness (at harvest maturity)**		
QN		**(a)**	very loose		1
			loose	Granat	3
			medium	Sixtyress	5
			firm	Bando, Regina	7
			very firm	Shunjyu	9
32.	**32.**	**VG**	**Head: apex of internal stem (at harvest maturity)**		
QN		**(a)**	pointed	Kaho	1
			round	Muso	2
			truncate	Syunju	3
33.	**33.**	**MG**	**Time of harvest maturity**		
	(*)		very early	Kenshin	1
QN			early	Regina, Sprinter	3
			medium	Muso, Nestor	5
			late	Chusyu, Granado	7
G			very late	Treasure Island	9

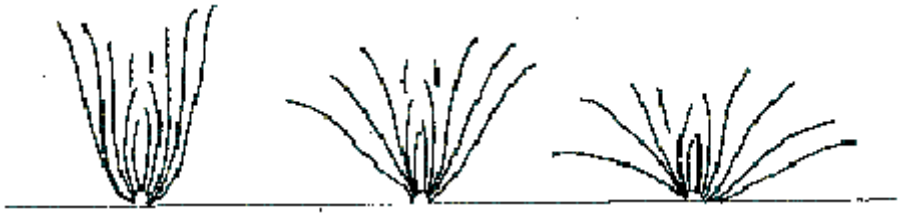
EXPLANATIONS AND METHODS

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

(a) Plant, leaf and head: Observations on the plant, leaf and head should be made at harvest maturity.

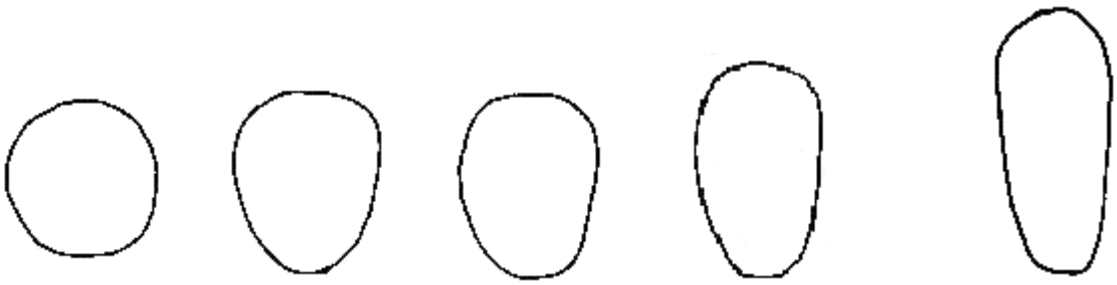
(b) Outer leaf: Observations on the outer leaf should be made on its upper outer side.

Ad. 1: Plant: habit (at the beginning of head formation)



1 erect | 2 semi-erect | 3 spreading

Ad 5: Outer leaf: shape (before harvest maturity)

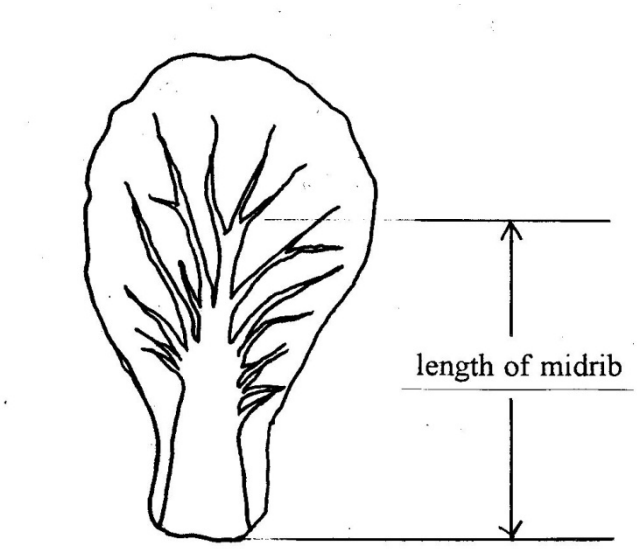


1 circular | 2 broad obovate | 3 obovate | 4 narrow obovate | 5 narrow elliptic

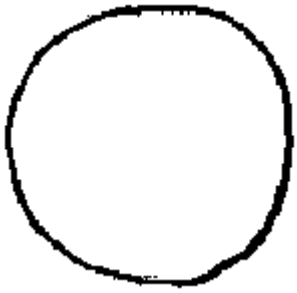
Ad 6: Outer leaf: apex

1 obtuse | 2 rounded | 3 truncated

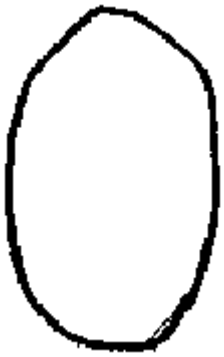
Ad 19: Outer leaf: length of midrib



Ad 24: Head: shape in longitudinal section

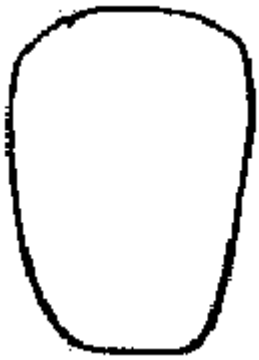


1
circular

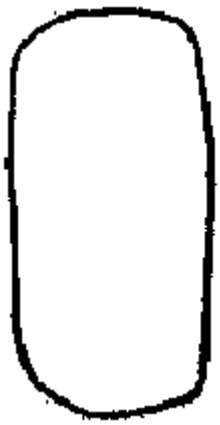


2
elliptic

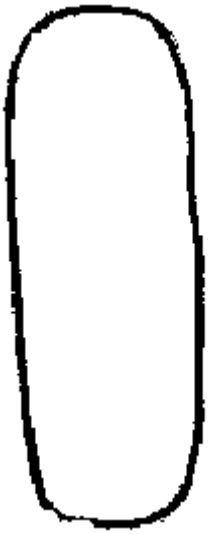
3
ovate



4
obovate



5
oblong



6
narrow oblong

LITERATURE

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Tsunoda, S., Hinata, K. and Gomez-Campo, C., 1980": "*Brassica* Crops and Wild Allies - Biology and Breeding," Japan Scientific Press, Tokyo.

ANNEX II

The Technical Questionnaire is available on the CPVO website under the following reference: CPVO-TQ/105/1