W25
Pteridium aquilinum-Rubus fruticosus underscrub

Synonymy
Marginal Society Salisbury 1981*a p.p.*; *Pteridietum auct. angl. p.p.*

Constant species
Pteridium aquilinum, *Rubus fruticosus* agg.

Physiognomy
The *Pteridium aquilinum-Rubus fruticosus* agg. underscrub brings together vegetation dominated by mixtures of bracken and bramble. As with the *Rubus-Holcus* underscrub, although this community is often found closely associated with taller woody vegetation, shrubs and trees generally make a negligible contribution to the cover: scattered *Crataegus monogyna*, *Sambucus nigra* and *Prunus spinosa* are sometimes found and there can be very occasional saplings of *Fraxinus excelsior*, *Acer pseudoplatanus*, *Quercus robur* or *Fagus sylvatica*.

Pteridium is generally the more abundant of the two constants and, by mid-summer when its fronds are fully unfurled, it can form a virtually complete canopy to the vegetation up to a metre or more in height. In other stands, brambles are more prominent, forming a thick tangle of arching shoots with patches of bracken between or scattered fronds throughout. The brambles, which generally retain some of their leaves through the winter, may become more conspicuous when the bracken has died back, though their shoots often hold the dead fronds upright until they decay. Other undershrubs are infrequent, though *Rubus idaeus*, *Rosa canina* agg. and *Rosa arvensis* have been recorded in one subcommunity and *Ulex europaeus* is a scarce associate in the other.

No other plants attain constancy throughout and many show a marked preference for one or other of the sub-communities. Also, with the often dense cover of the dominants, the abundance of these associates is sometimes low and some are very much confined to more open areas between the bracken and bramble. Of those species which can be found throughout, *Urtica dioica* and *Holcus lanatus* are the most common, with *Silene dioica*, *Rumex acetosa* and *Viola riviniana* occasional. *Hedera helix* sometimes forms a patchy ground carpet and there can be some scrambling *Lonicera periclymenum*. Weedy plants like *Epilobium angustifolium* and *Cirsium arvense* can be locally prominent and, in more open places, *Festuca rubra*, *Arrhenatherum elatius* and *Heracleum sphondylium* are sometimes found, though these are never so frequent here as in the *Rubus-Holcus* underscrub.

Bryophytes are strongly preferential to one of the subcommunities but, even there, are not very numerous or consistently abundant.

Sub-communities

***Hyacinthoides non-scripta* sub-community.** The vegetation is a little richer here than in the *Teucrium* subcommunity with more frequent records for scattered shrubs and saplings, notably *Crataegus* and *Sambucus*, occasional *Rubus idaeus* and roses among the bracken and bramble and, more obviously, a larger contingent of herbaceous associates. Foremost among these is *Hyacinthoides non-scripta* which is often present in abundance and which, flowering and fading before the *Pteridium* canopy closes, gives this vegetation a distinct vernal aspect. In the rare cases where the *Pteridium-Rubus* underscrub extends on to soils with some spring waterlogging, *Hyacinthoides* may be replaced by *Anemone nemorosa*. Grasses are often conspicuous, *Holcus mollis* in particular becoming prominent as *Hyacinthoides* fades and sometimes being accompanied by *Dactylis glomerata* and *Poa trivialis* with occasional *Holcus lanatus*. Among the dicotyledons, *Urtica dioica* and *Galium aparine* are the most frequent and they can be patchily abundant. Then, together with occasional plants of the community species *Silene dioica*, *Viola riviniana* and *Rumex acetosa*, there may be some *Stellaria holostea*, *Glechoma hederacea* and *Dryopteris filix-mas*. Taken together, these species give stands of this

sub-community the appearance of a disturbed *Quercus-Pteridium-Rubus* woodland without an intact cover of shrubs and trees. On somewhat more base-rich soils, elements of a more calcicolous woodland flora can be represented with records for *Mercurialis perennis*, *Arum maculatum* and *Geranium robertianum* but such plants are generally scarce.

Bryophytes are more frequent here than in the *Teucrium* sub-community with *Eurhynchium praelongum* frequent and *Brachythecium rutabulum* occasional, both sometimes with high cover.

***Teucrium scorodonia* sub-community**. Apart from occasional bushes of *Ulex europaeus*, the taller elements of this kind of *Pteridium-Rubus* underscrub are generally confined to mixtures of bracken and bramble and there is no marked vernal aspect to the vegetation, with *Hyacinthoides* being very scarce. Indeed, most of the herbs of the former sub-community are markedly uncommon with only *Urtica* attaining occasional frequency along with the community species *Viola riviniana, Rumex acetosa* and *Silene dioica*. But *Holcus lanatus* increases its representation and, with occasional *Anthoxanthum odoratum* and *Agrostis capillaris*, can give stands a markedly grassy appearance. More strongly preferential, however, is *Teucrium scorodonia* and this may occasionally be accompanied by *Digitalis purpurea* and the more diminutive *Potentilla erecta*, *Galium saxatile* and *Luzula multiflora*.

Habitat

The *Pteridium-Rubus* underscrub is characteristic of deeper and generally free-draining, circumneutral to moderately acid and fairly fertile soils in the British lowlands. It is most commonly found in close association with woodlands, less frequently among heaths, and often appears to have replaced them or spread from them as a result of changes in their treatment. Once established, the community may attain a measure of stability, preventing re-invasion of woody species unless disturbed.

Pteridium performs best on deeper soils which are free from waterlogging and it has become most widely established in Britain on more acidic profiles of this kind in the *Pteridium-Galium saxatile* community. In the *Pteridium-Rubus* underscrub, its dominance extends on to less oligotrophic brown earths, edaphic conditions well marked by the importance here of *Rubus fruticosus* agg., the occurrence of such herbs as *Holcus lanatus*, *Viola riviniana* and *Silene dioica* and the relative infrequency of calcifuges like *Galium saxatile*, *Potentilla erecta* and *Deschampsia flexuosa*. Although *Pteridium* can produce very large amounts of nutrient-poor and slowly-rotting litter, the humus regime of the soils beneath this underscrub is often of the mull type and the frequency and patchy abundance of *Urtica dioica* and *Galium aparine* point to a turnover of nutrients that is, at least locally, brisk.

Soils suitable for the establishment or spread of the *Pteridium-Rubus* underscrub are widespread throughout the British lowlands, though the bulk of them are under intensive agriculture. Bracken can colonise neglected open ground by spore dispersal but this is probably of minor significance: generally, the *Pteridium-Rubus* underscrub seems to develop by vegetative expansion from existing bracken. Most often here this is in woodland where *Pteridium* is a frequent component of the field layer but one whose abundance and vigour are held strongly in check by canopy shade. If the woody cover is removed by coppicing or clearance, the luxuriance and abundance of the bracken increase greatly, so that it can become dominant over what is essentially a woodland field layer, often with some additional species indicative of the disturbance that often accompanies such treatments. This is exactly the composition of the *Hyacinthoides* sub-community which is most frequently encountered in rides, clearings and more extensive open areas within wood-pasture where such an origin seems most likely. This kind of *Pteridium-Rubus* underscrub also persists as a field-margin vegetation type in less intensive agricultural landscapes where clearance of woody vegetation has been less assiduous as, for example, on many coastal cliffs.

The *Teucrium* sub-community may also often develop in the same way, though the poorer representation of eutrophic species and the shift towards a mildly calcifugous flora suggest that it is characteristic of somewhat drier, more acidic and impoverished profiles. Perhaps of equal importance is the great scarcity of *Hyacinthoides*, a plant slow to spread or to re-establish itself once eliminated, and the fact that *Teucrium*, *Digitalis* and *Holcus lanatus* are all very typical of more grossly disrupted or younger woodland habitats on fairly base-poor brown earths, as in much-disturbed coppice compartments, thinned plantations or along the outer margins of woodland, all of them situations where this sub-community is very common. This kind of *Pteridium-Rubus* underscrub also extends the occurrence of the community on to less extreme heathland soils where a combination of sporadic disturbance, notably burning, and the abandonment of traditional treatments like bracken-cutting has allowed this vegetation to spread over abandoned settlements and along pathways.

Grazing and browsing may also play some part in the development of the community. Herbivores can greatly hinder coppice regrowth or the establishment of planted saplings and allow the *Pteridium-Rubus* underscrub to become established in coppices or young plantations. But they also strongly affect the proportions of bracken and bramble: both can increase greatly with release from

shade and their eventual abundance here may be partly a reflection of the original amounts of each. Bramble, though, is readily browsed and can be totally eliminated where herbivores have access thus tilting the balance in favour of bracken-dominance.

With its annual pattern of frond development, *Pteridium* serves as an effective replacement in this community for a deciduous woody canopy and, except where it becomes very dense, does not pose any new threat with its shade to the vernal and shade-bearing elements of the original woodland field layer. The *Hyacinthoides* sub-community, where these elements are more obvious, may thus have a considerable degree of stability, especially since the bracken canopy may prevent the re-establishment of light-demanding woody species which could eventually overtop and shade out the bracken. The accumulation of bracken litter, which can overwhelm many smaller herbs, may also not be so great on the more mesotrophic soils of this kind of *Pteridium-Rubus* underscrub. The *Teucrium* sub-community, on the other hand, may be more dependent for its maintenance on the repeated opening of the bracken canopy by the physical disturbance of thinning operations in plantations or by fire on heaths.

Zonation and succession

The *Pteridium-Rubus* underscrub is commonly found in close association with woodlands or other replacements for them within predominantly agricultural or heath landscapes. Sometimes, the derivation from woodland is clear, as where the community occupies rides and clearings, extensive glades in wood-pasture, old coppice compartments or clear-felled sites; in other cases, the historical connection with long-lost woodland is more tenuous. In general, though, this is a vegetation type of regressive seres and the overwhelming dominance of bracken itself, together with the effects of grazing and burning, may prevent re-establishment of woodland.

The community shows a close floristic relationship to the *Quercus-Pteridium-Rubus* woodland, the main Carpinion forest of base-poor brown earths in the British lowlands, and, where it occurs within or adjacent to woodland, it is almost always of this type, the underscrub running from glades and rides under the tree and shrub canopy with very little change apart from some attenuation of the bracken and bramble cover. The *Hyacinthoides* sub-community is very similar to the field layer of the Typical sub-community of the *Quercus-Pteridium-Rubus* woodland, the *Teucrium* sub-community to the *Holcus lanatus* sub-community of the woodland, a common forest type of plantations; and, in the woodland context, the particular kinds of vegetation involved may be largely a reflection of treatment.

Where the woodland has totally disappeared, stands of the community can remain isolated, marking out the original site and sharply delimited from the surrounding landscape of improved agricultural grasslands or arable. In less intensive landscapes, the *Pteridium-Rubus* underscrub can persist as a field-border community and then it may form part of a fairly ordered sequence from grasslands through to remnants of woodland or scrub. Particularly striking zonations of this kind can be seen on the sea-cliffs of western Britain where the *Pteridium-Rubus* underscrub occurs interposed between maritime grasslands and scrub (Malloch 1970, 1971). In these situations, the different edaphic preferences of the two sub-communities are well seen, the *Hyacinthoides* type being found between *Festuca-Hyacinthoides* grassland and the *Prunus-Rubus* scrub on moister, mesotrophic soils, the *Teucrium* type occurring with the *Festuca-Holcus* grassland and the *Ulex-Rubus* scrub on more acidic profiles.

In more degraded heath landscapes, the *Pteridium-Rubus* underscrub is represented by the *Teucrium* sub-community which usually accounts for but a small proportion of the bracken-dominated vegetation, most of it clearly belonging to the more calcifugous *Pteridium-Galium* community. Vegetation patterns in such situations are usually complex mosaics but small stands of the *Ulex-Rubus* scrub can often be found with the *Teucrium* sub-community forming a patchwork over the less-impoverished soils. Although natural senescence of bracken may permit re-invasion of woody species, healthy *Pteridium-Rubus* underscrub is probably very resistant to progression back to climax forest. Birch or, on moister and more fertile soils, ash and sycamore are possible invaders here but none is well equipped to grow on thick bracken litter or in denser shade. *Quercus robur* can fare better, though it too may suffer under thicker bracken covers (Jones 1959). The proportion of surviving bramble in the underscrub may be important here, since it casts lighter shade and helps maintain the mull humus regime on which most of the eventual forest dominants can thrive, hindering the run-down to more impoverished conditions. Although less widespread than the *Pteridium-Galium* community, the persistence of the *Pteridium-Rubus* underscrub bears similar testimony to the long history of woodland clearance, grazing and improvement in the southern lowlands of Britain.

Distribution

The community is widespread on suitable soils throughout lowland Britain.

Affinities

The classification of bracken-dominated communities has always posed a problem and the usual solution in Britain has been to recognise a single compendious

Pteridietum (e.g. Tansley 1939). The *Pteridium-Rubus* underscrub accounts for a fairly small proportion of such a vegetation type, the bulk of our stands belonging to the *Pteridium-Galium* community. The floristic affinities of that community argue for placing it in the Nardo-Callunetea whereas the *Pteridium-Rubus* underscrub is best retained with scrubs and bramble-dominated vegetation in the Prunetalia, probably in the Rubion subatlanticum.

Floristic table W25

	a	b	25
Crataegus monogyna	II (1–4)	I (4)	I (1–4)
Sambucus nigra	II (1–4)		I (1–4)
Prunus spinosa	I (1–6)		I (1–6)
Fraxinus excelsior sapling	I (1–6)		I (1–6)
Acer pseudoplatanus sapling	I (2–5)		I (2–5)
Quercus robur sapling	I (3–6)		I (3–6)
Fagus sylvatica sapling	I (4–5)		I (4–5)
Pteridium aquilinum	V (1–10)	V (6–10)	V (1–10)
Rubus fruticosus agg.	III (2–5)	IV (1–8)	IV (1–8)
Hyacinthoides non-scripta	IV (3–10)	I (1–9)	III (1–10)
Urtica dioica	III (1–6)	II (2–4)	III (1–6)
Galium aparine	III (1–5)	I (1–4)	II (1–5)
Eurhynchium praelongum	III (1–6)	I (3)	II (1–6)
Holcus mollis	III (2–10)	I (3)	II (2–10)
Glechoma hederacea	II (1–8)	I (3–4)	II (1–8)
Dactylis glomerata	II (1–6)	I (2–4)	I (1–6)
Geranium robertianum	II (1–4)		I (1–4)
Dryopteris filix-mas	II (1–6)		I (1–6)
Stellaria holostea	II (1–4)		I (1–4)
Brachythecium rutabulum	II (1–7)		I (1–7)
Conopodium majus	II (1–4)		I (1–4)
Rosa canina agg.	I (2–7)		I (2–7)
Rubus idaeus	I (1–3)		I (1–3)
Rosa arvensis	I (1–8)		I (1–8)
Mercurialis perennis	I (1–6)		I (1–6)
Arum maculatum	I (1–3)		I (1–3)
Poa trivialis	I (2–3)		I (2–3)
Angelica sylvestris	I (1–4)		I (1–4)
Circaea lutetiana	I (1–3)		I (1–3)
Anemone nemorosa	I (1–6)		I (1–6)
Teucrium scorodonia	I (1–5)	IV (2–4)	II (1–5)
Holcus lanatus	II (1–5)	III (1–9)	II (1–9)
Digitalis purpurea	I (4–5)	II (1–4)	II (1–5)
Agrostis capillaris	I (3–8)	II (1–7)	I (1–8)
Anthoxanthum odoratum		II (2–8)	I (2–8)
Galium saxatile		I (3–4)	I (3–4)
Potentilla erecta		I (1–4)	I (1–4)
Luzula multiflora		I (1–7)	I (1–7)
Ulex europaeus		I (1–6)	I (1–6)

https://doi.org/10.1017/9780521235587.030 Published online by Cambridge University Press

Floristic table W25 *(cont.)*

	a	b	25
Viola riviniana	II (1–4)	II (1–4)	II (1–4)
Rumex acetosa	II (1–4)	II (1–4)	II (1–4)
Silene dioica	II (2–5)	II (3–4)	II (2–5)
Hedera helix	I (4–9)	I (3–10)	I (3–10)
Lonicera periclymenum	I (2–4)	I (2–6)	I (2–6)
Ranunculus ficaria	I (1–7)	I (3–4)	I (1–7)
Epilobium angustifolium	I (1–3)	I (3–4)	I (1–4)
Dryopteris dilatata	I (1–4)	I (2)	I (1–4)
Cirsium arvense	I (1–4)	I (2)	I (1–4)
Heracleum sphondylium	I (3–7)	I (1)	I (1–7)
Festuca rubra	I (3–4)	I (3–5)	I (3–5)
Galium mollugo	I (1–2)	I (1)	I (1–2)
Primula vulgaris	I (4–5)	I (4)	I (4–5)
Mnium hornum	I (1–3)	I (2)	I (1–3)
Arrhenatherum elatius	I (3–5)	I (4)	I (3–5)
Number of samples	32	22	54
Number of species/sample	18 (3–38)	no data	
Shrub height (m)	3 (1–6)	no data	
Shrub cover (%)	4 (0–35)	no data	
Herb height (cm)	63 (10–150)	no data	
Herb cover (%)	95 (25–100)	no data	
Ground height (mm)	18 (10–50)	no data	
Ground cover (%)	13 (0–100)	no data	
Altitude (m)	103 (3–250)	no data	
Slope (°)	9 (0–45)	no data	

a *Hyacinthoides non-scripta* sub-community
b *Teucrium scorodonia* sub-community
25 *Pteridium aquilinum-Rubus fruticosus* underscrub (total)

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