

มหาวิทยาลัยเชียงใหม่
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APPENDICES

Appendix A Glossary

The terms as defined here are applicable to the species included in this research

acaulescent stemless

achene a dry, one-seeded, indehiscent fruit

acrostichoid fronds with dense sporangia, not in sori, covering the ventral surface

acuminate gradually narrowing to a point

acute abruptly pointed

adnate united with a different part (see connate)

androphore a column/stalk of stamens; united filaments in a solid stalk

annulus a ring of cells on a sporangium

anterior front side (see posterior)

anther the portion of a stamen which contains the pollen

anthesis expansion, *i.e.* opening of a flower

apex tip

appendage a projecting part

aristate tapering to a very narrow tip or much elongated apex (see caudate)

attenuate drawn out and gradually narrowing (see acuminate)

auricle ear-like lobe/appendage

awn a bristle-like appendage in Gramineae spikelets

axil the area between a main axis and its branch

axile placentation of ovules along the central axis of the ovary

axis (plural axes) a central line or main stem

axillary in or from an axil

basifixed basally attached

beak a slender extension from the tip of some achenes in Compositae

berry an indehiscent fruit with the seeds immersed in a fleshy/juicy mesocarp

bifid divided into two parts or lobes

bilabiate two lips of calyx or corolla; in an irregular flower as in Labiatae,

Scrophulariaceae, Lentiburaliaceae, and Acanthaceae

bilocular having two compartments

bisexual having both functional sexes in one flower (see unisexual)

- blade** the expanded part of leaf or petal
- bract** scale or reduced leaf, usually subtending a flower or inflorescence
- bracteoles** a secondary bract, subtending each flower and accompanying bracts
- bulb** a modified underground stem with imbricating scale-like leaves
- bullate** surface with blister-like swellings
- caducous** falling off early
- callus** thickened or raised area
- calyx** the outer perianth whorl, composed of united sepals (see corolla)
- campanulate** bell-shaped
- canaliculate** channeled or grooved
- capitate** globose cluster; dense "head"-like group of flowers
- capsule** a dry, dehiscent fruit, opening at maturity by one or more valves
- carinate** keeled, sharply folded ("V"-shaped)
- carpel** a section of a compound pistil
- cataphyll** reduced leaves
- caudate** with a slender tail-like tip (see aristate)
- cauline** borne on the stem
- chaff** scales or bristles between the flowers in the capitula of some Compositae
- chartaceous** papery or tissue-like texture
- cilia** fine filiform hairs/appendages
- ciliate** with cilia
- ciliolate** minute cilia
- claw** the stalk-like base of a petal or sepals
- cochleate** coiled, like a snail shell
- column** fused stamens, stigmas, and styles into a single structure in Orchidaceae
- connate** united with a similar part (see adnate)
- connective** the portion of a stamen which joins the anther locules
- cordate** heart-shaped
- coriaceous** leathery, thick texture
- corolla** the inner perianth whorl, composed of united petals (see calyx)
- corona** a whorl of floral parts between the corolla and stamens
- corymb** a flat-topped inflorescence, which different pedicel lengths

- corymbose** corymb form
- costa** the main axis of a frond
- crenate** shallow, rounded marginal undulations
- crenulate** shallow, wavy (margin)
- crest** expanded part at the top of an organ
- cucullate** hood-shaped (galeate)
- culm** the jointed stems of Gramineae and Cyperaceae
- cuneate** wedge-shaped
- cupular** cup-shaped
- cuspidate** with a minute point (mucro) at the tip
- cyme** a determinate inflorescence, with the central flowers opening first
- cystoliths** intercellular thickenings, usually of calcium carbonate/oxalate
- decurrent** extending down, as when the base of a blade is prolonged down the petiole
- decussate** in opposite pairs, each pair at right angles to the other pair (see distichous)
- dehiscent** splitting open
- dentate** with sharp, incisions along the margin
- denticulate** minutely or finely toothed
- depressed** flattened from above, pressed down
- diadelphous** with two groups of stamens (5+5, 9+1)
- dichotomous** forked or branching in pairs
- didynamous** 4 stamens in 2 pairs of different lengths
- digitate** like finger, with the members arising from one point/level
- dimorphic** 2 different forms (bimorphic)
- dioecious** unisexual plants (see monoecious)
- disc** an organ outside and usually surrounding of the ovary, inside of the stamens or
corona
- discoid** disc-like
- distichous** 2-ranked or rows, the leaves from opposite sides of the stem in the same
plane (see decussate)
- disc flower** inner, regular flower in the capitula of Compositae (see ray flower)
- dorsal** upper side, outer surface (see ventral)
- dorsifixed** with the anthers attached to the back (dorsal) of the filament

- drupe** a fleshy fruit with the seed(s) enclosed in a hard endocarp (pyrene)
- eccentric** the axis not centrally, slightly asymmetric (see oblique)
- echinate** prickly
- elliptic** widest at or about the middle (see table 5)
- emarginate** with a shallow notch at the apex
- ensiform** sword-shaped
- entire** margin smooth, *e.g.* not toothed or lobed
- epicalyx** a whorl of a calyx-like organ outside and on the calyx in Malvaceae
- epichile** the distal portion of the lip in Orchidaceae (see hypochile)
- erect** upright
- erose** having irregularly cut or toothed margins
- evanescent** short-lived
- exserted** projecting above the surrounding parts (see included)
- galeate** hooded (cucullate)
- geniculate** abruptly bent or knee-like, jointed
- glabrescent** becoming glabrous
- glabrous** without indumentum
- glandular** with secreting organs or glands
- globose** spherical
- glume** lowest scale-like organ(s) in spikelets in Gramineae and Cyperaceae
- grain** a dry, 1-seeded, indehiscent fruit in Graminae
- gynophore** stalk of a pistil
- hastate** having arrow head lobes, “^”- shaped (see sagittate)
- helicoid cyme** a determinate inflorescence which the lateral flowers from the same side
- hirsute** with rough/coarse, erect hairs
- hirtellous** softly or minutely hirsute
- hypanthium** a cup-shaped or tubular enlarged receptacle (resembling a calyx tube)
- imbricate** margins overlapping (see valvate, convolute)
- imparipinnate** pinnate with a terminal leaflet or pinna
- incised** irregularly slashed, deeply and sharply cut
- included** not protruding (see exserted)
- incurved** curved inwards (see recurved)

- indumentum** hairs or scales
- indusium** protective organ covering sporangia
- inferior** ovary embedded in the receptacle below the other floral parts (see superior)
- inflated** enlarged, expanded, blown up
- inflorescence** group of flowers
- infructescence** group of fruits
- inserted** point of origin
- internode** the part of stem/inflorescence/infructescence between the nodes
- interpetiolar** between petiole pairs
- lacerate** irregularly and deeply cleft/cut
- lanate** very densely covered with long, soft, woolly hairs
- lanceolate** lance-shaped (see table 5)
- lemma** part of a spikelet between the glumes and palea in Graminae
- ligule** the thin projection from the inside top of the leaf sheath especially in Gramineae and Cyperaceae; the limb of ray flowers in Compositae (see disc flower)
- limb** the broader or expanded part of an organ
- lip** one of the two divisions of a bilabiate calyx or corolla; the labellum in orchidaceae and Zingiberaceae
- lobe** any incomplete division or segment of an organ
- loculicidal** splitting (dehiscing) along the locule wall (see septicidal)
- membranous** thin and slightly transparent/translucent
- mericarp** an indehiscent, 1-seeded portion of a schizocarp
- microphyllous** very small (microscopic) leaf
- monadelphous** all filaments united in one group (see diadelphous)
- monoecious** bisexual plant (see dioecious)
- mucronate** with a short and straight cusp/point
- multicellular** many-celled
- muricate** roughed with minute, short and hard projections
- nodosity** knob or small bump
- nut** an indehiscent, 1-seeded, hard dry fruit
- nutlet** a small nut in Labiatae
- oblanceolate** inversely lanceolate, broadest above the middle (see table 5)

- oblique** unequal-sided, asymmetric (see eccentric)
- oblong** longer than broad, with the sides mostly parallel (see table of shapes)
- obovate** reversely ovate, broadest above the middle (see table of shapes)
- obovoid** 3-dimensionally, obovate in outline
- obtuse** blunt, rounded
- ochrea** a tubular sheathing stipule from the nodes as in Polygonaceae
- odd pinnate** imparipinnate (see paripinnate)
- operculum** a lid/top
- orbicular** circular
- ovary** ovule containing part of a flower
- ovate** egg-like in outline, broadest below the middle (see table of shapes)
- ovoid** 3-dimensionally ovate in outline
- palea** the upper scale-like part of spikelets in Graminae (see lemma)
- palmatifid** hand-shaped, leaf blade lobed about half way or more to the base
- palmatisect** hand-shaped, with the lobes of the leaf extending almost to the base
- panicle** a spreading, indeterminate inflorescence, the branches being racemose
- papillate** with minute, pimple-like surface swellings
- pappus** whorl/tufts of hairs, bristles, scales on the top of ovaries and achenes in most
Compositae
- parietal** placentation of ovules from the inner ovary wall (see axile)
- paripinnate** compound leaf having an equal number of leaflets/pinnae and without a
terminal segment (see odd pinnate/imparipinnate)
- pectinate** pinnatifid with narrow segments like the teeth of a comb
- pedicel** stalk of a flower/fruit
- peduncle** main stalk of an inflorescence or infructescence
- peltate** insertion from inside the margin
- pendulous** hanging down
- perianth** united, undistinguishable calyx and corolla (see tepals)
- petiolar** relating to the petiole
- petiole** leaf stalk
- petiolule** leaflet stalk
- pilose** with long, ascending, soft hairs

- pinnate** a compound leaf/frond which the leaflets/pinnae on either side of the primary axis
- pinnatifid** pinnately divided (see palmatifid)
- pinnatisect** pinnately parted (see palmatisect)
- pistil** stigma, style and ovary
- plicate** folded into plaits, usually lengthwise
- plumose** with fine dense/spreading hairs on a central stalk, as the stigmas of Gramineae
- pod** a usually dehiscent dry fruit of one locule with one parietal (marginal) placenta in Leguminosae, dehiscing along one margin
- pollinium(ia)** a pollen mass
- posterior** back side (see anterior)
- pseudobulb** the thickened or bulbiform succulent stems of some Orchidaceae
- pubescent** with hairs (see glabrous)
- pulvinus** enlarged portion of the petiole or petiolule
- punctate** with minute dots
- raceme** an unbranched indeterminate inflorescence with pedicelled flowers
- racemose** an inflorescence having flowers in racemes
- rachilla** axis of a raceme, or spikelet
- rachis** main axis of a leaf/frond or inflorescence/infructescence
- ray flower** outer, irregular flower in the capitula of some Compositae (see disc flower)
- receptacle** an enlarged or elongated tip of the flower axis, bearing the flower parts
- recurved** curved downward or backward (see incurved)
- reflexed** abruptly recurved
- reniform** kidney-shaped
- reticulate** net-like, joined veins (see scalariform)
- retuse** shallowly notched (see emarginate)
- revolute** rolled backward
- rhizome** underground stem, with nodes, buds, or scales
- rigid** stiff
- rosette** a cluster of leaves at the base of the stem
- rugose** wrinkled
- saccate** bag-like

sagittate long, arrow head-shaped lobes, pointing downward, deeply “^” shaped

(see hastate)

salverform a slender corolla tube with an abruptly expanded and flat limb

scabrous surface roughened like sand paper

scabrellous finely scabrous

scalariform ladder-like, or having ladder-like veins (see reticulate)

scape a stalk of an inflorescence in Araceae

schizocarp a dry, dehiscent fruit that splits into 2 or more mericarps

scorpioid cyme a determinate inflorescence with lateral pedicelled flowers,
appearing racemose

sepal an outer, free segment of a flower

seriate in a series or row

sericeous adpressed silky hairs

serrate saw-toothed margin

serrulate minutely serrate

setose erect, rigid, stiff hairs

setulose finely setose

sheath a tubular covering (*i.e.* leaf sheath, ochrea)

sinus the space between two lobes

sorus (plural sori) a cluster of sporangia in ferns

spadix a spike-like inflorescence surrounded by a spathe in Araceae and Palmae

spathe a large bract enveloping the spadix in Araceae

spicate spike-like, sessile flowers/fruits

spike an unbranched inflorescence with sessile flowers/fruits

spikelet an inflorescence unit in Gramineae and Cyperaceae consisting of one or
more florets with glumes; a branch of a spike

spinescent with a spine or hard sharp point

sporangium a spore case

sporophyll a sporangium-bearing leaf/frond

spur tubular or sac-like appendage

stamen male sex organ, usually consisting of anther, connective and filament

staminode a sterile stamen

- standard** the upper or posterior petal of a papilionaceous flower
- stellate** star-like, radiating from one point indumentum
- stigma** the apex of the style
- stipe** stalk of fronds (petiole)
- stipitate** having a stipe
- stipule** an appendage associated with the base of the petiole or node
- stipulate** having stipules
- strigose** erect, stiff hairs or bristles
- strobili** cone-like structure containing the reproductive organs (sporophylls) in pteridophytes and gymnosperms
- strobiliform** cone-like
- strophiole** topknot or appendage on seeds of Polygonaceae
- stylopodium** fused style bases in some Umbelliferae
- stylid** sterile style in Gramineae
- synandria** androecium of coherent anthers
- sub-** a prefix, signifying somewhat, slightly, less than, or below
- subulate** awl-shaped, narrowly tapering from base to apex
- superficial** shallowly covering or depressed
- tepal** a free flower segment not clearly a sepal or petal
- terete** circular in cross section
- thyrs** panicle of cymes
- thyrsoid** resembling a thyrs
- tomentose** densely covered with woolly indumentum
- translator** structure which connect pairs of pollinia in Asclepiadaceae
- truncate** abruptly cut off at the base or apex
- tuberculate** with minute, rough knobby projections
- ultrajugal** the part of the leaf rachis from the upper most pair of lateral leaflets to the terminal leaflet as in Leguminosae
- umbel** an indeterminate, flat-topped inflorescence whose axes arise from a common point and are same length
- umbellate** with umbels, umbel-like
- undulate** wavy

unilocular a single chamber

unisexual one sex; male (staminate) or female (pistilate) only (see bisexual)

urceolate urn-shaped

utricle a small bladder in Lentibulariaceae; dry, 1-seeded fruit in some Cyperaceae

vaginate sheathing

valvate margins touching, as in buds (see imbricate)

vascular conductive tissue, strands

velutinous with velvety indumentum

venation nerves, arrangement of veins/nerves

ventral bottom side, inner face (see dorsal)

verticillate arranged in whorls

villous with long, soft, erect hairs

vexillary opposite the standard (posterior) petal in Leguminosae, Papilionoideae

wing thin lateral expansion of an organ; the lateral petals of a papilionaceous flower

Appendix B

Table 5 Table of shapes (Radanachaless and Maxwell, 1994)

SHAPES			
length/width	widest at the		
	base	middle	apex
~1	-	orbicular	-
1-2	ovate	elliptic	obovate
2-3	ovate-oblong	oblong	obovate-oblong
3-5	ovate-lanceolate	lanceolate	obovate-lanceolate
5-10	-	linear-lanceolate	-
10+	-	linear-subulate	-

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