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GENEVA

DRAFT

Associated Document
to the
General Introduction to the Examination
of Distinctness, Uniformity and Stability and the
Development of Harmonized Descriptions of New Varieties of Plants (document TG/1/3)

DOCUMENT TGP/14

**“GLOSSARY OF TECHNICAL, BOTANICAL AND STATISTICAL TERMS
USED IN UPOV DOCUMENTS”**

**Section TGP/14.2.1: Botanical Terms: Plant Shapes
(including TG/14.2.2: Botanical Terms: Hair Types)**

Document prepared by an expert from South Africa

to be considered by

*the Technical Working Party for Vegetables at its fortieth session, to be held in Guanajuato,
Guanajuato State, Mexico, from June 12 to 16, 2006*

*the Technical Working Party on Automation and Computer Programs at its twenty-fourth session,
to be held in Nairobi, Kenya, from June 19 to 22, 2006*

*the Technical Working Party for Agricultural Crops at its thirty-fifth session,
to be held in Beijing, China, from July 3 to 7, 2006*

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in Salvador, Bahia State, Brazil, from August 21 to 25, 2006*

*the Technical Working Party for Ornamental Plants and Forest Trees at its thirty-ninth session,
to be held in Fortaleza, Ceará State, Brazil, from August 28 to September 1, 2006*

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I. INTRODUCTION

The purpose of this document is:

(a) to provide guidance on the development of characteristics related to plant shapes, plant structures and color;

(b) to provide standard illustrations of plant shapes, plant structures and color patterns which may be useful for inclusion in Test Guidelines, whilst noting that illustrations for specific characteristics can be found in the relevant Test Guidelines and noting that searches for relevant individual characteristics can be made through TGP/7 “Collection of Approved Characteristics”; and

(c) to provide definitions of botanical terms (e.g. dentate, fastigiate, exserted, elliptic, acute, etc.) which form states of expression for characteristics used in the examination of DUS. Emphasis is placed on the states of expression because those are the basis for the assessment of DUS and, therefore, need to be understood specifically in relation to that function. This document provides illustrations and definitions of some terms which, although not used in the Test Guidelines, may be useful for breeders / applicants for characteristics formulated for use in the Technical Questionnaire. The definitions in this document provide an indication of whether terms are generally used in Test Guidelines, or whether alternative terms might be more appropriate for use in Test Guidelines. In general, the meaning of botanical terms which are used in the Test Guidelines to indicate the relevant part of the plant to be examined, but which are not themselves used as states of expression (e.g. bract, petal, berry, etc.), do not require a UPOV-specific definition and are not included in this document.

II. SHAPES

1. COMPONENTS OF SHAPE

1.1 Document TG/1/3 “General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants” (General Introduction) explains that shape can be considered in terms of a pseudo-qualitative characteristic:

“4.4.3 Pseudo-Qualitative Characteristics”

In the case of “pseudo-qualitative characteristics,” the range of expression is at least partly continuous, but varies in more than one dimension (e.g. shape: ovate (1), elliptic (2), circular (3), obovate (4)) and cannot be adequately described by just defining two ends of a linear range. In a similar way to qualitative (discontinuous) characteristics – hence the term “pseudo-qualitative” – each individual state of expression needs to be identified to adequately describe the range of the characteristic.”

However, document TGP/9 “Examining Distinctness” explains that the use of pseudo-qualitative characteristics for the assessment of distinctness on the basis of notes has particular limitations (see document TGP/9/1 Draft 6, Section 5.2.3) [*cross ref.*] :

“*Pseudo-qualitative (PQ) characteristics*”

[...]

“5.2.3.6[...] However, an important additional factor with pseudo-qualitative characteristics is that, whilst a part of the range is continuous, there is not an even distribution across the scale and the range varies in more than one dimension (e.g. shape: ovate (1), elliptic (2), circular (3), obovate (4): there is a variation in the length/width ratio and in the position of the widest point). This means that it is difficult to define a general rule on the difference in Notes to establish distinctness within a characteristic.

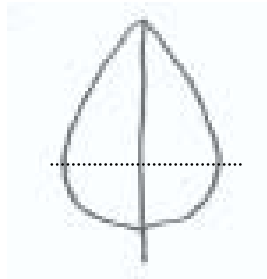
1.2 Therefore, for the purposes of DUS examination, it can be useful to develop quantitative or qualitative characteristics related to shape, rather than considering shape as a single pseudo-qualitative characteristic. In that respect, it is possible to define a plane shape using the following components:

(a) Ratio width/length

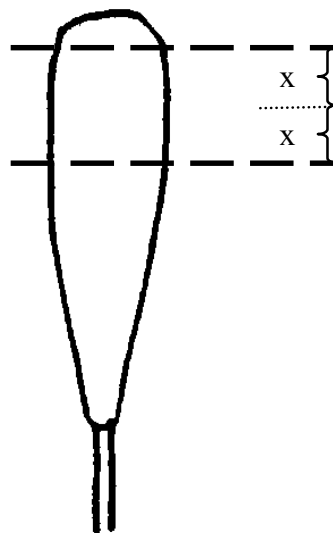
(used as a generic term in this document to cover also ratio: thickness/length; diameter/length; thickness/width, for profiles of 3 dimensional shapes);

(b) Position of broadest part

the broadest part may be a point (e.g. for a circle) or, in cases where the sides are parallel (e.g. for an oblong), the broadest part is situated along a length. In cases where the broadest part is not a precise point, the position of the broadest part is considered to be the mid-point along the broadest part. For example:



← position of broadest part



← position of broadest part
(mid-point of length of
broadest part)

(c) Shape of base (see Section 2.3 Base [*cross ref.*]);

(d) Shape of apex (see Section 2.4 Apex [*cross ref.*]);

(e) Lateral outline.

1.3 The shape of base and shape of apex are considered in Sections 2.3 and 2.4 [*cross ref.*] respectively. The chart below (Chart for Simple Symmetric Plane Shapes) illustrates the other three components for simple symmetric plane shapes (those for which the angle at the base and at the apex does not exceed 180°) as follows:

(a) Ratio width/length: the ratio width/length varies from left to right within a row [but is approximately the same within a column];

(b) Position of broadest part: the position of the broadest part varies from row to row [but is approximately the same in each row];

(c) Lateral outline: the shape of the lateral sides varies from set to set [but is approximately the same within a set].

Chart for Simple Symmetric Plane Shapes

ratio width/length	1: >6	1:6 to 1:3	1:2 to 1:1.5	1:1.2	1:1	1.2:1	1.5:1 to 2:1	3:1 to 6:1
	very narrow	narrow	medium	broad	very broad	shallow weakly compressed	very shallow moderately compressed	strongly compressed

Parallel set

oblong								
					9	10	11	12

Rounded set

ovate								
elliptic								
					5	6	7	8
obovate								

Angular set

triangular								
trullate								
rhombic								
						4		
obtrullate								
obtriangular								
				13	14	15		

1	(narrow deltate)	9	square
2	(medium deltate)	10	transverse broad oblong
3	(broad deltate)	11	transverse medium oblong
4	(quadrate rhombic)	12	transverse narrow oblong
5	circular	13	(narrow obdeltate)
6	narrow oblate	14	(medium obdeltate)
7	medium oblate	15	(broad obdeltate)
8	broad oblate		

Notes

Parallel set: the lateral sides are more or less straight over most of their length and more or less parallel to the main axis (The leaves of most of the monocotyledons belong in this group.)

Rounded set: the lateral sides are rounded in a single, sweeping curve, without sudden changes of direction (The leaves of most of the dicotyledons belong in this group.)

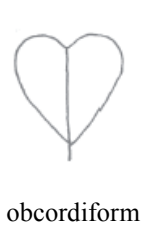
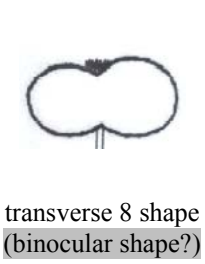
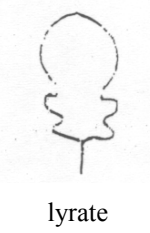
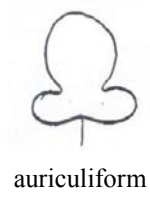
Angular set: the lateral sides are somewhat bent at a certain point, resulting in a change of direction, combined with a somewhat straightening towards the base and apex from that point and more or less forming two triangles joined at the longitudinal axis.

[Editorial note: all lines indicating “veins” will be deleted from the illustrations in the final document]

1.4 The following chart (Chart for Other Plane Shapes) illustrates some other common plane shapes:

Chart for Other Plane Shapes

For each of the shapes below, ranges for ratio width/length and position of broadest part can be developed, in a similar way to that shown in the Chart for Simple Symmetric Plane Shapes (Section 1.3 [cross ref.]).



2. DEVELOPING SHAPE-RELATED CHARACTERISTICS

2.1 Introduction

2.1.1 In general, it can be most useful to consider the variation in shape between varieties in the variety collection using the following steps:

Step 1: Ratio width/length (see Section 1 [*cross ref.*]);

Step 2: Position of broadest part (see Section 1 [*cross ref.*]);

Step 3: Shape of base (see Section 2.3 Base [*cross ref.*]);

Step 4: Shape of apex (see Section 2.4 Apex [*cross ref.*]);

Step 5: Lateral outline (see Section 1 [*cross ref.*]).

Thus, if all the variation in shape between varieties in the variety collection is accounted for by the ratio width/length (e.g. narrow elliptic, medium elliptic or broad elliptic), it is only necessary to have a characteristic “ratio width/length”. Similarly, if all the variation in shape between varieties in the variety collection is accounted for by ratio width/length and position of broadest part (e.g. all varieties fall within the rounded set in the Chart for Simple Symmetric Plane Shapes) it is only necessary to have the characteristics “ratio width/length” and “position of broadest part”. It is only necessary to go to subsequent steps when the variation in shape between varieties in the variety collection has not been accounted for by the preceding steps/components.

2.1.2 In general, it is appropriate to present the characteristics in the order of the steps 1 to 5. However, a particular exception to this approach should be made where a qualitative characteristic is identified. Qualitative characteristics should be presented as the first of the series of shape-related characteristics because of the value of such characteristics for assessing distinctness and because the examination of subsequent shape-related characteristics may not be relevant for varieties with certain states of expression for the qualitative characteristic. For example, “Only varieties with Leaf lateral outline: ovate: Leaf: ratio width/length” might be appropriate if the preceding characteristic for “Leaf: lateral outline” was qualitative, e.g. ovate (1); hastiform (2)) and there was no useful variation in ratio width/length for hastiform varieties.

































2.2 Full plane shape characteristics

The following illustrations provide examples of the use of the full plane shape components (ratio width/length, position of broadest part and lateral outline):

Example 2 (a circle indicates the shape of one or more varieties in the variety collection)

The only variation between varieties is found in the position of the broadest part. Therefore, the only characteristic required for the Test Guidelines would be the following:

Plant [part]: position of broadest part (towards base to towards apex) (QN)

ratio width/length	1: >6 very narrow	1:6 to 1:3 narrow	1:2 to 1:1.5 medium	1:1.2 broad	1:1 very broad	1.2:1 shallow weakly compressed	1.5:1 to 2:1 very shallow moderately compressed	3:1 to 6:1 strongly compressed
Parallel set								
oblong								
					9	10	11	12
Rounded set								
ovate								
elliptic								
obovate								
					5	6	7	8

Example 3 (a circle indicates the shape of one or more varieties in the variety collection)

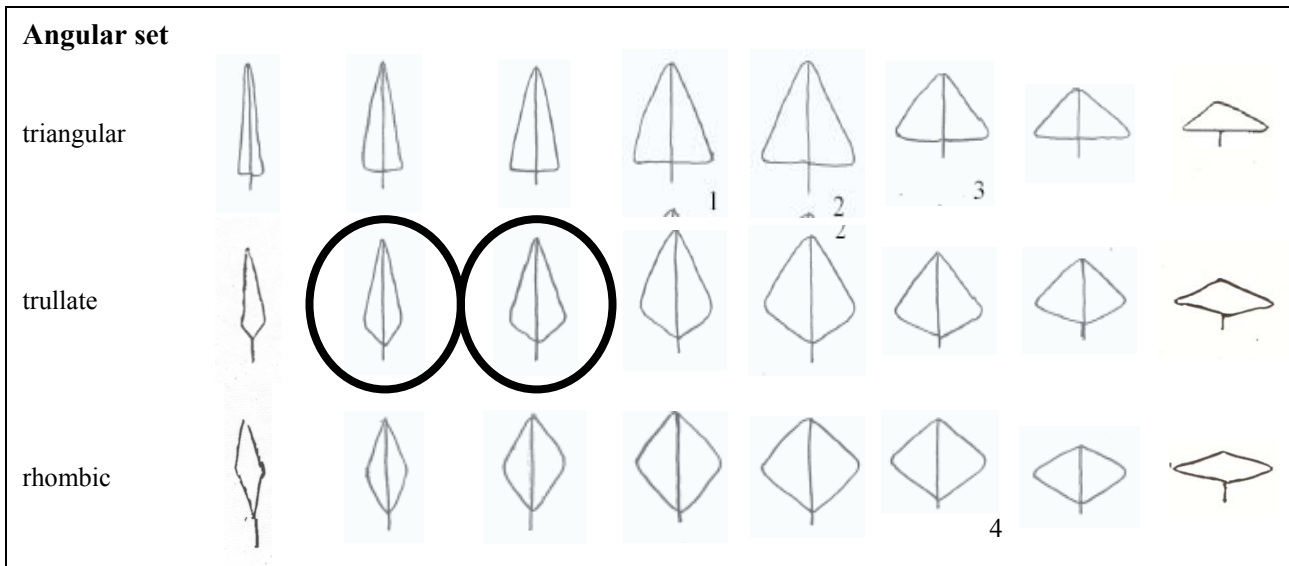
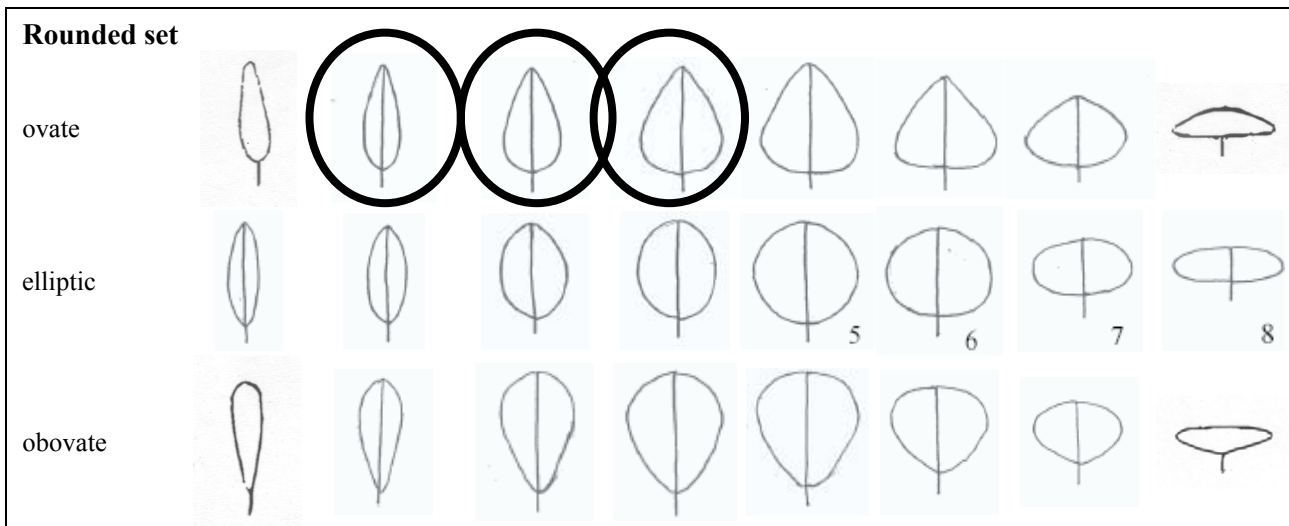
There is variation between varieties in the ratio width/length, the shape of the base and the lateral outline. Assuming that the lateral outline varies between ovate and trullate in a quantitative way, the characteristics required for the Test Guidelines might be the following:

Plant [part]: ratio width/length (small to large) (QN)

Plant [part]: shape of base (acute, obtuse, rounded) (PQ)

Plant [part]: lateral outline (clearly rounded to clearly triangular) (QN)

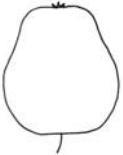
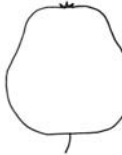

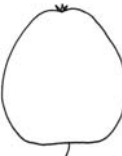
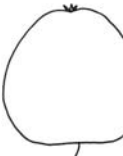

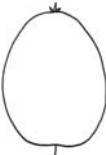








ratio width/length **1: >6** **1:6 to 1:3** **1:2 to 1:1.5** **1:1.2** **1:1** **1.2:1** **1.5:1 to 2:1** **3:1 to 6:1**



Example 4

the variation between the shapes below can be covered by:

- (a) ratio diameter/height (QN):
e.g. very small (1); small (3); medium (5); large (7); very large (9);
- (b) position of broadest part (QN):
e.g. at middle (1); moderately towards base (2); strongly towards base (3);
- (c) lateral outline in apical half (PQ):
e.g. rounded (1); parallel (2); flat taper (3); concave (4)

		ratio diameter/height			
	lateral outline in apical half (Notes)	small (3)	medium (5)	large (7)	position of broadest part (Notes)
waisted cylindrical	concave (4)				at middle (1); moderately towards base (2); or strongly towards base (3)
conic	flat taper (3)				at middle (1); moderately towards base (2); or strongly towards base (3)
ovoid	rounded (1)				moderately towards base (2); or strongly towards base (3)
cylindrical	parallel (2)				at middle (1)
ellipsoid	rounded (1)	 (obloid)	 (globose)	 (ellipsoid)	at middle (1)

Example 5

the variation between the range of shapes indicated by the illustrations below



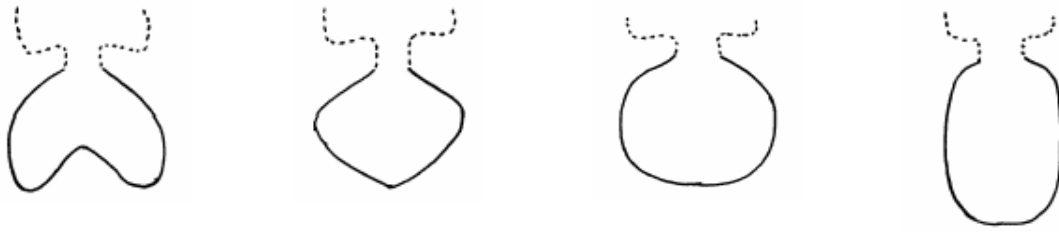
can be covered by:

- (a) ratio width/length (QN):
e.g. very small (1); small (3); medium (5); large (7); very large (9);
- (b) position of broadest part (QN):
e.g. strongly towards base (1); moderately towards base (3); at middle (5); moderately towards apex (7); strongly towards apex (9)

	ratio width/length				
position of broadest part	very small (1)	small (3)	medium (5)	large (7)	very large (9)
strongly towards base (1)					
moderately towards base (3)					
at middle (5)					
moderately towards apex (7)					
moderately to strongly towards apex (8)					
strongly towards apex (9)					





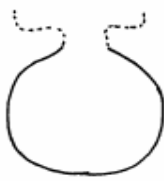
Example 6

the variation between the range of shapes indicated by the illustrations below



can be covered by:

- (a) lateral outline (QL)
e.g. reniform (1); rhombic (2); elliptic (3)
- (b) ratio width/length (QN):
e.g. small (1); medium (2); large (3)

	lateral outline		
ratio width/length	reniform (1)	rhombic (2)	elliptic (3)
small (1)			 (elliptic)
medium (2)			 (circular)
large (3)			 (transverse elliptic)

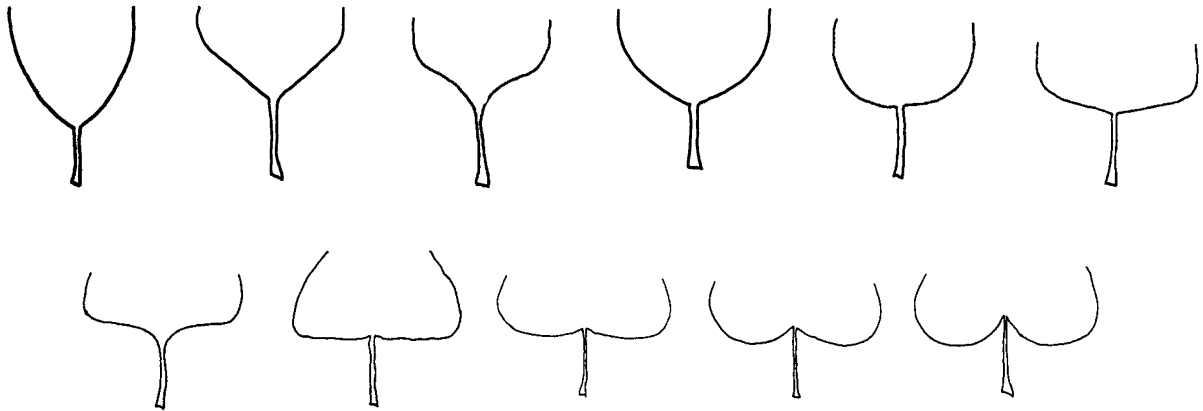
2.3 Base Shape Characteristics

2.3.1 As explained in Section 2.1 [*cross ref.*], it is only necessary to develop a characteristic for the shape of base when the variation in shape between varieties in the variety collection has not been accounted for by the ratio width/length or the position of the broadest part concerning the full plant part.

2.3.2 In the same way as for plane shapes, whilst a base shape can be considered in terms of a pseudo-qualitative characteristic, it can be useful to develop quantitative or qualitative characteristics related to base shape, rather than considering shape as a single pseudo-qualitative characteristic. A particular example of this is the consideration of the angle of the base (e.g. as a quantitative characteristic) and the curvature at the base.

Example

the variation between the range of base shapes indicated by the illustrations below



can be covered by:

- (a) angle of base (QN):
e.g. acute (1); obtuse (2); straight (180°) (3); weakly reflex (4); strongly reflex (5)
- (b) curvature at base (QN):
e.g. concave (1); flat (2); convex (3)

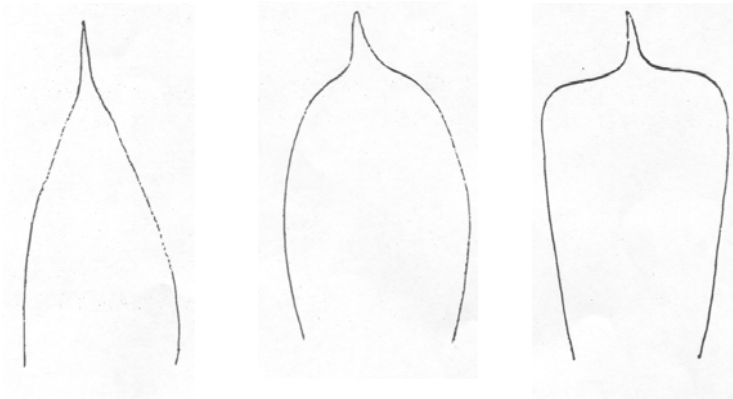
	angle at base				
curvature at base	acute (1)	obtuse (2)	straight (3)	weakly reflex (4)	strongly reflex (5)
concave (1)					
flat (2)					
convex (3)					

2.4 Apex Shape Characteristics

2.4.1 As explained in Section 2.1 [*cross ref.*], it is only necessary to develop a characteristic for the shape of apex when the variation in shape between varieties in the variety collection has not been accounted for by the ratio width/length or the position of the broadest part concerning the full plant part.

2.4.2 In the same way as for plane shapes, whilst an apex shape can be considered in terms of a pseudo-qualitative characteristic, it can be useful to develop quantitative or qualitative characteristics related to apex shape, rather than considering shape as a single pseudo-qualitative characteristic. A particular example of this is the consideration of the angle of the apex (e.g. as a quantitative characteristic).

2.4.3 In some cases the tip is differentiated within the general shape of the apex. For example:



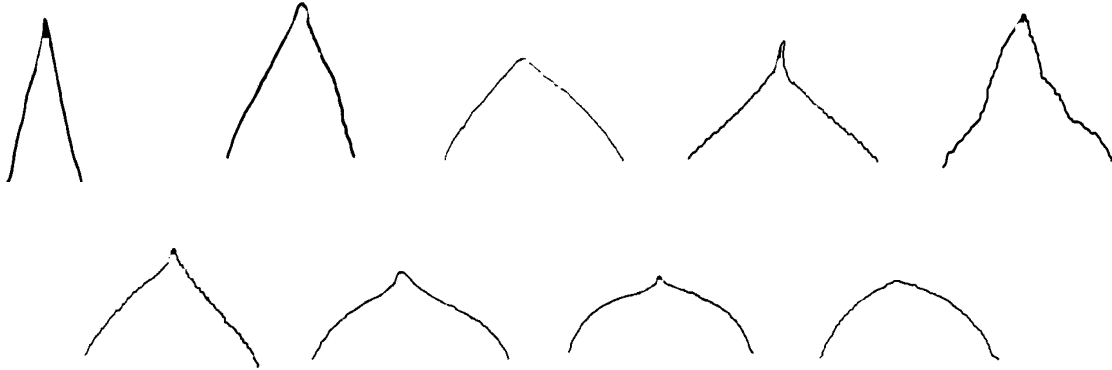
Differentiated tip:	acuminate	acuminate	acuminate
Apex:	acute	rounded	truncate

2.4.4 In cases where the tip is differentiated within the general shape of the apex, characteristics concerning the shape of the tip may be developed independently from those concerning the general shape of the apex. Different combinations between these two categories are possible, for example: a first characteristic for the general shape of the apex (e.g. acute, obtuse, rounded), together with a second characteristic for emargination at apex (absent, present), or apiculate tip (absent, present). For example:

2.4.5 In the case of tip shapes, it may be more appropriate to have a simple characteristic such as length of tip, rather than using botanical terms. The only difference between mucronate and aristate is the length of the 'tip', the only difference between cuspidate and pungent is the length of the 'tip', and the only difference between emarginate and retuse is the angle [depth?] of the notch. These pairs can therefore also be quantified where applicable, by stating, for example, 'length of tip' or 'depth of notch', instead of using the specific botanical terms.

Example

the variation between the range of apex shapes indicated by the illustrations below



can be covered by:

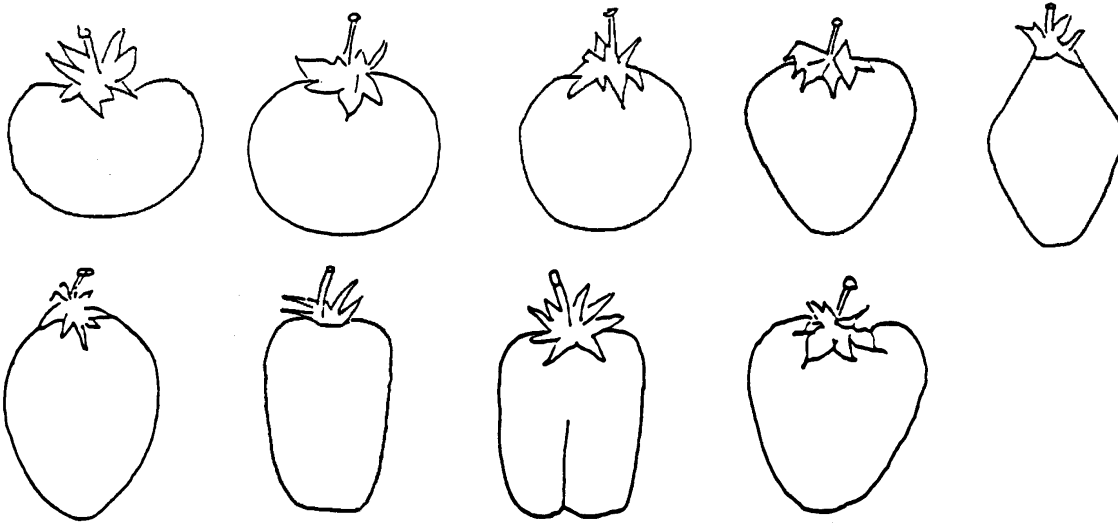
- (a) angle of apex (excluding acuminate tip, if present) (QN):
e.g. strongly acute (1); moderately acute (2); right-angle (3); moderately obtuse (4); strongly obtuse (5)
- (b) length of acuminate tip (QN):
e.g. absent or short (1); medium (2); long (3)

	angle of apex				
length of tip	strongly acute (1)	moderately acute (2)	right-angle (3)	moderately obtuse (4)	strongly obtuse (5)
absent or short (1)					
medium (2)					
long (3)					

2.5 Combination of Full Plane-, Base- and Apex Shape Characteristics









Example

the variation between the range of shapes indicated by the illustrations below



can be covered by:

- (a) ratio width/length (QN):
e.g. very small (1); small (3); medium (5); large (7); very large (9);
- (b) position of broadest part (QN):
e.g. at middle (1); moderately towards base (2); strongly towards base (3);
- (c) shape of base (QN/PQ):
e.g. pointed (1); rounded (2); depressed (3)
- (d) shape of apex (QN/PQ):
e.g. pointed (1); rounded (2); truncate (3); notched (4)

		shape of base			
shape of apex	pointed (1)		rounded (2)		depressed (3)
pointed (1)					
rounded (2)			 (ovate)	position of broadest part	
		ratio width/length	 (round)		
			 (oblate)		
truncate (3)					
notched (4)					

2.6 Three-dimensional shape characteristics

Wherever possible, three-dimensional plant parts should be described in profile as plane or two-dimensional shapes (see Section 2.1 [*cross ref.*]: ratio width/length, position of broadest part, base, shape and lateral outline), e.g. using characteristics in cross-section, lateral view, longitudinal section, etc. To describe the three-dimensional shape fully it may also be necessary to use, for example, a characteristic for hollow or solid interior in addition to the characteristics describing the plane shape. The use of characteristics for three-dimensional shapes should only be used where it is not practical to describe the characteristic in a two-dimensional way.

2.7 Symmetry

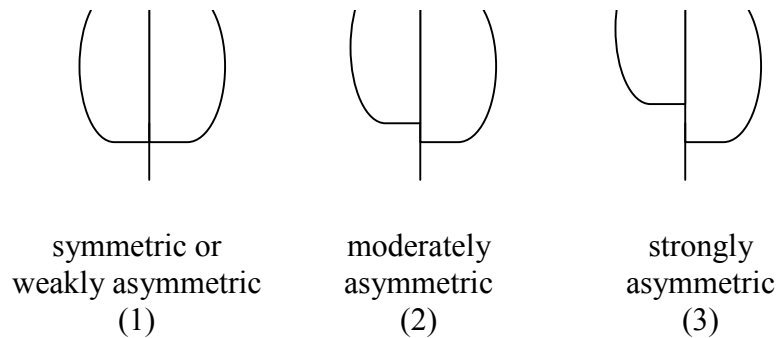
2.7.1 Lateral symmetry around the main axis may be handled in different ways. For example:

(a) lateral symmetry of plant part shapes may be considered within a particular shape, e.g. falcate and lunate are laterally asymmetric (see Section 1.4 [*cross ref.*]); or

(b) it may be appropriate to introduce symmetry as a separate characteristic. In such cases, whether the characteristic for symmetry is a qualitative (symmetric / asymmetric), a quantitative (e.g. symmetric or weakly asymmetric (1), moderately asymmetric (2), strongly asymmetric (3)) or a pseudo-qualitative characteristic needs to be considered on a case-by-case basis.

Example:

quantitative characteristic for symmetry



2.8 Types of expression and states / notes

The type of expression (i.e. qualitative, quantitative or pseudo-qualitative) of the characteristics describing components of shape needs to be considered separately for each situation. In particular, as explained in document TGP/7 “Development of Test Guidelines”, Annex 4, paragraph 1 “it should be remembered that what may appear to be very similar characteristics in different types of plant, or different organs of the same plant, may in fact be under different types of genetic control.” Thus, for example, in one type of plant, or one organ, the characteristic “position of broadest part” might be a qualitative characteristic but in

another type of plant, or organ, it might be a quantitative characteristic. Therefore, the following notes are only intended to indicate the most normal situations:

- (a) Ratio width/length: normally a quantitative characteristic
- (b) Position of broadest part: within the same lateral outline set (e.g. rounded), this is normally a quantitative characteristic. However, where varieties cover more than one lateral outline set (e.g. angular and hastiform), the position of the broadest part is less likely to be a quantitative characteristic and is more likely to be pseudo-qualitative or qualitative;
- (c) Shape of base (see Section 2.3 Base [*cross ref.*]);
- (d) Shape of apex (see Section 2.4 Apex [*cross ref.*]);
- (e) Lateral outline: there is no “normal” situation for the lateral outline, which can be a qualitative, quantitative or pseudo-qualitative characteristic

2.9 Defining the characteristic

In the same way as for any characteristic, each characteristic should be precisely defined. With respect to shape-related characteristics it is particularly important to clarify which part of the plant is to be observed. Some illustrative examples are as follows:

Leaf: ratio width/length

- to specify if any tip (e.g. aristate tip) should be included or excluded from the observation of leaf length
- to specify if the reference point for the “base” should be the point of attachment or the lowest part of the plant part (e.g. for a cordiform leaf);
- to specify how to observe width/length in the case of laterally asymmetric shapes

Leaf: position of broadest part

- to specify if any tip (e.g. aristate tip) should be included or excluded from the observation of the position of the broadest part
- to specify if the reference point for the “base” should be the point of attachment or the lowest part of the plant part (e.g. for a cordiform leaf);
- to specify how to observe position of the broadest part in the case of laterally asymmetric shapes

2.10 Technical Questionnaire Characteristics

Where the normal requirements for a Technical Questionnaire characteristic are met (see document TGP/7 Annex 3 GN 13.3.2), characteristics developed according to the guidance set out in Sections 1.2.1 to 1.2.4 are suitable for inclusion in the Technical Questionnaire. However, document TGP/7: Annex 3 GN 13.3.3 clarifies that “[w]here necessary, characteristics in the Test Guidelines can be simplified (e.g. color groups can be created rather than requesting an RHS Colour Chart reference) for inclusion in the Technical Questionnaire (TQ), if this would be of assistance for the breeder completing the TQ. Furthermore, the characteristics contained in the Test Guidelines can be formulated in a different way, if breeders would then be able to describe them more precisely and the information would be useful for performing the test.”. Thus, in some cases, it may be appropriate to provide

breeders with an opportunity to describe shape in a way which is more widely recognized. In such cases, the Technical Questionnaire may invite breeders to indicate shape on the following basis:

(a) Simple Symmetric Plane Shapes: to indicate the shape according to the Chart for Simple Symmetric Plane Shapes (see Section 1.3 [*cross ref.*]), e.g. narrow oblong

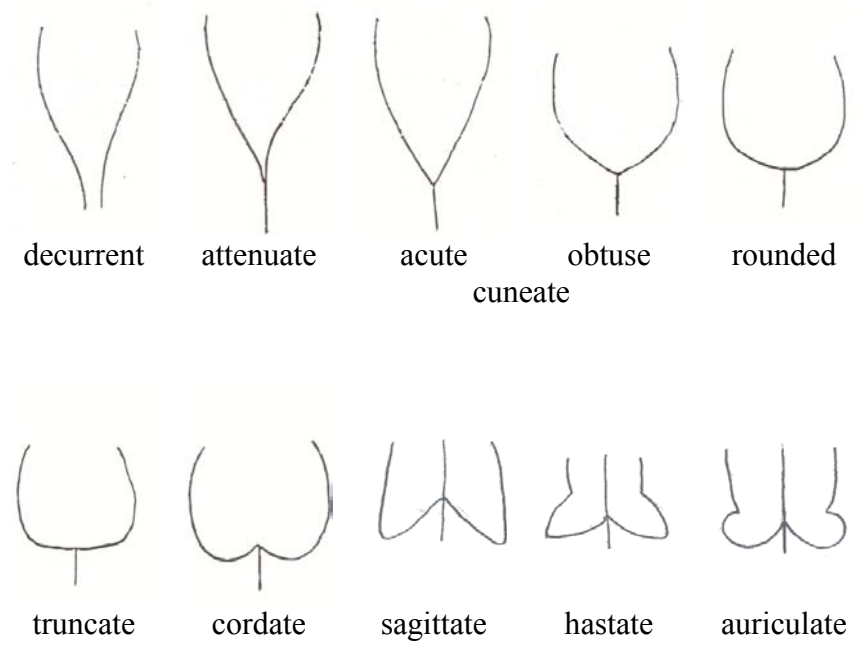
(b) Non-Simple-Symmetric Plane Shapes: to indicate the shape according to the non-simple-symmetric plane shapes identified in Section 1.4 [*cross ref.*], with an indication of relative width where useful, e.g. narrow cordiform

3. SHAPE ILLUSTRATIONS

3.1 Full Plane Shapes

see Chart for Simple Symmetric Plane Shapes and Chart for Other Plane Shapes (Section 2.1
[cross ref.])

3.2 Base Shapes

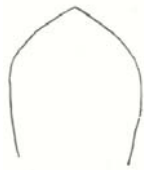


3.3 Apex Shapes

3.3.1 Apex



acute



obtuse



rounded



truncate



obcordate

3.3.2 Differentiated tip

length / depth of tip =>



apiculate



acuminate



caudate



cirrhous



cuspidate



pungent



mucronate



aristate



retuse



emarginate

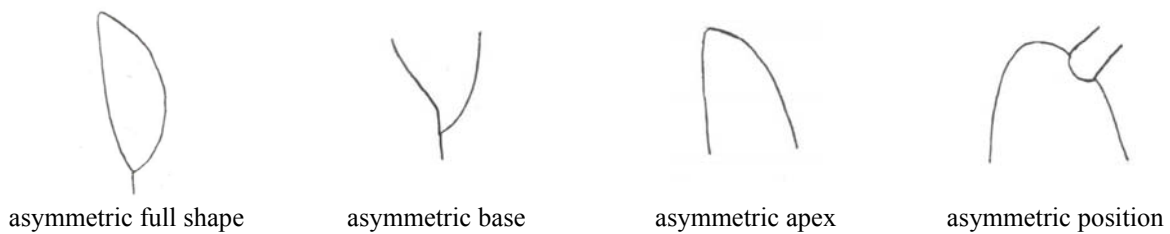


laciniate

3.4 Three-Dimensional Shapes

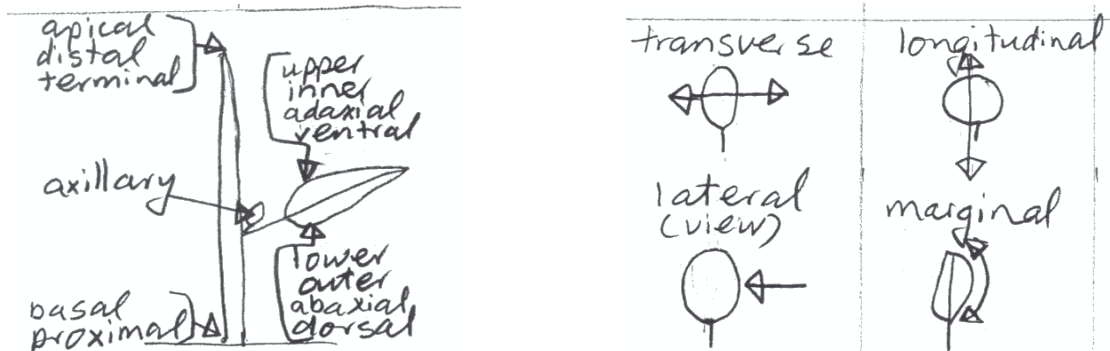


3.5 Symmetry



III. STRUCTURE

1. COMPONENTS OF STRUCTURE



[Editorial Note: New section to be developed explaining the wording of characteristic headings]

2. DEVELOPING CHARACTERISTICS FOR PLANT STRUCTURES

2.1 Growth habit

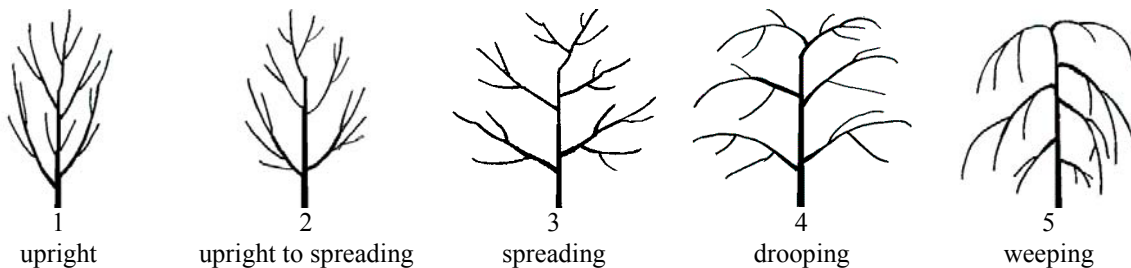
In general, the characteristic “Plant (or Tree): growth habit” is used to describe the overall growth habit of the plant, based on the deportment of the main branches or stems. The characteristic “Plant (or Tree): growth habit” is usually a quantitative characteristic. Whilst growth habit can be considered in terms of a pseudo-qualitative characteristic, it can be useful to develop quantitative or qualitative characteristics related to growth habit, rather than considering growth habit as a single pseudo-qualitative characteristic. In cases where qualitative characteristics exist, those are often presented in the form of “Plant (or Tree): type”, rather than growth habit.

Example 1: “Plant: growth type” determinate (note 1); indeterminate (note 2)

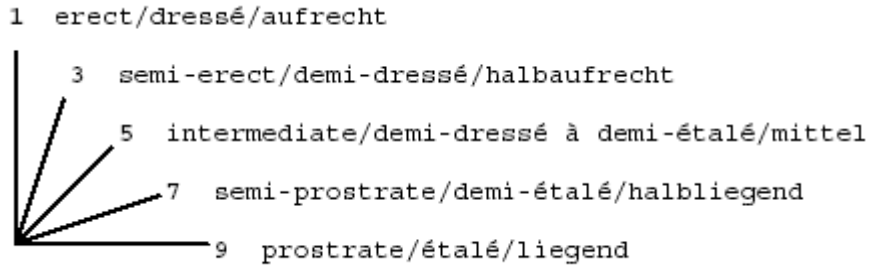
Example 2: “Plant: type” climbing (note 1); non-climbing (note 2)

Examples of “Plant (or Tree): growth habit” are provided below:

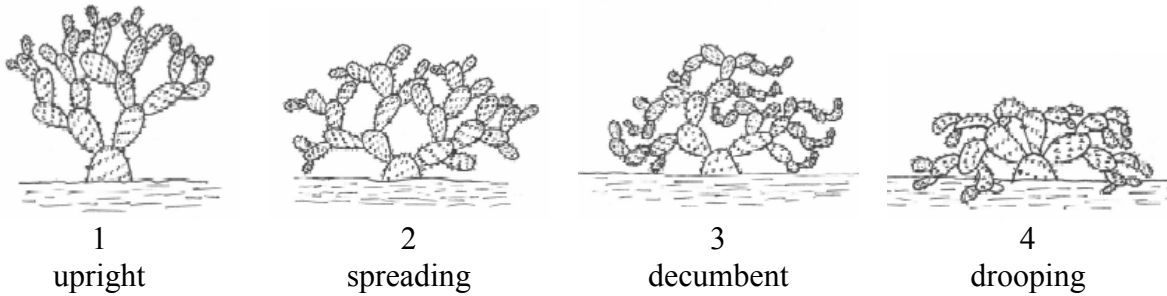
Example 1: *quantitative characteristic*



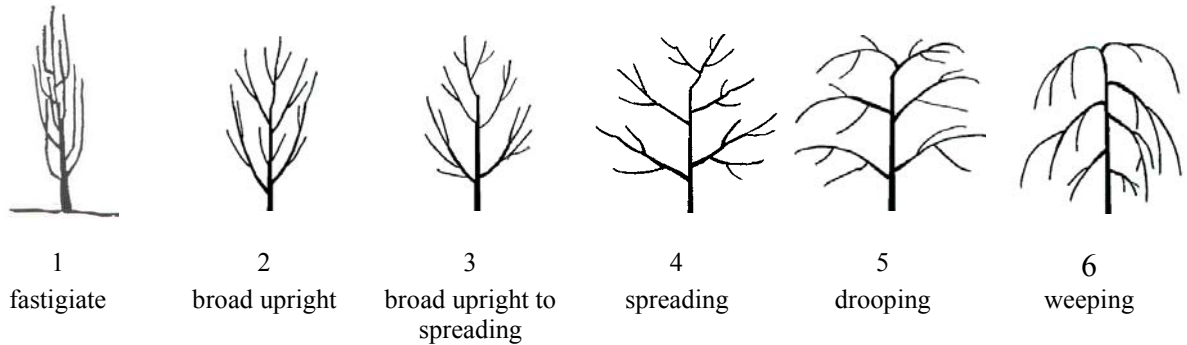
Example 2: quantitative characteristic



Example 3: pseudo-qualitative characteristic

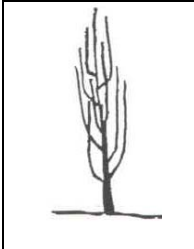
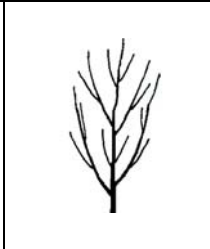
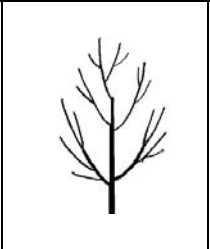
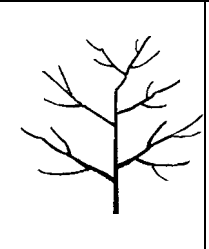
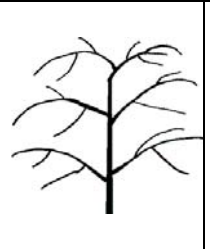



Example 4 – case 1: pseudo-qualitative characteristic



Example 4 – case 2:

- (a) *qualitative characteristic* (Tree: type); and
- (b) *quantitative characteristic* (Only non-fastigate varieties: Tree: growth habit)

QL	1 fastigate	2 non-fastigate				
						
QN	1 upright	2 upright to spreading	3 spreading	4 drooping	5 weeping	

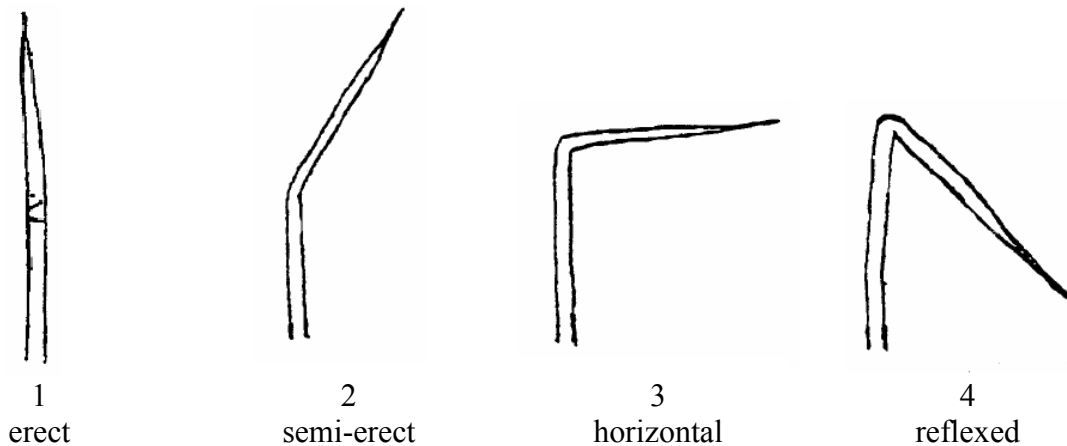
2.2 Attitude / direction (Plant parts)

In cases where individual plant parts are to be observed, the characteristics are, in general, presented as attitude, direction or angle with main axis, rather than habit. In a similar way to growth habit, it can be useful to develop quantitative or qualitative characteristics, rather than considering attitude and direction as a single pseudo-qualitative characteristic.

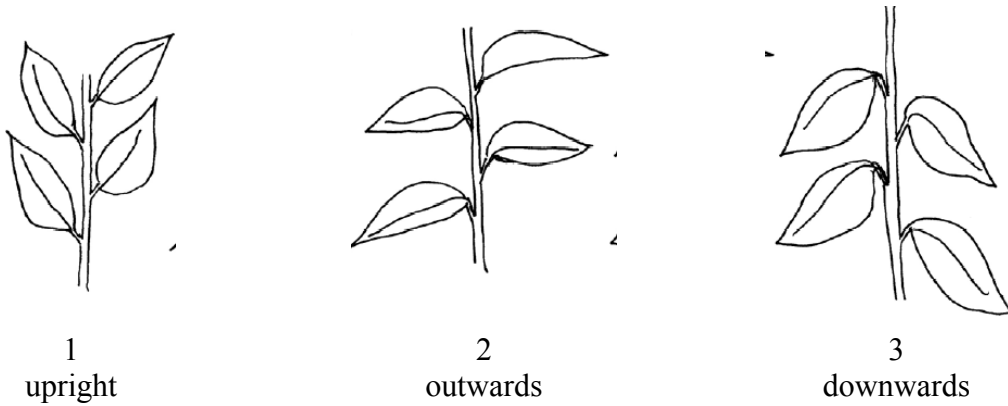
Examples of attitude as a quantitative characteristic are provided below:

Quantitative Characteristic

Example 1:



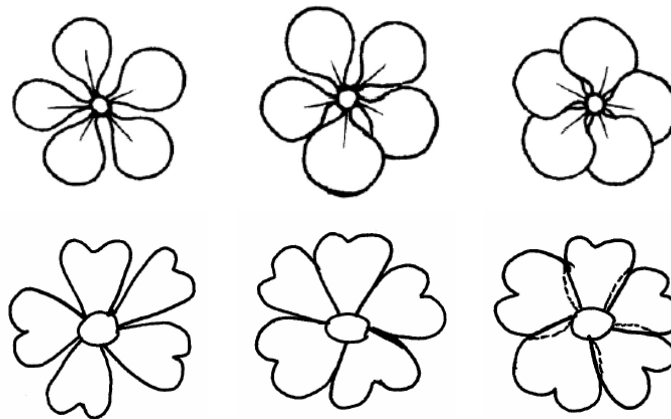
Example 2:



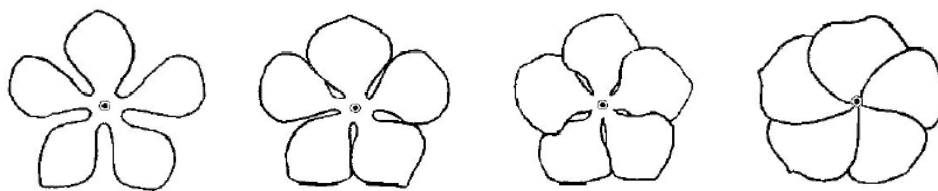
Example 3: [Note: to provide example for angle where main axis not vertical]

2.3 Relative position

A particular type of characteristic which commonly occurs in Test Guidelines is the relative position of leaves, petals, etc. The following examples can be used as guidance for the presentation of quantitative characteristics:



	1	2	3
Version 1	free	touching	overlapping
Version 2	free	intermediate	overlapping
Version 3	no overlapping	some (petals) overlapping	all (petals) overlapping



1	2	3	4
free	touching	slightly overlapping	strongly overlapping

2.4 Margins

2.4.1 It may be appropriate to have a quantitative characteristic, such as depth of incisions, rather than using botanical terms. In particular, it is not appropriate to use botanical terms in a way which indicates a qualitative characteristic when the characteristic is not qualitative. Thus, it would not be appropriate to have a characteristic with the states of expression serrate (Note 1) and dentate (Note 2), if there was not a clear discontinuity between those states.

2.4.2 Similarly, it may be appropriate to have a quantitative characteristic, such as depth of lobing, rather than trying to define a lobe. In particular, it is not appropriate to use lobing in a way which indicates a qualitative characteristic when the characteristic is not qualitative. Thus, it would not be appropriate to have a qualitative characteristic such as lobed (Note 1) and not lobed (Note 2) where there was not a clear discontinuity between those states. In the same way, a characteristic for the number of lobes could produce inconsistent results if the determination of lobes was not a qualitative characteristic. Quantitative characteristics such as depth of lobing or degree of lobing may be more appropriate, e.g.



absent or weak



medium



strong

2.5 Hairs and Spines

2.5.1 In general, botanical terms for types of hair and spine (e.g. aculeate, lanate, tomentose, etc.) are not used in the Test Guidelines, since the states of expression are likely to relate to number, density or length of hairs, spines, etc.

2.5.2 In the case of hair, the term “pubescence” is synonymous with “hairiness” for the purposes of Test Guidelines.

3. ILLUSTRATIONS OF PLANT STRUCTURES

3.1 Habit



upright



spreading



drooping



weeping



arborescent
(tree-like)



shrubby



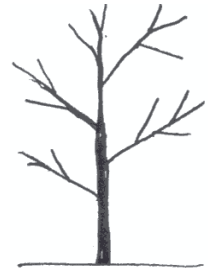
fastigate



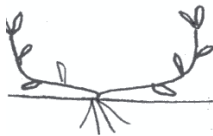
columnar



divaricate



ramified



decumbent



procumbent
(not rooting)

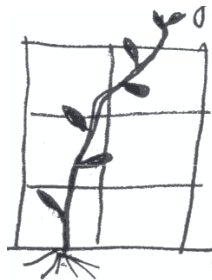


stoloniferous
(rooting)

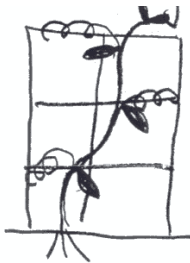


reclining

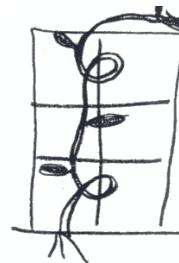
PROSTRATE



clambering



climbing



twining

3.2 Attitude / direction (Plant parts)



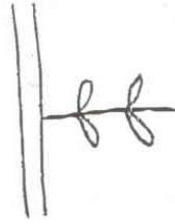
adpressed



erect



semi-erect



horizontal



reflexed



adpressed



recurved



arched

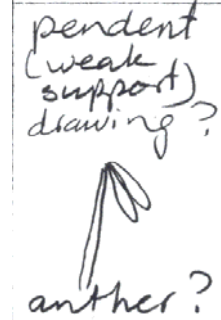
→ difference?

arcuate
(curved downwards)
smaller organs e.g.
column of orchid.
drawing?

arcuate

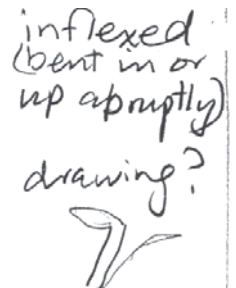


pendulous



pendent

anther?



inflexed

drawing?

inflexed (bent in or up abruptly)



incurved



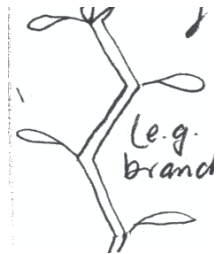
inwards



outwards



convolute

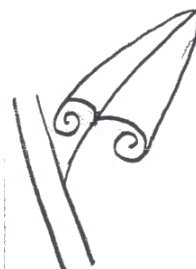


zig-zag

Le.g. brand



involute



revolute

3.3 Relative position



exserted



included



oblique



free



contiguous
(touching – not
joined)



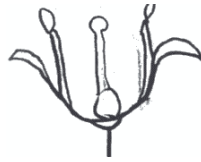
coherent
(like parts
superficially
joined)



connate
(like parts
histologically
joined)



adherent
(unlike parts
superficially
joined e.g.
anthers to style)



adnate
(unlike parts
histologically
joined e.g.
anthers and
style)



adpressed



sessile

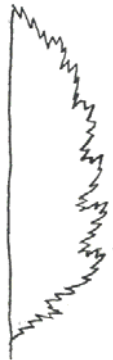


stipitate
(stalked)

3.4 Margins



serrate



biserrate
(1)



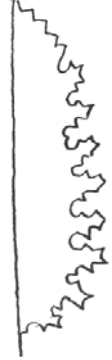
biserrate
(2)



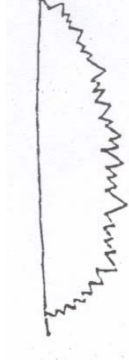
serrulate



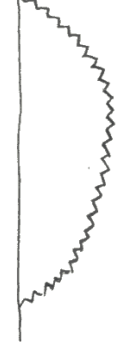
dentate



bidentate
(1)



bidentate
(2)



denticulate



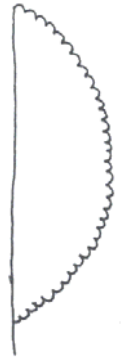
crenate



bicrenate
(1)



bicrenate
(2)



crenulate



repand



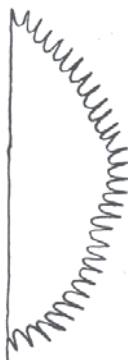
sinuate



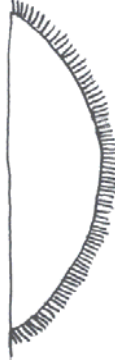
erose



entire



fimbriate



ciliate



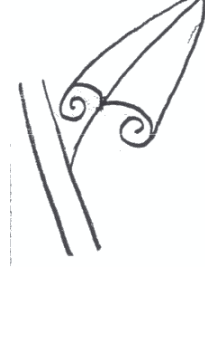
crispate



undulate

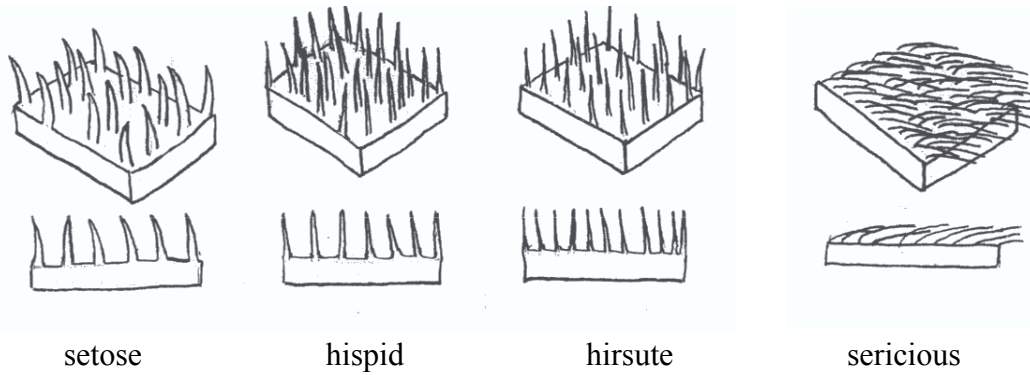
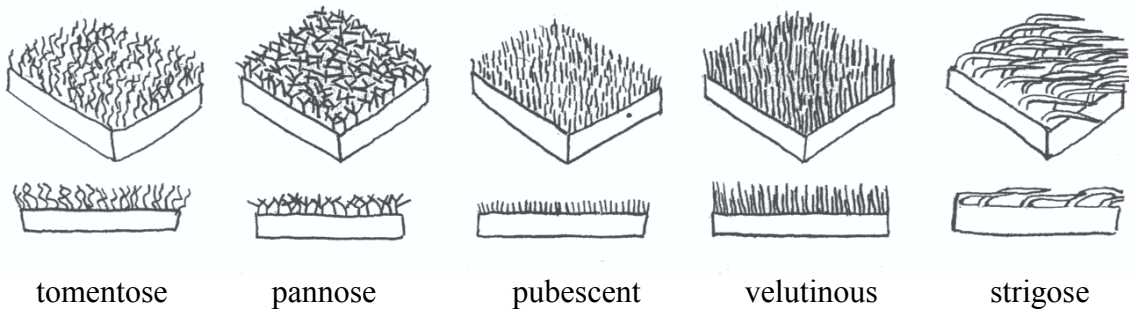
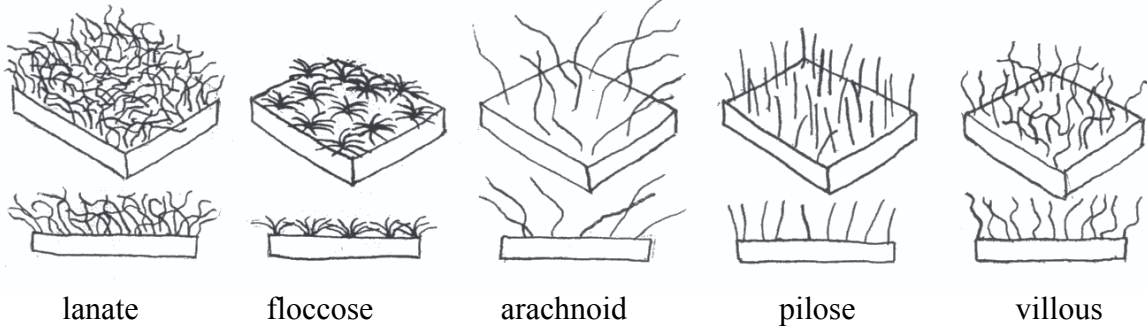


involute



revolute

3.5 Hairiness (Types of appendage covered by the general term “hair” in the Test Guidelines)



3.6 Spines (Types of appendage covered by the general term “spine” in the Test Guidelines)



aculeate



spinose

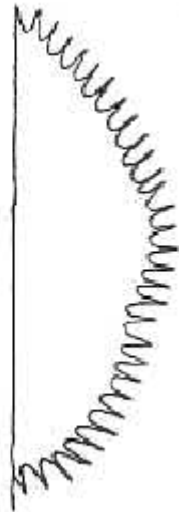


barbed; barbate

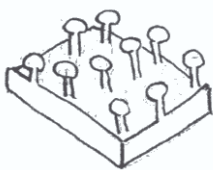
3.7 Other appendages



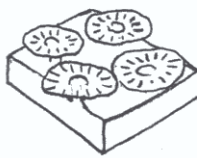
ciliate



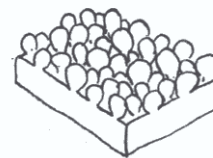
fimbriate



glandular

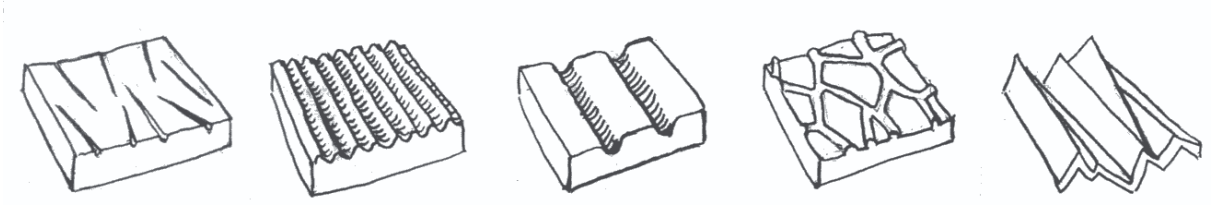


lepidote



papillose

3.8 Texture



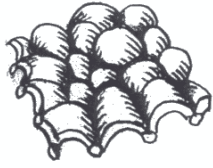
aciculate

striate

grooved

reticulate

corrugated



rugose



bullate



verrucose

IV. DEFINITIONS

		Relevant to:							Reference		
Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps:	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Abaxial	The lower, outer or dorsal side; the side facing away from the axis. Compare ‘adaxial’.					X					
Acicular	Needle-shaped; rigid, long and narrow and tapering to a fine point. Round or grooved in transverse section, e.g. conifers. Applies primarily to three-dimensional shape but may also be used for the outline.	X			X						
Aciculate	With fine, straight stripes, like needle scratches, lying in different directions, and of a different color or texture. Compare ‘striate’ (parallel lines).								X		
Actinomorphic	Radially symmetric, so that median division in any direction will produce two equal halves, e.g. inflorescence of Asteraceae. Compare ‘zygomorphic’.	X	X	X	X	X					
Aculeate (Prickly)	Type of appendage covered by the general term “spine” in the Test Guidelines. Bearing prickles; with stiff, sharp projections from the superficial layers of the plant part. Compare ‘spinose’ (from the superficial and deeper layers).							X			
Acuminate	Tapering gradually, with concave margins, to a sharp or blunt tip. Applies to the apex. Compare ‘apiculate’, tapering more abruptly and ‘caudate’, tapering more gradually, both applying to the tip only.			X							
Acute	With straight to slightly convex margins terminating in a sharp or blunt tip at an angle of less than 90 °. Applies to the base, apex, etc. Compare ‘obtuse’ where the angle is >90 °. In cases where it is useful to distinguish between ‘narrow acute’ and ‘broad acute’, one should remember that they should both still be <90 °.		X	X							
Adaxial	The upper, inner or ventral side; the side facing the axis. Compare ‘abaxial’.					X					
Adherent	Dissimilar plant parts in close contact, e.g. anthers adherent to style. Compare ‘adnate’, ‘coalesced’, ‘coherent’, connate’, ‘contiguous’.					X					

¹ To be completed when document finalized

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Adnate	Dissimilar plant parts fused histologically, e.g. stamens implanted onto the corolla. Compare ‘adherent’, ‘coalesced’, ‘coherent’, ‘connate’, ‘contiguous’.					x					
Adpressed	Lying close to or flat against the surface or another organ.					x					
Apex	The apex (apical or distal part) of an organ or plant part is the end furthest from the point of attachment. The shape of the apex is taken as the general shape, excluding any differentiated tip (if present)			x						II, 2.4	II, 3.3
Apical, Distal, Terminal	Located at the apex, furthest from the position of attachment. Compare ‘proximal’, ‘basal’ which is closest to the position of attachment. EB: Which term is preferred? ASL I prefer apical but perhaps need terminal as well			x		x					
Apiculate	Terminating abruptly in a small sharp but not rigid point which is both vascular and laminar in nature. Applies to the most distal part of the apex (tip). Compare ‘acuminate’ where the tapering is less abrupt and ‘cuspidate’ which is rigid.			x							
Apopetalous	With separate petals; petals not fused into a corolla tube. Compare ‘sympetalous’.					x					
Arachnoid	Covered by the general term “hair” in the Test Guidelines. Cobwebby; with loosely tangled, long, fine, white hair.							x			
Arborescent (Tree-like, Tree)	Tree-like; large woody plant, usually with a single main stem (trunk).					x					
Arched, Arching	Strongly curved more or less symmetrically, as an arch.					x					
Aristate	Awned; bearing a stiff, straight, bristle-like continuation of the primary vein. Applies to the most distal part of the apex (tip) or used for other parts where bristles may occur. Compare ‘mucronate’ where the point is shorter.			x							
Ascending, Upwards	Growing or orientated gradually upwards in relation to soil level or to other plant parts.					x					

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Asymmetric	Not being capable of median division into two equal halves in any direction.	x	x	x	x	x					
Attenuate	Tapering gradually, with lateral margins concave. Generally more tapered than ‘acute’. Applies to the base. Compare ‘acuminate’ which applies to the apex.		x								
Attitude	For UPOV purposes, ‘attitude’ is used for plant parts, while ‘growth habit’ is used for the whole plant. ‘Attitude’ is used in relation to soil level and to other plant parts. Rather to use ‘attitude’ instead of ‘stance’.					x					
Auriculate	Eared; with two rounded lobes directed outwards to either side and projecting beyond the general outline of the plant part. Applies to the base. Compare ‘hastate’ with triangular lobes directed outwards, and ‘sagittate’ with triangular lobes directed downwards. Compare ‘auriculiform’ which applies to full plane shape.		x								
Auriculiform	Eared; with two rounded basal lobes directed outwards and projecting beyond the general outline of the plant part. Compare ‘auriculate’ which applies to the base.	x									
Axillary	Situated within or arising from the axil, which is the upper angle between the axis and any lateral off-shoot, e.g. an axillary bud arising from the axil of a leaf.					x					
Barbate	See ‘barbed’			x							
Barbate	Bearded; with tufts of long hairs.							x			
Barbed	Terminating in a reflexed hook.			x							
Barbed	Type of appendage covered by the general term “spine” in the Test Guidelines. With short, rigid, hooked to reflexed bristles or points, like the barb of a fish-hook.							x			
Basal, Proximal	Located at the base, closest to the position of attachment. Compare ‘apical’, ‘distal’, ‘terminal’. EB: Which term is preferred? ASL prefer basal					x					
Base	The base (proximal part) of a plant part is the end nearest to the point of attachment.					x					
Bearded	See ‘barbate’.							x			
Bicrenate	Doubly crenate; with the crenations themselves crenate, or with alternating larger and smaller crenations.						x				

<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Bidentate	Doubly dentate; with the dentations themselves dentate, or with alternating larger and smaller dentations.						X				
Biserrate	Doubly serrate; with the serrations themselves serrate, or with alternating larger and smaller serrations.						X				
Blistered	See 'bullate'.								X		
Bristly	With stiff, strong trichomes. A general term including both 'hispid' (harsh to the touch) and 'setose' (spiny to the touch).							X			
Bullate	Blistered; the surface covered with irregular blister-like convexities. Compare 'papillose' with more elevated, nipple-like projections and 'verruucose' which is warty.								X		
Bumpy	A general term for a surface with rounded lumps or swellings.								X		
Campanulate	Bell-shaped; with an inflated tube, gradually widening distally into a limb or lobes. Normally applies to the corolla. Compare 'funnel-shaped' which is not inflated basally and 'cup-shaped' which does not diverge distally.				X						
Canaliculate	Channeled, gutter-shaped; long and narrow, with a longitudinal groove.				X						
Capitate	Headed; refers to a plant part which is stalked and terminates in a knob. Also applies to an inflorescence type with crowded flowers (florets) borne in a head-like cluster, e.g. Asteraceae.				X	?					
Cartilaginous	Firm and tough, like cartilage. Compare 'coriaceous' which is more flexible.								X		
Caudate	Tailed; tapering to a long, narrow, pointed appendage which is both vascular and laminar in nature. Applies to the most distal part of the apex (tip). Compare 'acuminate' where the point is shorter.			X							
Ciliate	Bearing a marginal fringe of fine trichomes (outgrowths from the epidermis). Compare 'fimbriate' which arises not only from the epidermis but from the deeper layers as well.						X	X			
Circular	Round; length/width ratio as well as dimension in all directions 1:1. The term 'circular' is preferable to 'round' and 'orbicular' for UPOV use. Forms part of the 'elliptic' series. Also applies to arrangement. Compare 'rounded' which applies to part of an outline, not the full shape.	X				X					

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Cirrhous	With a tendril; terminating in a narrow spiralled tip which is a continuation of the primary vein. Applies to the most distal part of the apex (tip) or to other parts with tendrils.			X							
Clambering	Climbing without the aid of special structures e.g. tendrils. Compare 'climbing'.					X					
Clavate	Club shaped - shaped like a club; thickening towards the apex from a tapered base				X						
Clawed (Unguiculate)	Abruptly contracted to a narrow, petiole-like basal portion. Applies to petals and sepals. Compare 'spatulate' which narrows more gradually towards the base.	X									
Climbing (Climber)	Climbing by means of special structures e.g. tendrils. Compare 'clambering'.					X					
Clustered	Clumped; closely grouped, arising from a common point.					X					
Coalesced	Unlike plant parts partially and irregularly fused. Compare 'adherent', 'adnate', 'coherent', 'connate', 'contiguous'. EB: Example?					X					
Coarse	See 'rough'.								X		
Coherent	Similar plant parts in close contact, not fused, e.g. anthers clinging together. Compare 'adherent', 'adnate', 'coalesced', 'connate', 'contiguous'.					X					
Columnar	Upright, with a dominant main stem and suppressed branch development. Compare 'fastigiate' where the branch development is not suppressed.					X					
Compressed	Flattened laterally or lengthwise. Compare 'depressed'.	X				X					
Concave	Hollowed; curved inwards.	X	X	X	X	X					
Congested	Densely crowded; with almost no intervening spaces. Compare 'crowded' which is less dense.					X					
Conic	Cone-shaped; tapering evenly from a circular base to an acute apex. Length/diameter ratio of the basic shape: 2:1 to 1,5:1. The conic series also includes 'deltoid', with a more specific length/diameter ratio. Compare 'triangular' which applies to two-dimensional shape and 'obconic' which narrows towards the base.				X						

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Cuneiform	See 'obconic'				x						
Cup-Shaped	With a tube which is rounded basally and which does not diverge distally. Compare 'campanulate' which diverges distally and 'funnel-shaped' which is not rounded basally.				x						
Cuspidate	Terminating in a short rigid point, or cusp, which is both vascular and laminar in nature. Applies to the most distal part of the apex (tip). Compare 'mucronate' which is only vascular, 'apiculate' where the point is not rigid and 'pungent' where the point is long and rigid.			x							
Cylindric	Solid, long and narrow with an even diameter, circular in transverse section. Compare 'tubular' which is hollow.				x						
Decumbent	Growing horizontally on the ground but with the apical parts ascending. Compare 'prostrate' where the apical parts do not ascend.					x					
Decurrent	Running downwards; [with the base of the leaf blade prolonged downwards onto the stem as a wing. Applies to the base of a leaf blade.] ASL also used for vegetative bud supports in plum – this must be part of the stem I think.		x			?	?				
Deflexed	See 'reflexed'.					x					
Deltate	More or less equilaterally triangular; narrowing towards the apex, that is away from the point of attachment. Length/width ratio of the basic shape: 1:1, same as 'very broad triangular'. Forms part of the 'triangular' series. Compare 'deltoid' which applies to three-dimensional shape, also compare 'obtriangular' and 'obdeltate' which narrow towards the base.	x									
Deltoid	More or less equilaterally cone-shaped; tapering evenly from a circular base to an acute apex. Length/diameter ratio of the basic shape: 1:1, same as 'very broad conic'. Forms part of the 'conic' series. Compare 'deltate' which applies to two-dimensional shape and 'obdeltoid' which narrows towards the base.				x						
Dense (Density)	Numerous per unit area, as opposed to sparse.					x					
Dentate	With sharp teeth pointed outwards. The two sides of a tooth are the same length. Compare 'denticulate' which is finer, 'crenate' where the teeth are rounded and 'serrate' where the teeth point towards the apex.						x				

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Denticulate							x				III, 3.4
Depressed	<p>Sunken, as if pressed into the middle from above or from above and below, causing a concavity. Compare ‘compressed’.</p> <p>EB: The published definitions seem to use ‘compressed’ and ‘depressed’ in a wider sense than we do. We don’t use ‘depressed’ for ‘flattened’, as in an obloid fruit.</p> <p>ASL Could say it was for plant parts e.g. base of a fruit and not for whole parts e.g. whole fruit</p>					x					
Descending, Downwards	Growing or orientated gradually downwards in relation to soil level or to other plant parts.					x					
Diffuse	With plant parts e.g. petals spreading widely, or with branches spreading widely and frequently branching. Compare ‘divergent’, spreading at almost right angles to the main axis.					x					
Distal, Apical, Terminal	<p>Located at the apex, furthest from the position of attachment. Compare ‘proximal’, ‘basal’ which is closest to the position of attachment.</p> <p>EB: Which term is preferred?</p> <p>ASL Apical</p>					x					
Distinct	Used for plant parts which are separate from one another but not to be used in this regard for UPOV purposes. This term is reserved for ‘distinctness’ in the DUS Test.										
Divaricate	<p>With branches spreading widely, at almost right angles to the main axis. Comment: ‘divaricate’ applies more specifically to the growth habit while ‘divergent’ applies to the direction of the branches. ‘A divaricate plant would have divergent branches.</p> <p>EB: Is this correct?</p> <p>CB 2005: Page 55 2.1.1.3 Divaricate, having branches at wide, variable angles and interangled. Divaricate is about habit where divergent is about angles, branching. also 2.2.26</p> <p>ASL Divaricate seems to be ‘widely spreading, greatly divergent’ Divergent is spreading away from each other. Presumably branches could be widely spreading but not away from each other.</p> <p>EB: I agree that divaricate is about the habit and divergent is about the direction of the branches.</p>					x					

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Divergent	With plant parts, specifically branches, spreading at almost right angles to the main axis. Compare 'diffuse' and 'divaricate'. 'Divaricate' applies more specifically to the growth habit while 'divergent' applies to the direction of the branches. 'A divaricate plant would have divergent branches. EB: Is this correct? CB 2005: Page 55 2.1.1.3 Divaricate, having branches at wide, variable angles and intertangled. Divaricate is about habit where divergent is about angles, branching. also 2.2.26					X					
Dorsal	The lower, outer or abaxial side in relation to the axis. Compare 'ventral'.					X					
Downwards	See 'descending'.					X					
Drooping	With branches bending downwards. Compare 'weeping' where the downward bending is more pronounced. Also used for attitude of plant parts.					X					
Drooping	Bending downwards. Compare 'pendulous' which is hanging, rather than bending downwards. Also used for growth habit.					X					
Dwarfed (Dwarf)	A plant or part of a plant of which the growth is suppressed, leading to a much reduced size compared to the average of its kind.					X					
Ellipsoid	A three-dimensional ellipse; broadest at the middle, with margins tapering convexly and evenly to either end. Length/diameter ratio of the basic shape: 2:1 to 1,5:1. The 'ellipsoid' series also includes 'spheric' and 'obloid', differing only in their length/diameter ratios. Compare 'elliptic', 'circular' and 'oblate' which apply to two-dimensional shapes.				X						
Elliptic	Ellipse-shaped; broadest at the middle, the margins tapering convexly and evenly to either end. Length/width ratio of the basic shape: 2:1 to 1,5:1. The elliptic series also includes 'circular' and 'oblate', differing only in their length/width ratios.	X									
Emarginate	Notched; with an acute, deep, central sinus. Applies to the apex. Compare 'retuse' and 'obcordate'.			X							
Entire	With an undivided margin; not toothed or lobed.						X				

<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Epiphytic (Epiphyte)	A plant growing on another plant, supported by the host, but not depending on it for food or water. Compare ‘parasite’.					X					
Equilateral	With sides or halves of equal shape and/or size. Compare ‘inequilateral’.	X	X	X	X	X					
Erect	Vertical in relation to the ground or perpendicular to the surface where the plant part is attached. For UPOV purposes ‘erect’ is used for plant parts only (attitude) and not for the whole plant (habit). The term to be used for plant habit is ‘upright’.					X					
Erode	Gnawed; with an irregularly toothed margin, as if chewed.						X				
Even	Smooth; opposite of rough. For internal texture characteristics the term ‘fine’ is used.								X		
Exserted	Extending beyond the surrounding parts, e.g. stamens sticking out beyond the corolla. Compare ‘included’.					X					
Falcate	Sickle-shaped; strongly curved sideways.	X									
Farinaceous (Farinose)	Mealy; with a whitish, powdery covering. Compare ‘granular’.								X		
<i>Fasciated</i>	With stems fused together and congested lengthwise, malformed and flattened; e.g. stems of pea.					X					
Fastigate	Strongly upright, with a narrow crown, the branches virtually erect, parallel and adpressed. Applies to trees. Compare ‘columnar’ of which the branch development is suppressed.					X					
Felted	See ‘pannose’.							X			
Fibrous	With tough strands.								X		
Filiform	‘Thread-like’.				X						
Fimbriate	Bearing a marginal fringe of hair-like appendages extending not only from the epidermis but from the deeper layers as well. Compare ‘ciliate’ which arises from the epidermis only.						X	X			
Fine	Not textured; smooth, opposite of ‘rough’. For surface characteristics the term ‘smooth’ or ‘even’ is used.								X		

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Fleshy	Pulpy; succulent but firm, easy to cut.								X		
Flexuous	Resiliently bendable, like a whip. EB: Is this correct? CB 2005: Page 46 2.6.7 Flexuous may be better defined as bending or curving in alternating and opposite directions. I think this is in the wrong place as stems can be flexuous. EB 2005: Stems can also be rigid, so perhaps we should divide this section in two: one for internal texture and one for resilience. ASL can it also be wavy?								X		
Floccose	Covered by the general term “hair” in the Test Guidelines. With tufts of long, soft hairs, usually rubbing off easily.’							X			
Form	in the UPOV Test Guidelines, the term “shape” should be used in its broadest sense and the use of terms such as “form” and “profile” should be avoided to minimize discrepancies in translation	X	X	X	X	X	X	X			
Free	Separate from one another; not joined.					X	X				
Funnel-Shaped (Infundibular)	With an obconic tube gradually diverging distally. Compare ‘campanulate’ and ‘cup-shaped’ which are rounded basally.				X						
Fusiform	Spindle-shaped; long and narrow, circular in transverse section, thick in the middle and tapering to both ends.				X						
Glabrate	Almost hairless.							X	X		
Glabrescent	Becoming hairless with age.							X	X		
Glabrous	Hairless.							X	X		
Glabrous	Bald; without trichomes, smooth, hairless.							X	X		
Glandular	Bearing glands; with stalked or sessile glands.							X	X		
Glandular	With short-stalked or sessile glands or with hairs bearing glands at their tips.							X			

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Globose (spheric)	Ball-shaped; round in outline when viewed from any angle.				X						
Granular (Grainy)	Covered with small granules or grains. Compare 'farinaceous'.							X	X		
Grooved	With one or more narrow channels								X		
Hastate	Arrow-shaped; with two equal, more or less triangular lobes directed outwards to either side. Applies to the base of a leaf blade. Compare 'auriculate' with rounded lobes directed outwards, 'sagittate' with triangular lobes directed downwards and 'hastiform' which applies to full plane shape.		X								
Hastiform	Arrowhead-shaped; gradually enlarged basally from an acute apex, but with two widely divergent basal lobes, directed outwards. Compare 'hastate' which applies to the base and 'sagittate' of which the lobes are directed downwards.	X									
Herbaceous (Herb)	Plant with soft, non-woody stems, of which the above-ground parts die back after the growing season, or, more generally, any non-woody plant.					X					
Hirsute	Covered by the general term "hair" in the Test Guidelines. With long, more or less erect, coarse, stiff trichomes. Compare 'setose' which is spiny to the touch and 'hispid' which is coarser. EB: I could not find clear differences between 'hirsute' and 'hispid', except that 'hirsute' seems to be somewhat finer. ASL I think hairs are rough and coarse but do not have to be stiff.							X			
Hispid	Covered by the general term "hair" in the Test Guidelines. With stiff, bristly trichomes; harsh to the touch. Compare 'setose' which is spiny to the touch, 'hirsute' which is somewhat finer and 'scabrous' which is also harsh to the touch.							X			

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Oblanceolate	Inversely lanceolate; broadest towards the apex, that is furthest from the point of attachment. Length/width ratio 6:1 to 3:1, same as 'narrow obovate'. Forms part of the 'obovate' series.	X									
Oblate	Transverse elliptic; ellipse shaped but shorter than broad, broadest at the middle, with margins tapering convexly and evenly to the base and apex, the longest dimension orientated transversely. Length/width ratio of the basic shape:1:1,5 to 1:2. Forms part of the 'elliptic' series.	X									
Oblique	Oblique to symmetry	X	X	X	X	X					
Oblique	Orientated at an angle other than 90 degrees to or parallel to the longitudinal axis. Applies to the base, apex, two-dimensional outline, position and attitude in relation to plant parts. In some cases the term refers to the shape or symmetry of a plant part, while in others it refers to the position.	X	X	X	X	X					
Oblique	Orientation of plant part: Orientated at an angle other than 90 degrees to or parallel to the longitudinal axis. Shape of plant part: Inequilateral; bilaterally asymmetric. Applies to the base, apex, two-dimensional outline, position and attitude in relation to plant parts.	X	X	X	X	X					
Obloid	Transverse ellipsoid; shorter than broad, broadest at the middle with margins tapering convexly and evenly to the base and apex, the longest dimension orientated transversely. Length/width ratio of the basic shape: 1:1,5 to 1:2. Forms part of the 'ellipsoid' series.				X						
Oblong	Approximately rectangular, with more or less parallel sides terminating obtusely at both ends; four-sided with opposite sides parallel and all angles approximately 90 degrees. Length/width ratio of the basic shape: 2:1 to 1,5. The 'oblong' series also includes 'square' and 'linear', differing only in their length/width ratios, 'square' having the same dimension in both its length and its width.	X									
Oblong	With more or less parallel sides terminating obtusely at the base and apex, circular in transverse section. Length/diameter ratio of the basic shape: 2:1 to 1,5:1. Applies to two- and three-dimensional shape. The 'oblong' series also includes	X			X						

<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Obovate	Inversely ovate; broadest above the middle, that is towards the apex. Length/width ratio of the basic shape: 2:1 to 1,5:1. Compare the ‘ovate’ series which is broadest towards the base and ‘obovoid’ which applies to three-dimensional shape.	x									
Obovoid	Inversely ovoid; broadest above the middle, that is towards the apex. Length/width ratio of the basic shape: 2:1 to 1,5:1. Compare the ‘ovoid’ series which is broadest towards the base and ‘obovate’ which applies to two-dimensional shape.				x						
Obtriangular	Inversely triangular; with three more or less straight sides, broadest at the apex and narrowing towards the point of attachment. Length/width ratio of the basic shape: 2:1 to 1,5:1. The ‘obtriangular’ series also includes ‘obdeltate’, with a more specific length/width ratio. Compare ‘triangular’ which is broadest at the base and ‘obconic’ which applies to three-dimensional shape.	x									
Obtrullate	Inversely trullate; broadest above the middle and tapering towards the basal and apical ends, the lateral margins more or less straight but angled at the position of greatest width. Length/width ratio of the basic shape: 2:1 to 1,5:1. Compare the ‘obovate’ series which is less angular, and the ‘rhombic’ series which is broadest at the middle.	x									
Obtuse	With straight to convex margins terminating in a blunt tip at an angle of 90 ° or more. Applies to the apex, base, etc. Compare ‘acute’ where the angle is <90 °. In cases where it is useful to distinguish between ‘narrow obtuse’ and ‘broad obtuse’, one should remember that they should both still be >90 °.		x	x		x					
Orbicular	The term ‘circular’, of which ‘orbicular’ is a synonym, is preferred for UPOV use.	x									
Outwards	Term used by UPOV for a plant part/ plant parts facing outwards in relation to the whole plant or in relation to other relevant plant parts, e.g. the corolla facing outwards in relation to the longitudinal axis of the flower. Compare ‘inwards’.					x					

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Ovate	Chicken-egg-shaped; broadest below the middle, that is towards the point of attachment, the margin entirely convex, although the apex may be either rounded or pointed. Length/width ratio of the basic shape: 2:1 to 1,5:1. Compare the ‘obovate’ series which is broadest towards the apex and ‘ovoid’ which applies to three-dimensional shape.	X									
Ovoid	Chicken-egg-shaped; broadest below the middle, that is towards the base, entirely convex, although the apex may be either rounded or pointed. Length/width ratio of the basic shape: 2:1 to 1,5:1. Compare the ‘obovoid’ series which is broadest towards the apex and ‘ovate’ which applies to two-dimensional shape.				X						
Pannose	Covered by the general term “hair” in the Test Guidelines. Felted; densely covered with short, matted, intertwined hairs.’ Compare ‘tomentose’ which is less matted. EB: Some references have drawings with branched hairs – so they’re not trichomes (trichomes are unbranched if I’m correct). ASL My definitions say trichomes are ‘any hair like growths, glandular or eglandular from the epidermis’ they do not mention branching so one assumes that a branched hair from the epidermis could be called a trichome.							X			
Papillose	Pimpled, with small, rounded, soft to firm, unequal bumps. Compare ‘bullate’ which has flatter, blister-like convexities.							X	X		
Papyraceous, Papery	With the consistency of paper; thin and somewhat opaque. Compare ‘membranous’ which is more transparent.								X		
Parasitic (Parasite)	An organism at least partly dependent on another organism (the host) for its food and water. Compare ‘epiphyte’.					X					
Pear-shaped	See ‘pyriform’.				X						
Pedicelled (Pedicellate)	An individual flower or fruit borne on a stalk.					X					
Peltate	Shield-shaped; applies to a stalked plant part, normally circular in shape and with the stalk attached at or near the center of the lower surface.				X	X					

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Pendent	Hanging downwards due to its own weight. Compare ‘pendulous’. Compare ‘drooping’ and ‘weeping’, which are ‘bending downwards’, ‘weeping’ being more pronounced than ‘drooping’.					X					
Pendulous	Hanging downwards, due to the weakness of its support. Compare ‘pendent’.					X					
Perpendicular	At right angle to another plant part.					X					
Pilose	Covered by the general term “hair” in the Test Guidelines. With long, soft, sparse, slender trichomes. Compare ‘villous’ which is more shaggy.							X			
Pointed	A general term for a base or apex which can be ‘acute’ (<90°) or ‘obtuse’(>90°). For the base, the term cuneate may be used instead of ‘pointed’.		X	X							
Pointed	A general term for a base or apex, etc. with straight or slightly convex margins terminating in a sharp or blunt tip. Compare ‘acute’ (<90°), obtuse (>90°).		X	X							
Prickly	<p>With sharp-pointed outgrowths from the superficial layers, e.g. the bark or epidermis, containing no conducting tissue. Applies to surface and margins, although a prickly margin is normally referred to as ‘aculeate’. Compare ‘spinose’ and ‘thorny’.</p> <p>EB: This does not agree totally with TWF/35/11 par. 43. I checked various publications and the main difference seems to be that prickles are from the epidermal layers only whereas spines and thorns are from the deeper layers as well.</p> <p>CB 2005: Page 45 2.5 The use of prickle, spine and thorn are often confused and misunderstood. For the Blackberry guideline revision I have concluded the following. Spine: tough, usually woody structure, exogenous, contains vascular tissue and has a sharp point found on the leaf, stem and root. Prickle: a type of small spine found usually on a leaf. A prickle is not in a leaf axil, subtending a bud, lacks vascular tissue and is exogenous. Thorn: a type of spine, usually of larger size, sharp pointed, hard outgrowth from stem wood. Could be added to 2.5 as 2.5.4-6</p> <p>ASL There does not appear to be any consistency in the literature. I have looked at two recent publications – both have spines related to leaves but prickles are woody and develop from both the epidermal and sub epidermal layers. (The opposite from the above)</p> <p>The best thing would be to agree on a UPOV definition and say this is what we are going to use.</p> <p>EB: I agree – to decide what we want to use.</p>							X			
Prickly	See ‘aculeate’.							X			

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Procumbent	Growing flat on the ground but not rooting at the nodes. Compare 'stoloniferous' rooting at the nodes.					X					
Profile	In the UPOV Test Guidelines, the term "shape" should be used in its broadest sense and the use of terms such as "form" and "profile" should be avoided to minimize discrepancies in translation	X	X	X	X	X	X	X			
Prominent	Standing out clearly from the surrounding surface, e.g. veins raised on the abaxial side of a leaf. Compare 'conspicuous', which is 'clearly visible'.								X		
Prostrate	Growing flat on the ground. Compare 'procumbent' (not rooting at the nodes) and 'stoloniferous' (rooting at the nodes or tips), both more specific types of prostrate. Also compare 'decumbent' of which the apical parts ascend.					X					
Proximal, Basal	Located at the base, closest to the position of attachment. Compare 'apical', 'distal', 'terminal'. EB: Which term is preferred? CB 2005: Page 63 2.2.42 Would prefer basal					X					
Pubescent	The terms 'pubescent'/'pubescence' are synonymous with 'hairy'/'hairiness' for the purposes of Test Guidelines.							X		III, 2.4	III, 3.5
Pungent	Terminating in a long, rigid, sharp point which is both vascular and laminar in nature. Applies to the most distal part of the apex (tip). Compare 'cuspidate' where the point is shorter.			X							
Pyriform	Pear-shaped; obovoid with a contraction towards the base.				X						
Quadrangular	Rectangular; four-sided with opposite sides parallel and all angles approximately 90 degrees. The term 'oblong' is preferred for UPOV use.	X									
Ramified	Branched. ASL Applies to all branched forms not just as shown in the drawing. EB: I agree. How to improve the drawing?					X					
Reclining	With branches gradually curving downwards from an erect position, the distal parts lying on the ground.					X					

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Semi-erect	Standing up at more or less 45 degrees in relation to the ground or to the surface where the plant part is attached. For UPOV purposes ‘semi-erect’ is used for plant parts only (attitude) and not for the whole plant (habit). The term to be used for plant habit is ‘semi-upright’.					x					
Semi-upright	Half-upright; between ‘upright’ and ‘spreading’, not as tall and narrow as ‘upright’ and not as wide as ‘spreading’. For UPOV purposes ‘semi-upright’ is used for the whole plant only (habit) and not for plant parts (attitude). The term to be used for plant parts is ‘semi-erect’.					x					
Sericeous	Silky; with fine, long, adpressed trichomes.							x			
Serrate	With sharp teeth pointed forwards, towards the apex. The front side of a tooth is shorter than the back. Compare ‘crenate’ where the teeth are rounded and ‘dentate’ where the teeth point outwards.						x				
Serrulate							x				III, 3.4
Sessile	Stalkless; attached directly to the supporting plant part. Compare ‘stalked’ and ‘pedicelled’.					x					
Setose, Setaceous	Covered by the general term “hair” in the Test Guidelines. Bristly; with long, erect, sharply pointed, rigid trichomes. Spiny to the touch. Compare ‘hispid’ which is harsh to the touch and ‘strigose’ with adpressed trichomes.							x			
Shape	In the UPOV Test Guidelines, the term “shape” should be used in its broadest sense and the use of terms such as “form” and “profile” should be avoided to minimize discrepancies in translation	x	x	x	x	x	x	x			
Sheathing	Surrounding a plant part and resembling a tube; e.g. the leaf base of a grass surrounding the stem.				x						
Sheathing	Enclosing; e.g. a leaf base enclosing the stem.				x	x					
Shrubby (Shrub)	Woody perennial with multiple stems arising from ground level.					x					

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Sinuate	<p>Alternatively concave and convex in the plane of the organ; wavy. Compare ‘repand’ which is shallowly ‘sinuate’ and ‘undulate’ which is wavy perpendicular to the plane of the plant part. Comment: When e.g. a leaf is more deeply incised so as not to only affect the margin, it is lobed. This is handled under the section ‘Division’.</p> <p><i>EB: To check the above comment.</i></p> <p>CB 2005: Page 51 2.18 Yes, comment is useful. We must not confuse margin terms with leaf divisions. It is possible to have a crenate margin on the lobe of a divided leaf. As stated the size of the marginal incision is significant and beyond a certain point it is no longer the margin that is divided but the whole leaf. A guide could be if the incision is more than half the distance between the margin and the midrib, then the leaf is divided, not just the margin. We need to discuss this.</p> <p><i>ASL</i> As I understand – the blade of the leaf is flat but the margin winds strongly inward and outwards</p> <p><i>EB: I agree. Is the definition OK? ASL</i> As sinuate but the margin winds up and down</p>						X				
Smooth	Even; opposite of rough. For internal texture characteristics the term ‘fine’ is used.								X		
Sparse (Density)	<p>Few per unit area, as opposed to ‘dense’.</p> <p>CB 2005: Page 64 2.2.45 Should we mention here the use of open instead of sparse for plant density?</p> <p>EB 2005: I agree. The plant is open and the branches are sparse. OK?</p>					X					
Spathulate	See ‘spatulate’.	X									
Spatulate (Spathulate)	Spoon-shaped; attenuate at the base and rounded at the apex. Compare ‘clawed’ (‘unguiculate’) which narrows more abruptly towards the base.	X									
Spheric	See ‘Globose’				X						

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Spine	A rigid, sharply pointed modified organ or part of an organ e.g. a modified stem or reduced branch, leaf, stipule, etc. Contains superficial as well as deeper layers. Compare ‘prickle’ which arises from the superficial layers only and ‘thorn’ which can be used synonymously to ‘spine’ but normally applies to modified stems only. CB 2005: Page 45 2.5 The use of prickle, spine and thorn are often confused and misunderstood. For the Blackberry guideline revision I have concluded the following. Spine: tough, usually woody structure, exogenous, contains vascular tissue and has a sharp point found on the leaf, stem and root. Prickle: a type of small spine found usually on a leaf. A prickle is not in a leaf axil, subtending a bud, lacks vascular tissue and is exogenous. Thorn: a type of spine, usually of larger size, sharp pointed, hard outgrowth from stem wood. Could be added to 2.5 as 2.5.4-6							X			
Spinose (Spiny, Thorny)	Bearing spines; with stiff, sharp projections from the superficial and deeper layers of the plant part. Compare ‘aculeate’ (only from the superficial layers).							X			
Spiral	Corkscrew-shaped; the circumference even or diminishing.				X						
Spreading	With branches directed outwards; wider than in ‘upright’. Also applies to plant parts.					X					
Spreading	Directed outwards; e.g. branches diverging. Also applies to growth habit.					X					
Spur Type	Plant habit in which the shoot internodes are very short. Found in some fruit varieties.					X					
Squamose (Scurfy)	Scaly; with minute adpressed scales.								X		
Square	Equilaterally quadrangular or rectangular; with the length and the width having the same dimensions. Length/width ratio 1:1. Forms part of the ‘oblong’ series.	X									
Stalked (Stipitate)	Attached to the supporting plant by a stalk. Compare ‘sessile’ and ‘pedicelled’.					X					
Stance	To use ‘attitude’, not ‘stance’.					X					
Star-shaped	See ‘stellate’	X									
Stellate	Star-shaped: with several points radiating from the centre				X						

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Stipitate	See 'stalked'.					X					
Stoloniferous	Bearing prostrate stems rooting at the nodes or at the tips, producing new plants. Compare 'procumbent' not rooting at the nodes.					X					
Striate	Finely striped; with more or less parallel lines of a different color, or grooves or ridges. Compare 'aciculate' (needle scratches in different directions).							X			
Strigose	Covered by the general term "hair" in the Test Guidelines. With stiff, sharp, coarse, adpressed, bristly trichomes, often swollen at the base. Compare 'setose' with erect trichomes.							X			
Subulate	Awl-shaped; tapering from a narrow base to a fine, sharp point.	X									
Symmetric	Being capable of median division into two equal halves, at least along the longitudinal axis. Compare 'asymmetric', 'actinomorphic'.	X	X	X	X	X					
Sympetalous	With petals fused, at least partly, into a corolla tube. Compare 'apopetalous'.					X					
Terete	Long and slender, tapering towards the apex, circular in transverse section.				X						
Terminal, Apical, Distal	Located at the apex, furthest from the position of attachment. Compare 'basal', 'proximal', closest to the position of attachment. EB: Which term is preferred? CB 2005: Page 64 2.2.50 Would prefer distal			X		X					
Thorn	A rigid, sharply pointed modified organ or part of an organ, normally a modified stem. Contains superficial as well as deeper layers. Compare 'prickle' which arises from the superficial layers only and 'spine' which can be used synonymously to 'thorn' but may apply to other modified organs as well, e.g. a leaf or stipule, etc. CB 2005: Page 45 2.5 The use of prickle, spine and thorn are often confused and misunderstood. For the Blackberry guideline revision I have concluded the following. Spine: tough, usually woody structure, exogenous, contains vascular tissue and has a sharp point found on the leaf, stem and root. Prickle: a type of small spine found usually on a leaf. A prickle is not in a leaf axil, subtending a bud, lacks vascular tissue and is exogenous. Thorn: a type of spine, usually of larger size, sharp pointed, hard outgrowth from stem wood. Could be added to 2.5 as 2.5.4-.6							X			
Thorny	See 'spinose'.							X			

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Tip	See Part II, Section 2.4									II, 2.4	II, 3.3.2
Tip	See Part II, Section 2.4									II, 2.4	II, 3.3.2
Tomentose	Covered by the general term “hair” in the Test Guidelines. Densely woolly; with short, matted, interwoven trichomes. ‘Densely and softly matted-lanate.’ Compare ‘pannose’ which is even denser and more matted (felted) and compare ‘lanate’ with longer, less matted hairs.							x			
Top	To be used in relation to soil level. Compare ‘tip’ and ‘apex’.			x		x					
Transverse	Perpendicular to the longitudinal axis, i.e. at right angle to the axis extending through the base and the apex, whether or not this is the longest axis. Compare ‘longitudinal’.					x					
Trapezoidal		x									
Tree-like (Tree)	See ‘arborescent’.					x					
Triangular	With three more or less straight sides, broadening towards the base, that is towards the point of attachment. Length/width ratio of the basic shape: 2:1 to 1,5:1. The triangular series also includes ‘deltate’, with a more specific length/width ratio. Compare ‘obtriangular’ which is broadest towards the apex and ‘conic’ which applies to three-dimensional shape.	x									
Trichome	Unbranched hair-like outgrowth from the epidermis. <u>ASL</u> add with or without glands? EB: We could add that. <u>ASL</u> My definitions say trichomes are ‘any hair like growths, glandular or eglandular from the epidermis’ they do not mention branching so one assumes that a branched hair from the epidermis could be called a trichome.							x			
Trullate	Broadest below the middle and tapering towards the basal and apical end, the lateral margins more or less straight but angled at the position of greatest width. Length/width ratio of the basic shape: 2:1 to 1,5:1. Compare the ‘ovate’ series which is less angular, and the ‘rhombic’ series which is broadest at the middle.	x									
Truncate	With the base (apex) abruptly terminated in a straight, transverse, basal (distal) margin, as if cut off. Applies to the base and apex.		x	x							

Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Tubular	Hollow, long and narrow with an even diameter, circular in transverse section. Compare ‘cylindric’, which is solid.				X						
Twining	Climbing by coiling around a support.					X					
Undulate	Wavy perpendicular to the plane of the plant part. Compare ‘repand’ and ‘sinuate’ which are wavy in the plane of the plant part. ASL As sinuate but the margin winds up and down EB: I agree. Is the definition OK?					X	X				
Unguiculate	See ‘clawed’.	X									
Upright	General term used for tall and narrow plants. More specifically, ‘fastigiate’ may be used if the branches are virtually erect and parallel to the main stem, and ‘columnar’ if the branch development is suppressed. For UPOV purposes ‘upright’ is used for the whole plant only (habit) and not for plant parts (attitude). The term to be used for plant parts is ‘erect’.					X					
Upwards	See ‘ascending’.					X					
Urceolate	Pitcher-shaped; with a tube that is very wide at the base, narrowing towards the apex, and strongly constricted at or below the mouth. Applies to the corolla.				X						
Velutinous	Covered by the general term “hair” in the Test Guidelines. Velvety; with long, dense, straight trichomes. Compare ‘tomentose’ with interwoven trichomes.							X			
Ventral	The upper, inner or adaxial side in relation to the axis. Compare ‘dorsal’.					X					
Verrucose	Warty; with more or less irregularly shaped wart-like elevations. Compare ‘bullate’, where the convexities are blister-like.							X			
Vertical	Upright in relation to the ground. To be used in relation to soil level, i.e. perpendicular to ‘horizontal’. ASL Add Wavy? EB: agree.					X					
Villous	Covered by the general term “hair” in the Test Guidelines. Shaggy; with long, slender, soft trichomes. Compare ‘pilose’ which is less shaggy.							X			

<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ¹	Illustrations ¹
Vine	Climbing or trailing plant with long, slender stems, not self-supporting.					X					
Viscid	Sticky or gummy. Compare 'resinous', in which case the stickiness is due to resin.							X			
Wart	See 'verrucose'							X			
Weeping	Bending downwards, the terminal parts hanging. Compare 'drooping' where downward bending is less pronounced.					X					
Wrinkled	With folds or creases; a general term. Compare 'corrugated' and 'rugose' where the wrinkling has a more specific nature.								X		
Zig-zag	With regular, angular, alternating changes of direction.					X					
Zygomorphic	Bilaterally symmetric, only along the longitudinal axis, e.g. flower of Fabaceae. Compare 'actinomorphic'.	X	X	X	X	X					

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