

## Dryopteris affinis

### Flora Nordica + additions for AC&B from WF (Welsh Ferns)

	<b>affinis / pseudomas</b>	<b>cambrensis</b>	<b>borreri</b>	<b>pseudodisjuncta - not UK</b>
	Yellow Scaly Male-Fern	Narrow Scaly Male-Fern	Common Scaly Male-Fern	
<b>Leaf</b>				
Wintering	± wintering	not wintering [WF: same]	not wintering [WF: mostly not]	not wintering
Glands	eglandular	usually with small glands on the rachis [WF: glandular on axes, at least when young]	eglandular	eglandular
Petiole	1/6-1/4 total leaf-length	1/6-1/5 total leaf-length	1/5-1/4 total leaf-length	1/6-1/4 total leaf-length
<b>Leaf Scales</b>				
Density	very densely set	very densely set	moderately densely set	densely set
Colour	mid- to dark- brown	pale brown to reddish-brown	pale brown to mid-brown with dark base	pale, usually with dark stripes or darker brown base
Stiffness	somewhat stiff			
Shape	mostly very narrow with elongated, acute apex, but wider ones also present	wider than in subsp. affinis, the narrow ones relatively less numerous; those on the middle and distal part of the petiole often longitudinally twisted.	the narrow ones relatively less numerous	the narrow ones relatively less numerous than in subsp. affinis
Gloss		more glossy than in subsp. affinis	less glossy than in subsp. affinis	
<b>Blade</b>				
Shape	ovate-lanceolate	oblanceolate to narrowly elliptic [WF: generally narrow in outline relative to the other two ssp]	lanceolate to oblong	oblanceolate to almost elliptic
Thick/Stiff	thick, coriaceous, somewhat stiff	slightly stiff	not very stiff	slightly stiff
Colour	dark-green	mid-green	pale- to mid-green	mid- to dark-green
Base	base somewhat tapering	base somewhat tapering	base truncate	base wider than in subsp. cambrensis
Gloss	upper surface glossy when fresh	upper surface slightly glossy when fresh	upper surface ± dull when fresh (though slightly more glossy than in D. filix-mas)	upper surface slightly glossy when fresh
<b>Veinlets</b>				
Colour	somewhat darkened on the lower surface (, especially in fresh material)			
Sunken	sunken into the upper surface, especially in fresh material	hardly to slightly sunken	not sunken.	not sunken
<b>Pinnae</b>				
Angle	in the plane of the leaf	at an angle to the plane of the leaf [WF: often swept upwards giving the frond the narrowest outline of the 3 ssp]	in the plane of the leaf	
Flat	flat	often concave because the pinnules are curved upwards (out of the plane)	flat	markedly flat or slightly convex
Shape	oblong with parallel sides	tapering from the base	oblong, tapering from the basal half	tapering from the base
Length		short		± short
Apex	long-acuminate;		short-acuminate	
Outline	outline markedly even (pinnules equal in length)	outline uneven (pinnules of varying length)	outline uneven (pinnules of varying length)	outline uneven (pinnules of varying length)
Costa Scales	lower surface with rather short, not markedly pale scales on the costa	lower surface with short, not markedly pale scales on the costa	lower surface with rather short, not markedly pale scales on the costa	lower surface with hairlike, pale scales on the costa
Black Patch			[WF: dark patch tends to disappear on dried herbarium specimens]	
Lowest Pair (Symmetry)	± symmetric	symmetric or slightly asymmetric	usually asymmetric	markedly symmetric
(Stalk)	innermost basicopic pinnule often not clearly stalked and not longer than the corresponding acroscopic pinnule [WF: both pinnae partially adnate to costa, not symmetrically but mostly on one side of the pinnule midrib].	innermost basicopic pinnule fully stalked, equal to or occasionally longer than the corresponding acroscopic pinnule	innermost basicopic pinnule fully stalked and usually markedly longer than the corresponding acroscopic pinnule [WF: on either side of the rachis, attached only round its midrib to the costa]	
(Overlap R.)	innermost basicopic pinnule not overlapping the rachis or with only the basal lobe of the innermost pinnule overlapping	innermost basicopic pinnule often partly overlapping the rachis [WF: attached only round the midrib to the costa]	innermost basicopic pinnule not overlapping the rachis or with only the basal lobe of the innermost pinnule overlapping.	not overlapping the rachis or with only the basal lobe of the innermost pinnule overlapping.

	<b>affinis / pseudomas</b>	<b>cambrensis</b>	<b>borreri</b>	<b>pseudodisjuncta - not UK</b>
<b>Pinnules</b>				
Overlap	not overlapping, usually separated by a U-shaped gap	± crowded and sometimes slightly overlapping	contiguous, rarely clearly separated	in the lower and middle parts of the pinnae separated by a V-shaped gap
Apex	rounded to rounded-truncate	rounded to rounded-truncate [WF: rounded]	truncate, especially in the proximal part of the leaf (but in luxuriant leaves often acute) [WF: truncate to subacute]	narrow or cuneate in lower pinnules, becoming truncate in distal ones (in lower pinnae of luxuriant leaves occasionally rounded);
Apex Teeth	with rather few, obtuse teeth [WF: sometimes prominent but occasionally not obvious]	often with ± long, narrow teeth directed slightly outwards from the apex (but teeth sometimes obtuse, insignificant or absent) [WF: obtuse teeth]	with long, mostly acute teeth (similar to those of <i>D. filix-mas</i> ) [WF: with sometimes prominent acute teeth round their apex (resembling cat's ears when prominent in the two corners); pinna segments often with two sharp corners at their apex, the corner on the basisopic side of the pinna obtuse while that on the acrosopic side acute, the pinna segment this resembling a parallelogram.]	
Side Margins	lateral margins usually entire;	lateral margins often revolute, usually entire [WF: pinna segments often reflexed from the cost of the pinna (pinna in transverse cross-section resembling the hull of a rowing boat)]	lateral margins parallel and often with acute teeth	lateral margins ± entire
Innermost	of the lower pinnae with a ± rounded-rectangular basal lobe.	of the lower pinnae longer than the rest, with a rounded or pointed, often conspicuous basal lobe. [WF: basal pinnules of each pinna often overlapping the rachis, the basisopic of these often bent outwards above the plane of the frond (resembling projecting steps up the rachis).]	of the lower pinnae usually with a ± large, rectangular basal lobe.	of the lower pinnae fully stalked, longer than the rest and sometimes with a conspicuous, wide basal lobe.
<b>Sori</b>				
	very large	large	small	± small
<b>Indusium</b>				
Shape	[WF: inflexed, resembling a bun pressed down in the middle when viewed from above]	[WF: inflexed as in <i>ssp affinis</i> ]	[WF: inflexed but soon becoming reflexed (shuttlecock-shaped)]	
Size	large			
Thickness	± thick	± thick	thin	± thick
Glands	eglandular	usually bearing small glands at the margin	eglandular	eglandular
Adherence	tightly clasping the sporangia until late autumn		at first loosely clasping the sporangia	
Splitting	splitting radially when mature (margin then only slightly raised) [WF: some eventually splitting radially to their centres (resembling a sponge cake with a slice taken out)]	shrivelling when mature (margin markedly raised)		
Shrivelling	finally slightly shrivelling,	some splitting radially	but shrivelling in autumn (then often appearing as an inverted cone because the margin is distinctly raised)	shrivelling when mature (margin markedly raised)
Persistence	persisting on dead leaves the next spring	some persisting on dead leaves the next spring [WF: shrivelling later like <i>ssp borreri</i> ]	finally dropping off, not splitting radially [WF: falling early]	
<b>Spores</b>				
Size	usually less than 50 µm	usually more than 50 µm	40-58 µm	usually more than 50 µm
% Fertile	mostly well-developed	at least 20% (occasionally well over 50%) abortive	usually more well-developed than in the other triploid subspecies, but less so than in <i>subsp. affinis</i> .	at least c. 20% abortive.
Timing	Spores maturing up to one month later than in the other subspecies.			
2n	[2n=82] [WF: apogamous diploid]	[WF: 2n=123 apogamous triploid]	[WF: 2n=123 apogamous triploid]	[2n=123]
<b>Distribution UK/Wales</b>	[WF: widespread, tends to be absent or scarce in base-rich areas, being less tolerant of such conditions than <i>ssp. borreri</i> . SW Europe & W central Europe.]	[WF: Least common in Wales of the three and its full distribution not known... a subspecies mostly of N Britain being one of the commonest <i>ssp</i> encountered in Scotland. In S Wales the sparse locations are mostly confined to the higher ground. In Europe, throughout the range of the species except in parts of central and S Europe.]	[WF: this <i>ssp</i> is the most variable and the most common and widespread in Wales and is tolerant of more base-rich areas than <i>ssp affinis</i> . In Europe, throughout the range of the species.]	
<b>Distribution</b>	Apparently rare; so far known only from 3	D OJy Feldballe (OjesO), discovered 1974,	D OJy Ans and northeast of Skanderborg, N from AA	N from AA to SF. Outside Norden in C Europe from

	<b>affinis / pseudomas</b>	<b>cambrensis</b>	<b>borreri</b>	<b>pseudodisjuncta - not UK</b>
	specimens. N Ro Sandnes, Ho Fjell, SF Askvoll. Outside Norden in W and C Europe, N Turkey, the Caucasus, NW Africa.	disappeared c. 1985. N from VA to MR. - Map see p. 77. Outside Norden in W, C and S Europe, N Turkey, the Caucasus.	to MR. Throughout the range of the species except Macaronesia.	Belgium to Austria.
<b>Taxonomy Variation</b>	<b>Taxonomy</b> Only var. <i>affinis</i> is known from Norden.	<b>Variation</b> Two varieties may be distinguished in Norden, the south and central European var. <i>insubrica</i> Oberholzer & Tavel ex Fraser-Jenk. (D Ojy, N from VA to SF) and the northwestern European var. <i>paleaceo-crispa</i> (E. J. Lowe) Fraser-Jenk. (N from VA to MR), differing in scale-colour unci prominence of pinnule-teeth. In N, as in France, intermediates occur. For example, some plants have leaves that are more lobed and more acutely toothed than in typical (British) var. <i>paleaceo-crispa</i> , but with normal pale-brown scales, while others are less lobed and toothed but may have the slightly reddish scales of var. <i>insubrica</i> . However, most populations are more or less typical var. <i>paleaceo-crispa</i> or var. <i>insubrica</i> . Similar taxa. <i>D. affinis</i> subsp. <i>cambrensis</i> is most similar to subsp. <i>affinis</i> (3 A), but has shorter and more tapering pinnae; the lowest pair of pinnules of each pinna is the longest, and the petiole-scales are generally wider; the indusium is more shrivelling, the spores are markedly larger, and the share of abortive spores is larger.		<b>Taxonomy</b> In its tendency to have squarely truncate pinnules this subspecies is rather conspicuously different from subsp. <i>cambrensis</i> and closer to subsp. <i>borreri</i> , but in all other respects it appears more closely related to subsp. <i>cambrensis</i> . However, in the few studies that have been done, it appears to differ from subsp. <i>cambrensis</i> in chromosome-pairing behaviour at meiosis. Usually the pairing is only partial, which suggests a segmental allopolyploid origin; it might possibly contain two slightly different O genomes. Further studies are required.
<b>Similar Taxa</b>	Narrow-leaved plants of subsp. <i>affinis</i> (from exposed localities) may be difficult to separate from subsp. <i>cambrensis</i> (3B). Subsp. <i>affinis</i> has, however, smaller spores, more glossy blade and generally narrower scales.	<i>D. affinis</i> subsp. <i>cambrensis</i> is most similar to subsp. <i>affinis</i> (3 A), but has shorter and more tapering pinnae; the lowest pair of pinnules of each pinna is the longest, and the petiole-scales are generally wider; the indusium is more shrivelling, the spores are markedly larger, and the share of abortive spores is larger.		

### Flora Nordica (2000)

3. *Dryopteris affinis* (Lowe) Fraser-Jcnk. Fig. 34B Fraser-Jenkins, Fern Gaz. 12: 56 (1979). - *Nephrodium a/fine* Lowe, Trans. Cambridge Philos. Soc. 6: 525 (1838). - Described from Madeira. *D. paleacea* auct., non (Moore) Hand.-Mazz. (1908), ncc (Sw.)C. Chr. (1911). *D. Guldkasi-Mangelov*. *F. norjanalvejuuri*. *N. raggtelg*. *S. raggtrajon*. Literature. Beitel & Buck 1988, Fraser-Jenkins 1980, Fraser-Jenkins & Reichstein 1984, Knaben 1948, Nordhagen 1947 Widgnet al. 1996. Rhizome decumbent to ascending, scaly at apex. Leaves 50-80(-150) cm, forming a crown, wintering or not. Petiole 1/5-1/3 the length of the blade, pale-brown at the base, green or straw-coloured above. Scales pale brown to dark brown, often darker at the base, predominantly linear, mixed with  $\pm$  narrowly lanceolate ones with acuminate apices, densely set also in the upper part of the petiole and on the rachis. Blade ovate-lanceolate, elliptic, oblong or oblanceolate, truncate or somewhat tapering at the base, pinnate-pinnatifid, 45-110 x 15-30 cm,  $\pm$  glossy, dark to pale green (in all subspecies yellow-green when exposed or young); point of insertion of pinnae blackish (often not visible in old dried leaves). Pinnae 15-35 pairs, oblong with parallel sides or tapering from the base. [Table as above]

### Welsh Ferns (1994)

As *D. filix-mas* except: Stalk and rachis shaggy with orange-yellow to golden or dark-brown, linear-lanceolate to ovate-lanceolate, acuminate scales; stipe as long as blade. Fronds somewhat leathery, yellowish-green, glossy, persisting until late in season. Pinnae (when living) with a dark brown or blackish patch near their junction with the rachis; pinna segments variable and sometimes similar to those of *D. filix-mas* in shape but often straight- and almost parallel-sided, usually more or less subtruncate and with a few obtuse or acute triangular teeth at the apex, the rest of the margin subentire. Sori (3-)4-5 on each side of the midrib. Indusium with margin tucked under the sorus (Fig. 60). Spores ripening July-October. Reproducing apogamously only. Apogamous diploid.  $2n=123$ . All its hybrids are apogamous. Common in hedge banks, woods, and woodland clearings. Throughout the British Isles but less common than *D. filix-mas*.

### Stace 3 (2010)

- 1 Leaves 1-pinnate with deeply lobed pinnae, to 2-pinnate with pinnules lobed to c.1/2 way to midrib 2
- 2 Leaves of 1 sort, lanceolate-elliptic, scarcely parallel-sided; pinnae with >15 pinnules each side; pinnules with acute, obtuse or 0 teeth 3
- 3 Leaf clear green (of various shades), not or slightly glandular; lowest pinna with pinnules successively smaller from base distally, or just the 2 proximal ± same size 4
- 4 Pinnules entire to lobed distinctly <1/2 way to midrib; petiole usually <=1/3 as long as blade; common 5
- 5 Pinnules parallel-sided for most of length, broadly rounded to ± truncate (but often toothed) at apex; pinnae with dark blotch where they join rhachis; petioles with dense golden scales (*D. affinis* agg.) 7
- 7 Apex of pinnules rounded to rounded-truncate 8
- 8 Apex of pinnules with rather few, obtuse teeth 3. *D. affinis*

- 3-5. *D. affinis* agg. Members of this agg. are separated from *D. filix-mas* as in the key (couplet 5). In *D. filix-mas* the pinnules are more narrowly rounded at the apex and are more regularly (but not always more deeply) toothed. *D. affinis* agg. are diploids or triploids which produce fertile spores by apomixis, but a small proportion of spore mother cells attempt meiosis, which is irregular and produces sterile spores. They have been derived from hybrids involving 3 diploid spp.: *D. oreades*, the non-British *D. caucasica* (A. Braun) Fraser-Jenk. & Corley, and at least 1 other ancestral diploid. Recognition of the 3 spp. and 3 extra sspp. (see also Other spp. above) is possible only after considerable experience. Combined description: Leaves to 1.5m (incl. petiole usually 1/6-1/4 as long as blade), 1-pinnate with deeply divided pinnae to 2-pinnate, with subentire to acutely or obtusely toothed lobes/ pinnules; petiole with very dense golden-brown scales; blade yellowish-green, with dark blotch at base of pinna. Native; similar places to *D. filix-mas* and often with it; frequent to common throughout BI (but less so than *D. filix-mas*).
3. *D. affinis* (Lowe) Fraser-Jenk. <sup>2</sup> Golden-scaled Male-fern. The most extreme (i.e. least like *D. filix-mas*) sp., with shiny leaves with very densely golden-scaly petioles, with lowest pinnae c.1/2 as long as longest; pinnae parallel- and straight-sided for proximal 1/2; pinnules with rounded to rounded-truncate apex with short obtuse teeth and subentire sides, and the lowest with a slight, rounded basal lobe; 2n=82. Throughout most of BI except extreme SE En.
- 1 Pinnules distinctly crowded, some with asymmetrical apices c. ssp. *kerryensis*
  - 1 Pinnules usually clearly separated, with symmetrical apices 2
  - 2 Lowest basiscopic pinnules of lowest pinna longer than rest, with small distinct lobes b. ssp. *paleaceolobata*
  - 2 Lowest basiscopic pinnules of lowest pinna usually not the longest, unlobed or shallowly lobed a. ssp. *affinis*
- a. Ssp. *affinis* (*D. pseudomas* (Woll.) Holub & Pouzar). The common ssp. Throughout the range of the sp.
- b. Ssp. *paleaceolobata* (T. Moore) Fraser-Jenk. Can be confused with *D. cambrensis* because of its lobed pinnules, but has longer and more parallel-sided pinnae and fewer and more obtuse pinnule teeth; differs from ssp. *affinis* as in key (couplet 2). Scattered in N & W Br, S Kerry.
- c. Ssp. *kerryensis* (Fraser-Jenk.) Fraser-Jenk. Can also resemble *D. cambrensis*, but has smaller more shiny leaves, more crowded pinnules, and see key (couplet 1). SW Ir; endemic.
4. *D. cambrensis* (Fraser-Jenk.) Beitel & W.R. Buck (*D. affinis* ssp. *cambrensis* Fraser-Jenk., ssp. *stilluppensis* auct. non (Sabr.) Fraser-Jenk.) <sup>2</sup> Narrow Male-fern. Intermediate between *D. affinis* and *D. oreades*, with rather shiny leaves with densely reddish-golden-scaly petioles, with lowest pinnae usually <1/2 as long as longest; pinnae tapering from base to apex; pinnules with very broadly rounded apex with obtuse often obscure teeth and obtusely toothed often revolute sides, and the lowest with a substantial rounded basal lobe often overlapping leaf rhachis; 2n=123. Throughout much of BI but absent from much of S & E En.
- a. Ssp. *cambrensis*. The common ssp., throughout the range of the sp.
  - b. Ssp. *pseudocomplexa* Fraser-Jenk. Differs from ssp. *cambrensis* in paler scales, broader leaf (relatively longer pinnae), and pinnae with more separated pinnules with narrower more acute teeth (when present). Known from Clyde Is, N EbuDES, N Kerry and Co Waterford.
5. *D. borrieri* (Newman) Newman ex Oberh. & Tavel (*D. affinis* ssp. *borrieri* (Newman) Fraser-Jenk., ssp. *stilluppensis* (Sabr.) Fraser-Jenk., *D. tavelii* Rothm., *D. woynarii* auct. non Rothm.) <sup>2</sup> Borrer's Male-fern. Closest to *D. filix-mas*, with scarcely shiny leaves with moderately densely light-golden-scaly petioles, with lowest pinnae >1/2 as long as longest; pinnae parallel-sided for proximal 1/2 but uneven due to various-lengthed pinnules; pinnules at least on proximal part of leaf with truncate apex often with a large acute tooth on each 'shoulder' and well-toothed sides, and the lowest with a large basal lobe; 2n=123. Throughout BI; the most widely distributed sp. and the only one in much of SE En. Distinct in its truncate pinnules but less golden-scaly than the other 2 segregates of *D. affinis* agg.

## Flora Europaea (1993)

2. ...Like 1 [*D. filix-mas*] but leaves often persisting in winter; petiole and rhachis densely covered with reddish to brown or pale brown scales; point of insertion of secondary rhachis usually blackish; lamina usually dark green, shining; pinnules or their ultimate segments parallel-sided, obliquely truncate, acute or rounded at apex, denticulate only at apex; indusium usually inflexed and embracing the sporangia when young. Much of Europe, but absent from most of the north and east. Au Az Be Br Bu Co Cz Da Ga Ge Hb He Ho Hs Hu It Ju Lu No Po Rm Rs(W, K) Sa Si Tu.

1 Pinnule-teeth obtuse; indusium thick,  $\pm$  persistent

2 Leaves persisting in winter; axes of lamina not glandular (a) subsp. *affinis*

2 Leaves not persisting in winter; axes of lamina glandular, at least when young (c) subsp. *cambrensis*

1 Pinnule-teeth acute; indusium thin, deciduous

3 Pinnule lobes oblong (b) subsp. *borreri*

3 Pinnule lobes rounded to acute (d) subsp. *persica*

(a) Subsp. *affinis* (*D. pseudomas* sensu J. Holub & Pouzar pro parte): Leaves persisting in winter. Scales dense, narrow, glossy, usually with a dark base. Lamina very glossy. All pinnae symmetrical. Pinnules rounded to rounded-truncate, usually with few obtuse teeth, these sometimes prominent. Lowest basicopic pinnule of lowest pinna 1/2-2/3 adnate to costa. Indusium inflexed, thick and persistent.  $2n = 82$ . S.W. & W.C. Europe.

(b) Subsp. *borreri* (Newman) Fraser-Jenkins, *Willdenowia* 10: 110 (1980) (*D. borrieri* (Newman) Newman ex Oberholzer & Tavel, *D. mediterranea* Fomin, *D. paleacea* (D. Don) Hand.-Mazz. pro parte, non (Swartz) C. Chr.): Leaves mostly not persisting in winter. Scales more or less dense, narrow and wide intermixed, pale or with a dark base. Lamina paler and less coriaceous and shining than that of subsp. (a). Pinnules truncate to subacute, with prominent, acute teeth. Lowest basicopic pinnule of lowest pinna usually longer, with oblong side-lobes, stalked. Indusium thinner and less inflexed than subsp. (a), shrivelling rapidly.  $2n = 123$ . Almost throughout the range of the species.

(c) Subsp. *cambrensis* Fraser-Jenkins, *Sommerfeltia* 6: XI (1987) (incl. subsp. *stilluppensis* sensu Fraser-Jenkins, non Sabr.): Leaves not persisting in winter. Scales dense, lanceolate, reddish- or yellowish-brown, without a dark base. Lamina glossy, glandular on the axis, at least when young. All pinnae more or less symmetrical, tapering. Pinnules rounded, with obtuse teeth. Indusium highly inflexed but shrivelling later.  $2n = 123$ . Calcifuge. Throughout the range of the species except parts of C. & S. Europe.

(d) Subsp. *persica* (Lowe) Fraser-Jenkins, *Willdenowia* 10: 113 (1980): Scales wider, pale. Lamina pale green, slightly glossy. Pinnules narrow, rounded to acute, with long, acute teeth; point of insertion of secondary rhachis only faintly blackish. Indusium curved down but not inflexed, soon shrivelling. Mainly in E. Europe.