

A KEY TO SOMERSET FERNS

This key is a new version of that to be found in my book, *Somerset Ferns, a Field Guide* (SANHS, 1989) updated to include the latest information on *Dryopteris affinis* and *Asplenium trichomanes*.

The *D. affinis* morphotypes are based on the classification by C. Fraser-Jenkins and include: *D. affinis* (Lowe) Fraser-Jenkins morphotype *affinis*, morphotype *borreri* (sensu Newman), morphotype *cambrensis* (sensu Fraser-Jenkins), morphotype *paleaceo-lobata* (sensu Fraser-Jenkins) and morphotype *robusta* (sensu auctt. Brit.).

The further subspecies of *A. trichomanes* were first described by M. Rickard (1989). Rickard also describes nothosubsp. *staufferi* (subsp. *pachyrachis* x subsp. *quadrivalens*) and *A. trichomanes* subsp. *inexpectans*. Jermy and Camus (1991), reviewed in this journal, include just three subspecies: *A. trichomanes* L. subsp. *trichomanes*, subsp. *quadrivalens* D.E. Meyer emend. Lovis and subsp. *pachyrachis* (Christ) Lovis & Reichst. Although subsp. *trichomanes* and *quadrivalens* are known in Somerset, I have, so far, found subsp. *pachyrachis* only on the Somerset Trust for Nature Conservation Reserve at Draycott Sleights.

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|----|---|----------------------------------|----|
| 1 | Free-floating, aquatic | <i>Azolla filiculoides</i> | |
| - | Terrestrial, not aquatic | | 2 |
| 2 | Filmy, moss-like, small, branching fronds with purse-shaped sorus | <i>Hymenophyllum tunbrigense</i> | |
| - | Plant with one or more leafy fronds | | 3 |
| 3 | Plant with single frond, a leafy portion enclosing a fertile spike | | 4 |
| - | Plant not as above | | 5 |
| 4 | Frond simple with unbranched fertile spike | <i>Ophioglossum vulgatum</i> | |
| - | Frond pinnate with branched fertile spike | <i>Botrychium lunaria</i> | |
| 5 | Fronds dimorphic, i.e. fertile fronds different in appearance from vegetative fronds | | 6 |
| - | Upper part of frond fertile and of different appearance from lower bipinnate part | <i>Osmunda regalis</i> | |
| - | All fronds of similar appearance, i.e. sori on vegetative fronds | | 7 |
| 6 | Fronds pinnate | <i>Blechnum spicant</i> | |
| - | Fronds bipinnate | <i>Thelypteris palustris</i> | |
| - | Fronds tripinnate, at least at the base | <i>Cryptogramma crispa</i> | |
| 7 | Indusium absent | | 8 |
| - | Indusium present | | 13 |
| 8 | Frond pinnate | | 9 |
| - | Frond bipinnate, maybe with pinnatisect pinnules | | 10 |
| - | Frond tripinnate, at least at the base | | 11 |
| 9 | Sori and scales forming a dense light brown mat on underside of frond | <i>Asplenium ceterach</i> | |
| - | Sori round or oval and separate from each other | <i>Polypodium</i> agg. | 24 |
| 10 | Sori marginal, close together; pinnae gradually get shorter to near the base of the stipe; scent of lemon | <i>Oreopteris limbosperma</i> | |
| - | Sori marginal but spaced; basal pinnae pair long and sharply reflexed | <i>Phegopteris connectilis</i> | |

- Sori hidden under down-rolled margins of pinnae; lower pinnae show little shortening *Thelypteris palustris*
- 11 Sori under down-rolled margins of pinnae; fronds large, up to 2 m or more *Pteridium aquilinum*
- Sori around margins of pinnules; fronds not more than 50 cm 12
- Sori not restricted to margins of segments 13
- 12 Each of lowest basal pinnae equal in size to the rest of the lamina; stipes slender, shiny, brittle, dark purple-brown *Gymnocarpium dryopteris*
- Each of the lowest basal pinnae less than the size of the rest of the lamina; stipes thicker, glandular, dull-green; bruised frond has an apple smell *Gymnocarpium robertianum*
- 13 Indusium bladder-like; stipe black and brittle *Cystopteris fragilis*
- Indusium linear 14
- Indusium J-shaped; pinnules taper gradually to acute point and have finely-toothed margins *Athyrium filix-femina*
- Indusium round or kidney-shaped 17
- 14 Frond simple *Asplenium scolopendrium*
- Frond pinnate 15
- Frond bipinnate, at least at the base 16
- 15 Pinnae fleshy, wedge-shaped \pm 2 cm long; stipe dark purple-brown *Asplenium marinum*
- Pinnae not fleshy, rounded or squared, less than 1 cm long; stipe black, no wings *Asplenium trichomanes* 26
- 16 Pinnae with few triangular pinnules; dark green stipe *Asplenium ruta-muraria*
- Pinnae with many pinnatifid pinnules; black stipe *Asplenium adiantum-nigrum*
- Not as above 17
- 17 Peltate indusium; pinnules with teeth extending into hairs 18
- Reniform indusium 19
- 18 Pinnules without stalks, base of lower pinnules forming acute angle; frond stiff and dark green *Polystichum aculeatum*
- At least the lower pinnae with stalked pinnules, with base forming an obtuse angle; soft arching frond, paler, bright green *Polystichum setiferum*
- 19 Frond bipinnate to tripinnate; pinnules each side of the midrib of the lowest pinnae unequal in length 20
- Frond pinnate with pinnatifid pinnules; pinnules each side of the midrib of the lowest pinnae of equal length 22
- 20 Plant forming an erect shuttlecock; young fronds triangular, lowest or next lowest pinnae longest 21
- Fronds arising in sparse groups from underground pale shiny rhizome; fronds with the lower 3 pairs of pinnae of similar length; pale tan, concolorous, ovate scales *Dryopteris carthusiana*
- 21 Scales usually with central longitudinal dark stripe; edges of pinnae curl downwards *Dryopteris dilatata*
- Scales pale orange-brown, narrowly triangular with long tapering apex; edges of pinnae curl upwards; scent of coumarin (hay) *Dryopteris aemula*

- 22 Black spot at junctions of pinnae and rachis; truncated pinnules with parallel sides and few teeth; stout rachis covered with shaggy golden scales *Dryopteris affinis* 28
 – No black spot at junction of pinna and rachis 23
- 23 Pinnules with rounded tips with incurving teeth *Dryopteris filix-mas*
 – Pinnules with entire margins *Thelypteris palustris*
- 24 Frond lanceolate-oval 25
 – Frond lanceolate with parallel sides for more than half its length *Polypodium vulgare*
- 25 Scales at base of stipe 3–4 times longer than broad *Polypodium cambricum*
 – Scales at base of stipe 2–3 times longer than broad *Polypodium interjectum*

Note: due to variation, the sori of mature fronds should be examined under the microscope and the annulus and basal cells counted (Page 1982):

	Annulus cells	Basal cells	With mature sori
<i>P. cambricum</i>	4–(5–10)–19	3–4	Nov–Jun
<i>P. interjectum</i>	4–(7–9)–13	2–3	Sep–Feb
<i>P. vulgare</i>	7–(10–14)–17	usually 1	Aug–Mar
<i>P. x font-queri</i>	8–(11–14)–20	1–3	
<i>P. x montaniae</i>	2–(9–10)–14	1–3	
<i>P. x shivasiae</i>	5–(7–8)–11	3–4	

The three hybrids show intermediate characters and the sori are poor and depauperate. I have found *P. x font-queri* and *P. x montaniae* in Somerset. Some fronds of *P. x shivasiae* collected in North Wales in late August showed, interestingly, two distinct types of sorus, one mature, one shrivelled and past maturity. When these were examined and the annulus and basal cells counted, they were found to derive from the parents: *P. cambricum* and *P. interjectum*.

- 26 Length of longest rhizome scales < 3.5 mm; sorus up to 2 mm long, 4–6 per pinna; pinnae up to 8 mm long *Asplenium trichomanes* subsp. *trichomanes*
 – Length of longest rhizome scales < 5.0 mm; sorus up to 3 mm long, 4–9 (–12) per pinna; pinnae up to 11 mm long 27
- 27 Pinnae oblong, almost sessile, symmetrical with square insertion *Asplenium trichomanes* subsp. *quadrivalens*
 – Pinnae oblong to subtriangular/hastate, usually with distinct basal auricle on upper (acroscopic) margin; margin often deeply crenate and wavy *Asplenium trichomanes* subsp. *pachyrachis*
- 28 Stipe with dense golden scales; pinnules lying flat in plane of frond, rounded-truncate tips with obtuse teeth up to 90° and the sides barely toothed; indusium thick with margins well tucked under and splitting at maturity *Dryopteris affinis* morph. *affinis*
 – Stipe with fewer pale-brown to light gold scales sometimes with dark centre and base; pinnules flat in plane of frond, squarely-truncate tips with acute teeth and prominent 'ears', teeth and lobes often present on pinnule sides; indusium thin, laxly incurved, rolling up at maturity *Dryopteris affinis* morph. *borreri*
 – Stipe with dense red-gold scales; pinnules often twisted, tips rounded with teeth about 90°, teeth and lobes often present on pinnule sides; indusium of medium thickness, margins well tucked under, some split at maturity *Dryopteris affinis* morph. *cambrensis*

- Stipe with moderately dense to dense gold scales with dark bases; pinnules lie flat, margins with deep rectangular lobes, apex obliquely truncate to sharp pointed with acute teeth, basal lobe rectangular and conspicuous on lower pinnae; indusium thin
Dryopteris affinis morph. *robusta*
- Stipe scales reddish or very dark gold; pinnules often twisted, margins deeply lobed, slightly curled under, apex rounded-truncate; basal lobe of pinnules on lower pinnae conspicuous, round to round-rectangular; indusium thick, remaining tucked under
Dryopteris affinis morph. *paleaceo-lobata*

These morphotypes are difficult to distinguish (Jermy and Camus 1991) especially since *D. affinis* is apogamous and each morphotype readily hybridises with *D. filix-mas* to give the *D. x complexa* (Fraser-Jenkins) group. All features should be considered in making an identification.

Although *Cryptogramma crispera* is included in this key, it is probably now extinct in Somerset.

REFERENCES

- Jermy, C., and Camus, J., 1991. *The Illustrated Field Guide to Ferns and Allied Plants of the British Isles*. Natural History Museum Publications, London.
- Page, C.N., 1982. *The Ferns of Britain and Ireland*. Cambridge.
- Rickard, M., 1989. Two spleenworts new to Britain. *Pteridologist*, **1**, 244-48.