



TGP/14/1 Draft 7

SECTION 2: Botanical Terms

Subsection 1: Introduction;

Subsection 2: Shapes and Structures

ORIGINAL: English

DATE: December 8, 2008

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

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 2: Botanical Terms

Subsection 1: Introduction;
Subsection 2: Shapes and Structures

Document prepared by the Office of the Union

*to be considered by the Enlarged Editorial Committee at its meeting
to be held in Geneva, Switzerland, on January 8, 2009*

Note for Draft version

Strikethrough (highlighted) indicates deletion from the text presented to the Technical Committee (TC) at its forty-fourth session

Underlining (highlighted) indicates insertion to the text presented to the TC at its forty-fourth session

highlighted text indicates text which cannot yet be completed

Footnotes will be retained in published document

Endnotes are for background information when considering this draft and will not appear in the final, published document

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SUBSECTION 1. INTRODUCTION

The purpose of this document (TGP/14 Section 2: Botanical Terms) 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.

SUBSECTION 2. SHAPES AND STRUCTURES

I. SHAPE

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 point¹). 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:

¹ The term “broadest part” is used in preference to “widest point” in this document, because 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 (see Section 1.2(b)).

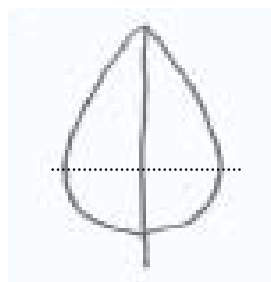
(a) Ratio length/width (or ratio width/length)

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

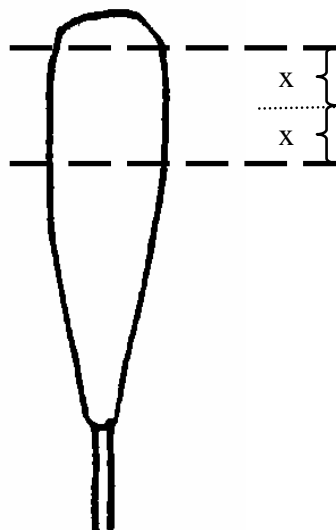
To ensure that the ratio length/width is clearly understood, it is recommended to use meaningful states such as “very elongated”, rather than states such as “very high”. To avoid confusion concerning the absolute dimensions, it is recommended to avoid the use of terms such as “narrow” and “broad” for ratio length/width, particularly where characteristics for the absolute dimensions are also included for the same plant part;

(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.

^a1.3 The apex (apical or distal part) of an organ or plant part is the end furthest from the point of attachment. The base (proximal part) of a plant part is the end nearest to the point of attachment. However, it should be noted that the illustrations of shapes in the Test Guidelines might not always be orientated with the point of attachment (base) at the bottom if that is not the natural orientation of the organ on the plant.

1.34 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 length/width (or ratio width/length): the ratio length/width 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].

1.45 The terms associated with certain length/width ratios used in the Chart for Simple Symmetric Plane Shapes are intended to illustrate the use of ratio length/width. Those terms are not necessarily appropriate for use in the Test Guidelines, because terms such as “narrow” and “broad” may be used in relation to the range of expression for the characteristic concerned. For example, if the range for the ratio length/width within a characteristic is from 2:1 to 1:1, then the ratio 2:1 may be indicated as “narrow” (not “medium” as indicated in the Chart for Simple Symmetric Plane Shapes) and the ratio 1:1 as “broad” (not “very broad” as indicated in the Chart for Simple Symmetric Plane Shapes).^b

Chart for Simple Symmetric Plane Shapes

ratio length/width	$b > 6:1$	6:1 to 3:1	2:1 to 1.5:1	1.2:1	1:1	1:1.2	1:1.5 to 1:2	1:3 to 1:6
		very elongated	moderately elongated	slightly elongated	medium	slightly compressed	moderately compressed	very compressed

Parallel set								
oblong								
					9	10	11	12
Rounded set								
ovate								
elliptic								
					5	6	7	8
obovate								
Angular set								
triangular								
				1	2	3		
trullate								
					2			
rhombic								
						4		
obtrullate								
obtriangular								
				13	14	15		

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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.)

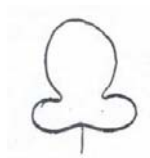
Rounded set: the lateral sides are rounded in a single, sweeping curve, without sudden changes of direction (The leaves of most of the dicotyledons belong in this group.)

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.

1.5 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 length/width (or 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.*]).



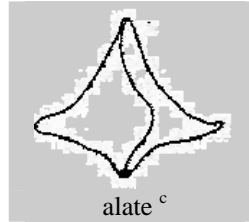
auriculiform



hastiform



sagittate



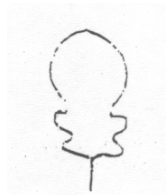
alate^c



trapezoidal



semi-elliptic



lyrate



cordiform



reniform



transverse 8 shape
(binocular shape?)



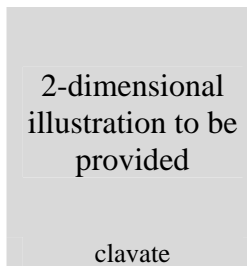
obcordiform



spatulate



clawed



2-dimensional
 illustration to be
 provided

clavate



stellate



acicular



subulate



falcate



lunate

The TWV agreed that it would be useful to consider developing a decision-tree, similar to that developed by Japan for color patterns in document TWV/42/3 Add.; Annex, for determining appropriate shape terms.

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 length/width (or 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 length/width (e.g. narrow elliptic, medium elliptic or broad elliptic), it is only necessary to have a characteristic “ratio length/width” (or ratio width/length). Similarly, if all the variation in shape between varieties in the variety collection is accounted for by ratio length/width 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 length/width” (or 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. Duplication of the same difference in two separate characteristics should be avoided: for example, the use of characteristics for both ratio length/width and for shape should be avoided where states of expression of the characteristic for shape relate to different length/width ratios.^d

2.1.2 In general, where shape characteristics are developed on the basis of the individual components above, 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 length/width (or 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 length/width for hastiform varieties.

2.1.3 Notwithstanding the difficulty in using a difference in Notes to establish distinctness for a pseudo-qualitative characteristic (see Section 1 [*cross ref.*]), it may be appropriate to develop a single pseudo-qualitative characteristic for shape. In such cases, it is important that the difference between the states of expression is indicated in an illustration. The illustration should, as far as possible, place the states with the least difference closest together, regardless of their notes, e.g. the illustrations for notes 1 and 5 might be positioned side-by-side and notes 2 and 4 might be further apart. Where the overall shape is presented as a single pseudo-qualitative characteristic, the order of states should be: primary order, broadest part below middle to broadest part above middle; secondary order, narrow to broad (high to low ratio length/width) (see Section 2.2, Example 5, Alternative 2).^e

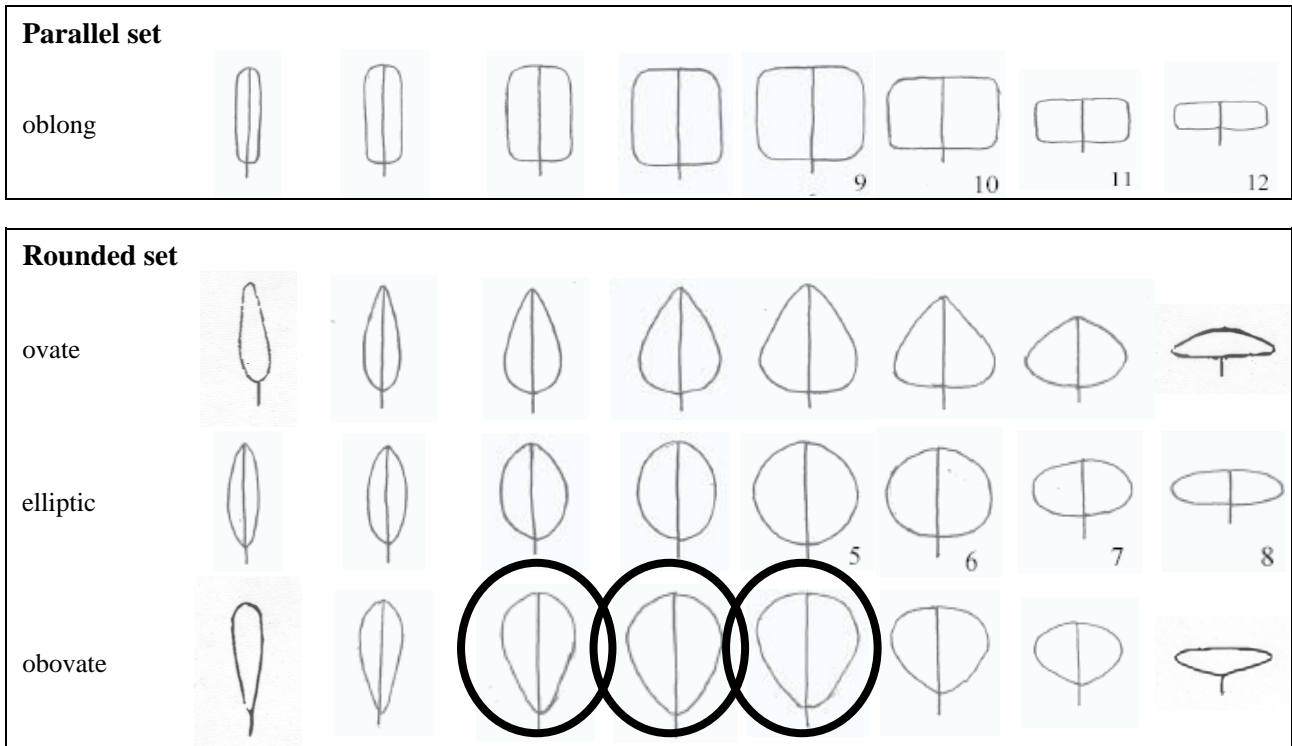
2.2 Full plane shape characteristics

The following illustrations provide examples of variation in full plane shape components (ratio length/width, position of broadest part and lateral outline) for the development of characteristics, either as characteristics for the individual components or as a single overall shape characteristic:

The TWA proposed to amend the examples to avoid an implication that particular shapes would have particular notes (e.g. ovate (1); elliptic (2); obovate (3)).
Office of the Union comment: possibly no change necessary because in Example 2 “ovate” has note 1; in Example 3 “narrow ovate” has note 2; in example 4 “ovate” has note 4, etc.

Example 1 (a circle indicates the shape of one or more varieties in the variety collection)

The only variation between varieties is found in the ratio length/width.



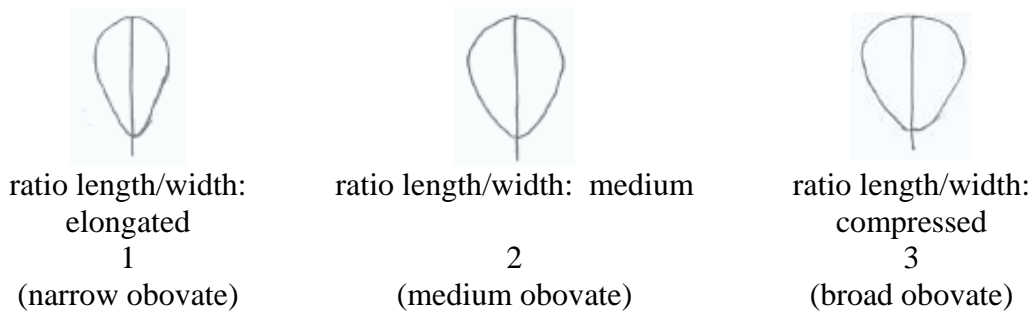
Possible characteristic(s) (Example 1)

Alternative 1

Plant [part]: ratio length/width (elongated to compressed) (QN)

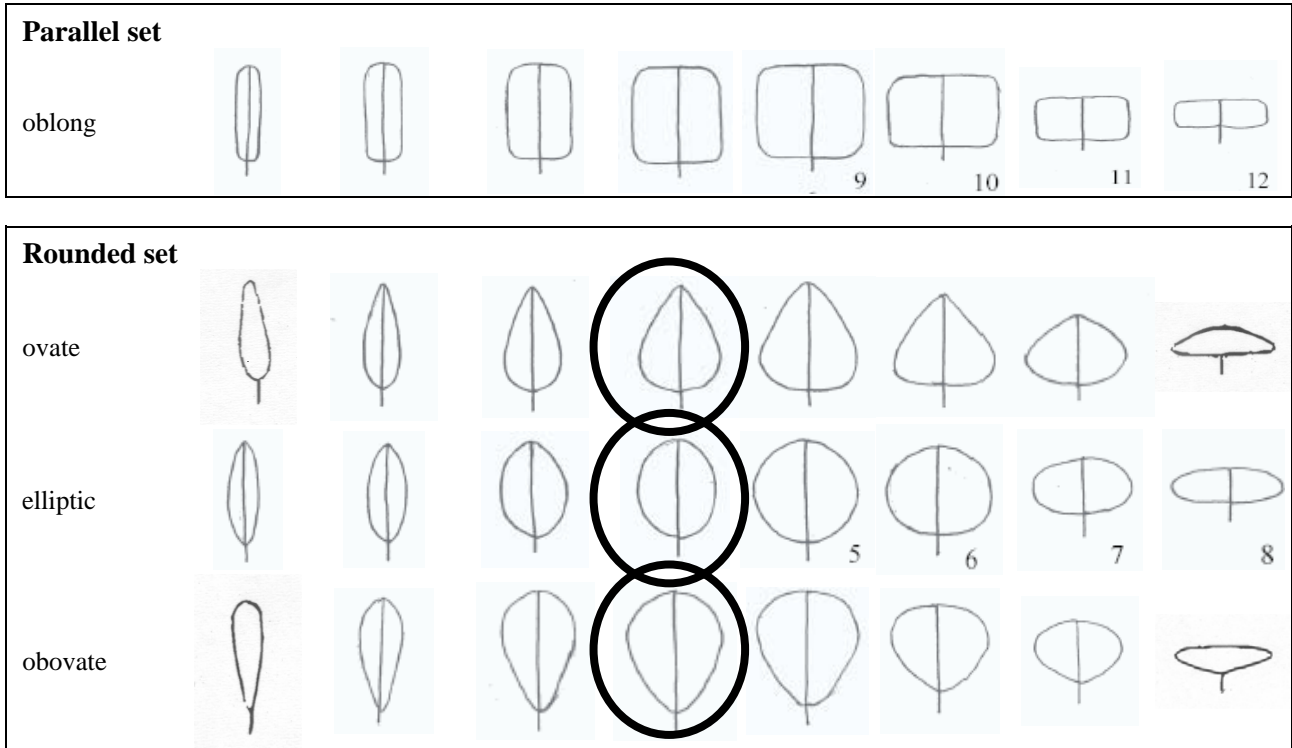
Alternative 2

*Plant [part]: shape (narrow obovate (1); medium obovate (2); broad obovate (3)) (QN)
 with the following illustration*



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.



Possible characteristic(s) (Example 2)

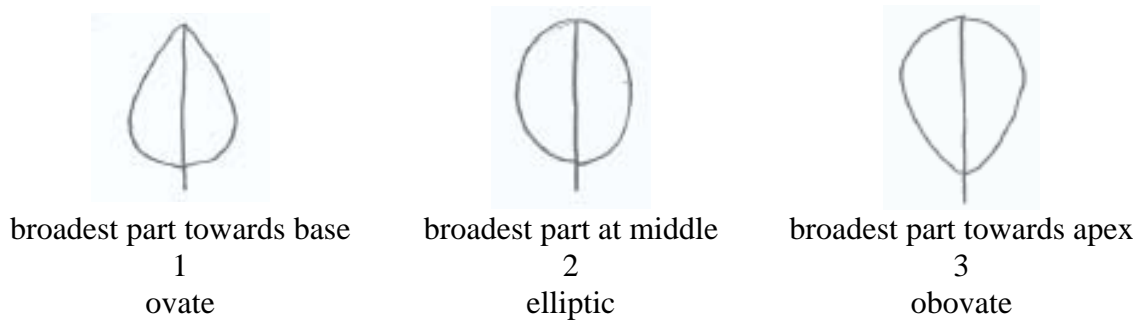
Alternative 1

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

Alternative 2

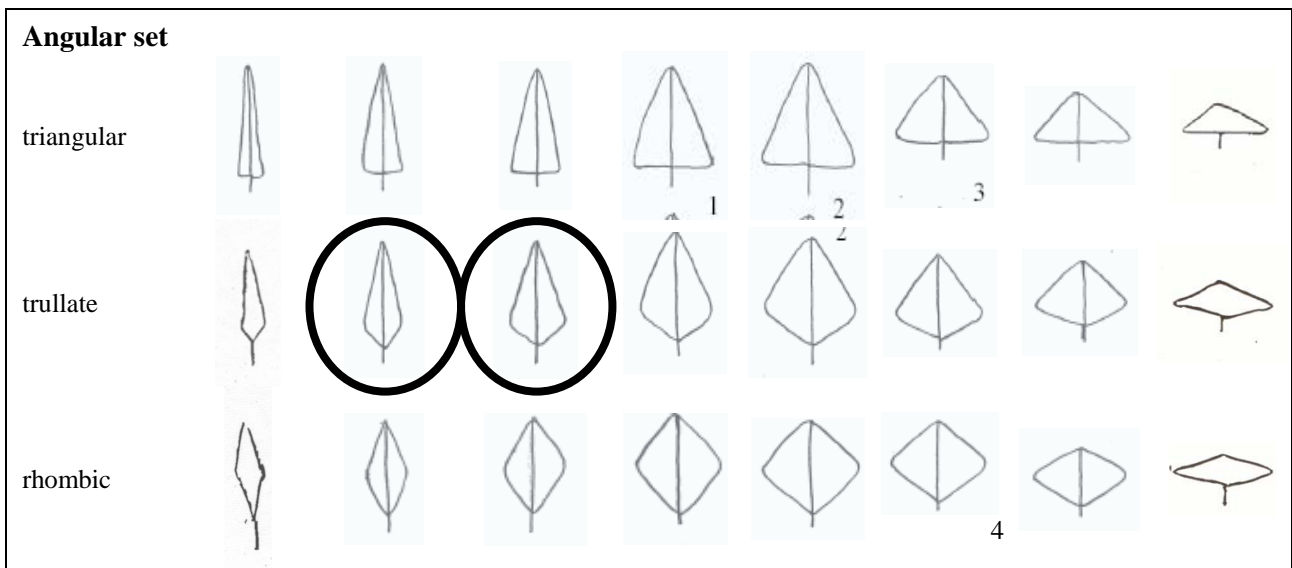
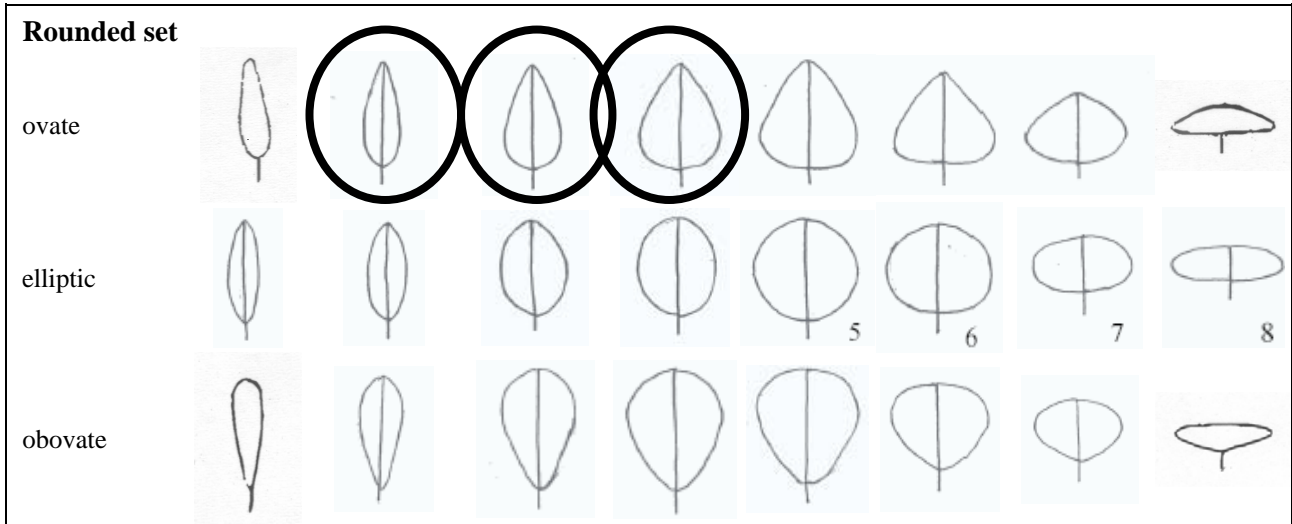
Plant [part]: shape (ovate (1); elliptic (2); obovate (3)) (QN)

with the following illustration



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

There is variation between varieties in the ratio length/width (or ratio width/length), the shape of the base and the lateral outline. The lateral outline varies between ovate and trullate.



Possible characteristic(s) (Example 3)

Alternative 1

Plant [part]: ratio length/width (elongated to compressed) (QN)

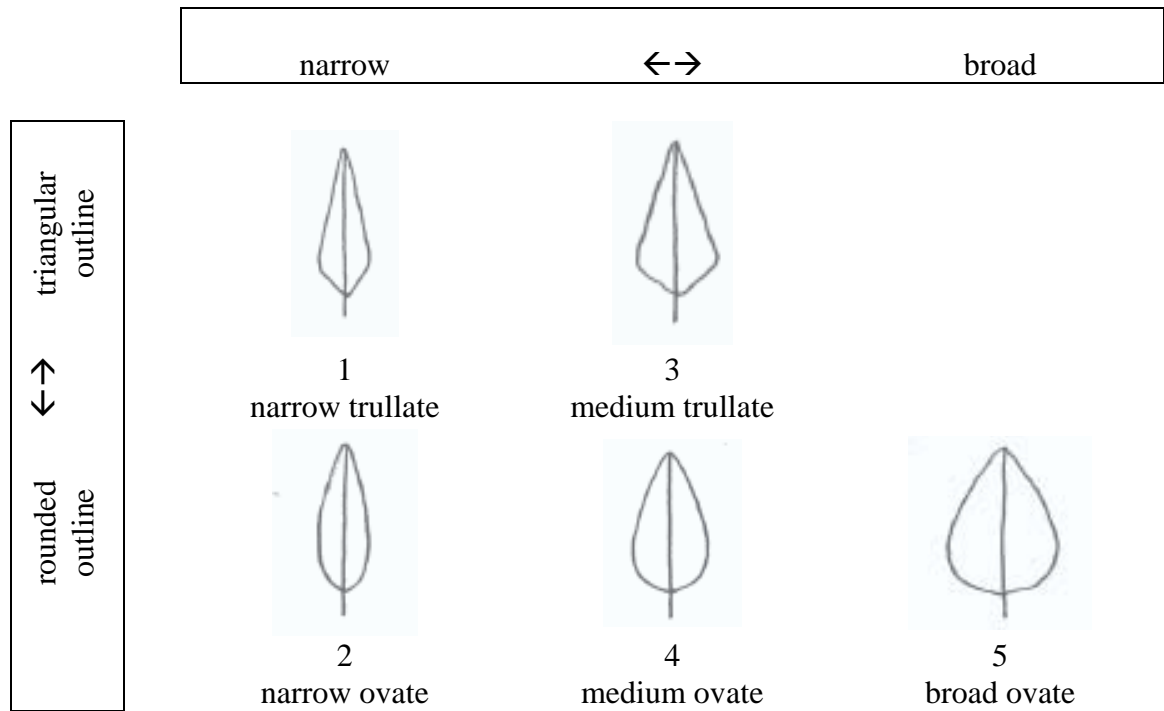
Plant [part]: shape of base (acute, obtuse, rounded) (PQ)

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

Alternative 2

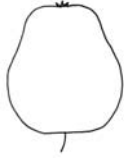
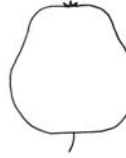

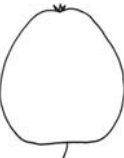


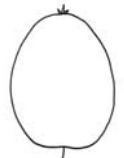
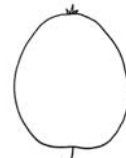

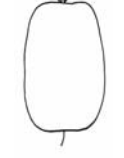
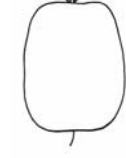

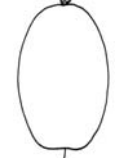
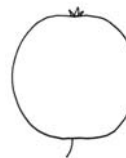
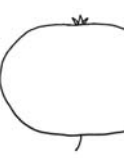
Plant [part]: shape (narrow trullate (1); narrow ovate (2); medium trullate (3); medium ovate (4); broad ovate (5)) (PQ)

with the following illustration



Example 4

There is variation between varieties in the ratio diameter/height, position of broadest part and the lateral outline in the apical half. The lateral outline varies between ovate and trullate.

		ratio diameter/height			
	lateral outline in apical half (Notes)	elongated (3)	medium (5)	compressed (7)	position of broadest part (Notes)
cylindrical waisted	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)	 (elliptic)	 (round)	 (oblate)	at middle (1)

Possible characteristic(s) (Example 4)

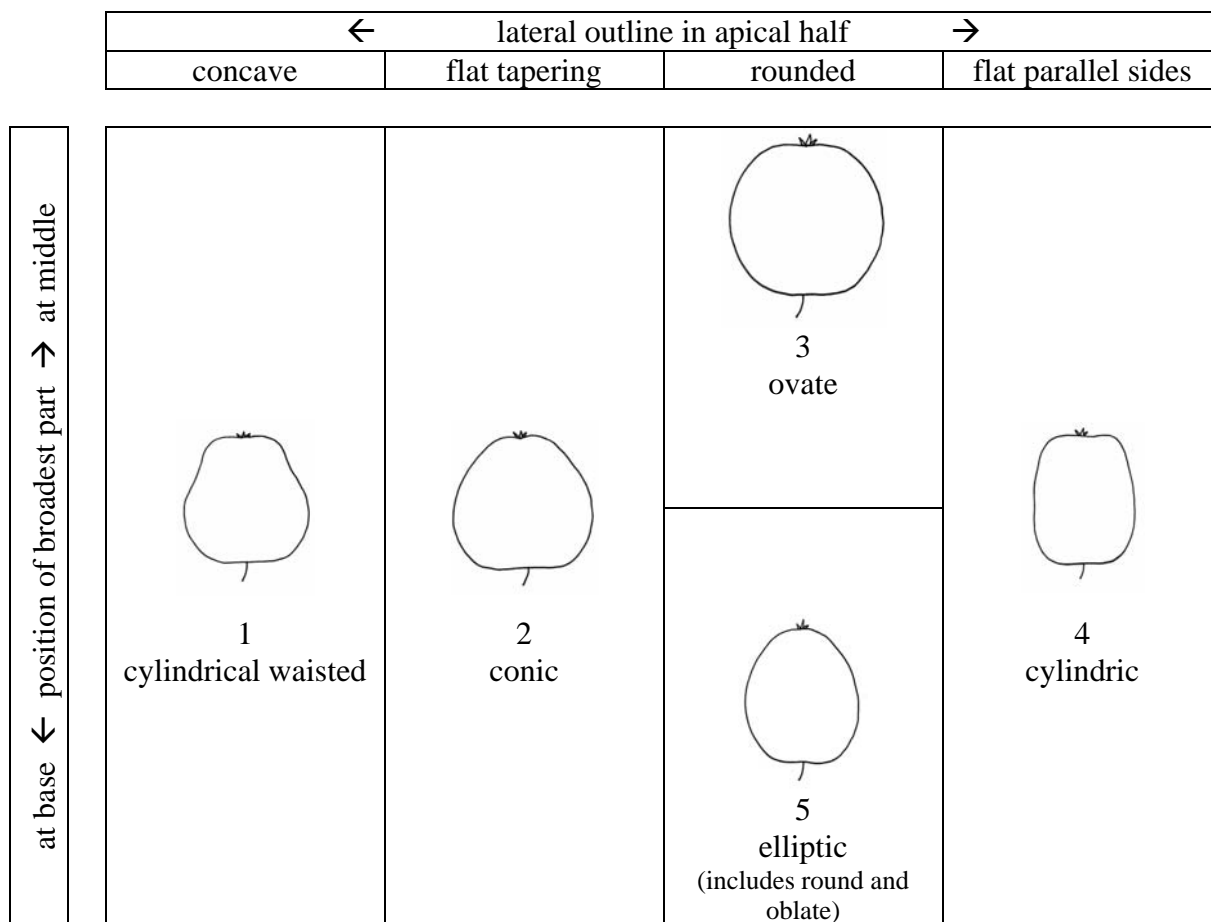
Alternative 1

- (a) ratio diameter/height (QN):
e.g. very elongated (1); moderately elongated (3); medium (5); moderately compressed (7); very compressed (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)

Alternative 2

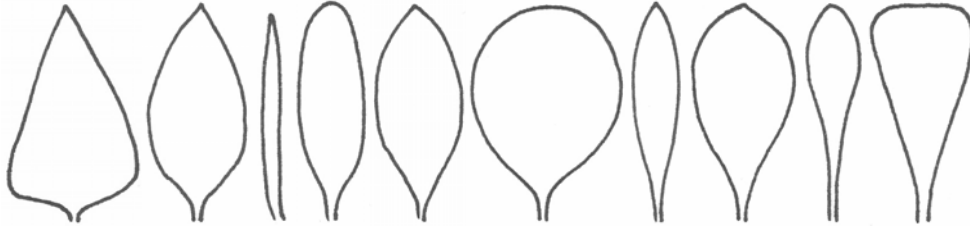
- (a) ratio diameter/height (QN):
e.g. very elongated (1); moderately elongated (3); medium (5); moderately compressed (7); very compressed (9)
- (b) general shape (PQ):
e.g. cylindrical waisted (1); conic (2); ovate (3); cylindrical (4); elliptic (5)

with the following illustration:



Example 5

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



Possible characteristic(s) (Example 5)

Alternative 1

- (a) ratio length/width (QN):
*e.g. very elongated (1); moderately elongated (3); medium (5);
moderately compressed (7); very compressed (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)*











Alternative 2

General shape (PQ): triangular (1); ovate (2); linear (3); oblong (4); elliptic (5); circular (6); oblanceolate (7); obovate (8); spatulate (9); obtriangular (10)

(Note: Where the overall shape is presented as a single pseudo-qualitative characteristic, the order of states should be: primary order, broadest part below middle to broadest part above middle; secondary order, narrow to broad (high to low ratio length/width)).

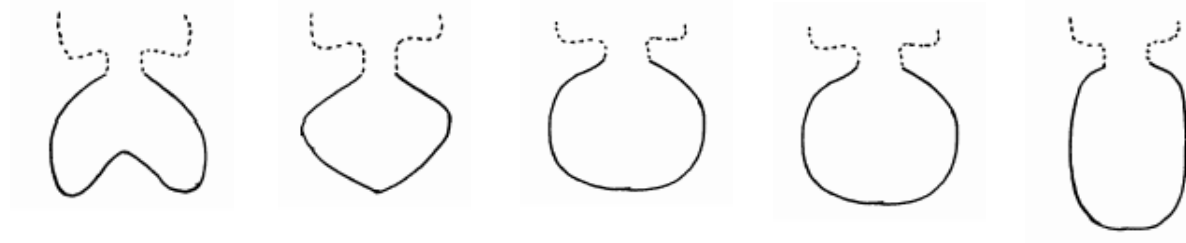
with the following illustration:

← broadest part →		
(below middle)	at middle	(above middle)

narrow (elongated) → width (ratio length/width) ← broad (compressed)		 3 linear			
		 4 oblong	 7 oblanceolate	 9 spatulate	
	 1 triangular	 2 ovate	 5 elliptic	 8 obovate	 10 obtriangular
	 6 circular				

Example 6

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



Possible characteristic(s) (Example 6)

Alternative 1

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

Alternative 2

General shape (PQ): reniform (1); rhombic (2); elliptic (3); circular (4);
 transverse elliptic (5)

with the following illustration:

← compressed ratio length/width → elongated	 1 reniform	 2 rhombic	 3 elliptic
			 4 circular
			 5 transverse elliptic

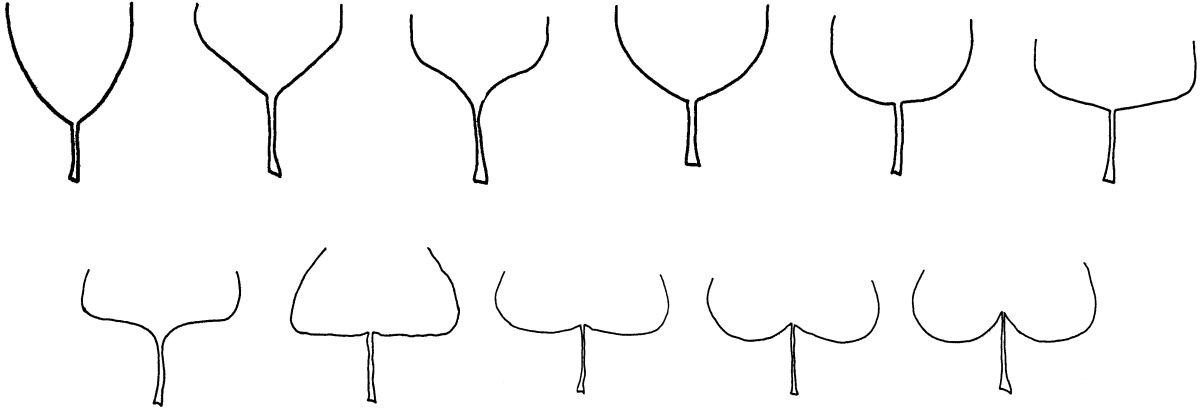
2.3 Base Shape Characteristics

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 length/width 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, an example of which is provided below for illustrations purposes.

Example

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



Possible characteristic(s)

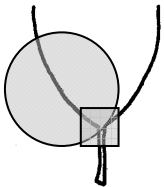
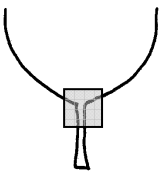
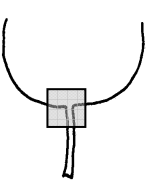
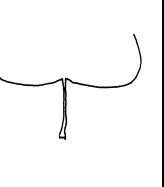
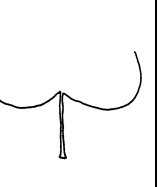
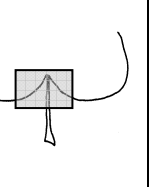
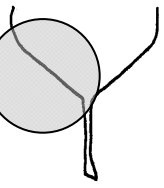
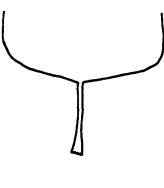
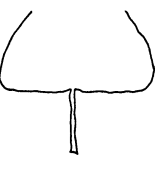
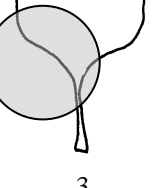
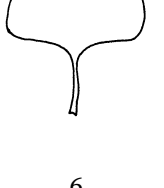
Alternative 1

- (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)

Alternative 2

Shape of base (PQ): wedge-shaped, convex (1); wedge-shaped, straight (2); wedge-shaped concave (3); broad wedge-shaped, convex (4); broad wedge-shaped, straight (5); broad wedge-shaped, concave (6); rounded (7); flat (8); weakly cordate (9); medium cordate (10); strongly cordate (11).

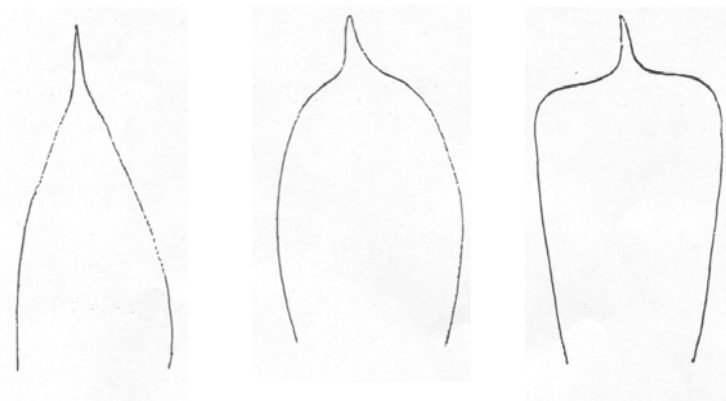
with the following illustration:

		← angle at base →					
		acute	obtuse	straight	weakly reflexed	medium reflexed	strongly reflexed
curvature	↑ convex	 1 wedge-shaped, convex	 4 broad wedge-shaped, convex	 7 rounded	 9 weakly cordate	 10 medium cordate	 11 strongly cordate
	flat	 2 wedge-shaped, straight	 5 broad wedge-shaped, straight	 8 flat			
	↓ concave	 3 wedge-shaped concave	 6 broad wedge-shaped, concave				

2.4 Apex/Tip Shape Characteristics

2.4.1 The APEX (apical or distal part) of an organ or plant part is the end furthest from the point of attachment.

2.4.2 In some cases, the distal extremity of the apex may be differentiated into a “TIP”. In such cases, the shape of the apex is taken as the general shape, excluding any differentiated tip (if present). For example:



Differentiated tip:	acuminate	acuminate	acuminate
Apex:	acute	rounded	truncate

2.4.3 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 length/width or the position of the broadest part concerning the full plant part.

2.4.4 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).

2.4.5 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).

2.4.6 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



Possible characteristic(s)






Alternative 1

- (a) angle of apex (excluding 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)

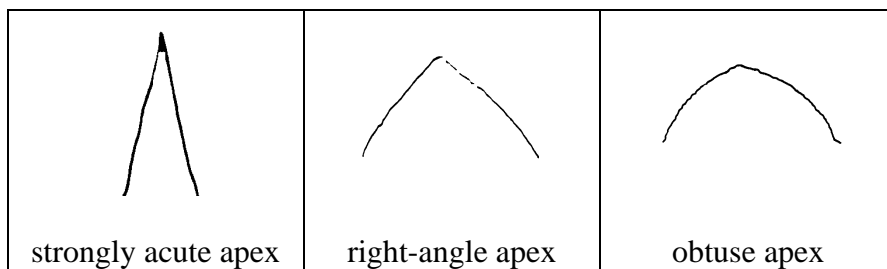
Alternative 2

- (a) angle of apex (excluding tip, if present) (QN):
e.g. strongly acute (1); moderately acute (2); right-angle (3); moderately obtuse (4); strongly obtuse (5)
- (b) tip (PQ): *absent or very weak (1); mucronate (2); narrow short acuminate (3); broad short acuminate (4); narrow long acuminate (5); broad long acuminate (6)*

with the following illustration:

		← length of tip →			
		absent or very weak	short	medium	long
↑ width of tip	narrow	[see below]			
			2 mucronate	3 narrow short acuminate	5 narrow long acuminate
↓	broad				
			4 broad short acuminate	6 broad long acuminate	

examples of tip: absent or very weak (1) with different angles of apex (characteristic (a)):

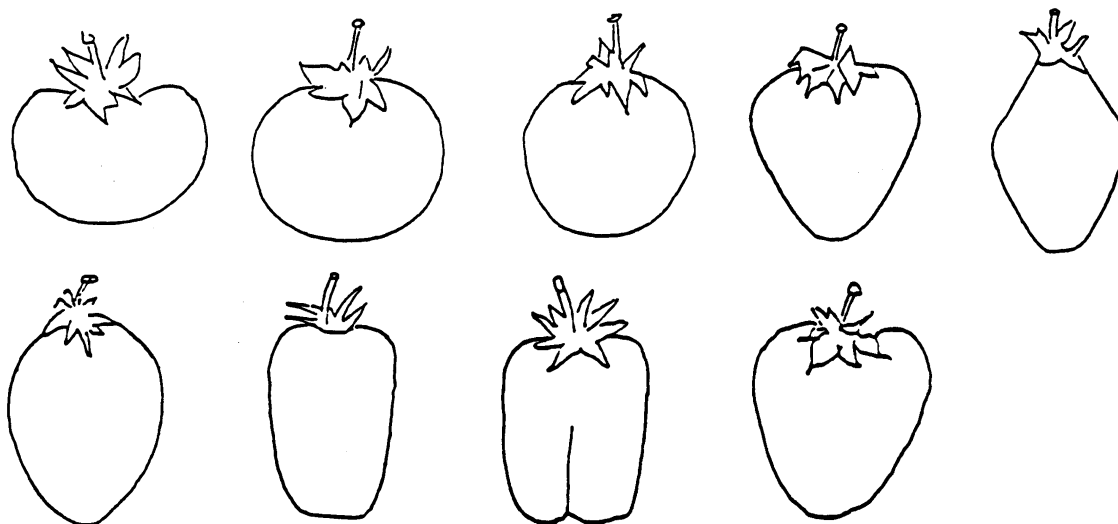


2.5 Combination of Full Plane-, Base- and Apex Shape Characteristics

The following example illustrates how the overall shape of an organ or plant part can be observed in relation to the components of shape explained in Sections 2.2 to 2.4 [*cross ref.*].

Example

the range of shapes covered by the illustrations below

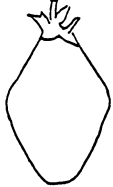
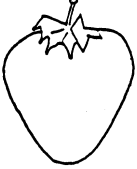








[Note: Calyx to be deleted from illustration?]

can be observed in relation to:

- (a) ratio length/width (QN):
e.g. very elongated (1); moderately elongated (3); medium (5); moderately compressed (7); very compressed (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)

The chart below illustrates how the different components cover the range of overall shapes. Such a chart is not appropriate in the Test Guidelines, although illustrations may be useful for the individual characteristics to clarify the parts to be observed.:

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

2.6 Three-dimensional shape characteristics

Wherever possible, three-dimensional plant parts should be described in cross-section as plane or two-dimensional shapes (see Section 2.1 [*cross ref.*]: ratio length/width, 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

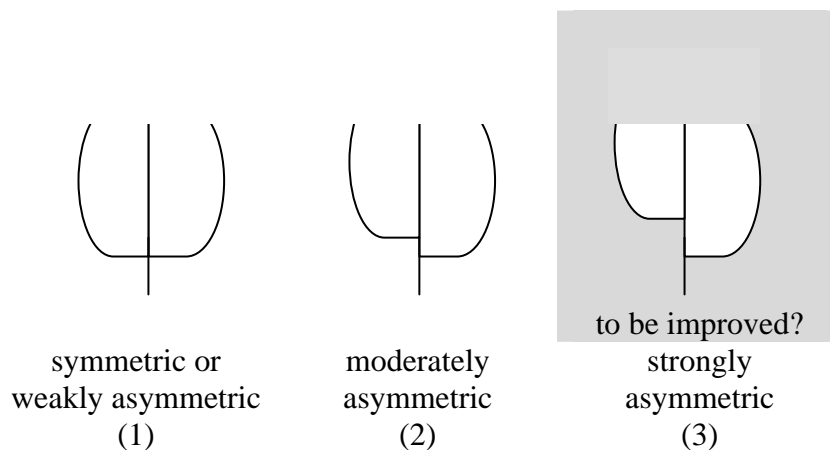
2.7.1 Lateral symmetry around the main axis may be handled in different ways. For example:

(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 length/width: 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 length/width

- 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

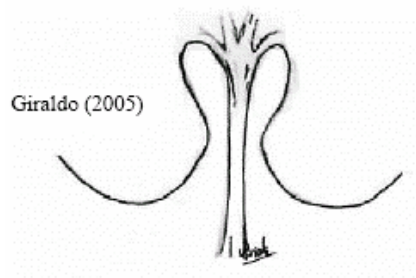
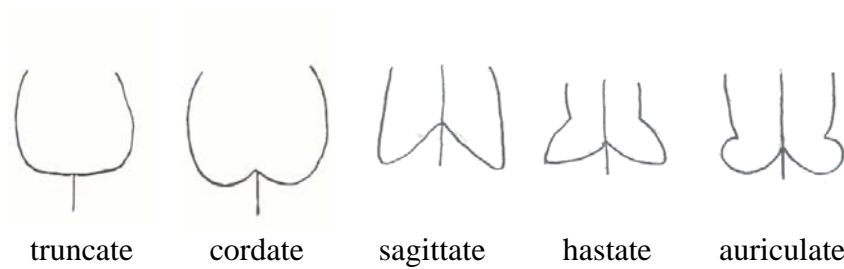
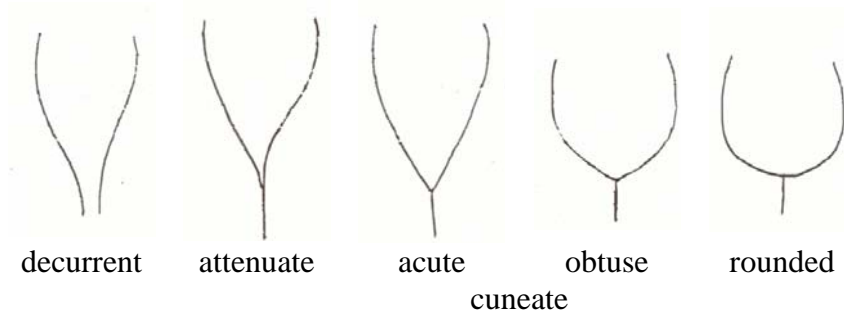
(b) Non-Simple-Symmetric Plane Shapes: to indicate the shape according to the non-simple-symmetric plane shapes identified in Section 1.4 [*cross ref.*], with an indication of relative width where useful, e.g. narrow cordiform

3. SHAPE ILLUSTRATIONS

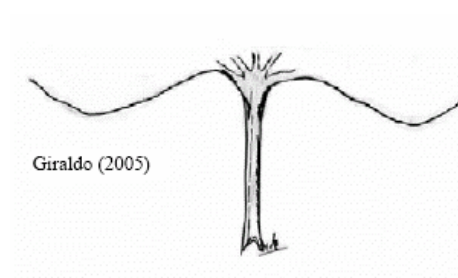
3.1 Full Plane Shapes

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

3.2 Base Shapes



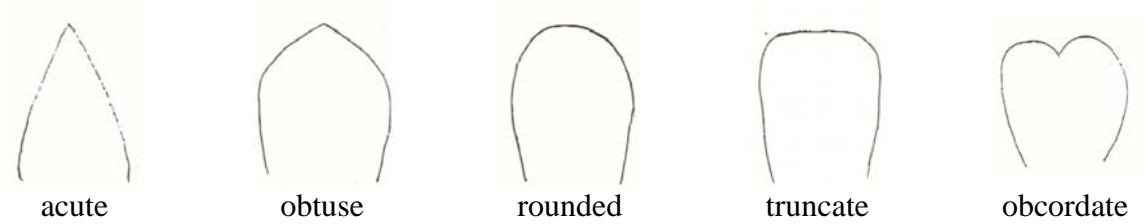
calcarate
(calcarate: having a "spur", e.g.
toadflax and larkspur)



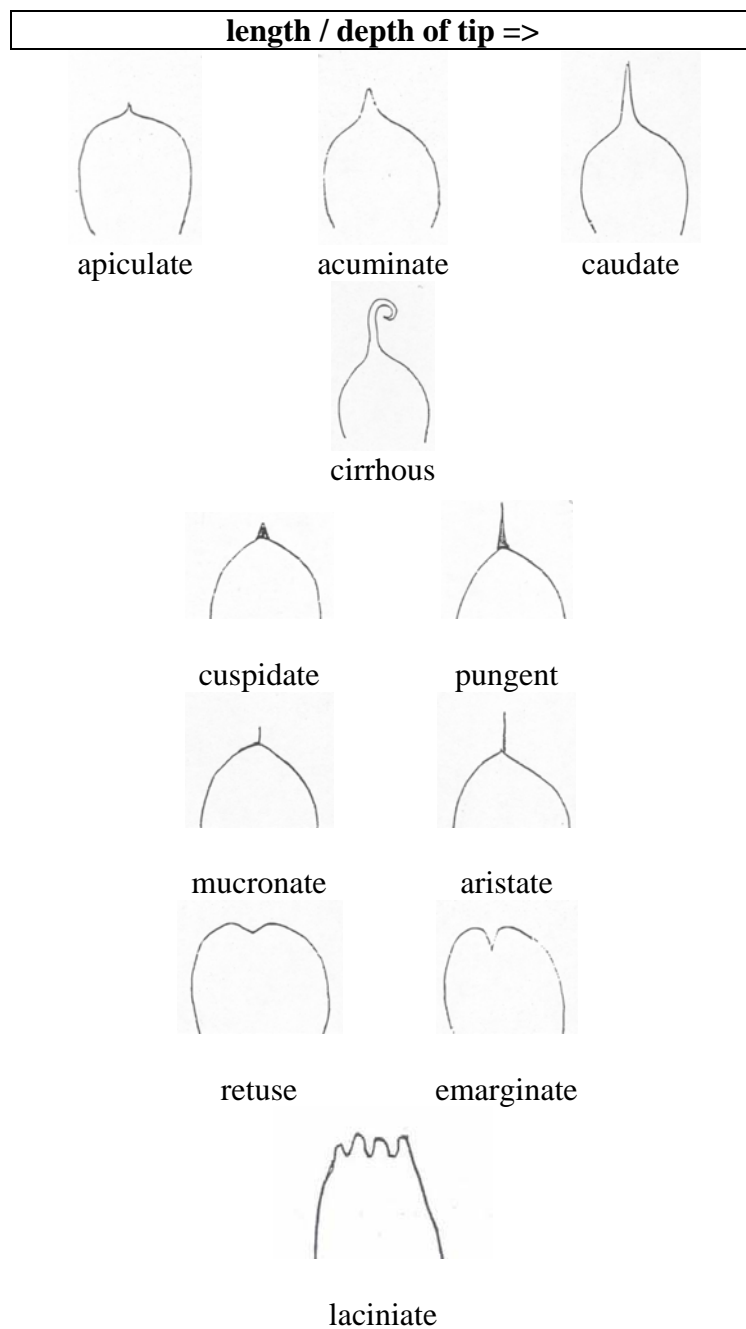
open calcarate

3.3 Apex Shapes

3.3.1 Apex

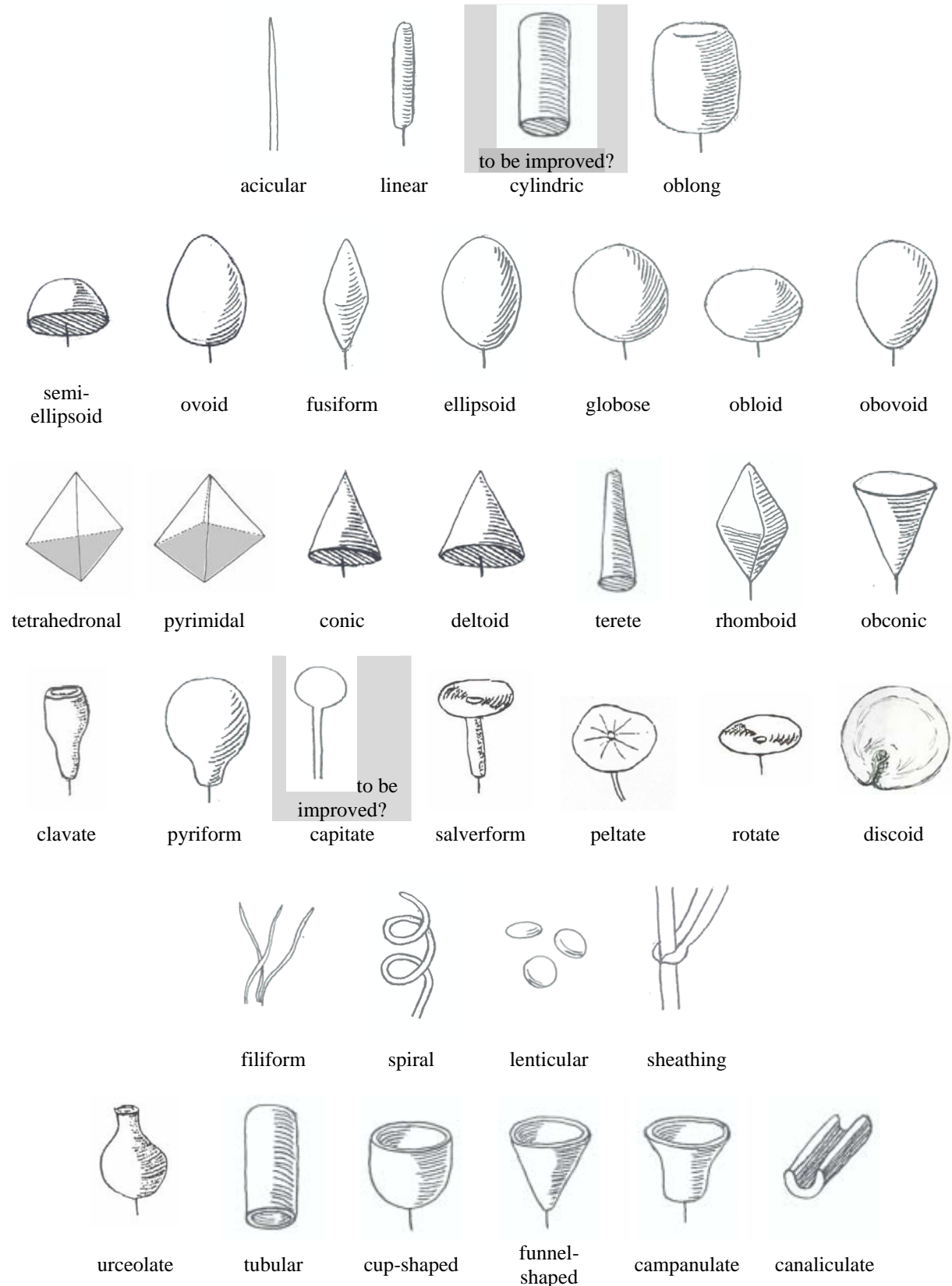


3.3.2 Differentiated tip



3.4 Three-Dimensional Shapes

Note: as explained in Section 2.6, wherever possible, three-dimensional plant parts should be described in cross-section as plane or two-dimensional shapes.



3.5 Symmetry



asymmetric full shape



asymmetric base



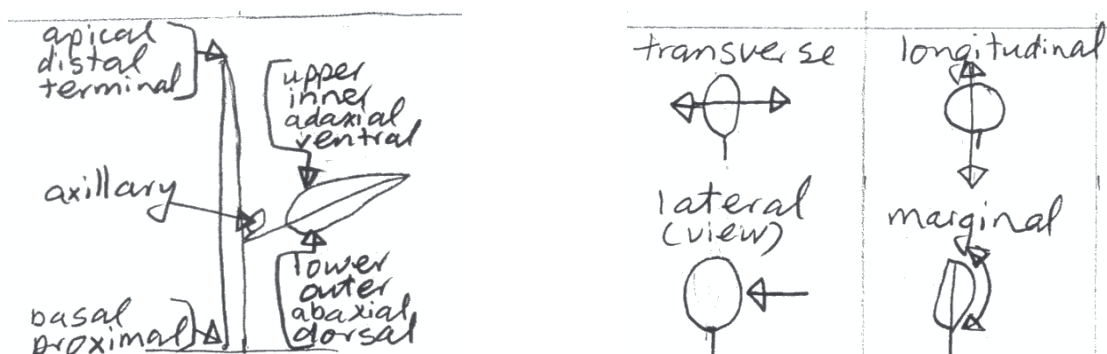
asymmetric apex



asymmetric position

II. 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 department 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. Explanations of “tree”, “shrub” and “semi-shrub” are provided in Section III “Definitions for Shape and Structure Terms”.^g

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

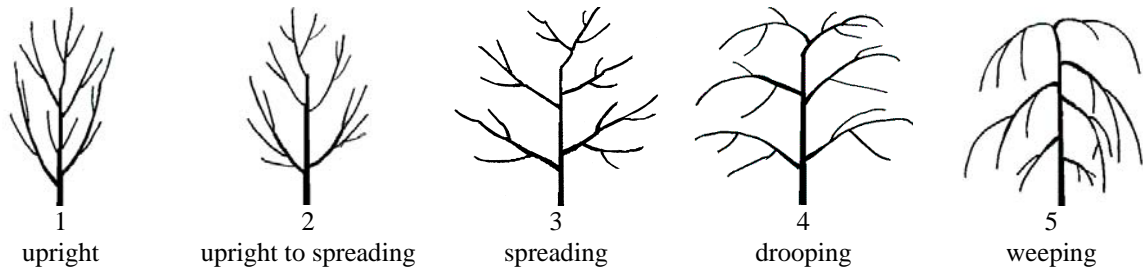
Example 2: “Plant: type” climbing (note 1); non-climbing (note 2)

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

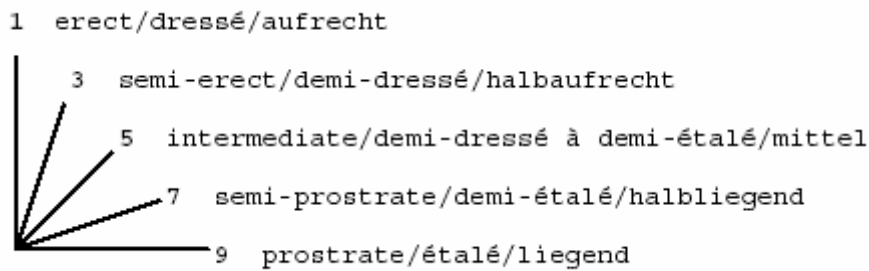
The TWA proposed to amend the examples to avoid an implication that particular growth types would have particular notes (e.g. upright (1); upright to spreading (2) spreading (3) etc.).

Office of the Union comment: possibly no change necessary because in Example 1 “spreading” has note 3; in Example 2 “spreading” has note 2, etc.

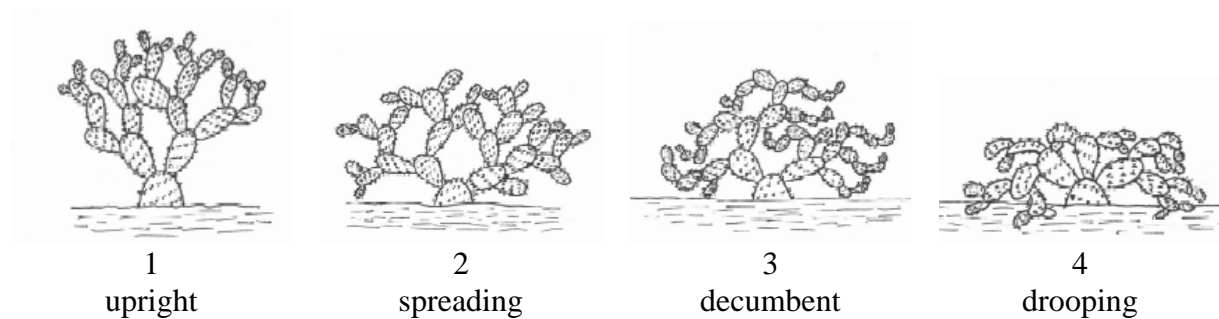
Example 1: quantitative characteristic



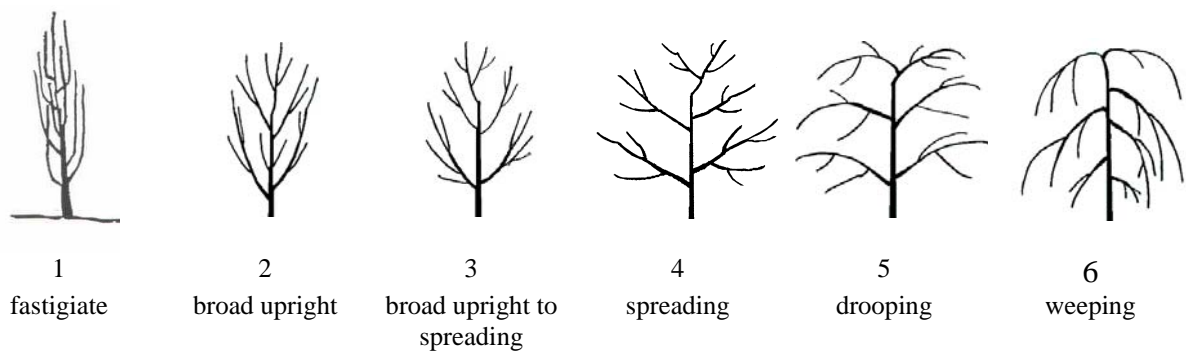
Example 2: quantitative characteristic



Example 3: pseudo-qualitative characteristic

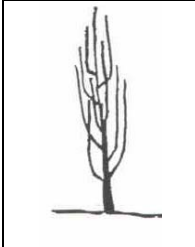
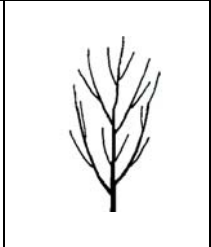
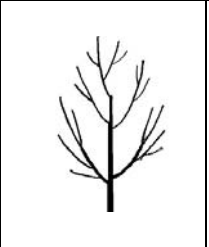
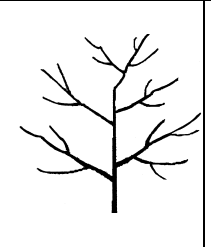
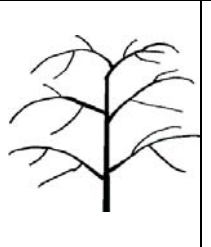
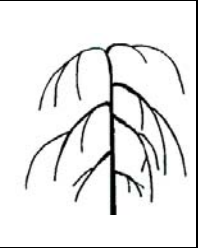


Example 4 – case 1: pseudo-qualitative characteristic



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	

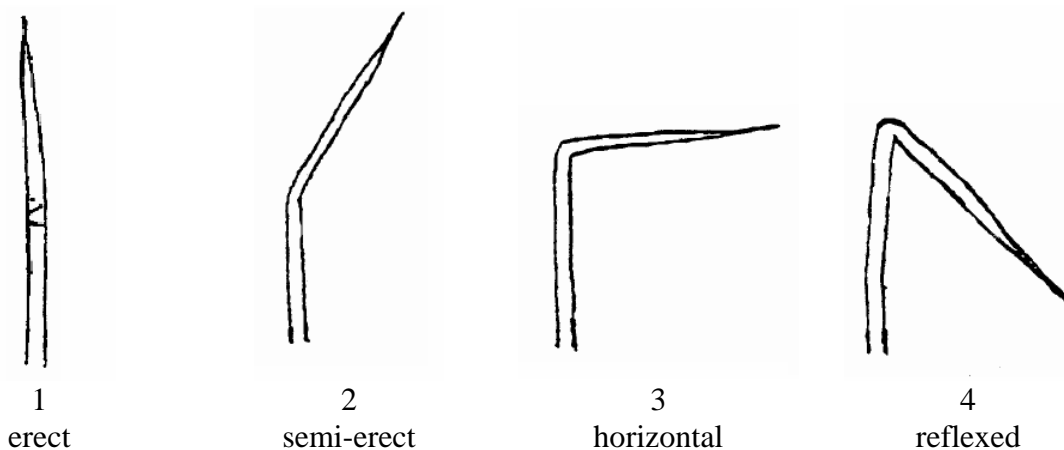
2.2 Attitude / direction (Plant parts)

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.

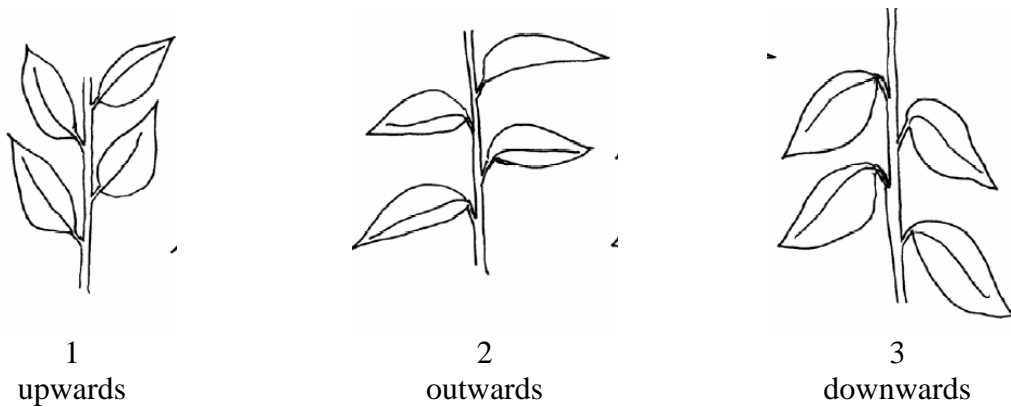
Examples of attitude as a quantitative characteristic are provided below:

Quantitative Characteristic

Example 1:



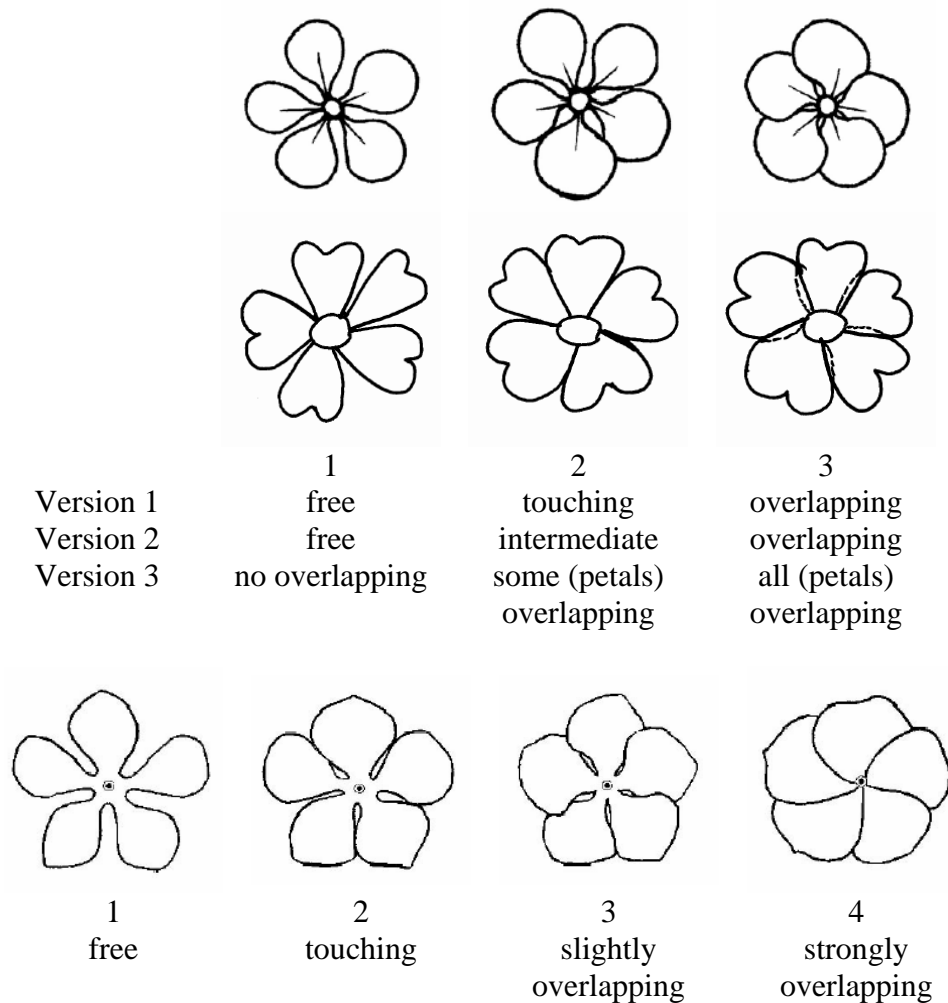
Example 2:



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:



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



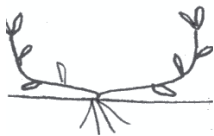
columnar



divaricate



ramified



decumbent



procumbent
(not rooting)

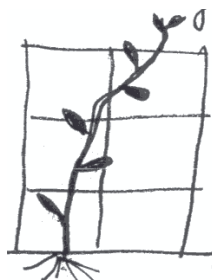


stoloniferous
(rooting)

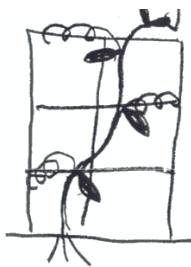


reclining

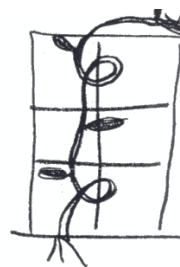
PROSTRATE



clambering



climbing



twining

3.2 Attitude / direction (Plant parts)



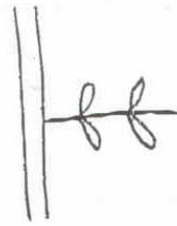
adpressed



erect



semi-erect



horizontal



reflexed



adpressed

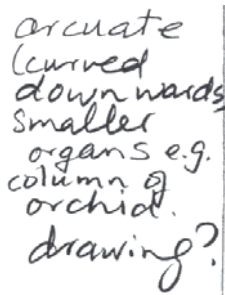


recurved



→ difference?

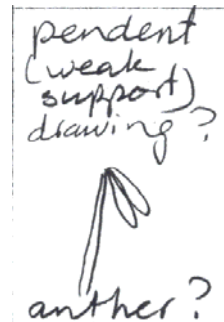
arched



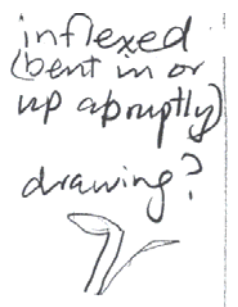
arcuate



pendulous



pendent



inflexed



incurved



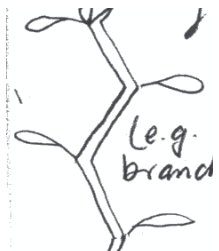
inwards



outwards



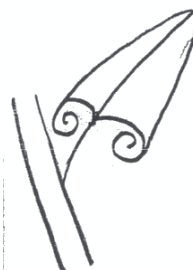
convolute



zig-zag

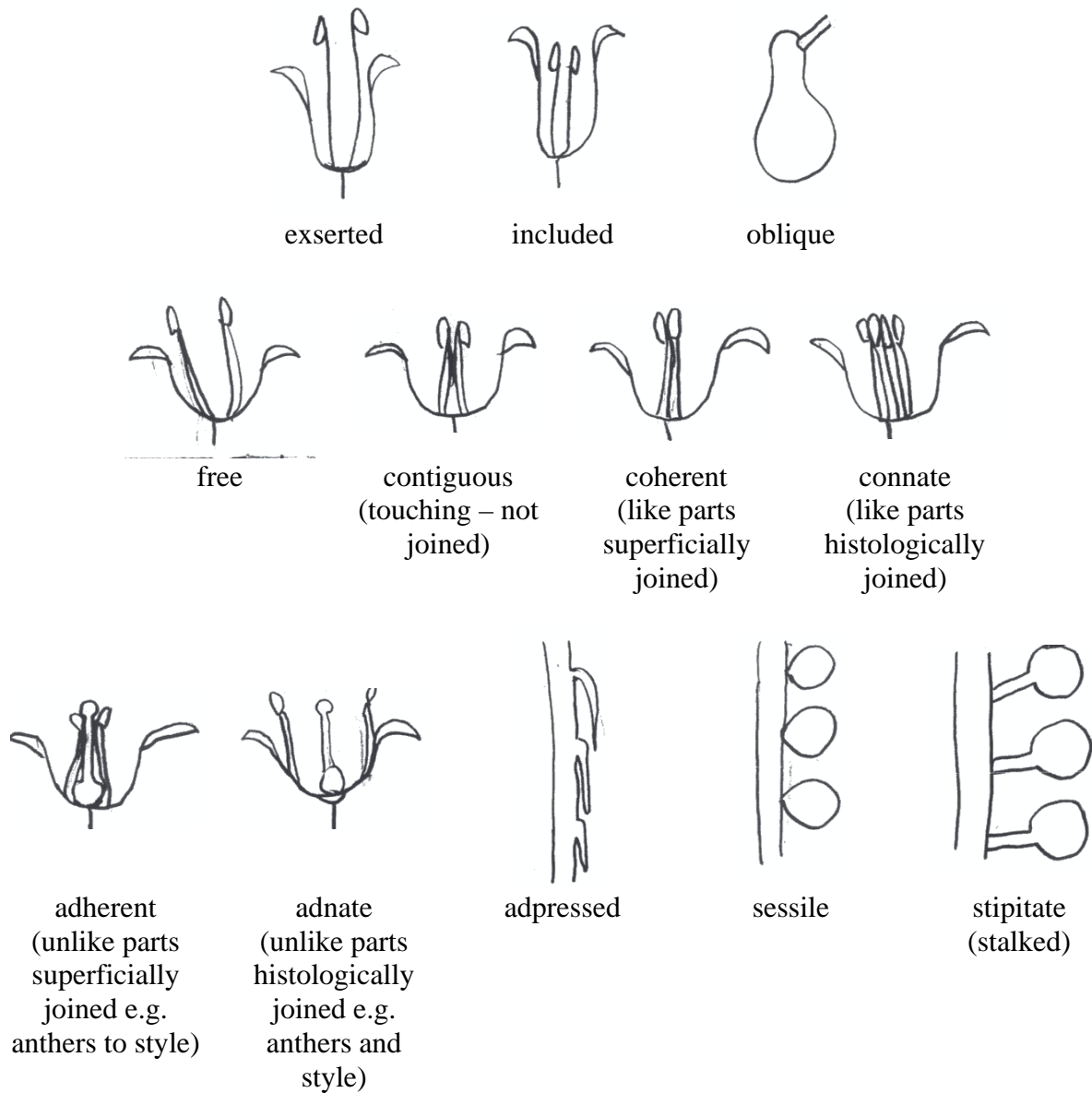


involute



revolute

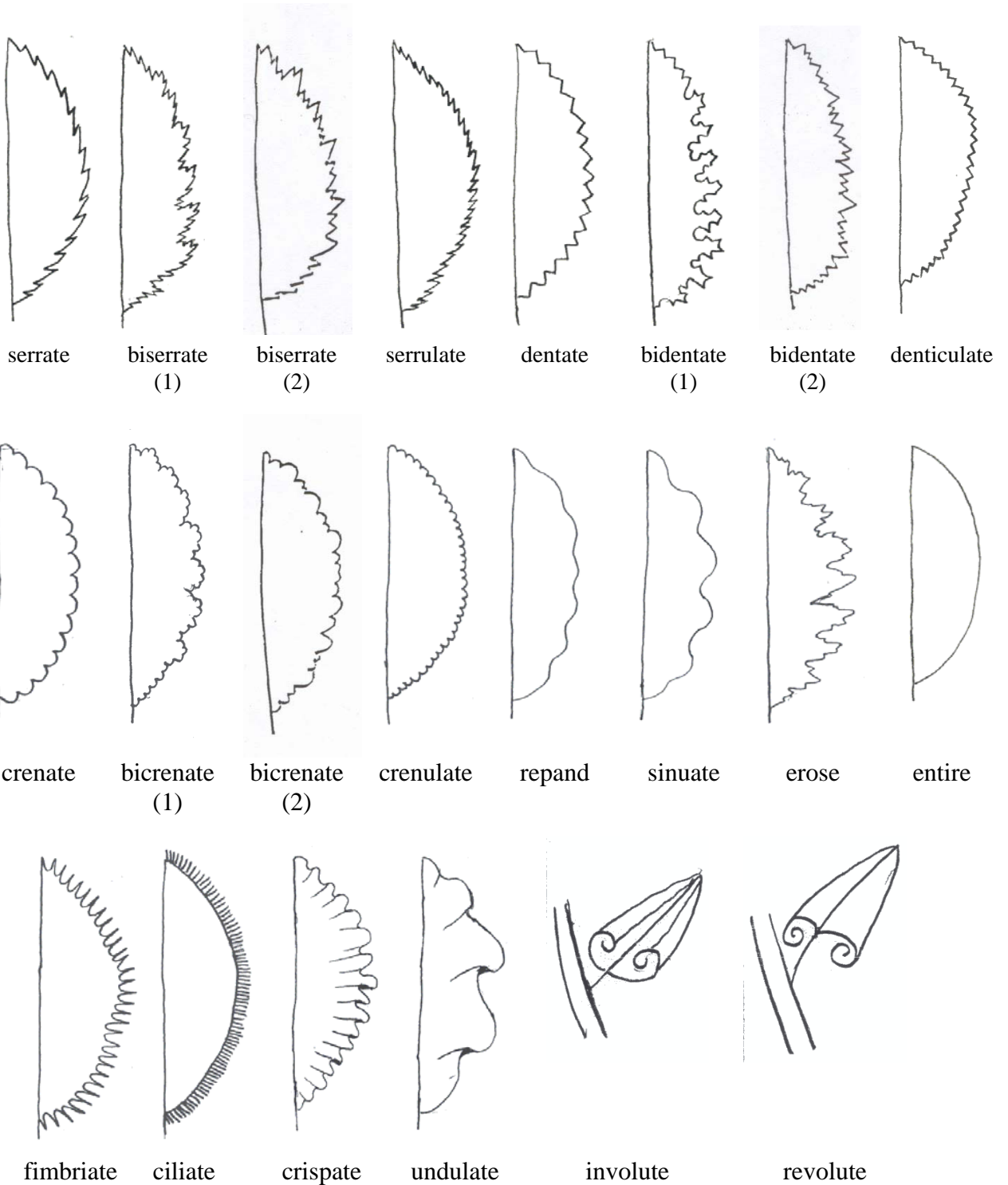
3.3 Relative position



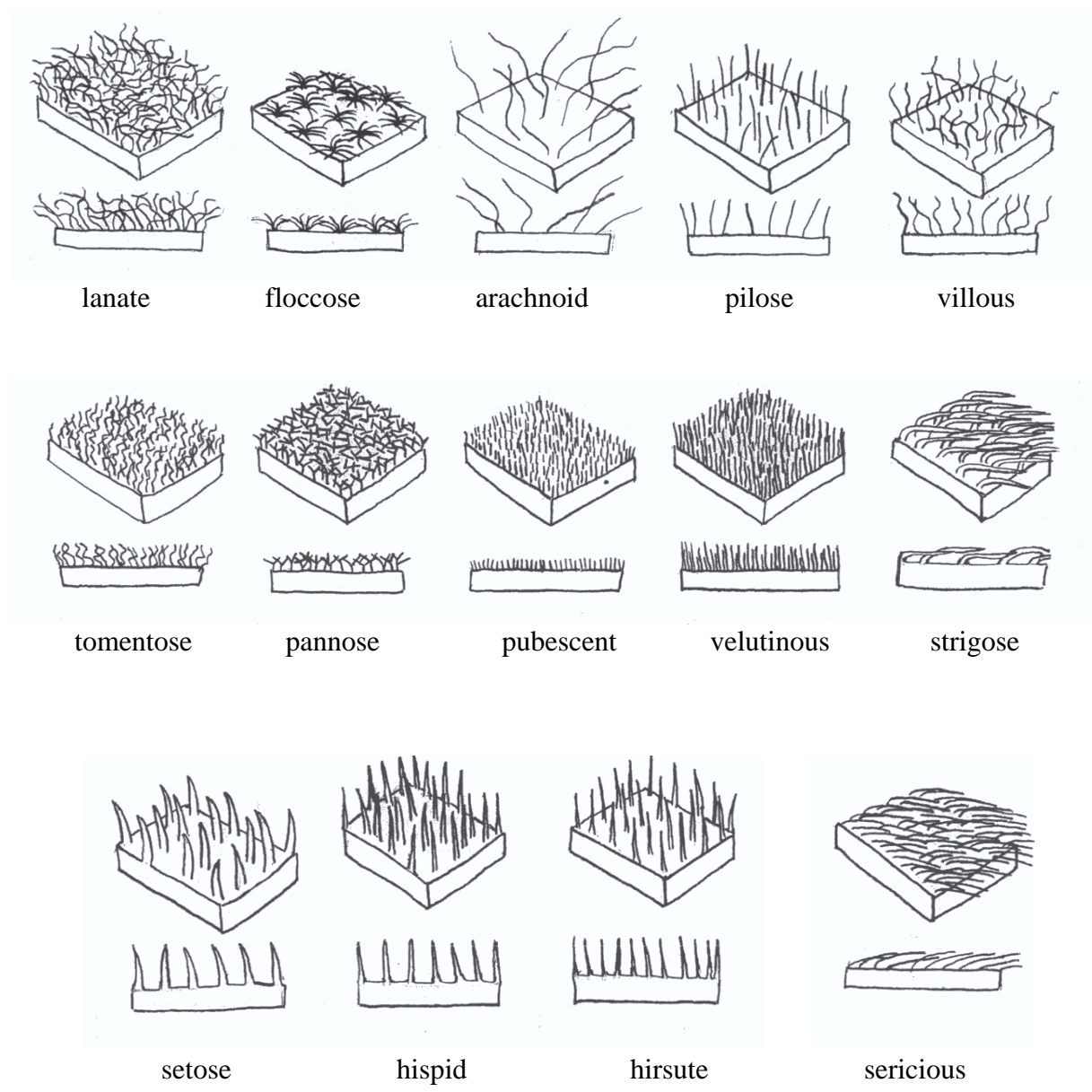
[new after 3.3] Types of Inflorescence

To provide illustrations (and definitions in Section IV) of different types of inflorescence

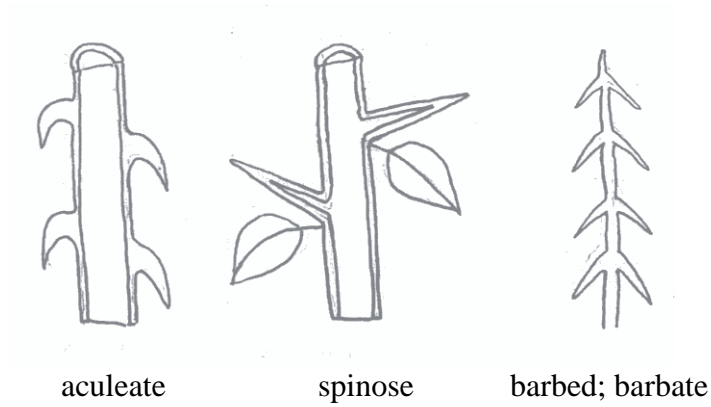
3.4 Margins



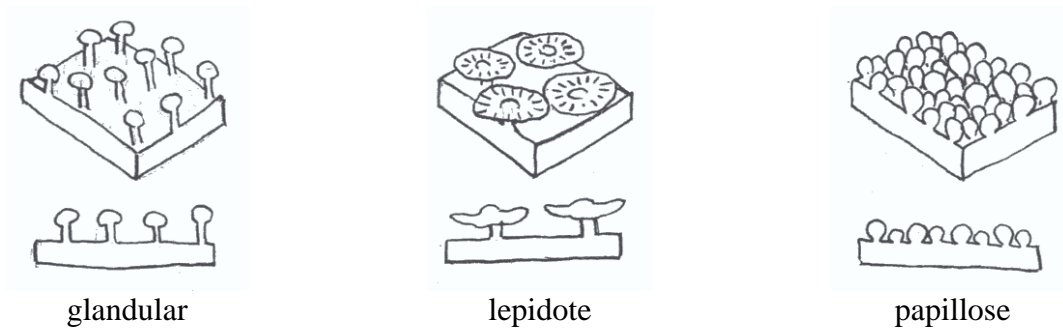
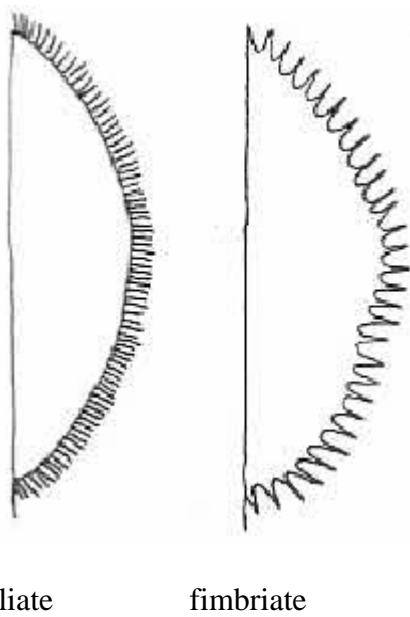
3.5 Hairiness (Types of appendage covered by the general term “hair” in the Test Guidelines)



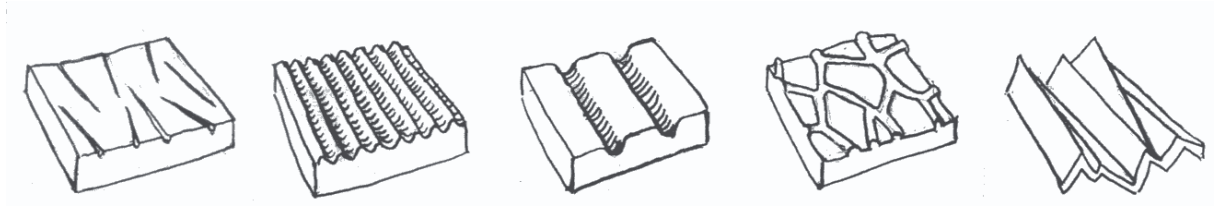
3.6 Spines (Types of appendage covered by the general term “spine” in the Test Guidelines)



3.7 Other appendages



3.8 Texture



aciculate

striate

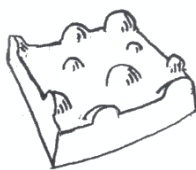
grooved

reticulate

corrugated



rugose



bullate



verrucose

III. DEFINITIONS FOR SHAPE AND STRUCTURE TERMS

		Relevant to:							Reference		
Term	Definition / comment	Full	Base	Apex	3-d	Hab./Att/Pos	Margin	Apps.	Surf./Texture	Developing Chars. ²	Illustrations ²
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	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 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					

² To be completed when document finalized.

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<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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	Located at the base, closest to the position of attachment. Compare ‘apical’, ‘distal’, ‘terminal’. Synonyms: Basal, Proximal (most appropriate term to be decided on a case-by-case basis)					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				
Bidentate	Doubly dentate; with the dentations themselves dentate, or with alternating larger and smaller dentations.						X				

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<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
Biserrate	Doubly serrate; with the serrations themselves serrate, or with alternating larger and smaller serrations.						X				
Blistered	use '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 'verrucose' 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					
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							

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<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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	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'.					X					
Coarse	use '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 'fastigiata' 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						
Connate	Like parts fused histologically, e.g. staminal filaments fused into a tube. Compare 'adherent', 'adnate', 'coalesced', 'coherent', 'contiguous'.					X					
Connivent	Converging but not fused, e.g. stamens with anthers touching.					X					

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
Contiguous	Touching but not fused. Not 'adnate', 'connate', 'adherent' or 'coherent'.					X					
Continuous	In an uninterrupted arrangement. Compare 'interrupted'.					X					
Convex	Rounded and curved outwards.	X	X	X	X	X					
Convolute	Rolled up longitudinally with the plant parts overlapping, as petals in a bud.					X	X				
Cordate	Heart-shaped; with two equal, rounded, basal lobes divided by a deep sinus. Compare 'obcordate' which has the sinus at the apex and 'cordiform' which applies to full plane shape.		X								
Cordiform	Heart-shaped; with two equal, rounded, basal lobes divided by a deep sinus, and tapering fairly straightly to the apex. Compare 'cordate' which applies to the base and 'obcordate' which is broadest towards the apex.	X									
Coriaceous	Leathery; thick, tough and flexible. Compare 'cartilaginous' which is more firm.								X		
Corrugated	Wrinkled, crumpled or folded into alternating furrows and ridges, e.g. <i>Papaver</i> petals in the bud. Compare 'rugose'.								X		
Crenate	Scalloped, with rounded teeth.						X				
Crenulate	having a margin with <i>small</i> rounded teeth (minutely crenate). Compare "crenate".						X				II, 3.4
Crispate	With the margin curled or crumpled and irregularly twisted.						X				
Crowded	Grouped together but with some intervening spaces. Compare 'congested' which is more densely crowded.					X					
Crustaceous	Thin, hard and brittle.								X		
Cuneate	Wedge-shaped; broadest towards the apex, the lateral margins more or less straight and converging towards the base at an acute or obtuse angle. Applies to the base.		X								
Cuneiform	use '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						

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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	use ‘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				
Denticulate	With <i>fine</i> , sharp teeth pointed outwards (finely dentate). Compare “dentate”.						x				II, 3.4
Depressed	Sunken, as if pressed into the middle from above or from above and below, causing a concavity. Compare ‘compressed’.					x					

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<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
Descending	Growing or orientated gradually downwards in relation to soil level or to other plant parts. Synonyms: Descending, Downwards (most appropriate term to be decided on a case-by-case basis)					X					
Diffuse	With plant parts, e.g. petals, spread widely, or with branches spread widely and frequently branching. Compare 'divergent', spreading at almost right angles to the main axis.					X					
Discoïd	Having a flat, circular form; disk-shaped.					X					I, 3.3.4
Distal	Located at the apex and/or furthest from the position of attachment. Compare 'proximal', 'basal' which is closest to the position of attachment. Synonyms: Apical, Distal, Terminal (most appropriate term to be decided on a case-by-case basis)					X					
Distinct	to be used only in terms of the meaning within DUS ...										
Divaricate	With branches spreading widely, at almost right angles to the main axis. 'Divaricate' applies more specifically to the growth habit while 'divergent' applies to the direction of the branches. 'A divaricate plant would have divergent branches.					X					
Divergent	With plant parts, specifically branches, spreading away from each other. 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.					X					
Dorsal	The lower, outer or abaxial side in relation to the axis. Compare 'ventral'.					X					
Downwards	Growing or orientated gradually downwards in relation to soil level or to other plant parts. Synonyms: Descending, Downwards (most appropriate term to be decided on a case-by-case basis)					X					
Drooping	Bending downwards. Compare 'weeping' where the downward bending is more pronounced and '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					

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<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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				
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					
Erose	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 protruding beyond the corolla. Compare 'included'.					X					
Falcate	Sickle-shaped; strongly curved sideways.	X									
Farinaceous (Farinose)	Mealy; with a whitish, powdery covering. Compare 'granular'.								X		
Fasciated	With stems fused together and congested lengthwise, malformed and flattened; e.g. stems of pea.					X					

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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	use '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		
Fleshy	Pulpy; succulent but firm, easy to cut.								X		
Flexuous	(a) Resiliently bendable, like a whip / lithe or fluid in movement; or (b) Having curves, turns or bends								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		

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
Glabrous	Bald; without trichomes, smooth, hairless.							X	X		
Glandular	Bearing glands; with short-stalked or sessile glands or with hairs bearing glands at their tips.							X			
Globose	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			

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<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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.							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		
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					
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							

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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					
<u>Semi-shrub</u>	<u>Woody perennial with multiple stems arising generally from the same point but not close to ground level or the graft point, with a main stem, not tall. (see also “tree” and “shrub”)</u>										
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	Finely serrated. See “serrate”.						X				II, 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						
<u>Shrub</u> Shrubby (Shrub)	<u>Woody perennial with multiple stems arising from ground level or close to the grafting point, with relatively low height. (see also “tree” and semi-shrub”)</u>					X					

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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><u>ASL</u> 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?</i><u>ASL</u> 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	Few per unit area, as opposed to 'dense'. The term "open" is used to describe plants with sparse branches or foliage.					X					
Spathulate	use 'spatulate'.	X									
Spatulate	Spoon-shaped; attenuate at the base and rounded at the apex. Compare 'clawed' ('unguiculate') which narrows more abruptly towards the base.	X									
Spheric	use 'Globose'				X						
Spine	<p>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.</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>							X			

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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	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	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	Attached to the supporting plant by a stalk. Compare 'sessile' and 'pedicelled'.					X					
Stance	use 'attitude'					X					
Star-shaped	use 'stellate'	X									
Stellate	Star-shaped: with several points radiating from the center				X						
Stipitate	use '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					

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Term	Definition / comment	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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? <u>EB</u> : 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							
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.					X	X				
Unguiculate	use 'clawed'.	X									
Upright	General term used for tall and narrow plants. More specifically, 'fastigiata' 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	Growing or orientated gradually upwards in relation to soil level or to other plant parts.					X					

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<u>Term</u>	<u>Definition / comment</u>	Full	Base	Apex	3-d	Hab/Att/Pos	Margin	Apps.	Surf/Texture	Developing Chars. ²	Illustrations ²
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’.					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			
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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^a The TWF agreed that it would be necessary to provide an explanation of orientation, with reference to base and apex, at the beginning of the subsection. The TWV agreed with the TWF proposal. However, the TWV agreed that TGP/14 should explain that it would not be obligatory to illustrate shapes with the point of attachment (base) at the bottom if that was not the natural orientation of the organ on the plant.

^b The TWA agreed that, in accordance with the explanation in Section 1.4, the terms used in the chart should not imply that they were restricted to the ratios indicated in the chart.

^c The TWA agreed to add “alate”

^d The TWA agreed that it should be explained that it is necessary to avoid duplication of the same difference in two separate characteristics; in particular, to avoid the use of characteristics for length, width and ratio length/width; and length, width and shape, where the shape related to different length/width ratios

^e The TWF, TWO and TWV noted the alternative to develop a single pseudo qualitative characteristic for shape rather than using the individual components of shape, provided that, in such cases, the difference between the states of expression was indicated in an illustration. The TWF, TWO and TWV agreed that that was a possibility which would be useful in some cases.

^f The TWA proposed to make a cross-reference to Section 2.6 concerning the preference to use 2-dimensional shapes where possible

^g The TWF proposed to provide an explanation of tree, shrub and semi shrub, based on the definition of shrub in TGP/14 and the explanation in the Test Guidelines for Hawthorn.

[End of Subsection 2]