



TGP/14/Workshop/2

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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
GENEVA

**WORKSHOP ON  
DOCUMENT TGP/14 SECTION 2,  
SUBSECTION 3 "COLOR"**

**Lisbon, Portugal, May 30 and 31, 2008**

DISCUSSION PAPER

*prepared by an expert from the European Community*

**BACKGROUND**

1. At its fortieth session, held in Kunming, China, from July 2 to 6, 2007, the Technical Working Party for Ornamental Plants and Forest Trees (TWO) noted that the discussions on draft Test Guidelines at its fortieth session had identified the following issues which needed to be resolved with regard to the development of document TGP/14/1 Draft 3: Section 2, Subsection 3(1) "Color characteristics":

- (a) characteristics for "number of colors";
- (b) strategies for sets of characteristics to describe color patterns;
- (c) describing color patterns where those are in addition to the variegation in variegated varieties;
- (d) the consideration of whether pigments, such as anthocyanin, should be considered as a color; and
- (e) explanation of conspicuousness (e.g. whether it relates to color *per se*, color contrast, etc. and excludes the area covered by the color).

2. The TWO agreed that it would be difficult to make progress on those matters within the TWO session in a timely and effective way and agreed to propose to hold a separate meeting to discuss the development of TGP/14/1 Section 2, Subsection 3 "Color" on the Friday afternoon and Saturday morning immediately prior to the Technical Working Party for Fruit Crops (TWF) or TWO session in 2008, whichever was the earliest. It suggested that an invitation to that meeting could be sent to all Technical Committee (TC) and Technical Working Party (TWP) experts. The TWF, at its thirty-eighth session, supported the

TWO proposal to hold a separate meeting to discuss the development of TGP/14/1 Section 2, Subsection 3 “Color”.

3. An invitation to attend the workshop on document TGP/14 Section 2, Subsection 3 “Color” (TGP/14 Workshop) was sent to all TC and TWP experts (see Circular E-669).

4. At its at its forty-fourth session, held in Geneva from April 7 to 9, 2008, the TC agreed to the organization of a meeting to discuss the development of TGP/14/1 Section 2, Subsection 3 “Color” on May 30 and 31, 2008.

#### MATTERS FOR DISCUSSION

5. In order to ensure that the TGP/14 Workshop was as productive as possible, the TWO agreed that a new draft of TGP/14/1, seeking to address as far as possible the issues raised above, should be produced before the meeting and that, in addition, a comprehensive set of examples and photographs should be prepared for discussion in the meeting. In conjunction with the Office of the Union, it was concluded that, rather than seeking to prepare a new draft of document TGP/14/1 Draft 3: Section 2, Subsection 3(1) “Color characteristics”, it would be more effective to prepare a discussion paper as a basis for the TGP/14 Workshop to develop proposals for amendments to TGP/14, which would then be considered by the TWPs at their sessions in 2008. In addition, all TC and TWP experts have been invited to provide color pictures illustrating examples of:

- numbers of colors
- main/secondary color; ground/over color  
(see document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part III, 1.2)
- different color patterns, currently illustrated by drawings  
(see document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part III, 2.1 to 2.5)
- variegation and variegation in combination with other color patterns  
(see document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part III, 1.3)
- conspicuousness  
(see document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part III, 2.6)
- other aspects of color which should be considered at the TGP/14 Workshop

6. The following sections consider the background and some possible approaches for the matters set out in paragraph 1.

**(a) Characteristics for “number of colors”: number of colors***(i) Number of colors*

7. There are two problems with the way in which “number of colors” has been used for some Test Guidelines and characteristics: firstly, different examiners may not always agree whether there are two (or more) different “colors” (recalling the demonstration at the TWO/40 in Kunming where there was a 50:50 split of experts on just one random flower; see also the draft Test Guidelines for *Portulaca Ad. 20* ([http://www.upov.int/export/sites/upov/restrict/en/tc/44/tg\\_portul\\_proj\\_4.pdf](http://www.upov.int/export/sites/upov/restrict/en/tc/44/tg_portul_proj_4.pdf)); and secondly, the characteristics have often been described as qualitative, which is clearly not the case if two experts have two different opinions on the same flower.

8. It would seem to be important to have an objective basis for deciding what are different colors are and what are not different colors. Given that color is 3-dimensional, that could be difficult and unmanageable unless, for example, every RHS Colour Chart reference was considered to be a different color (which it is). However, an alternative solution might be to describe the number of color GROUPS according to whether the colors present fall into different UPOV Color Groups (see TGP/14). That would provide objectivity in determining the number of colors / color groups.

Example:

	<b>Petal: number of UPOV Color Groups</b>	<b>Pétale: nombre de groupes de couleur de l’UPOV</b>	<b>Blütenblatt: Anzahl UPOV-Farbgruppen</b>	<b>Pétalo: número de grupos de color UPOV</b>	
<b>QN</b>	one	une	eine	uno	1
	two	deux	zwei	dos	2
	more than two	plus de deux	mehr als zwei	más de dos	3

9. In some cases, a characteristic for the number of colors might be a qualitative characteristic, e.g. if only a limited number of very different colors is possible and those colors have a different genetic control. However, in most cases, the characteristics are not qualitative because the states of expression (i.e. one color, two colors etc.) can be influenced by the environment and by the interpretation of “different” colors.

(Background note: It is important to remember that document TGP/9/1 Draft 10 (Section 5.2.3.2.1) explains that “[...] varieties which have different states of expression, i.e. different Notes, for the same qualitative characteristic can be considered to be distinct. [...]”.)

10. The characteristics for number of colors are often quantitative characteristics: the General Introduction (Chapter 4.4.2) explains that “The expression [for quantitative characteristics] can be recorded on a one-dimensional, continuous or discrete, linear scale.” The advantage of that approach is that there is no danger that two varieties would be automatically considered to be distinct because they had different notes.

(Background note: document TGP/9/1 Draft 10 (Section 5.2.3.2.3) explains that “[...] It is recalled that this section considers the assessment of distinctness based on the information obtained from the growing trial and, therefore, refers to a situation where the

states of expression and Notes are obtained for all varieties from the same growing trial in the same year. A difference of two Notes is appropriate [for distinctness] if the comparison between two varieties is performed at the level of Notes. If the difference is only one Note, both varieties could be very close to the same border line (e.g. high end of Note 6 and low end of Note 7) and the difference might not be clear.”)

(ii) *Main/secondary color; Ground/over color*

11. When the main color is defined as the color covering the largest surface area of the organ observed, a problem might occur when 2 colors cover (more or less) an equal surface area.

12. A solution could be to define that, in cases where it is difficult to determine the largest surface area, the darkest color is considered to be the main color. However, the influence of the environment and different interpretation by experts could lead to differences on whether “it is difficult to determine the largest surface area”. Thus, for environment A with examiner X, it may be considered easy to determine which is the color with the largest surface area (which could be the lighter color), but for the same variety in environment B with examiner Y, it might be considered to be difficult to determine the largest surface area and the darkest color would be considered to be the main color.

13. It would be better to fix an objective reference for such a decision. It would be possible to use the RHS Colour Chart for such a decision. The main color would be the color with the highest RHS Colour Chart number. However, in some crop sectors, the use of the RHS Colour Chart is less common.

14. In fruit species, like apple, the concept of ground color and over color is used rather than main color. The ground color is the first color to develop as the fruit grows, whilst the over color is the second one to appear; this may well mean that the over color may be predominant at the time of harvest of the fruit (and indeed that the ground color is not visible at all), but at least it would close any discussion on which is the main color. This concept could also be applied to ornamentals, but to be effective, the examiner would have to follow closely over a period of time the development of the flowering or fruiting.

15. With certain fruit species the ground color is not visible at full maturity of the fruit (example apple). If this can be the case, it is proposed to adapt the last sentence of document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part III, 1.2(a) to read “It is not always necessary the largest area of the (part of the) organ concern and it even can be completely absent at the end of the development of the organ concerned.”. It would also be helpful to illustrate this situation with some example pictures of the development of the fruit color of, for example, apple.

(iii) *Color observations highly influenced by the environment*

16. Wherever possible, it is advisable to avoid the observation of colors at stages of development when they can be easily affected by environmental influences. However in some crops, tested in the open, the influence of the environment cannot be excluded. A strategy for handling such situation should be developed on a case by case basis.

(iv) *Proposals for discussion:*

1. To define for the number of colors, based on:
  - (a) the RHS Colour Chart;
  - (b) the UPOV color groups;
  - (c) to leave both options open, depending on the characteristic
  - (d) to avoid the use of “number of colors” (e.g. to use ground color and over color, like in the apple testing: see also below); or
  - (e) to develop a strategy for cases where there the RHS Colour Chart is not used in the DUS test.
2. In cases where 2 colors have an equal area, that the main color is to be considered the color with the highest RHS numbering
3. Wherever possible, avoid the observation of colors at stages of development when they can be easily affected by environmental influences and to discuss how to deal with this aspect when the test is carried out in the open and the light influence is very high.
4. to add an introduction to Chapter III to fix proposal 1-2-3.
5. To define at the same time all terms that can be related to the main color and potentially confused, e.g. ground color and over color, if they are necessary at all, and to point out the differences.
6. To adapt the last sentence of document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part III, 1.2(a)) to read “It is not always necessary the largest area of the (part of the) organ concern and it even can be completely absent at the end of the development of the organ concerned.” and to illustrate with example pictures of the development of the fruit color of, for example, apple.

**(b) Strategies for sets of characteristics to describe color patterns**

17. Some species are famous for their complicated color patterns, e.g.

- *Phalaenopsis* and other orchid genera and species
- *Euphorbia pulcherrima*
- Some fruit species like *Malus*

(i) *Splitting of color characteristics of an organ into main color and color pattern characteristics*

18. In the current Test Guidelines for *Phalaenopsis* (TG/213/1), combinations of color patterns are used for the description of varieties. Some examples:

44. (*)	(b) Petal: number of colors	(d)	Pétale: nombre de couleurs	Blütenblatt: Anzahl Farben	Pétalo: número de colores	
QL	one		une	eine	uno	Cygnus 'Renaissance' 1
	two		deux	zwei	dos	Cherry Song 'Doll' 2
	three		trois	drei	tres	'Kyokomachi' 3
	more than three		plus de trois	mehr als drei	más de tres	4
45. (*)	(b) Petal: color pattern	(d)	Pétale: répartition des couleurs	Blütenblatt: Farbverteilung	Pétalo: distribución del color	
QL	evenly colored		de couleur uniforme	gleichmäßig gefärbt	color uniforme	1
	shaded		dégradée	schattiert	sombreado	Kahori 'Cupid' 2
	edged		bordée	gerändert	ribeteado	Cherry Song 'Doll' 3
	striped		striée	gestreift	estriado	4
	netted		réticulée	netzartig	reticulado	Happy Sheena 'Koala' 5
	spotted		tachetée	gefleckt	manchado	Carmen 'Himiko' 6
	shaded and striped		dégradée et striée	schattiert und gestreift	sombreado y estriado	7
	shaded and spotted		dégradée et tachetée	schattiert und gefleckt	sombreado y manchado	8
	shaded and striped and spotted		dégradée, striée et tachetée	schattiert, gestreift und gefleckt	sombreado, estriado y manchado	9
46. (*)	(b) Petal: main color	(d)	Pétale: couleur principale	Blütenblatt: Hauptfarbe	Pétalo: color principal	
PQ	RHS Colour Chart (indicate reference number)		Code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)	

19. However this way of describing the colors and patterns is not precise enough. Therefore, in the new draft revision, each pattern is separately treated for each organ for example:

<b>64.</b>	<b>(c) Petal: main color of upper side</b>	<b>Pétale: couleur principale de la face supérieur</b>	<b>Blütenblatt: Hauptfarbe der Oberseite</b>	<b>Pétalo: color principal del haz</b>	
<b>PQ</b>	RHS Colour Chart (indicate reference number)	Code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)	
<b>65.</b>	<b>(c) Petal: shading</b>				
<b>QL</b>	absent	absente	fehlend	ausente	1
	present	présente	vorhanden	presente	9
<b>66.</b>	<b>(c) Petal: color of shade</b>				
<b>PQ</b>	RHS Colour Chart (indicate reference number)	Code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)	
<b>67.</b>	<b>(c) Petal: spots</b>	<b>Pétale: taches</b>	<b>Blütenblatt: Flecken</b>	<b>Pétalo: manchas</b>	
<b>QL</b>	absent	absentes	fehlend	ausentes	1
	present	présentes	vorhanden	presentes	9
<b>68.</b>	<b>(c) Petal: number of spots</b>	<b>Pétale: nombre de taches</b>	<b>Blütenblatt: Anzahl Flecken</b>	<b>Pétalo: número de las manchas</b>	
<b>QN</b>	few	faible	gering	bajo	3
	medium	moyen	mittel	media	5
	many	élevé	gross	alto	7
<b>69.</b>	<b>(c) Petal: color of spots</b>	<b>Pétale: couleur des taches</b>	<b>Blütenblatt: Farbe der Flecken</b>	<b>Pétalo: color de las manchas</b>	
<b>PQ</b>	RHS Colour Chart (indicate reference number)	Code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)	

etc.

(ii) *Splitting of the organ in different parts of the organ or different places of the same organs position at the plant and describing the main color and color patterns of each part or each position separately*

20. It might be necessary either to observe different parts of the organ or to observe the same organ at different positions of the plant in order to have a good description of the colors and color patterns of that organ.

21. An example can be found in the Test Guidelines for Anthurium (TG/86/5), where the color of the spadix is different at basal and distal part of the organ:

(*)36.	Spadix: main color of <u>basal</u> part shortly <u>before</u> dehiscence of anthers	white to cream	blanc à crème	weiss bis cremefarben	Gloria	1
		yellow	jaune	gelb	Arinos	2
	Spadice: couleur principale de la partie <u>basale</u> immédiatement <u>avant</u> la déhiscence des anthères	orange	orange	orange	Hanna	3
		pink	rose	rosa	Merengue	4
		red	rouge	rot	Lipstick	5
	Kolben: Hauptfarbe des <u>basalen</u> Teils kurz <u>vor</u> dem Pollenstäuben	red purple	pourpre rouge	rotpurpur	Patti Ann	6
		purple	violet	purpur	Purple Rain	7
(*)37.	Spadix: main color of <u>distal</u> part shortly <u>before</u> dehiscence of anthers	white	blanc	weiss		1
		yellow	jaune	gelb	Arinos	2
		orange	orange	orange	Gloria	3
	Spadice: couleur principale de la partie <u>distale</u> immédiatement <u>avant</u> la déhiscence des anthères	red	rouge	rot	Lipstick	4
		red purple	pourpre rouge	rotpurpur	Southern Blush	5
		purple	violet	purpur	Purple Rain	6
	Kolben: Hauptfarbe des <u>distalen</u> Teils kurz <u>vor</u> dem Pollenstäuben	green	vert	grün	Calypto	7
		brown	brun	braun	Anteo	8

(iii) *Addition of a color photograph as annex to the variety description in case of need to illustrate the color pattern description of an organ*

22. The addition of color photographs to a variety description is a new concept at the UPOV level; however it is used at the national level, especially in the fruit sector.

23. The concept of adding an illustration to a variety description is not new. At the UPOV level, there are several Test Guidelines for fruit species where a “shadowgraph” is added to the variety description as annex:

*Fragaria* (TG/22/9: Chapter IV: 7)

*Ribes nigrum* (TG/40/6 Chapter IV: 9)

*Ribes sylvestre/niveum* (TG/52/5: Chapter IV: 10)

*Ribes uva-crispa* (TG/51/6: Chapter IV: 10)

24. This addition of a ‘shadowgraph’ is usually mentioned under chapter IV: Methods and Observations and is worded as follows (example from *Fragaria* TG/22/9):

“The description should be supplemented by:

(i) a shadowgraph of 2 typical leaves (showing characteristics 8, 9 and 10)

(ii) a shadowgraph of the outer side of 4 calyces (showing characteristic 18)

(iii) and imprints of 5 typical longitudinally sliced fruits (showing characteristics 21 and 23)”.

25. Similar addition to a variety description could be made with color photographs, showing specific elements of a variety description such as color patterns, color distribution etc.

26. In order to implement this idea of the addition of color photographs, the Community Plant Variety Office of the European Community (CPVO) has made a proposal to be discussed at TWO for the revision of the Test Guidelines for Phalaenopsis; the species covered by the Test Guidelines have a large variation in color distribution and color patterns on flowers and flower organs. Furthermore there is the necessity of many characteristics in order to describe the situation as accurately as possible. Under such circumstances, a color

picture attached to the variety description can give an overview of potentially complex patterns and usefully complement the variety description, which should be supplemented by:

- (i) a color photograph of a representative plant in full flower, for general impression; and
- (ii) a color photograph of a typical flower and/or color photographs of the different organs of the flower.

27. In order to have a direct link to the variety description, specific elements on the added color photograph could be indicated by arrows with the number of the characteristic concerned.

28. However, a warning should be added to this photograph, explaining that the first intention is to represent the distribution of colors on flowers of the varieties more than the colors themselves. Such colors can be affected by the technology of the camera and the facilities used to display the photograph (printer, overhead projector, etc.).

29. Additional information in relation to *Phalaenopsis*: The CPVO, in cooperation with Naktuinbouw, organized an open day for orchid breeders in the Netherlands in February 2008. The breeders participating in the meeting agreed that the addition of color photographs to the variety description for orchids could be an improvement of the description, and they supported this idea.

(iv) *Proposals for discussion*

1. To split observations into main (ground) color and colors of the different color pattern types when different types can be present in a candidate variety of a certain species.
2. In case of need: to consider different sub parts of the organ or the same organ located at different parts of the plant.
3. To consider the addition of a paragraph explaining that it could be convenient to add (a) picture(s) as annex to the variety description of the candidate to support the variety description.

(c) **describing color patterns where those are in addition to the variegation in variegated varieties**

30. Variegation could be considered as a color pattern and could follow the same approach as mentioned under (b) “Strategies for sets of characteristics to describe color patterns”, or could be excluded when the organ of the plant is observed, by stating in the relevant characteristic(s) “(excluding variegation)”.

*Proposals for discussion:*

1. On a cases-by-case basis to:
  - (a) consider variegation within general color pattern; or
  - (b) exclude variegation from general color pattern by defining variegation and indicating “(excluding variegation)” in general pattern characteristics (where appropriate)

(d) **consideration of whether pigments, such as anthocyanin, should be considered as a color**

31. Anthocyanin coloration could be considered as a color pattern and could follow the same approach as mentioned under (b) “Strategies for sets of characteristics to describe color patterns”, or could be excluded when the organ of the plant is observed by stating in the relevant characteristic(s) “(excluding anthocyanin coloration)”.

32. In some Test Guidelines (e.g. Test Guidelines for Beetroot: TG/60/7: characteristic 2 “Seedling: red coloration of hypocotyl”), the red coloration is not due to anthocyanin, but to another red pigment.

*Proposals for discussion:*

1. To refer to anthocyanin coloration or, in cases where the red pigment is not due to anthocyanin to refer to red coloration or to the name of the pigment.
2. On a case-by-case basis, to decide whether anthocyanin/red coloration should be:
  - (a) considered as a color pattern; or
  - (b) excluded from the pattern observations, by indicating, e.g. “(excluding anthocyanin)”.

(e) **Explanation of conspicuousness (e.g. whether it relates to color *per se*, color contrast, etc. and excludes the area covered by the color)**

33. The definitions of “conspicuous” and “inconspicuous” in TGP/14 (see document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part III, 1.2) are:

- Conspicuous: clearly visible, evident
- Inconspicuous: not clearly visible, obscure

34. If there is a clear explanation and if there is only a single factor (e.g. color contrast, size), the situation may be straightforward. However, there can be a problem if it becomes a mixture of different factors. For example, in the case of the Test Guidelines for *Nemesia* (TG/NEMES(proj.3): Char. 29, Ad. 29) it appears to be the contrast in colors combined with the size.

35. Perhaps the solution is not to accept the term “conspicuousness” if it is not clearly described in terms of a single factor (e.g. color contrast, relative size etc.). Characteristics which require a subjective synthesis of more than one factor might result in inconsistent observations between different experts.

*Proposals for discussion:*

1. To require an explanation of the meaning of “conspicuousness”

(f) **Other items**

(i) *Color Chart*

(see document TGP/14/1 Draft 6: Section 2, Subsection 3(1): Part II, 2.1.2)

36. A new version of the RHS Colour Chart has been published. It is understood that some color charts have been added in this new (2007) version.

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