UPOV

International Union for the Protection of New Varieties of Plants

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Technical Working Party for Fruit Crops

TWF/51/5

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RELEVANT MATTERS FOR DUS EXAMINATION IN THE FRUIT SECTOR

Document prepared by the Office of the Union

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The annex to this document contains a copy of a presentation “Ring tests for Strawberry - 2016-2019”, prepared by an expert from the European Union, to be considered by the fifty-first session of the Technical Working Party for Fruit Crops (TWF).

[Annex follows]

OCVV
Office Communautaire des Variétés Végétales

Ring tests for Strawberry 2016-2019

EU, CPVO

Participants

International Community of Breeders of Asexually Reproduced Ornamental and Fruit Varieties (CIOPORA)

Bundessortenamt (BSA) – GERMANY

Centralny Ośrodek Badania Odmian Roślin Uprawnych (COBORU) – POLAND

Direção Geral de Alimentação e Veterinária (DGAV) – PORTUGAL

Oficina Española de Variedades Vegetales (OEVV) - SPAIN

Coordination

CPVO

Objectives

- The harmonization of the implementation of the protocol
- Review of the characteristics of the current protocol

Varieties

Bearing type	Denomination	Holder of the right
Not remontant	Clery (CL)	CIV
	Gariguette (G)	Bred by INRA, French PBR expired in 1998
Partially remontant	Sweet Charlie (S)	Florida Foundation Seed Producers Inc.
	Camarosa (CA)	The Regents University of California
Fully remontant	Albion (A)	The Regents University of California
	Murano (M)	CIV
Day neutral	Portola (P)	The Regents University of California
	Everest (E)	Edward Vinson Limited

For protected varieties the material was obtained directly from the holder of the right or a source authorised by the holder

Testing sites

Trials in Spain

Trials in Portugal

Trials in Poland

Trials in Germany

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Growing cycles

2017 and 2018

Characteristics observed

CPVO Technical Protocol (TP) for strawberry – 48 characteristics

Additional characteristics – 3 characteristics

Harmonisation of the implementation of the TP via direct exchanges

Meetings of participants in the field:

- on 8 March 2017 in Spain
- on 30 May 2017 in Portugal
- on 6 June 2018 in Poland
- on 7 June 2018 in Germany

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Results

Characteristics	Note	Clery								Gariguette								Sweet Charlie								Camarosa								Albi			
		DE		ES		PL		PT		DE		ES		PL		PT		DE		ES		PL		PT		DE		ES		PL		PT		DE		ES	
Pedicel: attitude of hairs	1-3	2	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1	1	3		2	1	2	2	1	1	2	2	2	2	1	1
Flower: diameter	1-9	8	7	3	3	7	7	5	5	7	5	3	3	8	8	5	5	7	5	5	5	8	8	5		5	6	5	5	8	8	7	7	7	4	5	5
Flower: arrangement of petals	1-3	2	2	1	1	2	2	3	3	1	1	1	1	2	2	3	3	3	2	3	3	2	2	3		2	1	2	2	2	2	3	3	2	2	2	2
Flower: size of calyx in relation to corolla	1-3	2	3	1	1	1	2	2	2	3	3	1	1	2	2	2	2	1	1	3	3	2	1	2		3	3	3	3	3	3	3	3	3	3	3	3
Flower: stamen	1,9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9		9	9	9	9	9	9	9	9	9	9	9	9
Petal: length in relation to width	1-5	3	4	4	4	4	4	3	3	4	4	4	4	4	4	4	4	3	3	2	2	3	3	3		3	3	3	3	2	3	3	3	3	3	3	3
Petal: colour of upper side	1-4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		2	2	2	2	2	2	2	2	2	2	2	2
Fruit: length in relation to width	1-5	5	4	4	4	4	4	5	5	5	5	4	4	5	5	5	5	4	4	4	4	4	4	4		4	3	4	4	3	3	4	4	4	4	4	4
Fruit: size	1-9	7	7	5	4	7	7	5	5	7	7	3	3	6	6	5	5	7	7	3	3	5	5	5		8	7	5	9	6	6	7	7	8	7	5	5
Fruit: shape	1-9	2	2	2	2	2	2	2	2	5	2	6	6	6	6	6	6	2	2	2	2	2	2	2		2	5	9	5	5	5	9/2	2	2	2	2	2
Fruit: difference in shape of terminal and other fruits	1-9	3	3	5	7	1	1	1	1	5	3	3	3	2	2	1	1	7	6	3	3	1	1	3		7	5	5	6	2	3	5	5	3	3	1	1
Fruit: colour	1-7	5	5	5	5	5	5	4	4	5	5	4	4	5	5	4	4	5	5	5	5	5	5	5		5	5	6	1	5	5	6	6	6	6	6	6
Fruit: evenness of colour	1-3	2	2	1	2	1	1	1	1	2	2	1	1	1	1	1	1	3	2	1	1	1	1	1		2	2	1	1	1	1	1	1	2	2	2	2
Fruit: glossiness	1-3	3	3	2	2	3	3	3	3	3	3	2	2	3	3	3	3	3	3	2	2	2	3	3		3	3	2	2	3	3	3	3	3	3	2	2
Fruit: evenness of	1-3																																				

One-year data in TP characteristics in exceptional cases:

- Portola for ES
- Sweet Charlie – char. 8,13,17,20 – 48 for PT
- Everest – char. 6,7 for DE
- in case, where attribution of notes was not clear: char. 30 – Camarosa, Albion, Murano, Everest for PT

Results

- No variation, no discrimination for 2 QL and 1 PQ characteristics:
  - Leaf: variegation (« absent »)
  - Flower: stamen (« present »)
  - Petal: colour of upper side (« white »)

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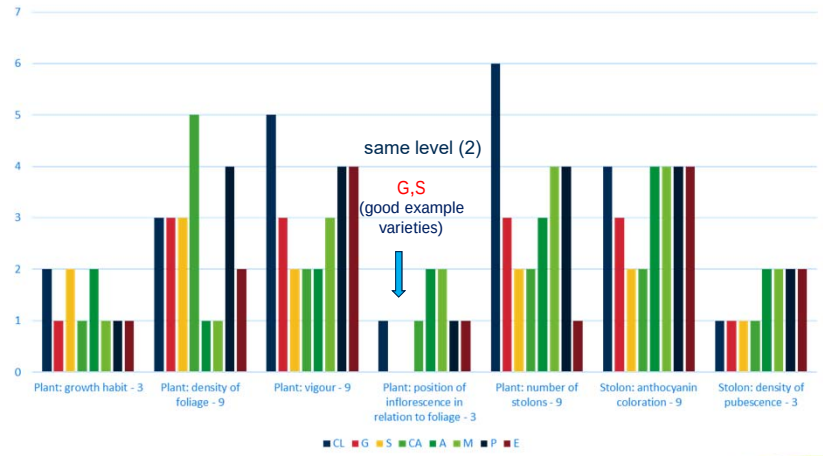
Results for varieties
maximum difference in notes between combinations EO/year (QN)



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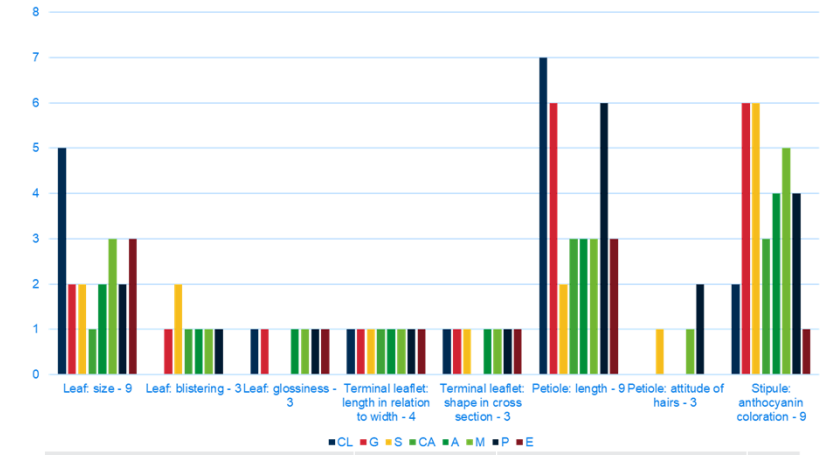
Results for varieties
maximum difference in notes between combinations EO/year (QN)



Leaf: blistering	absent or weak	Clery	1
	medium	Everest	2
Leaf: glossiness	medium	Sweet Charlie, Camarosa	2
Terminal leaflet: shape in cross section	concave	Camarosa	1
Petiole: attitude of hairs	horizontal	Clery, Gariguette	3

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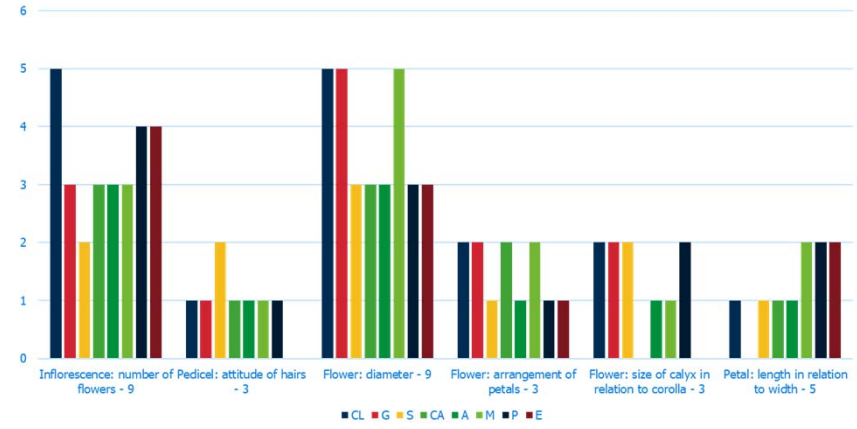
Results for varieties
maximum difference in notes between combinations EO/year (QN)



Pedicel: attitude of hairs	slightly outwards	Everest	2
Flower: size of calyx in relation to corolla	larger	Camarosa, Everest	3
Petal: length in relation to width	moderately longer	Gariguette	4

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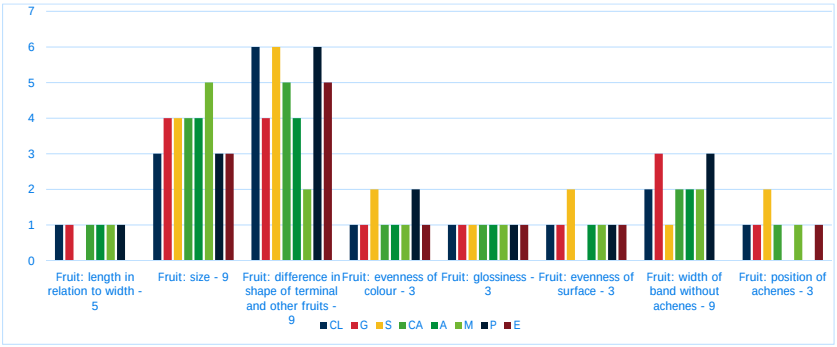
Results for varieties
maximum difference in notes between combinations EO/year (QN)



Fruit: length in relation to width	equal	Everest	3
	moderately longer	Sweet Charlie	4
Fruit: evenness of surface	slightly uneven	Camarosa	2
Fruit: width of band without achenes	narrow	Everest	3
Fruit: position of achenes	below surface	Albion, Portola	1

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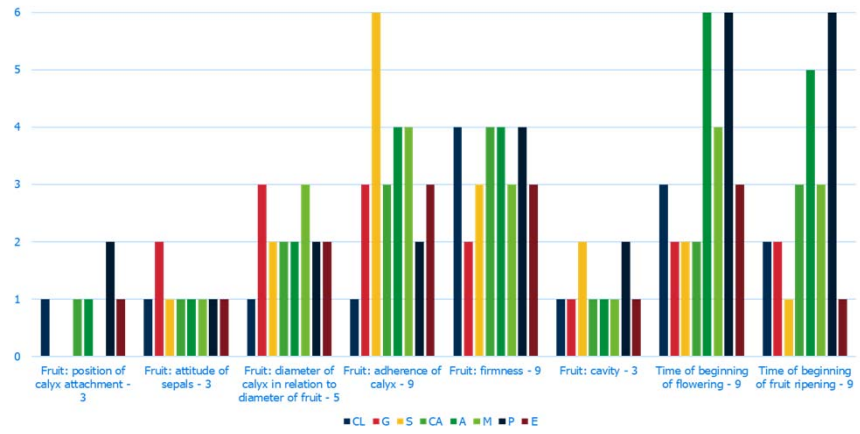
Results for varieties
maximum difference in notes between combinations EO/year (QN)



Fruit: position of calyx attachment	level with fruit	Murano, Sweet Charlie	2
	raised	Gariguette	3
Fruit: colour of flesh (excluding core)	medium red	Murano	5
Fruit: colour of core	medium red	Everest	3

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Results for varieties
difference in states of expression between combinations EO / year (PQ)

Leaf: colour of upper side

yellow green
light green
medium green
dark green
blue green

Clery & Gariguette – light/medium green

Sweet Charlie – light/medium/dark green

Albion & Murano & Portola & Everest – medium/dark green

Camarosa – always « medium green »

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Results for varieties
difference in states of expression between combinations EO / year (PQ)

Terminal leaflet: shape of base

Clery & Camarosa & Everest – acute/obtuse

Albion & Murano – obtuse/rounded

Sweet Charlie & Portola – acute/obtuse/rounded

Gariguette – always « acute »

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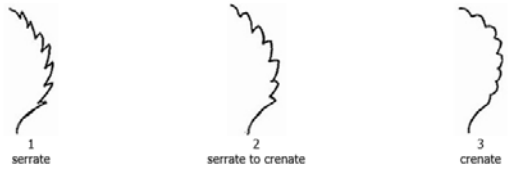
Results for varieties
difference in states of expression between combinations EO / year (PQ)

Terminal leaflet: margin



Clery & Murano – serrate/serrate to crenate

Sweet Charlie – serrate/serrate to crenate/crenate

Camarosa & Albion & Portola & Everest – serrate to crenate/crenate

Gariguette – always « serrate »

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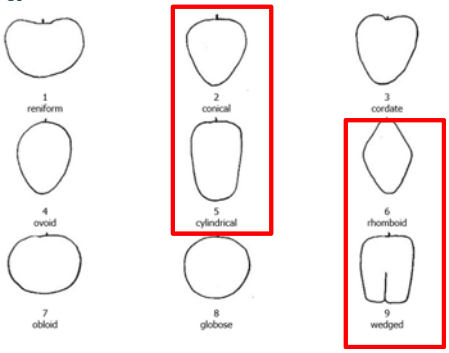
Results for varieties
difference in states of expression between combinations EO / year (PQ)

Fruit: shape



Camarosa – conical/cylindrical/wedged

Gariguette – conical/cylindrical/rhomboid

Portola – wedged/conical

Clery & Sweet Charlie & Murano & Albion & Everest – always « conical »

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Results for varieties
difference in states of expression between combinations EO / year (PQ)

Fruit: colour

whitish yellow
light orange
medium orange
orange red
medium red
dark red
blackish red

Clery & Gariguette & Murano & Portola – orange red/medium red

Camarosa – whitish yellow (?)/medium red/dark red

Albion & Everest - medium/dark red

Sweet Charlie – always « medium red »

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Results for varieties
difference in states of expression between combinations EO / year (PQ)

Fruit: colour of flesh

whitish
light pink
orange red
light red
medium red
dark red

Clery & Gariguette & Sweet Charlie & Portola – light/medium/dark red

Camarosa & Albion & Everest – medium/dark red

Murano – always « medium red »

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Results for varieties difference in states of expression between combinations EO / year (PQ)

Fruit: colour of core

white
light red
medium red

Clery & Gariguette & Sweet Charlie & Camarosa & Albion & Portola – light/medium red

Murano – white/medium red

Everest – always « medium red »

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Results for varieties difference in states of expression between combinations EO / year (PQ)

Type of bearing

not remontant
partially remontant
fully remontant
day neutral

Clery – not/partially remontant/day neutral

Gariguette & Camarosa – not/partially remontant

Sweet Charlie - not/partially/fully remontant

Albion & Murano & Portola & Everest– fully remontant/day neutral

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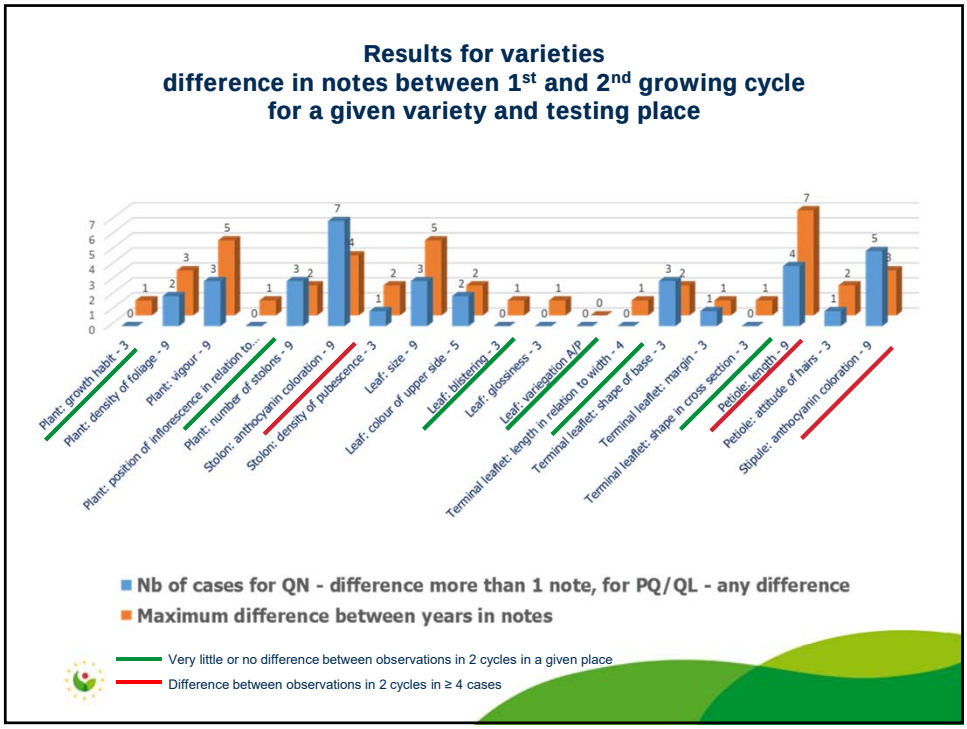
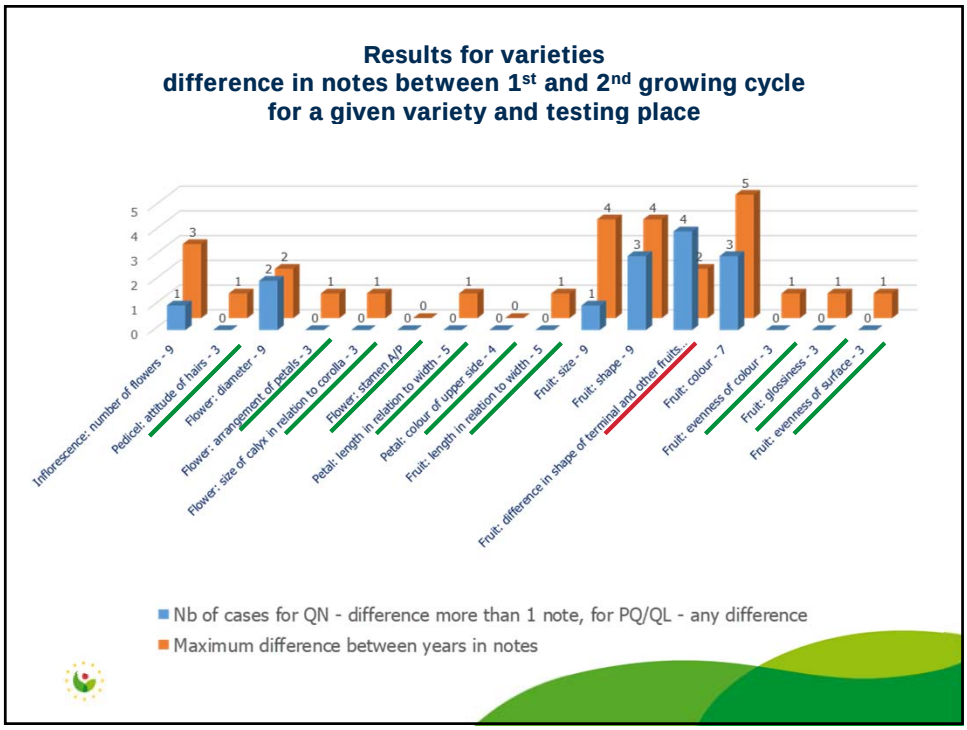
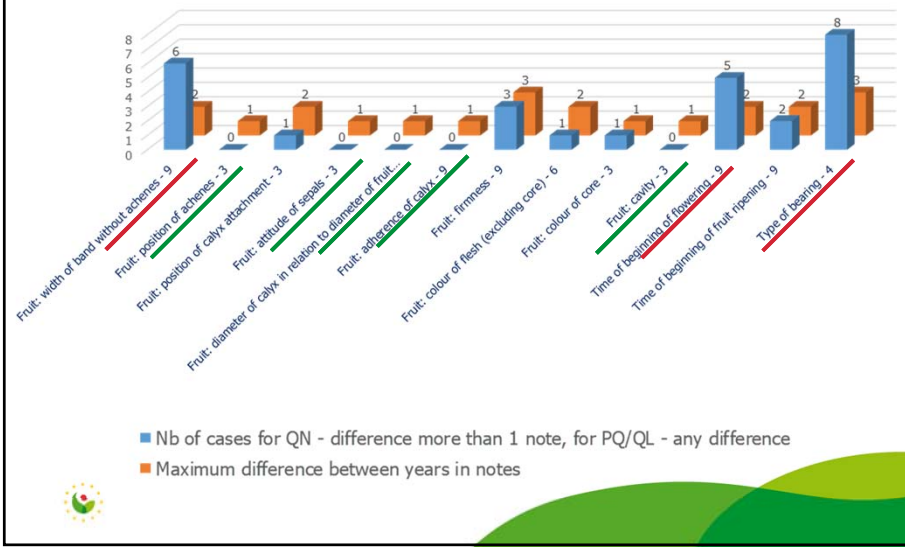

Results for varieties
difference in notes between 1st and 2nd growing cycle
for a given variety and testing place
Plant: growth habit - 3
Plant: density of foliage - 9
Plant: vigour - 9
Plant: position of inflorescence in relation to...
Plant: number of stolons - 9
Stolon: anthocyanin coloration - 9
Stolon: density of pubescence - 3
Leaf: size - 9
Leaf: colour of upper side - 5
Leaf: blistering - 3
Leaf: glossiness - 3
Leaf: variegation A/P
Terminal leaflet: length in relation to width - 4
Terminal leaflet: shape of base - 3
Terminal leaflet: margin - 3
Terminal leaflet: shape in cross section - 3
Petiole: length - 9
Petiole: attitude of hairs - 3
Stipule: anthocyanin coloration - 9
Nb of cases for QN - difference more than 1 note, for PQ/QL - any difference
Maximum difference between years in notes
Very little or no difference between observations in 2 cycles in a given place
Difference between observations in 2 cycles in ≥ 4 cases


Results for varieties
difference in notes between 1st and 2nd growing cycle
for a given variety and testing place
Inflorescence: number of flowers - 9
Pedicel: attitude of hairs - 3
Flower: diameter - 9
Flower: arrangement of petals - 3
Flower: size of calyx in relation to corolla - 3
Flower: stamen A/P
Petal: length in relation to width - 5
Petal: colour of upper side - 4
Fruit: length in relation to width - 5
Fruit: size - 9
Fruit: shape - 9
Fruit: difference in shape of terminal and other fruits...
Fruit: colour - 7
Fruit: evenness of colour - 3
Fruit: glossiness - 3
Fruit: evenness of surface - 3
Nb of cases for QN - difference more than 1 note, for PQ/QL - any difference
Maximum difference between years in notes

Results for varieties
difference in notes between 1st and 2nd growing cycle
for a given variety and testing place



Additional characteristics

- 18. **Petiole: appendice petiolar (a) QL**
  absent 1: Ventana, Gorella, San Andreas...
  present 9: Camarosa, Diamante, Albion

- 19. **Appendice petiolar: length (a) QN**
  short 3: Portola, Seascape
  medium 5: Camarosa, Diamante, Spartan...
  long 7: Albion, Bonnaire, Benicia

- **Leaf: number of leaflets**
  always three: Mara des Bois
  three to four: Evi 2
  three to five: Everest

Results - Uniformity criteria were not met

Additional characteristics

- **In 2018 – proposal to consider two additional characteristics**:
  - Density of achenes
  - Inflorescence: length

Conclusions

- The expression of a great majority of characteristics of the currently used TP for a given variety strongly depended on the testing site, the characteristic in question and the range of expression.
- The ring test proved that the harmonisation of the variety description has limitations, in particular linked to the testing conditions. These limitations need to be taken into account when using the variety description for different purposes (databases, enforcement, certification, ...).
- The differences between the observation in the 1st and 2nd growing cycle for the same variety in a given testing site were smaller than between the different testing sites. Variation observed in expression of characteristics in the ring test might be used to assess suitability of characteristics for DUS testing.
- No difference was noted for 3 characteristics (2 QL + 1 PQ) - Leaf: variegation, Flower: stamen and Petal: colour.

Conclusions

- The 3 additional characteristics studied in the project did not meet the UPOV requirements for use in the DUS testing.
- The varieties showing stable expression over environments are proposed to be example varieties.
- Numerous recommendations on the method of observation, states of expression, interpretation of characteristics were made. The recommendations made reflect in particular points where different interpretations were noted and/or the group considered that more precise data should be provided in order to harmonise implementation of the TG/TP.
- The project confirmed that a ring test is a very useful tool in order to raise awareness of differences in interpretation of individual characteristics, reasons for the differences, to enhanced harmonisation of the DUS testing and to elaborate on revision of the UPOV TG/CPVO TP.

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[End of Annex and of document]