
S14

Sparganium erectum swamp

Sparganietum erecti Roll 1938

Synonymy

Sparganium ramosum zone Walker 1905; *Sparganium erectum* society Spence 1964; *Sparganium erectum* reedswamp *auct. angl.*

Constant species

Sparganium erectum.

Rare species

Butomus umbellatus, *Wolffia arrhiza*.

Physiognomy

The *Sparganietum erecti* is generally dominated by *Sparganium erectum* which forms an open or closed cover of shoots about 1 m tall. Although pure and denser stands occur, there are usually some associates and certain of these can attain local prominence. The diversity and moderate species-richness of the vegetation are partly a reflection of the characteristic occurrence of the community in narrow open-water transitions where zonations are often contracted into jumbled mixtures but there are also some morphological and physiological features of the dominant which perhaps permit ready colonisation by other species. The underground organs of *S. erectum* comprises monopodial shoot-producing corms which, though bulky, are relatively short-lived (Cook 1961) and rhizomes which, though sometimes extensive, are much narrower than those of some other swamp dominants (Walker 1905, Cook 1961). The rather open and shifting network of buried organs and aerial shoots may thus leave patches of open water or substrate for invasion. Furthermore, although *S. erectum* thrives best in full sunlight (Cook 1961), it is shade-tolerant and will stand overtopping by other species, provided these are not too bulky. Indeed, elements of this community comprise one of the commonest synusial components of swamps under a variety of other dominants.

Sub-communities

***Sparganium erectum* sub-community.** Here are included pure and very species-poor stands in which *S. erectum* is overwhelmingly dominant. There are sometimes floating or floating-leaved aquatics, notably duckweeds, on small areas of open water between the *S. erectum* shoots and *Butomus umbellatus* has been recorded in this vegetation.

***Alisma plantago-aquatica* sub-community.** There may also be a patchy aquatic element in the more species-rich vegetation of this sub-community but the distinguishing feature is the occurrence, beneath and sometimes fronting the *S. erectum*, of an open and fragmentary understorey of species typical of shallow water margins, most frequently *Alisma plantago-aquatica*, sometimes with *Callitriche stagnalis*, *Nasturtium officinale* or *Apium nodiflorum*. Other swamp dominants, notably *Typha angustifolia*, and tall herbs such as *Epilobium hirsutum* or *Urtica dioica* may occur but these attain no more than local prominence, scattered plants or small clumps protruding above the bur-reed cover.

***Mentha aquatica* sub-community.** In this richest type of *Sparganietum*, the cover of the dominant is generally open and there is an almost complete understorey of a wide variety of associates including small emergent herbs such as *Mentha aquatica*, *Myosotis scorpioides* and *M. laxa* ssp. *caespitosa* and tussocky monocotyledons, most commonly *Juncus effusus* and *Carex otrubae*. Tall herbs, such as *Lycopus europaeus*, *Filipendula ulmaria*, *Iris pseudacorus*, *Epilobium hirsutum* and *Angelica sylvestris* may break the canopy and there are sometimes small clumps of other swamp dominants, notably *Typha latifolia*, *T. angustifolia* and *Carex acutiformis*. *Solanum dulcamara* and *Galium palustre* may be prominent as sprawlers and *Holcus lanatus* is frequent though never abundant.

***Phalaris arundinacea* sub-community.** Although most of the characterising species of the *Alisma* and *Mentha* sub-communities are absent here, there are occasional tussocks of *Juncus effusus*, scattered *A. plantago-aquatica* and sometimes floating duckweeds. In general, however, this vegetation is species-poor and distinguished by the consistent presence of small amounts of *Phalaris arundinacea*, whose clumps may overtop the bur-reed. *Polygonum persicaria* and *Veronica beccabunga* occur occasionally.

Habitat

The *Sparganietum* is a community of shallow, mesotrophic to eutrophic waters with mineral substrates. It occurs widely in the standing waters of small pools, agricultural ponds, dykes and canals, but its tolerance of moderate currents makes it also one of the commonest vegetation types along lowland streams and rivers.

Although *S. erectum* can survive in up to about 1 m of water (Cook 1961) and can even grow when fully submerged (Haslam 1978), the community thrives best in shallows and on water margins but it will not tolerate long periods with a water-table below the roots, about 10 cm below the substrate surface (Cook 1961). To some extent, the floristic variation in the sub-communities is related to the mean water depth, the *Sparganium*, *Alisma*, *Mentha* and *Phalaris* types occurring in progressively shallower waters with the last two extending on to the ground which is exposed in summer but winter-flooded.

S. erectum seems to grow best in waters where there is negligible flow and the densest and most luxuriant stands occur in the standing waters of small ponds and narrower dykes. Its roots, however, extend quite deeply in soft substrates and Butcher (1933) encountered the community widely in waters with a flow of up to about 450 m h⁻¹. Scour and spate, though, may damage *S. erectum* by eroding away the substrate from the shallow rhizomes and pulling at the tough leaves, so uprooting the plants (Haslam 1978). Along faster water-courses, therefore, the community often occurs as a fragmentary cover or tends to be confined to havens or the outer curves of bends.

The community occurs over a wide variety of mineral substrates and even occasionally on peat, but it is most characteristic of fine-grained silts and clays which may be anaerobic (Cook 1961).

S. erectum is tolerant of pollution by sewage and some industrial effluents (Haslam 1978) but it will not survive repeated summer cutting or heavy grazing by stock to which it is palatable (Cook 1961).

Zonation and succession

Extensive stands of the community are rare, although the *Sparganium* sub-community sometimes chokes the

centre of small ponds and narrow channels. More often, one or more of the sub-communities occurs in a belt with aquatic communities, other swamps and tall-herb vegetation in zonations related to water depth and water movement in open-water transitions and as riparian sequences. In the standing waters of ponds and dykes, bands of the *Sparganium* or *Alisma* sub-communities often give way in deeper water to *Potamogeton natans* and duckweeds (e.g. Walker 1905). On gently shelving margins with silty substrates, the *Sparganietum* may form a mosaic with the *Eleocharis* sub-community of the *Eleocharitetum palustris* or grade to it in shallower water. Limits of inundation in fluctuating waters are sometimes marked by a fairly abrupt change to the *Phalaridetum arundinaceae*, and the *Phalaris* sub-community may form a narrow transition. Where grazing stock have access and the substrate becomes poached (a common occurrence around streams and farm ponds), a fretted zone of the *Sparganietum* may give way to a patchy *Glycerietum fluitantis* or the *Agrostis stolonifera-Alopecurus geniculatus* community. Where there is a switch to clayey ground-water gleys on pond margins, there can be a transition through the *Mentha* sub-community of the *Sparganietum* to Holco-Juncion rush-pastures.

Along streams and rivers, the movement of water and the generally more steeply shelving banks often rise to rather different zonations which may be much fragmented or conflated. A common pattern is for a zone of the *Alisma* sub-community to pass in deeper water to the *Sparganium* sub-communities of the *Typhetum latifoliae* or *Scirpetum lacustris* and to give way in the shallows to the *Alisma-Sparganium* sub-community of the *Glycerietum maximae* (e.g. Haslam 1978). On the lower reaches of permanent chalk streams, where clay begins to constitute a considerable proportion of the substrate, the *Sparganietum* may occur in similar sequences in a patchy mosaic with the *Caricetum acutiformis* and, along peat dykes, the community sometimes fronts a zone of the *Phragmitetum australis* (e.g. Haslam 1978). In many cases, however, the *Sparganietum* occurs in patchy mosaics along stream and dyke sides with scattered clumps of the above communities or with the *Caricetum otrubae* or *Carex pseudocyperus* swamp.

Although *S. erectum* is capable of considerable small rhizome extension and spread of the community may aid the colonisation of small open water bodies, the species does not seem to be able to compete with the more robust *P. australis* and *Typha* spp. (Cook 1961). In running waters any advance of the community is often repeatedly set back by erosion of the banks.

Distribution

The *Sparganietum erecti* is a very common community throughout the agricultural lowlands of England, Wales

and southern Scotland, especially over argillaceous bed-rocks and drift. The distribution of *S. erectum* may be limited northwards and at higher altitudes by low summer temperatures rather than by an inability to tolerate more oligotrophic waters (Spence 1964).

Affinities

Although elements of the community are widely represented as understoreys beneath other swamp dominants characteristic of sluggish, silty, mesotrophic waters, it seems sensible to retain a distinct *Sparganietum erecti* for those very common occurrences where *S. erectum* is the dominant.

Floristic table S14

	a	b
<i>Sparganium erectum</i>	V (5–10)	V (5–10)
<i>Butomus umbellatus</i>	I (5–8)	
<i>Eleocharis palustris</i>	I (2)	
<i>Alisma plantago-aquatica</i>		IV (1–5)
<i>Callitriche stagnalis</i>		II (3–8)
<i>Nasturtium officinale</i>		II (1–4)
<i>Apium nodiflorum</i>		II (1–4)
<i>Mentha aquatica</i>		I (2)
<i>Juncus effusus</i>		I (3)
<i>Myosotis scorpioides</i>		I (3)
<i>Lycopus europaeus</i>		I (1–2)
<i>Solanum dulcamara</i>		I (3–4)
<i>Typha latifolia</i>		I (4)
<i>Iris pseudacorus</i>		I (3)
<i>Filipendula ulmaria</i>		
<i>Galium palustre</i>		
<i>Holcus lanatus</i>		
<i>Carex otrubae</i>		
<i>Carex acutiformis</i>		
<i>Juncus articulatus</i>		
<i>Oenanthe crocata</i>		
<i>Myosotis laxa caespitosa</i>		
<i>Ranunculus flammula</i>		
<i>Scutellaria galericulata</i>		
<i>Lotus uliginosus</i>		
<i>Angelica sylvestris</i>		
<i>Phalaris arundinacea</i>		
<i>Veronica beccabunga</i>		
<i>Holcus mollis</i>		
<i>Apium graveolens</i>		
<i>Agrostis canina canina</i>		

c	d	14
V (5–8)	V (6–10)	V (5–10)
		I (5–8)
		I (2)
III (3–4)	II (1)	III (1–5)
		I (3–8)
		I (1–4)
I (4)		I (1–4)
V (3–8)		II (2–8)
III (3–4)	II (2–4)	II (2–4)
III (3–4)		I (3–4)
III (3–4)	I (3)	I (1–4)
III (2–4)		I (2–4)
III (3–5)		I (3–5)
III (3–4)		I (3–4)
III (1–3)		I (1–3)
III (3–5)		I (3–5)
III (2–3)		I (2–3)
II (3–6)		I (3–6)
II (4–6)		I (4–6)
II (3–4)		I (3–4)
II (3–4)		I (3–4)
II (2–3)		I (2–3)
II (2–3)		I (2–3)
II (1–3)		I (1–3)
II (4)		I (4)
II (3)		I (3)
I (4)	V (2–4)	II (2–4)
	II (3–4)	I (3–4)
	II (1–2)	I (1–2)
	I (5)	I (5)
	I (3)	I (3)

Floristic table S14 (cont.)

	a	b
<i>Rumex crispus</i>		
<i>Polygonum persicaria</i>		
<i>Lythrum salicaria</i>		
<i>Hesperis matronalis</i>		
<i>Hydrocharis morsus-ranae</i>		
<i>Nuphar lutea</i>		
<i>Groenlandia densa</i>		
<i>Lemna minor</i>	I (3–5)	II (1–6)
<i>Lemna trisulca</i>	I (3–6)	I (9)
<i>Lemna gibba</i>	I (2)	I (4–6)
<i>Potamogeton natans</i>	I (3–6)	II (1–9)
<i>Wolffia arrhiza</i>	I (2–4)	
<i>Epilobium hirsutum</i>		I (1–5)
<i>Polygonum amphibium</i>		I (3–5)
<i>Typha angustifolia</i>		II (3–5)
<i>Glyceria fluitans</i>		I (2)
<i>Juncus inflexus</i>		I (4)
<i>Phragmites australis</i>		I (3)
<i>Urtica dioica</i>		I (1–3)
Number of samples	15	20
Number of species/sample	2 (1–5)	5 (2–11)
Vegetation height (cm)	99 (45–150)	101 (60–130)
Vegetation cover (%)	84 (25–100)	85 (30–100)

- a *Sparganium erectum* sub-community
- b *Alisma plantago-aquatica* sub-community
- c *Mentha aquatica* sub-community
- d *Phalaris arundinacea* sub-community
- 14 *Sparganietum erecti* (total)

c	d	14
	I (4)	I (4)
	I (4)	I (4)
	I (3)	I (3)
	I (2)	I (2)
	I (5)	I (5)
	I (5)	I (5)
	I (3)	I (3)
	II (1-9)	II (1-9)
		I (3-9)
		I (2-6)
		I (1-9)
	I (2-4)	I (2-4)
II (2-6)	II (1)	I (1-6)
I (3)	II (1-4)	I (1-5)
II (3-6)		I (3-6)
I (3)		I (2-3)
I (4)		I (4)
I (3)		I (3)
I (3)		I (1-3)
8	8	51
14 (8-24)	6 (2-8)	6 (1-24)
112 (40-150)	108 (80-130)	105 (40-150)
100	90 (70-100)	90 (25-100)

