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## MG5

### *Cynosurus cristatus*-*Centaurea nigra* grassland *Centaureo-Cynosuretum cristati* Br.-Bl. & Tx 1952

#### Synonymy

Dairy Pastures Stapledon 1925; Third-Grade Ryegrass Pastures Williams & Davis 1946; Rothamsted Plot 3 Brenchley rev. Warington 1958; Ridge and Furrow Old Meadow Duffey *et al.* 1974; *Lolio-Cynosuretum luzuletosum* Birse & Robertson 1976 *p.p.*; Calcareous clay pastures Ratcliffe 1977; Calcareous loam pastures Ratcliffe 1977 *p.p.*; *Trifolio-Agrosto-Festucetum* Evans *et al.* 1977 *p.p.*; *Festuco-Centaureo-Brizetum* Jones unpub. *p.p.*

#### Constant species

*Agrostis capillaris*, *Anthoxanthum odoratum*, *Centaurea nigra*, *Cynosurus cristatus*, *Dactylis glomerata*, *Festuca rubra*, *Holcus lanatus*, *Lotus corniculatus*, *Plantago lanceolata*, *Trifolium pratense*, *T. repens*.

#### Rare species

*Cirsium tuberosum*.

#### Physiognomy

The *Centaureo-Cynosuretum* is a dicotyledon-rich grassland of somewhat variable appearance: it may have a tight, low-growing sward or comprise a fairly lush growth up to 60 cm tall. The most frequent grasses are the fine-leaved *Festuca rubra*, *Cynosurus cristatus* and *Agrostis capillaris*. None of these is consistently the most prominent species in the community, although each may be abundant and occasionally the three are co-dominant. *Anthoxanthum odoratum* and the coarser *Dactylis glomerata* and *Holcus lanatus* are rather less frequent and usually not so abundant. *Lolium perenne* and *Trisetum flavescens* occur throughout but are preferential for particular sub-communities and almost always have low cover. *Briza media* is a distinctive occasional easily overlooked in early sampling. *Arrhenatherum elatius* and *Festuca arundinacea* are uncommon but their robust tussock habit may make them conspicuous. Carices may be abundant in some stands with occasional records for *Carex caryophylla*, *C. flacca*, *C. panicea* and *C. hirta*.

Dicotyledons always comprise a substantial proportion of the herbage and exceptionally may account for 95% of the cover. Among these, legumes and rosette hemicryptophytes are particularly prominent. *Lotus corniculatus*, *Plantago lanceolata* and *Trifolium repens* are the most frequent and generally the most abundant species, with *T. pratense* and *Centaurea nigra* rather less so. Other species frequent throughout are *Ranunculus acris*, *R. bulbosus*, *Rumex acetosa*, *Hypochoeris radicata*, *Taraxacum officinale* agg., *Achillea millefolium*, *Prunella vulgaris* and *Leontodon autumnalis*. In particular stands *Leontodon hispidus*, *Primula veris*, *Leucanthemum vulgare* (e.g. Birks 1973) and *Rhinanthus minor* may be prominent. Severe infestation with *R. minor* may greatly reduce the vigour of the grasses and give rise to a sward in which rosette species are dominant.

In the *Lathyrus pratensis* and *Galium verum* sub-communities, and especially where there is a long history of freedom from improvement and disturbance, the sward is enriched by occasional records for woodland field-layer species such as *Hyacinthoides non-scripta*, *Ranunculus auricomus* and *Anemone nemorosa* and a variety of meadow and pasture species which are of somewhat restricted distribution: *Silaum silaus*, *Colchicum autumnale*, *Ophioglossum vulgatum*, *Genista tinctoria*, *Alchemilla filicaulis* ssp. *vestita*, *Cirsium tuberosum*, *Orchis morio*, *Coeloglossum viride*, *Listera ovata* and *Platanthera chlorantha*.

Bryophytes are generally present although their total cover is very variable. The most frequent species are *Brachythecium rutabulum*, *Eurhynchium praelongum* and *Rhytidiadelphus squarrosus*. *Pseudoscleropodium purum* and *Calliergon cuspidatum* are less common but any of these species may be abundant in particular stands.

#### Sub-communities

***Lathyrus pratensis* sub-community:** *Centaureo-Cynosuretum typicum* Br.-Bl. & Tx 1952 *p.p.*; *Centaureo-Cyno-*

*suretum typicum* and *juncetosum* O'Sullivan 1965; Calcareous clay pastures Ratcliffe 1977. In this sub-community, legumes are particularly prominent. Apart from the abundant community constants *L. corniculatus* and *Trifolium* spp., *Lathyrus pratensis* is preferential here though it is rarely abundant. Grasses may have a substantial cover but their growth is often poor and, although *Lolium perenne* is preferential, it is generally sparse and of low vitality.

Some stands of the *Lathyrus* sub-community show a heterogeneity based on the presence of *Filipendula ulmaria* or *Juncus* spp. and such vegetation could be recognised as variants. *F. ulmaria* never attains dominance here but, with *Vicia cracca* and sometimes *Silaum silaus*, it can form quite conspicuous patches (*Filipendula ulmaria* variant Page 1980). *Juncus effusus*, *J. inflexus* and/or, less frequently, *J. articulatus* also occur occasionally, sometimes with *Potentilla erecta*, *Lotus uliginosus* and *Carex ovalis* (Sub-Association *juncetosum effusi* O'Sullivan 1965).

***Galium verum* sub-community:** Rothamsted Plot 3 Brenchley rev. Warington 1958; *Centaureo-Cynosuretum galietosum* O'Sullivan 1965, including *Centaureo-Cynosuretum*, Sub-Association of *Thymus drucei* Br.-Bl. & Tx 1952; Calcareous loam pastures Ratcliffe 1977 p.p. The grass component of this sub-community is somewhat more varied than in the *Lathyrus* sub-community. *Festuca ovina* partly replaces *F. rubra*, *Trisetum flavescens* and *Avenula pubescens* are preferential, generally at low cover, and *Koeleria macrantha* is occasional. In general, however, grasses remain less prominent than dicotyledons.

*Galium verum* is the most distinctive preferential for this sub-community. In summer, it gives the sward a prominent yellow aspect and its bushy growth may make the vegetation somewhat uneven. Other preferentials are species characteristic of Mesobromion grasslands such as *Agrimonia eupatoria*, *Carex flacca*, *Plantago media* and *Sanguisorba minor*. In some cases, the vegetation closely resembles the *Festuca ovina*-*Avenula pratensis* grassland in its floristics and physiognomy with a close sward with much *F. ovina* and *K. macrantha* and a variety of smaller calcicolous dicotyledons (Variants of *Poterium sanguisorba* and *Koeleria cristata* Page 1980).

***Danthonia decumbens* sub-community:** *Centaureo-Cynosuretum typicum*, *Sieglingia decumbens* Variant Br.-Bl. & Tx 1952; *Trifolio-Agrosto-Festucetum* Evans et al. 1977 p.p.; *Lolio-Cynosuretum luzuletosum* Birse & Robertson 1976 p.p.; *Centaureo-Cynosuretum sieglingietosum* Page 1980. Here, grasses are rather more prominent than in the other two sub-communities with *F. rubra* and/or *A. capillaris* usually abundant. *A. odora-*

*tum*, *C. cristatus*, *H. lanatus* and *D. glomerata* remain constant and *Danthonia decumbens* is strongly preferential, though generally at low cover. The dicotyledons typical of the community remain very frequent but *Lathyrus pratensis* and *Galium verum* are both rare here, being replaced by a block of species more characteristic of calcifugous grasslands: *Potentilla erecta*, *Succisa pratensis*, *Leontodon autumnalis*, *Luzula campestris*, *Stachys betonica* and, less frequently, *Lathyrus montanus*. Where stands occur near heath, seedlings of *Calluna vulgaris* are occasional in the sward and the sub-community often has clumps of *Ulex europaeus* and stands of *Pteridium aquilinum* within it. *Juncus articulatus* and *J. acutiflorus* may also occur in patches. Bryophytes remain frequent and *Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus* are often conspicuous with some *Hypnum cupressiforme* s.l.

### Habitat

The *Centaureo-Cynosuretum* is the typical grassland of grazed hay-meadows treated in the traditional fashion on circumneutral brown soils throughout the lowlands of Britain. It is becoming increasingly rare as a result of agricultural improvement but is still widespread in farm fields with more fragmentary stands in churchyards, on road verges, railway embankments and lawns and in disused quarries.

This community is the major grassland type included within the popular, but often loosely applied, category of 'Old Meadow'. The term has generally been used to describe species-rich stands of lowland meadow vegetation for which there is sometimes external evidence of (or often a presumption of) a long history of lack of disturbance or improvement. The presence of ridge-and-furrow under such stands is frequently accepted as absolute confirmation of an absence of ploughing since medieval or even earlier times. Although many examples of the *Centaureo-Cynosuretum* have probably been treated in the traditional manner for many generations, the epithet 'Old Meadow' should not be applied uncritically to the community. In the first place, other rich grassland types (most notably the *Alopecurus-Sanguisorba* community) have long been managed for hay in the lowlands. Second, the *Centaureo-Cynosuretum* is most frequently characterised by common, rather than rare, species indicative of lack of improvement. Although the full richness and variety of the vegetation is undoubtedly maintained by unbroken traditional treatment, the absence of rare species is not a simple indicator of agricultural improvement.

Furthermore, although the community often occurs in fields with ridge-and-furrow, the presence of this distinctive topography is no guarantee of the antiquity of the sward. Much ridge-and-furrow is a relic of the ploughing of medieval open fields or even earlier

enclosures, but some is relatively recent, like the 'narrow rig' of eighteenth- and nineteenth-century Parliamentary enclosures (see, for example, Orwin & Orwin 1938, Baker & Butlin 1973, Taylor 1975). Moreover, many grasslands with even very old ridge-and-furrow have been improved without disturbing the ancient ploughing patterns. Long-existing swards, including stands of the *Centaureo-Cynosuretum*, may, of course, occur on land that has no such signs of ploughing whatever.

What is characteristic of the community is a history of treatment which has traditionally comprised grazing, the taking of a hay crop and the light application of natural organic manures. The climate in the English lowlands is generally sufficiently mild to permit grazing throughout the winter, and stock are usually left on the grassland until the end of April when the fields are shut up for hay and lightly dressed, traditionally with farmyard manure. The hay is mown in June and the stock turned out again to graze the aftermath. Where there has been an unbroken regime of this kind, stands of the community may be of great age and show a pleasing richness and diversity. In some areas, as in the south-west Midlands, such stands often occur on land which bears the wide ridge-and-furrow typical of medieval ploughing and this gives sites an additional archaeological interest. However, the community can be maintained wherever an approximation to the traditional scheme has been applied on otherwise suitable sites and fragmentary stands are common in relatively recently created artificial habitats. These, too, may be species-rich.

Most of the floristic variation between the sub-communities is related to edaphic differences. The community as a whole is characteristic of deep brown soils of generally loamy to clayey texture but these vary considerably in their pH and calcium content, in trophic state and in their soil moisture regime. The *Lathyrus* sub-community is typically found on fairly mesotrophic and circumneutral brown earths of usually heavy texture, derived from clays and shales (such as the Lower Lias and Keuper Marl) or superficial deposits of low calcium content. On deep soils which are more calcareous but less mesotrophic, the *Galium* sub-community is characteristic. Such brown calcareous earths are often of lighter texture and develop from alluvium, loess and head, frequently, though not exclusively, over calcareous bedrocks such as Chalk and Carboniferous Limestone. The *Danthonia* sub-community extends the range of the community on to the upland margins where oligotrophic and calcium-deficient brown earths, sometimes of rather sandy texture and usually derived from siliceous material, have been bulked up and improved by repeated manuring. Such soils are superficially acid but show no signs of podzolisation.

Substantial proportions of finer particles in these soils may impede drainage and lead to gleying, especially in

hollows, beside streams or in areas of higher rainfall. Such profiles will be colder in spring and the start of new growth may be held back but they are also frequently marked out by the patchy occurrence of *Filipendula ulmaria* (especially where there is no grazing) or *Juncus* spp. (particularly where stock have access).

### Zonation and succession

Zonations in the *Centaureo-Cynosuretum* are usually related to edaphic patterns and, even in enclosed fields subject to a uniform treatment, there may be soil differences which reflect heterogeneities in the parent material. Within the *Galium* sub-community, an increase in Mesobromion species (such as *Koeleria macrantha* and *Sanguisorba minor*) is often related to a rise in calcium content and pH as the soil thins towards limestone exposures. Such patterns are commonly part of a complete transition from the *Centaureo-Cynosuretum* to calcicolous grassland on the Carboniferous Limestone of the Yorkshire Dales where meadows on till or head abut on to, or surround, rocky outcrops (cf. Ivimey-Cook & Proctor 1966b on comparable zonations in The Burren). In a similar fashion, there may be an increase of species typical of calcifugous grasslands and heaths in the *Danthonia* sub-community where its characteristic brown earths grade to rankers or podzolised soils over siliceous material.

The patchy occurrence of *Juncus* spp. or *F. ulmaria* within stands of the *Centaureo-Cynosuretum* represents truncated zonations to the *Holco-Juncetum* or Filipendulion mires which are mediated by the soil moisture status. Such patterns are a common feature of meadows on undulating topography and frequently accentuate ridge-and-furrow with fragmentary strips of *F. ulmaria* or *Juncus* spp. on the less well-drained soils of the furrows. Alongside streams there may be a more complete gradation to poor-fen vegetation.

Occasionally, differences in treatment may be evident as zonations within enclosed meadows as, for example, where narrow belts of rich *Centaureo-Cynosuretum* remain on steeper banks within fields or around margins which have escaped improvement. Generally, however, differences in treatment style have a gradual successional effect upon the community which is evident in a range of intermediates between the *Centaureo-Cynosuretum* and more improved and productive grassland types. Two changes of practice are of particular importance.

The first is an increase of grazing pressure. Growth starts quite early in the regions where the community occurs and stands may provide a valuable supplementary bite towards the end of April. If grazing is continued into the summer, and especially if it is heavy, there is an eventual decrease in the richness of the sward. Early-flowering species such as *Orchis morio* are then unable to

set seed and there is a gradual expansion of rosette hemicryptophytes. The occurrence of the poisonous *Colchicum autumnale* in stands of the community has sometimes led to their being set aside for hay but some farmers have destroyed this species so as to allow an expansion of grazing. In fact, *C. autumnale* is more toxic during the early part of the season than in summer (Butcher 1954). Frequent mowing of the community, as occurs in some churchyards and on some verges and lawns, appears to have a similar effect to an increase in grazing. Although such treatment may permit the survival of an impoverished form of the *Centaureo-Cynosuretum*, the trend is for the sward to be converted eventually to the *Lolio-Cynosuretum*.

This change may be further encouraged by the second, now very widespread, alteration in treatment. This is the replacement of the traditional farmyard manure by artificial mineral fertilisers. These enhance the growth of the grasses to the detriment of the dicotyledons. *Lotus corniculatus* and *Leontodon hispidus* are often the first species to be lost from the vegetation but a much greater impoverishment accompanies the rise in productivity in the long term.

More drastic treatments of the community involve ploughing or the use of total weedkillers such as paraquat and re-seeding to produce *Lolio-Cynosuretum* or various kinds of ley.

Such artificial successions to pasture depend ultimately on the maintenance of grazing. When the *Centaureo-Cynosuretum* or its derivatives are ungrazed, there is an expansion of coarser grasses and an eventual invasion of shrubs. The *Lathyrus* and *Galium* sub-communities seem to progress to various types of *Arrhenatheretum* or, on more calcareous soils, to one of the coarser Mesobromion swards. The exact nature of the succession may also be influenced by the fertiliser regime on the original meadow. Ungrazed stands of the *Danthonia* sub-community may be directly invaded by heath shrubs or *Ulex europeus*. The results of careless grazing are sometimes evident as mosaics of *Centaureo-Cynosuretum* with patches of coarse grassland or heath.

### Distribution

Stands of the community occur throughout the British lowlands but the centre of distribution is on the claylands of the Midlands. Even here, however, agricultural improvement has drastically reduced the extent of the community. The sub-communities are distributed largely in relation to local and regional variations in soil type. The *Lathyrus* sub-community is the most widespread type with the *Galium* sub-community showing a more restricted occurrence, largely over calcareous bedrocks. The *Danthonia* sub-community extends the altitudinal range of the community on to the upland margins of the Welsh borderlands and northern England.

In the harsh montane climate of the northern Pennines the community is replaced by the *Anthoxanthum-Geranium* community. As with this other increasingly restricted meadow type, verge stands provide a valuable reserve.

### Affinities

The *Centaureo-Cynosuretum* has been widely recognised in recent descriptive accounts with the increasing interest in the conservation of 'Old Meadows', although attention has generally been concentrated on richer stands and rarer species have been used for its characterisation. Phytosociologically, the community is distinct in its particular balance of more common and widespread species of agricultural grasslands and it clearly belongs among the pastures and meadows of the Cynosurion.

Although the great variety of agricultural treatments may blur the floristic distinctions between the community and the closely-related *Lolio-Cynosuretum*, the higher frequency (and often abundance) of the following species are especially characteristic of the *Centaureo-Cynosuretum*: *Lotus corniculatus*, *Centaurea nigra*, *Rhinanthus minor*, *Briza media*, *Carex flacca*, *Lathyrus pratensis*, *Leontodon hispidus*, *Chrysanthemum leucanthemum* and *Primula veris*. Most of these species are also characteristic of the *Anthoxanthum-Geranium* community but there the northern species *Geranium sylvaticum* and *Alchemilla glabra* effect an adequate separation and represent a transition to the alpine meadows of the Trisetion.

There is a considerable floristic overlap between the *Centaureo-Cynosuretum* and the coarse swards of the *Arrhenatherion* on the one hand and the calcicolous grasslands of the Mesobromion on the other. Distinctions in the former case are rarely difficult to make because *A. elatius* and tall herbs are usually totally excluded or held in check by grazing. There is, however, a close similarity between some stands of the *Galium* sub-community of the *Centaureo-Cynosuretum* and some Mesobromion swards such as the *Holcus-Trifolium* sub-community of the *Festuca ovina-Avenula pratensis* grassland. Similarly, it is sometimes difficult to make a distinction between the *Danthonia* sub-community and certain types of calcifugous grasslands. Problems of separation here reflect real lines of continuous floristic variation in relation to soil characteristics.

The occasional presence of species such as *Filipendula ulmaria* and *Juncus* spp. in the *Centaureo-Cynosuretum* represents floristic transitions to mires of the Filipendulion and Holco-Juncion. The lack of dominance by such species and the absence of the full range of associates usually serve to distinguish between the vegetation types involved.

The *Centaureo-Cynosuretum* was first described from

Eire by Braun-Blanquet & Tüxen (1952) and later, in greater detail, by O'Sullivan (1965). Phytosociological accounts have been provided from British localities by Birks (1973) and Shimwell (1968*a, b*). These descriptions all clearly correspond with the community as defined

here although the status of the various subdivisions erected in the Irish accounts differs somewhat in the above. No equivalent vegetation type has been described from the Continent.

### Floristic table MG5

	a	b	c	5
<i>Festuca rubra</i>	V (1–8)	V (2–8)	V (2–7)	V (1–8)
<i>Cynosurus cristatus</i>	V (1–8)	V (1–7)	V (1–7)	V (1–8)
<i>Lotus corniculatus</i>	V (1–7)	V (1–5)	V (2–4)	V (1–7)
<i>Plantago lanceolata</i>	V (1–7)	V (1–5)	IV (1–4)	V (1–7)
<i>Holcus lanatus</i>	IV (1–6)	IV (1–6)	V (1–5)	IV (1–6)
<i>Dactylis glomerata</i>	IV (1–7)	IV (1–6)	V (1–6)	IV (1–7)
<i>Trifolium repens</i>	IV (1–9)	IV (1–6)	V (1–4)	IV (1–9)
<i>Centaurea nigra</i>	IV (1–5)	IV (1–4)	V (2–4)	IV (1–5)
<i>Agrostis capillaris</i>	IV (1–7)	IV (1–7)	V (3–8)	IV (1–8)
<i>Anthoxanthum odoratum</i>	IV (1–7)	IV (1–8)	V (1–4)	IV (1–8)
<i>Trifolium pratense</i>	IV (1–5)	IV (1–4)	IV (1–3)	IV (1–5)
<i>Lolium perenne</i>	IV (1–8)	III (1–7)	I (2–3)	III (1–8)
<i>Bellis perennis</i>	III (1–7)	II (1–7)	I (4)	II (1–7)
<i>Lathyrus pratensis</i>	III (1–5)	I (1–3)	I (1)	II (1–5)
<i>Leucanthemum vulgare</i>	III (1–3)	I (1–3)	II (1–3)	II (1–3)
<i>Festuca pratensis</i>	II (1–5)	I (2–5)	I (1)	I (1–5)
<i>Knautia arvensis</i>	I (4)			I (4)
<i>Juncus inflexus</i>	I (3–5)			I (3–5)
<i>Galium verum</i>	I (1–6)	V (1–6)		II (1–6)
<i>Trisetum flavescens</i>	II (1–4)	IV (1–6)	II (1–3)	III (1–6)
<i>Achillea millefolium</i>	III (1–6)	V (1–4)	III (1–4)	III (1–6)
<i>Carex flacca</i>	I (1–4)	II (1–4)	I (1)	I (1–4)
<i>Sanguisorba minor</i>	I (4)	II (3–5)		I (3–5)
<i>Koeleria macrantha</i>	I (1)	II (1–6)		I (1–6)
<i>Agrostis stolonifera</i>	I (1–7)	II (1–6)	I (6)	I (1–7)
<i>Festuca ovina</i>		II (1–6)		I (1–6)
<i>Prunella vulgaris</i>	III (1–4)	III (1–4)	IV (1–3)	III (1–4)
<i>Leontodon autumnalis</i>	II (1–5)	II (1–3)	IV (1–4)	III (1–5)
<i>Luzula campestris</i>	II (1–4)	II (1–6)	IV (1–4)	III (1–6)
<i>Danthonia decumbens</i>	I (2–5)	I (1–3)	V (2–5)	I (1–5)
<i>Potentilla erecta</i>	I (1–4)	I (3)	V (1–4)	I (1–4)
<i>Succisa pratensis</i>	I (1–4)	I (1–5)	V (1–4)	I (1–5)
<i>Pimpinella saxifraga</i>	I (1–4)	I (1–4)	III (1–4)	I (1–4)
<i>Stachys betonica</i>	I (1–5)	I (1–4)	III (1–4)	I (1–5)
<i>Carex caryophylla</i>	I (1–4)	I (1–3)	II (1–2)	I (1–4)
<i>Conopodium majus</i>	I (1–4)	I (1–5)	II (2–3)	I (1–5)
<i>Ranunculus acris</i>	IV (1–4)	II (1–4)	IV (2–4)	III (1–4)
<i>Rumex acetosa</i>	III (1–4)	III (1–4)	III (1–3)	III (1–4)
<i>Hypochoeris radicata</i>	III (1–5)	II (2–4)	III (1–4)	III (1–5)
<i>Ranunculus bulbosus</i>	III (1–7)	II (1–5)	III (1–2)	III (1–7)
<i>Taraxacum officinale</i> agg.	III (1–4)	III (1–4)	III (1–3)	III (1–4)



<i>Brachythecium rutabulum</i>	II (1–6)	III (1–4)	II (2)	III (1–6)
<i>Cerastium fontanum</i>	III (1–3)	II (1–3)	II (1–3)	II (1–3)
<i>Leontodon hispidus</i>	II (1–6)	III (2–4)	III (1–5)	II (1–6)
<i>Rhinanthus minor</i>	II (1–5)	II (1–4)	II (1–3)	II (1–5)
<i>Briza media</i>	II (1–6)	III (1–4)	III (2–3)	II (1–6)
<i>Heracleum sphondylium</i>	II (1–5)	II (1–3)	III (1–3)	II (1–5)
<i>Trifolium dubium</i>	II (1–8)	II (1–5)	I (2)	II (1–8)
<i>Primula veris</i>	II (1–4)	II (2–4)	I (2)	II (1–4)
<i>Arrhenatherum elatius</i>	II (1–6)	II (1–7)	I (3–4)	II (1–7)
<i>Cirsium arvense</i>	II (1–3)	II (1–4)	I (1)	II (1–4)
<i>Eurhynchium praelongum</i>	II (1–5)	II (1–4)	I (1–2)	II (1–5)
<i>Rhytidadelphus squarrosus</i>	II (1–7)	II (1–5)	III (1–4)	II (1–7)
<i>Poa pratensis</i>	II (1–6)	II (2–5)		II (1–6)
<i>Poa trivialis</i>	II (1–8)	I (1–3)	I (1–2)	II (1–8)
<i>Veronica chamaedrys</i>	II (1–4)	I (1–4)	I (1)	II (1–4)
<i>Alopecurus pratensis</i>	I (1–6)	I (1–4)	I (1)	I (1–6)
<i>Cardamine pratensis</i>	I (1–3)	I (1)	I (3)	I (1–3)
<i>Vicia cracca</i>	I (1–4)	I (1–3)	I (1–2)	I (1–4)
<i>Bromus hordeaceus hordeaceus</i>	I (1–6)	I (2–3)	I (3)	I (1–6)
<i>Phleum pratense pratense</i>	I (1–6)	I (1–5)	I (1)	I (1–6)
<i>Juncus effusus</i>	I (2–3)	I (3)	I (1–2)	I (1–3)
<i>Phleum pratense bertolonii</i>	I (1–3)	I (1–3)	I (1)	I (1–3)
<i>Calliargon cuspidatum</i>	I (1–5)	I (2–4)	I (3)	I (1–5)
<i>Ranunculus repens</i>	II (1–7)	I (2)	II (1–4)	I (1–7)
<i>Pseudoscleropodium purum</i>	I (1–5)	I (3–4)	II (2)	I (1–5)
<i>Ophioglossum vulgatum</i>	I (1–5)	I (1)		I (1–5)
<i>Silaum silaus</i>	I (1–5)	I (1–3)		I (1–5)
<i>Agrimonia eupatoria</i>	I (1–5)	I (1–3)		I (1–5)
<i>Avenula pubescens</i>	I (1–3)	I (2–5)		I (1–5)
<i>Plantago media</i>	I (1–4)	I (1–4)		I (1–4)
<i>Alchemilla glabra</i>	I (2)	I (3)		I (2–3)
<i>Alchemilla filicaulis vestita</i>	I (1–3)	I (3)		I (1–3)
<i>Alchemilla xanthochlora</i>	I (1–3)	I (2)		I (1–3)
<i>Carex panicea</i>	I (1–4)	I (2–4)		I (1–4)
<i>Colchicum autumnale</i>	I (3–4)	I (1–3)		I (1–4)
<i>Crepis capillaris</i>	I (1–5)	I (3)		I (1–5)
<i>Festuca arundinacea</i>	I (1–5)	I (3–5)		I (1–5)
<i>Potentilla reptans</i>	I (1–6)	I (1–4)		I (1–6)
<i>Senecio jacobaea</i>	I (1–3)	II (1–4)		I (1–4)
<i>Filipendula ulmaria</i>	I (1–5)		I (1)	I (1–5)
<i>Juncus articulatus</i>	I (1–5)		II (2–3)	I (1–5)
Number of samples	137	42	15	194
Number of species/sample	22 (13–32)	26 (12–38)	22 (18–27)	23 (12–38)

- a *Lathyrus pratensis* sub-community  
b *Galium verum* sub-community  
c *Danthonia decumbens* sub-community  
5 *Centaureo-Cynosuretum cristati* (total)

