

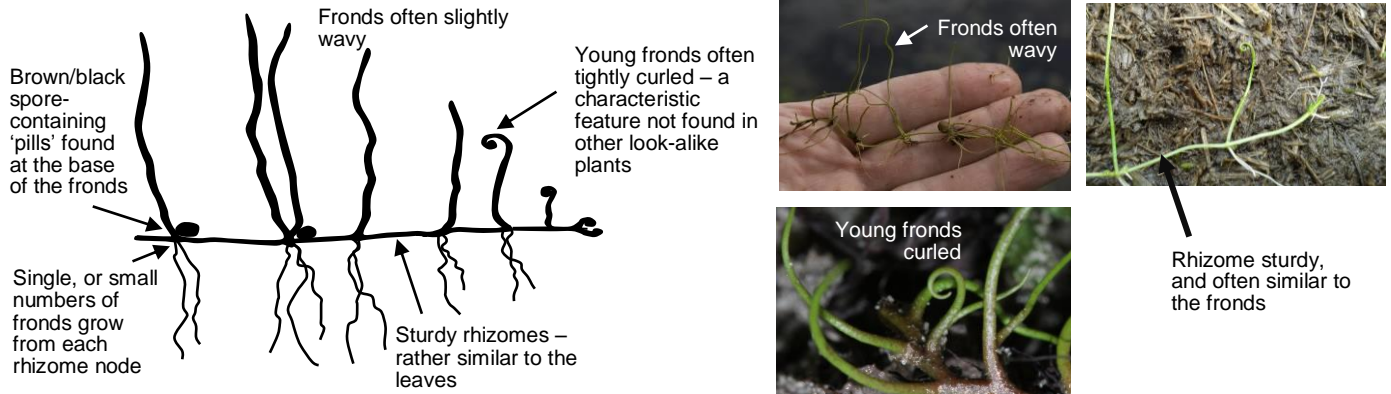
Pillwort (*Pilularia globulifera*) is a rare fern with a very unfern-like appearance: except for its tightly coiled young fronds – it looks much more like a small grass or rush.

There are two main issues for identifying Pillwort:

- (i) **Finding plants in the first place** – when Pillwort is growing amongst other plants or in deeper water it can be difficult to see – and even experienced botanists sometimes miss it!
- (ii) **Distinguishing Pillwort** from similar grass-like aquatic plants with which it can be confused.

What Pillwort looks like:

Pillwort is a low creeping plant with fine, cylindrical grass-like fronds that grow from a creeping runner (rhizome).



How to search for Pillwort:

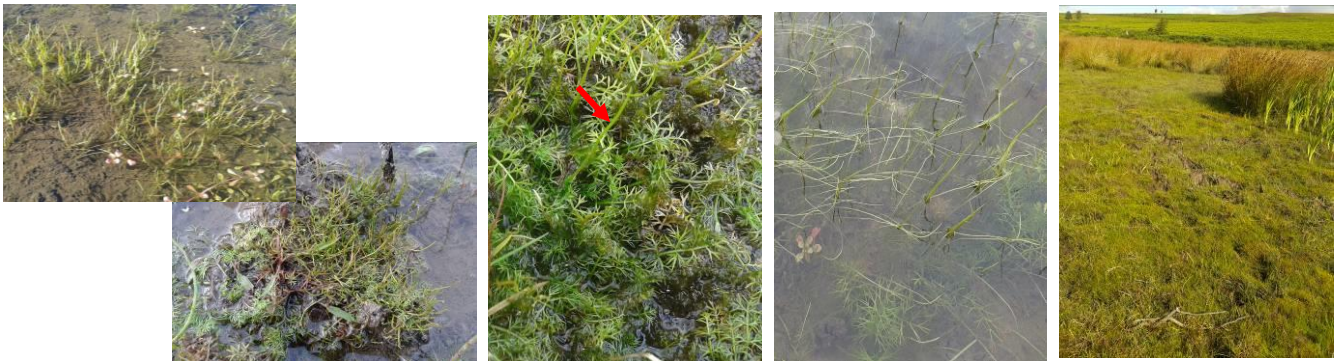
There are three stages to surveying Pillwort in a pond or pool:

- (i) **Scan the shallow water**, damp and dry pool edges to look for Pillwort plants. Search particularly carefully in pools which already have plants that are often associated with Pillwort (see below)
- (ii) **Look for submerged features**, and where necessary pull-up likely plants to check them (and then replant) until you have found Pillwort. Up-rooting pond plants should be minimised, but is unavoidable at first (and especially when you are still learning) because to definitively identify Pillwort you need to look at the whole plant, including its creeping runner-like rhizomes.
- (iii) **Get your eye in**, once Pillwort is found, get a good visual image for the plant fronds – so that you can survey the rest of the site without up-rooting plants

Where to look for Pillwort:

Like many aquatic plants, Pillwort has different forms depending on where it's growing. Classically, Pillwort is found on damp mud or in very shallow water, where it forms rather rigid, wavy grassy fronds around the height of a matchstick. However, in deeper water its fronds are often longer (c 10 cm) and more flexible, and where plants have been beached on dry ground for some-time they can be found as tiny plants, less than a centimetre high, often forming patches of a characteristic yellow-green colour.

Search images when scanning pools for Pillwort:



On mud and shallow water: patches of untidy plants with wavy stems often slightly more yellow green than rushes and grasses. New runners may be visible

Growing with other plants: wavy rush like fronds 2-5 cm long, sometimes slightly more yellow green than other plants









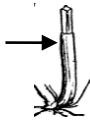



Deeper water: thin tubular fronds up to 0.5 m. Difficult to distinguish from plants like Bulbous Rush without pulling plants up to check.

Drying pond edges: Pillwort can sometimes form extensive carpets, which are typically a distinctive yellow-green colour

Plants that are often found with Pillwort – and give you a head's-up that it may be present:

Lesser Marshwort (*Apium inundatum*), Water-purslane (*Lythrum portula*), Floating Club-rush (*Eleogiton fluitans*), Marsh Pennywort (*Hydrocotyle vulgaris*), Lesser Spearwort (*Ranunculus flammula*), Bulbous Rush (*Juncus bulbosus*).

Characteristics for separating Pillwort from similar-looking rush species:

	Pillwort <i>Pilularia globulifera</i>	Bulbous Rush <i>Juncus bulbosus</i>	Needle Spike-rush <i>Eleocharis acicularis</i>	Floating Club-rush <i>Isolepis fluitans</i>
Photos				
Silhouettes of pressed plants				
Leaf shape and general appearance	Fronds often with a slight wave or curl, giving an untidy appearance	Very variable: submerged and floating leaves can be long and slender with an untidy habit. Terrestrial leaves are more rigid, with tufts of leaves growing at intervals from the stem	Leaves very slender and thread-like, especially when submerged	Creeping stems with alternate leaves. Sometimes forms floating mats
Leaf cross-section	Leaves more or less cylindrical	Leaves more or less cylindrical, composed of 2-4 hollow tubes	Leaves are four angled – though this can be difficult to see because the leaves are so slender, composed of 3-4 tubes	Fattened: triangular at the base, slightly keeled along most of their length, flat at the tip
Leaf size	In cross-section, fronds are typically 2-10 cm long, and c 0.5mm diameter – but in deeper water they can be up to 0.5m in length	Less than 1mm in diameter, typically 5-20 cm long, but can be much longer when growing submerged	Less than 1mm in diameter, typically 2-10 cm long, but can be longer when growing submerged	Leaves usually less than 1mm wide, 2-5 cm long
Leaf colour	Often tends towards yellow-green	Dark to mid green - often with red tints	Mid green	Often rather light lime green
Young leaves/fronds	Very characteristic rolled tip that is typical of ferns as they unfurl	Young leaves never tightly curled	Young leaves never tightly curled	Young leaves never tightly curled
Leaf sheath	No sheath at the base	Leaf sheath at the base of stems: short and blunt – with overlapping margins	A delicate tubular sheath encloses the base of the stems 	Young leaves have an open sheath at the base. The sheath falls away to leave just a kink as leaves mature
Plant base and runners (rhizome or stolon)	Single or multiple fronds emerge from the stout runner which is similar in shape and texture to the leaves	Tufted shoots, often bulbous at the base. No underground rhizome, but tufts of shoot often arise from nodes on the stems 	Tufts of leaves and shoots arise from a fine brown creeping runner 	No runner, but the stem is lax and much branching. 
Flowers and fruit	Flowers / fruit <i>never</i> present. Spores (if present) - are contained in a circular blackish/brown sporocarp c 3mm diameter, developed at the base of the plant fronds in June-October	Flowers /fruit in small clusters along the stem or at its tip. Leafy plantlets sometimes sprout from them	Flowers /fruit (if present) form small brown spikelets at the tip of the stem	Flowers /fruit (if present) form small brown spikelets at the tip of the stem