



PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Cucurbita pepo L.

VEGETABLE MARROW, SQUASH

UPOV Code: CUCUR_PEP

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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 *Cucurbita pepo* 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/119/4 Corr. dated 28/03/2007 (<http://www.upov.int/edocs/tgdocs/en/tg119.pdf>) for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on **19.03.2014**. 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 vigor, 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

Two independent growing cycles

The minimum duration of tests should normally be two independent growing cycles.

The two independent growing cycles should be in the form of two separate plantings.

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.

3.4 Test design

3.4.1 Each test should be designed to result in a total of at least 20 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.

3.4.3 For pollination and fruit set of triploid varieties it is needed to interplant with diploid varieties in a trial layout so that the diploid pollenizers will be close to the triploid plants. The minimum percentage of diploid plants should not be less than 30%. When pollinators (e.g. bees, bumblebees) are used a slightly lower percentage of pollenizer may be required.

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

(a) Fruit species and seed propagated agricultural and vegetable species

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.

(b) Vegetatively propagated agricultural and vegetable species

The variety collection shall comprise variety descriptions; no living reference collection is required. 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

(a) Fruit species and seed propagated agricultural and vegetable species

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

(b) Vegetatively propagated agricultural and vegetable species and ornamental species

The examination office shall obtain living plant material of reference varieties as and when those varieties need to be included in growing trials or other tests.

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 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

(a) Seed propagated species

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.

(b) Vegetatively propagated species

The examination office shall maintain the variety collection under appropriate growing conditions (e.g. glasshouse, orchard, in vitro), where it shall be ensured that the plants are adequately irrigated, fertilised, pruned and protected from harmful pests and diseases. 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 or by checking the identity of the new material against the variety description.

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.

Further guidance is provided in documents TGP/9 "Examining Distinctness" and TGP/8 "Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability".

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.

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 10 plants or parts taken from each of 10 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. color 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:

(a) Cross-pollinated varieties

For the assessment of uniformity of cross-pollinated varieties, relative uniformity standards should be used.

(b) Hybrid varieties

For the assessment of uniformity of hybrid varieties, a population standard of 1% and an acceptance probability of at least 95% should be applied to off-types excluding clearly recognisable inbred plants. In addition a population standard of 1% with the same acceptance probability should be applied to clearly recognisable inbred plants. In the case of a sample size of 20 plants, 1 off-type is 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.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new plant 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) Fruit: type (as outlined in page 31 of the protocol)
- b) Plant: growth habit (characteristic 4)
- c) Plant: branching (characteristic 5)
- d) Leaf blade: incisions (characteristic 13)
- e) Leaf blade: silvery patches (characteristic 15)
- f) Leaf blade: relative area covered by silvery patches (characteristic 16)
- g) Fruit: general shape (characteristic 30)
- h) Fruit: main colour of skin (characteristic 50)

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.

(a) Technical Protocols allowing the use of electrophoresis

6.1.1 The list of characteristics derived from electrophoresis as in Annex X should only be used as a complement to other differences in morphological or physiological characteristics.

(b) Technical Protocols with asterisked characteristics (only for certain vegetable species)

6.1.2 In the case of disease resistance characteristics, only those resistances marked with an asterisk (*) in the CPVO column are compulsory.

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
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 8.2

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.

7. TABLE OF CHARACTERISTICS

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
1.	1.		Seedling: shape of cotyledons		
			narrow elliptic	Bianchini	1
			elliptic	Cora, Tivoli	2
			broad elliptic	Cinderella, Goldi	3
			circular	Yellow Crookneck	4
			obovate		5
2.	2.		Seedling: intensity of green colour of cotyledons		
			very light	Sunburst	1
			light	Bianchini	3
			medium	Cora	5
			dark	Lidia	7
			very dark	Saray	9
3.	3.		Seedling: cross section of cotyledons		
			concave		1
			straight	Sunburst	2
		convex	Bianchini, Yellow Crookneck	3	
4.	4.		Plant: growth habit		
			bush	Greyzini	1
			semi-trailing	Cinderella, Everest, Twickers	2
			G	trailing	Becky, Long Green Trailing
5.	5.		Plant: branching		
			absent	Goldi	1
G		present	Patty Green Tint	9	

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
6.	6.		Plant: degree of branching		
			very weak	Cora	1
			weak	Karioka, Verdi	3
			medium	Gold Rush, Tivoli	5
			strong	Blanche non coureuse 3, Jack O'Lantern, Yellow Crookneck	7
			very strong	Patty Green Tint, Sweet Dumpling	9
7.	7.		<u>Bush varieties only:</u> Plant: attitude of petiole (excluding lower external leaves)		
			erect	Blanche non coureuse 3, Yellow Crookneck	1
			erect to semi-erect	Sardane	2
			semi-erect	Arlesa	3
			semi-erect to horizontal	Goldi	4
			horizontal	Ambassador	5
8.	8.		Stem: colour		
			completely green	Becky	1
			partly green and partly yellow	Autumn Gold	2
9.	9.		Stem: intensity of green colour		
			very light	Maayan	1
			light	Bianchini	3
			medium	Cinderella	5
			dark	Greyzini	7
			very dark	Goldrush	9
10.	10.		Stem: mottling		
			absent	Cinderella	1
			present	Cora	9
11.	11.		Stem: tendrils		
			absent to rudimentary	Goldrush, Sylvana	1
			well developed	Baby Bear, Greyzini	2

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
12.	12.		Leaf blade: size		
			very small	Becky	1
			small	Small Sugar	3
			medium	Ambassador	5
			large	Kriti	7
			very large		9
13. (+)	13.		Leaf blade: incisions		
			absent or very shallow	Scallopini	1
			shallow	Everest	3
			medium	Jackpot	5
			deep	Civac	7
G			very deep	Isotta	9
14.	14.		Leaf blade: intensity of green colour of upper surface		
			light	Ghazzi	3
			medium	Cora	5
			dark	Everest	7
15.	15.		Leaf blade: silvery patches		
			absent	Black Forest, Scallopini	1
G			present	Civac	9
16.	16.		Leaf blade: relative area covered by silvery patches		
			very small	Albo	1
			small	Aziz	3
			medium	Ambassador	5
			large	Cora	7
G			very large	Summerstar	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
17.	17.		Petiole: length		
			short	Jack be Little, Karioka	3
			medium	Goldi	5
			long	Autumn Gold, Baikal	7
18.	18.		Petiole: number of prickles		
			absent or very few	Kojac	1
			few	Opaline	3
			medium	Spidy	5
			many	White Bush Scallop	7
			very many	Yellow Crookneck	9
19.	19.		Female flower: ring at inner side of corolla		
			absent	Cinderella, Greyzini	1
			present	Aurore	9
20.	20.		Female flower: colour of ring at inner side of corolla		
			yellow	Diamant, Patro	1
			green	Aurore, Early White Bush Scallop, President	2
			yellow and green	Pueblo	3
21.	21.		<u>Only varieties with green ring at inner side of corolla:</u> Female flower: intensity of colour of green ring at inner side of corolla		
			weak	Maya, Sardane	3
			medium	Samba, Senator	5
			strong	Aristocrat, Diamant	7
22.	22.		Male flower: ring at inner side of corolla		
			absent	Bianchini	1
			present	Goldi	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note	
23.	23.		Male flower: colour of ring at inner side of corolla			
			yellow	Afrodite, Patro, Zyzo	1	
			green	Austral, Belor, Goldi	2	
			yellow and green	Alice, Carmina, Green Gem, Ibis	3	
24.	24.		<u>Only varieties with green ring at inner side of corolla:</u> Male flower: intensity of green colour of ring at inner side of corolla			
			weak	Cora	3	
			medium	Verdi	5	
			strong	Goldi	7	
25.	25.		<u>Only Zucchini type varieties:</u> Young fruit: ratio length/maximum diameter			
			very small	Ghazzi	1	
			small	Opal	3	
			medium	Cora	5	
			large	Carlotta	7	
			very large	Spidy	9	
26.	26.		<u>Only Zucchini and Rounded Zucchini type varieties:</u> Young fruit: general shape			
			(+)	globular	De Nice à fruit rond	1
				pear shaped	Clarita	2
				tapered elliptical	Top Kapi	3
				elliptical	Table Dainty	4
				cylindrical	Ambassador, Ibis	5
				tapered cylindrical		6

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
27.	27.		Young fruit: main colour of skin (excluding colour of ribs or grooves)		
			white	White Bush Scallop	1
			cream	Tivoli	2
			yellow	Goldi	3
			green	Elite, Opal, Romano	4
			partly white and partly yellow		5
			partly white and partly green		6
		partly yellow and partly green	Sunburst, Zephyr	7	
28.	28.		<u>Only varieties with yellow colour of skin:</u> Young fruit: intensity of yellow colour of skin (as for 27)		
			very light		1
			light		3
			medium		5
			dark		7
		very dark		9	
29.	29.		<u>Only varieties with green colour of skin:</u> Young fruit: intensity of green colour of skin (as for 27)		
			very light	Clarita, Goya, Patty Green Tint	1
			light	Arika	3
			medium	Baccara	5
			dark	Arlesa, Sandra, Zefira	7
		very dark	Carnaval, Corsair	9	

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
30. (+)	30.		Fruit: general shape		
			disc shaped		1
			transverse elliptical		2
			transverse broad elliptical		3
			globular		4
			top shaped		5
			broad elliptical		6
			ovate		7
			elliptical		8
			cylindrical		9
			pear shaped		10
			bottle shaped		11
G			club shaped		12
31.1	31.1		<u>Only Scallop type varieties:</u> Fruit: length		
			short	Bennings Green Tint	3
			medium	Sunburst	5
			long	Yellow Bush Scallop	7
31.2	31.2		<u>Only Acorn type varieties:</u> Fruit: length		
			short	Table Gold	3
			medium	Swan White Acorn	5
			long	Ebony Table Queen	7
31.3	31.3		<u>Only Neck type varieties:</u> Fruit: length		
			short	Wryneck	3
			medium	Yellow Crookneck	5
			long	Sunbar	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
31.4	31.4		<u>Only Zucchini type varieties:</u> Fruit: length		
			very short	Jericho	1
			short	Jedida	3
			medium	Cora	5
			long	Carlotta	7
			very long	Altea	9
32.1	32.1		<u>Only Scallop type varieties:</u> Fruit: maximum diameter		
			small	Scallopini	3
			medium	Yellow Bush Scallop	5
			large	White Bush Scallop	7
32.2	32.2		<u>Only Acorn type varieties:</u> Fruit: maximum diameter		
			small	Table Gold	3
			medium	Table King	5
			large	Swan White Acorn	7
32.3	32.3		<u>Only Zucchini type varieties:</u> Fruit: maximum diameter		
			small	Goldi	3
			medium	Opal	5
			large	Jericho, Spidy	7
33.1	33.1		<u>Only Scallop type varieties:</u> Fruit: ratio length/ maximum diameter		
			small	White Bush Scallop	3
			medium	Scallopini	5
			large	Sunburst	7
33.2	33.2		<u>Only Acorn type varieties:</u> Fruit: ratio length/ maximum diameter		
			small	Heart of Gold	3
			medium	Table Gold	5
			large	Table King	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
33.3	33.3		<u>Only Zucchini type varieties:</u> Fruit: ratio length/maximum diameter		
			very small	Jericho	1
			small	Jedida	3
			medium	Cora	5
			large	Carlotta	7
			very large	Tarquino	9
34.1	34.1		<u>Only Pumpkin type varieties:</u> Fruit: size		
			very small	Wee-B-Little	1
			small	Peek-a-Boo	3
			medium	Spirit	5
			large	Ghost Rider	7
			very large	Howden	9
34.2	34.2		<u>Only Rondini type varieties:</u> Fruit: size		
			small	Pomme d'Or	3
			medium	Rolet	5
			large	Little Gem	7
35.	35.		<u>Only Miniature Pumpkin type varieties:</u> Fruit: peduncle end		
			straight	Sweetie Pie	1
			concave	Jack Be Little	2
36.	36.		<u>Only Scallop type varieties:</u> Fruit: protrusion of equatorial margin		
			weak	Scallopini	3
			medium	Sunburst	5
			strong	White Bush Scallop	7
37.	37.		<u>Only Scallop type varieties:</u> Fruit: position of equatorial margin		
			at the middle	Sunburst	1
			towards stem end	Golden Bush Scallop	2

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
38.	38.		<u>Only Scallop type varieties:</u> Fruit: peduncle end		
			straight	White Bush Scallop	1
			convex	Yellow Bush Scallop	2
39.	39.		<u>Only Scallop type varieties:</u> Fruit: blossom end		
			flat	Scallopini	1
			indented	Yellow Bush Scallop	2
40.	40.		<u>Only Acorn type varieties:</u> Fruit: position of maximum diameter		
			at the middle	Ebony Table Queen	1
			towards stem end	Swan White Acorn	2
41.	41.		<u>Only Acorn type varieties:</u> Fruit: peduncle end		
			concave	Swan White Acorn	1
			straight	Table King	2
			convex	Ebony Table Queen	3
42.	42.		<u>Only Neck type varieties:</u> Fruit: length of neck		
			short	Wryneck	3
			medium	Yellow Crookneck	5
			long	Sundance	7
43.	43.		<u>Only Neck type varieties:</u> Fruit: diameter of neck in relation to maximum diameter		
			small	Sundance	3
			medium	Yellow Crookneck	5
			large	Sunbar	7
44.	44.		<u>Only Neck type varieties:</u> Fruit: curving of neck		
			absent	Early Prolific Straightneck	1
			present	Yellow Crookneck	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
45.	45.		Only Neck and Zucchini type varieties:		
			Fruit: blossom end		
			rounded	Spooktacular	1
			pointed		2
46.	46.		Fruit: grooves		
			absent		1
			present		9
47.	47.		Fruit: depth of grooves		
			very shallow	Spooktacular	1
			shallow	Connecticut Field	3
			medium	Delicata, Table Queen	5
			deep	Jack Be Little, Swan White Acorn	7
			very deep	Heart of Gold, Sweet Dumpling	9
48.	48.		Fruit: ribs		
			absent		1
			present		9
49.	49.		Fruit: protrusion of ribs		
			very weak	Leda, Tivoli	1
			weak	Ambassador	3
			medium	Ibis, Opal	5
			strong	Spidy	7
			very strong	Mogango Enrugado Mineiro, Tonda Padana	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
50.	50.		Fruit: main colour of skin (excluding colour of dots, patches, stripes and bands)		
			white	Pâtisson blanc panaché de vert	1
			cream	Early White Bush Scallop, Little Boo	2
			yellow	Autumn Gold	3
			green	Ambassador, Baby Bear	4
			partly white and partly yellow		5
			partly white and partly green		6
G			partly yellow and partly green	Sunburst, Zephyr	7
51.	51.		<u>Only varieties with yellow colour of skin:</u> Fruit: intensity of yellow colour of skin (as for 50)		
			very light		1
			light		3
			medium		5
			dark		7
very dark		9			
52.	52.		<u>Only varieties with green colour of skin:</u> Fruit: intensity of green colour of skin (as for 50)		
			very light		1
			light		3
			medium		5
			dark	Cora	7
very dark	Baby Bear, Sardane	9			
53.	53.		<u>Varieties with two main colours only:</u> Fruit: distribution of green colour		
			green ring around blossom end	Sunburst	1
			from blossom end one third green	Zephyr	2
			from blossom end one half green		3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
54. (+)	54.		Fruit: stripes in grooves		
			absent	Baby Bear, Jack Be Little	1
			present	Delicata, Heart of Gold, Pâtisson jaune panaché de vert	9
55.	55.		Fruit: colour of stripes in grooves		
			dark green	Sweet Dumpling	1
			yellow	Puccini	2
56. (+)	56.		Fruit: colour of ribs compared to main colour of skin (as for 50)		
			same	Grey Zucchini	1
			darker	De Nice à fruit rond, Orangetti	2
57. (+)	57.		Fruit: dots		
			absent	Sunburst	1
			present	Gold Rush, Table Queen	9
58.	58.		Fruit: size of main dots		
			very small	Badger Cross	1
			small	Ambassador	3
			medium	Grey Zucchini	5
			large	Kingsize	7
			very large	Becky	9
59. (+)	59.		Fruit: secondary green colour between ribs (excluding dots)		
			absent	Grey Zucchini, Small Sugar	1
			present	Beatrice, Greyzini, Heart of Gold, Steierischer Ikürbis, Tonda Padana, Zubi	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note	
60.	60.		Fruit: intensity of secondary green colour between ribs			
			(+)	very light		1
				light		3
				medium		5
				dark		7
				very dark	Heart of Gold	9
61.	61.		Fruit: distribution of secondary green colour between ribs			
			(+)	sparse patches	Greyzini, Elite	1
				dense patches	Steierischer Ölkürbis	2
				one coloured stripes	Altea	3
				two coloured stripes		4
				one coloured bands covering the whole surface	Badger Cross, Twickers, Zubi	5
	two coloured bands covering the whole surface	Beatrice	6			
62.	62.		Fruit: warts on skin			
				absent		1
			present		9	
63.	63.		Fruit: number of warts on skin			
				very few	Scallopini	1
				few		3
				medium	Pâtisson verruqueux panaché	5
				many	Yellow Crookneck	7
	very many	Wryneck	9			

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
64.	64.		Fruit: size of flower scar		
			very small	Jack be Little	1
			small	Goldi	3
			medium	Spidy	5
			large	Cinderella	7
			very large	Howden	9
65.	65.		Fruit: length of peduncle		
			very short	Arlesa	1
			short	Clarita	3
			medium	Cinderella	5
			long	Tivoli	7
			very long	Western Sunrise	9
66.	66.		Fruit: colour of peduncle		
			yellow		1
			green	Ambassador	2
			partly yellow and partly green	Autumn Gold	3
67.	67.		Fruit: intensity of green colour of peduncle		
			light	Bianchini	3
			medium	Sunburst	5
			dark	Gold Rush	7
68.	68.		Fruit: mottling of peduncle		
			absent	Sunburst	1
			present	Elite	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
69.	69.	(+) Ripe fruit: main colour of skin (excluding colour of mottles, patches, stripes and bands)	white	Pâtisson blanc panaché de vert	1
			whitish	White Bush Scallop	2
			cream	Bianchini, Opal	3
			yellow	Gold Rush	4
			orange	Autumn Gold	5
70.	70.	Ripe fruit: intensity of main colour of skin (only yellow and orange)	light		3
			medium		5
			dark		7
71.	71.	Ripe fruit: secondary colour of skin (as for 69)	whitish		1
			cream		2
			yellow		3
			orange		4
			green		5
72.	72.	Ripe fruit: green hue (only white and cream)	absent	Jedida	1
			present	Amalthee	9
73.	73.	Ripe fruit: prominence of green hue (as for 72)	weak	Eskenderany	3
			medium	Corona	5
			strong	Amalthee	7

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
74.	74.		Ripe fruit: colour of flesh		
			cream	Elite	1
			yellow	Sunburst, Vegetable Spaghetti	2
			orange	Autumn Gold	3
75.	75.		Ripe fruit: lignified rind		
			absent	Small Sugar, Table Queen, Vegetable Spaghetti	1
			present	Elite, Little Gem, Scallopini, Yellow Crookneck	9
76.	76.		Ripe fruit: structure of flesh		
			not fibrous	Elite	1
			fibrous	Vegetable Spaghetti	2
77.	77.		Seed: size		
			very small	Jack be Little	1
			small	Delicata	3
			medium	Diamant	5
			large		7
			very large	Citrouille de Touraine	9
78.	78.		Seed: shape		
			narrow elliptic	Caserta	3
			elliptic	Elite	5
			broad elliptic	Baby Boo	7
79.	79.		Seed: hull		
			absent	Chapingo Uno, Steierischer Ölkürbis	1
			present	Baby Bear, Elite	9
80.	80.		Seed: appearance of hull		
			rudimentary	Baby Bear	1
			fully developed	Elite	2

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
81.	81.		Seed: colour of hull		
			whitish	Table Queen	1
			cream	De Nice à fruit rond	2

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:

8.2 Explanations for individual characteristics

Ad. 13: Leaf blade: incisions



1
absent or very shallow



3
shallow



5
Medium



7
deep



9
very deep

Ad. 26: Only Zucchini and Rounded Zucchini varieties: Young fruit: general shape



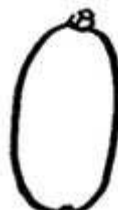
1
globular



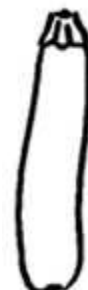
2
pear shaped



3
tapered
elliptical



4
elliptical

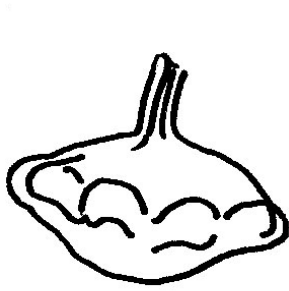


5
cylindrical



6
tapered
cylindrical

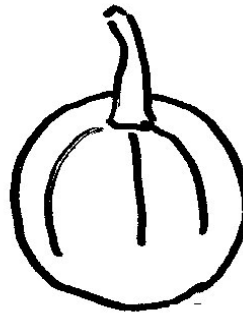
Ad. 30: Fruit: general shape



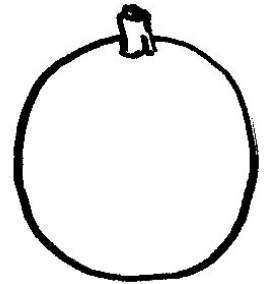
1
disc shaped



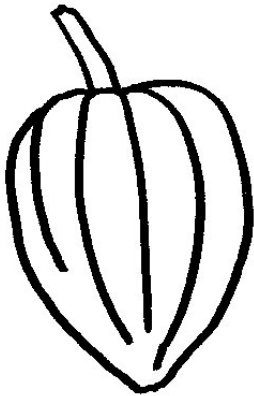
2
transverse elliptical



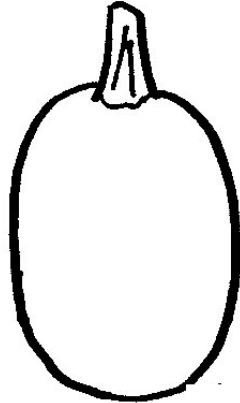
3
transverse broad elliptical



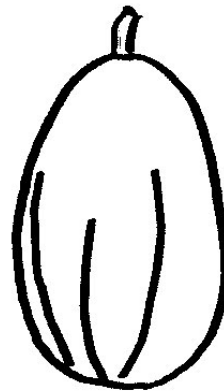
4
globular



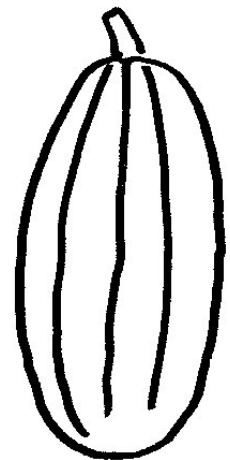
5
top shaped



6
broad elliptical



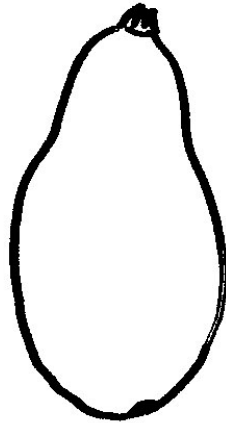
7
ovate



8
elliptical



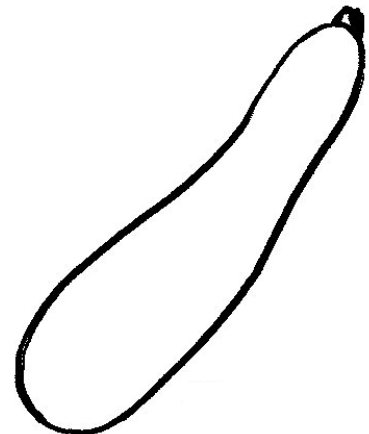
9
cylindrical



10
pear shaped

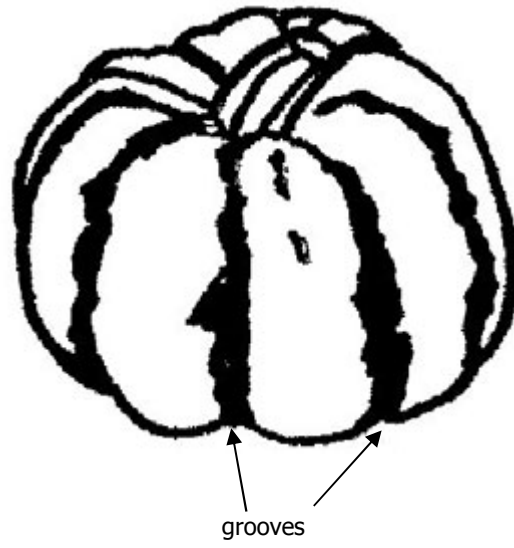


11
bottle shaped

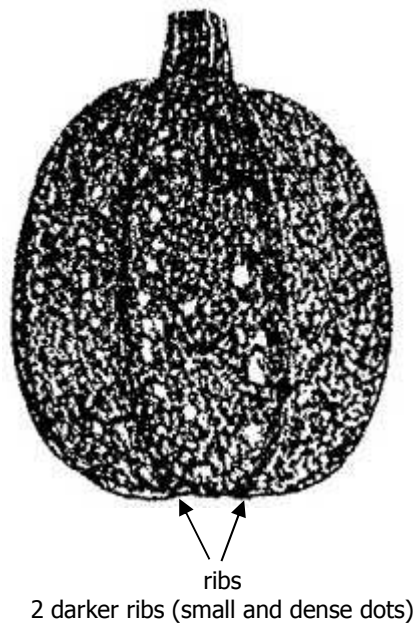


12
club shaped

Ad. 54: Fruit: stripes in grooves



Ad. 56 and 57: Fruit: colour of ribs compared to main colour of skin (56), dots (57)



Ad. 59, 60, 61 and 69: Fruit: secondary colour between ribs (excluding dots)



sparse patches



stripes



dense patches



bands

Fruit: type	Fruit: general shape (Ch. 30)	Plant: growth habit (Ch.4)		Fruit: grooves (Ch. 46)	Fruit: ribs (Ch.48)	Fruit: warts on skin (Ch.62)	Ripe fruit: main colour of skin (Ch.69)	Ripe fruit: lignified rind (Ch.75)	Ripe fruit: colour of flesh (Ch.74)	Ripe fruit: structure of flesh (Ch.76)	Example varieties
Pumpkin	From flattened globular to elliptical globular			Present	Absent	Absent		Absent	Orange		Halloween, Little Boo, Small Sugar
Miniature Pumpkin	Transverse elliptical	Trailing	Very small	Present	Absent	Absent		Absent	Orange		Jack Be Little
Scallop	Flattened disc shaped with equatorial margin	Bush or Semi-trailing		Absent	Absent			Present	Cream		Patty Pan, Scallopini
Acorn	Top shaped with furrows	Bush						Absent	Orange		Table Queen
Neck	Bottle shaped with pointed blossom end	Bush				Present	Orange	Present			Early Prolific Straightneck, Yellow Crookneck
Zucchini	From pear-shaped to elliptical to cylindrical to club-shaped							Present	Cream		Ambassador, Beirut, Clarita, Elite, Ibis, Romano
Rounded Zucchini	Globular	Bush				Absent		Present	Cream		De Nice à fruit rond, Redondo
Delicata	Elliptical	Trailing		Present	Absent	Absent					Delicata
Spaghetti Squash	Elliptical	Trailing				Absent		Absent	Dark yellow to orange	fibrous	Pasta, Vegetable Spaghetti
Rondini	Globular	Trailing	Very small		Absent	Absent		Present	Yellow		Little Gem
Ölkürbis	Globular	Trailing			Present	Absent					Markant
Other											

9. LITERATURE

Decker, D.S., 1988, Origin(s), Evolution, and Systematics of *Cucurbita pepo* (Cucurbitaceae). *Economic Botany*, 42(1), pp. 4-15.

Paris, H.S., 1986, A proposed subspecific classification for *Cucurbita pepo*, *Phytologia* 61 (3), pp. 133-138.

Paris, H.S., 1998, Some Observations Concerning Diversity in the Subspecies and Horticultural Groups of *Cucurbita pepo*, *Cucurbits Genetics Cooperative Report* 21, pp. 51-53.

Andres, T.C. 1995, Complexities in the infraspecific nomenclature of the *Cucurbita pepo* complex, *Acta Horticulturae* 413, pp 65-91.

Tapley, W.T., Enzie, W.D., Eseltine, G.P. van, 1937, *The Vegetables of New York*, New York State Agricultural Experiment Station.

Paris, H.S., 1989, Historical Records, Origins and Development of the Edible Cultivar Groups of *Cucurbita pepo* (Cucurbitaceae), *Economic Botany*, 43(4), 1989, pp 423-443.

Paris, H.S., 1996, Summer Squash: History, Diversity, and Distribution, *HorTechnology* Jan/March 6/1.

Brancucci, Dr. Michel, Banziger, Erica, 2000, *Das Grosse Buch vom Kürbis*, Midea & Fona Verlag GmbH.

Phillips, Roger & Rix, Martyn, 1994, *Groente*, Het Spectrum B.V.

10. TECHNICAL QUESTIONNAIRE

The Technical Questionnaire is available on the CPVO website under the following reference: CPVO-TQ/119/1