

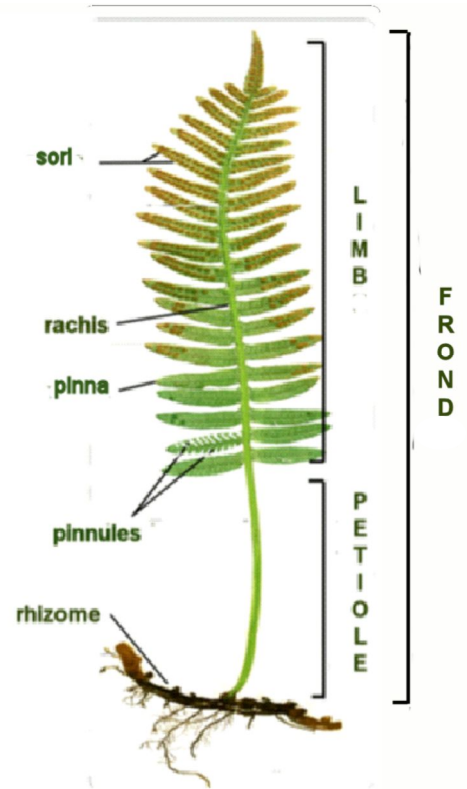
FROND : a leaf of the plant

PINNA (*pl.* PINNAE): the first division of the frond (=foliole), supported by the RACHIS, the principal axis of the frond

PINNATI- : the divisions each side of the stalk, like the barbs of a feather



FROND



PINNA



**UNIPINNATE**

The frond is divided just once



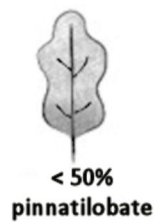
**BIPINNATE**

The frond is divided twice  
Thus the pinna is divided once  
(more rarely, tripinnate)

Bipinnate frond

bipinnatipartite

(each pinna has fairly deep incisions)



Bipinnate frond

bipennatisect

(twice pinnatisect)

(each pinna has very deep divisions)

# SPORES

Encased within the SPORANGES (or SPORANGIA)

Grouped within a SORUS (pl. SORI)

Ferns have no flowers, only spores.

The presence of spores is essential for the identification of most ferns.

The spores are generally found on the underside of the leaf, usually either along the margins or around the veins.

SPORE: the reproductive cell (instead of a seed: microscopic, unicellular, 1/2 chromosomes, resulting from meiosis)

SPORANGE : capsule enclosing the spores (*alternative*: sporangium)

SORUS (*pl. SORI*): group of sporanges

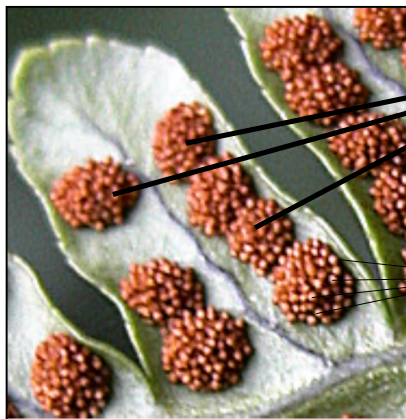
INDUSIUM (*pl. INDUSIA*): membrane which covers the sorus

PELTATE INDUSIUM: the indusium is attached by a stalk under the indusium

RENIFORM INDUSIUM: the indusium is deeply notched on one side, right down to the centre

LINEAR INDUSIUM

NO INDUSIUM



SORI, without INDUSIA

SPORANGES (each enveloping their microscopic unicellular SPORES)



SORI

With circular INDUSIA,  
RENIFORM (notched)



SORI

Linear, in 2 parallel lines, indusia (not easily visible) opening centrally, turning outwards



SORI

Oblong, elongated indusia,  
opening at the side (laterally)



1. Annual (no dead fronds) *Anogramma leptophylla* ...

1'. Perennial

2. Sori in a spike, without fronds ..... 3

3. Looks like a typical fern

*either*: Large tuft, branched spike *Osmunda regalis* .....

*or*: Medium tuft, dark green, simple spike resembling a frond

*Blechnum spicant* .....

3'. Not like a typical fern

*either*: Single undivided frond, surrounding a simple spike (resembling an Arum)

*Ophioglossum* (2 species) ....

*or*: Pinnate frondes, branched spike *Botrychium* (2 species) ...

2' Sori on the underside of the pinnae ..... 4

4. Sores at the underside edges of the pinnae

*either*: Margins of the pinnae very curled over, hiding the sori *Cryptogramma crispa* .....

*or*: Margins of the pinnae slightly curled over, a robust heathland plant *Pteridium aquilinum* ...

*or*: Margins of the pinnae uncurled, a delicate plant of wet rocks

*Adiantum capillus-veneris* .....

4'. Sori around the veins of the pinnae

5. Very large fern (often growing in the ground, or between large boulders) ...

6. Sori circular, with an indusium

*either*: Indusium reniform (notched)

*Dryopteris spp.* (see final page for all 9 species) .....

*or*: Indusium peltate (stalked), pinnae with ears

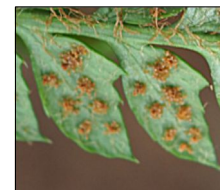
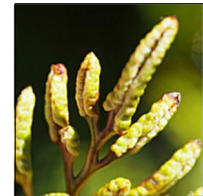
*Polystichum* (3 species) .....

6'. Sori oblong/oval, elongated indusium inserted laterally

*Athyrium filix-femina* (+1 species) .....

5'. Average sized fern (often in rock fissures or stone walls)

See following page



[ cont. (Perennials, sori on the underside of the fronds, around the veins of the pinnae)]



5'. /cont. Average sized fern (often in rock fissures or stone walls)

7. Sori circular, without indusium

8. Fronds unipinnate, spaced out (rhizome), robust plant

***Polypodium vulgare*** (+ 2 other species)



.....

8' Fronds bipinnate or tripinnate

*either:* light green, lower pinnae often pointing downwards

***Phegopteris connectilis*** .....



*or:* Slim petiole/rachis

***Gymnocarpium robertianum*** (limestone)

***Gymnocarpium dryopteris*** (schist/granite)



.....

7' Linear sori

*either:* Sori oval (a bit linear), confluent when ripe, indusium

shell-shaped, fixed at the edge

***Cystopteris fragilis*** .....



*or:* Sori clearly linear, often confluent when ripe, indusium fixed laterally

***Asplenium*** spp. ....

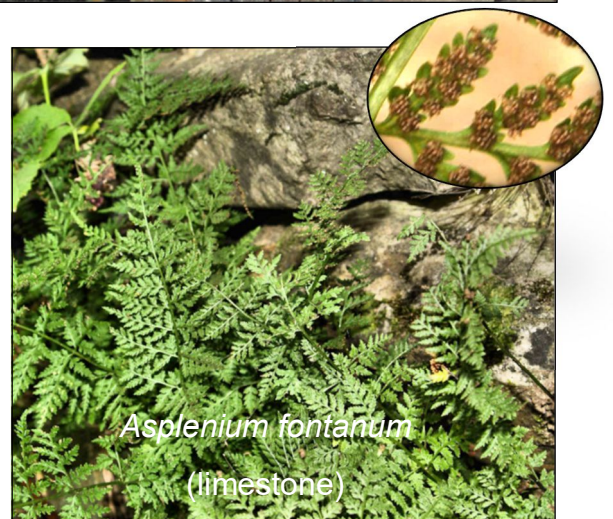
(9 species with widely different forms; an important group,

often crisped up in times of drought)



See following pages for the ***Aspleniums*** of our region









**Tip:** Remove an entire frond, with the spores, to verify your identification  
in Flore de la France Méditerranéenne Continentale

**Attention! Group needing expertise.** Remove an entire frond, with the spores, to verify your identification in Flore de la France Méditerranéenne Continentale or English equivalent

1. Limb **entirely bipinnate**, even at the base. .... 2

2 Rachis of the pinnae **not marked** with black on the underside .... 3

3 Basal pinnae clearly shorter than the middle ones.

*Either:* Indusium without glands. (Plants in isolated tufts or in small groups) ***Dryopteris felix-mas***

*Or:* Indusium border with many glands (examine the underside of the border).

(Tend to form dense colonies) ***Dryopteris oreades***

3' Basal pinnae little different in length to the middle ones

(thus the limb not obviously narrower at its base) ***Dropteris ardechensis***

2'. At the level of their insertion on the main rachis, the rachis of the pinnae have **black marks on the under side** (and often on the upper). (Petiole scales dense, golden or dark) ***Dryopteris affinis* ..... 4. for the ssp.**

4. Pinnules with (sub) entire larteral margins : ***Dryopteris affinis* subsp. *affinis***: petiole scales very dense; limb rough, shiny, strongly narrowed at the base; pinnules with sub-parallel margins; pinnules superficially or subentirely toothed: (Cassagnas, Barre-des-Cévennes)

4' Pinnules with lateral margins obvoiusly toothed.

*Either:* Petiole scales less dense; limbe plus souple, barely shiny: ***Dryopteris affinis* subsp. *borreri***: weakly narrowed at the base; lower basal pinnules pinnatilobate; indusia supple, twisting or crisping up when mature: (N. Mont Lozère, SE of RN 106)

*Or:* Petiole scales very dense; limb +/-rough, shiny: ***Dryopteris affinis* subsp. *combrenensis***.

Like subsp. *affinis*, but narrower limb; lower pinnules pinnatiilobate : (Genolhac and far SE)

1'. Limb **tripinnatisect**, at least at the base..... 5

5. Petiole scales all single colour, a light rusty brown ***Dryopteris carthusiana***

5' Petiole scales at least in part bi-coloured, a light rusty brown with a darker or blackish centre

*Either:* Pinnules of the middle pinnae with an obtuse oblong contour or weakly elongated; virtually all petiole scales bi-coloured ***Dryopteris dilatata***

*Or:* Contour of the pinnules of the middle pinnae very elongated or even caudate; petioile generally with a mixture of uni-colour and bi-colour scales. ***Dryopteris expansa***

