EUROPEAN UNION

COMMUNITY PLANT VARIETY OFFICE

PROTOCOL FOR DISTINCTNESS, UNIFORMITY AND STABILITY TESTS

***Vaccinium angustifolium* Aiton; *Vaccinium corymbosum* L., *V. formosum* Andrews, *V. myrtilloides* Michx., *V. myrtillus* L., *V. simulatum* Small., *V. virgatum* Aiton**

BLUEBERRY

UPOV Code: VACCI_ANG; VACCI_COR; VACCI_FOR; VACCI_MYD; VACCI_MYR; VACCI_VIR; VACCI_SIM

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/137/4 dated 06/03/2007 for the conduct of tests for Distinctness, Uniformity and Stability. This protocol applies to fruit varieties of *Vaccinium angustifolium* Aiton; *V. corymbosum* L.; *V. formosum* Andrews; *V. myrtilloides* Michx.; *V. myrtillus* L.; *V. simulatum* Small.; *V. virgatum* Aiton, and their hybrids

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 final dates for request of technical examination and sending of Technical Questionnaire by the CPVO as well as submission date, quantity and quality of plant material by the applicant can be found in the S2 supplement of the CPVO Official Gazette and the CPVO website (www.cpvo.europa.eu).

Quality of plants: Should not be less than the standards laid down in Council Directive 2000/29/EC and its amendments concerning quarantine organisms, and Council Directive 92/34/EEC and Commission Directive 93/48/EEC and their amendments concerning organisms impairing quality, at the date of adoption of this protocol; please refer to "Eur-Lex" for the full text and in case of any subsequent amendments to the three aforesaid Directives.

Healthy plant material of the candidate variety should be delivered to the test station in accordance with the requirements outlined in the instructions sent by the CPVO for the submission of plant material, and which can also be consulted in the relevant entries for blueberry within the S2 Gazette and the CPVO website. In particular with respect to the phytosanitary requirements, the plant material must be accompanied by a valid certificate from a recognised authority attesting to the fact that the plant material sent for the DUS technical examination has shown negative laboratory test results for the list of pests and pathogens outlined in the pertinent entry of the examination office in the S2 Gazette/CPVO website, where the candidate blueberry variety is to undergo its DUS technical examination.

Chemical 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.

Labelling of individual plants in sample:
- Species
- File number of the application allocated by the CPVO
- Breeder's reference
- Examination office's 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 blueberry. 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 expression 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 characters used for grouping could be the following:

a) Plant: growth habit (characteristic 2)

b) Fruit: colour of skin (after removal of bloom) (characteristic 27)

c) Plant: fruiting type (characteristic 31)

d) Time of beginning of flowering on one-year-old shoot (characteristic 33)

e) Varieties which fruit on one-year-old and current season's shoots: Time of beginning of flowering on current year's shoot (characteristic 34)

f) Time of beginning of fruit ripening on one-year-old shoot (characteristic 35)

g) Varieties which fruit on one-year-old and current season's shoots: Time of beginning of fruit ripening on current year's shoot (characteristic 36)

5. Trial designs and growing conditions

The minimum duration of tests (independent growing cycles) will normally include at least two satisfactory crops of fruit. 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

Each test should include 5 plants.

Unless otherwise indicated, all observations should be made on 5 plants or parts taken from each of 5 plants. In the case of parts of plants, the number to be taken from each of the plants should be 2.

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**

A candidate will be considered to be sufficiently uniform if the number of off-types does not exceed the number of plants as indicated in the table below. A population standard of 1% and an acceptance probability of 95% should be applied.

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

Number of plants	off-types allowed
≤ 5	0

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 fruiting periods but in some cases three fruiting 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

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Legend:

(+) See explanations on the Table of characteristics
(a)-(d) See Explanations on the Table of Characteristics

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.

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Technical Questionnaire

ANNEX I

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

CPVO N°	UPOV N°	Observation	Characteristics	Examples	Note
1.	**1.**	**VG**	**Plant: vigour**		
	(*)	**(a)**	weak	Bluetta, Weymouth	3
(+)	**(+)**		medium	Patriot, Bluejay	5
QN	**QN**		strong	Bluecrop, Duke, Earliblue	7
2.	**2.**	**VG**	**Plant: growth habit**		
	(*)	**(a)**	upright	Ivanhoe	1
QN	**QN**		semi-upright	Bluetta	2
G			spreading	Jersey	3
3.	**3.**	**VG**	**One-year-old shoot: colour**		
PQ	**PQ**	**(a)**	green	Puru	1
			greenish red	Reka	2
			greyish red	Berkeley	3
			reddish yellow	Heerma	4
			reddish brown	Earliblue	5
			dark red	Aron	6
4.	**4.**	**VG**	**One-year-old shoot: length of internode (upper half)**		
QN	**QN**	**(a)**	short		3
			medium		5
			long		7
5.	**5.**	**MS/VG**	**Leaf: length**		
	(*)	**(b)**	short	Darrow	3
QN	**QN**		medium	Bluecrop, Patriot	5
			long	Collins, Berkeley, Toro	7

CPVO N°	UPOV N°	Observation	Characteristics	Examples	Note
6.	**6.**	**MS/VG**	**Leaf: width**		
QN	**QN**	**(b)**	narrow	Emil, Heerma, Putte	3
			medium	Ama, Bluecrop	5
			broad	Collins, Berkeley	7
7.	**7.**	**MS/VG**	**Leaf: ratio length/width**		
QN	**QN**	**(b)**	small	Gretha	3
			medium	Patriot	5
			large	Heerma	7
8.	**8.**	**VG**	**Leaf: shape**		
	(*)	**(b)**	lanceolate	Weymouth	1
PQ	**PQ**		ovate	Puru	2
			elliptic	Rancocas, Earliblue	3
			oblong	Berkeley, Bluetta, Jersey	4
9.	**9.**	**VG**	**Leaf: colour of upper side**		
QL	**QL**	**(b)**	yellow	Geerdens	1
			green		2
10.	**10.**	**VG**	**Only varieties with green leaf colour:** **Leaf: intensity of green colour on upper side**		
	(*)	**(b)**	light	Earliblue	3
QN	**QN**		medium	Berkeley, Toro	5
			dark	Weymouth, Darrow	7
11.	**11.**	**VG**	**Leaf: margin**		
	(*)	**(b)**	entire	Blueray, Jersey	1
QL	**QL**		serrate	Brigitta, Rancocas	2
12.	**12.**	**VG**	**Flower bud: anthocyanin coloration**		
QN	**QN**	**(a)**	weak	Hele	3
			medium	Patriot	5
			strong	Bluecrop	7

CPVO N°	UPOV N°	Observation	Characteristics	Examples	Note
13.	**13.**	**MS/VG**	**Inflorescence: length (excluding peduncle)**		
QN	**QN**	**(c)**	short	Bluetta, Collins	3
			medium	Duke, Earliblue	5
			long	Berkeley, Bluecrop	7
14.	**14.**	**VG**	**Flower: shape of corolla**		
PQ	**PQ**	**(c)**	urceolate	Maru	1
			campanulate		2
			cylindrical	Reka	3
15.	**15.**	**VG**	**Flower: size of corolla tube**		
	(*)	**(c)**	small	Blueray	3
QN	**QN**		medium	Heerma	5
			large	Collins	7
16.	**16.**	**VG**	**Flower: anthocyanin coloration of corolla tube**		
	(*)	**(c)**	absent or very weak	Maru	1
QN	**QN**		weak	Ama	3
			medium	Gretha	5
			strong	Bluecrop	7
17.	**17.**	**VG**	**Flower: ridges on corolla tube**		
QL	**QL**	**(c)**	absent		1
			present		9
18.	**18.**	**VG**	**Fruit cluster: density**		
QN	**QN**	**(d)**	sparse	Rahi	3
			medium	Toro	5
			dense	Tifblue	7

CPVO N°	UPOV N°	Observation	Characteristics	Examples	Note
19.	**19.**	**VG**	**Unripe fruit: intensity of green colour**		
	(*)		light	Heerma	3
QN	**QN**		medium	Ama	5
			dark	Berkeley	7
20.	**20.**	**VG**	**Fruit: size**		
	(*)	**(d)**	small	Ama	3
QN	**QN**		medium	Concord	5
			large	Darrow	7
21.	**21.**	**VG**	**Fruit: shape in longitudinal section**		
	(*)	**(d)**	elliptic	Northland	1
(+)	**(+)**		round	Bluecrop, Jersey	2
PQ	**PQ**		oblate	Earliblue	3
22.	**22.**	**VG**	**Fruit: attitude of sepals**		
QN	**QN**	**(d)**	erect	Powderblue	1
			erect to semi-erect		2
			semi-erect	Tifblue	3
23.	**23.**	**VG**	**Fruit: type of sepals**		
QN	**QN**	**(d)**	incurving	Delite	1
			straight	Powderblue	2
			reflexed	Tifblue	3
24.	**24.**	**VG**	**Fruit: diameter of calyx basin**		
QN	**QN**	**(d)**	small	Blueray	3
			medium	Bluecrop	5
			large	Darrow	7
25.	**25.**	**VG**	**Fruit: depth of calyx basin**		
QN	**QN**	**(d)**	shallow	Collins	3
			medium	Blueray	5
			deep	Heidi, Jersey	7

CPVO N°	UPOV N°	Observation	Characteristics	Examples	Note
26.	**26.**	**VG**	**Fruit: intensity of bloom**		
QN	**QN**	**(d)**	very weak	Goldtraube	1
			weak	Gretha	3
			medium	Ama, Bluetta	5
			strong	Darrow, Gila	7
27.	**27.**	**VG**	**Fruit: colour of skin (after removal of bloom)**		
PQ	**PQ**	**(d)**	light blue	Berkeley	1
			medium blue	Patriot	2
			dark blue	Heerma	3
G			blue red	Delite	4
28.	**28.**	**VG/VS**	**Fruit: firmness**		
(+)	**(+)**	**(d)**	soft		3
QN	**QN**		medium	O'Neal	5
			firm	Duke	7
			very firm	Rahi	9
29.	**29.**	**VG**	**Fruit: sweetness**		
	(*)	**(d)**	low	Bluetta	3
(+)	**(+)**		medium	Collins	5
QN	**QN**		high	Goldtraube	7
30.	**30.**	**VG**	**Fruit: acidity**		
	(*)	**(d)**	low	Gretha	3
(+)	**(+)**		medium	Darrow	5
QN	**QN**		high	Ascorba, Bluecrop	7
31.	**31.**	**VG**	**Plant: fruiting type**		
G	**(*)**	**(c)**	on one-year-old shoots only	Darrow, Patriot	1
QL	**QL**		on one-year-old and current season's shoots	Concord, Burlington	2

CPVO N°	UPOV N°	Observation	Characteristics	Examples	Note
32.	**32.**	**MG**	**Time of vegetative bud burst**		
	(*)		early	Patriot, Weymouth	3
(+)	**(+)**		medium	Bluecrop	5
QN	**QN**		late	Blueray	7
33.	**33.**	**MG**	**Time of beginning of flowering on one-year-old shoot**		
	(*)		very early	Patriot	1
(+)	**(+)**		early	Weymouth	3
QN	**QN**		medium	Berkeley	5
			late	Darrow	7
G			very late	Jersey	9
34.	**34. (*)**	**MG**	**Only varieties which fruit on one-year-old and current season's shoots: Time of beginning of flowering on current year's shoot**		
(+)	**(+)**		early	O'Neal	3
QN	**QN**		medium	JU83	5
G			late		7
35.	**35.**	**MG**	**Time of beginning of fruit ripening on one-year-old shoot**		
	(*)		very early	Bluetta	1
(+)	**(+)**		early	Blueray	3
QN	**QN**		medium	Heerma	5
			late	Darrow	7
G			very late	Elizabeth	9
36.	**36. (*)**	**MG/QN**	**Only varieties which fruit on one-year-old and current season's shoots: Time of beginning of fruit ripening on current year's shoot**		
(+)	**(+)**		early	O'Neal	3
QN	**QN**		medium	JU83	5
G			late		7

EXPLANATIONS AND METHODS

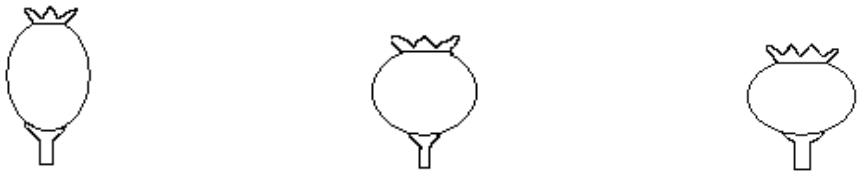
Characteristics containing the following key in the third column of the Table of Characteristics should be examined as indicated below:

(a) Observations on the plant should be made on unpruned bushes in the dormant season.
(b) Observations on the leaf should be made on fully developed leaves in early summer.
(c) Observations on the inflorescence and flower should be made at the time of full flowering.
(d) Unless otherwise stated, observations on the fruit should be made on physiologically ripe fruits.

Ad. 1: Plant: vigour

The plant vigour should be considered as the overall abundance of vegetative growth.

Ad. 21: Fruit: shape in longitudinal section



1
oblong

2
round

3
oblate

Ad. 28: Fruit: firmness

Firmness should be determined by hand in comparison to the example varieties, or measured using a penetrometer.

Ad. 29: Fruit: sweetness
Ad. 30: Fruit: acidity

Sweetness and acidity should be observed by tasting in comparison to the example varieties.

Ad. 32: Time of vegetative bud burst

The time of vegetative bud burst is when the first vegetative buds begin to burst.

Ad. 33: Time of beginning of flowering on one-year old shoot
Ad. 34: Varieties which fruit on one-year-old and current season's shoots: Time of beginning of flowering on current year's shoot

The time of beginning of flowering is when 10% of the flowers are fully open.

Ad. 35: Time of beginning of fruit ripening on one-year-old shoot
Ad. 36: Varieties which fruit on one-year-old and current season's shoots: Time of beginning of fruit ripening on current year's shoot

The time of beginning of fruit ripening is when 10% of the fruits are ripe.

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ANNEX II

The Technical Questionnaire is available on the CPVO website under the following reference: CPVO-TQ/137/1