

Rumex aquaticus L.

Scottish Dock

Rumex aquaticus has tall, hollow stems, large basal leaves with a deeply cordate base, a pale-green panicle and entire tepals with no tubercles. It is known to hybridise with a number of other docks, including *R. crispus*, *R. sanguineus* and *R. obtusifolius*. A rare plant in Britain, *R. aquaticus* is confined to the Loch Lomond area in Dunbartonshire and Stirlingshire and is restricted to nutrient-rich sandy, silty wet soils on the margins of lakesides, ditches and streams and on estuarine floodplain marshes and wet woodland. It is assessed as Vulnerable in GB due to small population size and continuing decline.



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IDENTIFICATION

A stout, upright perennial herb with 1-5 grooved, often reddish hollow stems (80)100 -185(200) cm tall, bearing a lax pale-green panicle with ascending branches and a few leafy bracts (Jonsell 2000). The panicle becomes heavier as the fruits mature, and this additional weight together with high winds and a hollow stem mean that plants often collapse “like windblown trees” (Idle 1968) in the autumn months.

Each inner tepal (valve) is entire, distinctly longer than wide, ovate-triangular or suborbicular with a truncate or slightly cordate base and no tubercles (Lousley & Kent 1981; Jonsell 2000; Stace 2010). The inner tepals often become a golden-brown colour later in the growing season and are attached to a hair-like pedicle up to 2½ times the length of the valve (Tutin

et al. 1964).

The mid-green triangular-ovate basal leaves (25-45 cm x 11-22cm) have petioles (5)9-20(25) cm long and are 0.5-1.5 times as long as the blade (Jonsell 2000). The large basal leaves have crisped-undulate margins and a deeply cordate (heart-shaped) base, and the underneath of the leaf occasionally has papillose veins (Poland & Clement 2009). Upper stem leaves are smaller and narrower (11-25 cm long, 4-13 cm wide) than the basal leaves, become progressively more linear, and have a cordate to truncate base.

SIMILAR SPECIES

Rumex longifolius differs from *R. aquaticus* in having broadly lanceolate leaves with shorter petioles 0.2-0.5 times as long as the leaf blade (very rarely as long as the blade), a very dense and compact panicle, and much more rounded valves with an obvious cordate base (Idle 1968; Lousley & Kent 1981).

At its Scottish locations *R. aquaticus* is known to hybridise with a number of other dock species including *R. crispus*, *R. sanguineus* and *R. obtusifolius* (Stace 2010). Most *Rumex* hybrids can initially be recognised by an irregular enlargement of the tepals and the production of little if any viable seed (Lousley & Williams 1975). Mitchell (1983) describes the relatively common hybrid between *R. aquaticus* and *R. obtusifolius* (*R. x platyphyllus*) as producing partially sterile pollen and seeds with a lower fertility rate. Morphologically, this hybrid has less triangular and duller green basal leaves and jagged ‘teeth’ along the lower edges of inner tepals.



Rumex aquaticus at Endrick Water, Dunbartonshire. ©Tim Harrison.

Rumex aquaticus L.

HABITATS

A 'waterside' plant of nutrient-rich, sandy, silty wet soils. In Britain, habitat is restricted to lakesides, the margins of ditches and streams, and on the estuarine floodplain in marshes, wet fields, and damp woodland such as alder swamps (Idle 1968; Preston & Croft 1997; Akeroyd 2002). It is most frequently associated with tall emergent vegetation with *Carex vesicaria*, *Fillipendula ulmaria*, *Phalaris arundinacea* and *Sparganium erectum* (Preston & Croft 1997).

Across its global range, *R. aquaticus* is found in similar habitats to Britain and is also present in brackish sea-shore meadows with associates including *Calamagrostis neglecta*, *Matricaria maritima* and *Primula finmarchia* (Nordhagen 1954).

BIOGEOGRAPHY

R. aquaticus was discovered new to Britain by R. Mackechnie in 1935 (Lousley 1939) and is currently known from a very small number of locations in Dunbartonshire and Stirlingshire around the shore of Loch Lomond and the flood plain of Endrick Water.

It is a Circumpolar Boreo-temperate species that is present across central, northern and eastern Europe from eastern France eastwards to northern Mongolia and northern regions of China, Kamchatka and Japan southwards to the Balkans, the Caucasus, the Altai and Kyrgyzstan. It has its northern range limit in Norway. *R. aquaticus* is extinct in Belgium and

the Netherlands.

There are at least two closely related taxa that occur outside of this global range. *R. fenestratus* is present in North America and Eastern Siberia (Jonsell 2000), and *R. aquaticiformis* is found in Patagonia (Preston & Croft 1997).

ECOLOGY

A long-lived rhizomatous perennial hemicryptophyte or helophyte of periodically wet, eutrophic soils, flowering from mid-late summer. Each year plants produce multiple shoots from a horizontal rootstock and are capable of persisting at locations that experience a drawdown of water in the summer months, provided that the main tap root is able to reach below the water table (Hull & Nicholl 1982).

R. aquaticus is thought to be wind pollinated, with seed viability at least 89% in the largest British population (Preston & Croft 1997). Seeds require moist bare ground for germination, but do not germinate and establish in submerged conditions (Liu et al. 2005). It is not known how long viable seeds persist in the soil, but other dock species have been shown to have a persistent (>5 years) seed bank and the British population is known from an area previously drained for agriculture.

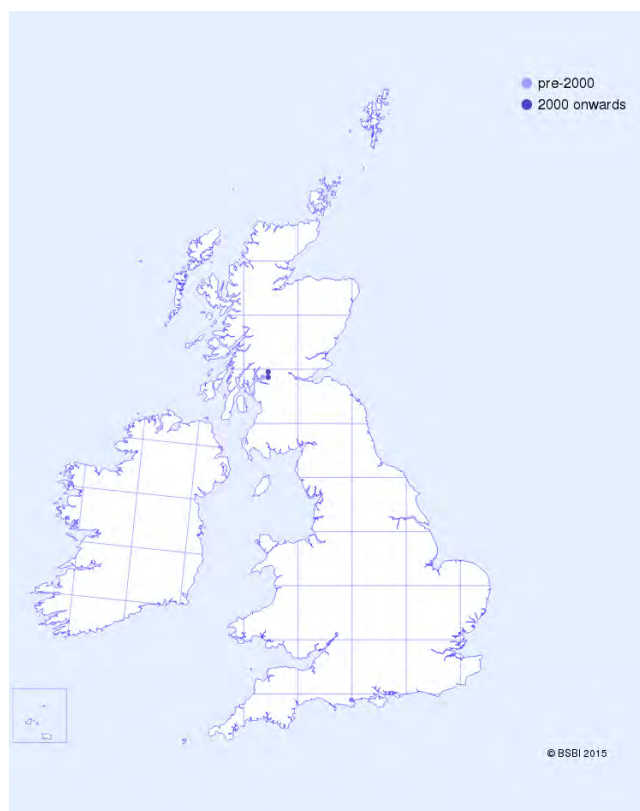
R. aquaticus freely hybridises with *R. obtusifolius*, with many of the hybrids recorded from drier ground more suited to *R. obtusifolius*. Investigations concerning hybridisation between the two species found that there was no significant barrier to gene flow between the two species (Hull & Nicholl 1982), and although the possibility of one genotype eventually replacing the other exists, this process would be substantially slowed down due to different eco-hydrological tolerances, the perennial life-form and regenerative strategy of both species, and the lower fertility rate of the hybrid when compared with the freely fruiting *R. aquaticus* (Mitchell 1983).

THREATS

As discussed above, introgression may eventually lead to *R. aquaticus* being replaced in Britain by *R. x platyphyllus*. More immediate and manageable threats include substantial and prolonged changes to hydrology (e.g. drainage), cessation of grazing and the application of herbicides.

MANAGEMENT

Plants are robust and require little active management, save for the maintenance of suitable hydrological conditions and the continuation of a traditional grazing regime, ideally using cattle, in order to maintain biologically diverse conditions and providing small areas of poached/bare ground to present opportunities for seed germination and establishment.



Distribution of *Rumex aquaticus* in Great Britain and Ireland.

Rumex aquaticus L.

REFERENCES

- Akeroyd, J.R. 2002. *Rumex aquaticus*. In: Preston, C.D., Pearman, D.A. & Dines, T.D. (eds & comps). *New Atlas of the British and Irish Flora*. pp. 193. Oxford University Press, Oxford.
- Hull, P. & Nicholl, M.J. 1982. Hybridization between *Rumex aquaticus* L. and *Rumex obtusifolius* L. in Britain. *Annals of Botany* 49: 127-129.
- Idle, E.T. 1968. *Rumex aquaticus* L. at Loch Lomondside. *Transactions of the Botanical Society of Edinburgh* 40: 445-449.
- Jonsell, B. 2000. *Flora Nordica Volume 1*: Lycopodiaceae to Polygonaceae. The Bergius Foundation and The Royal Swedish Academy of Sciences, Stockholm.
- Liu, G., Zhou, J., Li, W., & Cheng, Y. 2005. The seed bank in a subtropical freshwater marsh: implications for wetland restoration. *Aquatic Botany* 81: 1-11.
- Lousley, J.E. & Williams, J.T. 1975 *Rumex* L. In: Stace, C.A. (ed). *Hybridisation and the Flora of the British Isles*. pp. 278-292. Academic Press, London.
- Lousley, J.E. 1939. *Rumex aquaticus* L. as a British plant. *Journal of Botany* 77: 149-152.
- Mitchell, J. 1983. The dock of Loch Lomond. *Living Countryside* 11: 2488-2489.
- Nordhagen, R. 1954. Studies on the vegetation of salt and brackish marshes in Finland (Norway). *Vegetatio* 5/6: 381-394.
- Poland, J. & Clement, E. 2009. *The Vegetative Key to the British Flora*. Botanical Society of the British Isles (BSBI), London.
- Preston, C.D. & Croft, J.M. 1997. *Aquatic Plants in Britain and Ireland*. pp. 73. Harley Books, Essex.
- Stace, C. A. 2010. *New Flora of the British Isles*, third edition. Cambridge University Press, Cambridge
- Tutin, T.G., Heywood, V. H., Burgess, N. A., Valentine, D. H., Walters, S. M. & Webb, D. A. (eds.). 1964. *Flora Europaea Volume 1*. Lycopodiaceae to Plantanaceae. Cambridge University Press, Cambridge.

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