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DRAFT

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

DOCUMENT TGP/14

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

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

Document prepared by an expert from South Africa

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GENERAL COMMENTS FOR TERMS SUBGROUP

EB: In selecting terms to be included in the document, I found many terms which were somehow related to 'shape' and decided to rather include them than to leave them out. This will enable us to evaluate each of these terms and to delete any we don't require. I've included terms on texture (which also relates to hairiness), pattern (which relates to shape and color), arrangement and branching (which can also be considered as shapes), etc. In this process I worked through a number of glossaries and selected what I thought useful for UPOV purposes. I also attempted to formulate the definitions in such a way, as far as possible, that their meanings could be understood precisely for plant breeders' rights purposes, especially in comparison to similar terms, and I've included cross-references to similar terms where applicable. None of the definitions nor drawings have been taken directly from any single glossary (so we won't have copyright problems), although several glossaries were consulted and compared in the attempt to extract, as far as possible, the most discriminating features for each definition.

EB: For the two- and three-dimensional general outline length/width ratios I tried to standardize between the different series. You will find that some of the ratios deviate a bit from those in some publications, but the references used differ from one another anyway. Although it was decided last year (TWF/35/11 par 42(a)) to use only the basic shapes in a characteristic and then to give their L/W ratios in a next characteristic, it was thought useful to include the 'general outline chart' to use as a standardized reference and to serve as an explanation for the above approach.

EB: Advice from the TWF was that the drawings should be done in a general way to cover all cases and not be specific e.g. for leaves. This was done as far as possible. The longitudinal axis and position of attachment were indicated, where applicable, for explanation purposes. (These are not necessarily the main vein and petiole of a leaf.) In some cases, however, it was easier to explain a definition by means of a specific example (one could add 'e.g.' to the drawing) and in cases where a shape was restricted to a certain plant part, that plant part was drawn. It is always important to interpret the drawing together with the definition.

CB2005: Suggest that the title of the topic be broadened to Technical and Botanical terms.

CB2005: I remain in general agreement with the approach of having basic shapes and then length and width information, particularly for the solid shapes, however we should still permit the use of the other descriptive terms. I agree with your comments on p14, that where there are a number of shapes forming a quantitative scale then the basic shape and length/width be used and where there are shapes forming a non continuous scale then narrow elliptic, broad ovate etc be used.

SECTION A: PLANE / TWO-DIMENSIONAL SHAPES

1. FULL PLANT PARTS

1.1 General Outlines of Simple Basic (Symmetric) Plane Figures (Those Forming Part of the Length/Width Ratio Series)

EB: The 'general' refers to the fact that, for these observations, we ignore small deviations in the outline such as incisions and prolonged tips.

Comment

These shapes are defined according to

- (i) the position of the broadest part, i.e. below the middle, in the middle, or above the middle (with a subdivision according to their general angularity/curvature)
- (ii) their length/width ratios

On the chart, the different horizontal rows represent different basic shape series. For each characteristic, the first step would be to investigate whether the different shapes all occur in a single horizontal row (form part of a single series) or whether they occur in different rows. If they are found in different series, one should first consider grouping the shapes according to the position of the broadest part, then see whether the lateral margins are more or less angular or rounded. Discrete differences between the rows, often found in the position of the broadest part, could qualify a characteristic for qualitative status.

The horizontal rows represent series of shapes only differing in their length/width ratios, the differences normally being merely quantitative. In the Table of Characteristics these differences should as far as practical only be expressed as differences in length/width ratios. These will then be categorized as quantitatively expressed characteristics. However, if there is a clear, discrete gap between two consecutive shapes within a single row (e.g. one shape being 'narrow elliptic' and the next one being 'oblate'), such a characteristic could also qualify for qualitative status.

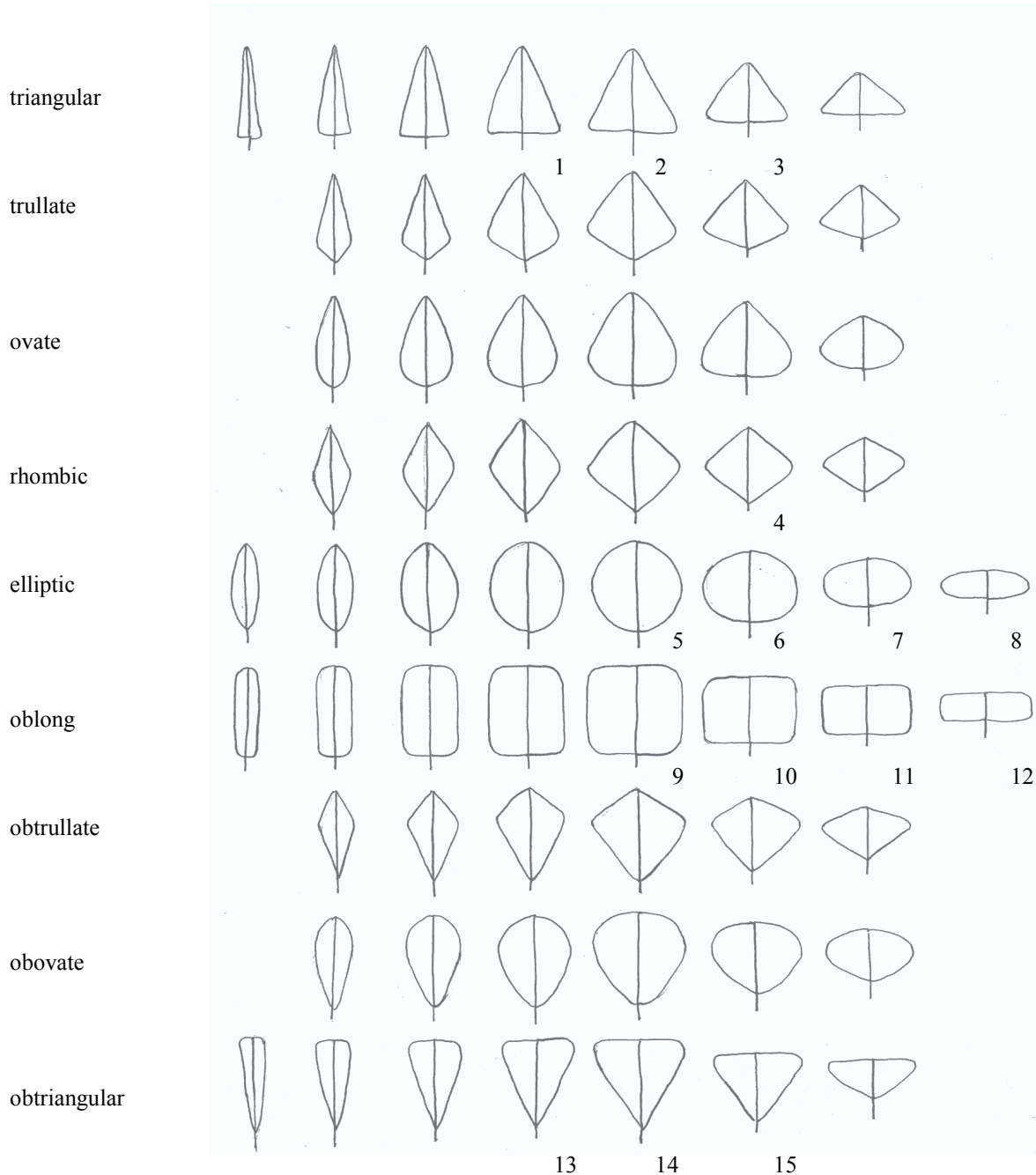
The above procedure should normally be considered for all cases, namely first to see whether one could identify a qualitative difference between any of the shapes and to take this out as a qualitatively expressed characteristic, and then to group the remaining differences into a quantitatively expressed characteristic. This is especially useful for longer ranges of shapes, and only in cases where the different shapes cannot practically be grouped according to the above procedure may one combine the different states of expression into a pseudo-qualitative characteristic.

CB2005: I remain in general agreement with the approach of having basic shapes and then length and width information, particularly for the solid shapes, however we should still permit the use of the other descriptive terms. I agree with your comments on p14, that where there are a number of shapes forming a quantitative scale then the basic shape and length/width be used and where there are shapes forming a non continuous scale then narrow elliptic, broad ovate etc be used.

CB 2005: Page 15 The numbers indicate some more commonly used shape terms. We should consider expanding this to indicate lanceolate, linear, oblanceolate, conic etc. As our approach is perhaps different from classic botanical shape descriptors, it would be helpful to connect with terms users may be more familiar with.

1.1.1 Illustrations

>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 narrow	narrow	medium	broad	very broad	shallow	very shallow	



- | | | | |
|---|----------------------|----|--------------------------|
| 1 | (narrow deltate) | 9 | square |
| 2 | (medium deltate) | 10 | transverse broad oblong |
| 3 | (broad deltate) | 11 | transverse medium oblong |
| 4 | (quadrangle 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 | | |

1.1.2 Definitions

1.1.2.1 *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.

1.1.2.2 *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.

1.1.2.3 *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.

PB: Not necessarily broadest at the middle – it includes 'circular'.

EB: *We look at the width perpendicular to the length, which is indicated by the longitudinal axis, so I think we can safely say 'broadest at the middle'.*

ASL agree with Elise, perhaps not strictly correct in geometric terms but can be included here. In all botanical publications, circular is accepted as the middle of the elliptic range.

1.1.2.4 *Lanceolate*

Lance-shaped; narrow ovate, broadest towards the base, that is towards the point of attachment. The apex may have a sharp or blunt tip. Length/width ratio 6:1 to 3:1, same as 'narrow ovate'.
Forms part of the 'ovate' series.

1.1.2.5 *Ligulate (Lorate)*

Strap-shaped; long and narrow, with the lateral margins parallel. Length/width ratio 6:1 to 3:1, same as 'narrow oblong'.
Forms part of the 'oblong' series.
Applies to two-dimensional shape.

1.1.2.6 *Linear*

Long and narrow, with the lateral margins parallel. Length/width ratio more than 6:1, same as 'very narrow oblong'.

Forms part of the 'oblong' series.

Applies to two- and three-dimensional shape and to arrangement.

1.1.2.7 *Lorate*

See 'ligulate'.

1.1.2.8 *Obdeltate*

Inversely deltate; more or less equilaterally obtriangular, narrowing towards the base, that is towards the point of attachment. Length/width ratio of the basic shape: 1:1, same as 'very broad obtriangular'.

Forms part of the 'triangular' series.

Compare 'obdeltoid' which applies to three-dimensional shape and 'deltate' which narrows towards the apex.

1.1.2.9 *Oblanceolate*

Inversely lanceolate; broadest towards the apex, that is furthest from the point of attachment. Length/width ratio 6:1 to 3:1, same as 'narrow obovate'.

Forms part of the 'obovate' series.

1.1.2.10 *Oblate*

Transverse elliptic; ellipse shaped but shorter than broad, broadest at the middle, with margins tapering convexly and evenly to the base and apex, the longest dimension orientated transversely. Length/width ratio of the basic shape: 1:1,5 to 1:2.

Forms part of the 'elliptic' series.

1.1.2.11 *Oblong*

Approximately rectangular, with more or less parallel sides terminating obtusely at both ends; four-sided with opposite sides parallel and all angles approximately 90 degrees. Length/width ratio of the basic shape: 2:1 to 1,5.

The 'oblong' series also includes 'square' and 'linear', differing only in their length/width ratios, 'square' having the same dimension in both its length and its width.

PB: rather 'rectangular'? Oblong means not square or round.

EB: according to my dictionaries, 'rectangular' also means not square. Seems to be the same problem with both terms. 'quadrangular' may be square or not. I don't have a solution for the various problems we have with this series, both two- and three-dimensional. 'linear' does not seem to be right for a three-dimensional shape, but we agreed to use 'oblong'. Also, the 1:1

ratio 'square' definitely does not fit into three-dimensional shape. A further problem is that e.g. an oblong fruit is definitely not square in diameter, it is circular, although in lateral view it is squared. Is 'cubic' necessarily 1:1:1? This needs discussion.

CB 2005: Page 17 oblong I suggest we consider quadrangular, as this includes rectangles and square, a four cornered or four angled figure. It could also cover the irregular fruit or other shapes we have which still have four corners/angles but are not really square. Agree that definitions for quadrangular and rectangular are related and these plus oblong be discussed together. I would favour quadrangular as the primary term with oblong, square, rectangular part of it.

ASL as with circular, in all botanical publications circular is accepted as the middle of the oblong range. I think that we need to use oblong. The Shorter Oxford Dictionary (actually the largest, longest) has the following definitions oblong – elongated in one direction usually as a deviation from an exact square or circular form, having the main axis longer than the transverse diameter. (Transverse oblong would have the main axis longer.) This allows for rounded oblongs as we have in plant parts. Rectangular is a figure having four sides and four right angles. It is a geometric term. A four sided figure with all its angles right angles and its opposite sides equal and parallel. A square is a rectangle with four equal sides. Quadrangular is having four angles.

Cubic is a solid figure with 6 equal square faces. **Cuboid** is a solid figure with 6 parallelograms, opposite pairs identical and parallel, but whose faces are not all equal.

1.1.2.12 Obovate

Inversely ovate; broadest above the middle, that is towards the apex. Length/width ratio of the basic shape: 2:1 to 1,5:1.

Compare the 'ovate' series which is broadest towards the base and 'obovoid' which applies to three-dimensional shape.

1.1.2.13 Obtriangular

Inversely triangular; with three more or less straight sides, broadest at the apex and narrowing towards the point of attachment. Length/width ratio of the basic shape: 2:1 to 1,5:1

The 'obtriangular' series also includes 'obdeltate', with a more specific length/width ratio.

Compare 'triangular' which is broadest at the base and 'obconic' which applies to three-dimensional shape.

1.1.2.14 Obtrullate

Inversely trullate; broadest above the middle and tapering towards the basal and apical ends, the lateral margins more or less straight but angled at the position of greatest width.

Length/width ratio of the basic shape: 2:1 to 1,5:1.

Compare the 'obovate' series which is less angular, and the 'rhombic' series which is broadest at the middle.

1.1.2.15 Orbicular

The term 'circular', of which 'orbicular' is a synonym, is preferred for UPOV use.

1.1.2.16 Ovate

Chicken-egg-shaped; broadest below the middle, that is towards the point of attachment, the margin entirely convex, although the apex may be either rounded or pointed. Length/width ratio of the basic shape: 2:1 to 1,5:1.

Compare the 'obovate' series which is broadest towards the apex and 'ovoid' which applies to three-dimensional shape.

1.1.2.17 Quadrangular

Rectangular; four-sided with opposite sides parallel and all angles approximately 90 degrees. The term 'oblong' is preferred for UPOV use.

EB: To check together with 'oblong'.

1.1.2.18 Rectangular

Quadrangular; four-sided with opposite sides parallel and all angles approximately 90 degrees. The term 'oblong' is preferred for UPOV use.

EB: To check together with 'oblong'.

1.1.2.19 Rhombic

Diamond-shaped; broadening towards the middle and tapering with more or less straight margins to the basal and apical end. Length/width ratio of the basic shape: 2:1 to 1,5:1.

Compare 'trullate' which is broadest below the middle and 'obtrullate' which is broadest above the middle.

1.1.2.20 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.

EB: To check together with 'oblong'.

1.1.2.21 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.

1.1.2.22 *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.

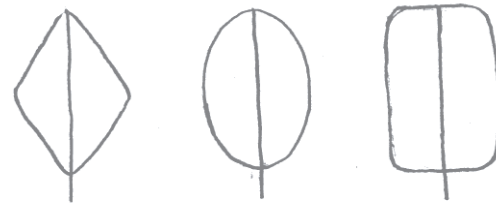
Compare the 'ovate' series which is less angular, and the 'rhombic' series which is broadest at the middle.

1.2 General Outlines of Other Simple Plane Figures (Those not Forming Part of the Length/Width Ratio Series)

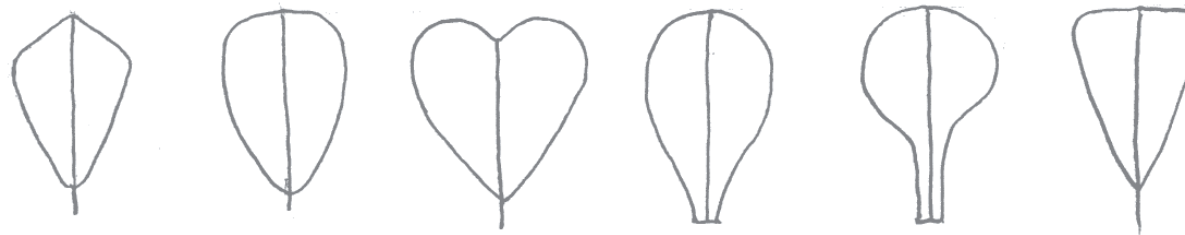
1.2.1 Illustrations



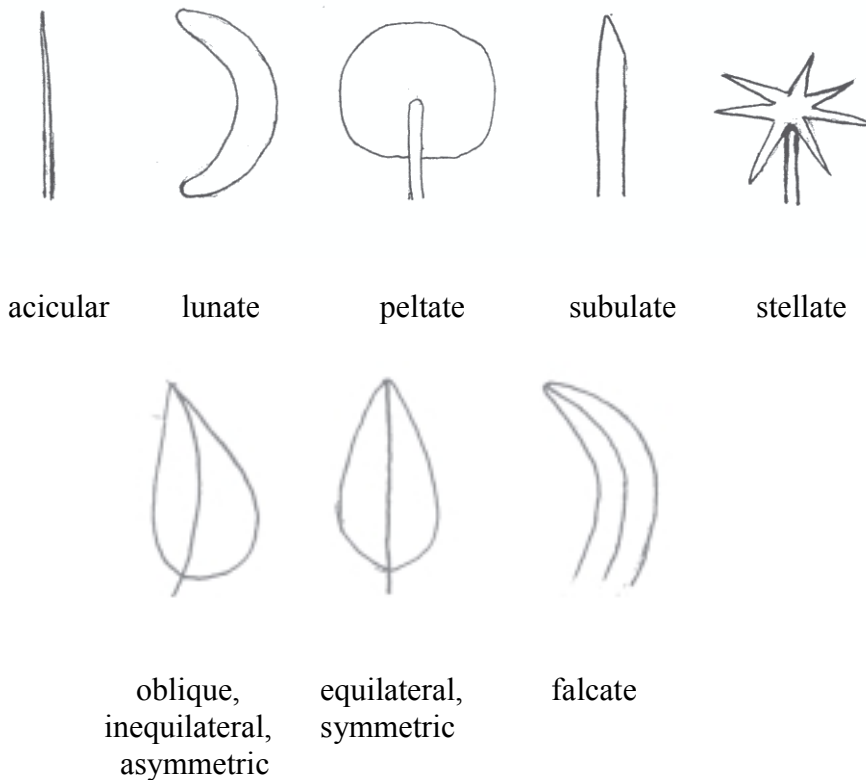
hastiform sagittate triangular semi-elliptic reniform trullate ovate cordiform



rhombic elliptic oblong



obrullate obovate obcordiform spatulate
(rather 'unguiculate?') clawed obtriangular



1.2.2 Definitions

1.2.2.1 *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.

1.2.2.2 *Clawed (Unguiculate)*

Abruptly contracted to a narrow, petiole-like basal portion.

Applies to petals and sepals.

Compare 'spatulate' which narrows more gradually towards the base.

EB: Which term is preferred – 'clawed' or 'unguiculate'?

CB 2005: Page 22 clawed I would prefer this term as it is already in guidelines and understood.

ASL prefer clawed –this is in general use for petals.

EB: OK

1.2.2.3 *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.

EB: Is this correct? Same situation as 'hastate' and 'hastiform' - that 'hastate' applies to the base and 'hastiform' applies to the full figure and 'cordate' applies to the base and 'cordiform' applies to the full figure?

CB 2005: Cordate can be applied to the full shape, not just the base.

ASL cordate/hastate are in general/common use for whole leaf shapes as well as for base shapes. We could UPOV use ie. cordiform for whole shapes and cordate for base shapes. Same for hastate/hastiform.

1.2.2.4 *Falcate*

Sickle-shaped; strongly curved sideways.

EB: Since this is a specific shape, I have not put it under 'symmetry'. OK?

ASL OK

1.2.2.5 *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.

1.2.2.6 *Lunate*

Crescent-shaped with more or less acute ends.

Compare 'reniform'.

EB: Where should the longitudinal axis be?

CB 2005: Page 23 Lunate and reniform. The axis would be vertical for the first and horizontal for the second.

ASL will be the shorter axis, mid way between the acute ends (in a symmetrical leaf)

EB: Please clarify.

1.2.2.7 *Obcordiform*

Inversely heart-shaped; with two equal, rounded, apical lobes divided by a deep sinus, and tapering fairly straightly to the base.

Compare 'obcordate' which applies to the apex and 'cordiform' which is broadest towards the base.

EB: Is this correct? Same as 'hastate' and 'hastiform'?

ASL same as for cordate etc

1.2.2.8 *Peltate*

Shield-shaped; applies to a stalked plant part, normally circular in shape, with the stalk attached to the lower surface instead of the margin.

1.2.2.9 *Reniform*

Kidney-shaped; thickly lunate with rounded ends.

Compare 'lunate'.

EB: Where should the longitudinal axis be?

CB 2005: Page 23 Lunate and reniform. The axis would be vertical for the first and horizontal for the second.

ASL same as for lunate

1.2.2.10 *Sagittate*

Arrowhead-shaped; gradually enlarged basally from an acute apex, with two more or less triangular basal lobes directed downward.

Applies to the base and overall outline.

Compare 'hastiform' of which the lobes are directed outwards and 'hastate' which applies to the base.

1.2.2.11 *Semi-elliptic*

An ellipse with the basal half cut off; rounded at the apex and flattened at the base.

ASL drawing is semi circular – I know this is in the elliptic series but perhaps the drawing should be more like half of fig 8 (broad oblate)

EB: OK.

1.2.2.12 *Spathulate*

See 'spatulate'.

1.2.2.13 *Spatulate (Spathulate)*

Spoon-shaped; attenuate at the base and rounded at the apex.

Compare 'clawed' ('unguiculate') (EB: *Which is preferred?*) which narrows more abruptly towards the base.

ASL we need both spatulate and clawed. Spatulate for leaves and clawed for petals.

EB: As I understand there is a shape difference between spatulate and clawed, spatulate narrowing less abruptly and clawed narrowing to a 'stalk'. The question was between clawed and unguiculate.

1.2.2.14 *Subulate*

Awl-shaped; tapering from a narrow base to a fine, sharp point.

1.2.2.15 *Unguiculate*

See 'clawed'.

2. BASE

2.1 Illustrations



decurrent attenuate acute obtuse rounded truncate cordate



sagittate hastate auriculate



oblique sheathing

2.2 Definitions

CB 2005: Under base and apex shapes, do we need a section giving direction on the use of shape or angle. We can use narrow acute and broad acute, however sometimes an angle may be better?

2.2.1 Acute

With straight to slightly convex margins terminating in a sharp or blunt tip at an angle of less than 90°.

Applies to the apex, base, etc.

Compare 'obtuse' where the angle is >90°.

Comment: In cases where it is useful to distinguish between 'narrow acute' and 'broad acute', one should remember that they should still both be $<90^\circ$.

2.2.2 Attenuate

Tapering gradually, with lateral margins concave. Generally more tapered than 'acute'.
Applies to the base.
Compare 'acuminate' which applies to the apex.

2.2.3 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.

2.2.4 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 general plane outline.

2.2.5 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.

2.2.6 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.

2.2.7 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 general plane outline.

2.2.8 Obtuse

With straight to convex margins terminating in a blunt tip at an angle of 90° or more.

Applies to the base, apex, etc.

Compare 'acute' where the angle is <90 °.

Comment: In cases where it is useful to distinguish between 'narrow obtuse' and 'broad obtuse', one should remember that they should still both be >90 °.

2.2.9 Pointed

A general term for a base or apex with concave or straight to slightly convex margins terminating in a sharp or blunt tip.

Compare 'acute' (<90°) and 'obtuse'(>90°).

2.2.10 Rounded

Curved like the outline of a circle.

Applies to the base, apex, etc. but not to be used for describing the general outline of a plane figure.

2.2.11 Sagittate

Arrowhead-shaped; with two equal, more or less triangular lobes directed downwards.

Applies to the base and overall outline.

Compare 'hastate' with triangular lobes directed outwards and 'auriculate' with rounded lobes directed outwards.

2.2.12 Sheathing

Surrounding a plant part and resembling a tube; e.g. the leaf base of a grass surrounding the stem.

2.2.13 Truncate

With the base (apex) abruptly rounded to a straight, transverse, basal (distal) margin, as if cut off.

Applies to the base and apex.

3. APEX

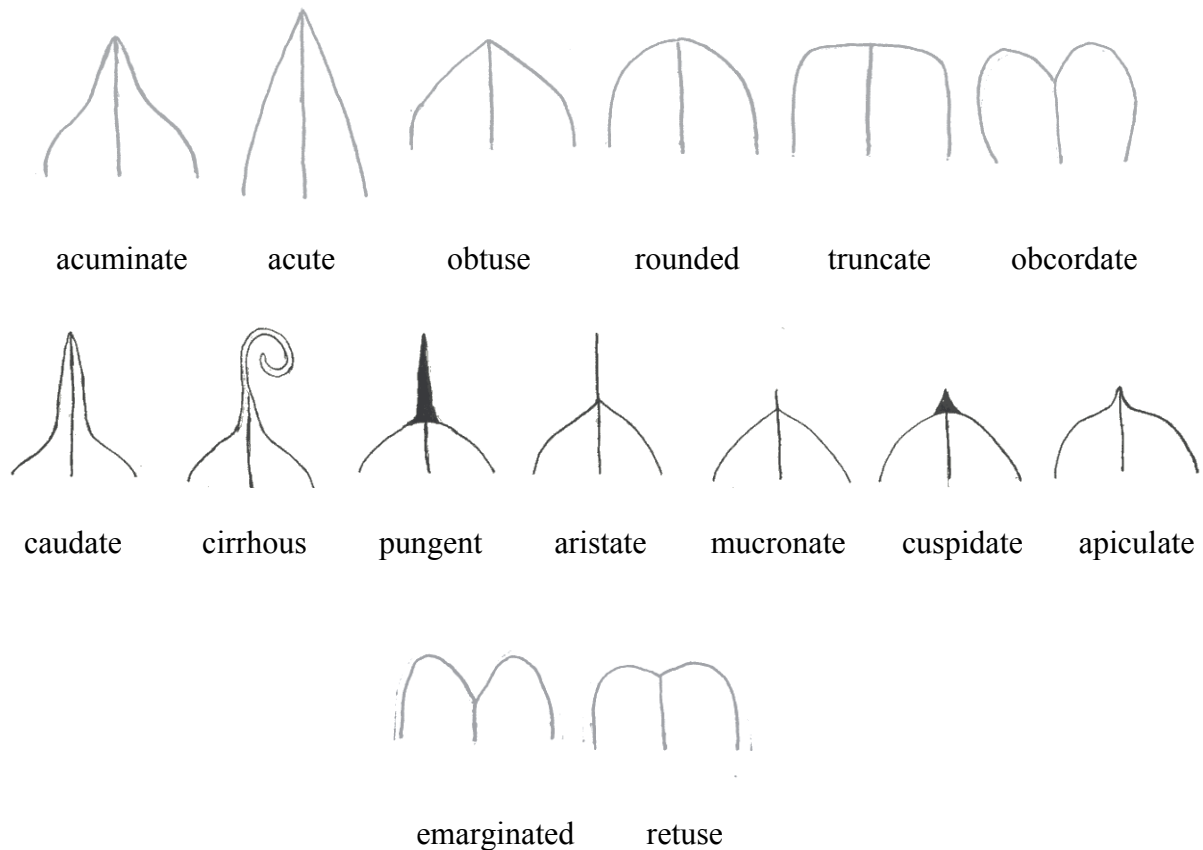
3.1 General Shape of Apex, Excluding Most Apical Prolongation (Tip) or Minor Apical Incision

3.1.1 Illustrations

Page 27 APEX 3.1.1 drawings

ASL Drawings first line - acuminate is a tip term – the apex of this drawing is obtuse. Acute is both this drawing is of an acute apex with an acute tip. Rest of drawings are for the apex. The first 2 need to have lines in to show the tip separate from the apex. Line two are tips, line three are apex. Order of drawings could be sorted.

EB: I appreciate ASL’s comments and have had the same thoughts. I have often wondered whether acuminate should be considered a tip char or an apex char but sometimes I think it can be both. I decided to put acuminate with the apex row (row 1) because we have apiculate and caudate in the next row (tip) which affect the tip only. Obcordate was listed together with the apex terms (first row) because it affects the whole apical part but emarginate and retuse were listed separately because they may only affect the very apical part. As far as the order goes, I tried to go from narrow to broad in row 1 and 3. In row 2 I tried an order but that was more difficult. We could change it.



3.1.2 Definitions

3.1.2.1 *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.

Comment: In some cases it could be helpful to distinguish between ‘short acuminate’, ‘medium acuminate’ and ‘long acuminate’.

3.1.2.2 *Acute*

With straight to slightly convex margins terminating in a sharp or blunt tip at an angle of less than 90 °.

Applies to the base, apex, etc.

Compare 'obtuse' where the angle is >90 °.

Comment: In cases where it is useful to distinguish between 'narrow acute' and 'broad acute', one should remember that they should both still be <90 °.

3.1.2.3 *Obcordate*

Inversely heart-shaped; with two equal, rounded, apical lobes divided by a deep sinus, and tapering fairly straightly to the base.

Applies to general plane outline and the general shape of the apex.

Compare 'cordate' which has the sinus at the base and 'obcordiform' which applies to general plane outline.

Also compare 'emarginate' and 'retuse' where the incisions are too small to affect the general shape.

CB 2005: Page 28 3.1.2.3 obcordate is also known as cleft. Cleft and emarginate are often confused.

3.1.2.4 *Obtuse*

With straight to convex margins terminating in a blunt tip at an angle of 90 ° or more.

Applies to the apex, base, etc.

Compare 'acute' where the angle is <90 °.

Comment: In cases where it is useful to distinguish between 'narrow obtuse' and 'broad obtuse', one should remember that they should both still be >90 °.

3.1.2.5 *Pointed*

A general term for a base or apex, etc. with straight to slightly convex margins terminating in a sharp or blunt tip.

Compare 'acute' (<90°), obtuse (>90°).

3.1.2.6 *Rounded*

Curved like the outline of a circle.

Applies to the base, apex, etc. but not to be used for describing the general outline of a plane figure.

3.1.2.7 *Truncate*

With the apex (base) abruptly rounded to a straight, transverse, distal (proximal) margin, as if cut off.

Applies to the base and apex.

3.2 Shape of Most Distal Prolongation (Tip) or Minor Apical Incision

Comment

These expressions may be handled separately from those concerning the general shape of the apex, since different combinations between these two categories are possible, e.g. a first characteristic: 'general shape of apex: acuminate, acute, obtuse, rounded' together with a second characteristic: 'emargination at apex: absent, present' or 'apiculate tip: absent, present'.

3.2.1 Apiculate

Terminating abruptly in a small sharp but not rigid point which is both vascular and laminar in nature.

Applies to the most distal part of the apex (tip).

Compare 'acuminate' where the tapering is less abrupt and 'cuspidate' which is rigid.

3.2.2 Aristate

Awned; bearing a stiff, straight, bristle-like continuation of the primary vein.

Applies to the most distal part of the apex (tip) or used for other parts where bristles may occur.

Compare 'mucronate' where the point is shorter.

3.2.3 Barbed, Barbate

Terminating in a reflexed hook.

3.2.4 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.

3.2.5 Cirrhou

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.

3.2.6 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.

3.2.7 Emarginate

Notched; with an acute, deep, central sinus.

Applies to the apex.

Compare 'retuse' and 'obcordate'.

3.2.8 Mucronate

Terminating abruptly in a short, hard point which is a continuation of the primary vein and is only vascular in nature.

Applies to the most distal part of the apex (tip).

Compare 'aristate' where the point is longer and 'cuspidate' which is both vascular and laminar.

3.2.9 Pungent

Terminating in a long, rigid, sharp point which is both vascular and laminar in nature.

Applies to the most distal part of the apex (tip).

Compare 'cuspidate' where the point is shorter.

3.2.10 Retuse

Notched; with an obtuse, shallow, central sinus.

Applies to the apex.

Compare 'emarginate' and 'obcordate'.

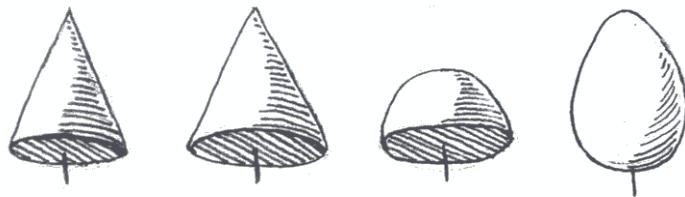
SECTION B: THREE-DIMENSIONAL SHAPES

1. SIMPLE BASIC THREE-DIMENSIONAL SHAPES (THOSE FORMING PART OF THE LENGTH/DIAMETER RATIO SERIES)

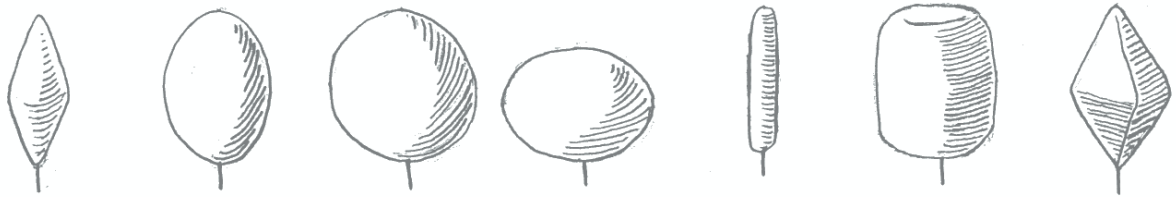
Comment

For more information on the length/diameter ratios, these shapes can be related to their two-dimensional counterparts (see chart).

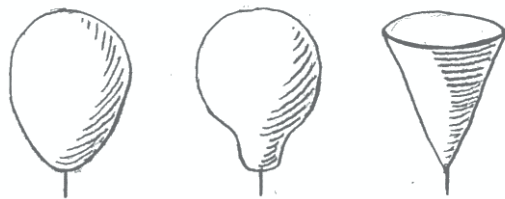
1.1 Illustrations



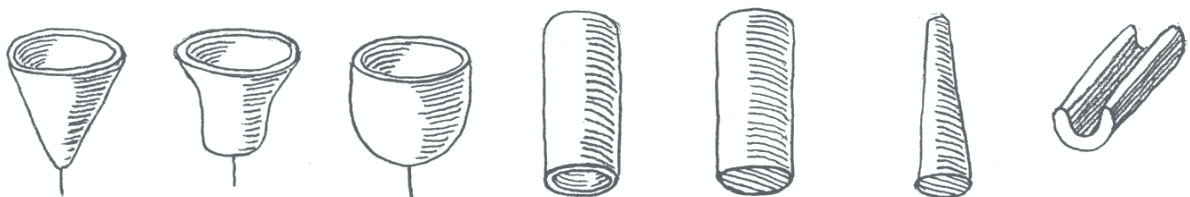
conic deltoid semi-ellipsoid ovoid



fusiform ellipsoid spheric obloid linear oblong rhomboid



obovoid pyriform obconic



funnel -
shaped campanulate cup-shaped tubular cylindric terete canaliculate



acicular

filiform

spiral

capitate

lenticular

1.2 Definitions

1.2.1 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.

1.2.2 Cuneiform

See 'obconic'.

EB: We could delete this synonym.

ASL yes

1.2.3 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.

1.2.4 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.

1.2.5 Globose

See 'spheric'.

ASL In common use as a UPOV term. Should definition be here as well as for spheric or should one or other term be encouraged? I like globose – it is not as mathematical sounding as spheric – more suited to less precise shapes found in fruit.

EB: I agree.

1.2.6 Linear

Long and narrow, with the lateral margins parallel. Length/diameter ratio more than 6:1, same as 'very narrow oblong'.

Forms part of the 'oblong' series.

Applies to two- and three-dimensional shape.

EB: Is this OK? We decided to use 'oblong' for 3-dimensional shapes also, therefore I suppose we may use 'linear' here as well???

ASL OK

1.2.7 Obconic

Inversely conic; tapering evenly from a circular apex to an acute base. Length/diameter ratio of the basic shape: 2:1 to 1,5:1.

The obconic series also includes 'obdeltoid', with a more specific length/diameter ratio.

Compare 'obtriangular' which applies to two-dimensional shape and 'conic' which narrows towards the apex.

1.2.8 Obloid

Transverse ellipsoid; shorter than broad, broadest at the middle with margins tapering convexly and evenly to the base and apex, the longest dimension orientated transversely.

Length/width ratio of the basic shape: 1:1,5 to 1:2

Forms part of the 'ellipsoid' series.

1.2.9 Oblong

With more or less parallel sides terminating obtusely at the base and apex, circular in transverse section. Length/diameter ratio of the basic shape: 2:1 to 1,5:1.

Applies to two- and three-dimensional shape.

The 'oblong' series also includes

EB: See comments under 'linear' and under 'oblong' in the plane shape section.

1.2.10 Obovoid

Inversely ovoid; broadest above the middle, that is towards the apex. Length/width ratio of the basic shape: 2:1 to 1,5:1.

Compare the 'ovoid' series which is broadest towards the base and 'obovate' which applies to two-dimensional shape.

1.2.11 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.

1.2.12 Rhomboid

Diamond-shaped; square in transverse section, broadest and angled at the middle, tapering with more or less straight margins to each end. Length/width ratio of the basic shape: 2:1 to 1,5:1.

1.2.13 Spheric (Globose)

Ball-shaped; round in outline when viewed from any angle.

1.2.14 Spheroid

EB comment: The Oxford Dictionary and some botanical glossaries define 'spheroid' as 'broad ellipsoid'. Radford defines it as with a ratio of 1:1. What should we do? I propose to delete.

CB 2005: Page 34 1.2.14 I suggest we keep spheroid as a synonym for spheric, although spheroid is not always 1:1, but is used generally for round. Plants are usually irregular anyway.

ASL Delete

2. OTHER SIMPLE THREE-DIMENSIONAL SHAPES (THOSE NOT FORMING PART OF THE LENGTH/DIAMETER RATIO SERIES)

2.1 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.

2.2 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.

2.3 Canaliculate

Channeled, gutter-shaped; long and narrow, with a longitudinal groove.

2.4 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.

2.5 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.

2.6 Cylindric

Solid, long and narrow with an even diameter, circular in transverse section.
Compare ‘tubular’ which is hollow.

2.7 Filiform

‘Thread-like’.

2.8 Funnel-Shaped (Infundibular)

With an obconic tube gradually diverging distally.
Compare ‘campanulate’ and ‘cup-shaped’ which are rounded basally.

2.9 Fusiform

Spindle-shaped; long and narrow, circular in transverse section, thick in the middle and tapering to both ends.

2.10 Infundibular

See ‘funnel-shaped’.

2.11 Inflated

Blown up; hollow and swollen in appearance.

2.12 Lenticular

Lens-shaped; doubly convex.

EB comment: We could also add 'narrow' to this definition as in RHS but it appears that it should be narrow in lateral view and circular perpendicular to that. We can't just say narrow because that would give the impression that the shape is elliptic in all lateral views. Do you agree that the above definition is sufficient?

CB 2005: Page 35 Lenticular. The definition is enough on its own.

ASL All the publications seem to assume one knows what a lens looks like. Leave definition as is.

EB: OK.

2.13 Pear-shaped

See 'pyriform'.

2.14 Pyriform

Pear-shaped; obovoid with a contraction towards the base.

2.15 Semi-ellipsoid

Ellipsoid with the basal half cut off; rounded at the apex and flattened at the base.

2.16 Spiral

Corkscrew-shaped; the circumference even or diminishing.

2.17 Stellate

Star-shaped.

2.18 Terete

Long and slender, tapering towards the apex, circular in transverse section.

2.19 Tubular

Hollow, long and narrow with an even diameter, circular in transverse section.
Compare 'cylindric', which is solid.

**SECTION C: SURFACE (EXTERNAL TEXTURE), COLOR PATTERN, GLOSSINESS
AND VISIBILITY, TEXTURE (INTERNAL TEXTURE) AND RESILIENCE**

1. ILLUSTRATIONS

Hairiness and Spininess:



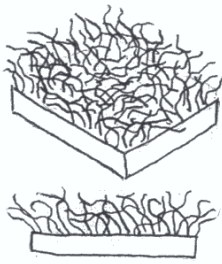
aculeate



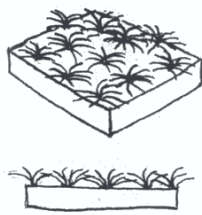
spinose



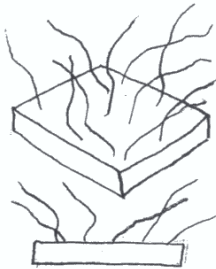
barbed; barbate



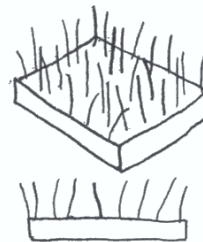
lanate



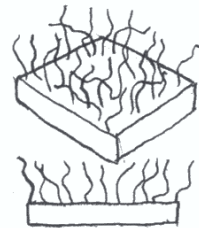
floccose



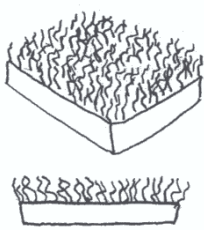
arachnoid



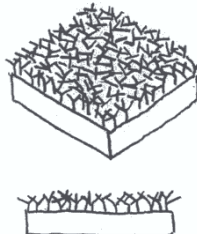
pilose



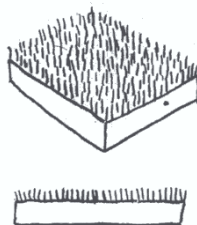
villous



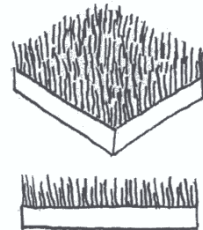
tomentose



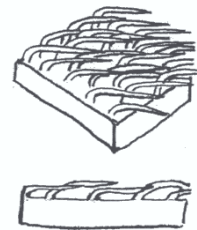
pannose



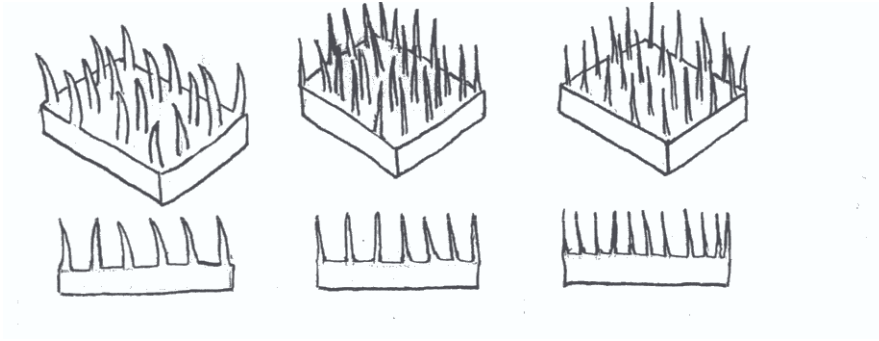
pubescent



velutinous



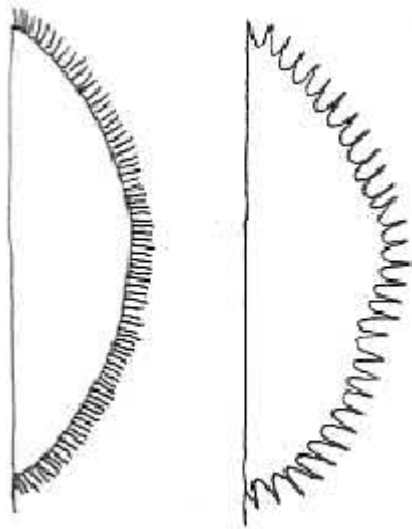
strigose



setose

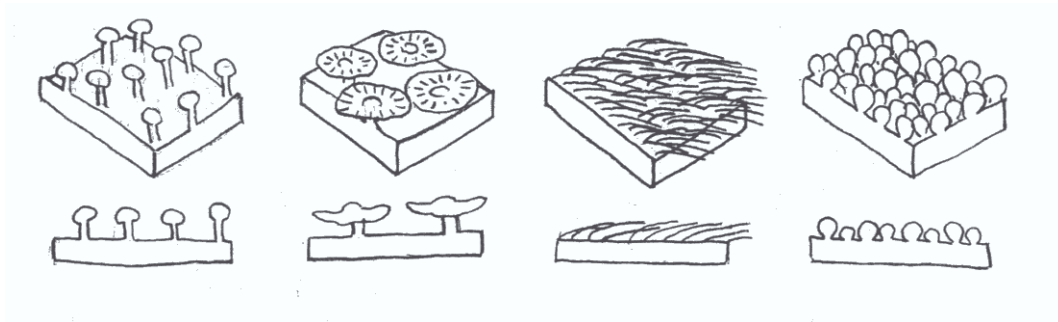
hispid

hirsute



ciliate

fimbriate



glandular

lepidote

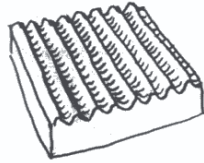
sericous

papillose

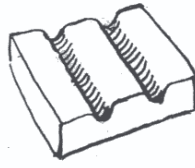
Texture:



aciculate



striate



grooved



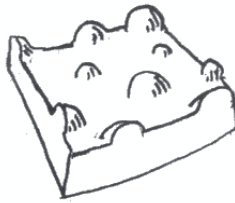
reticulate



corrugated



rugose



bullate

Color pattern:



aciculate



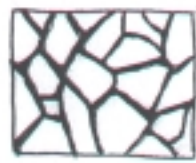
striate



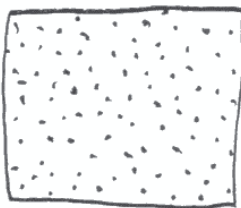
striped



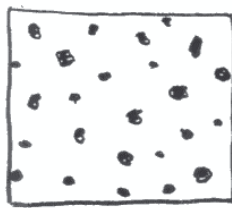
banded



reticulate



dotted



spotted



maculate



mottled

2. DEFINITIONS

2.1 Surface (External Texture)

2.1.1 Aciculate

With fine, straight stripes, like needle scratches, lying in different directions, and of a different color or texture.

Compare 'striate' (parallel lines).

2.1.2 Blistered

See 'bullate'.

2.1.3 Bullate

Blistered; the surface covered with irregular blister-like convexities.

EB: What is the difference between this and 'papillose'?

ASL bullate has flatter broader convexities – papillose has 'small, nipple like projections'

2.1.4 Bumpy

A general term for a surface with rounded lumps or swellings.

2.1.5 Coarse

See 'rough'.

2.1.6 Corrugated

Wrinkled, crumpled or folded into alternating furrows and ridges, e.g. *Papaver* petals in the bud.

Compare 'rugose'.

2.1.7 Even

Smooth; opposite of rough.

For internal texture characteristics the term 'fine' is used.

2.1.8 Farinaceous (Farinose)

Mealy; with a whitish, powdery covering.

Compare 'granular'.

2.1.9 Glabrous

Hairless.

2.1.10 Glandular

Bearing glands; with stalked or sessile glands.

2.1.11 Granular (Grainy)

Covered with small granules or grains.
Compare 'farinaceous'.

2.1.12 Grooved

With one or more narrow channels'

2.1.13 Papillose

Pimpled, with small, rounded, soft to firm, unequal bumps.

EB: What is the difference between this and 'bullate'?

CB 2005: Page 40 2.1.3 Papillose is a surface with small soft protuberances, sometimes hair. Blisters are not protuberances. Bullate are blister like and larger, often more rigid.

ASL small nipple like projections rather than flat blister like

2.1.14 Prominent

Standing out clearly from the surrounding surface, e.g. veins raised on the abaxial side of a leaf.

Compare 'conspicuous', which is 'clearly visible'.

2.1.15 Pubescent

Either a general term for 'hairy' or a specific type of hairiness.

EB: This is according to most references. To decide.

CB 2005: Page 41 2.1.15 Pubescence is a specific type of hair, however is generally used to describe the presence of short, fine hair. If we decide to define as a hair type only, then this could cause confusion as in many guidelines could give the wrong information. Suggest we define it as a hair type, but put a note that it may be used as a general term for fine, short hair.

ASL Agree – in very common use as a general term for 'hairy'. Can be used as a specific term for soft hairs. Often used in publications e.g. Leaf pubescent (hairy) or leaf glabrous (no hairs) Do we have a term for soft hairs other than pubescent? I would prefer it kept as a general term for hairy.

2.1.16 Resinous

Covered with or exuding resin, which may be sticky.
Compare 'viscid'.

2.1.17 Reticulate

Netted; with a fine network contrasting in color or texture, e.g. veins on the abaxial side of a leaf.
Compare 'rugose' which has convex areas in between the netted venation.

2.1.18 Rough

Coarse; opposite of 'even' and 'smooth'.

2.1.19 Rugose

Impressed wrinkled; as in a leaf with convex areas in between the netted venation.
Compare 'corrugated' and 'reticulate'.

2.1.20 Smooth

Even; opposite of rough.
For internal texture characteristics the term 'fine' is used.

2.1.21 Striate

Finely striped; with more or less parallel lines of a different color, or grooves or ridges.
Compare 'aciculate' (needle scratches in different directions).

2.1.22 Viscid

Sticky or gummy.
Compare 'resinous', in which case the stickiness is due to resin.

2.1.23 Wrinkled

With folds or creases; a general term.
Compare 'corrugated' and 'rugose' where the wrinkling has a more specific nature.

2.2 Color Pattern

2.2.1 Aciculate

With fine, straight stripes, like needle scratches, lying in different directions, and of a different color or texture.

Compare 'striate' where the stripes are more or less parallel.

2.2.2 Banded

Broadly striped; with broad, more or less parallel stripes of a different color.

Compare 'striped' (narrower) and 'striate' (much finer).

2.2.3 Blotched

See 'maculate'.

2.2.4 Dotted

Finely spotted and of a different color, as if made by a pen.

Compare 'spotted' where the spots are larger.

2.2.5 Maculate (Blotched)

With sharply outlined blotches of irregular size and shape and of a different color.

Compare 'mottled' which is not sharply outlined and 'spotted' which is not necessarily irregular and 'dotted' where the spots are very fine.

ASL Maculate seems to be in common use as a general term for spotted. Perhaps we should just use blotched.

2.2.6 Marbled

Resembling marble in color pattern.

EB: Example for drawing? Do we need this?

ASL Drawing would probably be difficult. Could add 'irregularly mottled and veined' to the definition

2.2.7 Mottled

With differently colored blotches that are not sharply outlined.

Compare 'maculate' (sharply outlined).

2.2.8 Reticulate

Netted; with a fine network contrasting in color or texture, e.g. veins on the abaxial side of a leaf.

2.2.9 Speckled

See 'spotted'.

2.2.10 Spotted (Speckled)

A general term for sharply outlined circular or differently shaped markings of a different color.

Compare 'dotted' where the spots are very fine, 'maculate' where the spots are specifically irregular in size and shape and 'mottled' which is not sharply outlined.

2.2.11 Striate

Finely striped; with more or less parallel lines of a different color, or grooves or ridges. Compare 'striped' (broader), 'banded' (much broader) and 'aciculate' (needle scratches in different directions).

2.2.12 Striped

With more or less parallel lines or narrow bands of contrasting shade or color. Compare 'striate' (narrower) and 'banded' (broader).

2.3 Glossiness and Visibility

2.3.1 Conspicuous

Clearly visible; evident.

Compare 'prominent' which has to do with the surface and compare 'conspicuous'.

2.3.2 Dull

Not shiny; opposite of 'glossy'.

CB 2005: Page 44 2.3.2 Suggest matt as a synonym for dull
EB 2005: I agree.

2.3.3 Glauous

Coated with a whitish or greyish waxy bloom which rubs off easily.

CB 2005: Page 44 2.3.3 Suggest that bloom be added as a synonym for glauous. Bloom is a somewhat more general term for glauous.

EB 2005: OK but how do we list it? Bloom is a noun and not a pronoun as the other terms.

2.3.4 Glossy

Shiny; opposite of 'dull'.

2.3.5 Inconspicuous

Not clearly visible; obscure.
Compare 'conspicuous'.

2.3.6 Indistinct

Not to be used for 'inconspicuous' for UPOV purposes. This term is reserved for 'distinctness' in the DUS Test.

2.3.7 Opaque

Not transmitting light, as opposed to 'translucent' and 'transparent'.

2.3.8 Translucent

Semi-transparent; transmitting light diffusely.
Compare 'opaque' and 'transparent'.

2.3.9 Transparent

Transmitting light clearly; enabling one to see through clearly.
Compare 'opaque' and 'translucent'.

2.3.10 Uniform

Not to be used for 'evenness of color' for UPOV purposes. This term is reserved for 'uniformity' in the DUS Test.

2.4. Types of Hair and Hair-Like or Prickly Appendages

2.4.1 Aculeate (Prickly)

Bearing prickles; with stiff, sharp projections from the superficial layers of the plant part.
Compare 'spinose' (from the superficial and deeper layers).

2.4.2 Arachnoid

Cobwebby; with loosely tangled, long, fine, white hair.

2.4.3 Barbate

Bearded; with tufts of long hairs.

2.4.4 Barbed

With short, rigid, hooked to reflexed bristles or points, like the barb of a fish-hook.

2.4.5 Bearded

See 'barbate'.

2.4.6 Bristly

With stiff, strong trichomes.

A general term including both 'hispid' (harsh to the touch) and 'setose' (spiny to the touch).

2.4.7 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.

2.4.8 Felted

See 'pannose'.

2.4.9 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.

2.4.10 Floccose

With tufts of long, soft hairs, usually rubbing off easily.'

2.4.11 Glabrate

Almost hairless.

2.4.12 Glabrescent

Becoming hairless with age.

EB: Some references have 'glabrate' and 'glabrescent' the other way round.

ASL I agree with the way you have put it.

2.4.13 Glabrous

Bald; without trichomes, smooth, hairless.

2.4.14 Glandular

With short-stalked or sessile glands or with hairs bearing glands at their tips.

2.4.15 Hirsute

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.

2.4.16 Hispid

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.

ASL OK

2.4.17 Lanate

Woolly; with long, somewhat matted, tangled trichomes.

Compare 'tomentose' with shorter, denser hairs and 'pannose' which is even denser (felted).

2.4.18 Lepidote (Leprous)

Peltate-scaly; with small stalked scales.

2.4.19 Pannose

Felted; densely covered with short, matted, intertwined hairs.’

Compare ‘tomentose’ which is less matted.

EB: Some references have drawings with branched hairs – so they’re not trichomes (trichomes are unbranched if I’m correct).

ASL My definitions say trichomes are ‘any hair like growths, glandular or eglandular from the epidermis’ they do not mention branching so one assumes that a branched hair from the epidermis could be called a trichome.

2.4.20 Pilose

With long, soft, sparse, slender trichomes.

Compare ‘villous’ which is more shaggy.

2.4.21 Prickly

With sharp-pointed outgrowths from the superficial layers, e.g. the bark or epidermis, containing no conducting tissue.

Applies to surface and margins, although a prickly margin is normally referred to as ‘aculeate’.

Compare ‘spinose’ and ‘thorny’.

EB: This does not agree totally with TWF/35/11 par. 43. I checked various publications and the main difference seems to be that prickles are from the epidermal layers only whereas spines and thorns are from the deeper layers as well.

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

ASL There does not appear to be any consistency in the literature. I have looked at two recent publications – both have spines related to leaves but prickles are woody and develop from both the epidermal and sub epidermal layers. (The opposite from the above)

The best thing would be to agree on a UPOV definition and say this is what we are going to use.

EB: I agree – to decide what we want to use.

2.4.22 Pubescent

Downy; with short, fine, soft, erect, slender trichomes.

2.4.23 Scabrous

Rough to the touch; with stiff, coarse, ascending trichomes.

EB: It appears that it is not a specific trichome type but rather refers to the roughness. See RHS.

ASL agree = roughness

2.4.24 Sericeous

Silky; with fine, long, adpressed trichomes.

2.4.25 Setose, Setaceous

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..

2.4.26 Spine

A rigid, sharply pointed modified organ or part of an organ e.g. a modified stem or reduced branch, leaf, stipule, etc. Contains superficial as well as deeper layers.

Compare 'prickle' which arises from the superficial layers only and 'thorn' which can be used synonymously to 'spine' but normally applies to modified stems only.

CB 2005: Page 45 2.5 The use of prickle, spine and thorn are often confused and misunderstood. For the Blackberry guideline revision I have concluded the following.

Spine: tough, usually woody structure, exogenous, contains vascular tissue and has a sharp point found on the leaf, stem and root.

Prickle: a type of small spine found usually on a leaf. A prickle is not in a leaf axil, subtending a bud, lacks vascular tissue and is exogenous.

Thorn: a type of spine, usually of larger size, sharp pointed, hard outgrowth from stem wood.

Could be added to 2.5 as 2.5.4-.6

2.4.27 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).

2.4.28 Squamose (Scurfy)

Scaly; with minute adpressed scales.

2.4.29 Strigose

With stiff, sharp, coarse, adpressed, bristly trichomes, often swollen at the base.

Compare 'setose' with erect trichomes.

2.4.30 Thorn

A rigid, sharply pointed modified organ or part of an organ, normally a modified stem. Contains superficial as well as deeper layers.

Compare 'prickle' which arises from the superficial layers only and 'spine' which can be used synonymously to 'thorn' but may apply to other modified organs as well, e.g. a leaf or stipule, etc.

CB 2005: Page 45 2.5 The use of prickle, spine and thorn are often confused and misunderstood. For the Blackberry guideline revision I have concluded the following.

Spine: tough, usually woody structure, exogenous, contains vascular tissue and has a sharp point found on the leaf, stem and root.

Prickle: a type of small spine found usually on a leaf. A prickle is not in a leaf axil, subtending a bud, lacks vascular tissue and is exogenous.

Thorn: a type of spine, usually of larger size, sharp pointed, hard outgrowth from stem wood.

Could be added to 2.5 as 2.5.4-.6

2.4.31 Thorny

See 'spinose'.

2.4.32 Tomentose

Densely woolly; with short, matted, interwoven trichomes.

'Densely and softly matted-lanate.'

Compare 'pannose' which is even denser and more matted (felted) and compare 'lanate' with longer, less matted hairs.

2.4.33 Trichome

Unbranched hair-like outgrowth from the epidermis.

ASL add with or without glands?

EB: We could add that.

2.4.34 Velutinous

Velvety; with long, dense, straight trichomes.

Compare 'tomentose' with interwoven trichomes.

2.4.35 Villous

Shaggy; with long, slender, soft trichomes.

Compare 'pilose' which is less shaggy.

Terms are derived from A.E. Radford, Vascular Plant Systematics and RHS Encyclopedia of Gardening.

EB: I don't think we need to refer to Radford any more, the definitions have been extracted from various references.

2.5 Scales

2.5.1 Scaly

Bearing scales.

2.6 Spininess

2.6.1 Aculeate (Prickly)

Bearing prickles; with stiff, sharp projections from the superficial layers of the plant part.
Compare 'spinose'.

2.6.2 Prickly

See 'aculeate'.

2.6.3 Spinose (Spiny, Thorny)

Bearing spines; with stiff, sharp projections from the superficial and deeper layers of the plant part.
Compare 'aculeate'.

2.7 Texture (Internal Texture) and Resilience

EB: To be taken out of this section?

2.7.1 Cartilaginous

Firm and tough, like cartilage.
Compare 'coriaceous' which is more flexible.

2.7.2 Coriaceous

Leathery; thick, tough and flexible.
Compare 'cartilaginous' which is more firm.

2.7.3 Crustaceous

Thin, hard and brittle.

2.7.4 Fibrous

With tough strands.

2.7.5 Fine

Not textured; smooth, opposite of 'rough'.
For surface characteristics the term 'smooth' or 'even' is used.

2.7.6 Fleshy

Pulpy; succulent but firm, easy to cut.

2.7.7 Flexuous

Resiliently bendable, like a whip.

EB: Is this correct?

CB 2005: Page 46 2.6.7 Flexuous may be better defined as bending or curving in alternating and opposite directions. I think this is in the wrong place as stems can be flexuous.

EB 2005: Stems can also be rigid, so perhaps we should divide this section in two: one for internal texture and one for resilience.

ASL can it also be wavy?

2.7.8 Ligneous

Woody.

2.7.9 Membranous

Like a membrane; thin and somewhat transparent.
Compare 'papyraceous' which is more opaque.

2.7.10 Papyraceous, Papery

With the consistency of paper; thin and somewhat opaque.
Compare 'membranous' which is more transparent.

2.7.11 Rigid

Stiff; not easily bendable.

2.7.12 Rough

Textured; coarse, opposite of 'fine'.

2.7.13 Smooth

EB: Do we use this for internal texture?

ASL possibly but more likely to use 'fine'

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Section D margins 1 Drawings

**ASL I don't like the drawing for bidentate – it should be one big tooth one small tooth
Rather than big teeth with smaller teeth on sides**

SECTION D: MARGINS

1. ILLUSTRATIONS



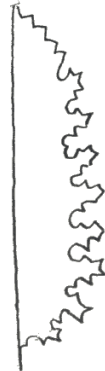
entire



denticulate



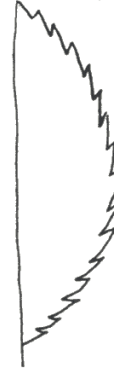
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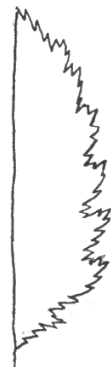
bidentate



serrulate



serrate



biserrate



crenulate



crenate



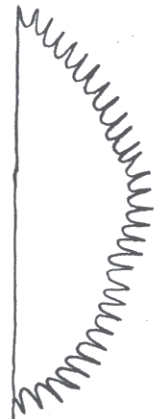
bicrenate



erose



ciliate



fimbriate



repand



sinuate



crispate



undulate

2. DEFINITIONS

2.1 Bidentate

Doubly dentate; with the dentations themselves dentate.

ASL Doubly dentate with the margin composed of alternate larger and smaller teeth

2.2 Bicrenate

Doubly crenate; with the crenations themselves crenate.

ASL with alternate large and small crenations

2.3 Biserrate

Doubly serrate; with the serrations themselves serrate.

ASL with alternate large and small serrations.

2.4 Ciliate

Bearing a marginal fringe of fine trichomes (outgrowths from the epidermis).

Compare 'fimbriate'.

EB: To compare wording in TGP/14.2.2.

CB 2005: Page 49 2.4 Either definition would be OK.

2.5 Crenate

Scalloped, with rounded teeth.

Compare 'crenulate' which is finer as well as 'dentate' and 'serrate' where the teeth are sharp.

2.6 Crenulate

Finely crenate; with minute rounded teeth.

Compare 'crenate' which is coarser.

EB: To delete all the terms ending in '-ulate', which means 'minute'? I have deleted most others.

CB 2005: Page 50 2.6, 2.9, 2.17 Agree that they are not essential as just finer versions of 2.5, 2.8, 2.16. Is it unlikely that distinctness could be decided on a serrate v serrulate leaf variety?

ASL Agree. If there were definite differences an additional characteristic could be used eg. Size of crenations

2.7 Crispate

With the margin curled or crumpled and irregularly twisted.

2.8 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.

2.9 Denticulate

EB: To delete?

ASL Yes also 2.17 serrulate

2.10 Entire

With an undivided margin; not toothed or lobed.

2.11 Eroze

Gnawed; with an irregularly toothed margin, as if chewed.

2.12 Fimbriate

Bearing a marginal fringe of hair-like appendages extending not only from the epidermis but from the deeper layers as well.

Compare 'ciliate'.

EB: To compare wording in TGP/14.2.2.

CB 2005: Page 50 2.12 Is fimbriate in TG/14.2.2 Draft 2?

2.13 Involute

With margins (margin?) rolled towards the adaxial surface.

Compare 'revolute' with margins (margin?) rolled downwards.

ASL Can use the plural as both margins will be rolled

EB: OK.

2.14 Repand

Shallowly sinuate.

Compare 'undulate' which is wavy perpendicular to the plane of the plant part.

2.15 Revolute

With margins (margin?) rolled towards the abaxial surface.

Compare 'involute' with margins (margin?) rolled upwards.

2.16 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.

2.17 Serrulate

EB: To delete?

2.18 Sinuate

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'.

EB: To check the above comment.

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.

ASL As I understand – the blade of the leaf is flat but the margin winds strongly inward and outwards

EB: I agree. Is the definition OK? ASL As sinuate but the margin winds up and down

2.19 Undulate

Wavy perpendicular to the plane of the plant part.

Compare 'repand' and 'sinuate' which are wavy in the plane of the plant part.

ASL As sinuate but the margin winds up and down

EB: I agree. Is the definition OK?

SECTION E: GROWTH HABIT; RELATIVE POSITION, GROUPING, FUSION; ATTITUDE, ORIENTATION, COURSE; SYMMETRY

EB: To say 'plant habit', 'growth habit' or 'habit'?





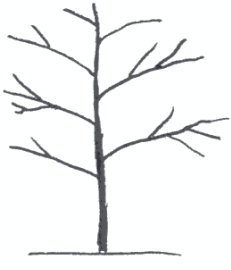




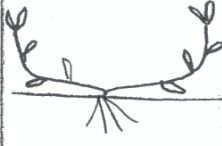




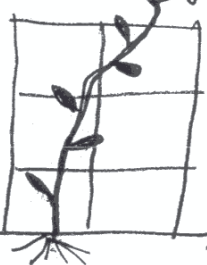
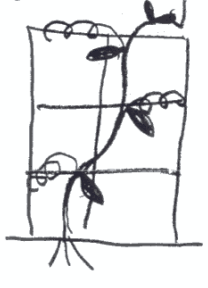
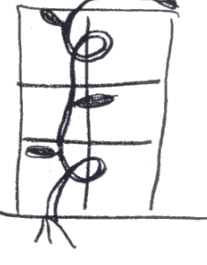
EB: The different subsections are not totally separated – some terms appear to belong in more than one section. However, I thought it could be useful to group the terms into smaller sections. Some terms have been repeated in different sections. We have to decide where they belong.

CB 2005: Page 51 section e Should we include here plant form and type? These are used where growth habit does not fit or for separation. e.g deciduous, evergreen, rosette, bushy, climber etc I prefer habit as we can have plant habit, branching habit.

ASL Either plant habit or growth habit. When we just use habit it is qualified e.g. tree: habit. Bush fruits are plant: growth habit.

1. ILLUSTRATIONS



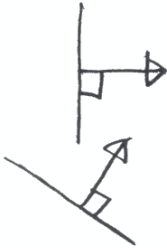


















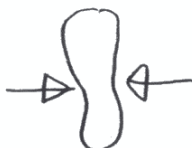
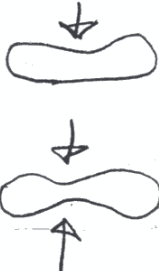
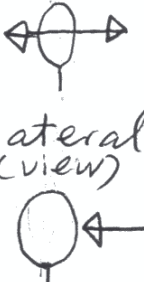

Habit (preliminary sketches):

<p>arborescent (tree-like)</p> 	<p>columnar</p> 	<p>fastigiata</p> 	<p>upright</p> 	<p>spreading</p> 
<p>drooping</p> 	<p>weeping</p> 	<p>divaricate</p> 	<p>ramified</p> 	
<p>decumbent</p> 	<p>procumbent (not rooting)</p> 	<p>stoloniferous (rooting)</p> 	<p>prostrate</p> 	<p>reclining</p> 
<p>clambering</p> 	<p>climbing</p> 	<p>twining</p> 		

Relative position (preliminary sketches):

<p>apical distal terminal</p> <p>axillary</p> <p>basal proximal</p>	<p>upper inner adaxial ventral</p> <p>lower outer abaxial dorsal</p>	<p>exserted (e.g. stamens)</p>	<p>included (e.g. stamens)</p>	<p>oblique (e.g. stalk attachment)</p>
<p>Free (e.g. stamens)</p>	<p>contiguous (e.g. stamens) (touching not joined)</p>	<p>coherent (like parts superficially joined) (e.g. stamens)</p>	<p>connate (like parts histologically joined) (e.g. staminal tube)</p>	
<p>adherent (unlike parts superficially joined) (e.g. anthers + style)</p>	<p>adnate (unlike parts histologically joined) (e.g. anther to corolla tube)</p>	<p>adpressed</p>		
<p>sessile</p>	<p>stipitate (stalked)</p>			
			<p>attitude, direction Zig-zag (e.g. branches)</p>	

Attitude, direction (preliminary sketches):

vertical 	horizontal 	perpendicular 	erect (e.g. branches) 	semi-erect (e.g. branches) 
diffuse, divergent, spreading (e.g. branches) 	ascending (upwards) 	descending (downwards) 	recurved (curving apically) drawing? compare reflexed. 	arched (branches) 
arcuate (curved downwards) smaller organs e.g. column of orchid. drawing? 	reflexed drawing? 	pendulous (e.g. heavy fruit) 	pendent (weak support) drawing? anther? 	incurved e.g. anthers? drawing? 
inflexed (bent in or up abruptly) drawing? 	inwards (e.g. corolla) 	outwards (e.g. corolla) 	involute 	revolute 
convolute drawing? 	compressed 	depressed 	transverse lateral (view) 	longitudinal marginal 

2. DEFINITIONS

2.1 Growth Habit

2.1.1 Forms Relating to the Direction and Length of the Branches

2.1.1.1 *Columnar*

Upright, with a dominant main stem and suppressed branch development.
Compare 'fastigiate' where the branch development is not suppressed.

2.1.1.2 *Decumbent*

Growing horizontally on the ground but with the apical parts ascending.
Compare 'prostrate' where the apical parts do not ascend.

2.1.1.3 *Divaricate*

With branches spreading widely, at almost right angles to the main axis.
Comment: 'divaricate' applies more specifically to the growth habit while 'divergent' applies to the direction of the branches. 'A divaricate plant would have divergent branches.'
EB: Is this correct?

CB 2005: Page 55 2.1.1.3 Divaricate, having branches at wide, variable angles and intertangled. Divaricate is about habit where divergent is about angles, branching. also 2.2.26

ASL Divaricate seems to be 'widely spreading, greatly divergent' Divergent is spreading away from each other. Presumably branches could be widely spreading but not away from each other.

EB: I agree that divaricate is about the habit and divergent is about the direction of the branches.

2.1.1.4 *Drooping*

With branches bending downwards.
Compare 'weeping' where the downward bending is more pronounced.
Also used for attitude of plant parts.

2.1.1.5 *Fastigiate*

Strongly upright, with a narrow crown, the branches virtually erect and parallel.
Compare 'columnar' of which the branch development is suppressed.

2.1.1.6 *Prostrate*

Growing flat on the ground.

Compare ‘procumbent’ which is more specific and ‘decumbent’ of which the apical parts ascend.

2.1.1.7 *Reclining*

With branches gradually curving downwards from an erect position, the distal parts lying on the ground.

2.1.1.8 *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’.

2.1.1.9 *Spreading*

With branches directed outwards; wider than in ‘upright’.
Also applies to plant parts.

2.1.1.10 *Upright*

General term used for tall and narrow plants. More specifically, ‘fastigate’ 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’.

2.1.1.11 *Weeping*

Bending downwards, the terminal parts hanging.
Compare ‘drooping’ where downward bending is less pronounced.

2.1.2 Other Growth Habit Forms

2.1.2.1 *Arborescent (Tree-like, Tree)*

Tree-like; large woody plant, usually with a single main stem (trunk).

2.1.2.2 *Clambering*

Climbing without the aid of special structures e.g. tendrils.
Compare ‘climbing’.

2.1.2.3 *Climbing (Climber)*

Climbing by means of special structures e.g. tendrils.
Compare 'clambering'.

2.1.2.4 *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.

2.1.2.5 *Epiphytic (Epiphyte)*

A plant growing on another plant, supported by the host, but not depending on it for food or water.
Compare 'parasite'.

2.1.2.6 *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.

2.1.2.7 *Parasitic (Parasite)*

An organism at least partly dependent on another organism (the host) for its food and water.
Compare 'epiphyte'.

2.1.2.8 *Procumbent*

Growing flat on the ground but not rooting at the nodes.
Compare 'stoloniferous' rooting at the nodes.

2.1.2.9 *Ramified*

Branched.

ASL Applies to all branched forms not just as shown in the drawing.
EB: I agree. How to improve the drawing?

2.1.2.10 *Shrubby (Shrub)*

Woody perennial with multiple stems arising from ground level.

2.1.2.11 *Spur Type*

Plant habit in which the shoot internodes are very short. Found in some fruit varieties.

2.1.2.12 *Stoloniferous*

Bearing prostrate stems rooting at the nodes or at the tips, producing new plants.
Compare 'procumbent' not rooting at the nodes.

2.1.2.13 *Tree-like (Tree)*

See 'arborescent'.

2.1.2.14 *Twining*

Climbing by coiling around a support.

2.1.2.15 *Vine*

Climbing or trailing plant with long, slender stems, not self-supporting.

2.2 Relative Position, Grouping, Fusion

2.2.1 Abaxial

The lower, outer or dorsal side; the side facing away from the axis.
Compare 'adaxial'.

2.2.2 Adaxial

The upper, inner or ventral side; the side facing the axis.
Compare 'abaxial'.

2.2.3 Adherent

Dissimilar plant parts **in close contact**, e.g. anthers **adherent** to style.

Compare 'adnate', 'coalesced', 'coherent', connate', 'contiguous'.

ASL Don't like 'unlike' – how about dissimilar. Unlike at the beginning sounds as if it is a comparative .

Parts are in close contact but not fused – joined sounds as if they are fused.

EB: Thanks. Changed. OK?

2.2.4 Adnate

Dissimilar plant parts fused histologically, e.g. stamens implanted onto the corolla.
Compare 'adherent', 'coalesced', 'coherent', 'connate', 'contiguous'.

ASL: Dissimilar

EB: Thanks.

2.2.5 Adpressed

Lying close to or flat against the surface or another organ.

2.2.6 Apex

The apex (apical or distal part) of an organ or plant part is the end furthest from the point of attachment. The shape of the apex is taken as the general shape, excluding the most apical prolongation (the tip) or minor apical incision, if present.

2.2.7 Apical, Distal, Terminal

Located at the apex, furthest from the position of attachment.
Compare 'proximal', 'basal' which is closest to the position of attachment.
EB: Which term is preferred?

ASL I prefer apical but perhaps need terminal as well

2.2.8 Apopetalous

With separate petals; petals not fused into a corolla tube.
Compare 'sympetalous'.

2.2.9 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.

2.2.10 Basal, Proximal

Located at the base, closest to the position of attachment.
Compare 'apical', 'distal', 'terminal'.
EB: Which term is preferred?

ASL prefer basal

2.2.11 Base

The base (proximal part) of a plant part is the end nearest to the point of attachment.

2.2.12 Clustered

Clumped; closely grouped, arising from a common point.

2.2.13 Coalesced

Unlike plant parts partially and irregularly fused.
Compare 'adherent', 'adnate', 'coherent', 'connate', 'contiguous'.
EB: Example?

2.2.14 Coherent

Similar plant parts in close contact, not fused, e.g. anthers clinging together.
Compare 'adherent', 'adnate', 'coalesced', 'connate', 'contiguous'.
ASL Similar (the same)? In close contact, not fused.
EB: Thanks. Changed.

2.2.15 Congested

Densely crowded; with almost no intervening spaces.
Compare 'crowded' which is less dense.

2.2.16 Connate

Like parts fused histologically, e.g. staminal filaments fused into a tube.
Compare 'adherent', 'adnate', 'coalesced', 'coherent', 'contiguous'.

2.2.17 Connivent

Converging but not fused. E.g. stamens with anthers touching.

2.2.18 Contiguous

Touching but not fused.
Not 'adnate', 'connate', 'adherent' or 'coherent'.

2.2.19 Continuous

In an uninterrupted arrangement.
Compare 'interrupted'.

2.2.20 Convolute

Rolled up longitudinally with the plant parts overlapping, as petals in a bud.

2.2.21 Crowded

Grouped together but with some intervening spaces.
Compare 'congested' which is more densely crowded.

2.2.22 Dense (Density)

Numerous per unit area, as opposed to sparse.

2.2.23 Diffuse

With plant parts e.g. petals spreading widely, or with branches spreading widely and frequently branching.
Compare 'divergent', spreading at almost right angles to the main axis.

2.2.24 Distal, Apical, Terminal

Located at the apex, furthest from the position of attachment.
Compare 'proximal', 'basal' which is closest to the position of attachment.
EB: Which term is preferred?

ASL, Apical

2.2.25 Distinct

Used for plant parts which are separate from one another but not to be used in this regard for UPOV purposes. This term is reserved for 'distinctness' in the DUS Test.

2.2.26 Divergent

With plant parts, specifically branches, spreading at almost right angles to the main axis.
Compare 'diffuse' and 'divaricate'
Comment: 'divaricate' applies more specifically to the growth habit while 'divergent' applies to the direction of the branches. 'A divaricate plant would have divergent branches.'

EB: Is this correct?

CB 2005: Page 55 2.1.1.3 Divaricate, having branches at wide, variable angles and interangled. Divaricate is about habit where divergent is about angles, branching. also 2.2.26

2.2.27 Dorsal

The lower, outer or abaxial side in relation to the axis.
Compare 'ventral'.

2.2.28 Exserted

Extending beyond the surrounding parts, e.g. stamens sticking out beyond the corolla.
Compare 'included'.

2.2.29 Fascicled, Fasciculate

In tight clusters, appearing to arise from a common point, e.g. pine leaves.

2.2.30 Free

Separate from one another; not joined.

2.2.31 Included

Enclosed within; not extending beyond the surrounding parts, e.g. stamens not sticking out beyond the corolla.
Compare 'exserted'.

2.2.32 Indistinct

Used for plant parts which are not separate from one another but not to be used in this regard for UPOV purposes. This term is reserved for 'distinctness' in the DUS Test.

2.2.33 Interrupted

Not continuous; an arrangement which is disturbed at some point/points.
Compare 'continuous'.

2.2.34 Intricate

Entangled; irregularly intertwined.

2.2.35 Lax

Loose; not compact, in an open arrangement.

2.2.36 Lateral

Towards or at the side of an axis or plant part.

2.2.37 Longitudinal

Parallel to the axis extending through the base and the apex, whether or not this is the longest axis.

EB: My references talk about the 'long axis' but I don't think it is right. A longitudinal section of a fruit is made through the base and apex, even if the fruit is obloid in shape.

Compare 'transverse'.

ASL strongly agree

CB 2005: Page 62 2.2.37 agree longitudinal is not always the longest, from base to apex also 2.3.20

2.2.38 Marginal

Associated with the margin or edge of an organ.

2.2.39 Oblique

Orientated at an angle other than 90 degrees to or parallel to the longitudinal axis.

Applies to the base, apex, two-dimensional outline, position and attitude in relation to plant parts. In some cases the term refers to the shape or symmetry of a plant part, while in others it refers to the position.

2.2.40 Pedicelled (Pedicellate)

An individual flower or fruit borne on a stalk.

2.2.41 Perpendicular

At right angle to another plant part.

2.2.42 Proximal, Basal

Located at the base, closest to the position of attachment.

Compare 'apical', 'distal', 'terminal'.

EB: Which term is preferred?

CB 2005: Page 63 2.2.42 Would prefer basal

2.2.43 Sessile

Stalkless; attached directly to the supporting plant part.

Compare 'stalked' and 'pedicelled'.

2.2.44 Sheathing

Enclosing; e.g. a leaf base enclosing the stem.

2.2.45 Sparse (Density)

Few per unit area, as opposed to 'dense'.

CB 2005: Page 64 2.2.45 Should we mention here the use of open instead of sparse for plant density?

EB 2005: I agree. The plant is open and the branches are sparse. OK?

2.2.46 Spreading

Directed outwards; e.g. branches diverging.
Also applies to growth habit.

2.2.47 Stalked (Stipitate)

Attached to the supporting plant by a stalk.
Compare 'sessile' and 'pedicelled'.

2.2.48 Stipitate

See 'stalked'.

2.2.49 Sympetalous

With petals fused, at least partly, into a corolla tube.
Compare 'apopetalous'.

2.2.50 Terminal, Apical, Distal

Located at the apex, furthest from the position of attachment.
Compare 'basal', 'proximal', closest to the position of attachment.

EB: Which term is preferred?

CB 2005: Page 64 2.2.50 Would prefer distal

2.2.51 Tip

An apical prolongation extending from the general outline of the plant part, e.g. a caudate tip on an ovate leaf.

For UPOV purposes the tip of a plant part is considered to be the most extreme distal or apical point, if existent. When considering the shape of the apex, the tip often requires additional description, to record its nature (e.g. whether hard or soft) or its dimensions (e.g. length). Using this definition it is possible e.g. for a leaf tip to be absent, i.e. when the most apical part of the blade is rounded. See ‘apex’.

2.2.52 Top

To be used in relation to soil level. Compare ‘tip’ and ‘apex’.

2.2.53 Transverse

Perpendicular to the longitudinal axis, i.e. at right angle to the axis extending through the base and the apex, whether or not this is the longest axis.
Compare ‘longitudinal’.

2.2.54 Ventral

The upper, inner or adaxial side in relation to the axis.
Compare ‘dorsal’.

2.3 Attitude, Orientation, Course

2.3.1 Arched, Arching

Strongly curved more or less symmetrically, as an arch.

2.3.2 Ascending, Upwards

Growing or orientated gradually upwards in relation to soil level or to other plant parts.

2.3.3 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’.

2.3.4 Compressed

Flattened laterally or lengthwise.
Compare ‘depressed’.

2.3.5 Concave

Hollowed; curved inwards.

2.3.6 Convex

Rounded and curved outwards.

2.3.7 Deflexed

See 'reflexed'.

2.3.8 Depressed

Sunken, as if pressed into the middle from above or from above and below, causing a concavity. Compare 'compressed'.

EB: The published definitions seem to use 'compressed' and 'depressed' in a wider sense than we do. We don't use 'depressed' for 'flattened', as in an obloid fruit.

ASL Could say it was for plant parts e.g. base of a fruit and not for whole parts e.g. whole fruit

2.3.9 Descending, Downwards

Growing or orientated gradually downwards in relation to soil level or to other plant parts.

2.3.10 Downwards

See 'descending'.

2.3.11 Drooping

Bending downwards.

Compare 'pendulous' which is hanging, rather than bending downwards.

Also used for growth habit.

2.3.12 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'.

2.3.13 Diffuse

With plant parts e.g. petals spreading widely, or with branches spreading widely and frequently branching.

Compare 'divergent', spreading at almost right angles to the main axis.

2.3.14 Horizontal

Level; parallel to the ground. To be used in relation to soil level, i.e. perpendicular to 'vertical'.

To be used for plant parts and not for growth habit. 'Prostrate' is to be used for habit. 'Adpressed' is preferable for plant parts lying flat on a surface, therefore not necessarily parallel to the ground.

2.3.15 Incurved

Curving inwards or upwards (adaxially).

Compare 'inflexed', which is bent inwards or upwards more abruptly.

2.3.16 Inflated

Blown up; hollow and swollen in appearance.

2.3.17 Inflexed

Bent inwards or upwards (adaxially) abruptly.

Compare 'incurved'.

2.3.18 Involute

Inrolled; with margins rolled inwards (adaxially).

Compare 'revolute'.

2.3.19 Inwards

Term used by UPOV for a plant part/plant parts facing inwards in relation to the whole plant or in relation to other relevant plant parts, e.g. stamens facing inwards in relation to the corolla.

Compare 'outwards'.

EB: Is this OK?

CB 2005: Page 67 2.3.19 OK

2.3.20 Longitudinal

Parallel to the axis extending through the base and the apex, whether or not this is the longest axis.

EB: My references talk about the 'long axis' but I don't think it is right. A longitudinal section of a fruit is made through the base and apex, even if the fruit is obloid in shape.

Compare 'transverse'.

CB 2005: Page 62 2.2.37 agree longitudinal is not always the longest, from base to apex also 2.3.20

ASL as 2.2.37

2.3.21 Oblique

Orientated at an angle other than 90 degrees to or parallel to the longitudinal axis.

Applies to the base, apex, two-dimensional outline, position and attitude in relation to plant parts. In some cases the term refers to the shape or symmetry of a plant part, while in others it refers to the position.

2.3.22 Outwards

Term used by UPOV for a plant part/ plant parts facing outwards in relation to the whole plant or in relation to other relevant plant parts, e.g. the corolla facing outwards in relation to the longitudinal axis of the flower.

Compare 'inwards'.

EB: Is this OK?

ASL OK

2.3.23 Pendent

Hanging downwards due to its own weight.

Compare 'pendulous'.

Compare 'drooping' and 'weeping', which are 'bending downwards', 'weeping' being more pronounced than 'drooping'.

2.3.24 Pendulous

Hanging downwards, due to the weakness of its support.

Compare 'pendent'.

2.3.25 Perpendicular

At right angle to another plant part.

2.3.26 Recurved

Curving downwards (abaxially).

Compare 'reflexed', which is bent downwards more abruptly.

2.3.27 Reflexed (Deflexed)

Bent downwards (abaxially) abruptly.

Compare 'recurved' of which the downward curving is less abrupt.

2.3.28 Revolute

Rolled backwards; with margins rolled abaxially.

Compare 'involute'.

2.3.29 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'.

2.3.30 Stance

To use 'attitude', not 'stance'.

2.3.31 Upwards

See 'ascending'.

2.3.32 Vertical

Upright in relation to the ground. To be used in relation to soil level, i.e. perpendicular to 'horizontal'

ASL Add Wavy?

EB: agree.

2.3.33 Zig-zag

With regular, angular, alternating changes of direction.

2.4 Symmetry

2.4.1 Actinomorphic

Radially symmetric, so that median division in any direction will produce two equal halves, e.g. inflorescence of Asteraceae.
Compare 'zygomorphic'.

2.4.2 Asymmetric

Not being capable of median division into two equal halves in any direction.

2.4.3 Equilateral

With sides or halves of equal shape and/or size.
Compare 'inequilateral'.

2.4.4 Inequilateral

With sides or halves of unequal shape and/or size; oblique.
Compare 'equilateral'.

2.4.5 Oblique

Orientation of plant part: Orientated at an angle other than 90 degrees to or parallel to the longitudinal axis.
Shape of plant part: Inequilateral; bilaterally asymmetric.
Applies to the base, apex, two-dimensional outline, position and attitude in relation to plant parts.

2.4.6 Symmetric

Being capable of median division into two equal halves, at least along the longitudinal axis.
Compare 'asymmetric', 'actinomorphic'.

2.4.7 Trapezoidal **to delete**

EB comment: There was a proposal to add 'trapezoidal' but we called it 'oblique rhombic' instead. Do we need 'trapezoidal'? RHS calls it 'trapeziform': 'asymmetrical and four-sided, as a trapezium'.

**CB 2005: Page 70 2.4.70 Does not really fit here. Is a shape, not really symmetry.
Would question if needed at all?**

EB 2005: I would be happy to delete it!

ASL delete

2.4.8 Zygomorphic

Bilaterally symmetric, only along the longitudinal axis, e.g. flower of Fabaceae.
Compare 'actinomorphic'.

SECTION F: ARRANGEMENT, DIVISION, BRANCHING AND INFLORESCENCE TYPES

1. ILLUSTRATIONS

2. DEFINITIONS

2.1 Arrangement

2.1.1 Alternate

Staggered; borne singly, as opposed to (GRAMMAR) 'opposite' or 'whorled'.

ASL Think this is OK

2.1.2 Circular

Arrangement in a circular shape.
Also applies to two-dimensional shape.

2.1.3 Decussate

In opposite pairs, with successive pairs at right angles to one another.

2.1.4 Imbricate

Overlapping like tiles on a roof.

2.1.5 Linear

Arranged in a line/lines.
Also applies to two-dimensional and three-dimensional shape.

2.1.6 Opposite

Borne in pairs.
Compare 'alternate' and 'whorled'.

2.1.7 Radiating

Diverging symmetrically from a central point.

2.1.8 Random

‘With no apparent pattern of arrangement’.

2.1.9 Tristichous

In three ranks along the axis, the individual parts either alternate or opposite.

2.1.10 Verticillate

See ‘whorled’.

2.1.11 Whorled (Verticillate)

Borne in groups of three or more, arising from the same level; as opposed to ‘alternate’ or ‘opposite’.

2.2 Division and Branching

EB: I have not yet completed these definitions.

2.2.1 Bilobate

Having two lobes; with two subdivisions which are not completely separated and are normally rounded.

Comment: Segments are subdivisions which are completely separated while lobes are only partially divided.

2.2.2 Bipinnate

ASL Double pinnate; the primary leaflets again pinnate.

EB: Thanks. OK.

2.2.3 Compound

Divided into two or more similar parts, e.g. a leaf with two or more clearly separate leaflets. Compare ‘simple’.

2.2.4 Determinate

With the terminal (central) part developing first, thereby limiting the growth of the main axis.
Applies to inflorescences, e.g. a cyme.
Compare 'indeterminate'.

2.2.5 Dichotomous

ASL Forked; the axis divided into two equal branches.
EB: Thanks. OK.

2.2.6 Digitate

See 'palmate'.

2.2.7 Distichous

In two opposite ranks along the axis, the individual parts either alternate or opposite.

2.2.8 Furcate

Forked; the terminal lobes prong-like.

2.2.9 Imparipinnate

Pinnately compound, with a single terminal leaflet.
Compare 'paripinnate'.

2.2.10 Indeterminate

With the terminal (central) part developing last, thus not limiting the growth of the main axis.
Applies to inflorescences, e.g. a raceme, panicle or corymb.
Compare 'determinate'.

2.2.11 Lobate

See 'lobed'.

2.2.12 Lobed (Lobate)

Having one or more lobes; with subdivisions which are not completely separated and are normally rounded.
Comment: Segments are subdivisions which are completely separated while lobes are only partially divided.

2.2.13 Palmate (Digitate)

Lobed, veined or divided from a common point, like the fingers of a hand.

2.2.14 Palmatifid **to delete**

Palmately cleft rather than lobed.

EB comment: Do we need the terms 'palmatifid' (deeper incisions than 'lobed') and 'palmatisect' (deeper than 'palmatifid' but not totally divided. For our purposes we could perhaps just say 'lobed' and then 'depth of lobes' with states 'shallow' to 'deep'.

ASL agree

CB 2005: Page 73 2.2.14 Agree could do without?

2.2.15 Palmately Compound

2.2.16 Palmately Lobed

A leaf with three or more lobes originating from a common basal point.
Compare 'pinnately lobed'.

2.2.17 Paripinnate

Pinnately compound, with an even number of leaflets and none terminal.
Compare 'imparipinnate'.

2.2.18 Pinnate

Leaf: Feather-like; a compound leaf with leaflets (pinnae) arranged on opposite sides along an elongated rachis.

Venation: With a single primary vein from which the secondary veins originate.

2.2.19 Pinnately Compound

2.2.20 Pinnately Lobed

A leaf with three or more lobes arranged on opposite sides along an elongated rachis.
Compare 'palmately lobed'.

2.2.21 Segmented (Segment)

2.2.22 Simple

Not divided into two or more similar parts, e.g. an undivided leaf or a lobed leaf but not one with two or more clearly separate leaflets.

Compare 'compound'.

2.2.23 Trifoliate

ASL My definition says 'three leaved. Trifoliolate is with three leaflets

2.3 Inflorescence Types

2.3.1 Capitulate

With crowded flowers (florets) borne in a head-like cluster, e.g. Asteraceae. Also applies to a plant part which is stalked and terminates in a knob.

2.3.2 Corymbose (Corymb)

Indeterminate inflorescence, flat-topped to convex, the flowers pedicelled, pedicels progressively shorter upward, not arising from a common point, the outer flowers opening first.

Compare 'cyme', in which the terminal flower opens first, and 'umbel' in which the pedicels arise from a common point.

2.3.3 Cymose (Cyme)

Determinate inflorescence, flat-topped to convex, the terminal flower opening first.

Compare 'corymb' (pedicels not arising from a common point) and 'umbel' (pedicels arising from a common point), both with the terminal flower opening last.

2.3.4 Paniculate (Panicle)

An indeterminate, branched inflorescence, the flowers pedicelled, the lower flowers opening first.

Compare 'raceme', in which the axis is unbranched.

2.3.5 Racemose (Raceme)

A long and narrow indeterminate inflorescence with unbranched axis, the flowers pedicelled, the lower flowers opening first.

Compare 'panicle', in which the axis is branched, 'corymb' and 'umbel', which are flat-topped to convex, and 'spike' of which the flowers are sessile.

2.3.6 Scapose (Scape)

An erect, leafless peduncle arising from near the ground, typically from a basal rosette in liliaceous plants.

2.3.7 Spicate (Spike)

An elongate, indeterminate inflorescence bearing sessile flowers on an unbranched axis. Compare 'raceme' with pedicelled flowers.

2.3.8 Umbel, Umbellate

Determinate or indeterminate inflorescence, branched or unbranched, flat-topped to convex, the flowers pedicelled, pedicels arising from a common point. Compare 'corymb' (terminal flower opening last) and 'cyme' (terminal flower opening first), with pedicels not arising from a common point.

SECTION G: PLANT PARTS AND FRUIT TYPES

1. PLANT PARTS

EB: I have not yet completed these definitions.

1.1 Illustrations

1.2 Definitions

1.2.1 Bract

1.2.2 Calyx

1.2.3 Carpel

1.2.4 Column

1.2.5 Endocarp

The inner layer of the wall of the fruit (pericarp), e.g. the stony part of a peach. (The middle layer is the mesocarp (flesh) and the outer layer is the exocarp (skin)).

1.2.6 Exocarp

The outer layer of the wall of the fruit (pericarp), e.g. the skin of a peach. (The middle layer is the mesocarp (flesh) and the inner layer is the endocarp (stony part)).

1.2.7 Filament

1.2.8 Foliage

Includes the leaves and branches, not the leaves only. Gives a global impression.

1.2.9 Inflorescence

1.2.10 Lamina

1.2.11 Main Vein

To be used for Monocotyledons.
Compare 'midrib'.

1.2.12 Mesocarp

The middle layer of the wall of the fruit (pericarp), e.g. the flesh of a peach. (The inner layer is the endocarp (stony part) and the outer layer is the exocarp (skin)).

1.2.13 Midrib

To be used for Dicotyledons.
Compare 'main vein'.

1.2.14 Peduncle

1.2.15 Perianth

1.2.16 Pericarp

The wall of a fruit, sometimes differentiated into exocarp, mesocarp and endocarp.

1.2.17 Petal

An individual segment of the corolla, usually the larger, most colorful part of a flower.
Compare 'tepal' and 'sepal'.

1.2.18 Petiole

1.2.19 Petiolule

1.2.20 Pistil

1.2.21 Propagule

Any plant material which is capable of growing into a plant (tissue culture plantlet, seed, etc.)

1.2.22 Rhizome

1.2.23 Sepal

An individual segment of the calyx, or outer whorl of a flower, usually green and smaller than the corolla.
Compare 'petal' and 'tepal'.

1.2.24 Sheath

1.2.25 Sinus

EB: Where does this belong?

**CB 2005: Page 77 1.2.25 Sinus Place is OK as we can have leaf base sinus, leaf bud sinus.
Not confined to one organ.**

1.2.26 Spadix

1.2.27 Spathe

1.2.28 Stalk

Term used for the stem of a fruit.

1.2.29 Stamen

1.2.30 Stigma

1.2.31 Stipule

Originating from the leaf, not the stem, and therefore to be handled under the leaf characteristics in the Test Guidelines.

1.2.32 Stolon

1.2.33 Style

1.2.34 Tepal

A segment of a perianth which is not differentiated into a calyx and corolla. Often occurs in the Monocotyledons.

Compare 'petal' and 'sepal'.

1.2.35 Vegetative parts

Referring to the non-sexual parts of a plant. Vegetative propagation is by means of vegetative material.

2. FRUIT TYPES

2.1 Illustrations

2.2 Definitions

2.2.1 Berry

A fleshy, indehiscent fruit, derived from a superior ovary, normally several- to many-seeded, (e.g. tomato).

Compare 'drupe', 'pome'.

2.2.2 Capsule

A dry, dehiscent fruit derived from more than one carpel.

Compare 'follicle'.

2.2.3 Drupe

A fleshy, indehiscent fruit, derived from a superior ovary, normally one-seeded, with a stony endocarp (e.g. peach, cherry).

Compare 'berry', 'pome'.

2.2.4 Follicle

A dry, dehiscent fruit derived from a single carpel, splitting longitudinally along one side.

Compare 'capsule', 'legume'.

2.2.5 Legume

A dry, dehiscent, fruit of the Leguminosae (CHECK), derived from a single carpel, splitting longitudinally along two sides (e.g. pea pod).

Compare 'follicle', 'capsule'.

2.2.6 Nut

A hard, dry, indehiscent fruit, normally one-seeded.

EB: What about almond, macadamia and pistachio? They are dehiscent.

ASL I think that Almond, macadamia and pistachio are all botanically the same as drupes. The nut is the large seed in a woody pericarp and we do not eat the outside. In plum for example we eat the fleshy outside but discard the nut. I do not know whether they are all single seeded.

EB: Should we delete the word indehiscent? I'm still confused.

2.2.7 Pod

A general term for a legume or a follicle or other dry, dehiscent fruit types.

2.2.8 Pome

A fleshy, indehiscent fruit, derived from an inferior ovary with several locules, e.g. apple, pear.

2.2.9 Samara

A dry, indehiscent, winged fruit.

SECTION H: GENERAL

EB: I have not yet completed these definitions. Where do these terms belong? They don't relate to shape – should we broaden the heading of the document to accommodate these terms?

1. REPRODUCTION TYPES

1.1 Allogamous

See 'cross-fertilized'.

1.2 Apomyctic

Producing viable seed without fertilization.
Compare 'self-compatible'.

1.3 Autogamous

See 'self-fertilized'.

1.4 Cross-Fertilized (Allogamous)

Outcrossing, one plant fertilizing another.
Compare self-fertilized.

1.5 Dioecious

With unisexual (imperfect) flowers, the male and female borne on different plants.
Compare 'monoecious'.

1.6 Hermaphrodite

1.7 Heterogamous

1.8 Heterozygotic

1.9 Homozygotic

1.10 Monoecious

With unisexual (imperfect) flowers, the male and female borne on the same plant.
Compare 'dioecious'.

1.11 Propagation

Is vegetative multiplication. (To check.)
Compare 'reproduction'.

ASL propagation is a general term and also covers propagation by seed.

1.12 Reproduction

Is generative multiplication. (To check.)
Compare 'propagation'.

1.13 Self-Compatible

Self-fertile; when the plant produces fruit from its own pollen.
Compare 'self-incompatible' and 'apomyctic'.

1.14 Self-Fertilized (Autogamous)

Individual flowers fertilizing themselves.
Compare cross-fertilized.

1.15 Self-Incompatible

Self-infertile; when the plant cannot produce fruit from its own pollen.
Compare 'self-compatible' and 'apomyctic'.

1.16 Vegetatively propagated

Referring to the non-sexual parts of a plant. Vegetative propagation is by means of vegetative material.

2. GROWTH CYCLE TYPES

2.1 Annual

A plant of which the full life span is completed in one year, from germination to dying down.

ASL: A plant of which the full life span is completed in one year, from germination **add?–**
through flowering and seed production to dying down.

EB: OK.

2.2 Biennial

A plant of which the full life span is completed in two years, from germination to dying down.

ASL: A plant of which the full life span is completed in two years, from germination **add? and vegetative growth in the first year through flowering and seed production** to dying down **in the second year.**

EB: Yes thanks.

2.3 Caducous

Early deciduous; plant parts falling off very early.

2.4 Deciduous

Non-evergreen plants or shedding leaves or petals **over a specific period.**

CB 2005 Page 82 2.4 Deciduous Suggest non evergreen plants or shedding of all leaves or petals over a specific period. Evergreens also shed leaves but not all at once.

EB 2005: OK thanks.

2.5 Ephemeral

An annual with a short growing season.

2.6 Evergreen

Having foliage throughout the year.

Compare 'deciduous'.

2.7 Intermittent (Flowering)

2.8 Perennial

A plant that lives for more than two years.

2.9 Persistent

Plant parts remaining attached and unwithered although similar parts may fall off at an earlier stage (e.g. calyx on a fruit).

2.10 Remontant

Flowering twice or more during one season.

3. OTHER

3.1 Apetalous

Without petals.

3.2 Asepalous

Without sepals

3.3 Dehiscent

Splitting open or apart at maturity or when ripe. Applies to a fruit or an anther.

3.4 Dimorphic

3.5 Indehiscent

Not splitting open or apart at maturity or when ripe. Applies to a fruit or an anther.

3.6 Petaloid

Petal-like in appearance.

3.7 Resistant

Compare 'tolerant'.

3.8 Sepaloid

Sepal-like in appearance.

3.9 Tolerant

Compare 'resistant'.

SECTION H: COLORS

EB: Not for this document?

CB 2005: Colour question: Crimson, lime, cream etc is mentioned. How far do we want to go with other 'colours'; scarlet, mauve, bronze?

EB 2005: Maybe just list them all together in a paragraph.

1. CREAM

A term acceptable for UPOV purposes, for 'yellowish white' or 'near-white' (?) (same situation as 'orange').

2. CRIMSON

For UPOV purposes rather to use 'dark red' or 'purple red'.

3. GRAY

For UPOV purposes use the spelling: 'grey'.

4. GREY

For UPOV purposes use the spelling: 'grey', not 'gray'.

5. LIME

For UPOV purposes rather use 'yellow green' or 'green yellow'.

6. PIGMENTS

EB: Where does this belong?

7. ANTHOCYANIN

Harris 'Water-soluble pigments (blue, purple or red)'

ASL present in plant cells – responsible for blue/purple/ red coloration.

EB: OK.

SECTION I: MASS AND WEIGHT

EB: Where does this belong?

1. MASS

See 'weight'.

2. WEIGHT

To be used instead of 'mass', to avoid confusion with 'volume'.

[End of document]