
W1

Salix cinerea-*Galium palustre* woodland

Synonymy

Salix carr Willis & Jefferies 1959 *p.p.*; *Salix cinerea* carr Wheeler 1980c *p.p.*; Woodland plot type 32 Bunce 1982; *Scutellaria galericulata*-*Alnus glutinosa* Association Birse 1982 *p.p.*

Constant species

Salix cinerea, *Galium palustre*.

Rare species

Lysimachia thyrsiflora.

Physiognomy

The *Salix cinerea*-*Galium palustre* woodland has a canopy dominated by *S. cinerea* but stands vary considerably in their overall appearance. Where invasion is more recent, there can be a confused mass of bushes of varying height and density but older stands have a more even look with usually a single tier of willows forming a canopy 4–8 m high. Here, there can be an abundance of standing dead wood beneath, where thickly-set colonising bushes have been shaded out by the developing survivors, but long-established willows, especially multi-stemmed individuals which form broadly-spreading crowns, usually cast a light shade.

The commonest woody associate, though it is still no more than occasional, is *Betula pubescens* and scattered trees of this species, together with scarcer *Alnus glutinosa*, *Quercus robur* and *Betula pendula*, sometimes break the willow canopy, reaching 10–15 m. Other Salices are uncommon (there are sometimes records for the osiers, *S. viminalis* and *S. purpurea*) but there can be scattered bushes of *Crataegus monogyna*, *Corylus avellana* and *Frangula alnus*. Saplings of *Betula pubescens*, *Quercus robur* and *Alnus* occur very occasionally.

The field layer varies in its cover and composition but the general appearance is of an open scatter of herbs with different species attaining occasional local prominence. Quite commonly there are mosaics developed in relation to canopy gaps and over undulations of wetter and drier ground. The commonest species throughout is

Galium palustre but *Mentha aquatica* and *Juncus effusus* are also frequent, the latter sometimes forming large tussocks in lighter shade. Then, there are scattered plants of *Angelica sylvestris*, *Lycopus europaeus*, *Ranunculus flammula*, *R. repens*, *Epilobium palustre*, *Equisetum fluviatile*, *Filipendula ulmaria*, *Cirsium palustre* and *Rumex sanguineus*. Less common, though sometimes abundant, are *Caltha palustris*, *Hydrocotyle vulgaris*, *Potentilla palustris* and *Iris pseudacorus* and, in North Yorkshire and central Scotland, the national rarity *Lysimachia thyrsiflora* occurs (e.g. Birse 1982). In some stands, there may be much *Rubus fruticosus* agg. and *Solanum dulcamara* and, where these sprawl over the living and dead willows, the vegetation can be virtually impenetrable. *Hedera helix*, too, can be abundant over the ground and among the bushes. In other cases, the field layer may have a more grassy look with *Holcus lanatus* and, especially where stock graze, sheets of *Agrostis canina* ssp. *canina* or *A. stolonifera* (e.g. Willis & Jefferies 1959). In general, swamp and fen dominants are not a consistent feature of this community but occasional stands can be found with an abundance of *Carex paniculata*, *C. riparia*, *C. vesicaria* (e.g. Bunce 1982) or sparse *Phragmites australis*.

There is quite often a considerable amount of bare ground among the herbs, particularly where stock have trampled, and over this, and on fallen twigs and over the bush bases, there is frequently a patchy cover of bryophytes. *Eurhynchium praelongum* is the most frequent species but *Chiloscyphus polyanthos*, *Calliergon cuspidatum*, *C. cordifolium*, *Brachythecium rutabulum* and *Rhytidiadelphus squarrosus* can also be found. In more sheltered situations, and especially towards the south-west, there may be a striking profusion of epiphytic lichens over the lightly-shaded willow branches. Usneion barbatae communities seem especially characteristic and, at Slapton Ley in Devon, Hawksworth (1972) recorded *Ramalinetum fastigiatae*, *Usneetum subfloridanae* and *Usneetum articulato-floridae* var. *ceratinae* assemblages (see also James *et al.* 1977).

Habitat

The *Salix*-*Galium* woodland is essentially a community of wet mineral soils on the margins of standing or slow-moving open waters and in moist hollows, mainly in the lowlands. It occurs, often as a narrow fringe or scattered fragments, around ponds, lakes and dune slacks and along ditches, canals and sluggish streams and rivers. Less often, it can be found on silty peats in the lagg of basin mires and on flood-plain mires.

Salix cinerea can invade moist ground in a wide variety of situations, provided there is some period of freedom from surface standing water in early summer when the seeds germinate simultaneously (Ellis 1965). Here, such conditions are provided by the seasonal fall of the water-table after the winter inundation of lake and stream margins or by the gradual terrestrialisation of open waters by silting. Once established in congenial surroundings, it can grow very rapidly and reproduce not only by prolific fruiting but also from detached shoots. The soils are often strongly gleyed and *S. cinerea* seems to tolerate a fair degree of winter waterlogging. Stands may have residual pools of water between the bushes and, in exceptional circumstances, whole stands may be flooded but prolonged raising of the water-table probably kills the species (e.g. Hawksworth 1972).

Where suitable open waters or wet ground occur within agricultural land, freedom from grazing is another essential for the development of the community: in the Gordano valley in Somerset, for example, Willis & Jefferies (1959) considered that occasional grazing might be sufficient to set back the spread of the scattered *S. cinerea* bushes. In wet meadows and roadside ditches, regular cutting can also restrict the spread of sallows.

The field layer of the community is, generally speaking, a shaded version of the kind of poorly-developed swamp understorey characteristic of the limits of winter-flooding of mineral soils where *Galium palustre*, *Mentha aquatica* and scattered *Juncus effusus* are typically prominent. Much of the variation within and between stands reflects the pattern of light penetration beneath the developing canopy, differences in the amount of soil moisture over the often uneven ground and, where stock have access to established stands, the extent of grazing beneath. Some, however, may represent inherited variation from the diverse kinds of vegetation which *S. cinerea* can invade.

Zonation and succession

On the margins of open waters, the *Salix*-*Galium* woodland often forms a patchy fringe behind some kind of swamp vegetation growing on the wetter mineral substrates, e.g. the *Phragmitetum australis*, *Typhetum latifoliae*, *Sparganietum erecti*, *Caricetum ripariae* or *Caricetum vesicariae*. In more extensive transitions, there can

be an intervening zone of *Phragmites*-*Eupatorium* or *Phragmites*-*Urtica* fen or complex mosaics of woodland, fen and swamp which reflect the extent and pattern of colonisation by woody vegetation: such patchworks are a common feature of silted pools, disused ponds and canals and larger loops of sluggish streams. On occasion, the community can pass, towards drier ground, to some type of *Alnus*-*Urtica* woodland but, very frequently, agricultural improvement almost to the margins of open waters means that stands of the *Salix*-*Galium* woodland give way to modified herbaceous vegetation. Such transitions may be gradual, as in ill-drained farmland around field ponds, where the community may pass to grazed *Holco-Juncetum* or *Lolio-Cynosuretum*. In other cases, sharp treatment-related boundaries terminate the sequence more abruptly and the woodland remains isolated within an intensive agricultural landscape.

Some other particular contexts of the *Salix*-*Galium* woodland deserve special mention. In roadside ditches, the community can occur in linear stands which on occasion function as hedges and here it is usually fronted by some kind of mown *Arrhenatheretum*. In dune slacks, it can form a zone between the *Salix repens*-*Holcus lanatus* community on wetter ground and some kind of grassland or heath on the drier fixed sand around. Where the community occurs in the lags of raised mires, it gives way towards the mire centre to herbaceous bog vegetation or, where trees have colonised the drying peat surface, to the *Betula*-*Molinia* woodland.

Seral developments of the *Salix*-*Galium* woodland have not been followed but, in its usual position in topogenous wetlands with mineral soils, it would seem most likely that the community would be replaced by *Alnus*-*Urtica* woodland with increased terrestrialisation. Extension of an *Alnus glutinosa* or *Betula pubescens* canopy above the sallows and an increase in *Urtica dioica*, *Rubus fruticosus* agg. and dryopteroid ferns in the field layer would result in a composition akin to that found in the *Sambucus* or *Betula* sub-communities of that woodland type. *Salix*-*Galium* woodland as defined here is not a precursor to the richer kinds of carr on fen peats. In more exposed localities, as around the coasts of Cornwall, west Wales and western Scotland, the community may represent the end-point of colonisation by woody species on wetter mineral soils.

Distribution

The community occurs in scattered localities throughout the lowlands.

Affinities

Most descriptions of scrub or woodland dominated by *S. cinerea* (e.g. Pearsall 1918, Tansley 1939, Willis & Jefferies 1959, Wheeler 1978, Birse 1982, 1984) involve

vegetation which, at least in part, is best considered as immature forms of carr on fen peat. This is described elsewhere in this scheme and the present unit is retained for those stands dominated by *S. cinerea* which lack field layers with such swamp and fen dominants as *Phragmites australis*, *Carex paniculata*, *C. acutiformis* or *C. rostrata*. Although somewhat poorly defined in floristic terms and often present in fragmentary form, the

community seems to have an ecological integrity as a pioneer woody vegetation of wet mineral soils. It cannot easily be incorporated into the *Alnus-Urtica* woodland (unlike scrubs dominated by the osiers *S. viminalis* and *S. purpurea*) but it is probably best considered as part of the *Alnion glutinosae* rather than the *Salicion cinereae* (*Frangulo-Salicion auritae* of Ellenberg 1978).

Floristic table W1

<i>Salix cinerea</i>	V (4–10)	<i>Dryopteris carthusiana</i>	I (4–6)
<i>Betula pubescens</i>	II (3–7)	<i>Rumex acetosa</i>	I (1–4)
<i>Quercus robur</i>	I (4–5)	<i>Cardamine flexuosa</i>	I (1–3)
<i>Betula pendula</i>	I (4–7)	<i>Lotus uliginosus</i>	I (3–4)
<i>Crataegus monogyna</i>	I (1–5)	<i>Carex remota</i>	I (1–5)
<i>Alnus glutinosa</i>	I (4)	<i>Rhytidadelphus squarrosus</i>	I (1–3)
<i>Frangula alnus</i>	I (4–8)	<i>Calliergon cuspidatum</i>	I (1–4)
<i>Corylus avellana</i>	I (3–5)	<i>Carex paniculata</i>	I (1–8)
<i>Salix viminalis</i>	I (6)	<i>Brachythecium rutabulum</i>	I (3–5)
<i>Salix purpurea</i>	I (5)	<i>Lychnis flos-cuculi</i>	I (4–5)
<i>Betula pubescens</i> sapling	I (2–4)	<i>Lonicera periclymenum</i>	I (2–4)
<i>Quercus robur</i> sapling	I (1–3)	<i>Juncus acutiflorus</i>	I (3–8)
<i>Alnus glutinosa</i> sapling	I (3–9)	<i>Plagiomnium undulatum</i>	I (1–4)
<i>Galium palustre</i>	IV (1–4)	<i>Thuidium tamariscinum</i>	I (1–5)
<i>Juncus effusus</i>	III (1–6)	<i>Lophocolea bidentata</i> s.l.	I (2–4)
<i>Mentha aquatica</i>	III (1–6)	<i>Callitriche stagnalis</i>	I (2–6)
<i>Holcus lanatus</i>	II (3–6)	<i>Equisetum palustre</i>	I (2–5)
<i>Eurhynchium praelongum</i>	II (1–6)	<i>Calliergon cordifolium</i>	I (3–4)
<i>Angelica sylvestris</i>	II (2–5)	<i>Galium uliginosum</i>	I (3–5)
<i>Rubus fruticosus</i> agg.	II (1–6)	<i>Valeriana officinalis</i>	I (3)
<i>Ranunculus flammula</i>	II (1–6)	<i>Agrostis capillaris</i>	I (2–4)
<i>Solanum dulcamara</i>	II (1–7)	<i>Dactylis glomerata</i>	I (3–4)
<i>Lycopus europaeus</i>	II (1–6)	<i>Myosotis scorpioides</i>	I (2–3)
<i>Ranunculus repens</i>	II (1–6)	<i>Carex riparia</i>	I (1–8)
<i>Equisetum fluviatile</i>	II (1–4)	<i>Phalaris arundinacea</i>	I (5–6)
<i>Hedera helix</i>	II (1–6)	<i>Lemna minor</i>	I (3–4)
<i>Epilobium palustre</i>	II (2–4)	<i>Apium nodiflorum</i>	I (4–5)
<i>Agrostis canina canina</i>	I (3–7)	<i>Glyceria fluitans</i>	I (1–4)
<i>Filipendula ulmaria</i>	I (1–8)	<i>Galium aparine</i>	I (2–3)
<i>Cirsium palustre</i>	I (3–4)	<i>Carex nigra</i>	I (2–4)
<i>Agrostis stolonifera</i>	I (1–7)	Number of samples	38
<i>Rumex sanguineus</i>	I (1–4)	Number of species/sample	17 (3–32)
<i>Hydrocotyle vulgaris</i>	I (3–4)	Tree/shrub height (m)	6 (1–15)
<i>Potentilla palustris</i>	I (1–5)	Tree/shrub cover (%)	82 (40–100)
<i>Chiloscyphus polyanthos</i>	I (1–4)	Herb height (cm)	56 (5–200)
<i>Caltha palustris</i>	I (4–8)	Herb cover (%)	82 (10–100)
<i>Phragmites australis</i>	I (2–4)	Ground height (mm)	18 (10–30)
<i>Molinia caerulea</i>	I (4–8)	Ground cover (%)	24 (0–100)
<i>Iris pseudacorus</i>	I (1–4)	Altitude (m)	102 (1–390)

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