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

PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Begonia boliviensis A. DC., *Begonia pendula* Ridl., *Begonia x semperflorens-cultorum hort, Begonia x tuberhybrida* Voss, Hybrids between these species and other Begonia species

BEGONIA

UPOV Code: BEGON; BEGON_BOL; BEGON_PEN; BEGON_SEM; BEGON_TUB

Adopted on 12/05/2017

Entry into force on 15/04/2017

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CPVO-TP/BEGONIA/1

1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to all varieties of ***Begonia boliviensis*** **A. DC., *Begonia pendula* Ridl., *Begonia x semperflorens-cultorum hort, Begonia x tuberhybrida* Voss and hybrids between these species and other *Begonia* species.**

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/).

1.2 Entry into Force

The present protocol enters into force on **15.04.2017**. 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

Single growing cycle
The minimum duration of tests should normally be a single growing cycle.

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.

Observation of colour by eye
Because daylight varies, colour determinations made against a colour chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform to the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background. The colour chart and version used should be specified in the variety description.

3.4 Test design

Single plots
Each test should be designed to result in a total of at least 15 plants.

3.5 Additional tests

In accordance with Article 23 of Implementing Rules N ° 874/2009, 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 may comprise living plant material. 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 obtain living plant material of reference varieties and when those varieties need to be included in growing trials or other tests.

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

The inventory shall include varieties protected under National and Community PBR, varieties in trade or in commercial registers.

In addition to the above, the inventory shall be extended to the appropriate to

- any commercial document in which varieties are marketed as propagating or harvested material, especially when there is no official registration system;
- any list including varieties which are publicly available within plant collections (varieties included in genetic resource collections, collection of old varieties, etc.);
- information provided by relevant plant experts;
- relevant example varieties referred to in the technical protocols

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.

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. 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 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 point is provided for elaboration or emphasis in this Technical Protocol.

For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 15 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/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 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) Shoot: length (characteristic 2)

b) Leaf blade: colour of upper side (characteristic 7)

c) Flower: type (characteristic 14)

d) Flower: diameter (characteristic 16)

e) Outer petal: number of colours on inner side (characteristic 19)

f) Outer petal: colour of middle on inner side (characteristic 21) with the following groups:

Gr. 1: white
Gr. 2: yellow
Gr. 3: orange
Gr. 4: pink
Gr. 5: red
Gr. 6: purple red

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.

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 column 'CPVO N°':

G	Grouping characteristic	- see Chapter 5
QL	Qualitative characteristic	
QN	Quantitative characteristic	
PQ	Pseudo-qualitative characteristic	
(+)	Explanations for individual characteristics	- see Chapter 8.2

For column 'UPOV N°':

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 column 'Stage, method':

MG, MS, VG, VS		- see Chapter 4.1.5
(a)-(b)	Explanations covering several Characteristics	- see Chapter 8.1

7. TABLE OF CHARACTERISTICS

CPVO N°	Stage, Method	Characteristics	Examples	Note
1. (+)	**VG/MS**	**Plant: height**		
QN		short	Yaspwhit	3
		medium	GFBSFCOROS	5
		tall	Sunbegopi	7
2.	**VG/MS**	**Shoot: length**		
QN		short	BKPBEWFASO	3
G		medium	Yasped	5
		long	Sunbegobupi	7
3. (+)	**VG**	**Shoot: anthocyanin coloration**		
QN		absent or very weak	Fimissmo	1
		weak	Brothglow	2
		medium		3
		strong	BKPBEWFER	4
		very strong	BEGPRE 07	5
4. (+)	**VG/MS**	**Leaf blade: length of apical part**		
QN	**(a)**	short	GFBSFCOROS	3
		medium	Horbedolce	5
		long	Sunbegopi	7
5. (+)	**VG/MS**	**Leaf blade: length of basal part**		
QN	**(a)**	short	Sunjirapi	3
		medium	Peardrop	5
		long	GSAH 77 KO	7

CPVO N°	Stage, Method	Characteristics	Examples	Note
6. (+)	**VG/MS**	**Leaf blade: width**		
QN	**(a)**	narrow	BKPBEBVRD	3
		medium	Brothglow	5
		broad	Sunbegosu	7
7. (+)	**VG**	**Leaf blade: colour of upper side**		
PQ	**(a)**	light green		1
G		medium green	BKPBEWFER	2
		dark green	Yaspyell	3
		reddish green	BEGPRE 07	4
		nearly black	Brothglow	5
8. (+)	**VG**	**Leaf blade: conspicuousness of veins on upper side**		
PQ	**(a)**	absent or very weak		1
		weak		2
		medium		3
		strong		4
		very strong		5
9. (+)	**VG**	**Leaf blade: colour of lower side**		
PQ	**(a)**	green only		1
		green and red		2
		red only		3
10. (+)	**VG**	**Leaf blade: angle of apex**		
QN	**(a)**	very small		1
		small		2
		medium		3
		large		4
		very large		5

CPVO N°	Stage, Method	Characteristics	Examples	Note
11.	**VG/MS**	**Bract: size**		
QN	**(b)**	small	Elserta	3
		medium	TMBG 0802	5
		large	TMBG 0822	7
12. (+)	**VG/MS**	**Peduncle: length**		
QN		short	Sunbegosu	3
		medium	Sunjirared	5
		long		7
13. (+)	**VG**	**Peduncle: anthocyanin coloration**		
QN		absent or very weak		1
		weak	Sunjirared	2
		medium	Fimissmo	3
		strong	BKPBEWFER	4
		very strong		5
14. (+)	**VG**	**Flower: type**		
QL	**(b)**	single		1
G		double		9
15. (+)	**VG/MS**	**<u>Varieties with Flower: type: double only</u>** **Flower: number of petals**		
QN	**(b)**	few		3
		medium		5
		many		7

CPVO N°	Stage, Method	Characteristics	Examples	Note
16. (+)	**VG/MS**	**Flower: diameter**		
QN	**(b)**	very small	GFBSFCOROS	1
G		small	Brothglow	3
		medium	Innbolora	5
		large	Horbeveram	7
		very large		9
17. (+)	**VG/MS**	**Outer petal: length**		
QN	**(b)**	very short	GFBSFCOROS	1
		short	Sunbegosu	3
		medium	Yamina	5
		long	Horbedolce	7
		very long		9
18. (+)	**VG/MS**	**Outer petal: width**		
QN	**(b)**	narrow	GFBSFCOROS	3
		medium	Yaspell	5
		broad	Horbedolce	7
19. (+)	**VG**	**Outer petal: number of colours on inner side**		
QN	**(b)**	one		1
G		two		2
		more than two		3
20.	**VG**	**Outer petal: colour of margin on inner side**		
PQ	**(b)**	RHS Colour Chart (indicate reference number)		
21.	**VG**	**Outer petal: colour of middle on inner side**		
PQ G	**(b)**	RHS Colour Chart (indicate reference number)		

CPVO N°	Stage, Method	Characteristics	Examples	Note
22.	**VG**	**Outer petal: main colour on outer side**		
PQ	**(b)**	RHS Colour Chart (indicate reference number)		
23. (+)	**VG**	**Outer petal: depth of incisions of margin**		
QN	**(b)**	absent or shallow		1
		medium		2
		deep		3
24. (+)	**VG**	**<u>Varieties with Flower: type: double only</u>** **Inner petal: colour of margin**		
PQ		RHS Colour Chart (indicate reference number)		
25. (+)	**VG**	**<u>Varieties with Flower: type: double only</u>** **Inner petal: colour of middle**		
PQ		RHS Colour Chart (indicate reference number)		

8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS

8.1 Explanations covering several characteristics

Observations should be made at the time of full flowering.

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

(a) Observations on the leaf should be made on fully grown leaves from the middle part of a shoot.

(b) Observations on the bract, the pedicel and the flower should be made on fully developed male flowers.

8.2 Explanations for individual characteristics

Ad. 1: Plant: height

The plant height should be observed from the soil level to the highest point of the plant including flowers.

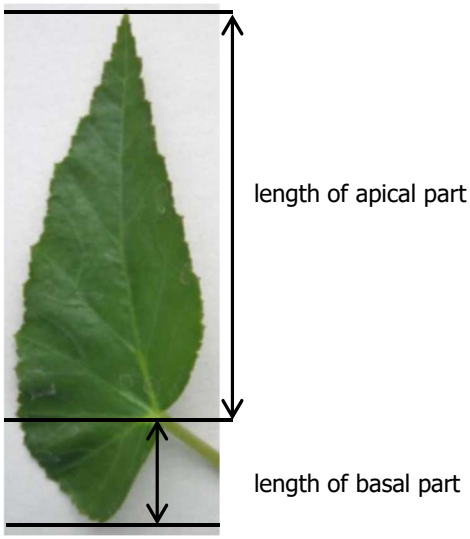
Ad. 2: Shoot: length

The shoot length should be observed on the longest shoot excluding flowers.

Ad. 3: Shoot: anthocyanin coloration

The anthocyanin coloration should be observed on the sunny side of the distal part of a shoot.

Ad. 4: Leaf blade: length of apical part
Ad. 5: Leaf blade: length of basal part



Ad. 6: Leaf blade: width

Ad. 7: Leaf blade: colour of upper side

Observations on the colour of the leaf blade should be made between veins only.

Ad. 8: Leaf blade: Conspicuousness of veins on upper side

1	2	3	4	5
absent or very weak	weak	medium	strong	very strong

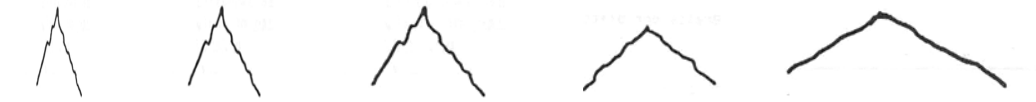
Ad. 9: Leaf blade: colour of lower side

1
green only

2
green and red

3
red only

Ad. 10: Leaf blade: angle of apex



1
very small

2
small

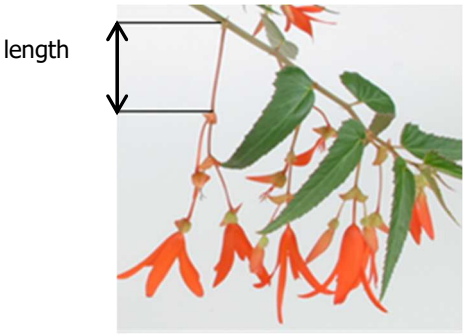
3
medium

4
large

5
very large

Ad. 12: Peduncle: length

The length of the peduncle should be observed on a fully developed inflorescence from the attachment point at the shoot up to the first branching point.



Ad. 13: Peduncle: anthocyanin coloration

The anthocyanin coloration should be observed on the sunny side of the same part which is used for observing the length of the peduncle.

Ad. 14: Flower: type

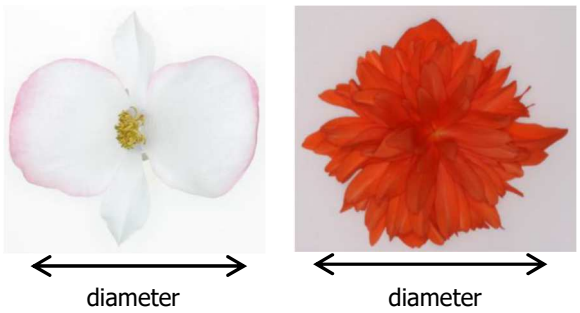
A single flower has four or five petals. A double flower has more than five petals.

Ad. 15: Varieties with Flower: type: double only: Flower: number of petals

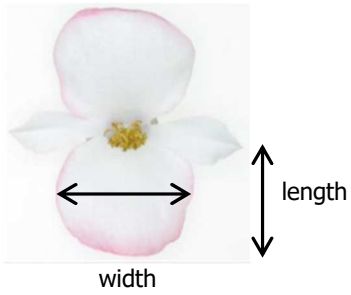
1	3	5	7	9
very low	low	medium	high	very high

Ad. 16: Flower: diameter

The diameter should be observed as maximum width of the flower in natural attitude.



Ad. 17: Outer petal: length
Ad. 18: Outer petal: width



Ad. 19: Outer petal: number of colours on inner side

One:	Flowers with only one colour on the inner side of the outer petals. Although there is only one colour, there might be parts of the flower, which are somewhat lighter or darker than the rest.
Two:	Flowers with two different colours on the upper side of the outer petals, e.g. red and white.
More than two:	Flowers with more than two different colours on the upper side of the petals, e.g. red, white and yellow.

Ad. 23: Outer petal: depth of incision of margin

1
absent or shallow

2
medium

3
deep

Ad. 24: Varieties with Flower: type: double only: Inner petal: colour of margin
Ad. 25: Varieties with Flower: type: double only: Inner petal: colour of middle

The observation should be done on the inner side of petals, which are in the penultimate whirl of inner petals.

9. LITERATURE

Thopson, Mildred L., Thopmson Edward J., 1981: Begonias. The complete reference guide. Times Books New York, US.

10. TECHNICAL QUESTIONNAIRE

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