U3
Agrostis curtisii grassland

Synonymy
Grass-heath Tansley 1911, 1939, Ward *et al.* 1972*a*, Tubbs 1986, all *p.p.*; *Festuca-Agrostis* grassland Tansley 1939 *p.p.*; Grassland Ward *et al.* 1972 *p.p.*; Acid grassland Tubbs 1986 *p.p.*

Constant species
Agrostis curtisii, Calluna vulgaris, Danthonia decumbens, Festuca ovina, Galium saxatile, Potentilla erecta.

Rare species
Agrostis curtisii, Erica vagans.

Physiognomy
Agrostis curtisii is an integral element of a number of important heath communities in south-west Britain, and in each of these it can show some abundance among a canopy of sub-shrubs, but the *Agrostis curtisii* grassland subsumes all those swards in which this grass has dominance over other components of the vegetation. It is a densely caespitose plant, growing as isolated tufted individuals which can expand and coalesce into clumps or a virtually continuous cover from which all but the most strongly competitive associates are excluded.

Usually, however, there are at least a few other grasses present and certain of these can show modest abundance. *Festuca ovina, Danthonia decumbens* and *Agrostis capillaris* are the most frequent and where these, together with occasional *F. rubra, A. canina* ssp. *montana* and *Anthoxanthum odoratum*, rival *Agrostis curtisii* in extent, the vegetation tends to grade to typical *Festuca-Agrostis-Galium* grassland, a trend especially likely to be seen where the community extends on to less acid and impoverished soils (Tansley 1939, Ward *et al.* 1972*a*, Tubbs 1986). Other stands have some *Nardus stricta*, though this is not very common here and in some areas, like parts of Dartmoor, decidedly scarce, perhaps because of a distinctive grazing history with ponies of continuing importance (Ward *et al.* 1972*a*). Then, again, there can be some *Molinia caerulea*, a grass which often occurs with *A. curtisii* in the heaths and sometimes becomes abundant with it after burning: indeed, it can be almost co-dominant in this community though, when it exceeds *A. curtisii*, as is especially likely on moister soils, the vegetation is best considered as grassy *Molinia-Potentilla* mire. *Deschampsia flexuosa* is at most occasional and has nothing like the role here that can be seen among heathy grassland in south-east England. More mesophytic grasses, such as *Holcus lanatus* and *Poa* spp. figure very rarely, though they are sometimes seen where the *Agrostis* grassland occurs on some of the stream-side 'lawns' in the New Forest (Tubbs 1986). Sedges also tend to be more frequent where the soils are not too dry and impoverished, with *Carex pilulifera* frequent and *C. binervis* and *C. panicea* occasional.

The other common element of this vegetation consists of scattered sub-shrubs, typically of low cover, but thickening up in places, particularly where the community represents a recovery phase after the burning of heaths: then it can be difficult to make a distinction among the vegetation types. *Calluna vulgaris* is the most frequent species in this group, but *Erica cinerea* is very common, too, with *Ulex gallii* in the south-west, *U. minor* in central southern England, and *U. europaeus* locally throughout where the soils are a little richer than usual, a condition sometimes associated with disturbance. *Erica tetralix* is occasionally found where there is a tendency towards drainage impedence and, on The Lizard, *E. vagans* sometimes occurs in this vegetation. *Vaccinium myrtillus* is also common, particularly on free-draining soils at higher altitudes, as around the moorland fringes of south-west England.

Herbaceous dicotyledons are not numerous, although *Potentilla erecta, Galium saxatile* and *Polygala serpyllifolia* occur frequently and scattered individuals of these plants often persist in quite dense swards. In more open places, there can be rosettes of *Hypochoeris radicata* and some *Teucrium scorodonia*. Another plant that can assume local importance is *Pteridium aquilinum*, normally only an occasional present as sparse fronds, but

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sometimes invading along with the spread of *A. curtisii* and, favoured by particular treatments, able to get a strong hold as thick patches. The grass can survive beneath fairly thick covers of bracken (Ivimey-Cook 1959) though such dense vegetation is generally best included as part of the *Pteridium-Galium* community.

Early stages of development of the *Agrostis* grassland after fire can see an extensive growth of small acrocarpous mosses such as *Polytrichum piliferum*, *P. juniperinum*, *Ceratodon purpureus* and *Funaria hygrometrica* (e.g. Hopkins 1983) but, where recovery is more advanced, such species usually give way to scattered tufts of *Dicranum scoparium* and patches of pleurocarpous mosses like *Hypnum cupressiforme s.l.*, *Pleurozium schreberi*, *Hylocomium splendens*, *Rhytidiadelphus squarrosus* and *Pseudoscleropodium purum*, the cover of which is no more than locally high. Lichens are sparse, though occasional *Cladonia impexa* and *C. floerkeana* occur, with greater diversity and cover of encrusting species where bare patches of soil remain.

Habitat

The *Agrostis* grassland is confined to the warm oceanic parts of central southern and south-west Britain, where it develops over moist, base-poor soils in response to burning and grazing. It can represent a temporary phase in the regeneration of a variety of heath communities where fire is used judiciously as a treatment, but over-frequent burning, especially where combined with heavy grazing, has tended to establish it as a more or less permanent feature in some areas.

The geographical limits of *A. curtisii* appear to be set by a balance of climatic and edaphic factors (Ivimey-Cook 1959). Through Europe as a whole, the grass has a marked Oceanic West European range (Matthews 1955) and in Britain is strongly concentrated in the South-West Peninsula, extending eastwards to the New Forest and the Isle of Wight, with outlying stands clustered on the Berkshire/Surrey border, and occurring too on Gower and elsewhere in the Glamorgans (Perring & Walters 1962). Throughout this zone, annual rainfall is almost always in excess of 800 mm, and reaches more than twice that over the higher ground of Dartmoor, Bodmin Moor and Exmoor (*Climatological Atlas* 1952). East of Cornwall, the number of wet days yr^{-1} is less than 140 (Ratcliffe 1968) and, with the warm summers characteristic of the extreme eastern part of its range, there can be some tendency to droughtiness there on more free-draining soils. Through most of its distribution, though, the climate is more humid and equable: there is some tendency to a winter maximum in rainfall but such seasonality is not very marked (Ivimey-Cook 1959, Chandler & Gregory 1976) and, with mean annual maximum temperatures often less than 27 °C (Conolly & Dahl 1970), potential water deficits are low. Annual accumulated temperatures are much the same as for the whole of the lowland south of Britain, but the winters are noticeably mild with much of the zone near the coast having winter accumulated temperatures (December–March) above freezing (Page 1982).

Throughout this part of the country, *A. curtisii* is characteristic of base-poor soils which are too moist to support dry heath, yet not so frequently subject to seasonal waterlogging as to be able to sustain wet heath. The superficial pH is generally between 4 and 5, and the profiles are typically very deficient in lime and major nutrients, so much of the general character of the swards included here comes from plants of wide occurrence through Nardo-Callunetea communities, such as *Agrostis capillaris*, *Danthonia decumbens*, *Potentilla erecta*, *Galium saxatile* and *Calluna vulgaris*, with *Carex pilulifera* and, more so, *C. binervis*, confirming the broadly oceanic stamp. More distinctive, though, is the occurrence together here of plants such as *Ulex minor*, *U. gallii* and *Erica cinerea* on the one hand with *Molinia caerulea*, *Erica tetralix* and *Polygala serpyllifolia* on the other, something which reflects the intermediate nature of the soil moisture conditions (e.g. Rutter 1955, Bannister 1964*a,d*, 1965, 1966, Jones & Etherington 1970, Jones 1971*a,b*, Gimingham 1972). The edaphic optimum for *A. curtisii* seems to be represented by free-draining podzolic soils, kept moist more by high rainfall than by any marked drainage impedence (Ivimey-Cook 1959), requirements which are best met in the higher heartland of the oceanic parts of Devon, Cornwall and north-west Somerset, but across its range the kinds of profiles colonised, and the parent materials which give rise to them, are quite varied. And, through its distribution, the different combinations of edaphic and climatic conditions are responsible for the modest diversity that can be seen among the plants with which it is found.

Towards the drier parts of its range, in central southern England, *A. curtisii* is most dependent on a measure of drainage impedence in base-poor, oligotrophic soils to protect it against parching, and this often comes about where an argillic B horizon or B_{Fe} pan has developed within podzolised profiles. On the commons of Berkshire and north-west Surrey, for example, the grass is often to be found on palaeo-argillic podzols of the Southampton Series, weathered from the more clayey deposits among the Eocene Bagshot and Bracklesham Beds and liable to some surface-water gleying after the winter rains. Then, right through the New Forest and round into the Poole Basin, Tertiary sands and gravels, extensively overlain by Plateau gravels and river-terrace drift, have given rise to a variety of suitable palaeo-argillic podzols, gley-podzols and intergrade stagnogley-podzols on terraces with a perched water-table and over the gentle surrounds to wetter hollows (*Soil Survey* 1983, Jarvis *et al.* 1984).

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Moving westwards into Devon, there is one of the sharper disjunctions among the associates of *A. curtisii*, with a replacement of *U. minor* by *U. gallii*, perhaps reflecting a greater need by the latter for milder climatic conditions (Proctor 1965). At lower altitudes, though, where precipitation remains much the same as in central southern England, the edaphic conditions beneath most *A. curtisii* vegetation are similar to those of the Hampshire Basin. On the Pebble-Bed commons, for example, developed over the dissected surface of a Triassic dip slope, stagnogleys and gley-podzols occur extensively (Ivimey-Cook *et al.* 1975). And, on The Lizard, too, where *A. curtisii* is one of the best markers of stretches of base-poor loess and Crousa Gravels (Coombe & Frost 1956*b*, Hopkins 1983), the soils experience sub-surface impedence where surplus winter rain drains laterally through the profiles at but a slow pace over the more or less level surface of the interior of the headland (Staines 1984, Findlay *et al.* 1984). Here, the drift deposits serve to insulate the vegetation from the influence of the underlying serpentine and gabbro although, where the mantle thins, the Lusitanian rarity *Erica vagans* can occur in close association with *A. curtisii* in what are some of the most oceanic climatic conditions around our coast (Coombe & Frost 1956*a*, Malloch 1971, Hopkins 1983). It is a covering of superficials which also enables *A. curtisii* to maintain a strong representation over Carboniferous Limestone in south Wales (Ivimey-Cook 1959).

With the shift to higher ground, where the rainfall shows a sharp increase, *A. curtisii* occurs much more widely over free-draining soils derived from such rocks as the pervious sandstones of Devonian and Carboniferous age that underlie much of Cornwall, Exmoor and the Quantocks, and the granite masses that make up Dartmoor and Bodmin Moor, where the profiles are usually of the brown podzolic type or podzols proper. Among the associates, *V. myrtillus* tends to show an increase in the moister and cooler conditions characteristic of these upland fringes, and there can be some tendency for profiles to accumulate a humose topsoil, particularly where the vegetation extends a little way on to more impervious shales and mudstones with ill-draining intergrades to the ombrogenous peats that mantle the highest ground. But it is probably the increased tendency of impeded soils to accumulate waterlogged peat that sets a northern limit to the range of *A. curtisii* vegetation in the heartland of Wales (Ivimey-Cook 1959).

Throughout this range, much of the vegetation in which *A. curtisii* occurs can be classified in various of the sub-shrub communities of southern Britain. Most obviously, this grass is an important component of the *Ulex minor-Agrostis* and *Ulex gallii-Agrostis* heaths which occupy the intermediate position between dry and wet heaths so important in the more oceanic parts of the country west of the Hampshire Basin. It also figures occasionally in damper stands of the *Calluna-U. minor* heath, where most of the Berkshire and Surrey vegetation with *A. curtisii* can be placed, and of the *Calluna-U. gallii* heath in some localities in south-west England and south Wales. And, on The Lizard, some of the sub-shrub vegetation with *A. curtisii* can be accommodated in the *E. vagans-Ulex* heath. It is clear that the *Agrostis* grassland can develop from any of these communities, and that its establishment and permanence are ultimately dependent on treatments, particularly burning and grazing.

Each of the heaths can be repeatedly regenerated by burning and such treatment has formed an important part of heathland exploitation in these parts of Britain for many generations (Tubbs 1968, 1986, Ward *et al.* 1972*a*, Harvey & St Leger-Gordon 1974, Webb 1986). After fire, particularly on the soils characterised by the *Ulex minor-Agrostis*, *U. gallii-Agrostis* and *E. vagans-Ulex* heaths, *A. curtisii* is especially well adapted to monopolise the ground in the early years of recovery, succeeding the bryophyte and lichen mats that develop quickly on the bare ground, or the scattered coarse weeds like *Epilobium angustifolium* which are favoured by the flush of nutrients from the ash. The tough, fibrous bases of the tussocks appear quite fire-resistant (Ward *et al.* 1972*a*), so established plants are able to put up new shoots quickly. More importantly, unburned plants in the relatively near vicinity are able to seed in: *A. curtisii* sets abundant viable seed each year which ripens from early August and is dispersed, presumably by wind, to germinate in the same season. Colonisation can be prolific, with the seedlings growing rapidly and expanding vegetatively to form the characteristically dense tufts that can quickly coalesce into a virtually pure sward, sometimes extending over many hectares (Ivimey-Cook 1959). It is possible for such a condition to last but a short time, as little as two years, before the sub-shrubs sprouting from the surviving stools re-establish the composition and structure of the particular heath assemblage, and many stands of the *Agrostis* grassland can be seen as a temporary recovery phase where the grass still retains ascendancy over the other plants.

However, where burning is injudicious, there is a strong tendency for large amounts of *A. curtisii* to become a more permanent feature of the vegetation, particularly in areas like Dartmoor where climatic and edaphic conditions are optimal and where reckless exercise of burning rights has been combined with heavy grazing (Worth 1933, Ward *et al.* 1972*a*, Harvey & St Leger-Gordon 1974). Burning over-large tracts of heath with the wind, for example, can result in superficial combustion leaving the grasses largely untouched and giving *A. curtisii* a head start over the sub-shrubs.

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Similarly, too frequent fires may weaken the hold of *Calluna* and the other woody plants, especially where large numbers of stock graze the regenerating shoots in winter. *A. curtisii* itself may be eaten by cattle, sheep and ponies where other food is in short supply, but it has tough and wiry herbage that does not seem very palatable (Ivimey-Cook 1959, Ward *et al.* 1972*a*), and the presence of extensive stands of the community around Dartmoor in which the sub-shrubs are present as sparse diminutive individuals seems powerful testimony to the role of selective grazing in maintaining the community. Equally clearly, where prudent regimes of burning and grazing have been restored to areas once subject to the kind of mistreatment common on Dartmoor, as was the case in parts of the New Forest prior to the 1949 New Forest Act, the *Agrostis* grassland has become a somewhat less prominent feature of the landscape again.

Zonation and succession

The *Agrostis* grassland is a treatment-derived replacement for various heath communities that characteristically occur in zonations of sub-shrub and mire vegetation developed in relation to drainage impedence, often with bracken, sometimes with other grasslands, scrub and woodland reflecting different responses to particular histories of burning, grazing and disturbance. Generally, at lower altitudes, it is found as a local, and often temporary, element on the sequences of communities around valley mires. On higher ground, it can also form part of the fringing zone of grasslands and heaths around the blanket bog of the summits, and here it may become a more permanent component of upland pasture.

The particular communities involved in the lowland sequence vary according to the locality. In the New Forest, where the classic pattern of valley-mire vegetation types described by Rose (1953) can still be widely seen around the elongated hollows eroded into the cover of sands and gravel, the *Agrostis* grassland is usually found as a replacement for stretches of the *Ulex minor-Agrostis* heath, sandwiched between the *Calluna-U. minor* heath of sharply-draining podzols and the *Ericetum tetralicis* on seasonally-waterlogged soils. In the former direction, *A. curtisii* can extend some little way if there is local impedence in profiles with much clay below or an iron pan; in the latter, it is quickly extinguished, except where slight soligenous influence ameliorates the lack of aeration, though then *Molinia* can out-compete it. Full sequences, in which the zonation continues downslope into the *Narthecio-Sphagnetum* valley bog, occur on Cranesmoor, Denny, Holmsley and Wilverley bogs (Newbould 1960, Ratcliffe 1977, Tubbs 1986), but extensive patchworks of the heaths with *Agrostis* grassland are to be seen over the terraces and undulating lower ground of the southern part of the forest (Lambert & Manners 1964, Fisher 1975*a*,*b*), with deposits of Brick Earth providing a particularly congenial substrate for the grass to get a firm hold (Tubbs 1986).

Moving westwards, the New Forest pattern is repeated in its essential features, though on not nearly so extensive a scale, on the Hartland–Arne and Studland–Godlingston heaths, the largest remnants of the once extensive continuation of heathland vegetation around Poole (N. W. Moore 1962, Webb 1986). Then, with the move on to the next most important area of this kind of vegetation, on the Devonsire Pebble-Bed commons, the *Ulex minor-Agrostis* heath is replaced by the *Ulex gallii-Agrostis* heath as the usual progenitor of the *Agrostis* grassland, with the *Calluna-U. gallii* heath appearing as the characteristic dry sub-shrub community in the sequence. Aylesbeare Common has some good zonations of this kind (Ivimey-Cook *et al.* 1975), with the interesting complication of soligenous *Schoenus-Narthecium* mire along soakways, and *Cirsio-Molinietum* and *Molinia-Potentilla* mire over the lightly-flushed slopes around.

In these kinds of system, the base-enrichment is usually very slight and dependent on sub-surface drainage from limy strata. On The Lizard, however, the *Agrostis* grassland can be found as a replacement for the *U. gallii-Agrostis* heath in close juxtaposition with vegetation whose character is determined by the serpentine and gabbro which give rise to soils that are lime-poor but base-rich. Here, the community and its heath progenitor mark out patches of loess and Crousa Gravels that mask the influence of the underlying bedrocks. Over the deeper deposits, *E. vagans* cannot grow but, where the drift cover thins, there can be some striking vegetation transitional to the *E. vagans-Schoenus* heath of the gleyed profiles developed from the igneous parent materials (Coombe & Frost 1956*a*, Hopkins 1983). *A.curtisii* can also gain a locally dominant hold in loess-contaminated soils transitional to the free-draining brown earths which, around the cliff-top margins of The Lizard, have the other endemic sub-shrub community of the area, the *E. vagans-U. europaeus* heath (Hopkins 1983).

Moving to the wetter and cooler climate of the high ground in the South-West Peninsula, the *U. gallii-Agrostis* heath continues a strong representation around the fringes of Dartmoor, Bodmin Moor and Exmoor and, together with derived stretches of *Agrostis* grassland, it can be found around the topogenous hollows and their associated water-tracks that drain radially from the summits. Here, though, there tends to be a shift in the whole character of the vegetation towards the sub-montane with some kind of *Scirpus-Erica* wet heath replacing the *Ericetum tetralicis* on the wetter ground or rush-dominated *Carex echinata-Sphagnum* mire along soakways. Then, towards drier ground, it is bilberry

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rather than gorse which often provides the most obvious floristic continuity from the *Agrostis* grassland to the dry sub-shrub vegetation, which is here often represented by the *Calluna-Vaccinium* heath occurring on brown podzolic soils and rankers, frequently on steep rocky slopes.

Also here, though, the *Agrostis* grassland and the *U. gallii-Agrostis* heath can be seen as part of the larger-scale zonation which runs, in crudely concentric fashion, around the blocks of higher ground. Above, on intergrade stagnopodzols and stagnohumic gleys developed over the edge of the summit plateaus, there is a transition to *Scirpus-Erica* wet heath and then, over the deeper ombrogenous peat, to *Scirpus-Eriophorum* blanket mire. This kind of pattern is best developed over Dartmoor and well illustrated in the map and descriptions of Ward *et al* (1972*a*), though less extensive and clear zonations can also be seen over the other major upland areas of the south-west.

The clarity of definition of the *Agrostis* grassland among the heaths which immediately give rise to it and the neighbouring sub-shrub communities is largely a function of the treatment the vegetation has received. The impact of a recent burn or the effect of a sharp grazing boundary can be very clear, with an abrupt switch in dominance from the grass to the particular assemblage of sub-shrubs, but often the zonations are much less well defined, where recovery from burning is well advanced or where grazing is light or sporadic. In previous accounts, 'grass-heath' categories have sometimes been devised to cater for difficult intermediates or fine mosaics (Ward *et al*. 1972*a*, Tubbs 1986) and, in this scheme, the *U. minor-Agrostis*, *U. gallii-Agrostis* and *E. vagans-Ulex* heaths all have sub-communities in which *A. curtisii* is especially abundant in relation to the woody plants: it should always be remembered that variation among these elements is virtually continuous.

Then, there are other developments which can supervene as a result of the perturbations produced by different treatments and these can complicate the basic patterns described above. In the first place, on soils which are a little moister than usual, but well aerated, a situation often associated with some slight sub-surface through-put in heaths on sloping ground, *Molinia* often has a better start in regeneration than has *A. curtisii*. Although this grass is much more palatable than the bent, indeed it often provides the best early bite of all in burned heaths, it too can quickly become abundant after fires. Stands in which the grasses are co-dominant can still be included here but, where *Molinia* is clearly in the ascendancy, the vegetation is best placed in the *Anthoxanthum* sub-community of the *Molinia-Potentilla* mire. This can frequently be found with stands of the *Agrostis* grassland and many of the herbaceous associates are the same, the boundary between the communities being often dependent on the relative abundance of the two grasses. *Nardus stricta*, on the other hand, which is so abundant in poor-quality grazings over the ill-drained upland areas through Wales and northern Britain, does not seem to present much challenge to *A. curtisii* in some parts of the south-west, notably Dartmoor, even on the peaty intergrades. It has been suggested that this is because the plant is kept in check by a diversity of grazing stock, particularly by the ponies which bite the heart out of the tufts (Havinden & Wilkinson 1970, Ward *et al.* 1972*a*).

A second development can be seen where the soils are well drained but somewhat more base-rich than is usual where *A. curtisii* flourishes. Then, after burning or under the influence of long, hard grazing alone, grasses such as *Festuca ovina*, *Agrostis capillaris* and *Anthoxanthum* can become co-dominant in a *Festuca-Agrostis-Galium* grassland. Sometimes, such swards develop on distinct patches of brown earth soils, perhaps maintained by flushing, as over the highest northern terraces of the New Forest, or where the stretches of heath abut on to stream sides, woodland margins, roadside verges or the edges of settlements where pH can remain low but where there is some measure of enrichment from flooding, leaf-fall and dunging. *A. curtisii* sometimes persists in such grasslands but only in small amounts and the distinction between the communities is often clear, particularly where more mesophytic grasses and dicotyledons get a hold. In the New Forest, this kind of vegetation makes up the best grazing on the drier 'lawns', where liming has been used in some places to enhance the quality of the herbage further, with the development of particularly rich *Lolio-Cynosuretum* and *Lolio-Plantaginetum* grasslands (Tubbs 1986). Although of highly artificial origin, these vegetation types form a very interesting local series grading continuously into *Agrostis* grassland. Around the upland fringes, such diversity is uncommon but, on Dartmoor, the *Agrostis* grassland occurs widely in mosaics with *Festuca-Agrostis-Galium* swards on brown podzolic soils and it can sometimes be difficult to distinguish the two (Tansley 1939, Ward *et al.* 1972*a*).

Where more mesotrophic brown earths with these grasslands have had some modest disturbance, *Ulex europaeus* often invades and patches of *Ulex-Rubus* scrub, developing where grazing is light, often mark out old (sometimes very old) field boundaries and settlements among stretches of *Agrostis* grassland. On deeper soils with free drainage, though, a more likely development after fires or where sheep alone are grazed, is for bracken to spread. *A. curtisii* can persist under a quite dense cover of the fronds (Ivimey-Cook 1959) but, where invasion is very vigorous, as over stoneless colluvial soils, the *Pteridium-Galium* community becomes established. Cutting can push back the succession and, combined with grazing, particularly if heavier-trampling cattle and ponies are used, re-establish *Agrostis* grassland (Tubbs 1986).

Distribution

The community can occur throughout the range of *A. curtisii* wherever suitable treatments favour its development, but it has become especially extensive and well entrenched around the upland fringes of the south-west, with some large stands too in the southern parts of the New Forest. Further sampling might allow the definition of different kinds of *Agrostis* grassland reflecting remnant floras of the various heath progenitors.

Affinities

Although swards with an abundance of *A. curtisii* have long been recognised as a distinctive feature of south-west Britain, they have often been grouped with transitions to heath or seen as part of a fairly compendious calcifuge grassland community (Tansley 1911, 1939, Ward *et al.* 1972*a*, Tubbs 1986). Distinctions among both these groups of vegetation are sometimes difficult to make, particularly against the heaths where definition is often a matter of proportions of components common throughout, but the important ecological role which *Agrostis*-dominated grassland can have makes it worthwhile recognising a separate unit. In other parts of its European range, as in south-west France and the Pays Basque (Allorge & Jovet 1941), *A. curtisii* can be found in similar heath assemblages to those in Britain, with such associates as *Calluna*, *Erica cinerea*, *Ulex minor*, *U. europaeus*, *Carex pilulifera*, *Molinia caerulea*, *Polygala serpyllifolia* and *Galium saxatile*, and it can become locally very abundant in derived grasslands.

Floristic table U3

Agrostis curtisii	V (4–10)
Potentilla erecta	V (1–5)
Calluna vulgaris	IV (1–5)
Festuca ovina	IV (2–7)
Galium saxatile	IV (1–5)
Danthonia decumbens	IV (1–6)
Agrostis capillaris	III (1–4)
Ulex gallii	III (1–5)
Vaccinium myrtillus	III (1–4)
Erica cinerea	III (1–5)
Molinia caerulea	III (3–6)
Polygala serpyllifolia	III (1–3)
Carex pilulifera	III (2–3)
Nardus stricta	III (2–5)
Dicranum scoparium	III (1–3)
Agrostis canina montana	II (2–4)
Anthoxanthum odoratum	II (2–3)
Carex binervis	II (2–4)
Carex panicea	II (2–3)
Pteridium aquilinum	II (1–5)
Hypnum cupressiforme s.l.	II (1–4)
Pleurozium schreberi	II (1–7)
Rhytidiadelphus squarrosus	II (1–3)
Erica tetralix	II (2–4)
Festuca rubra	II (1–4)
Hypochoeris radicata	II (1–3)
Ulex europaeus	II (4–7)
Hylocomium splendens	II (1–3)
Pseudoscleropodium purum	II (2–5)
Cladonia impexa	I (2–4)
Deschampsia flexuosa	I (2–4)
Luzula campestris	I (3)
Teucrium scorodonia	I (3)
Cladonia floerkeana	I (1)
Number of samples	18
Number of species/sample	15 (7–22)

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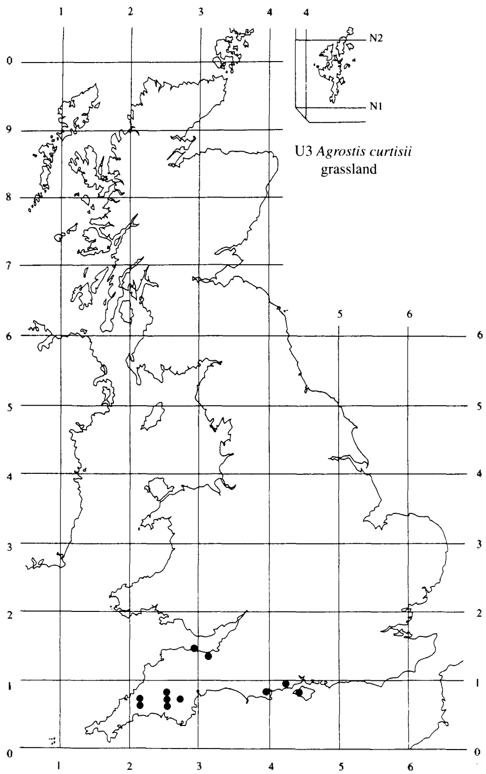

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