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The status of the class Elyno-Seslerietea Br.-Bl. 1948 in the British Isles

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The Status of the Class Elyno-Seslerietea Br.-Bl. 1948 in the British Isles

by

David W. Shimwell, Hull

The Class Elyno-Seslerietea Br.-Bl. 1948 comprises most of the calcicolous grass-heath communities of the arcticalpine zones of the Alps, Pyrenees, several of the mountain regions of Norway, Sweden and Finland (to 68 — 70° north), Iceland and northern Scotland. In addition, there are a few other localities in the British Isles, e. g. Snowdonia, the Lake District and Co. Sligo, Ireland, where fragmentary relict communities are found. In the majority of these regions the grass-heaths are found above 2000 feet (660 m.) but in north-west Scotland they occur down to sea level. In central Europe the grass-heaths occupy a zone of between 4200—4500 feet (1400 to 1500 m.) in the Jura Mountains and up to 5500 feet (1800 m.) in the central Alps (BRAUN-BLANQUET 1948).

In the Alps and the Pyrenees the communities are usually dominated by *Sesleria coerulea*, *Kobresia* (*Elyna*) *myosuroides*, *Carex ferruginea* and *Dryas octopetala*, while those of Scandinavia are dominated mainly by *Dryas*, *Kobresia*, *Cassiope tetragona*, *Carex rupestris* and *Carex nardina* (NORDHAGEN 1955). The British communities fall midway between these two types. Only *Dryas* and *Carex rupestris* occur as dominants and of the other species, only *Sesleria* is present in a few isolated localities.

Communities in which this latter grass is dominant or co-dominant and which are referable to the Sub-alliance Seslerio-Mesobromion Oberd. 1957 of the Class Festuco-Brometea Br.-Bl. & R. Tx. 1943 occur in a marked zone across northern England to western Ireland and form a phytogeographical link between the Classes Festuco-Brometea and Elyno-Seslerietea. On examination it soon becomes apparent that the grasslands of the Seslerio-Mesobromion of northern England show quite close similarities to several of the Scottish *Dryas*-heaths. Individual Aufnahmen of the Seslerio-Caricetum pulicaris dryadetosum Shimwell 1968 from Cronkley Fell, Teesdale could be placed in the Elyno-Seslerietea mainly because of the dominance of *Dryas*. However, these lists are retained in the Seslerio-Mesobromion for three main reasons:

(a) *Sesleria coerulea*, the gregarious dominant of these pastures, apparently survived forest maxima in refugia where presumably Elyno-Seslerietea communities survived. Subsequent spread of the grass after deforestation and the invasion of the original refugia by mesophilous grassland species have given rise to communities which are uncharacteristic of Elyno-Seslerietea and closer to typical Mesobromion;

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(b) the stands of the Seslerio-Caricetum pulicaris Shimwell 1968 in the Craven district of Yorkshire have a richer complement of Mesobromion character species and form the starting point of a line of continuous variation which includes those of Teesdale and passes through to the impoverished *Carex pulicaris-Festuca ovina* dominated pastures of the high Pennines; to extract the Teesdale stands and place them in the Elyno-Seslerietea would break this sequence;

(c) the absence or paucity of arctic-alpine indicator species of the Elyno-Seslerietea recommend that the communities in question be retained in the Seslerio-Mesobromion.

Similar arguments apply to the status of the Association Asperulo-Seslerietum (Br.-Bl. & R. Tx. 1952) Shimwell 1968 of NW England and western Ireland.

CLASS ELYNO-SESLERIETEA Br.-Bl. 1948

(a) Alps

ORDER SESLERIETALIA COERULEAE Br.-Bl. 1926

ALLIANCE CARICION FERRUGINEAE Br.-Bl. 1931.

SESLERION COERULEAE Br.-Bl. 1926.

ORDER OXYTROPIDO-ELYNETALIA Oberd. 1957

OXYTROPIDO-ELYNION Br.-Bl. 1948.

(b) Pyrenees

ORDER SESLERIETALIA COERULEAE Br.-Bl. 1926

ORDER OXYTROPIDO-ELYNETALIA Oberd. 1957

(c) Scandinavia and Great Britain

ORDER ELYNO-DRYADETALIA Br.-Bl. 1948

(Syn: Elyno-Seslerietalia Nordh. 1936).

ALLIANCE KOBRESIO-DRYADION (Nordh. 1936) emend? Dahl 1956 (McV. & Rat. 1962).

(Syn: Elynion bellardii Nordh. 1936.
Caricion nardinae Nordh. 1936.
Kobresieto-Dryadion Nordh. 1936.
Dryadion Kalliola 1939.)

ALLIANCE POTENTILLETO-POLYGONION VIVIPARI Nordh. (1928) 1936.

Figure 1. Syntaxonomy and synonymy within the Class Elyno-Seslerietea

Because of the occurrence of a similar type of calcicolous grass-heath in widely separated geographical regions, there has been considerable confusion over the nomenclature of the constituent Orders and Alliances of this Class. Figure 1 summarises and clarifies the syntaxonomy and synonymy of the Class Elyno-Seslerietea for the three main regions — the Alps, the Pyrenees and Scandinavia (including Scotland and Iceland).

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The adoption of the Order names Seslerietalia coeruleae or Elyno-Seslerietalia for Scottish and Scandinavian grass-heaths, conveys an erroneous impression, because *Sesleria coerulea* is infrequent or absent in most of the communities. In order to avoid confusion with the Seslerio-Mesobromion and to emphasise the arctic-alpine nature of the communities, the name Elyno-Dryadetalia Br.-Bl. 1948, is adopted.

As BRAUN-BLANQUET suggests (1948, p. 149), "... the high number of exclusively nordic species indicate in favour of a special nordic order (Elyno-Dryadetalia), which also comprises a comparatively unknown number of boreo-arctic groups, analogous (to the Alps)".

Order Elyno-Dryadetalia Br.-Bl. 1948

Comprises the alpine and arctic-alpine calcicolous grass-heaths of Scotland and Scandinavia. Two Alliances are recognised in both these areas:

Alliance Potentillo-Polygonion vivipari Nordh. (1928) 1936 is reported from Scotland by MCVEAN & RATCLIFFE (1962), but not with any certainty. It appears that several of their base-rich, damp grasslands of the Dwarf Herb Nodum and the Saxifrageto-Agrosto-Festucetum belong to this Alliance, but this remains to be verified.

Alliance Kobresio-Dryadion (Nordh. 1936) emend. ? McV. & Rat. 1962. This Alliance contains all the familar *Dryas*-heaths of Scotland and Scandinavia and a variety of grass-heaths dominated by *Cassiope tetragona*, *Carex rupestris* etc. Character species of the Alliance and Order in Scotland are:

(All.) *Dryas octopetala* L.
Carex rupestris All.
Minuartia rubella (Wahlenb.) Hiern.
Arenaria norvegica Gunn.
Salix reticulata L.
Salix myrsinites L.

(O.) *Silene acaulis* (L.) Jacq.
Potentilla crantzii (Crantz) G. Beck ex Fritsch
Saxifraga oppositifolia L.
Carex atrata L.
Sesleria coerulea (L.) Ard. (rarely)
Cerastium alpinum L.
Astragalus alpinus L.

Order differential species (from Seslerio-Mesobromion)

Saxifraga aizoides L.
Polygonum viviparum L.

Two distinct Associations and a series of relict *Dryas* communities are described for the Kobresio-Dryadion in the British Isles:

Association Plantagino-Dryadetum (Table 1, see appendix)

Synonymy. *Dryas* Heaths Poore & McVean 1957
Dryas-Carex rupestris Nodum MvVean & Ratcliffe 1962
Dryas-Carex flacca Nodum McVean & Ratcliffe 1962
Dryas octopetala localities Elkington 1962 pro parte

Habitat details

The Association is restricted to the lowland Cambrian limestones and machair or blown shell sand of the north and west coasts of Scotland. The Aufnahmen in Table 1 have been collected from pastures between Durness

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and Smoo Cave and from Druim Chuibhe, near Bettyhill, Sutherland, on the north coast, and inland from Inchnadamph in Sutherland and Glas Cnoc, Kishorn in Ross-shire. Lists are also included from the island of Raasay (ELKINGTON 1962). McVEAN & RATCLIFFE (1962) also report similar stands at Heilam and Borralie in Sutherland and Monadh Dubh on the Isle of Rhum. The altitudinal distribution of the Association varies between 50 feet (16 m.) at Bettyhill and 1700 feet (550 m.) above Inchnadamph, though the majority of stands fall within the 100—250 feet (30—80 m.) range.

The climate is an extremely oceanic type with high rainfall figures of 1203 mm. at Cape Wrath, but with relatively warm average annual temperatures of 47°F (5.2°C) (WALTER & LIETH 1967). The higher temperatures of the lowland coastal regions result in a much shorter snow-lie period and enhance the performance of this chionophobous Association. DAHL (1951) has shown that in Fennoscandia the distribution ranges of most arctic-alpine species are closely related to maximum summer temperature isotherms. The critical temperature calculated by Dahl is 22—29°C for different species, a range of temperatures much higher than those associated with *Dryas* which withstands average summer maxima of about 50°F in its localities at Bettyhill and Durness. The presence of *Dryas* at low levels is probably due to the minimal snow-lie period and also the presence of open calcareous habitats where it can compete effectively with other shrubs.

The soils on which the Association occur are mainly Rendzinas and Brown Rendzinas overlying brashy limestones. There is frequently a large proportion of black-brown humus in the A_0 horizon, the accumulation of which eventually gives rise to a *Calluna-Empetrum* heath. The soils at Bettyhill are primitive "calcareous syrosems" similar to those of Upper Teesdale, but the main source of calcium carbonate is shells rather than metamorphosed limestone. In these machairs the percentage of free calcium carbonate by weight varies between 40 and 58 (GIMINGHAM et al., 1949), and there is a small amount of humus accumulation in the surface horizons.

Characteristics of the Association

The Association is characterised by the dominance of *Dryas octopetala* and its co-dominance with *Carex rupestris* in many localities. The only other Alliance character species is *Arenaria norvegica*, and *Silene acaulis* is the sole Order character species. The two Order differential species, *Saxifraga aizoides* and *Polygonum viviparum*, are of high constancy.

The Association is differentiated by a marked group of character species, most of which indicate the grazed, lowland nature of the majority of the stands: *Plantago lanceolata*, *P. maritima*, *Carex flacca*, *Bellis perennis*, *Cynosurus cristatus* and *Cerastium holosteioides*. These species differentiate the Association from all others so far described from Scandinavia, and the mountains of Scotland, and relate the Association to communities of the Seslerio-Mesobromion to the south. The sporadic occurrence at Durness of the Mesobromion character species *Gentianella amarella*, *Scabiosa columbaria*, *Koeleria cristata* and *Anthyllis vulneraria* is a further link with Mesobromion.

The Association has a remarkably uniform structure with respect to companion species and of the many constants some of the more important ones in determining structure are: *Festuca ovina*, *Thymus drucei*, *Carex pulicaris*, *Antennaria dioica*, *Lotus corniculatus*, *Ditrichum flexicaule* and *Hylocomium splendens*.

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Two Subassociations are recognisable. The Subass. Typicum comprises the majority of the lists from inland localities and has a lower average species number of 35. The Maritime Subassociation is differentiated by the presence of *Cerastium atrovirens*, *Leontodon autumnalis*, *Sieglingia decumbens*, *Achillea millefolium* and *Scilla verna*, and is generally more floristically rich than the latter. The Mesobromion character species mentioned above are more common in this Subassociation.

Zonation and Succession

In many places the Plantagino-Dryadetum is replaced by calcicolous *Empetrum nigrum-Calluna* heath, which on the accumulation of peaty humus, gives rise to a blanket-bog community. At Bettyhill where machair overlays acidic cliffs the zonation proceeds to a community dominated by *Arctostaphylos uva-ursi* and *Juniperus communis* and resembling the Juniperetum nanae of McVean & Ratcliffe 1962.

Association Salico-Dryadetum (McV. & Rat. 1962) emend. Shimwell 1968 (Table 2)

Synonymy. Dryas-Salix reticulata Nodum McV. & Rat. 1962.

Habitat details

The Salico-Dryadetum is described from mica-schist cliff ledges between 2250 and 2800 feet (700—900 m.) on Meall nan Tarmachan, Ben Lawers and Cairnwell, Perthshire and Caenlochan Glen, Angus. McVean & Ratcliffe (1962) report similar communities up to 3000 feet (950 m.) on Creag Mhor, Loch Lyon in Perthshire, and within the above range at Glen Doll, Clova in Angus, and on Ben Lui, Argyllshire.

The most significant feature of climate relative to the distribution of this Association seems to be the fact that stands are found on cliff ledges facing east or south where insolation is maximum and consequently the snow-lie periods are reduced. Otherwise the distribution pattern of the Association appears not affected by climate, but is due to substrate and vegetation history.

The soils of these mica-schist ledges are mainly damp, humus rich Rankers or Rendzinas with a pH of 6.8 to 7.8. McVean & Ratcliffe (1962) describe an alpine Rendzina from Cairnwell in Perthshire, overlying crystalline metamorphic limestone which is atypical of this Association, because of its depth, parent rock and sandy nature.

Characteristics of the Association

The Association is characterised and differentiated from the Plantagino-Dryadetum by the co-dominance with *Dryas octopetala* of several arctic-alpine willow species, mainly *Salix reticulata*, but also *S. arbuscula* and *S. myrsinites*. The more widespread *Salix herbacea* is also present. The absence of a group of species characteristic of grazing differentiates the Association from the previous one and the presence of a group of arctic-alpine Order character species, amongst them *Saxifraga oppositifolia*, *Silene acaulis*, *Potentilla crantzii* and *Cerastium alpinum*, also serves to differentiate between the two Associations and confirm the relationships to Scandinavian communities. *Sesleria caerulea* is also quite frequent in this Association and in one Aufnahme from Meall nan Tarmachan is co-dominant with *Salix reticulata*.

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Table 2. Association Salico-Dryadetum (McV. & Rat. 1962)

2. Creag an Lochan, Breadalbane, Perths., NN 592405, 2250 ft.
1. Creag an Lochan, NN 594398, 2400 ft.
3. Meall nan Tarmachan, Perths., NN 586392, 3000 ft.
4. Western Rocks, Ben Lawers, Perths., NN 635411, 3250 ft.
6. Caenlochan Cliffs, Angus, NO 180773, 2600 ft.
31. Crag above Traligill Burn, Inchnadamph, Sutherland, NC 264211.
38. The Cairnwell, Perths., NO 128782, 2950 ft.
39. Ben Vrackie, Perths., NN 952629, 2200 ft.

	SL	SL	SL	SL	SL	SL	SL	SL
Aufnahme No.	2	1	3	4	6	31	38	39
Species No.	44	39	44	33	32	31	39	29
Aspect.	E	SE	SE	SW	SW	W	SW	SE
Slope °.	45	55	50	50	40	15	2	20
Cover %: Herbs. & Shrubs.	80	90	100	80	80	80	100	100
Bryophytes.	30	30	40	30	30	10	30	20
Quadrat size (m^2)	1	1	1	1	1	1	4	2
				Av. sp. no. 37				
Association Character species								
Salix reticulata	1.2	.	2.3	2.3	2.3	.	(+)	.
S. arbuscula	+	2.3	+	+	+	.	.	.
S. myrsinites	+	+.2	+	.	+	1.3	.	.
S. lapponum	.	.	.	.	1.2	1.2	.	.
S. lapponum x reticulata	.	.	.	.	1.3	.	.	.
S. lapponum x myrsinites	.	.	.	.	.	2.3	.	.
Alliance and Order Character Species								
Dryas octopetala	+.2	3.4	1.2	1.2	1.2	+.2	2.3	.
Saxifraga oppositifolia	1.2	.	+.2	1.2	2.2	1.2	1.2	1.2
Silene acaulis	1.2	2.2	+.2	2.2	.	+.2	+.2	+.2
Cerastium alpinum	1.1	+	+	+	1.1	.	+	+
Potentilla crantzii	+	+	1.1	+	+	.	1.1	1.1
Sesleria coerulea	3.3	1.2	.	1.2	.	.	+	.
Carex rupestris	.	.	1.1	1.2	.	.	2.2	3.4
Minuartia rubella	.	.	.	(+)	.	.	+.3	.
Oxytropis halleri	.	.	.	.	.	.	.	1.1
Astragalus alpinus	.	.	.	.	.	.	.	2.3
Alliance and Order Differential Species								
Saxifraga aizoides	1.1	1.1	+	+	1.1	+	+	+
Polygonum viviparum	1.1	+	+	1.1	+	1.1	2.2	1.1
Companions								
Festuca ovina	1.1	2.2	1.2	2.2	1.2	2.2	1.1	1.2
Thymus drucei	1.2	+.2	1.2	+.2	+	+.2	1.2	+.2
Linum catharticum	+	+	.	+	+	+	+	+
Selaginella selaginoides	+	+	+	+	+	.	+	+.
Galium sterneri	+.2	+	+	+	+	.	+.2	.
Salix herbacea	+.2	.	.	+	+.2	+	1.2	+.2
Carex capillaris	1.1	+	1.2	2.2	+	.	1.2	.
Alchemilla alpina	1.2	+	+.2	.	1.2	.	+.2	+.2
Thalictrum alpinum	+	+	+	.	1.1	.	1.1	1.1
Rhacomitrium lanuginosum	+.3	+.3	2.3	.	.	1.3	1.3	+.3
Ctenidium molluscum	+	+	+	.	1.3	.	1.3	1.3
Carex pulicaris	+.2	+	1.1	+	1.1	.	.	.
Galium boreale	.	+	1.1	.	.	1.1	+	+

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Aufnahme No.	2	1	3	4	6	31	38	39
Pinguicula vulgaris	+	+	+	+	.	.	.	.
Tofieldia pusilla	1.1	+	1.1	+	.	.	.	.
Ditrichum flexicaule	+.3	.	1.3	2.3	.	.	+.3	.
Hylocomium splendens	.	.	.	+	1.3	1.3	1.3	1.3
Rhytidiadelphus triquetrus	+	1.3	.	.	.	1.3	.	+
Festuca rubra	+	.	+	+	.	.	.	.
Draba incana	+	.	+	.	.	.	.	+
Rubus saxatilis	+.2	.	+.2	.	.	+.2	.	.
Trollius europaeus	+	.	.	.	.	+	.	+
Alchemilla glabra	+	.	+	+	.	.	.	.
Luzula multiflora	.	+	+	+	.	.	.	.
Parnassia palustris	+	.	+	.	.	.	+	.
Viola riviniana	.	1.2	.	.	.	2.2	+.2	.
V. lutea	+	.	+	+	.	.	.	.
Tortella tortuosa	.	+.2	.	.	.	+.2	+.2	.
Scapania aspera	+	.	+	.	.	.	+	.
Distichum capillaceum	1.3	+	.	+	.	.	.	.
Rhytidium rugosum	.	+	+	.	.	.	+.3	.
Certraria aculeata	+.2	.	.	+.2	.	.	+.2	.

Also: (2) Alchemilla glomerulans +; Carex bigelowii +; Juncus triglumis +; Lycopodium selago +; Cerastium arctium +; Pohlia cruda +; Mnium undulatum +; (1) Cheleria sedoides +.3; Galium saxatile +; Anthyllis vulneraria +; Philonotis fontana +.3; Hypnum sp. +; Cladonia gracilis +; Coeloglossum viride +; Ptilidium ciliare +; Lophocolea bidentata +; Tritomaria quinquedentata +; (3) Euphrasia scotica +; Carex atrata +; Anthoxanthum odoratum +.2; Pleurozium schreberi +.2; Plagiochila asplenioides +; Dicranum majus +.3; Entodon concinnus +; Hypnum cupressiforme +; Fissidens cristatus +.2; Breutelia chrysocoma +.3; (4) Myosotis alpestris +; Poa balfourii (+); Plagiobryum zierii +; (6) Veronica fruticans +.2; Anoectangium compactum +.3; Dicranum scoparium +.2; Hypnum cupressiforme +; Cerastium arcticum +; Viola canina +; Agrostis tenuis +.2; Campanula rotundifolia +; Potentilla erecta +.2; Bellis perennis +.2; (31) Calluna vulgaris +; Hypericum pulchrum +.2; Anthoxanthum odoratum +.2; Ptilidium ciliare +; Mnium hornum +; M. undulatum +; Fissidens cristatus +.2; Geranium robertianum +.2; Polystichum lonchitis +; Breutelia chrysocoma +.3; Thuidium tamariscinum +; (38) Empetrum hermaphroditum +.2; Vaccinium myrtillus +.2; Potentilla erecta +; Leontodon autumnalis +; Certraria islandica +; Cladonia gracilis +; Alectoria nigricans +; Frullania tamarisci +; (39) Veronica serpyllifolia +; Prunella vulgaris +; Galium saxatile +; Carex bigelowii +; Lophocolea bidentata +; Cladonia pyxidata +.2.

Other Alliance character species present are *Minuartia rubella* and *Carex rupestris*. The most prominent constant companion species are those recorded for the Plantagino-Dryadetum.

Zonation and Succession

In all the localities these communities are fragmentary and zonation is obscured by rock-exposures and cliffs. On Cairnwell, the zonation from broken outcrops and sands of sugar limestone, through eutrophic heath to oligotrophic heath has been described by McVean & Ratcliffe (1962, Fig. 6, p. 49).

Related Communities

Also included in Table 2 is one Aufnahme from 2750 feet (880 m.) on the base-poor rocks of Ben Vrackie, Perthshire. This fragmentary grassland

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community is dominated by *Carex rupestris* and *Festuca* ssp. and has *Oxytropis halleri*, *Astragalus alpinus*, *Saxifraga oppositifolia* and *Silene acaulis* as notable companions.

Fragmentary *Dryas* communities have been recorded in Snowdonia and the Lake District, and ELKINGTON (1962) records the following list at Llyn Idwal, Glyder Fawr, Caernarvon:

Grid ref. 23/648594 — Altitude 1750 ft., SSW 75° — Cover 40%, 2 m².

Kobresio-Dryadion species				
	3	*Dryas octopetala*	3	*Rhacomitrium lanuginosum*
	3	*Saxifraga oppositifolia*	4	*Calluna vulgaris*
	4	*Silene acaulis*	3	*Festuca ovina*
			3	*Thymus drucei*
Companions			1	*Amphidium mougeotii*
	2	*Succisa pratensis*	1	*Ctenidium molluscum*
	1	*Antennaria dioica*	1	*Grimmia doniana*
	1	*Alchemilla glabra*	1	*Tortella tortuosa*
	1	*Veronica officinalis*	1	*Trichostomum brachydontium*
	1	*Lycopodium selago*	1	*Frullania tamarisci*

(Figures on the DOMIN scale)

The Breutelio-Seslerietum Br.-Bl. 1952 from Ben Bulben, Co. Sligo is not so closely related to the Salico-Dryadetum as this latter fragment. The dominance is shared between *Breutelia* and *Sesleria* similar to some of the Burren Asperulo-Seslerieta, but *Dryas* is absent and arctic-alpine species such as *Silene acaulis* and *Saxifraga aizoides* differentiate these communities from the latter; (see BRAUN-BLANQUET & TÜXEN 1952, Table 38, p. 317).

The Phytogeographical Relationships of the Associations of the Alliance Kobresio-Dryadion (Table 3)

The Plantagino-Dryadetum (columns A and B) appears to have no lowland, grazed counterpart in Scandinavia. MCVEAN (1955) reports lowland *Dryas* heaths at 200 feet (60 m.) at Lodmundarfjordur in Iceland, but even at this low level arctic-alpine species such as *Kobresia myosuroides*, *Cerastium alpinum*, *Erigeron borealis*, *Potentilla crantzii* and *Silene acaulis*, are common.

The Salico-Dryadetum has a closely related counterpart in the Species-rich Dryas-Association of NORDHAGEN (1928) from Sylene in Norway. As MCVEAN (1964) states, besides *Dryas* and *Salix reticulata*, the two Associations have a number of species in common (cf. Table 3, columns C and D).

Table 3. The Phytogeographical Relationships of the Associations of the Alliance Kobresio-Dryadion

A. Plantagino-Dryadetum typicum.
B. Plantagino-Dryadetum, Maritime Subass.
C. Salico-Dryadetum.
D. Artenreiche Dryas-Ass. Nordhagen 1927—28 Table 34, p. 243.
E. Elyna Bellardii-Certraria nivalis-Ochrolechia tartarea-Soz. Nordhagen 1936, p. 38.
F. Arctostaphylos uva-ursi-Soz. Nordhagen 1936, p. 38.
G. Artenreiche Diapensia-Ass. Nordhagen 1927—28, Table 33, p. 241.

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	A	B	C	D	E	F	G
No. of Aufnahmen	14	7	7	14	20	10	2
Alliance Character species							
Dryas octopetala	V	V	V	V	IV	V	1
Carex rupestris	III	III	III	V	V	V	2
Salix reticulata	.	.	IV	V	V	.	2
Potentilla crantzii	.	.	V	V	III	.	.
Silene acaulis	II	.	V	V	V	.	2
Saxifraga oppositifolia	r	.	V	III	IV	IV	.
Cerastium alpinum	.	.	V	IV	V	.	.
Astragalus alpinus	.	.	(I)	V	IV	III	.
Carex atrata	.	.	I	III	I	.	.
Salix myrsinites	.	.	IV	.	.	.	.
Minuartia rubella	.	.	II	.	I	.	.
Arenaria norvegica	1	.	.	.	.	.	.
Sesleria coerulea	.	.	III	.	.	.	.
Association and Subassociation Differential species							
(AB) Plantago lanceolata	V	IV	.	.	.	.	.
P. maritima	IV	V	.	.	.	.	.
Carex flacca	IV	V	.	.	.	.	.
Bellis perennis	IV	IV	I	.	.	.	.
Cynosurus cristatus	III	II	.	.	.	.	.
Cerastium holosteioides	II	II	.	.	.	.	.
(B) Koeleria cristata	.	V	.	.	.	.	.
Scabiosa columbaria	.	V	.	.	.	.	.
Anthyllis vulneraria	.	IV	I	.	.	.	.
Sieglingia decumbens	I	IV	.	.	.	.	.
Achillea millefolium	.	III	.	.	.	.	.
Leontodon autumnalis	I	III	I	.	.	.	.
Cerastium atrovirens	.	IV	.	.	.	.	.
Scilla verna	.	III	.	.	.	.	.
(C) Salix arbuscula	.	.	IV	.	.	.	.
S. myrsinites	.	.	IV	.	.	.	.
Alchemilla alpina	.	.	IV	.	.	.	.
Salix lapponum	.	.	II	.	.	.	.
(D) Carex vaginata	.	.	.	V	II	.	.
Pedicularis oederi	.	.	.	V	.	.	1
Hieracium alpinum (coll.)	.	.	.	V	.	.	1
Viola biflora	.	.	.	V	I	.	.
Phyllodoce coerulea	.	.	.	IV	.	.	.
Cassiope hypnoides	.	.	.	IV	.	.	.
(E) Kobresia myosuroides	.	.	.	III	V	.	.
Oxytropis lapponica	.	.	.	II	V	.	.
(F) Arctostaphylos uva-ursi	.	.	.	.	.	V	.
Agropyron latiglume	.	.	.	.	I	IV	.
Festuca rubra	I	V	III	I	.	V	.
(G) Diapensia lapponica	.	.	.	.	.	.	2

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	A	B	C	D	E	F	G
No. of Aufnahmen	14	7	7	14	20	10	2
Companions: Phanerogams (Constancy V and IV)							
Festuca ovina (+ vivipara)	V	V	V	V	V	.	2
Thymus drucei	V	V	V	.	.	.	.
Linum catharticum	V	V	IV	.	.	.	.
Polygonum viviparum	IV	IV	V	V	V	I	2
Saxifraga aizoides	IV	IV	V	I	I	I	.
Lotus corniculatus	IV	V	I	.	.	.	.
Euphrasia officinalis agg.	IV	IV	.	V	.	.	.
Antennaria dioica	III	V	.	II	.	.	.
Selaginella selaginoides	III	V	IV	V	I	.	.
Hypericum pulchrum	IV	IV	.	.	.	.	.
Potentilla erecta	IV	III	I	.	.	.	.
Viola riviniana	V	.	II	.	.	.	.
Polygala vulgaris	III	IV	.	.	.	.	.
Calluna vulgaris	IV	III	.	.	.	.	.
Carex pulicaris	III	IV	III	.	.	.	.
Prunella vulgaris	IV	II	I	.	.	.	.
Gentianella amarella	III	IV	I	.	.	.	.
Empetrum nigrum	II	IV	I	III	.	.	1
Thalictrum alpinum	II	IV	IV	V	V	.	2
Campanula rotundifolia	II	IV	I	V	IV	V	.
Agrostis tenuis	II	IV	I	.	.	.	.
Parnassia palustris	I	IV	II	IV	II	.	.
Carex panicea	I	IV	.	.	.	.	.
Galium sterneri	I	.	IV	.	.	.	.
Salix herbacea	.	.	IV	V	I	.	2
Carex capillaris	I	III	IV	II	I	.	.
Vaccinium vitis-idaea	.	.	.	V	II	.	2
V. uliginosum	.	.	.	IV	III	.	2
Juncus trifidus	.	.	.	V	III	.	1
Luzula spicata	.	.	I	V	III	.	1
Astragalus oroboides	.	.	.	IV	II	.	.
Pinguicula vulgaris	II	II	III	IV	II	.	.
Saussurea alpina	.	.	.	V	III	III	2
Tofieldia pusilla	.	.	III	IV	I	.	.
Companions: Cryptogams							
Hylocomium splendens	IV	II	III	V	.	.	.
Ditrichum flexicaule	II	V	III	.	.	.	.
Tortella tortuosa	II	IV	II	.	.	.	.
Rhacomitrium lanuginosum	II	II	IV	I			2
Ctenidium molluscum	III	III	IV	.			.
Dicranum muhlenbeckii	.	.	.	V			.
Polytrichum alpinum	.	.	.	IV			.
Certraria cucullata	.	.	.	V			2
C. islandica s. l.	.	.	II	V			2
C. nivalis	.	.	.	V			2
Cladonia gracilis	.	.	I	V			2
C. arbuscula	.	.	.	V			2
Ochrolechia tartarea	.	.	.	IV	.	.	2
Thamnolia vermicularis	.	.	.	IV	.	.	2

no details

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Other Associations and Sociations of Kobresio-Dryadion are summarised admirably in Table XIV, p. 38 of NORDHAGEN (1936). Of these groups only the Elyna-Certraria nivalis-Ochrolechia tartarea-Soc. and the Arctostaphylos uva-ursi-Dryas-Soc. are included in Table 3 (columns E and F). The former is included to give some idea of the structure of communities where *Kobresia myosuroides* is co-dominant. The latter Sociation is particularly interesting because of its apparent close relationship to the *Arctostaphylos-grass* heath recorded by MCVEAN & RATCLIFFE (1962) at Blair Atholl, Perthshire.

Column G in Table 18 comprises two lists of the Species-rich Diapensia-Association Nordhagen 1928, which is closely related to the previous Sociations. It seems possible that a survey of the *Diapensia lapponica* locality in Scotland may reveal a community similar to this.

Summary

The status of the Class Elyno-Seslerietea in the British Isles is reviewed and, according to the proposals of BRAUN-BLANQUET (1948) the Order name Elyno-Dryadetalia is adopted for Scandinavian and British communities referable to the above Class. The distinguishing features between Elyno-Seslerietea and Seslerio-Mesobromion communities in northern England are considered.

Two Associations are recognised within the Alliance Kobresio-Dryadion:

(a) Plantagino-Dryadetum — restricted to lowland Cambrian limestones and blown shell-sand in NW. Scotland and characterised by the dominance of *Dryas octopetala* and its co-dominance with *Carex rupestris*;

(b) Salico-Dryadetum — fragmentary relict communities on south and east facing base-rich cliff ledges in central Scotland.

The phytogeographical relationships of these two Associations are discussed relative to data from Norway (NORDHAGEN 1928, 1936). The Salico-Dryadetum is closely related to the Artenreiche Dryas-Ass. from Sylene, Norway, but the Plantagino-Dryadetum with its abundance of mesophilous grassland species appears to have no Scandinavian counterpart.

Zusammenfassung

Die Arbeit gibt einen Überblick über den Stand der Klasse Elyno-Seslerietea auf den britischen Inseln. Nach dem Vorschlag von BRAUN-BLANQUET (1948) wird, mit Bezug auf die obige Klasse, der Ordnungsname Elyno-Dryadetalia für die britischen und skandinavischen Gesellschaften übernommen. Die Unterscheidungsmerkmale zwischen Elyno-Seslerietea- und Seslerio-Mesobromion-Gesellschaften in Nordengland werden erwogen.

Innerhalb des Verbandes Kobresio-Dryadion wurden zwei Assoziationen festgestellt:

Plantagino-Dryadetum — auf Kambrian-Kalkstein und Muschelsandverwehungen des Flachlandes in Nordwestschottland beschränkt und

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durch die Dominanz von *Dryas octopetala* und ihrer Ko-dominanz mit *Carex rupestris* charakterisiert;

Salico-Dryadetum — fragmentarische Relikte von Gesellschaften auf süd- und ost-gerichteten basenreichen Felsenriffen in Zentralschottland.

Die pflanzengeographische Verwandtschaft dieser beiden Assoziationen wird diskutiert mit Bezug auf Daten aus Norwegen (NORDHAGEN 1928, 1936). Das Salico-Dryadetum ist eng verwandt mit der Artenreichen Dryas-Ass. aus Sylene, Norwegen; das Plantagino-Dryadetum scheint dagegen mit seiner großen Anzahl von mesophilen Wiesen-Arten kein skandinavisches Gegenstück zu haben.

The above work forms part of a Ph. D. Thesis submitted for higher degree at the University of Durham. In this respect, I wish to thank the Natural Environmental Research Council for a Studentship for the period of research, and my supervisor Dr. D. J. BELLAMY. My thanks are also due to Mrs. M. T. HEALY for translation of the summary and to Miss E. M. SHARPE and Mrs. J. C. PALMER for typing the manuscript.

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S.B.

Table 1. Association Plantagino-Dryadetum

Subass. typicum

31. Above Loch an Loin, Kishorn, Ross-shire, NG 863445, 800 ft.
32, 38. Glasscnock, Kishhorn, NG 865454, 500 ft.
36. Coille Dhubh, Kishorn, NG 869447, 1050 ft.
11. Traligill Burn, Inchnadamph, NC 263215, 450 ft.
16. Blar nam Fiadhag, Inchnadamph, NC 252208, 700 ft.
17, 18. Knockanrock, Elphin, Sutherland, NC 188092, 900 ft.; NC 197098, 1000 ft.
14, 15. Ben nan Cnaimhseag, Inchnadamph, NC 280186, 1250 ft.
74. Rubha na Leac, Raasay, NG 598379, 250 ft.
73. Druim an Aonaich, Raasay, NG 583424, 850 ft.
72. nr. South Screapadal, Raasay, NG 578439, 500 ft.
71. Creag na Bruaich, Raasay, NG 583437, 750 ft.
(71—74 from ELKINGTON 1962)

Maritime Subass.

19. E. of L. Borralie, Durness, Sutherland, NC 390667, 150 ft.
20. nr. L. Caladail, Durness, NC 393666, 150 ft.
21. Durness, NC 394674, 100 ft.
22. Leirinbeg, Durness, NC 414678, 100 ft.
23. Smoo, Durness, NC 413671, 150 ft.
24, 26. Druim Chuibhe, Bettyhill, Sutherland, NC 700608, 250 and 200 ft.

Aufnahme No.	SL 31	SL 32	SL 38	SL 36	SL 11	SL 16	SL 17	SL 18	SL 14	SL 15	E 74	E 73	E 72	E 71	SL 19	SL 20	SL 21	SL 22	SL 23	SL 24	SL 26
Species No.	32	37	32	34	36	35	35	32	33	29	28	27	29	25	42	52	50	36	47	45	36
Aspect.	NW	W	W	SW	SW	W	NW	NW	NW	NE	NW	SE	W	NE	SW	N	.	W	NW	NE	NE
Slope °.	30	10	25	40	30	5	30	30	20	25	65	60	50	55	2	2	.	10	2	45	25
Cover %: Herbs.	90	100	100	80	80	100	80	80	70	80	100	100	100	100	100	100	90	90	90	90	80
Bryops.	40	20	10	20	20	10	10	10	10	20	20	20	40	50	20	20	20	30	20	10	20
Quadrat size (m²)	10	4	4	4	2	2	4	4	10	4	4	4	4	4	4	4	4	10	10	4	4
	Av. sp. no. 32 Subass. typicum														Av. sp. no. 44 Maritime Subass.						
Association character species																					
Dryas octopetala	3.4	3.3	2.3	4.4	3.3	4.4	2.3	3.3	2.2	2.3	7	8	5	6	2.2	3.4	1.2	1.2	2.3	4.4	4.5
Carex rupestris	1.1	+	2.2	1.1	.	.	.	.	+	1.2	.	.	.	.	1.2	.	2.3	+.2	2.2	.	.
Association differential species *)																					
Plantago lanceolata	+	+	+	+	+	+	1.1	+	.	.	2	4	2	3	.	+	1.1	.	+	+	+
P. maritima	1.1	+	1.1	+	1.1	+	.	+	+	+	.	.	.	.	+	1.1	2.1	2.1	1.1	2.1	+
Carex flacca	+	1.1	1.1	.	2.3	3.3	4.3	3.3	2.2	2.3	.	.	.	.	2.2	1.2	3.4	2.2	2.3	1.2	1.1
Bellis perennis	+	.	+.2	+	+	+	1.1	1.1	+	1.1	.	.	1	1	1.1	+	.	.	1.1	+	+
Cynosurus cristatus	.	+	+	+	.	+	+	1.1	.	.	.	.	2	.	.	.	+	.	.	+	.
Cerastium holosteioides	.	+	+.2	+	.	.	+	+	.	.	.	.	.	.	.	+	+	.	.	.	.
Differential species of maritime Sub-association																					
Koeleria cristata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.2	2.3	1.1	2.3	2.2	1.2	1.2
Scabiosa columbaria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.1	1.1	1.1	+	1.1	+	+
Anthyllis vulneraria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1.1	.	+	+	+
Sieglingia decumbens	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1.2	+	1.2	+	1.2	1.1	.
Achillea millefolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1.1	.	+	+	.
Leontodon autumnalis	.	.	.	.	.	.	.	.	.	.	.	.	.	2	+	.	1.1	.	1.2	+	+
Cerastium atrovirens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.1	+	+	1.1	1.1
Scilla verna	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1.1	.	1.1	+
Alliance & Order Character (ch) & Differential species (d)																					
Saxifraga aizoides (d)	+	+	+	.	+	.	.	.	+	+	1	1	.	.	+	1.1	.	+	.	1.1	+
Polygonum viviparum (d)	1.1	.	.	1.1	1.1	+	+	+	1.1	1.1	.	.	.	.	+	+	+	+	1.1	.	+
Silene acaulis (ch)	.	.	.	+.2	.	.	.	.	.	+	1	2	.	.	.	.	.	.	.	.	.
Arenaria norvegica (ch)	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.
Companions																					
Festuca ovina	1.2	1.2	3.3	1.2	1.1	2.2	2.2	2.2	2.3	2.2	3	1	3	1	+	1.2	1.2	+	+	1.1	+
Thymus drucei	1.2	+.2	+.2	2.2	1.2	+.2	1.2	2.2	1.2	1.2	4	4	4	5	+.2	2.2	+.2	2.2	+.2	1.2	1.2
Linum catharticum	+	+	.	+	+	+	.	+	+	+	1	3	3	1	+	+	+	+	+	+	+
Lotus corniculatus	+.2	1.2	+	1.2	.	1.2	+	1.2	1.1	+.2	.	4	2	.	+	+	1.2	+.2	+	+	+
Euphrasia cf. scotica	+	.	1.1	+	+	+	+	+	.	.	.	1	2	1	+	+	+	.	+	+	+
Antennaria dioica	.	1.1	+	+	+	.	1.1	+	.	1.1	.	.	.	1	+	1.2	+	+	1.1	+	1.1
Polygala vulgaris	+	.	.	+	+	.	+	+	+	.	.	1	1	.	+	+	.	.	+	+	1.1
Hypericum pulchrum	.	+.2	+	.	+	+	+	+	.	.	1	1	1	1	+	+	.	+	.	+	.
Selaginella selaginoides	1.1	+	+	.	+	.	+	.	+	1.1	.	1	.	.	+	1.1	+	1.1	+	+	+
Potentilla erecta	1.2	1.2	1.2	+	+	1.2	+.2	1.2	.	.	2	.	1	1	.	.	1.1	+	1.2	+	.
Calluna vulgaris	.	+.2	+	.	+	.	+	+	.	.	7	2	1	5	.	.	+.2	+.2	+	+.2	.
Ditrichum flexicaule	+.3	.	.	.	.	+	+	+	.	.	.	.	.	.	1.3	1.3	+	+	1.3	+	+
Carex pulicaris	.	1.2	.	+.2	+	+	.	+	+	1.1	.	.	.	.	+.2	1.2	+	.	1.2	+	.
Prunella vulgaris	.	+	1.2	.	+	.	+	+.2	+	+.2	2	1	2	.	+	+	.	.	.	.	1.1
Hylocomium splendens	.	1.2	+	+	2.3	+	+	1.2	+	1.2	.	.	.	.	.	+	1.2	.	+	1.2	.
Viola riviniana	+	+	+	+	1.1	+	+	.	1.1	+	1	1	1	1	.	.	.	.	.	.	.
Rhytidiadelphus squarrosus	+	+	+	.	+	+	1.3	+	+	.	.	.	.	.	.	+	+	.	+	+	+
Ctenidium molluscum	1.3	+	.	+	1.1	.	.	+	1.3	2.3	.	.	.	.	1.1	+	.	+	.	+	.
Camptothecium lutescens	+.3	+	.	1.3	+	+	+	+	.	.	.	.	.	.	+	+	+	.	.	+	1.2
Gentianella amarella	.	+	+	.	+	+	+	+	.	.	.	.	.	.	+	+	+	+	1.1	.	.
Viola canina	+	.	+	1.1	.	+	+	1.1	+	+	.	.	.	.	.	.	+	.	+	+	.
Empetrum nigrum	.	+.2	.	+.2	.	+	.	.	.	.	1	.	.	4	+.2	1.2	.	+.2	.	1.2	+.2
Thalictrum alpinum	.	.	1.1	.	.	.	.	.	1.1	2.3	.	.	.	.	1.1	1.1	1.1	.	+	+	.
Festuca rubra	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1.1	1.1	+	+	1.2	1.2	1.1
Tortella tortuosa	+.2	.	.	1.2	.	1.2	.	.	+	.	.	.	.	.	+	+	+	+	1.1	.	+
Scapania aspera	+	+	.	.	+	+	+	+	+	.	.	.	.	.	.	+	.	.	+	.	+
Campanula rotundifolia	.	.	+	1.1	.	+	.	.	.	.	.	.	.	.	+	1.1	+	+	1.1	+	.
Agrostis tenuis	.	+.2	+	.	.	.	.	.	+	.	.	.	.	.	1.1	+	.	+	+	+	.
Coeloglossum viride	1.1	.	.	+	.	.	+	.	1.1	+	.	.	.	.	+	+	.	+	.	.	.
Luzula campestris	.	.	+	.	.	+	.	.	.	.	.	.	.	.	+	+	+	.	+	.	.
Anthoxanthum odoratum	.	+.2	.	.	.	.	.	.	.	.	2	1	.	.	.	+	+	.	.	+	.
Parnassia palustris	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	+
Carex panicea	.	.	1.2	.	.	.	.	.	.	.	.	.	.	.	1.1	+	+	.	+	+	.
Galium saxatile	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	1.2	+.2	+.2	.
Pinguicula vulgaris	.	.	.	.	+	.	.	.	.	.	.	.	1	1	.	.	+	+	.	.	.
Rhacomitrium languinosum	.	.	.	.	.	.	.	.	1.2	+.3	.	.	1	.	.	.	+	.	+	.	.
Solorina saccata	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	+	.	+	.	.
Carex capillaris	.	+.2	.	.	.	.	.	.	.	.	.	.	.	.	1.1	1.1	1.1	.	+	.	.
Taraxacum s/spectabilia	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	+	.	.	+
T. s/erythrosperma	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.
Rhinanthus minor	.	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Epipactis atrorubens	+	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.
Breutelia chrysocoma	+.2	.	+	.	+.2	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Alchemilla vestita	.	+.2	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.
Carex serotina	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1.2	.	1.1	.
Dactylorchis fuchsii	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	+	.	+	.	.
Hypnum cupressiforme	.	+.3	.	.	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.
Neckera crispa	.	.	+.2	.	.	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
Pteridium aquilinum	+.2	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.
Primula vulgaris	.	.	.	.	.	.	.	.	.	.	1	1	1	1	.	.	.	.	.	.	.
Pleurozium schreberi	.	.	.	.	.	.	.	+	.	.	1	2	2	.	.	.	.	.	.	.	.
Betula pubescens	.	.	.	+	.	.	.	.	.	.	2	.	.	2	.	.	.	.	.	.	.
Erica cinerea	.	.	.	.	.	.	+.2	.	.	.	4	.	1	.	.	.	.	.	.	.	.
Hieracium ssp.	.	.	.	.	+	.	.	.	.	.	3	.	1	.	.	.	.	.	.	.	.
Rhytidium rugosum	.	.	.	.	.	+	+	.	.	1.2	.	.	.	.	.	.	.	.	.	.	.
Succisa pratensis	.	.	.	.	.	.	.	.	.	.	2	2	4	.	.	.	.	.	.	.	.
Blindia acuta	.	.	.	.	.	.	.	.	.	.	.	2	2	8	.	.	.	.	.	.	.
Veronica officinalis	.	.	.	.	.	.	.	.	+	.	1	.	1	.	.	.	.	.	.	.	.
Cladonia ssp.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	.	.	.	.	.	.	.
Frullaria tamarisci	.	+.2	.	.	.	+.2	.	+.2	.	.	.	.	.	.	.	.	.	.	.	.	.
Alchemilla alpina	+.2	.	.	.	.	.	.	.	.	+	5	.	.	.	.	.	.	.	.	.	.

Also: (31) Asplenium viride +; Angelica sylvestris +; Distichum capillaceum 1.3; Thuidium abietinum +; (32) Thuidium delicatulum +; Galium boreale +; (36) Fraxinus seedling +; Geum rivale +; Acrocladium cuspidatum +.3; Polytrichum piliferum +; Encalypta vulgaris +.3; (11) Rhytidiadelphus triquetrus +.3; Festuca vivipara +; Deschampsia caespitosa +.3; Tortella densa +.3; (16) Ranunculus acris +; Lophozia bantriensis +; (17) Carex demissa 1.1; Alchemilla glabra +; A. wichurae +; (18) Carex caryophyllea +; Hylocomium brevirostre +.3; (14) Saxifraga oppositifolia 1.2; Galium sterneri +.2; Thuidium sp. +.2; (74) Salix repens 1; Angelica sylvestris 1; Polytrichum commune 3; Sphagnum sp. 1; (73) Asplenium adiantum-nigrum 1; Juncus squarrosus 2; Trifolium pratense 2; Teucrium scorodonia 2; (72) Agrostis canina 1; Fragaria vesca 1; Ranunculus repens 1; (71) Asplenium marinum 1; A. viride 1; Ranunculus acris 1; Hypochaeris radicata 1; Thuidium tamariscinum 6; (19) Mnium undulatum +; Daucus carota +; (20) Trollius europaeus 1.1; Mnium undulatum +; Draba incana +; (21) Aira praecox +; Sagina procumbens +.2; Pohlia nutans +; Poa annua +.2; (22) Distichum capillaceum +.3; (23) Aira praecox +; Lathyrus montanus +; Carex pilulifera +.2; (24) Brachythecium albicans 1.3; B. erythrorrhizon +; Campylium chrysophyllum +.3; (26) Salix repens 1.1; Meum athamanticum +; Galium verum +; Tortula ruraliformis +.3; Brachythecium albicans +.3.

*) Differential species within the Alliance Kobresio-Dryadion.

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