

TAXONOMY OF PTERIDOPHYTES

KEY 1: VEGETATIVE MATERIAL*

1. Foliar organs less than 5 mm long, scale-like, subulate, or flat and bimorphic, always simple
2. Foliar organs scale-like, whorled, achlorophyllous, stems prominently striate, internodes hollow.... *Equisetum debile* (81)
2. Foliar organs subulate or flat and bimorphic, spirally arranged or distichous, chlorophyllous, stems not or slightly striate, solid
3. Leaves subulate, monomorphic, spirally arranged, stems lacking rhizophores...
Lycopodium cernuum (74)
3. Leaves flat, bimorphic, distichous, rhizophores present
 4. Stems equally dichotomous at the first node.. *Selaginella ostenfeldii* (78)
 4. Stems variously branching, not equally dichotomous at the first node
 5. Stems scrambling, more than 50 cm long... *Selaginella helferi* (75)
 5. Stems not scrambling, erect to decumbent, less than 25 cm long
 6. Ventral (larger) leaves overlapping, without any space between adjacent leaves ... *Selaginella involvens* (76)
 6. Ventral leaves not or slightly overlapping, space between adjacent leaves at least 1/2 mm wide
 7. Margins of ventral leaves glabrous...*Selaginella minutifolia* (77)
 7. Margins of ventral leaves ciliolate, at least the base
 8. Margins of dorsal (smaller) leaves white...
Selaginella repanda (79)
 8. Margins of dorsal leaves not white... *Selaginella roxburghii* (80)

* Numbers in brackets refer to the page of the description

1. Foliar (fronds) organs more than 5 mm long, flat, mostly monomorphic, simple or compound

9. Foliar organs simple, not lobed

10. Laminae less than 10 mm wide, coriaceous, covered with minute stellate hairs ventrally... *Pyrrossia adnascens* (133)

10. Laminae more than 20 mm wide, thin, lacking stellate hairs

11. Laminae less than 20 cm long... *Leptochilus decurrens* (131)

11. Laminae at least 25 cm long

12. Rhizome erect, with a dense fibrous root mass concealing the rhizome, fronds congested, radially arranged, with a continuous submarginal vein... *Asplenium nidus* var. *nidus* (105)

12. Rhizome creeping, conspicuous, without a fibrous root mass, fronds spaced, not radially arranged, without a continuous submarginal vein

13. Laminae less than 6 cm wide, veins indistinct to parallel

14. Fronds with stipes to c. 13 cm long, veins distinctly parallel... *Oleandra undulata* (94)

14. Fronds sessile, veins indistinct... *Lepisorus scolopendrium* (130)

13. Laminae more than 7 cm wide, veins distinct, reticulate...
Microsorium membranaceum (132)

9. Foliar (fronds) organs pinnately lobed or compound

15. Plants massive, "nest-like", with persistent, exterior, dry (i.e. bimorphic) fronds or with basal remnants of monomorphic ones, epiphytic or epilithic

16. Foliar organs monomorphic, persistent dry part from the lower autotrophic part of the frond... *Aglaomorpha coronans* (126)

16. Foliar organs bimorphic, persistent and dry, and deciduous and autotrophic

17. Autotrophic fronds deeply, pinnately-lobed or dichotomously lobed, dry fronds dentate or dichotomously lobed
18. Autotrophic laminae numerous, erect, deeply, pinnately-lobed, glabrous, the lobes simple, at most 3.5 cm wide, dry fronds dentate...
Drynaria bonii (128)
18. Autotrophic laminae 2, pendulous, deeply, dichotomously-lobed, densely covered with stellate hairs ventrally, first lobes more than 5 cm wide, dry fronds deeply lobed... *Platynerium wallichii* (134)
17. Autotrophic fronds pinnate, dry fronds lobed... *Drynaria rigidula* (129)
15. Plants not massive, not "nest-like", lacking dry fronds, geophytic or epilithic
19. Fronds pinnately-lobed or once pinnate
20. Fronds climbing, vine-like, segments cordate at the base...
Lygodium flexuosum (85)
20. Fronds not climbing, segments not cordate at the base
21. Fronds deeply, pinnately-lobed, the lobes more than 15 mm wide...
Colysis pothifolia (127)
21. Fronds pinnate, pinnae entire to lobed, the lobes less than 10 mm wide
22. Pinnae at most 10 mm wide, lobed, lobes less than 10...
Cheilanthes belangeri (97)
22. Pinnae more than 20 mm wide, lobed, lobes more than 15
23. Rhizome creeping
24. Fronds monomorphic, pinnae margins serrate, not lobed...
Thelypteris nudata (119)
24. Fronds bimorphic (sterile & fertile), pinnae lobed half-way or more to the costule
25. Pinnae lobed more than half-way to the costule, lobes serrate, basal lobes c. 10 mm wide...
Dryopteris cochleata (112)

25. Pinnae lobed at most half way to the costule, lobes entire, basal lobes less than 5 mm wide...*Bolbitis sinensis* (109)
23. Rhizome erect or sub-erect
26. Pinnae opposite, basal pinnae the largest
27. Stipes brownish-green, pinnae green underneath, basal pinnae with basispic pinnules... *Pteris biaurita* (100)
27. Stipe glossy dark-brown; pinnae with silvery farina underneath, basal pinnae without basispic pinnules...
Cheilanthes formosana (98)
26. Pinnae alternate, basal pinnae the smallest
28. Pinnae lobed to less than 0.5 mm to the costule...
Pteris decrescens (101)
28. Pinnae unlobed or lobed to more than 2 mm to the costule
29. Pinnae dimidiate, costule indistinct or basispic
30. Pinnae with a stalk more than 2 mm long...
Adiantum philippense (95)
30. Pinnae sessile or with a stalk less than 1 mm long
31. Acroscopic margin of pinnae lobed 1/3 -1/2 way to the costule... *Adiantum zollingeri* (96)
31. Acroscopic margin of pinnae finely serrulate...
Asplenium obscurum (106)
29. Pinnae not dimidiate, costule medial or eccentric
32. Pinnae more than 2 cm wide
33. Margins serrulate...
Bolbitis virens var. *virens* (109)
33. Margins deeply and irregularly lobed...
Asplenium excisum (104)

32. Pinnae less than 2 cm wide

34. Pinnae asymmetric, especially at the base,
costule eccentric...

Nephrolepis delicatula (93)

34. Pinnae symmetric, costule medial

35. Pinnae venation pinnate, veins mostly free...

Anisocampium cumingianum (124)

35. Pinnae venation parallel, free or
anastomosing

36. Pinnae more than 25 cm long...

Blechnum orientale (107)

36. Pinnae less than 25 cm long

37. Rhizome massive, trunk-like, fronds
spirally/radially congested at the top of
the rhizome, pinnae margins serrate...

Brainea insignis (108)

37. Rhizome not massive, not trunk-like;
fronds well-spaced, margins entire or
lobed

38. Pinnae less than 15, margins entire to
crenate

39. Venation free, unbranched

40. Some pinnae with irregular
lobes, pinnae up to 12 mm
wide...

Pteris heteromorpha (102)

40. All pinnae simple, without
irregular lobes, pinnae more
than 25 mm wide...

Pteris venusta (103)

39. Venation branching and anastomosing...*Lindsaea ensifolia* ssp.
ensifolia (89)

38. Pinnae more than 20, margins shallowly to deeply lobed

41. Rhizome erect

42. Veins all free, lower 6-8 pinnae gradually reduced, the
lowest pinnae scale-like, 2-3 mm long.....

Thelypteris falciloba (116)

42. Veins anastomosing, lowest pinnae not reduced or the
lowest 1-2 pairs slightly reduced, the lowest one more than
15 mm long

43. Lowest 1-2 pairs of pinnae slightly reduced and
reflexed...*Thelypteris siamensis* (121)

43. Lowest pinnae very reduced, not reflexed

44. Basal acroscopic lobe of pinnae slightly longer than
the other lobes, aerophores absent at base of costule
epilithic... *Thelypteris ciliata* (115)

44. Basal acroscopic lobe of pinnae as long as the other
lobes, aerophores present at base of costules, in
soil...*Thelypteris truncata* (123)

41. Rhizome creeping

45. Pinnae at most 1.5 cm wide, 1 pair of veins united below
each sinus

46. Middle pinnae up to 10 mm wide, lobes in the middle of
the pinnae c. 3 mm long... *Thelypteris interrupta* (117)

46. Middle pinnae more than 12 mm wide, lobes in the
middle of the pinnae 5-6 mm long...
Thelypteris parasitica (120)

45. Pinnae more than 20 mm wide, more than 1 pair of veins
united below each sinus

47. Lowest pinnae gradually reduced to auricles...
Thelypteris subelata (122)

47. Lowest pinnae not gradually reduced to auricles...
Thelypteris hirtisora (118)

19. Fronds 2-4x pinnate

48. Fronds dichotomously branching

49. The two branches at each fork equal, pinnule lobes less than 3 cm long and 4 mm wide... *Dicranopteris linearis* var. *linearis* (83)

49. The two branches at each fork unequal, pinnule lobes more than 4 cm long and 8 mm wide... *Dicranopteris splendida* (84)

48. Fronds not dichotomously branching

50. Fronds 2x pinnate

51. Rhizome with a hard lobe on each side of the insertion of the stipes, fronds more than 3 m long... *Angiopteris evecta* (82)

51. Rhizome without a lobe on each side of the stipe, fronds less than 2.5 m long

52. Plants at most 1 m tall, pinnae pairs unequal in size, stipe less than 5 mm diameter... *Dryopteris porosa* (113)

52. Plants more than 1.5 m tall, pinnae pairs equal in size, stipe more than 6 mm diameter

53. Rhizome creeping, costules hirsute underneath

54. Pinnae at most 2 cm wide, deeply lobed nearly to the costule, veins free... *Pteridium aquilinum* ssp. *aquilinum* var. *wightianum* (88)

54. Pinnae at least 5 cm wide, lobed c. 1/2 way to the costule, veins anastomosing... *Pleocnemia irregularis* (114)

53. Rhizome erect, costules glabrous underneath

55. Scales dense, golden brown, pinnules lobed almost to the costule, c. 3 mm wide... *Cibotium barometz* (86)
55. Scales not dense, blackish-brown, pinnules lobed less than 1/4 way to the costule, more than 10 mm wide...
Diplazium esculentum (125)
50. Fronds 3-5x pinnate
56. Fronds 4-5x pinnate, margins of segments aristate...
Arachniodes henryi (111)
56. Fronds 3x pinnate, margins of segments rounded to entire
57. Plants more than 1 m tall, stipe 10 mm or more diameter, pinnules more than 20 pairs... *Microlepia speluncae* (87)
57. Plants at most 50 cm tall, stipe at most 5 mm diameter, pinnules less than 15 pairs
58. Rhizome long-creeping, fronds well-spaced
59. Lowest ultimate segment of lowest pinnule of lowest pinnae 2 mm wide, scales black with paler margins, more than 5 mm long... *Davallia trichomanoides* var. *lorrainii* (91)
59. Lowest ultimate segment of lowest pinnule of lowest pinnae 4 mm wide, scales brown, up to 4 mm long...
Leucostegia immersa (92)
58. Rhizome short-creeping; fronds close together
60. Stipe glossy blackish when both fresh and dry, at most 2 mm diameter, segment tips rounded...
Cheilanthes tenuifolia (99)
60. Stipe yellow-green when fresh and drying stramineous, more than 4 mm diameter, segment tips truncate...
Sphenomeris chinensis var. *chinensis* (90)

KEY 2: FERTILE MATERIAL*

1. Plants with strobili, foliar organs microphyllus, 1-nerved
2. Leaves indistinct, scale-like, achlorophyllus, stems with hollow internodes, strobili more than 4 mm diameter... *Equisetum debile* (81)
2. Leaves distinct, not scale-like, chlorophyllus, stems solid, without internodes, strobili up to 2 mm diameter
3. Strobili up to 2 mm diameter, drooping, leaves monomorphic...
Lycopodium cernuum (74)
3. Strobili less than 1.5 mm diameter, straight, leaves bimorphic
4. Sporophylls monomorphic
5. Sporophylls strigose, stems equally dichotomous at the first node...
Selaginella ostenfeldii (78)
5. Sporophylls glabrous, stems not equally dichotomous at the first node
6. Strobili more than 12 mm long, stems scrambling, more than 50 cm long... *Selaginella helferi* (75)
6. Strobili less than 8 mm long, stems erect to decumbent, less than 40 cm long
7. Strobili up to 6 mm long, leaves on stems very closely spaced, stems 1.5-2 mm diameter near the lowest branches...*Selaginella involvens* (76)
7. Strobili less than 4 mm long, leaves on stems widely spaced, stems less than 1 mm diameter near the lowest branches..
Selaginella repanda (79)
4. Sporophylls bimorphic
8. Margins of ventral (larger) leaves glabrous...
Selaginella minutifolia (77)

* Numbers in brackets refer to the page of the description

8. Margins of ventral leaves ciliolate at least at the base...

Selaginella roxburghii (80)

1. Plants with sori, foliar organs (fronds) macrophyllus, many-nerved

9. Plants (fronds) climbing, vine-like, indusia and sporangia in two rows on marginal lobes of the frond segments... *Lygodium flexuosum* (85)

9. Plants (fronds) not climbing or vine-like, indusia and sporangia not as above

10. Fronds dimorphic, i.e. sterile and fertile

11. Fertile fronds simple

12. Fertile fronds up to 2.5 mm wide, the whole ventral surface of the laminae covered with sori, stipes more than 20 cm long. Sterile fronds more than 3 cm wide, venation distinctly reticulate... *Leptochilus decurrens* (131)

12. Fertile fronds more than 5 mm wide, c. upper 1/3 of the ventral surface of the laminae covered with sori; stipes less than 3 cm long. Sterile fronds less than 2 cm wide; venation indistinct... *Pyrrhosia adnascens* (133)

11. Fertile fronds pinnate to pinnately-lobed or dichotomously-lobed fronds once pinnate... *Dryopteris cochleata* (112)

13. Plants "nest-like", sterile fronds dry, smaller than the fertile ones, pinnate or dichotomously lobed. Sterile fronds dentate to lobed

14. Fertile fronds pinnate, sori in one row on each side of the costule. Sterile fronds irregularly lobed...
Drynaria rigidula (129)

14. Fertile fronds pinnately or dichotomously lobed, sori scattered or in a dense mass. Sterile fronds dentate or dichotomously lobed

15. Fertile fronds pinnately-lobed, glabrous, sori scattered. Sterile fronds dentate...
Drynaria bonii (128)

15. Fertile fronds dichotomously lobed, covered with stellate hairs, sori in a dense mass.
Sterile fronds dichotomously lobed...
Platycerium wallichii (134)
13. Plants not "nest-like", sterile fronds green, larger than the fertile ones, pinnate
16. Pinnae of fertile fronds up to 5 cm long and 1 cm wide, sporangia brown. Pinnae margins of sterile fronds lobed... *Bolbitis sinensis* (109)
16. Pinnae of fertile fronds more than 10 cm long and less than 4 mm wide, sporangia light yellow. Pinnae margins of sterile fronds undulate...
Bolbitis virens var. *virens* (110)
10. Fronds monomorphic
17. Sori marginal
18. Sori continuously linear along the whole margin of the segment
19. Pinnae more than 20
20. Fronds 3x pinnate... *Cheilanthes tenuifolia* (99)
20. Fronds once pinnate
21. Pinnae to more than 12 cm long, with silvery farina underneath, lobes more than 20...
Cheilanthes formosana (98)
21. Pinnae less than 6 cm long, green underneath, lobes less than 10... *Cheilanthes belangeri* (97)
19. Pinnae less than 18
22. Indusia opening towards the margin... *Lindsaea ensifolia* ssp. *ensifolia* (89)
22. Indusia opening towards the costa/costule

23. Pinnae entire to irregularly lobed, the lobes less than 1/4 way towards the costule
24. Pinnae irregularly lobed, up to 12 mm wide...
Pteris heteromorpha (102)
24. Pinnae entire, more than 25 mm wide...
Pteris venusta (103)
23. Pinnae regularly lobed, the lobes more than 1/2 way towards the costule
25. Pinnae opposite, basal pinnae largest, with basispic pinnules... *Pteris biaurita* (100)
25. Pinnae alternate, basal pinnae smallest, without basispic pinnules... *Pteris decrescens* (101)
18. Sori not continuously linear, but on the sides or tips of lobes or segments
26. Fronds 3-4x pinnate, sori on split tips of the segments... *Sphenomeris chinensis* var. *chinensis* (90)
26. Fronds 1-2x pinnate, sori not as above
27. Plants more than 1 m tall, fronds 2x pinnate, pinnae lobed nearly to the costule
28. Rhizome massive, erect, scales dense, pinnae glabrous on both surfaces, sori 2 pairs, on the base of the lobes, indusia globose, 2-valved...
Cibotium barometz (86)
28. Rhizome not massive, creeping, scales sparse, pinnae densely hirsute underneath, sori continuous along most of the lobe margins, indusia absent... *Pteridium aquilinum* ssp. *aquilinum* var. *wightianum* (88)

27. Plants less than 70 cm tall, fronds once pinnate, pinnae entire or lobed up to 1/2 way towards the costule
29. Pinnae glabrous, with a stipe to more than 2 mm long, sori more than 10 mm long...
Adiantum philippense (95)
29. Pinnae puberulous, sessile, sori less than 2 mm long ...
Adiantum zollingeri (96)
17. Sori not marginal
30. Sori along or close to the costule
31. Fronds once pinnate, sori continuous, costular, linear
32. Pinnae more than 25 cm long, several lower pinnae reduced to auricles, rhizome scales blackish brown, sori concealing the costule...
Blechnum orientale (107)
32. Pinnae less than 25 cm long, lower pinnae not reduced to auricles, rhizome scales light brown, sori not concealing the costule...
Brainea insignis (108)
31. Fronds simple or dichotomously branched, sori not continuous, not costular, round
33. Plants less than 50 cm tall, fronds simple
34. Fronds with stipes up to c. 13 cm long, veins distinct, parallel, sori c. 1.5 mm diameter, indusia present... *Oleandra undulata* (94)
34. Fronds sessile or with stipes up to 3 cm long; veins indistinct, sori c. 5 mm diameter, indusia absent... *Lepisorus scolopendria* (130)
33. Plants more than 60 cm tall, fronds dichotomously branching...
Dicranopteris linearis var. *linearis* (83)

30. Sori scattered, along finer veins, or submarginal

35. Sori submarginal

36. Rhizome with a hard lobe on each side of the insertion of the stipes, fronds more than 3 m long, sori on every vein, continuous, c. 1 mm from margin of pinnules, indusia absent... *Angiopteris evecta* (82)

36. Rhizome without hard lobes at the insertion of the stipes, fronds less than 2 m long, sori not on every vein, not continuous, indusia present

37. Fronds 2-3x pinnate

38. Indusia basifixed, sporangia visible... *Leucostegia immersa* (92)

38. Indusia tubular, sporangia not visible...
Davallia trichomanoides var. *lorrainii* (91)

37. Fronds once pinnate

39. Roots tuberous, pinnae up to 2.5 cm long, margins crenate, indusia reniform, base truncate and nearly as wide as the sori... *Nephrolepis delicatula* (93)

39. Roots lacking tubers, pinnae more than 4 cm long, margins lobed, indusia round, base rounded, narrower than the sori

40. Rhizome erect

41. Indusia glabrous

42. Aerophores present at the base of the costules, pinnae more than 1.5 cm wide, lobed c. 1/3 way to the costule, veins anastomosing... *Thelypteris truncata* (123)

42. Aerophores absent, pinnae at most 1 cm wide, lobed more than 1/2 way towards the costule, veins all free... *Thelypteris falciloba* (116)

41. Indusia hirsute

43. Lowest 1-2 pairs of pinnae slightly reduced and reflexed, broadest pinnae more than 1.5 cm wide... *Thelypteris siamensis* (121)
43. Lowest pinnae slightly reduced, not reflexed, broadest pinnae at most 1 cm wide... *Thelypteris ciliata* (115)
40. Rhizome creeping
44. Pinnae at most 1.5 cm wide, 1 pair of veins united below each sinus
45. Middle pinnae up to 10 mm wide, lobes in the middle of the pinnae c. 3 mm long... *Thelypteris interrupta* (117)
45. Middle pinnae more than 12 mm wide, lobes in the middle of the pinnae 5-6 mm long... *Thelypteris parasitica* (120)
44. Pinnae more than 20 mm wide, more than 1 pair of veins united below each sinus
46. Lowest pinnae gradually reduced to auricles, sori c. 1/2 way from the costule on most veinlets, indusia and sporangia glabrous... *Thelypteris subelata* (122)
46. Lowest pinnae not gradually reduced to auricles, sori c. 1/3 way from the costule on most veinlets, indusia and sporangia hirsute... *Thelypteris hirtisora* (118)
35. Sori scattered along finer veins
47. Fronds sessile, basal part becoming dry and persistent... *Aglaomorpha coronans* (126)
47. Fronds with stipes, basal part not as above

48. Sori elongate

49. Fronds simple or pinnately lobed

50. Root mass dense, fronds simple, venation pinnate with a continuous submarginal vein, epiphytic or epilithic...

Asplenium nidus var. *nidus* (105)

50. No root mass, fronds pinnately lobed, venation reticulate, submarginal vein absent, geophytic... *Colysis pothifolia* (127)

49. Fronds 1-2x pinnate

51. Fronds once pinnate, pinnae dimidiate or irregularly lobed, all veins free

52. Pinnae dimidiate, acroscopic margin finely serrulate, upper part curved, sori at most 3 mm long... *Asplenium obscurum* (106)

52. Pinnae not dimidiate, both margins deeply lobed, upper part straight, sori than 5 mm long ...

Asplenium excisum (104)

51. Fronds 2x pinnate, pinnae or segments not dimidiate, not irregularly lobed, veins anastomosing...

Diplazium esculentum (125)

48. Sori round

53. Fronds simple, more than 9 cm wide... *Microsorium membranaceum* (132)

53. Fronds 1-5x pinnate or dichotomously branched, pinnules less than 8 cm wide

54. Fronds unequally dichotomously branched...

Dicranopteris splendida (84)

54. Fronds 1-5x pinnate, not dichotomously branched

55. Fronds 1-2x pinnate

56. Fronds once pinnate
57. Pinnae more than 25 cm long, veins anastomosing, sori mostly on anastomosing veins... *Thelypteris nudata*
57. Pinnae less than 20 cm long, veins mostly free, sori mostly on free veins...
Anisocampium cumingianum (124)
56. Fronds 2x pinnate
58. Pinnae at most 1 cm wide, veins all free, sori c. 2 mm diameter, indusia c. 1 mm diameter... *Dryopteris porosa* (113)
58. Pinnae more than 4 cm wide, veins reticulate, sori c. 1 mm diameter, indusia c. 1.5 mm diameter...
Pleocnemia irregularis (114)
55. Fronds 3-5x pinnate
59. Fronds 4-5x pinnate, glabrous, margins of segments aristate, indusia round- reniform, glabrous... *Arachniodes henryi* (111)
59. Fronds 3x pinnate, densely hirsute, margins of segments rounded, indusia cup-shaped, hirsute... *Microlepia speluncae* (87)