Planting up ponds

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A pond's aesthetic appeal largely reflects the plants grown in and around it. Plants turn a pond from a water filled hole in the ground to a thing of beauty. Perhaps of more importance to a wildlife garden pond, plants provide oxygen, food and shelter so that aquatic animals can thrive and after life, their decay ensures that the next generation of plants have substrate and fertiliser from which to succeed. From an aquatic animal's point of view, the plants that provide the best habitats are those that create a diverse and complex underwater structure at the water's edge.

Plants will of course, arrive under their own steam if one is patient enough to let this happen, but this could take several seasons and is entirely dependent on the ponds elsewhere in the locality. Planting up is best done during spring when plants are at their most vigorous and after a period of time sufficient for a new pond to allow water chemicals to dissipate, especially if you have had no option but to use tap water. This generally amounts to a few weeks. This period of grace will also allow any filamentous algae (blanket weed) to develop and be controlled.

If you have introduced sand or some other form of substrate into your pond (and only do this if you know they are low in nutrients (e.g. clean gravel or inert play sand)), then plants may be planted directly into this. Alternatively, deeper rooting plants will need to be potted, as will those plants that have the potential to run riot throughout the pond (if you want to plant these at all). Specialist pots can be bought which are perfect for this purpose and allow water to permeate, whilst retaining the soil. Similarly, hessian sacks or even old tights can do the same job. Any exposed soil within pots should receive a layer of gravel on top to keep them in place and to make them more resistant to disturbance, for example, whilst undertaking pond maintenance.

Plan to have between 50% and 75% of your pond vegetated as this will provide a home for invertebrates and amphibians. Dense vegetation will also provide a refuge from fish if they have been introduced - but we advise giving fish a miss in wildlife ponds. Some surface areas (about 25%) should be kept vegetation free, as a number of pond inhabitants need open areas to complete vital parts of their life-cycle or for feeding. The great crested newt for example requires vegetation free areas for mating displays.

Try to introduce a complex of plants that includes floating vegetation such as lilies, submerged 'oxygenators' and emergent plants such as rushes and sedge. There is a strong relationship between habitat complexity and aquatic insect diversity which essentially means the more complex you can make your garden pond, the more different types of pond life you will see.

Finally, be aware of what you are introducing into your pond. Not all suppliers adhere to good practice and continue to sell banned plants or those that are known to become invasive. Non-native plants that have become invasive were typically those originally introduced for their aesthetic appeal in gardens and have since found their way into the wild, or where viable fragments have been incidentally introduced along with other plants or garden materials. Most non-native species, however, cause no real concern for our native wildlife and in the right setting can provide intrigue, colour and excitement alongside our native wildlife.

Generally though, a wildlife garden pond should show a preference for native plant species as it will be to these that pond life will be adapted and will more actively seek out. For more information about non-natives visit the Be Plant Wise campaign, which has been launched by Defra and the GB non-native species secretariat www.nonnativespecies.org/beplantwise .

Top performing plants

For any good quality pond, a selection from each of the following five plant groups will guarantee a range of habitats ready for all sorts of wildlife to visit. In the section following, I will also outline some of the plants to avoid or to keep a close eye on if they appear. As with everything to do with wildlife gardening, there are no hard and fast rules and depending on the nature of your pond a typically invasive plant can be subdued and a normally unobtrusive one can proliferate.

Emergents

These are plants that are rooted on the bottom, with leaves and stems that emerge from the water and do not float upon the water's surface. These will be typically planted around the pond margins. Emergent plants should be planted at relatively low density, no more than three per square metre. In a small garden pond, larger plants are best avoided altogether, unless potted which will help control their spread. Some species which grow in excess of 1 – 2m in height might look out of proportion in a pond no bigger than a few square metres.

Name	**Height (up to)**	**Flower / seedhead**	**Notes**
Burr read (*Sparganium erectum*)	1.5m	White, spherical flowers	Quite unique appearance
Common club-rush (*Schoenoplectus lacustris*)	3m	Spikelets egg-shapes, red-brown	Tall and leafless dark green stem with a blueish hue
Dwarf reed mace (*Typha minima*)	60cm	Rounded seedheads	Non-native but a nice alternative to native cousins
Flowering rush (*Butomus umbellatus*)	1.5m	Three rose-pink petals in large umbels	Unrelated to true rushes (*Juncus sp.*)
Mare's tail (*Hippurus vulgaris*)	1m (usually smaller)	Tiny, pink and without petals at base of leaves	Will grow in a variety of water depths
Sweet flag (*Acorus calamus*)	1.2m	Many small green/yellow flowers on phallic like projection	Leaves smell like tangerines when crushed
Water plantain (*Alisma plantago-aquatica*)	1m	Pale-lilac	
Yellow flag iris (*Iris pseudocorus*)	1.5m	Large yellow	Blue and purple ornamental varieties are available

Submerged

These are plants which are rooted on the bottom, with their leaves and stems beneath the water surface; only the flowers emerge above. Often these are considered “oxygenators” as they release relatively high levels of oxygen into the water column during the day. However, in the night they take up oxygen, and pond life (fish excepted) is adapted to still water with variable oxygen content. Submerged plants usefully can 'buffer' against excessive nutrients, absorbing them during their rapid growth. Technically speaking, some submerged plants could be considered free-floating as many will do just fine without being rooted to the bottom.

Name	**Stem length (up to)**	**Flower / seedhead**	**Notes**
Curly pondweed (*Potamogeton crispus*)	2m	Small flower spikes	Unique wavy and toothed leaves. Invasive in the United States, and can dominate ponds
Hornwort (*Ceratophyllum demersum*)	1m	Minute at the base of leaves	Completely submerged, brittle leaves
Spiked water-milfoil (*Myriophyllum spicatum*)	2.5m	On erect spikes from red to white	Fine, feather like leaves not to be mistaken for parrot's feather (*M. aquaticum*)
Water starwort (*Callitriche stagnalis*)	60cm	Small and yellowish	Will also survive on wet mud
Water violet (*Hottonia palustris*)	30cm	Lilac-pink, with yellow throat	Generally uncommon, requires clean water

Floating

Some of the most charismatic of pond plants belong to this category. These are plants which are rooted at the bottom but have at least some of their leaves that float flat upon the water’s surface. Often floating plants are able to grow in deeper water and can provide structure as well as shade in areas where other vegetation cannot.

Name	**Stem length (up to)**	**Flower / seedhead**	**Notes**
Broad-leaved pondweed (*Potamogeton natans*)	1.5m	Erect green spike up to around 5cm in length	Leaves vary between light and dark green / brown. Leave up to 120mm in length
Amphibious bistort (*Polygonum amphibium*)	75cm	Bright pink flowers on compact spike	Can occur on dry land
Water crowfoot (*Ranunculus aquatilis*)	60cm	White flowers with yellow throat	There are a number of closely related species

			including pond water crowfoot (*R. peltatus*)
Fringed water-lily (*Nymphoides peltata*)	2m	Yellow, fringed flowers about 2.5cm across	
Frogbit (*Hydrocharis morsus-ranae*)	1m	White 3-petalled flower about 2-3cm across	Becoming scarce in wild
White water-lily (*Nymphaea alba*)	1.5m	Large generally white flowers with shades of yellow, pink and red	Many ornamental varieties on offer

Free-floating

These are plants which are not rooted to the bottom and whose leaves float entirely on the water surface. In many instances you will not introduce free-floating plants into your pond, but they will find their own way to it stuck to aquatic insect or wildfowl or along with other planted plants. Often these will be ones to monitor and potentially manage – so see the corresponding section below.

Name	**Stem length (up to)**	**Flower / seedhead**	**Notes**
Water soldier (*Stratiotes aloides*)	1m	White or pinkish 3 petalled flower about 3cm across	Narrow, sharp pointed leaves to 45cm in length

Pond edge

These are plants that are more associated with wet and marshy ground as opposed to standing water. Some listed may prefer a few centimetres depth of water and all can provide an excellent complement to your pond. From an aesthetic point of view, allowing for a border of wetland plants to develop around your pond will soften the transition from a terrestrial habitat to the pond. From a pond life perspective, these areas will provide cover to the pond and be a familiar environment for many that have terrestrial life stages such as amphibians or dragonflies, as well as many other winged insects that start their life as aquatic larvae. I have put these roughly in order of preference from dry to wet.

Name	**Height (up to)**	**Flower / seedhead**	**Notes**
Hemp agrimony (*Eupatorium cannabinum*)	1.5m	Dense clusters of small light pink to purple flowers	Excellent for butterflies and other pollinators
Great burnet (*Sanguisorba officinalis*)	1m	Deep pink flowers in rounded or oval spikes	Member of the rose family and a once familiar site across floodplain meadows
Devil's-bit scabious (*Succisa pratensis*)	1m	Single light purple flower heads per stem	Excellent for butterflies and other pollinators
Purple loosestrife (*Lythrum salicaria*)	1.2m	Dense, small bright purple-pink flowers on spikes	Excellent for butterflies and other pollinators

Ragged robin (*Lychnis flos-cuculi*)	75cm	Rose pink, narrow petalled flowers	Excellent choice for a bog garden
Marsh woundwort (*Stachys palustris*)	1m	Pink, purple flowers arranged in whorls near leaf bases	Excellent choice for a bog garden
Marsh-marigold (*Caltha palustris*)	50cm	Clusters of neat, deep yellow flowers about 4cm across	Excellent choice for a bog garden
Small sweet-grass (*Glyceria fluitans*)	75cm	Grass species	Can provide an excellent habitat complex
Water forget-me-not (*Myosotis palustris*)	30cm	Small light blue, white and yellow flowers	Better planted in shallow water (2-5cm)
Spike rush (*Eleocharis palustris*)	50cm	Bright green stem and brown terminal spikelet containing minute flowers	Great for dragonfly larvae
Soft rush (*Juncus effusus*)	75cm	Bright green stem and spikelet at the side	Also available as a cork-screw form *spiralis*
Jointed rush (*Juncus articulatus*)	75cm	Flowers spike terminal and open with green stem sections	Stems divided into sections, hence 'jointed'
Water mint (*Mentha aquatica*)	50cm	Dense clusters of lilac-pink flowers	A lovely aromatic introduction, invasive!

Plants to avoid, monitor or control

The following are some species that should be avoided when planting up. This said, it's not always possible to control the introduction of some potentially troublesome plants into your garden pond. If one of the following species does turn up unannounced, some will want immediate control and eradication from your pond, whilst others may just need to be carefully monitored and managed.

Emergent

All of the species in the table below will be fine in large ponds, but being large and competitive plants they will have a tendency to dominate the typical garden pond and are best avoided.

Name	**Stem length (up to)**	**Description**	**Notes**
Reed sweet grass (*Glyceria maxima*)	2m	Tall plant of shallow water and marshy ground. Leaves narrow (to 18mm).	Native, but can out-compete many other plants, particularly in nutrient rich waters.
Greater reedmace (*Typha latifolia*)	3m	Tall impressive plant with conspicuous brown spikes packed full of tiny brown flowers	Native, but can out-compete many other plants in nutrient rich water. Commonly referred to a bulrush.

Lesser reedmace (*Typha angustifolia*)	2.5m	More slender than greater reedmace but otherwise similar	Share many of the same potentially invasive traits as greater, also native.
Common reed (*Phragmites australis*)	3m	Cane-like stems with purple spikelets.	Native, but can take over garden ponds. Excellent structural plant that will require continual control.

Submerged

Most of the species listed in the table below have strict controls on their sale and it is worth reviewing the Ponds and the Law section. Nevertheless, there remains a possibility that you will encounter them for sale in your local garden or aquatics centre and they are certainly widespread in the wild. You may even be offered them by an unassuming neighbour or friend so it will help to be aware of what to look out for.

Name	**Stem length (up to)**	**Description**	**Notes**
Australian swamp-stonecrop (*Crassula helmsii*)	30cm	Flowers whitish with 4 petals longer than sepals (1-2mm). Linear bright green and fleshy leaves.	Non-native. See Ponds and the Law. Can completely choke pond margins.
Parrot's feather (*Myriophyllum aquaticum*)	2.5m	Similar to native *Myriphyllum* species but has emergent as well as submerged leaves.	Non-native. See Ponds and the Law. Can completely choke entire ponds.
Curly waterweed (*Lagarosiphon major*)	3m	Leaves arranged spirally up the stem.	Non-native. See Ponds and the Law.
Canadian pondweed (*Elodea canadensis*)	3m	Soft, branching stems with whorled leaves of three (though lower leaves may be paired).	Non-native. Has generally been replaced by Nuttall's pondweed in the south of the UK.
Nuttall's pondweed (*Elodea nutallii*)	3m	More narrow, linear leaves than Canadian pondweed.	Non-native.
Water primrose (*Ludwigia grandiflora*)	1m	Long oval leaves with a bright, primrose like, yellow flower.	Non-native. See Ponds and the Law. Could be classified more of a marsh plant.

Floating

Name	**Stem length (up to)**	**Description**	**Notes**
Yellow water-lily (*Nuphar lutea*)	3m	Lily pads can reach up to 40cm across. Yellow	Native. Invasive in the United States. More feasible for

		flower.	planting into a large pond but can be invasive in nutrient rich water.
Floating pennywort (*Hydrocotyle ranunculoides*)	30cm	Free-floating or rooted, fleshy, vivid green leaves up to 7-8cm across. Flowers whitish.	Non-native. See Ponds and the Law. Can grow up to 20cm per day (!) and forms dense, choking mats.

Free-floating

Name	Leaf size (up to)	Description	Notes
Water fern (*Azolla filiculoides*)	2cm	Floating rosettes composed of branched fronds. Green to red-brown (in autumn)	Non-native, but occurred in Britain in the Hoxnian interglacial. See leaflet Ponds and the Law.
Water lettuce (*Pistia stratiotes*)	25cm	Floating rosette of leaves arranged in a circle that resembles an open head of lettuce.	Non-native. Has become invasive in United States but is tender and killed by normal UK winter
Duckweeds	See section 'Blanketweed and Duckweed'		

Blanketweed and Duckweed

Blanketweed and duckweed share a similar trait in that they do particularly well in still and nutrient-rich water. Both occur naturally in the United Kingdom, and neither need to be a problem and can be effectively managed. Within the few days and weeks that follow a new pond being built it is quite likely that blanket weed will develop. Over these initial periods this is not a problem and blanketweed will naturally come under control as populations of zooplankton (e.g. *Daphnia*) establish and graze upon it. In many ways, blanketweed can be seen as a helpful indicator and remover of nutrient from pond water for every time it is removed, so too are some of the nutrients.

More correctly blanketweed is filamentous algae, which will be more productive where there is a lack of shade and increased nutrient levels. As the pond gets older (several years on), blanketweed can be removed by hand or by using a rake. Enzymes released from barley or lavender straw can help moderate blanketweed growth, but is only temporarily effective. Similarly, various commercial additives can be shop bought to control its growth. Ultimately though, whilst there are excess nutrients, blanket weed will continue to grow. Therefore, the most effective management technique will be to lower nutrient levels by considering the advice given here elsewhere (e.g. don't use supplementary fish food or top up with tap water). Blanketweed growth may also be reduced by lowering light levels, so consider planting some floating leaved plants or improving marginal cover.

Duckweed is a group of three species of tiny simple plants, *Lemna minuta, L. gibba* and *L. minor.* They can cover a pond in days, and are often considered a nuisance. As with blanketweed, the presence of duckweed doesn't have to be a major issue. In fact, due to its size and relative complexity, duckweed can provide some additional valuable habitat. If you

fish out some duckweed, carefully examine it and you will see a range of pond life that is making use of it. However, also similar to blanket weed, in nutrient rich waters duckweed can spread across the entire surface, which will not only be unsightly, but can choke other aquatic plants and cause the water to become deoxygenated.

On rivers, duckweed is only ever found in calm backwaters where there is little to no flow. If you are able, introducing some movement to your pond will deter duckweed growth. During spring and summer when duckweed growth is at its peak, this could be achieved by installing a solar powered fountain or pump which can be bought quite cheaply. Not only will this operate at no extra cost during the sunniest, and potentially most duckweed friendly days, but it will also serve to oxygenate the pond during key periods.

Finally, if you are forced to remove blanketweed or duckweed, do so carefully. Whilst it'll never be possible to save every single bit of pond life as you do so, some of the more conspicuous inhabitants such as amphibians, fish, water beetles or bugs can be carefully released. Contrary to popular advice, don't leave removed weed at the side of the pond for many of the nutrients will be released by the plants as they are removed. Instead, put the removed plants in a compost heap well away from any pond.