A Pilot Project To Assess The Potential Of Detecting Botanical Change In British Native Woodlands Using The 1971 National Woodlands Survey Database

DN Hirst and RGH Bunce

DRAFT

November 1998

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Overall Results

A botanical survey of twelve woods in northern England and Southwest Scotland was carried out using the same methodology as 1971, relocating the plots as closely as possible.

Data from this survey were compared and integrated with data collected in the same areas in 1971 and analysed using the VESPAN, TWINSPAN and DECORANA computer programs. Shifts of the paired plots between TWINSPAN classes and on the ordination diagram can therefore be compared and their ecological significance determined.

The eight plots supply sufficient information for general comments to be made about the management status of each wood and these are provided in the text.

Only two woods show signs of minimal management – all the others have direct evidence of intervention, which has disturbed the natural process of forest development.

There was an overall decline in total basal area of the trees of 14%, a corresponding decline in total basal area of the shrubs of 76%, which gave a combined fall in basal area of 19%. Only two woods however showed a major increase in overall basal area, which would be expected according accepted models of tree growth.

Of the most common trees encountered, ash, oak and birch all declined in total basal area. Of the less frequently encountered trees, lime and wych elm also declined in basal area whilst yew, spruce and alder all showed an increase in total basal area. Fir and willow, although recorded in 1971 were not found in 1998.

There was an overall decline in sapling numbers of 58% with oak, birch and ash all showing losses of over 50%. Beech and larch were the only species to actually increase in numbers over the 27 years.

Ash and birch were both present in 1998 in smaller numbers in the lowest DBH class of 5-10 cm when compared to 1971, reflecting poor regeneration in recent years. Oak was found to be stable in this respect. Yew was present in the largest DBH class >40 cm in higher numbers in 1998, whilst ash and oak had declined in this class, suggesting the felling of mature stems.

There was an overall decline of 43% in maiden stem numbers (all tree species) of the lowest 5-10 cm DBH class, and a corresponding decline of 31% in stem numbers of the largest > 40 cm DBN class over 27 years. These figures reflect poor regeneration plus the felling of mature trees.

In the ordination there was a marginal shift towards vegetation associated with a more open canopy and a marked shift towards vegetation containing more species from moister conditions, particularly in the acid woods

Of ten field layer species common in old broadleaved woods all were found to be less frequent, with *Dryopteris filix-mas* declining the most closely followed by *Rubus fruticosus* and *Teucrium scorodonia. Dryopteris filix mas* and *Dryopteris dilitata* declined the most in cover values (-5.1 & -6.6 respectively). *Viola spp.* increased in cover value by 1.8.

When woods managed by NGOs were compared with wood managed in private ownership, the overall decline in all categories was more marked. In those woods managed privately tree

plus shrub stem number had declined by 56%, frequency by 7% and basal area 7%. In those woods managed by NGOs these figures fell by 79%, 24% and 38% respectively. At one site managed by a NGO the saplings and shrubs had been removed completely, whilst at another a large area of juniper had been removed and converted to improved pasture.

General Conclusions

Although eight plots were sufficient to provide an adequate assessment of the changes, the full sixteen plots would be more accurate, especially for the scarcer tree species and would enable more detailed management descriptions to be produced for each site. It is therefore recommended that any future survey should involve recording all sixteen plots in each site.

Although the plots may not be in the exact location, they are sufficiently accurate to enable valid conclusions to be drawn, because the changes are large and consistent.

Further analysis of the changes in balance between species and vegetation classes is required to amplify and confirm the initial conclusions. This could be facilitated by larger sample numbers and the inclusion of more sites.

The conclusions demonstrate the value of the 1971 database as a means of showing trends in trees and vegetation within native woodlands. Because of the method of site selection in 1971, many of the sites are SSSIs and nature reserves. The database therefore has the potential for auditing the status of these sites.

The majority of changes can be clearly attributed to management and emphasize the role of human influence as opposed to natural processes in change within native woodlands.

The decline in regenerative capacity is a real cause for concern especially considering the many discussions on the role of natural regeneration identifying natural processes rather than management as being the limiting factor.

Statements made in 1970 concerning minimal management in both pinewoods and native woodlands need consideration especially in view of the fact that the two woods with the best regeneration structure, are both unmanaged.

Introduction

Although ancient semi-natural woodland has been recognised as an important aspect of our natural heritage for many years, very few long-term studies have been carried out in order to determine the nature and rate of botanical change within these habitats in the UK. Peterken and Backmeroff (1988) describe five such studies that have monitored change in woodland over 25 years or more. These include a comprehensive account of botanical change over forty years at Lady Park Wood in the Forest Of Dean by Peterken and Jones published separately (1987 and 1989). Kirby, Thomas and Dawkins (1996) describe changes in Wytham Woods (Oxfordshire) with some reference to the associated herb layer. Cooke, Farrell *et al.* (1995) describe changes in the abundance and size of dog's mercury *Mercurialis perennis* associated with deer browsing. Barkham (1992) describes the effects of management on the ground flora of Brigsteer Park Wood in Cumbria over 18 years. Stutter (1996) describes change in botanical composition over thirty two years at Monks Wood National Nature Reserve. Earlier work carried out in the USA also adequately describes secondary succession in temperate woodlands (Bormann and Likens 1981) and (Stevens and Waggoner 1980).

This present study is an attempt to pull together the different strands and emphases of these past works, combined with the analysis of data collected in 1998 compared with those collected in 1971. This should give an insight into the nature and direction of change in twelve areas of woodland in Northwest England and Southwest Scotland, and allow an explanation for any changes that have taken place over the past 27 years.

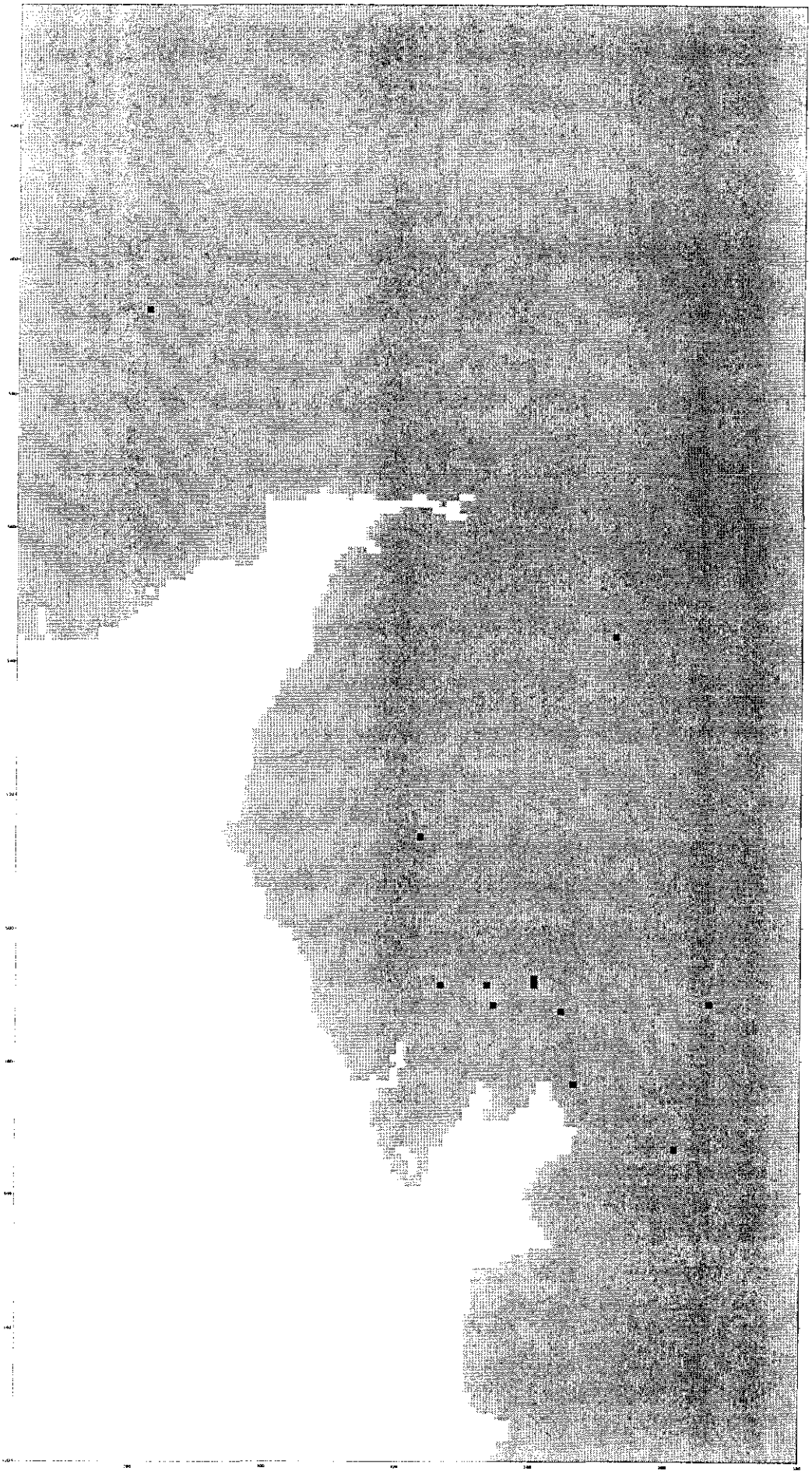
HISTORICAL CONTEXT

In 1969 the then Nature Conservancy Council initiated a survey of 103 cartologically defined woodlands using a standardised methodology. This was carried out in order that an integrated system of woodland classification could be produced (Bunce 1982). As the original data were still extant in 1997 it was decided that they could be used as baseline data for a study of vegetation change over the ensuing 27 years.

Countryside Information System GB 5.41

Woodland Sites 1971

LOCATION MAP



as; partridge, pheasant, roe deer, salmon and brown trout being the main foci of attention. Roe deer are culled annually and any increase in browsing pressure over the last 27 years was suggested as unlikely. It was also mentioned that bracken (*Pteridium aquilinum*) had increased in cover substantially over the last 27 years.

Wood 2, Seatoller (OS grid ref. NY 240130), has been owned and managed by the National Trust since the 1971 survey (Bunce pers. comm.). Although subject to grazing by sheep and unchecked deer browsing it maintains a rich bryophyte flora, the conservation of which is one of the prime aims of present management (National Trust pers. comm.). It is intended that stock fencing be erected this winter (1998-1999), in order to keep sheep grazing under control.

Woods 3 and 4, Birk's Brow and Winster House (OS grid ref. SD 410930) are contiguous areas of privately owned woodland. There was evidence of extensive coppicing within the last 30-50 years. The affected trees being mainly sycamore (*Acer pseudoplatanus*) and oak (*Quercus petraea*). However apart from this and some sheep and cattle grazing in certain compartments there was no evidence of intensive interventionist management. Consultation with the gamekeeper confirmed this assumption and although most areas are free from grazing, the presence of roe deer (*Capreolus capreolus*) could not be ignored during the survey as sporadic barking echoed through the trees heralding the beginning of the rutting season.

Wood 5, Hall Brow (OS grid ref. SD 347886) is owned and managed by the Lake District National Park Authority. Although details of past management are unknown, it is fenced from grazing and there was evidence of limited replanting of yew (*Taxus baccata*) and oak *(Quercus* spp.) and also 30-50 yr. old coppicing of oak. One area was protected with deer fencing and although bracken (*Pteridium aquilinum*) was rife, many saplings of beech (*Fagus sylvatica*), birch (*Betula* spp.) and rowan (*Sorbus aucuparia*) were growing up through the bracken which were absent from the rest of the wood.

Wood 6, Great Knott (OS grid ref. SD 335917) is owned and managed by the Forestry Commission and again although details of past management are not known it was

evident that a popular public right of way runs through this wood, which is also fenced from grazing. There was no evidence of any past coppicing, unlike the other woods. Again like Hall Brow this wood contained an area protected from deer, although the fencing was presumably erected more recently as there was not the same degree of regeneration in this area as there was at Hall Brow. There was some evidence of the felling of young oaks at two of the sample locations.

Wood 7, Whitbarrow (OS grid ref. SD 445875) is privately owned and managed except for an area at the northern tip, which is managed by English Nature under lease. In the summer of 1998 this wood was designated a National Nature Reserve. Consultation with the gamekeeper revealed regular deer culls and some thinning of mature trees. The section managed by English Nature has recently been extensively cut for coppice in an effort to encourage butterflies (English Nature pers. comm.). Again, sheep or cattle do not graze this wood.

Wood 8, Haverigg Holme (OS grid ref. SD 265917) is the site of a former much larger area of woodland. As the iron industry in the mid eighteenth century reached new peaks of production the demand for charcoal was greater than ever before and the woodland at Haverigg Holme supplied this industry until coke became the preferred fuel over charcoal in the mid nineteenth century (Satchell 1989). Indeed, the presence of fragments of pig iron around the site suggests that smelting was actually carried out on site at some time during its history.

Larch trees were planted presumably for the production of pit props to supply the iron ore mines in the early nineteenth century. However as their full potential was never realised the larch at Haverigg Holme were felled during the war years to aid a failing economy (Rimmington pers. comm.). Since the present owner acquired this site trees have been continuously cleared in order to increase the area of land available for sheep grazing. Although the site is now very sparsely wooded the owner is considering replanting again with the aid of the 'Woodland Grant Scheme'. It should be noted that the sward left after felling is very diverse in plant species and attracts many butterflies including fritillaries and skippers and the intermittent

rustling of the undergrowth amongst the rocks in some areas suggests prime habitat for the common lizard (*Lacerta vivipara*).

Wood 9, Pike Gill (OS grid ref. SD 615665) is privately owned and although the southern perimeter is stock-proof, evidence of limited sheep grazing within the wood was apparent to the east, although the western end appeared ungrazed. Silvicultural management at this site appeared to be non-existent, with no evidence of planting, felling or coppicing in recent times. Certain areas at the edge of the wood had been incorporated into the adjacent semi-improved pastures by moving the fence line inside the wood. In these instances the trees were still standing but the field layer was closely cropped with no natural regeneration.

Wood 10, Rottenbutts Wood (OS grid ref. SD 668890) is privately owned and classified as 'replanted ancient woodland' by English Nature (Frankland pers. comm.). This woodland is a mosaic of semi-natural broadleaved woodland and conifer plantations. The site is stockproof and ungrazed by sheep, roe deer however browse throughout the wood. During the lifetime of the present ownership regular thinning and replanting has been carried out, but no coppicing or clear felling.

Wood 11, Eaves Wood (OS grid ref. SD 465763) is owned and managed by the National Trust and is a National Nature Reserve. Although ungrazed in most parts a compartment (not included in the survey) is fenced and grazed. Roe deer are present throughout the wood. A warden has been responsible for the management of this wood for the last nine years and has carried out limited coppicing and scrub clearance (Nat. Trust pers. comm.). Evidence of the felling of non-native conifers was also found at one sample point.

Wood 12, Tynron (OS grid ref. NX 826926) is privately owned. A large section of juniper (*Juniperus communis*) scrub is fenced from grazing and managed by Scottish Natural Heritage as a National Nature Reserve. This site was designated a NNR in 1957 and management at the present includes bracken control and the trapping of rabbits.

BOTANICAL COMPOSITION AND TOPOGRAPHY

Eden Gorge:

Eden Gorge (ca.30ha.) can be separated into two distinct woodland types; that on the east bank being diverse in both species and age structure, with a dense canopy cover on clayey soil and much regeneration. Although the bedrock is sandstone this wood contains many mature beech trees along with ash (*Fraxinus excelsior*), birch and sycamore. All of these except birch tend to prefer basic soils whilst sandstone is usually associated with acidic soils.

Rodwell's description (1991) of W11 woodland (*Quercus petraea-Betula pubescens-Oxalis acetosella*) seems to fit this wood well although the high incidence of sycamore and the presence of alder (*Alnus glutinosa*) on the east bank give this area some affinity with its south-eastern counterpart the W10 (*Quercus robur-Pteridium aquilinum-Rubus fruticosus*) woodland. Peterken's Stand Type 3D (Acid sessile oak-hazel-ash wood) would also suffice as a description (Peterken 1981). Using Bunce's key (1982) the classification as woodland type 9 (*Endymion non-scriptus*, *Rubus fruticosus*) is probably the most accurate.

On the west bank the cover is predominantly bracken with some birch, rowan and hawthorn (*Crataegus monogyna*) scattered throughout. Although resembling Rodwell's (1991) description of W25 (*Pteridium aquilinum-Rubus fruticosus*) underscrub it is perhaps more acceptable to regard this community as the remnants of a W11 (*Quercus robur-Pteridium aquilinum-Rubus fruticosus*) woodland that previously occupied this east facing bank.

Flushed areas on both banks are present, with alder (*Alnus glutinosa*) proliferating on the eastern bank and soft rush (*Juncus effusus*) proliferating in these areas on the western bank. Although occurring in only two of the eight quadrats, foxglove (*Digitalis purpurea*) gave the impression of being more frequent with its brilliant pink-purple flowers swaying in the unseasonable rain-laden breezes that accompanied this survey. Where precipitous cliffs protected the vegetation of the West Bank from

browsing, heather (*Calluna vulgaris*) had found a niche. This species is included by Rodwell (1991) in his description of W11 woodland and the U20 (*Pteridium aquilinum-Galium saxatile*) calcifugous community, and it is probable that a shift from W11 to U20 possibly via W25 has allowed this species to remain a constituent here. On infrequently used tracks on the western bank those species associated with trampling were evident ie. plantains and buttercups (see sample 70 Appen. 4). However even on the edge of the path through the eastern wood these species were seldom seen.

Seatoller:

Seatoller at 150-300m elevation (ca. 50ha.) has one of the most oceanic climates of the twelve woods, the presence of *Rubus saxatilis, Polygala serpyllifolia* and *Aira praecox* at quadrat 95 (see appen. 4), giving this area a sub-montane influence. This wood is situated on a steep south-easterly facing slope with the soil surface being broken in many places by outcrops of the Borrowdale volcanic rock that lies close to the surface over much of the wood. The north eastern half of the wood is predominantly W17 (*Quercus petraea-Betula pubescens-Dicranum majus*) woodland (Rodwell 1991). Peterken's classification of stand type 6A (upland sessile oak wood) and Bunce's Plot Type 25 (*Galium saxatile-Deschampsia flexuosa*) western acid sessile oak wood, serve as alternative classifications.

The south western half of this wood is far more open with few trees and a closely grazed field layer resembling Rodwell's (1992) U4a (*Festuca ovina-Agrostis capillaris-Galium saxatile*) calcifugous grassland, typical sub-community, (see quadrat 95 in Appen. 4). There are patches of coniferous plantations in this half of the site but the oak-birch canopy is not present at all here. The presence of three ancient yew trees in the centre of the site, dating back to the beginning of the first millenium A.D., (Mills 1998) give this area an added attraction to complement its rich bryophyte community.

Winster House and Birk[1]s Brow:

Winster House and Birk[1]s Brow are contiguous parts of a larger area of woodland, covering approximately 50 hectares between them. These woods are located on Silurian slates grits and flags with the corresponding acidic soils. These rocks are never far from the surface and outcrops and cliffs covered in bryophytes and billberry (*Vaccinium myrtillus*) are frequent (although unrecorded at Winster House). Like Seatoller, Birk[1]s Brow can be described as a mainly species poor W17 community. Winster House however is more akin to Rodwell's (1991) W11 (*Quercus petraea-Betula pubescens-Oxalis acetosella*) woodland, with the most frequent tree being sycamore (III), with birch and oak having frequencies of II. Peterken's stand type 3D (Acid sessile-oak-hazel-ash wood) and Bunces's plot type 22 (*Blechnum spicant-Rubus fruticosus*) would also serve as useful classifications. Bracken is one of the most frequently occurring forbs in these woods and has the highest cover of any. Its associates *Oxalis acetosella* and *Anthoxanthum odoratum* are present at the corresponding frequencies for W11 and W17 respectively.

The topography of this area is one of undulating terrain rising from 60m. to 130m. in parts. There are flushes, bogs and streams at various locations throughout the woods lending an aquatic influence to the otherwise relatively homogeneous field layer. The principal hydrophytic species being *Deschampsia cespitosa,* and *Carex remota.*

Hall Brow:

Hall Brow is another W17 wood (ca. 25ha.) with the canopy dominated by oak and birch and a field layer dominated by bracken, *Anthoxanthum* and *Deschampsia flexuosa*. Where streams cut through this wood, species such as *Juncus effusus, Galium palustre, Chrysosplenium oppositifolium* and *Scutellaria minor* play an important role in field layer community structure. This wood is situated on a west facing hillside extending from 50m. to 150m. in elevation. In areas where the underlying rocks break the surface, yew trees find a niche and grow in clumps throughout this wood. *Vaccinium* is far more frequent in this wood than any of the previous woods described and it also has a much greater allocation of pterydophytes

than would be expected in a W17 community. In particular bracken, *Dryopteris dilatata*, and *Dryopteris filix-mas* are abundant, suggesting that deer browsing is kept in check, although roe deer were seen during the survey.

Great Knott:

Great Knott is a wooded hill (ca. 20ha.) extending from 70m. to 170m. in elevation and is a contiguous part of Grizedale Forest, situated at its southern end. Similar to Hall Brow in many ways it has high bracken cover and more *Dryopteris dilatata* than would be expected. However this wood is lacking in ash cover with beech replacing it as a complement to the oak-birch dominance. There are fewer rocky outcrops here and it can be assumed that the soil is perhaps deeper here than at the previous four sites. Yew trees are absent from this wood again the reason may be the absence of suitably thin soils and rocky substrata. A waterlogged area along the north eastern edge of the wood supports *Juncus effusus, Blysmus compressus* and *Deschampsia cespitosa,* adding to its diversity.

Whitbarrow:

Whitbarrow covers an area of approximately 125ha. with the majority of the wood situated on gently undulating Carboniferous limestone at 50m.-100m. elevation, however to the east of this area a steep incline leading to Whitbarrow Scar ascends to 180m. The vegetation at this altitude is dominated by *Sesleria albicans,* with a sprinkling of *Molinia caerulea.* Stunted yews grow here alongside birch amongst the limestone crags. This community is a sparsely wooded example of Rodwell's (1992) CG9 (*Sesleria albicans-Galium sterneri*) calcicolous grassland. Whilst at the foot of the incline and spreading out westwards is an upland ash-birch-hazel wood, categorised by Rodwell (1991) as W9 (*Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis)* woodland. This wood follows Rodwell's description closely apart from the abundance of yew trees growing throughout this site. Where flushes and streams cut through this woodland, plants such as *Equisetum arvense, Carex remota, Juncus filiformis* and *Filipendula ulmaria,* add a distinct richness to the field layer.

Haverigg Holme:

This site covers an area of approximately 25ha. Previously oak/birch woodland, this site is now mostly semi-improved pasture. Using Rodwell's classification (1992), this site is dominated by U4 *Festuca ovina, Agrostis capillaris, Galium saxatile* calcifugous grassland, with a few scattered oak trees and occasional patches of grazed woodland. The site is situated on a steep NW facing hillside rising from 80m. to 160m. The presence of rocks and boulders of the Silurian Coniston grits scattered throughout this area break the open sward in many places.

The dominant grasses here are *Deschampsia flexuosa* and *Agrostis capillaris* with *Festuca ovina* and *Cynosurus cristatus* also present at high frequencies. The dicotyledonous element contains *Galium saxatile* and *Rumex acetosella* at high frequencies, with a liberal sprinkling of the hawkbits *Leontodon hispidus* and *Leontodon autumnalis.*

Amongst the boulders the ferns *Polypodium vulgare*, *Dryopteris dilatata* and *Dryopteris filix mas* grow alongside the heaths *Calluna vulgaris* and *Erica cinerea*, where the rocks have protected these species from grazing by sheep.

Pike Gill:

This wood is situated on either side of a tributary to the River Roeburn and is one part of a continuously wooded gill that stretches 2km. upstream from the confluence with the river. The area covered by Pike Gill is approximately 10ha. at an elevation of 90m. This, often steep sided gill is densely wooded with the dominant tree species being; sycamore, hazel, ash, oak and alder. Rodwell's W9a *Fraxinus excelsior, Sorbus aucuparia, Mercurialis* woodland, typical sub community, describes the botanical composition of this wood well. However in this instance, dominance of the canopy by ash, rowan and birch is replaced by ash, sycamore and birch, with oak being more dominant at Pike Gill than in Rodwell,s W9a wood.

Hazel is the dominant shrub with hawthorn and holly well represented. The field layer is dominated by *Deschampsia cespitosa, Dryopteris filix mas, Oxalis, Rubus fruticosus* and *Dryopteris dilatata.* The presence of *Deschampsia* at such a high frequency alongside the abundance of alder and *Chrysosplenium* suggests that areas of this wood are more akin to W7 (*Alnus glutinosa, Fraxinus excelsior, Lysimachia nemorum*) woodland than W9 and a description of this wood as a patchwork of the two may well be more accurate than solely W9a.

Rotten Butts:

Situated on a steep NE facing slope this wood rises from 140m. to 240m. and covers an area of approximately 20ha. Although dominated by planted spruce and larch there are areas of broadleaved woodland with a substantial number of dead elm trees still standing. Beech, sycamore, oak and rowan are the dominant broadleaved trees, with a field layer dominated by; *Agrostis capillaris, Oxalis acetosella, Dryopteris dilatata* and *Dryopteris filix mas,* with the latter only growing in those areas free from conifers. Although ash trees were not recorded the other constituents suggest that this woodland is extensively modified W9a (ash, rowan, dogs mercury) woodland.

The western end of this wood is covered by *Rhododendron* and the field layer is virtually non existent, indeed most of the areas where larch and spruce have been planted have a very species poor field layer.

Eaves Wood:

Covering an area of approximately 50ha. Eaves Wood sits on limestone pavement where the skeletal soils allow yew to proliferate. At 40-70m. elevation this wood is located 1km. from the coast and as such benefits from a mild microclimate. This is a very diverse wood with many introduced species including; *Cotoneaster horizontalis,* and *Clematis vitalba.* Oak, ash and yew dominate the canopy layer whilst *Viola spp.*

Rubus fruticosus and *Brachypodium sylvaticum* dominate the field layer. Hazel and hawthorn, with some blackthorn (*Prunus spinosa*) represent shrubs here with wayfaring tree (*Viburnum lantana*) interspersed. Where yew trees proliferate, the field layer is patchy with few species apart from seedlings of holly and ash. However where the canopy is thin a multitude of dicotyledons grow in profusion.

With many similarities to Whitbarrow, this wood can be classified as W9, with the presence of yew trees adding to its diversity.

Tynron:

Tynron Wood covers an area of approximately 25ha. rising from an elevation of 80m. to 130m.

This site contains an area of improved grassland, (MG6b- *Lolio, Cynosuretum cristati* grassland, sub community *Anthoxanthum odoratum*), an area of semi-improved grassland U4 (see Haverigg Holme above), and an area of juniper woodland (W19 *Juniperus communis ssp.communis, Oxalis acetosella*).

The improved grassland is very species poor and dominated by the grasses *Lolium perenne, Cynosurus cristatus, Agrostis capillaris* and *Dactylis glomerata.* It contains few dicotyledons and is grazed by sheep. The semi-improved grassland is far more diverse with many more dicotyledons and a tussocky appearance. The area of juniper woodland is almost as diverse as the semi-improved grassland but with additional species such as *Calluna vulgaris, Inula conyza, Fragaria vesca, Succisa pratensis* and *Rosa canina agg.* replacing the more nitrogen demanding dicotyledons.

Methodology

Although the original survey in 1971 involved the recording of 16 quadrats per wood, this second survey halved this number to eight as it was thought to be more important to cover more different woodland types in less detail given the time restraints. It was decided to revisit all the odd sample locations i.e. 1-15, using compass bearings and

pacing distances from easily identified locations, such as boundary intersections, watercourse confluences and the intersections of woodland tracks.

The owners of the woods all had to be contacted in order that permission could be granted for the survey to be carried out. This involved travelling to the vicinity of each wood and making inquiries at the nearest place of habitation. In many instances these happened to be farms where information was freely available as to who the owners were. Follow up phone calls and letters secured permission on all but two occasions.

As much of the survey was carried out on hilly terrain a degree of correction had to be made for steep inclines when pacing distances. The following is a guide to the corrections made; 20deg.=+6%, 25deg. +10%, 30deg. =+15%, 35deg. =+22%, 40deg. =+31%, (Bunce 1971 unpub.)

Using 1:25,000 scale Ordnance Survey maps and the original 1 inch scale maps the position of each original quadrat was located and a new quadrat laid out and examined. Using the same method of recording as in 1971, data were collected from eight locations in twelve woods, giving a total of ninety six samples in all. The quadrats used (Appen. 1) were identical to the originals and consisted of a central peg with four lengths of twine attached to it. Each length of twine was 10m. long with coloured tags at intervals of; 1.42m., 3.54m., 5.00m., 7.07m., and at the end was attached another peg.. These tags delineated the corners of four nested quadrats, and the pegs marked the corners of the largest quadrat (14.14m.X 14.14m. = 200 sq. m.), once the lengths of twine were stretched out at 90deg. to each other. A search for all vascular plants was made, starting in the central quadrat (2m. X 2m.) and gradually working outwards once all species in the previous quadrat had been identified and assigned a cover value (Appen. 3). Only species that had not been recorded in the previous quadrat/s were recorded in subsequent quadrats. A final cover value was estimated for each species as a % of the largest 200sq. m. quadrat. Any trees, shrubs or saplings were recorded on a separate sheet (Appen. 2). The most northerly and southerly quarters of the quadrat (delineated by the lengths of twine), were checked for trees, shrubs and saplings with a measurement of diameter at breast height (DBH)

for each being recorded. The other two quarters (west and east), were only checked for trees over 4cm in DBH. All oaks were recorded as *Quercus petraea* and all birches as *Betula pubescens*.

The tree data were analysed first, with number of stems over 4cm. of each species in each wood totalled, frequency of occurrence over the eight samples and total DBH and basal area were also estimated (Tables 1 & 2). These figures were then compared with those for 1971 and an estimate of overall change over 27 years made, (Tables 3 & 4). Numbers of saplings for each species were totalled for each survey year, (Table 5), and an overall indication of change estimated.

The DBH data were then categorised into stem number per DBH class. These DBH classes were; 1: 5-10cm., 2: 11-20cm., 3: 21-30cm., 4: 31-40cm. and 5: >40cm. Bar charts were then drawn for the most common tree species in each of the woods, (Figs. 1-17).

In order to determine trends in regeneration, and the felling of mature trees the data were checked for the number of maiden stems 5-10cm. DBH and the number of mature trees >40cm. DBH. Data from 1971 were compared with data from 1998 (Table 6), and a site by site comparison made (Tables 7-14)

After analysis of the tree and shrub data the field layer data were entered into the VESPAN computer program (Malloch 1995), using the RECORD option. Once entered the data were then selected by wood in SELECT and then frequency and cover values for each species were printed in TABLE, (Appen. 4). The frequency tables were then analysed and the ten commonest species were chosen and their changes in frequency and cover value noted over the 27 years, (Table 15).

The data entered into RECORD were then prepared in PREPARE and a TWINSPAN analysis carried out (Fig. 18), using the same procedure a DECORANA analysis was also carried out for both species and samples (Figs. 19 & 20).

TWINSPAN (Hill 1979b) is a computer program written in the 1970's and still used extensively today for vegetation analysis. It separates samples of vegetation according to their degree of similarity or difference. As Fig. 18 shows the most disparate samples are located at either end of the continuum, whilst those in the centre tend to be very similar. This procedure uses *indicator species* to make the divisions between samples. The best indicator species are present in all the samples on one side of the split but not in any on the other side. However these species tend to be rare and often one finds species confined to one side of the division, but not in all the samples of that side, or present in all the samples on one side but also with a few on the other (Malloch unpub.).

DECORANA (Hill 1979a) is a computer program that was also written in the 1970's and still used widely today for vegetation analysis. It is a method of ordination that allocates scores to both samples and species according to their similarities and differences. This method differs from TWINSPAN in that it is able to produce a two or even three dimensional plot of the species or samples, showing their degree of similarity or difference using *matrix algebra.*

A comparison was then made between those woods that had been managed privately and those woods that had been managed by non- governmental organisations (National Trust, Lake District National Park Authority, Scottish Natural Heritage, and Forestry Commission). Data relating to mean stem number, frequency (diversity) and basal area per wood for trees and shrubs were compared between management regimes (Table 16).

Results

Tables 1 and 2 show how stem numbers, frequency of occurrence and total basal area of the commonest trees and shrubs have changed from 1971 to 1998, and also how these attributes vary between woods. If the 'total' rows are compared it can be seen that basal area (which is an indicator of canopy density) has increased at:

- Hall Brow (11%), Eden Gorge (6%), Winster House (33%), Pike Gill (11%) and Birk's Brow (43%).

But has fallen at:

- Great Knott (48%), Seatoller (62%), Haverigg Holme (68%), Rotten Butts (43%) Eaves Wood (38%), Tynron (66%) and Whitbarrow (6%).

Spearmans Rank Correlation was carried out on % change in basal area and % change in species no. per quadrat per wood ($r_s = 0.813$, $n = 7$, $P < 0.05$), basal area and species richness were negatively correlated. The same test was carried out with % change in stem numbers and % change in species no. per quadrat per wood ($r_s = 0.848$, $n = 7$, $P < 0.05$), stem numbers and species richness were also negatively correlated.

Tables 3 and 4 show the changes in basal area between tree and shrub species over the 27 years. Alder and spruce increased the most (150 & 121% respectively), however in real terms these changes are not as important as those regarding ash, oak, birch and sycamore which were far more numerous. Again the biggest decreases involved those trees that were very infrequent (fir & willow). But the figures for the

commoner trees; ash, oak, birch, elm and beech all showed substantial decreases in basal area. Sycamore showed a slight fall in basal area (2%) which is unlikely to be significant and yew showed a substantial increase (19%). All the shrubs except cherry showed a considerable decline, up to 93% in the case of juniper and 90% for holly.

An overall decline in total basal area of all trees of 14% was found and a corresponding decline of 76% for shrubs was noted. However the decline in stem numbers was more dramatic with shrubs declining by 84% and trees by 49%.

Table 1.

Stem Numbers (SN), Frequency Of Occurrence (F) And Total Basal Area (TBA) At Breast Height (sq. cm.) Of Trees And Shrubs Found In Eight 200sq.m. Quadrats In Each Of Twelve Different Areas Of Semi-Natural Woodland Surveyed In 1971.

	Great Knott			Hall Brow			Eden Gorge			Winster House			Seatoller			Birk's Brow		
	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA
Ash	None			None			2	2	2737	13	2	1346	3	3	5422	32	1	1738
Oak	105	8	23473	42	8	10003	3	2	9082	20	4	5530	15	5	21461	225	5	13530
Birch	57	6	7189	66	7	7481	8	3	2937	76	7	6552	11	3	978	71	7	4833
Yew	None			None			None			1	1	1520	None			None		
Alder	None			12	1	371	None			None			None			2	1	41
Sycamore	None			None			13	2	3417	98	4	6539	None			3	1	173
Larch	None			None			2	1	732	None			None			None		
Elm	None			None			3	1	962	None			4	2	2159	None		
Beech	None			2	1	3356	6	2	8273	None			None			None		
Willow	None			2	2	177	None			11	2	869	None			3	1	184
Hawthorn	None			None			None			7	1	8	10	3	1687	1	1	5
Hazel	23	2	115	88	4	1129	9	1	26	211	3	1623	79	4	1704	82	2	1153
Holly	None			None			2	1	663	None			5	1	909	None		
Cherry	None			None			None			None			None			None		
Rowan	None			1	1	28	None			None			36	3	780	None		
Elder	None			None			None			1	1	78	None			None		
Total	185	16	30777	213	26	22545	48	15	28829	438	25	24065	163	24	35100	419	19	21657

	Whitbarrow			Haverigg Holme			Pike Gill			Rotten Butts			Eaves Wood			Tynron		
	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA
Ash	74	6	6640	None			14	4	1856	8	3	3556	38	5	2815	8	2	2934
Oak	23	3	3395	131	5	14168	34	5	5027	3	2	8187	13	3	2820	None		
Birch	30	5	5791	13	3	566	13	4	1697	None			None			None		
Yew	23	4	15229	None			None			None			60	5	7131	None		
Alder	None			None			12	4	4166	None			None			None		
Sycamore	21	3	2277	None			17	3	7934	14	5	9236	64	4	2930	None		
Spruce	26	1	5794	None			None			None			None			None		
Larch	None			None			None			21	2	9052	4	3	4786	None		
Lime	None			None			None			None			97	2	2216	None		
Elm	2	1	594	None			1	1	660	40	4	12129	2	1	2928	None		
Beech	None			None			None			8	3	3870	1	1	1886	None		
Willow	None			None			10	4	1677	None			None			None		
Fir	None			None			None			2	2	5944	None			None		
Scots Pine	None			None			None			None			10	4	4910	None		
Hawthorn	14	4	446	None			15	3	2049	1	1	78	None			None		
Hazel	367	7	2647	11	1	142	97	5	2113	None			464	7	2255	None		
Holly	3	2	646	None			5	2	966	None			None			None		
Cherry	1	1	20	1	1	2290	None			1	1	346	None			6	2	6167
Rowan	3	1	14	None			18	3	1933	3	1	147	1	1	95	None		
Elder	None			None			11	4	42	None			None			None		
Juniper	None			None			None			None			None			899	6	6198
Total	587	38	43493	156	10	17166	247	42	30120	101	24	52545	657	36	34772	913	10	15299

Table 2.

Stem Numbers (SN), Frequency Of Occurrence (F) And Total Basal Area (TBA) At Breast Height (sq. cm.) Of Trees And Shrubs Found In Eight 200 sq.m. Quadrats In Each Of Twelve Different Areas Of Semi-Natural Woodland Surveyed In 1998.

	Great Knott			**Hall Brow**			**Eden Gorge**			**Winster House**			**Seatoller**			**Birk's Brow**		
	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA
Ash	None			2	1	378	20	3	3137	28	3	2195	None			3	1	165
Oak	22	7	11516	40	7	18220	6	3	15862	11	3	12717	2	1	10936	75	5	17318
Birch	12	5	3728	17	6	2967	8	5	1965	12	3	2377	1	1	1134	28	4	4590
Yew	None			5	1	2523	None			1	1	1735	None			None		
Alder	None			5	1	640	8	1	2284	None			None			None		
Sycamore	None			None			25	3	4706	36	4	7805	None			52	2	7516
Spruce	None			None			13	1	960	1	1	2642	None			None		
Lime	None			None			None			None			None			9	2	1567
Elm	None			None			5	3	456	None			None			2	1	431
Beech	6	2	525	None			9	2	401	None			None			2	1	528
Scots Pine	None			1	1	4778	None			None			None			None		
Hawthorn	None			1	1	133	18	3	73	None			8	2	1402	None		
Hazel	2	1	142	2	1	15	7	2	21	8	1	150	None			22	1	208
Holly	None			None			None			1	1	7	None			1	1	3
Cherry	None			None			None			3	1	535	None			None		
Rowan	None			None			18	3	33	1	1	706	None			None		
Elder	None			None			3	1	35	None			None			None		
Total	42	15	15911	73	19	29654	120	30	29933	102	19	30869	11	4	13472	194	18	32326

	Whitbarrow			**Haverigg Holme**			**Pike Gill**			**Rotten Butts**			**Eaves Wood**			**Tynron**		
	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA	SN	F	TBA
Ash	46	7	9508	1	1	1017	9	4	3901	None			31	6	1638	11	2	2218
Oak	6	2	3017	None			14	4	4720	4	3	2521	22	7	3664	None		
Birch	23	4	6470	None			14	4	5729	7	2	2208	1	1	113	None		
Yew	40	5	13341	None			None			None			67	6	10814	None		
Alder	None			None			12	4	4366	2	1	2669	None			7	1	1510
Sycamore	6	2	2086	None			27	5	4380	5	2	4576	10	5	644	None		
Spruce	6	1	5000	None			1	1	3019	7	1	1221	None			None		
Larch	None			None			None			34	3	9572	9	4	3231	None		
Lime	None			None			None			None			None			None		
Elm	None			None			10	2	426	2	1	911	None			None		
Beech	None			None			2	1	2778	6	3	873	None			None		
Willow	None			None			None			None			None			None		
Scots Pine	None			None			None			1	1	5026	1	1	707	None		
Hawthorn	2	2	6	None			9	4	1197	None			25	3	199	None		
Hazel	34	6	468	3	1	5	76	5	572	None			46	5	391	None		
Holly	17	1	185	None			5	3	42	None			1	1	78	None		
Cherry	7	1	598	1	1	4417	1	1	2290	5	2	162	None			9	1	1096
Rowan	None			None			None			7	2	414	11	3	146	None		
Elder	None			None			2	1	10	None			None			None		
Juniper	None			None			None			None			None			63	1	404
Total	187	31	40679	5	3	5439	182	39	33430	80	21	30153	224	42	21625	90	5	5228

Table 3.

Total Stem Numbers (SN), Frequency Of Occurrence (F) And Basal Area (sq.cm.) For Each Tree Type (over 4cm.DBH) And Each Shrub Species (any diameter), For Both 1971 And 1998.

	1971			1998		
	SN	F	Basal Area	SN	F	Basal Area
Ash	192	28	29044	154	28	24157
Oak	614	50	116640	202	42	100491
Birch	345	45	38024	123	35	31281
Yew	84	10	23880	113	13	28413
Alder	40	6	4578	34	8	11469
Sycamore	230	22	32506	161	23	31713
Spruce	26	1	5798	28	5	12842
Lime	97	2	2216	9	2	1567
Elm	52	10	19432	19	7	2224
Beech	17	7	17385	25	9	5105
Willow	26	9	2907	Nil	Nil	Nil
Fir	2	2	5944	Nil	Nil	Nil
Scots Pine	10	4	4910	3	3	10511
Cherry	9	5	8823	26	7	9098
Subtotal 1	1744	201	312083	897	182	268871
Hawthorn	48	13	4273	63	15	3010
Hazel	1431	36	12907	200	23	1972
Holly	15	6	3184	25	7	315
Rowan	62	10	2997	37	9	1299
Elder	12	5	120	5	2	45
Juniper	899	6	6198	63	1	404
Subtotal 2	2467	76	29679	393	57	7045

Table 4.
Change In SN, F And Basal Area Over Twenty Seven Years (%) For All Twelve Woods.

	SN	F	Basal Area
Ash	-20	0	-17
Oak	-67	-16	-14
Birch	-64	-22	-18
Yew	34	30	19
Alder	-15	33	150
Sycamore	-30	4	-2
Spruce	8	400	121
Lime	-90	0	-29
Elm	-63	-30	-88
Beech	47	28	-70
Willow	-100	-100	-100
Fir	-100	-100	-100
Scots Pine	-70	-25	114
Cherry	189	40	3
Hawthorn	31	15	-29
Hazel	-86	-36	-85
Holly	67	17	-90
Rowan	-40	-10	-57
Elder	-58	-60	-62
Juniper	-93	-83	-93
Total Change			
(trees &			
shrubs)	-69	-14	-19
Trees Only	-49	-9	-14
Shrubs Only	-84	-25	-76

Table 5.		
Total Number Of Tree Saplings (<5cm.DBH)		
For 1971 And 1998 And % Change		
	1971	1998
Oak	38	17
Larch	1	2
Birch	57	5
Spruce	1	0
Aspen	1	0
Elm	2	2
Sycamore	57	48
Ash	109	48
Beech	1	5
Yew	17	5
Lime	29	0
Willow	1	0
Scots Pine	0	1
Total	314	133
Total change = 58% loss in tree saplings		
over 27 years.		

Table 5 shows how dramatically the number of saplings has dropped over the 27 years; from 314 to 133, a drop of 58%. The species that had declined were predominantly oak, birch, yew and ash whilst beech and larch showed a slight increase.

Table 6 shows how the regeneration of maiden stems of different tree types (genus or species, 5-10 cm. DBH) has changed over the 27 years between the surveys. This table also shows how the number of mature trees over 40 cm. DBH has changed over time. The *Betula* genus has decreased the most in terms of recent regeneration, whilst the *Quercus* genus has remained remarkably stable. Ash numbers have fallen in both age classes, whilst aspen, poplar and *Salix spp.* have disappeared completely from the records. Mature yew trees over 40 cm. DBH have increased from 0 in 1971 to 4 in 1998. The resulting overall decreases in both age classes are 43% for young trees and 31% for mature trees.

Table 6.
Total Change In Stem Numbers Of Trees 5-10cm. DBH And >40cm. DBH Over 27 Years.

	1971 5-10	1971 >40	1998 5-10	1998 >40
Ash	46	3	38	1
Oak	34	18	33	14
Birch	157	0	31	1
Yew	3	0	7	4
Alder	2	0	0	1
Sycamore	14	3	15	0
Larch	0	1	4	0
Elm	1	4	4	0
Beech	0	5	8	0
Willow	7	0	0	0
Spruce	1	0	8	2
Fir	0	2	0	0
Scots	0	0	0	2
Cherry	1	3	5	2
Rowan	9	0	5	0
Whitebeam	0	0	1	0
Lime	0	0	2	0
Aspen	8	0	0	0
Poplar	2	0	0	0
Total	285	39	161	27

Fall of 43% in stem numbers (5-10 cm.DBH) over 27 years
Fall of 31% in stem numbers (>40 cm.DBH) over 27 years

A breakdown of the data shown in Table 6 allowed comparisons to be made between some of the woods in respect of recent regeneration and the survival of mature trees.

Table 7	Birks Brow			
	1971	1998	1971	1998
	5-10 cm	5-10 cm	>40 cm	>40 cm.
Ash	3	0	1	0
Oak	15	21	1	1
Birch	33	10	0	0
Sycamore	2	0	0	0
Willow	2	0	0	0
Lime	0	2	0	0

Oak regeneration at Birks Brow increased by 40% over the 27 years, but birch regeneration decreased by 70%.

Table 8	Whitbarrow			
	1971	1998	1971	1998
	5-10 cm.	5-10 cm.	>40 cm.	>40 cm.
Ash	23	9	0	0
Oak	0	1	0	1
Birch	11	6	0	0
Yew	0	0	2	3
Sycamore	2	1	0	0
Willow	1	0	0	0
Spruce	1	0	0	0
Cherry	1	3	0	0

Ash regeneration at Whitbarrow decreased by 61% and birch regeneration decreased by 45% over 27 years.

Table 9	Pike Gill			
	1971	1998	1971	1998
	5-10 cm.	5-10 cm.	>40 cm.	>40 cm.
Ash	3	2	0	0
Oak	1	0	0	0
Birch	1	0	0	1
Alder	2	0	0	0
Sycamore	2	4	0	0
Rowan	6	0	0	0

The number of trees in these categories at Pike Gill was very small indicating that most trees are middle aged and any changes were minimal.

Table 10	Eaves Wood			
	1971	1998	1971	1998
	5-10 cm.	5-10 cm.	>40 cm.	>40 cm.
Ash	7	13	0	0
Oak	0	6	0	1
Yew	3	7	1	0
Sycamore	1	5	0	0
Larch	0	3	1	0

Young stems of ash, oak, yew and sycamore had increased over the 27 year period reflecting vigorous regeneration at Eaves Wood.

Table 11	Great Knott			
	1971	1998	1971	1998
	5-10 cm.	5-10 cm.	>40 cm.	>40 cm.
Oak	1	4	3	2
Birch	24	5	0	0
Beech	0	4	0	0

There were increases in young oak and beech stems at Great Knott but a 79% decrease in young birch stem numbers.

Table 12	Hall Brow			
	1971	1998	1971	1998
	5-10 cm.	5-10 cm.	>40 cm.	>40 cm.
Oak	7	1	2	1
Birch	41	5	1	0
Aspen	8	0	0	0

There was a big decrease in young oak stems at Hall Brow (86%), a similar decrease in young birch (88%) and a complete absence of young aspen in 1998. Mature stems of oak and birch also declined.

Table 13	Eden Gorge			
	1971	1998	1971	1998
	5-10 cm.	5-10 cm.	>40 cm.	>40 cm.
Ash	0	10	1	1
Oak	0	0	2	4
Birch	2	4	0	0
Sycamore	1	3	0	0

Eden Gorge showed a huge increase in young ash stems and also increases in young birch and sycamore. There was a twofold increase in mature oaks whilst mature ash stems remained stable.

Table 14	Winster House			
	1971	1998	1971	1998
	5-10 cm.	5-10 cm.	>40 cm.	>40 cm.
Ash	8	0	0	0
Oak	3	0	0	1
Birch	31	1	0	0
Sycamore	6	2	0	0
Yew	0	0	1	1

At Winster House there has been a huge decrease in the number of young ash, oak, sycamore and in particular, birch which has declined by 97%.

Table 15.		
Total Change In Field Layer Composition Over All Twelve Woods (F=Frequency Of Occurrence and D=Mean Domin Value). Only The Ten Most Common Vascular Plants Are Shown.		
	F	D
Dryopteris filix mas	-24	-5.1
Dryopteris dilatata	-20	-6.6
Oxalis acetosella	-14	-1.3
Rubus fruticosus	-23	-3.2
Teucrium scorodonia	-23	-3.1
Lonicera periclymenun	-16	-1.3
Pteridium aquilinum	-9	-2.2
Anthoxanthum odoratu	-3	-1.7
Deschampsia flexuosa	-16	-6.5
Viola spp.	-5	1.8

Of the ten most common species found throughout the twelve woods surveyed, all species declined in both frequency and % cover over 27 years, with the exception of *Viola spp.* which declined in frequency but not in cover (Table 15). The species that decreased in both values the most were male fern (*Dryopteris filix-mas*), broad buckler fern (*Dryopteris dilatata*) bramble (*Rubus fruticosus*) and wood sage (*Teucrium scorodonia*).

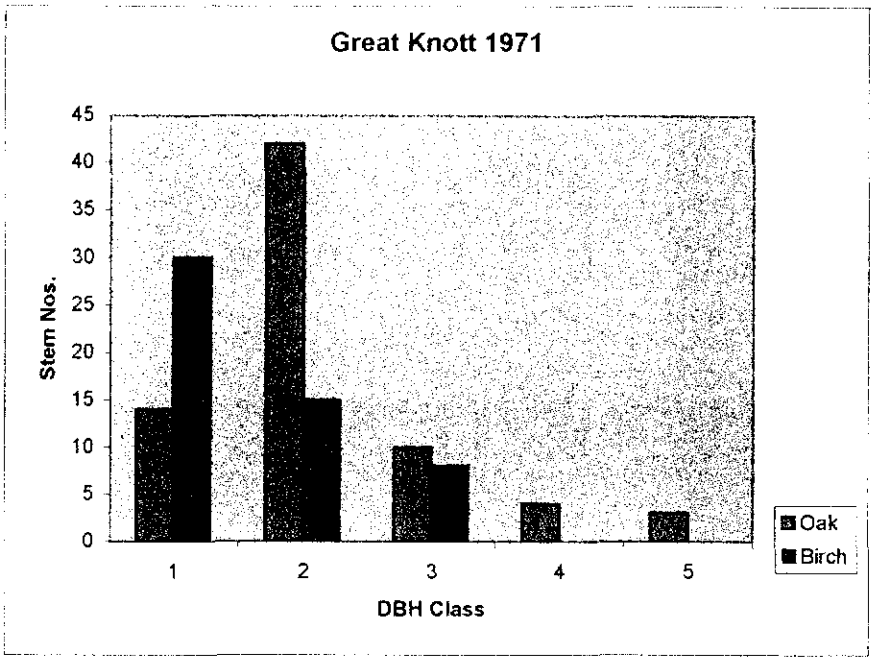
Table 16.

A Comparison Of Stem Numbers (SN), Frequency (F) And Basal Area Between Survey Years And Between Management Categories, (NGO and Private).

Prvately Managed						
		1971			1998	
	SN	F	Basal Area	SN	F	Basal Area
Eden G.	48	15	28829	120	30	29933
Winster H.	438	25	24065	102	19	30869
Birks B.	419	19	21657	194	18	32326
Haveriggs H.	156	10	17166	5	3	5439
Pike G.	247	42	30120	182	39	33430
Rotten B.	101	24	52545	80	21	30153
Whitbarrow	587	38	43493	187	31	40679
Total	1996	173	217875	870	161	202829
Mean	285.1429	24.71429	31125	124.2857	23	28975.57
NGO Managed						
Gt. Knott	185	16	30777	42	15	15911
Hall Brow	213	26	22545	73	19	29654
Seatoller	163	24	35100	11	4	13472
Eaves Wood	657	36	34772	224	42	21625
Tynron	913	10	15299	90	5	5228
Total	2131	112	138493	440	85	85890
Mean	426.2	22.4	27698.6	88	17	17178
Summary:						
In 1971 woods managed by NGOs had 50% more tree stems, 12% less diversity (F) and 11% less timber (basal area)						
In 1998 woods managed by NGOs had 29% fewer tree stems, 26% less diversity (F) and 41% less timber (basal area)						

When woods managed by NGOs were compared with those managed privately it became apparent that those managed by NGOs had suffered much greater losses of stem numbers, frequency and basal area, over 27 years; 79%, 24% and 38%, respectively, compared to; 56%, 7% and 7% for privately managed woods.

Figs. 1-17 are histograms showing how the age structure of different species in different woods has altered over time. The number of stems of a species of a particular age class (cohort) was plotted throughout the sample population. The cohorts were defined by DBH (1=5-10cm., 2=11-20cm., 3=21-30cm., 4=31-40cm., 5=>40cm.).


Great Knott 1971
Stem Nos.
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
DBH Class
Oak
Birch

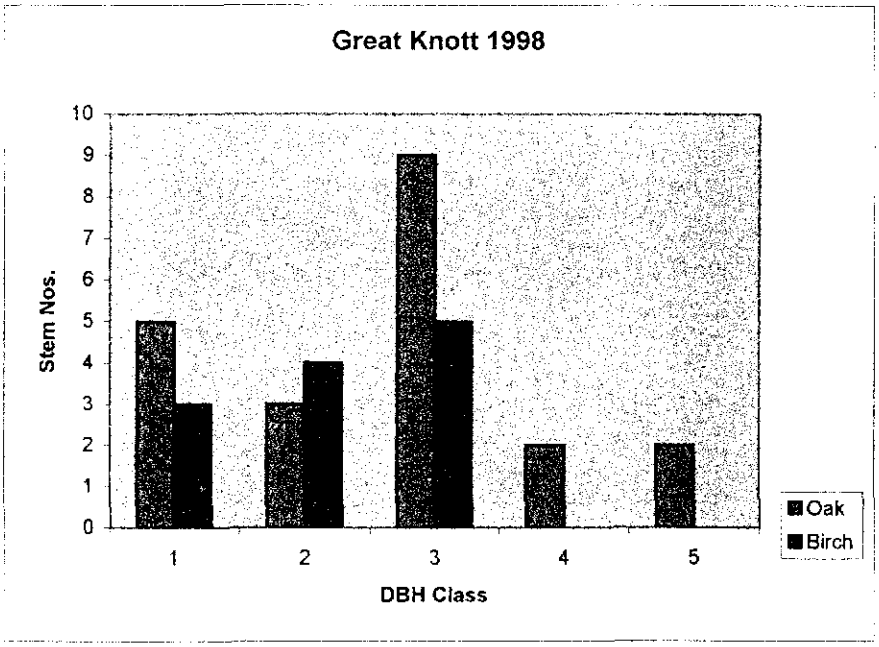
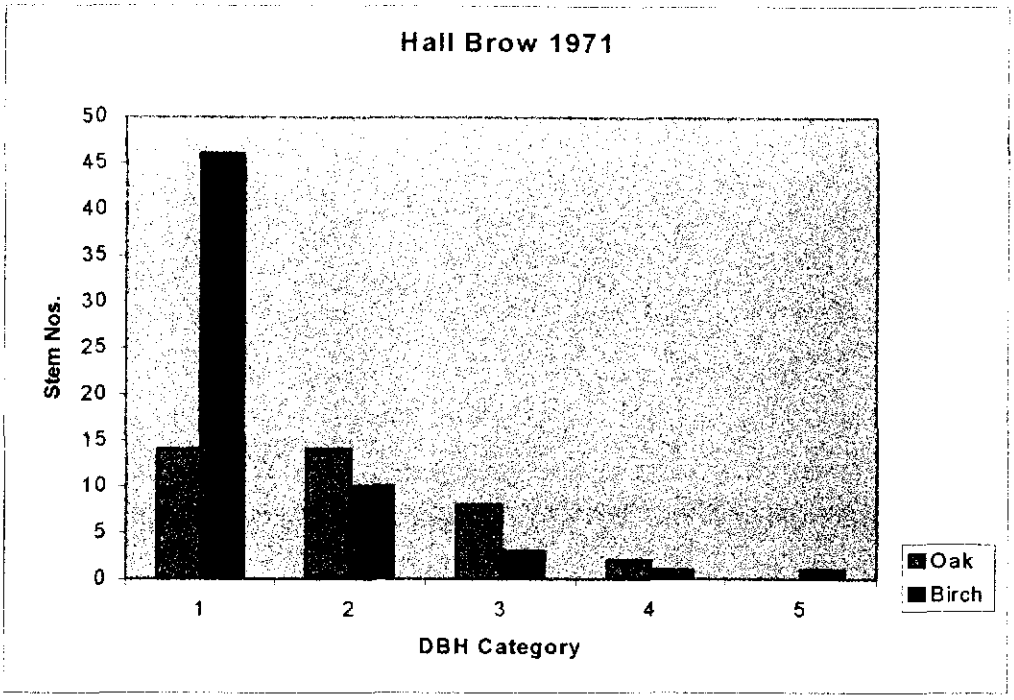

Great Knott 1998
Stem Nos.
10
9
8
7
6
5
4
3
2
1
0
1
2
3
4
5
DBH Class
Oak
Birch

Fig.1.


Hall Brow 1971
Stem Nos.
50
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
DBH Category
Oak
Birch

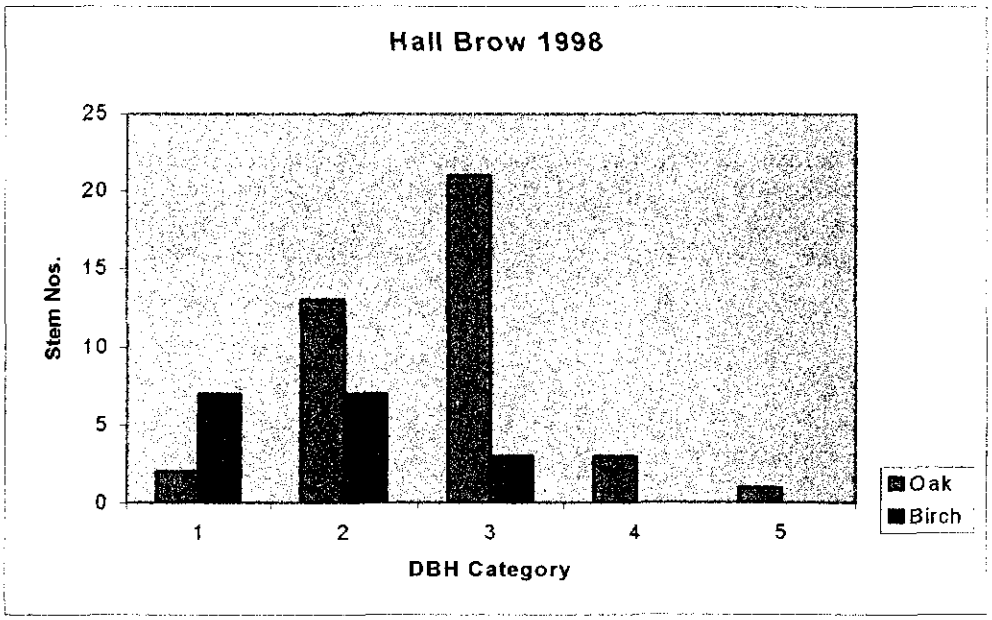
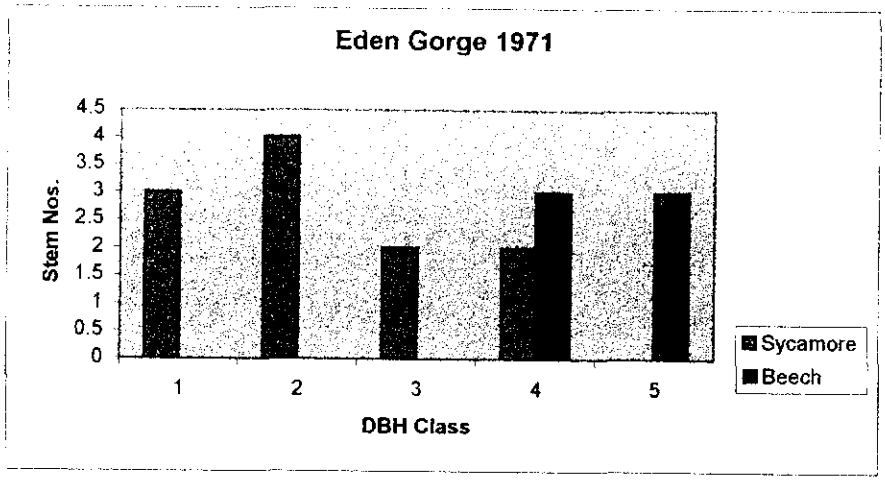

Hall Brow 1998
Stem Nos.
25
20
15
10
5
0
1
2
3
4
5
DBH Category
Oak
Birch

Fig. 2.


Eden Gorge 1971
Stem Nos.
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
2
3
4
5
DBH Class
Sycamore
Beech

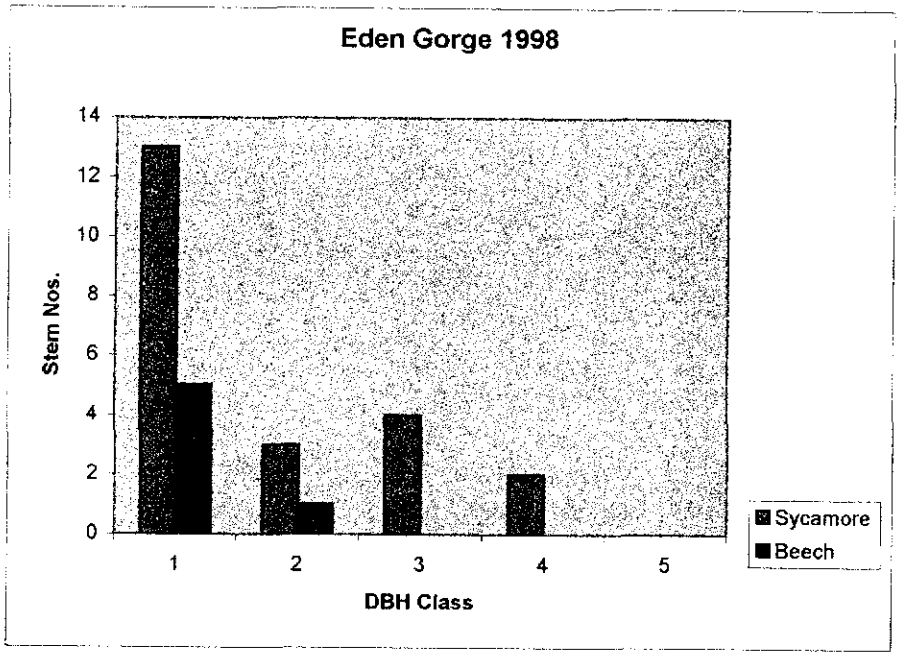
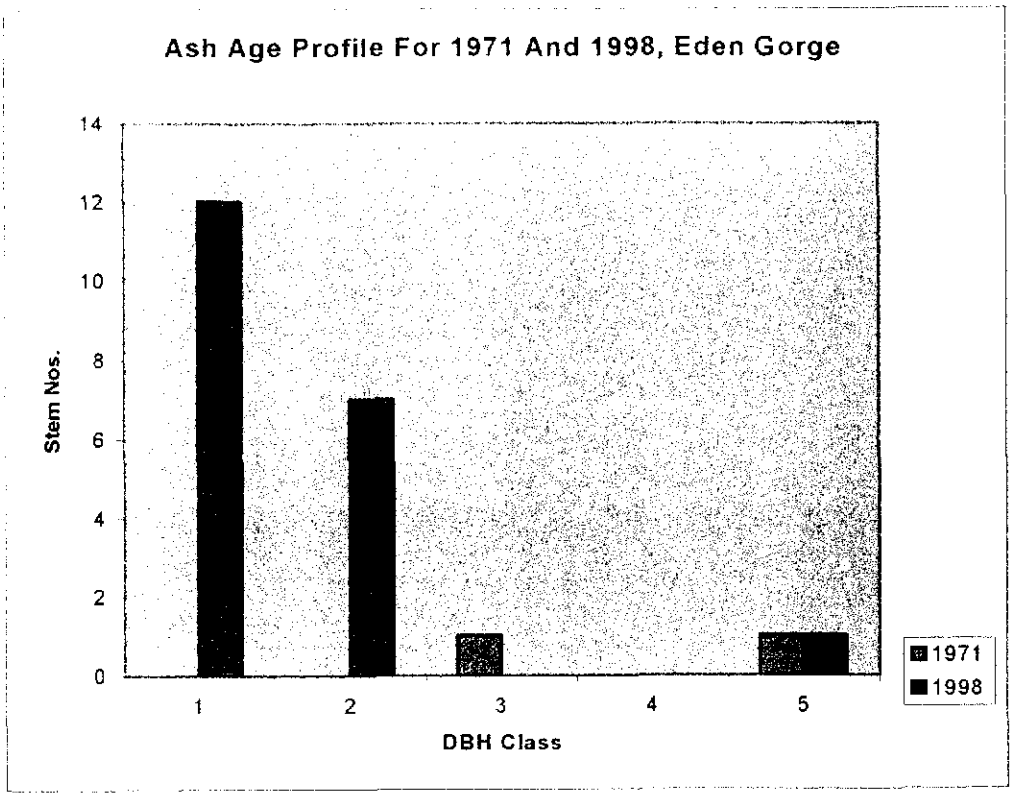

Eden Gorge 1998
Stem Nos.
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Sycamore
Beech

Fig.3.


Ash Age Profile For 1971 And 1998, Eden Gorge
Stem Nos.
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
1971
1998

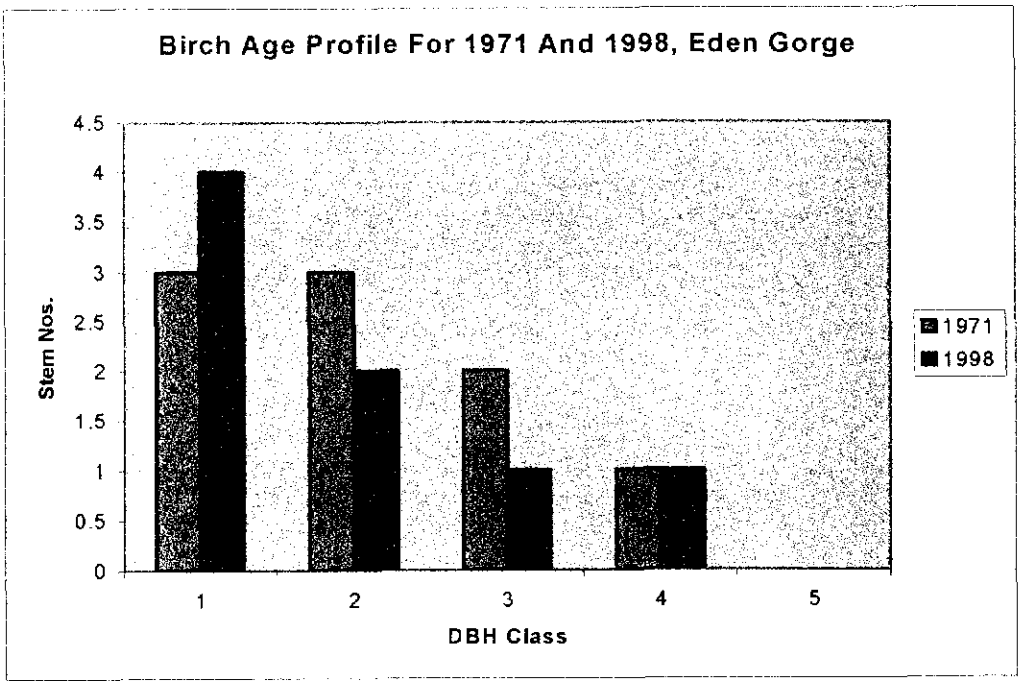
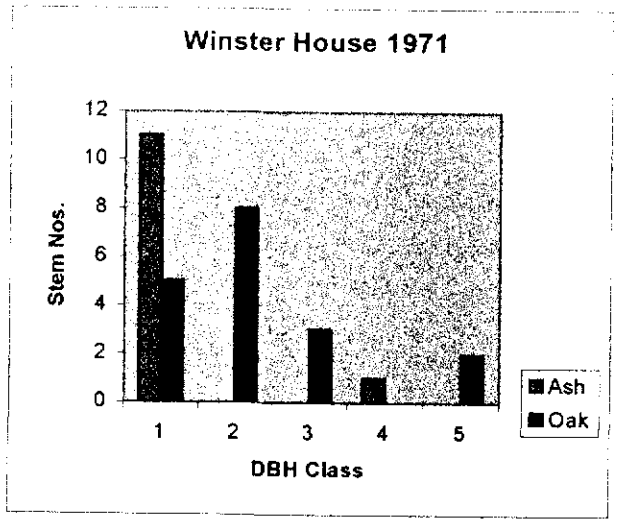
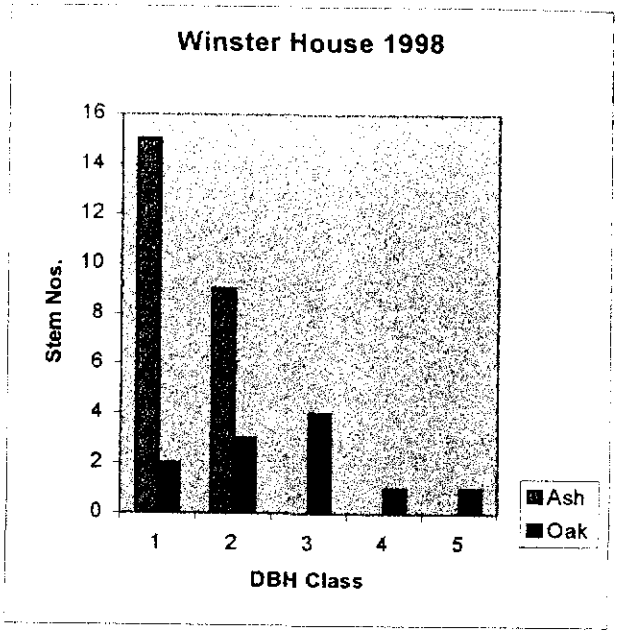
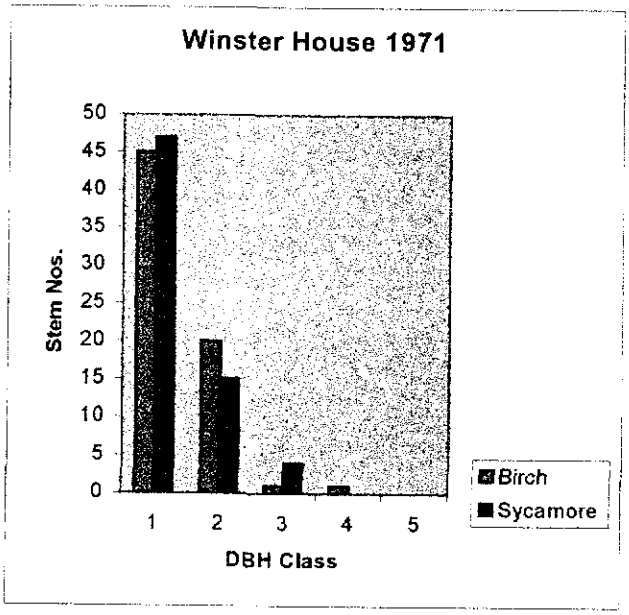

Birch Age Profile For 1971 And 1998, Eden Gorge
Stem Nos.
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
2
3
4
5
DBH Class
1971
1998

Fig. 4.


Winster House 1971
Stem Nos.
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Ash
Oak


Winster House 1998
Stem Nos.
16
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Ash
Oak


Winster House 1971
Stem Nos.
50
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
DBH Class
Birch
Sycamore

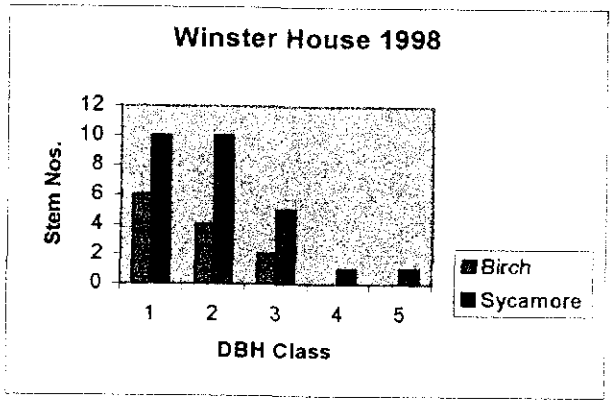
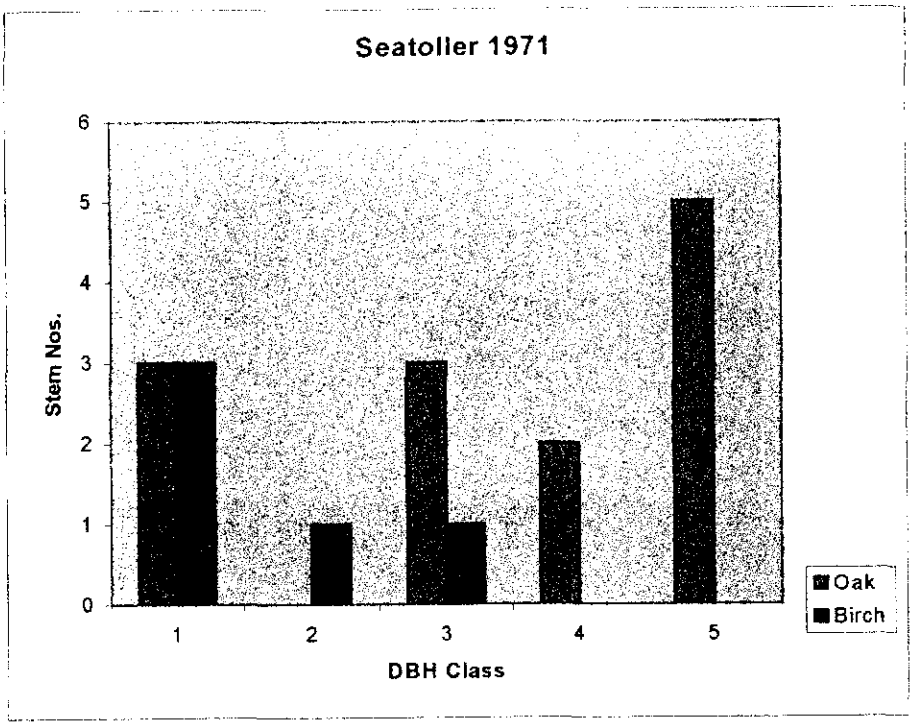

Winster House 1998
Stem Nos.
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Birch
Sycamore

Fig. 5.


Seatoller 1971
Stem Nos.
0
1
2
3
4
5
6
1
2
3
4
5
DBH Class
Oak
Birch

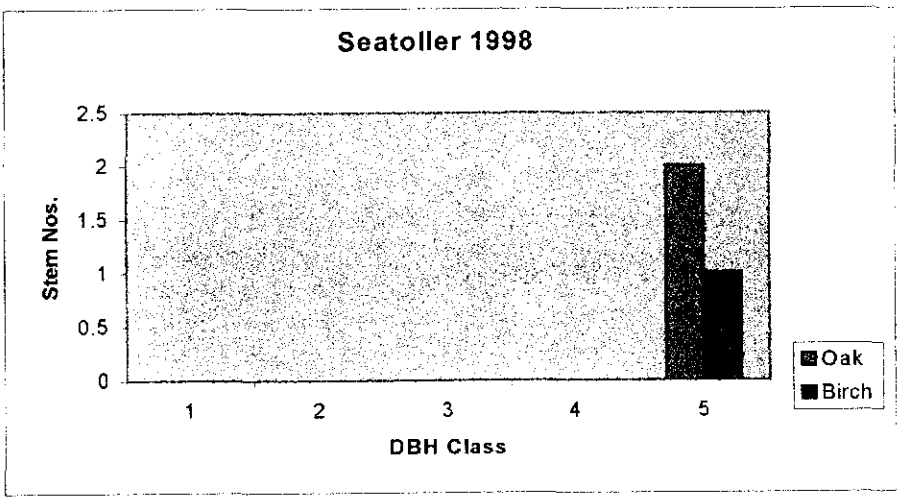
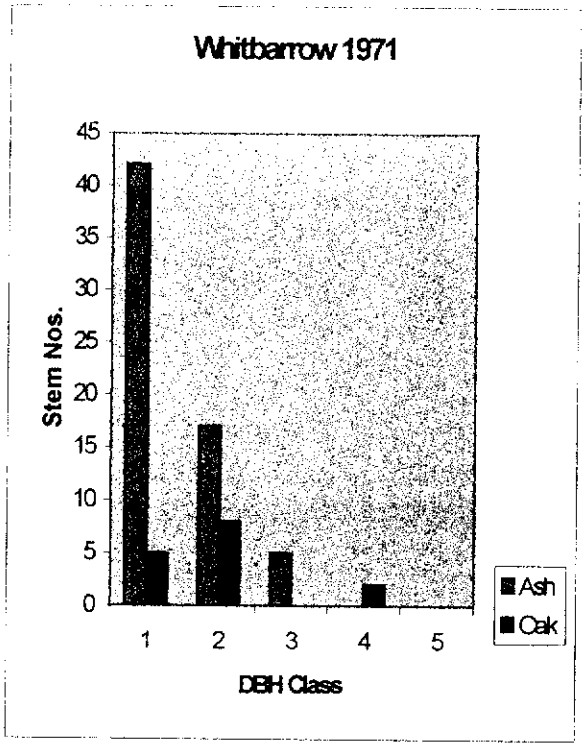
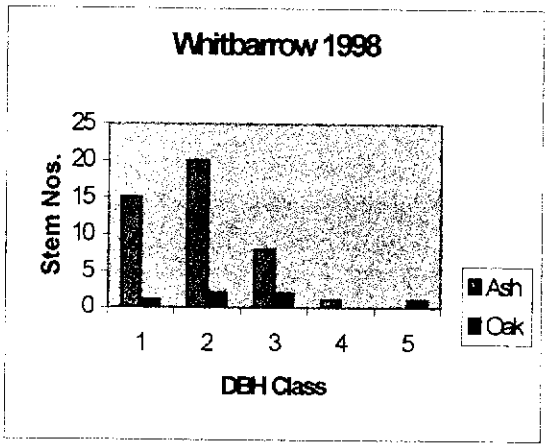
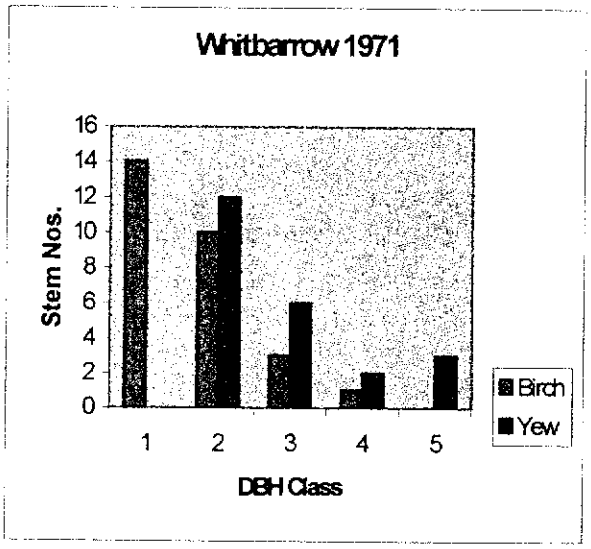

Seatoller 1998
Stem Nos.
0
0.5
1
1.5
2
2.5
1
2
3
4
5
DBH Class
Oak
Birch

Fig. 6.


Whitbarrow 1971
Stem Nos.
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
DBH Class
Ash
Oak


Whitbarrow 1998
Stem Nos.
25
20
15
10
5
0
1
2
3
4
5
DBH Class
Ash
Oak


Whitbarrow 1971
Stem Nos.
16
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Birch
Yew

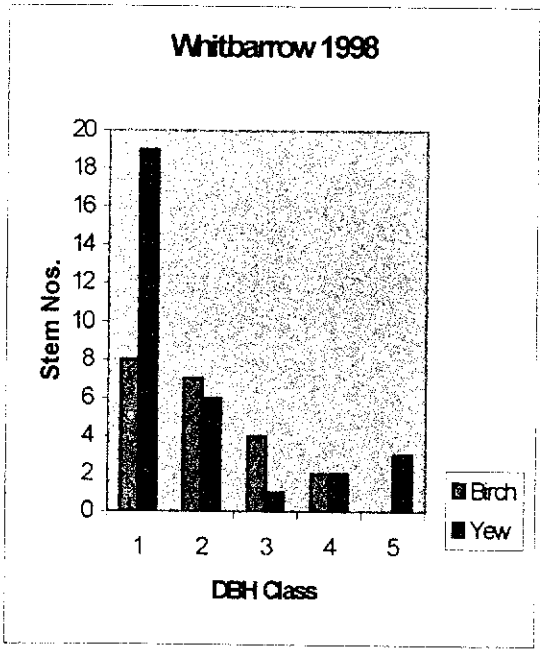

Whitbarrow 1998
Stem Nos.
20
18
16
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Birch
Yew

Fig. 8.

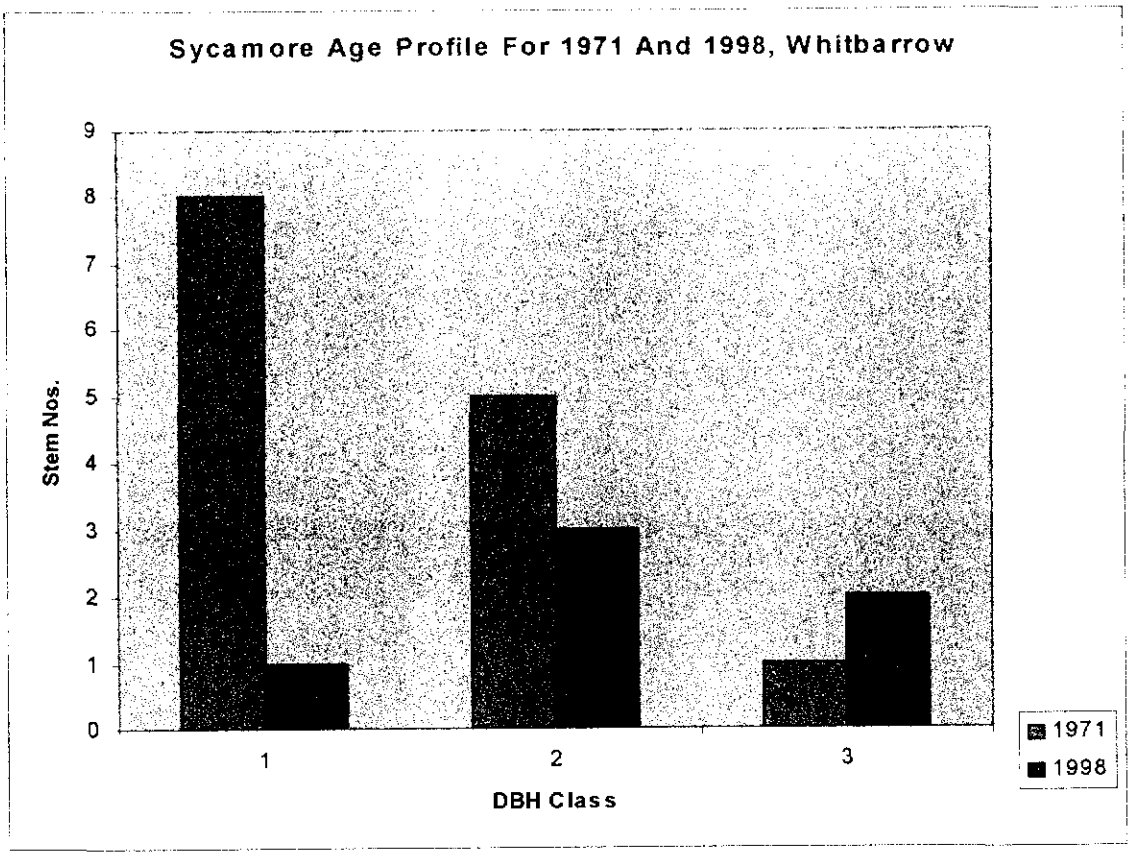
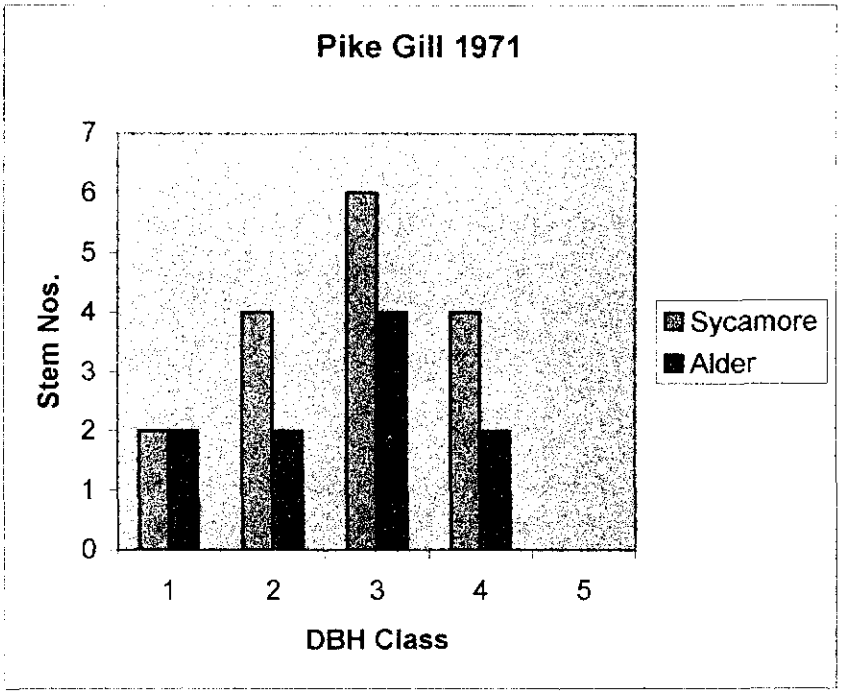

Sycamore Age Profile For 1971 And 1998, Whitbarrow
Stem Nos.
0
1
2
3
4
5
6
7
8
9
1
2
3
DBH Class
1971
1998

Fig. 9.


Pike Gill 1971
Stem Nos.
0
1
2
3
4
5
6
7
1
2
3
4
5
DBH Class
Sycamore
Alder

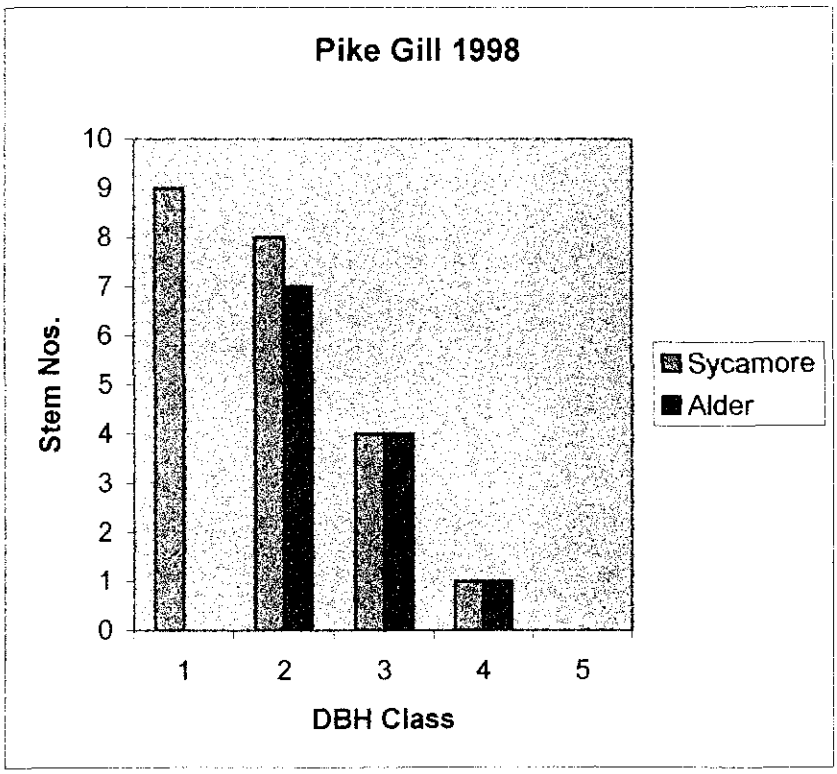
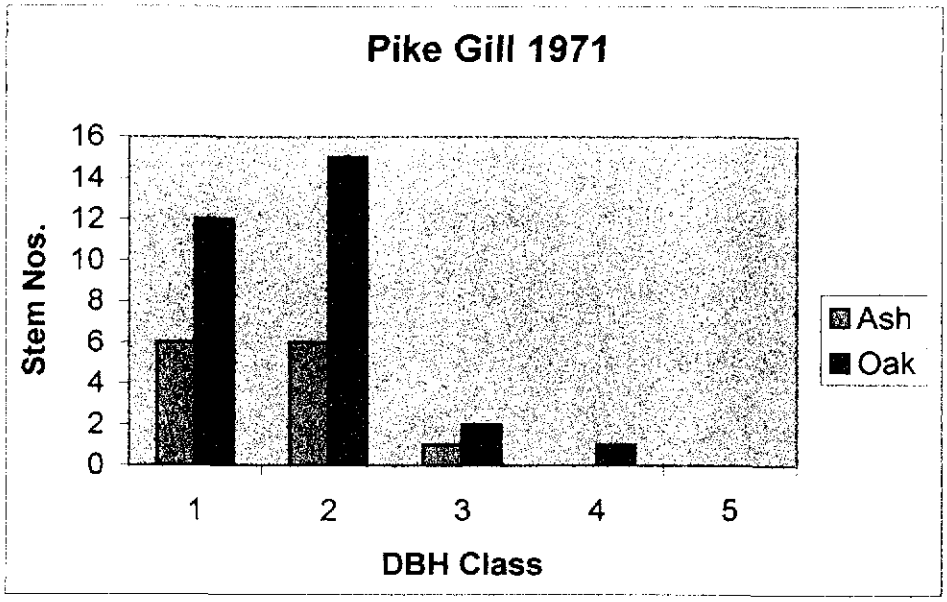

Pike Gill 1998
Stem Nos.
0
1
2
3
4
5
6
7
8
9
10
1
2
3
4
5
DBH Class
Sycamore
Alder

Fig.10.


Pike Gill 1971
Stem Nos.
16
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Ash
Oak

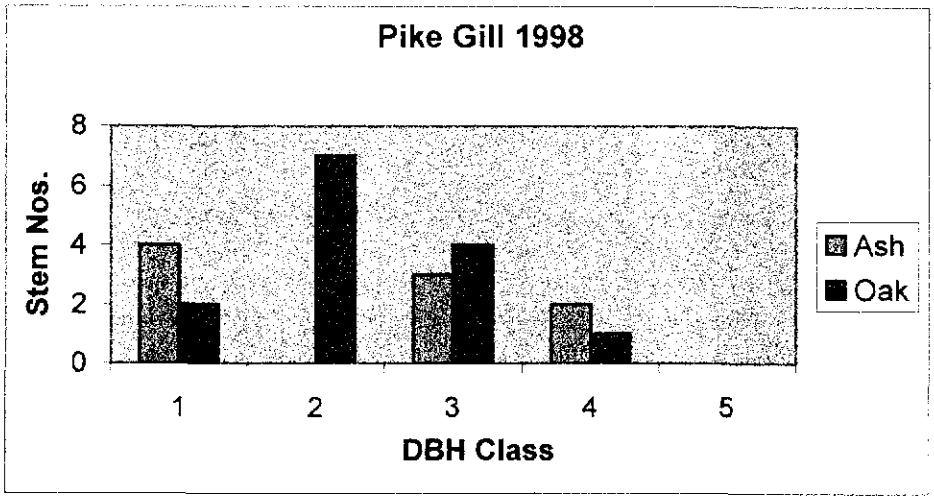

Pike Gill 1998
Stem Nos.
8
6
4
2
0
1
2
3
4
5
DBH Class
Ash
Oak

Fig. 11.

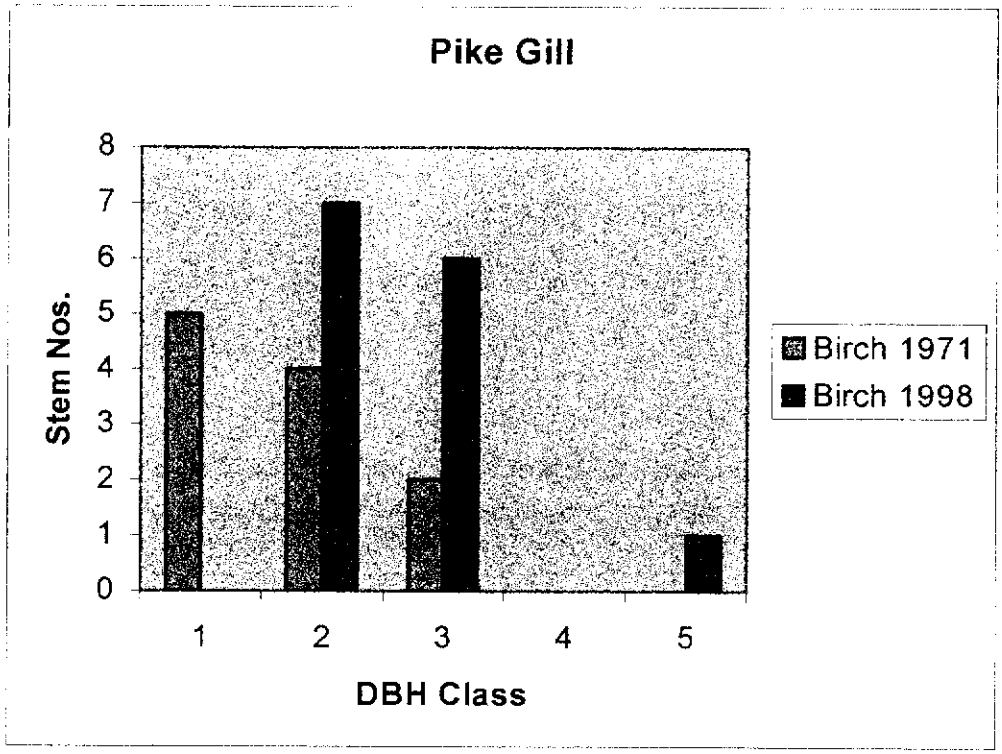
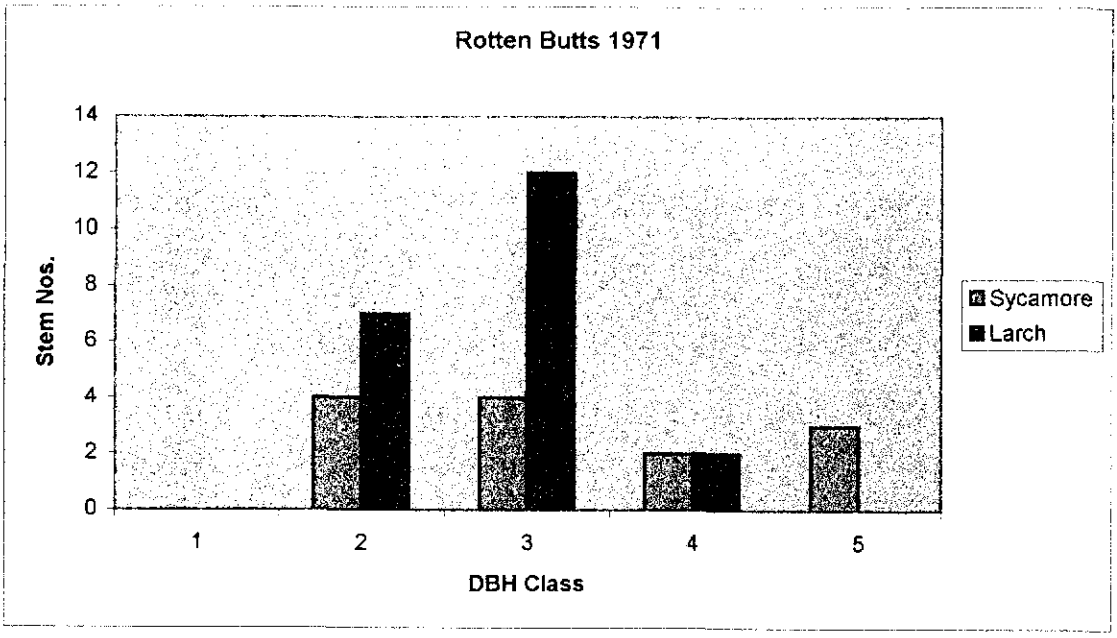

Pike Gill
Stem Nos.
0
1
2
3
4
5
6
7
8
1
2
3
4
5
DBH Class
Birch 1971
Birch 1998

Fig. 12.


Rotten Butts 1971
Stem Nos.
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Sycamore
Larch

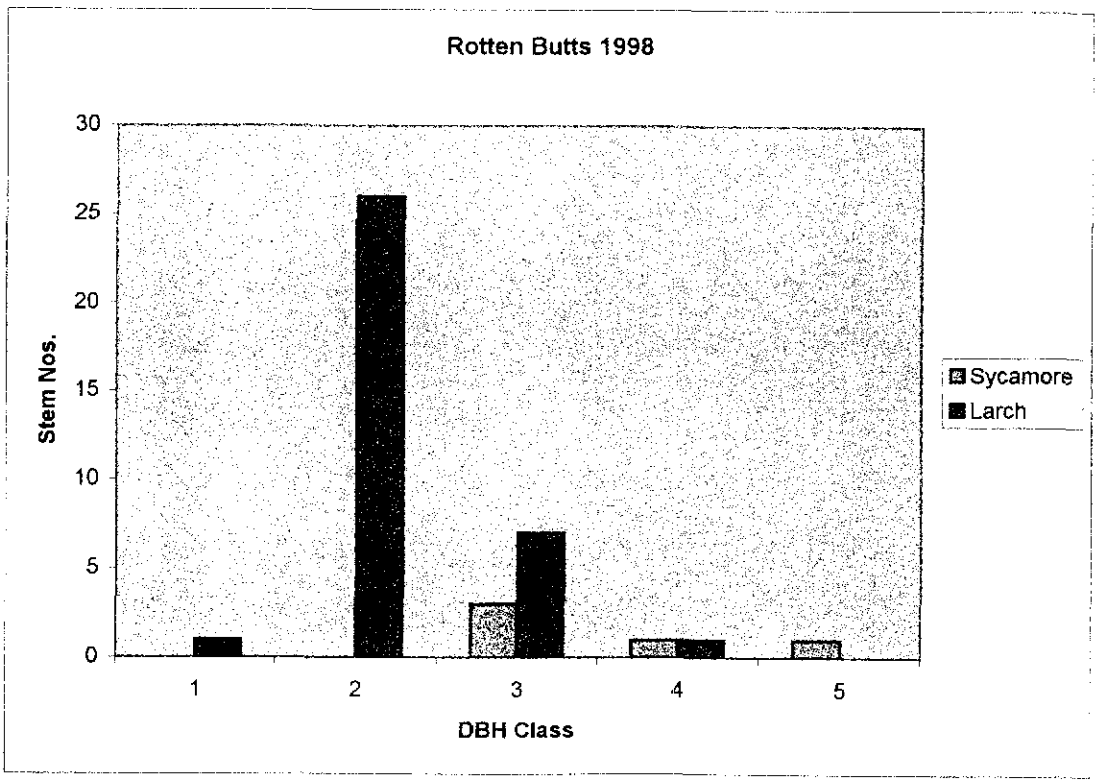
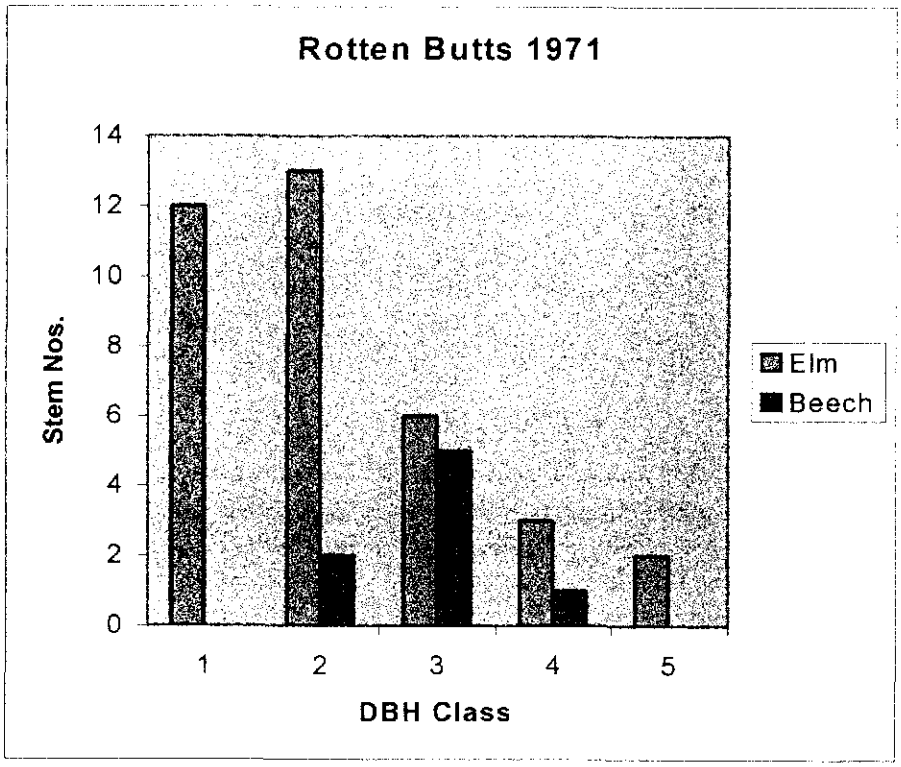

Rotten Butts 1998
Stem Nos.
30
25
20
15
10
5
0
1
2
3
4
5
DBH Class
Sycamore
Larch

Fig. 13.


Rotten Butts 1971
Stem Nos.
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Elm
Beech

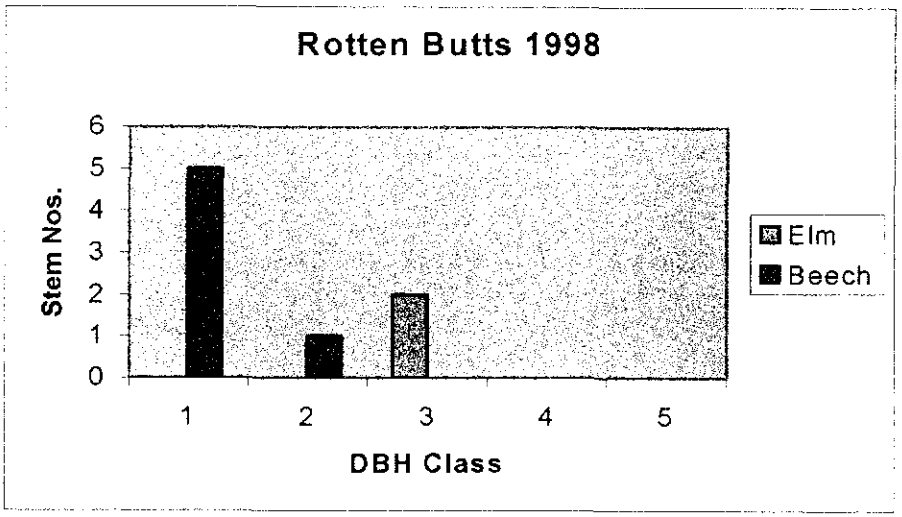
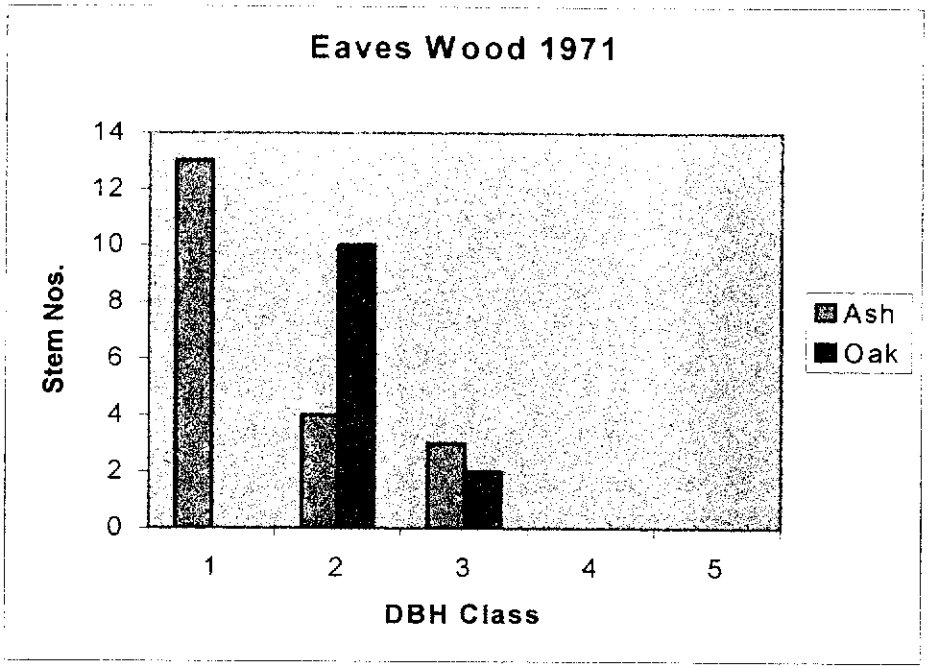

Rotten Butts 1998
Stem Nos.
6
5
4
3
2
1
0
1
2
3
4
5
DBH Class
Elm
Beech

Fig. 14.


Eaves Wood 1971
Stem Nos.
14
12
10
8
6
4
2
0
1
2
3
4
5
DBH Class
Ash
Oak

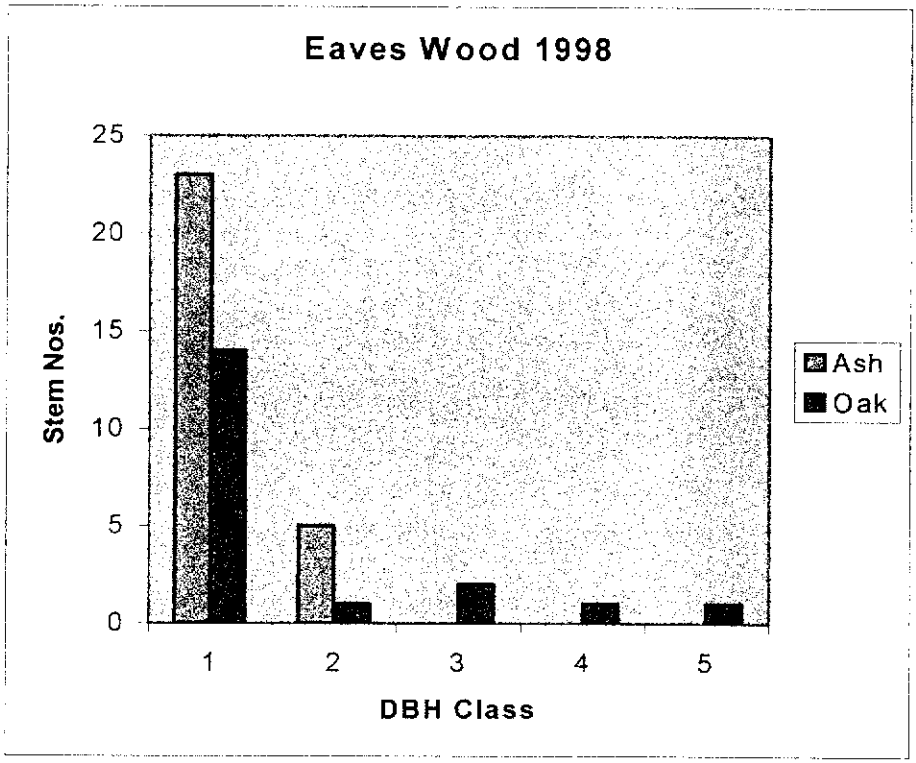
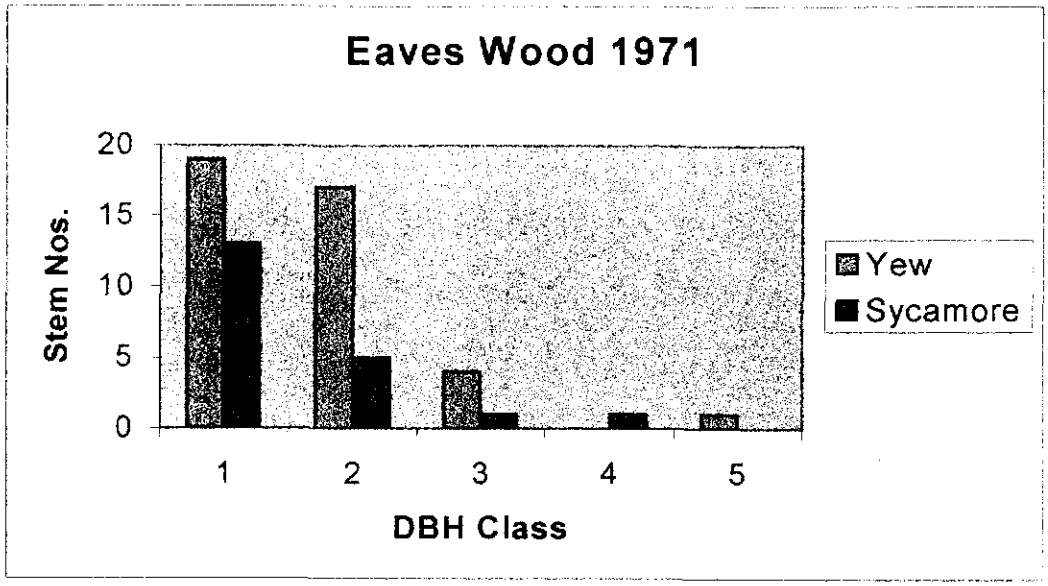

Eaves Wood 1998
Stem Nos.
25
20
15
10
5
0
1
2
3
4
5
DBH Class
Ash
Oak

Fig. 15.


Eaves Wood 1971
Stem Nos.
20
15
10
5
0
1
2
3
4
5
DBH Class
Yew
Sycamore

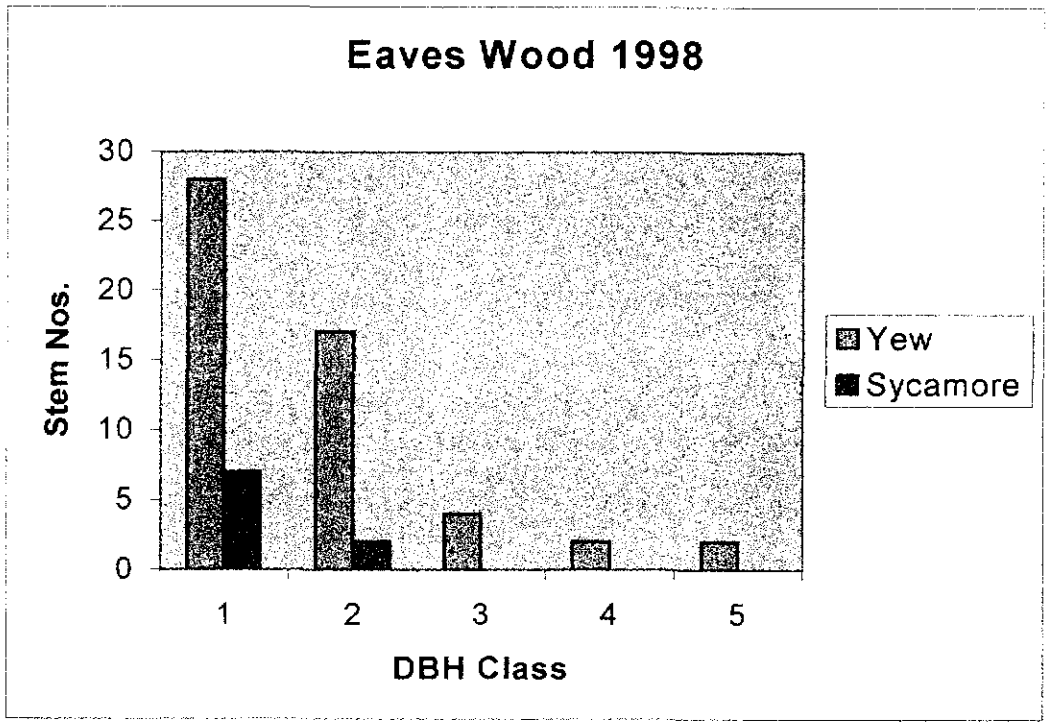

Eaves Wood 1998
Stem Nos.
30
25
20
15
10
5
0
1
2
3
4
5
DBH Class
Yew
Sycamore

Fig. 16.

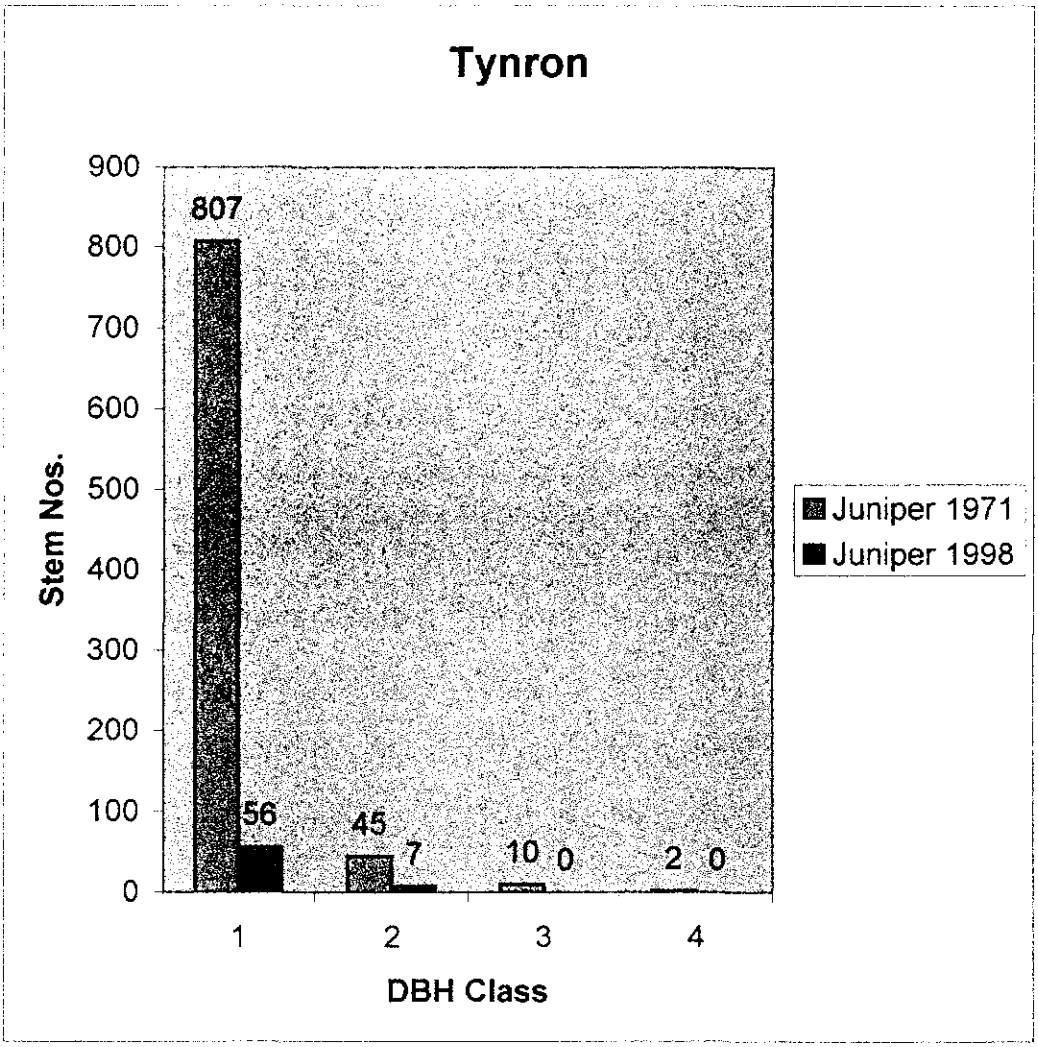


Fig. 17.

NB. DBH Classes;

1=1-4 cm.

2=5-8 cm.

3=9-12 cm.

4=13-16 cm.

Fig.1 (Great Knott) shows how a large cohort of oak trees at 11-20cm. DBH in 1971 have moved from age class 2 (11-20cm.) to age class three (21-30cm.) over 27 years, with no replacement of those from class 2. The birch however have declined substantially throughout the population with little recruitment from numerous class 1 and 2 individuals in 1971into classes 3 and 4, 27 years later

Fig. 2 (Hall Brow) shows the healthy recruitment of young oaks in 1971 to class 3 in 1998, with virtually no replacement of young trees. The birch population however has remained very stable except for a big decline in class 1 individuals which were very numerous in 1971, and also a loss of stems >30cm. DBH.

Fig. 3 (Eden Gorge) shows a huge increase in young sycamore trees (class 1) in 1998, with some recruitment into class 3 from classes 1 and 2 in 1971. Beech shows a very different pattern with the absence in 1998 of large individuals present in 1971, but a substantial recruitment to classes 1 and 2 in 1998 from saplings presumably germinating at some time between the survey dates.

Fig. 4 (top) shows how ash has proliferated at Eden Gorge over 27 years. In 1971 ash trees were only represented in classes 3 and 5 (by one individual in each case), however in 1998 this species was present in far larger numbers in classes 1 and 2 (12 and 7 individuals respectively). Whilst class 5 remained stable. The bottom histogram shows how remarkably stable the birch age structure has remained over 27 years, with slightly more individuals in class 1 in 1998 than 1971, slightly less in age classes 2 and 3, but the same number in class 4 in 1998 as in 1971.

Fig. 5 shows a similar trend at Winster House for ash as that at Eden Gorge. Again 1998 showed a large increase in young trees compared to 1971. Although in 1998 no ash trees were recorded for class 3 or above. The profile for oak is more satisfactory from a conservation point of view with age classes 1 and 2 from 1971 moving through the profile to be recruited by classes 3 and 4 in 1998. Birch and sycamore however show a different trend with both species almost equally represented in 1971 by classes 1-3, but in 1998 numbers of both species had dropped by approximately 80% with

sycamore now being more prolific than birch. Recruitment of sycamore into age classes 4 and 5 however was evident, whilst birch, previously present in class 4 is now absent from classes 4 and 5.

Fig. 6 shows a dramatic change in age profile of oak and birch at Seatoller from 1971 to 1998. In 1971 oak was represented in age classes 1, 3, 4 and 5, however in 1998 oak was only represented in class 5 and at less than half the number that was present in 1971. Again birch which was present in classes 1-3 in 1971 is now only present in class 5.

Fig. 7 shows the virtual eradication of ash at Birk's Brow, but a healthy recruitment of oak into subsequent age classes over the 27 years. A very high number of young oak stems in 1971(150), have been recruited into classes 2-5 over the 27 years, with a substantial number of young stems still being recruited from both saplings and coppice regrowth in 1998. The number of young birch trees has fallen considerably over 27 years with slight subsequent recruitment into classes 3 and 4. Sycamore however shows a different trend with a large recruitment into classes 1-4 from coppice regrowth,, whilst the mature maiden stems present in class 5 in 1971 have disappeared.

Fig. 8 (Whitbarrow) shows a reduced recruitment of ash trees into class 1 in 1998, but those cohorts in classes 1 and 2 in 1971 have been recruited into classes 3 and 4 in 1998. The number of individuals in age class 2 is greater in 1998 than it was in 1971. Although the overall number of oak stems present in 1998 is down by 74% (Tables 1 & 2) there has been some recruitment into subsequent age classes by those remaining. The profile for birch in this wood is one of marked stability when compared to the other woods (except Eden Gorge) with a similar age structure in 1998 to that in 1971, although numbers are down slightly, (Tables 1 & 2). The profile for yew is again one of marked stability apart from the appearance of young stems in class 1 in 1998.
Fig. 9 shows the change in age structure of sycamore stems over 27 years at Whitbarrow. In 1971 there were relatively large numbers of young stems in age classes 1 and 2, recruited from both coppice regrowth and saplings. In 1998 the

number of stems in age class 1 had fallen by 87% (from 8 to 1). Those in age class 2 had also fallen, whilst there had been some recruitment into class 3 from the lower age classes, in 1998.

Although not illustrated by a chart, the data from Haverigg Holme (Tables 1&2) show that 131 stems of oak have completely disappeared from the survey areas over 27 years and 13 stems of birch have also disappeared. It would also appear that 1 stem of ash has replaced this formerly wooded area. Data from the 1998 survey (Appen.4) show that this formerly wooded area has undergone 'improvement' and is currently semi-improved acid grassland.

Fig.10 shows that sycamore has regenerated at Pike Gill over 27 years with more individuals in age classes 1 and 2 at present compared to 1971. Mature individuals however appear to have been removed, this is illustrated by comparing age classes 3 and 4 (1998) with the same age classes for 1971. Alder has changed little apart from no recruitment into age class 1 in 1998 but more individuals present in age class 2 in 1998 than in 1971.

Ash trees at Pike Gill are shown moving through the profile from age classes 1 and 2 in 1971 to age classes 3 and 4 in 1998 (Fig. 11), with some continued recruitment into age class 1 in 1998. Oak trees are shown also moving through the profile from age classes 1 and 2 in 1971 to age classes 2 and 3 in 1998. Recruitment into age class 1 in 1998 however appears to involve far fewer individuals than in 1971.

Birch trees at Pike Gill are shown moving through the profile from age classes 1, 2 and 3 in 1971 to age classes 2, 3 and 5 in 1998 (Fig. 12)

Fig. 13 shows little change in the age profile for sycamore and no regeneration. Larch is shown with many individuals in age class 2 in 1998 when compared to 1971, but little change in the other age classes. Fig. 14 shows how few individuals of elm there are now compared to 1971, this is backed up in Tables 1 and 2. Beech trees appear in age classes 1 and 2 in 1998 and in age classes 2, 3 and 4 in 1971.

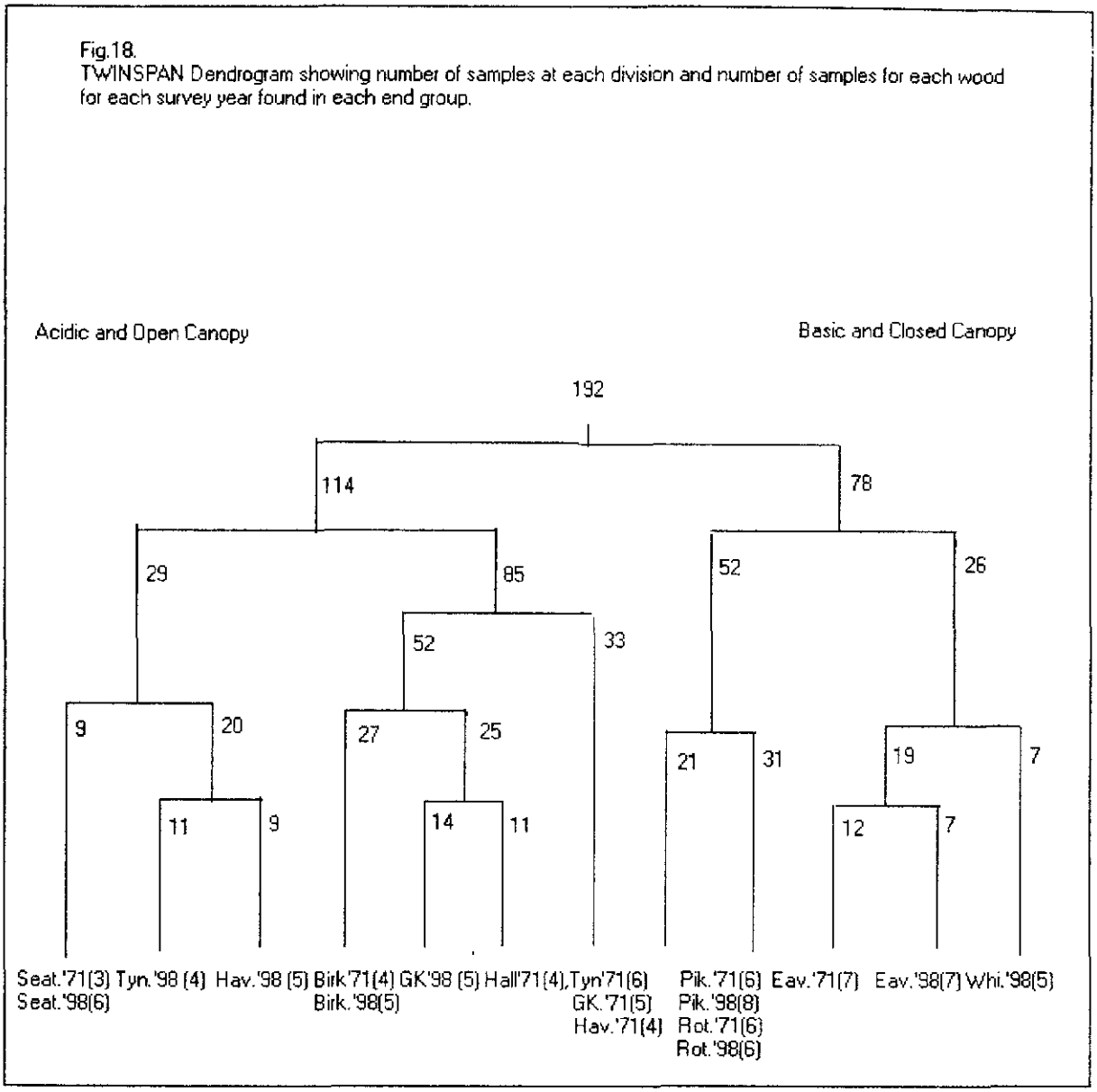
Fig.15 shows more young ash stems present today at Eaves Wood compared with 1971 but no individuals present over 20 cm. DBH. Oak also shows recruitment into age class 1 in recent years whereas in the years preceding 1971 this had not happened. There are now fewer individuals in age class 2 however, but more mature trees in age classes 4 and 5.

Fig. 16 shows yew to have a remarkably similar profile in 1998 to 1971 with many young stems and a few mature stems. Sycamore however had declined in the number of young stems and any stems present in 1971 >20cm. DBH have now gone.

Fig. 17 shows a dramatic decline in juniper stems of all sizes over 27 years.

TWINSPAN analysis of the data revealed that at either end of the spectrum there were increases over 27 years in samples showing extreme characteristics (Fig. 18). To the left of the dendrogram (where the samples from Seatoller are located and the open, acidic communities) there was an addition of six samples from 1998 to the three samples from 1971. The indicator species for these samples were *Oreopteris limbosperma, Carex echinata, Narthecium ossifragum* and *Galium aparine.* These new arrivals originated in the end groups 33 and 14 further to the right of the spectrum.. To the right (where the Whitbarrow samples are located and the calcicolous communities) there has been a shift from the end group 12 to an end

Fig.18.
TWINSPAN Dendrogram showing number of samples at each division and number of samples for each wood for each survey year found in each end group.



group typified by *Asplenium marinum.*

It should be noted that data were entered into TWINSPAN and DECORANA on a presence/absence basis rather than using cover values, as it was thought that the comparison of two different surveyors' cover values could reflect inherent differences in this relatively subjective procedure.

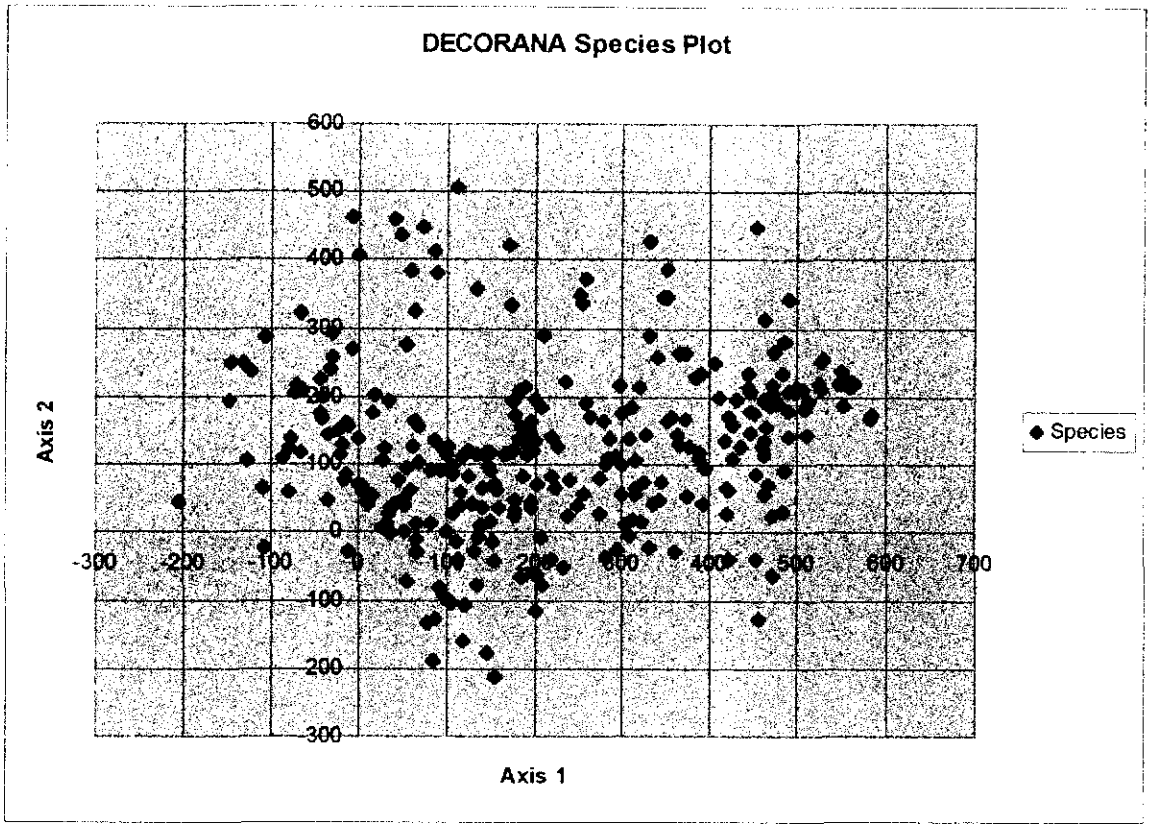

DECORANA Species Plot
600
500
400
300
200
100
0
-100
-200
-300
-300
-200
-100
0
100
200
300
400
500
600
700
Axis 2
Axis 1
Species

Fig.19.

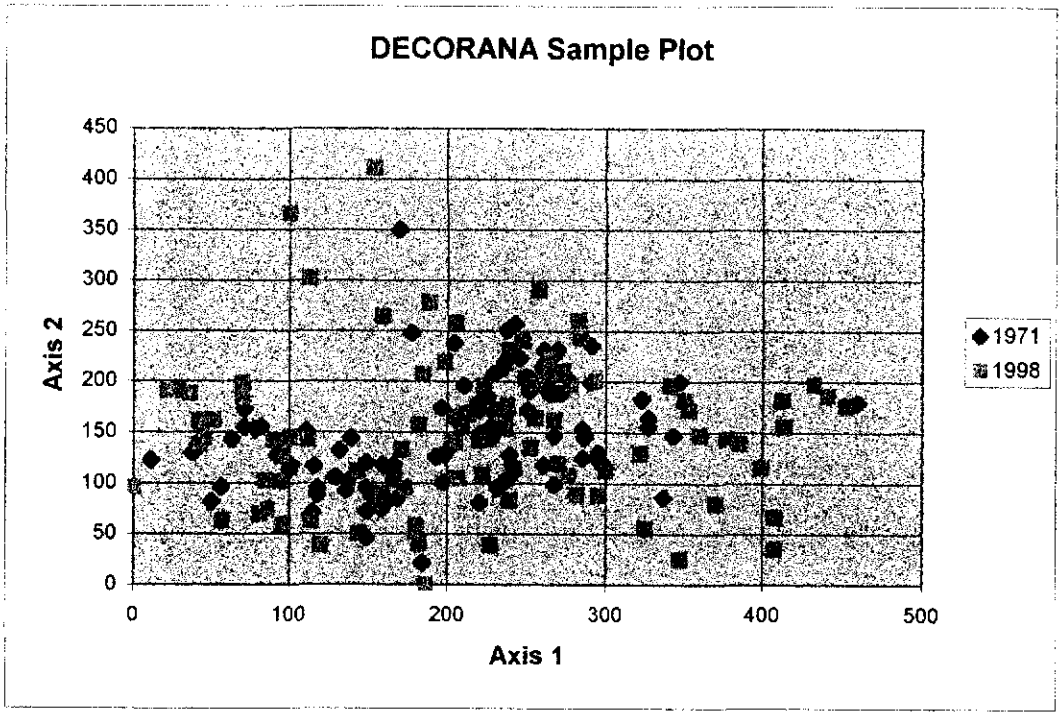

DECORANA Sample Plot
450
400
350
300
250
200
150
100
50
0
Axis 2
0
100
200
300
400
500
Axis 1
1971
1998

Fig.20.

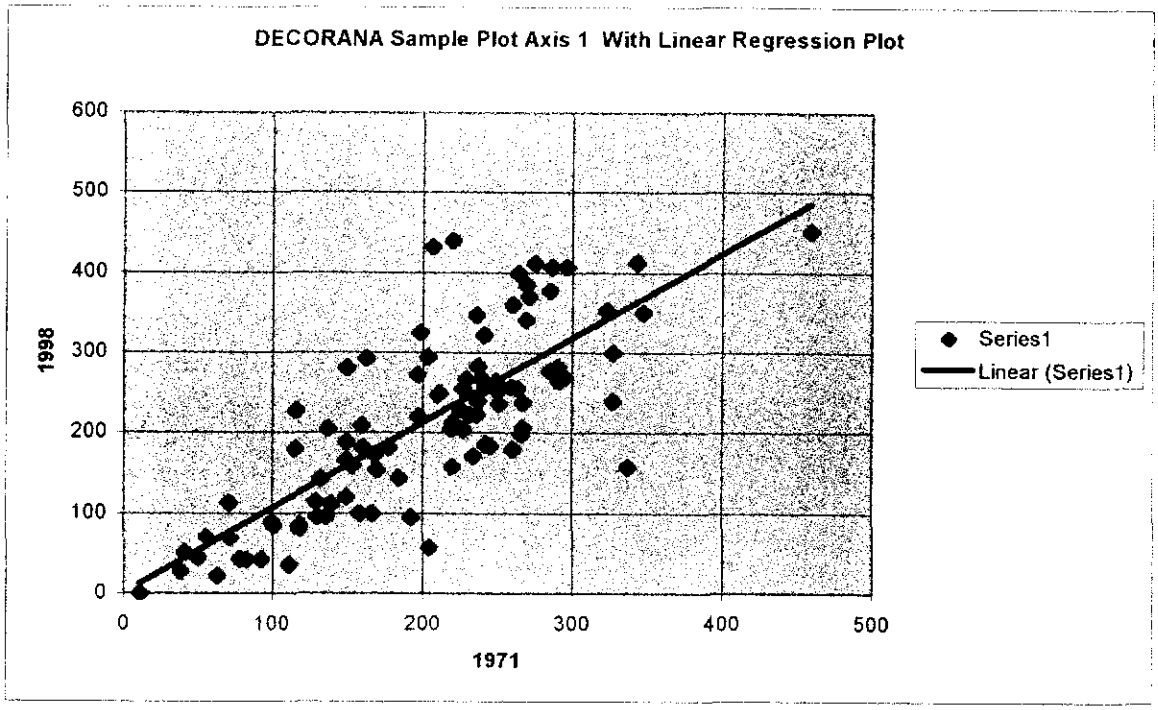

DECORANA Sample Plot Axis 1 With Linear Regression Plot
600
500
400
300
200
100
0
1998
0
100
200
300
400
500
1971
Series1
Linear (Series1)

Fig. 21.

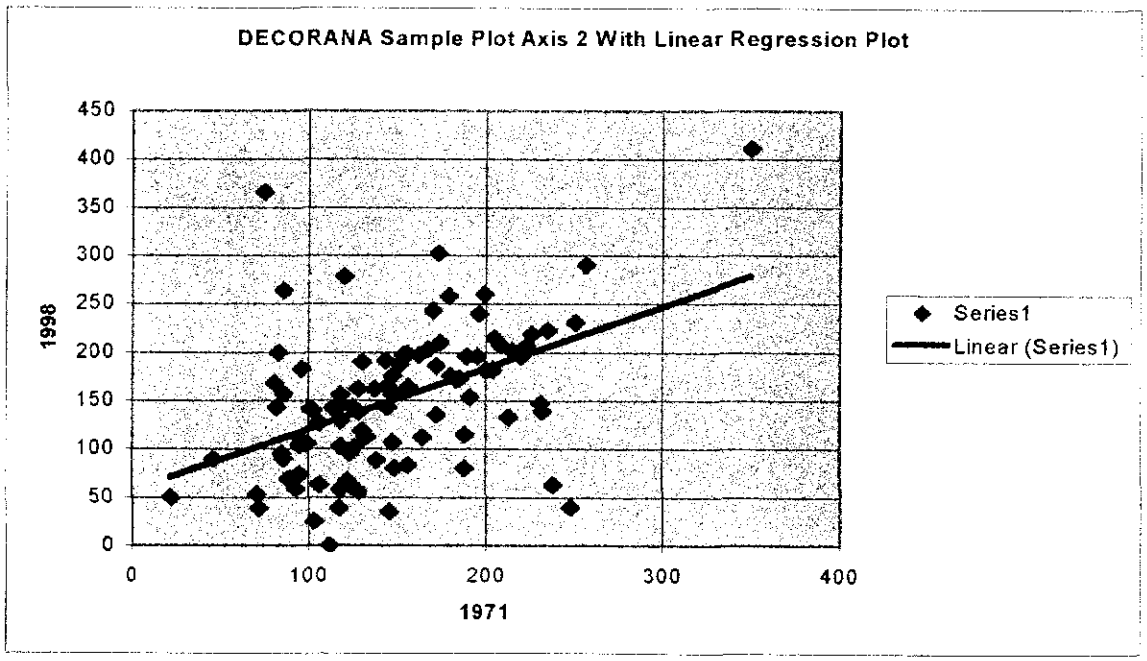

DECORANA Sample Plot Axis 2 With Linear Regression Plot
450
400
350
300
250
200
150
100
50
0
1998
0
100
200
300
400
1971
Series1
Linear (Series1)

Fig. 22.

By analysis of the DECORANA sample scores and species scores for each axis (Appen. 5) it was possible to attribute environmental gradients to both axes of the DECORANA plots (Figs. 19 & 20). The sample scores indicate the location of samples taken in a damp or boggy environment to be at the bottom of the plot (low y values), whilst those taken in dry conditions on sandy soil to be located at the top of the plot (high y values). Samples taken under dense canopies on basic soils were located to the left of the plot (low x values) whilst those taken in the absence of any tree cover on acidic soils were found to the right of the plot (high x values). Using this information it was possible to propose axis 1 (x) to represent an environmental gradient from closed canopy and calcareous soils on the left to open canopy and acidic soils at the right. It was also proposed that axis 2 (y) represented an environmental gradient from damp boggy conditions at the bottom to dry sandy soils at the top. This was backed up by the presence of *Rhododendron ponticum* at the top of the species plot with the highest value for axis 2. This species thrives on dry sandy soils (Rose 1981). The presence of *Hydrocotyle vulgaris, Populus nigra, Veronica beccabunga* and *Senecio aquaticus* (which all favour wet soils) at the bottom of the plot with very low values for axis 2, also consolidates this proposal.

Axis 1 (the x axis) can be shown to represent an environmental gradient linking the amount of light incident on the field layer with soil pH. At the left of the species plot are yew, wayfaring and lime trees and larch and pine seedlings. All these species were found at Eaves Wood on Limestone pavement, whilst to the right of the plot are *Drosera rotundifolia, Eriopherum angustifolium,, Carex demissa* and *Carex echinata* which all favour open acid environments.

By examining the sample scores (Appen. 5), it can be seen that the five red squares representing Eaves Wood 1998 (with axis 2 scores of just under 200 and axis 1 scores of <100) have moved up axis 2 and down axis 1. This represents a shift towards drier and more closed communities. Whereas samples representing Seatoller and Tynron

(1998) with axis 1 scores >400 represent a shift towards more open communities between 1971 and 1998

Another method used to illustrate botanical change over the 27 years was to plot the DECORANA sample scores for 1971 against 1998 (Appen. 5.), for both axis 1 and axis 2 (Figs. 21 & 22). If there had been little change over time then a 45 deg. straight line should have resulted, however axis 1 (closed to open canopy) showed a slight shift towards the top left of the plot. Axis 2 (soil moisture) showed a shift to the bottom right of the plot for samples with high values and a shift to the top left for samples with low values

Discussion

From the analysis of these results it is clear that substantial changes in many different ways have taken place throughout these woods over 27 years. The most important of these changes in terms of woodland conservation are:

- The opening up of the canopies of the upland acid oak-birch woods
- The overall fall by 58% of saplings numbers, essential for woodland regeneration
- The fall of 25% in species richness
- The dramatic fall in stem numbers, frequency and basal area, of shrubs (84%, 25%, and 76% respectively)

PIKE GILL, EAVES WOOD, ROTTEN BUTTS, WHITBARROW AND EDEN GORGE

Although the twelve woods have been grouped together for overall analyses, if the five least acidic woods are separated from the other seven more acidic woods, comparisons can be made as to changes between these woods. These woods are similar in species composition (being to the right of the TWINSPAN continuum) and have similar non-anthropogenic influences (soil pH, drainage, etc.). Eden Gorge has

seen a substantial increase in stem numbers, frequency of trees and total basal area and Pike Gill has seen an increase in total basal area, whilst the other three have seen a corresponding decline. However the change in total basal areas for Eden Gorge, Whitbarrow and Pike Gill (trees and shrubs) were the smallest recorded (+6%, -6% and +10% respectively, see Table 2), reflecting a degree of stability. It should be noted that these woods are managed in very different ways; Eden Gorge and Pike Gill minimally and Whitbarrow for conservation. This could account for the radical differences in change in stem numbers.

Although in 1971 these woods were more species rich than their acidic counterparts, by 1998 there had been a considerable decline. This decline can be attributed to different factors at play between these woods. For example the increase in yew cover at Eaves Wood and Whitbarrow (Appen. 4) is likely to have prevented a lot of field layer species from thriving by casting too much shade in certain areas. The overall increase in canopy cover at Pike Gill and Eden Gorge indicated by the increases in total basal area (Tables 1 & 2) is also likely to have reduced the diversity of field layer species as well. At Rotten Butts the continued planting of conifers with their associated carpeting of needles and dense shade is also likely to have reduced field layer diversity.

Age profiles at Eden Gorge for sycamore, beech, ash and birch all show healthy regeneration (Figs.3 & 4). The numbers of young trees <20cm. DBH are far higher for all four species in 1998 than in 1971. However at Whitbarrow a different picture emerges (Figs. 8 & 9). There has been some recruitment to age classes 3 and 4 by ash, showing that young trees have been allowed to mature. There has been a large recruitment to age class 2 by ash possibly from age class 1 in 1971which had a very high number of individuals. But the number of trees 5-10cm. DBH (1998) has fallen dramatically indicating that either there has been a change in management policy towards the increased thinning of young ash trees or else other factors such as deer browsing have prevented any natural regeneration.

Although some oak trees have been allowed to mature to age class 5, the numbers in the lower age classes have been reduced substantially. Although there has been a slight reduction in birch stem numbers at Whitbarrow the age structure is remarkably similar now to how it was in 1971. Sycamore has seen a fall in young stems <11cm. DBH. over 27 years, this could be caused by the same factors that have reduced age class 1 ash stems as well, which are discussed above. The age profiles for yew are intriguing in that although numbers of older trees have fallen slightly, the number of young stems has shot up from none in age class 1 in 1971 to 19 in that class in 1998. It is possible that deer browsing young shoots at the base of some mature trees has forced the trees to send up vertical shoots higher up the trunks (Mills pers. comm.). This could account for some of this phenomenon, but examination of the original recording sheets showed that the cause is possibly recording error in 1971, or mislocation of the sample in 1998. Seven mature yew trees were recorded at sample 50 (1971), whilst nine young trees were recorded at the same location in 1998 (sample 106). An alternative explanation is that the mature trees were felled and have been replaced by the young trees recorded in 1998, certainly one of the mature yews recorded in 1971 had many dead stems.

The age profiles for Pike Gill (Figs. 10-12) show that whilst young sycamore stems were more prolific in 1998 than 1971 the number of middle aged trees >20 cm. DBH had actually decreased over this time period. Although there was no visible evidence of the felling of mature sycamore trees, it is possible that this happened several years ago and any traces have disappeared. The regeneration of alder appears to have halted in recent years but older stems have survived in similar numbers to those recorded in 1971. The profiles for ash and oak at Pike Gill show a degree of stability with less regeneration in 1998 than in 1971, but marginally more older trees than in 1971. Birch regeneration in 1998 has decreased substantially with no stems 5-10 cm. DBH recorded but those young trees recorded in 1971 have moved through the profile into larger DBH classes. The scenario at Pike Gill appears to be one of an increase in canopy cover attributable to oak, ash and birch, whilst the regeneration of young trees has shifted from these species to the dominance of young sycamore trees.

Rotten Butts is undergoing a period of 'coniferisation' as can be seen in Fig. 13 where young larch in age class 2 are almost four times more numerous in 1998 than in 1971. Although some older larch have been felled they are still being replanted as can be seen by the appearance of young stems in age class 1. The presence of sycamore in this wood has changed little over the years, but in a wood where elm was a major constituent before Dutch elm disease, the changes have been considerable in terms of tree species. However TWINSPAN analysis of this wood shows little change for 6 samples out of 8 (Fig. 18). As TWINSPAN involves the analysis of field layer data as well as tree species it is possible that in terms of the field layer the changes have been minimal.

Young ash trees at Eaves wood were much more prolific in 1998 than 1971, although mature trees >30 cm. DBH were not recorded in 1971 and those >20 cm. DBH were not recorded in 1998. The reasons for the apparent disappearance of older ash trees in this wood are not clear, but possibly the thin soil covering the Limestone pavement here may not be able to support them. Since the 1971 survey, oak trees at Eaves Wood appear to have become more numerous in all age classes except 11-20 cm. DBH, with many young trees and 1 individual >40 cm. DBH. If this is a result of positive discrimination by management over the years then it has been successful.

Sycamore cover at Eaves Wood appears to have been reduced in recent years with no trees >20cm. DBH encountered in the survey. Young maiden stems however have increased suggesting regeneration is increasing. Yew trees appear to have proliferated here over the last 27 years. In 1998 there were more stems of 5-10 cm. DBH and more mature stems >30 cm. DBH. This may well be another successful consequence of positive discrimination and if so the composition of the wood is shifting towards a canopy dominated by yew and oak (see Whitbarrow above) where ash trees are only present as young individuals and sycamore cover is falling.

Eden Gorge showed a substantial increase in both bramble and bracken (Appen. 4), and substantial decreases in *Holcus mollis, Anthoxanthum* and *Deschampsia flexuosa,* whilst Whitbarrow showed a substantial fall in bracken, little change for bramble and corresponding increases in *Holcus mollis, Anthoxanthum* and *Deschampsia flexuosa.* Increases relating to bracken were evident over all areas of Eden Gorge (both east and west banks) but it is possible that different factors have caused these changes on each bank.

From the evidence within the deer exclosure at Hall Brow (sample 75) it is evident that deer do eat bracken, perhaps only the young shoots, but they nevertheless help to keep a check on its proliferation. With the increase in people visiting the countryside in the past decades it is possible that the presence of more people on the east bank of Eden Gorge are deterring deer from browsing in this area in spring and early summer hence allowing bracken to become more abundant here. Regarding the west bank, the encroachment of bracken could be something that has been taking place for decades, since the area was more densely wooded, the shade cast by a dense canopy tending to deter the growth of bracken (Page 1976). The increase in cover of this fern over the last 27 years being part of a continual process, probably still in operation today.

In NVC terms this can be seen as a shift from a W11 community towards a U20 community (on the west bank), the former having a lower abundance of bracken than the latter, but a higher abundance of *Anthoxanthum* and *Deschampsia flexuosa* than the latter. Also from the data relating to the trees and shrubs it would seem that the east bank is going through a vigorous period of regeneration of all the principal tree species except oak, with the shrubs; hawthorn (*Crataegus monogyna*), rowan (*Sorbus aucuparia*) and hazel (*Corylus avellana*) also showing vigorous regeneration.

Whitbarrow appears to have undergone substantial thinning of young stems of ash, oak, birch and sycamore as Figs. 8 and 9 testify and Table 8. The data for yew are less easy to understand, with young stems more prolific in 1998, age classes 2 and 3 showing a decline, whilst age classes 4 and 5 remain stable. Tables 1 and 2 show an

increase in stem numbers, a slight increase in frequency, but a 12% fall in basal area of yew. Just as Eaves Wood is becoming increasingly dominated by oak and yew so too is Whitbarrow as Table 8 testifies. Whether this management regime is responsible for the changes in the field layer, is unclear but the fall in bracken cover must be attributable to some factor, with the most often quoted reason for decline being an increase in shading, (Page 1976). This factor however seems unlikely to be the cause, as total stem numbers, frequency and basal area have all fallen, suggesting an opening up of the canopy, allowing more light onto the woodland floor.

Bracken is known to be unable to survive in waterlogged conditions, especially if the soil is calcareous (Watt 1976). It is possible that an opening up of the canopy at Whitbarrow has reduced the interception of precipitation by foliage, resulting in more water reaching the ground and waterlogged soils becoming more widespread. This theory would need investigating in order to be accepted but is one that should not be ignored. Watt (1976) describes the relationship between *Deschampsia flexuosa* and bracken, and on the evidence he presents it would seem that these two species act as mutualists on acidic substrates, ie. if the cover of *Deschampsia* falls then so does that of bracken. However he does not say what happens to the cover of *Deschampsia* if the cover of bracken falls. It would appear from the evidence of this survey that if bracken cover falls on circum-neutral soils *Deschampsia* cover increases. If the changes in bracken cover and *Deschampsia* cover at Eden Gorge are taken into account then it would appear that rather than being mutualistic, these two species are antagonistic in this environment, in contrast to the findings of Watt (1976). From the evidence in Table 15 it would appear that *Anthoxanthum* is more likely to be a mutualist of bracken rather than *Deschampsia flexuosa.* Whatever the nature of these species' relationship it is apparent that in plant communities where bracken is present, *Deschampsia flexuosa* and *Anthoxanthum odoratum* are also important constituents, and where bracken cover has a Domin value of >8 these two grasses are replaced by *Holcus mollis* (samples 75 & 85 Appen. 4). In certain instances these three grasses may need the initial colonisation of bracken before they can flourish amongst the litter of dead bracken fronds.

substantial increase in total basal area in contrast to Seatoller and Haverigg Holme, which showed a greater combined fall in total basal area. Given the limited knowledge of the past management of Hall Brow and Birks Brow it is only by analysis of the data collected during the surveys that inferences can be made in this respect.

WINSTER HOUSE, HALL BROW AND BIRK'S BROW

The limited intervention at Birks Brow has been mentioned earlier, and has resulted in the increase in mature trees in this wood. If the age profiles for this wood are consulted (Fig. 7) it can be seen that the number of young stems of ash, birch and oak has reduced substantially over the 27 years, but young sycamore stems were more numerous in 1998 than 1971, suggesting increased regeneration. However if coppice stems are removed from these data (Table 7) a different picture emerges, which is one of decreased regeneration for all species except oak which increased from 15 to 21 maiden stems 5-10 cm. DBH. This shows that the coppicing of sycamore trees in this wood's recent history accounts for a large proportion of the young tree stems present in 1998 and that rather than declining, oak regeneration has actually increased in recent years.

Hall Brow, owned by the Lake District National Park Authority, has undergone a process of maturation, with oak maturing at the expense of birch (Fig. 2), with decreased regeneration of both, (Table 12). Like Birks Brow this can be explained by the increased canopy cover attributable to oak, shading out the birch trees, resulting in their decline. Hall Brow has also seen a large decline in hazel in all respects, but a corresponding increase in hawthorn (Tables 1 & 2). If deer browsing has increased substantially in this wood, as the data for sapling decline and the decline of young maidens would suggest, then this could account for the decline in hazel. This shrub grows low enough for the foliage to be browsed and the bark to be damaged, whilst the thorns of the hawthorn have protected it from the attention of these deer and allowed it to flourish as a replacement for hazel.

Birk's Brow also saw a decline in hazel (although not quite so great), but no subsequent increase in hawthorn. Perhaps the larger increase in basal area at this wood has resulted in the canopy casting too much shade for hawthorn to become established. Hawthorn may have been more abundant in the past in this wood and as the canopy closes in Hall Brow, hawthorn will become less abundant there.

The age profiles of the principal tree species at Winster House (ash, oak, birch and sycamore), suggest the healthy regeneration of ash for both 1971 and 1998 (Fig. 5), with a large number of individuals being recruited to age classes 1 and 2 from coppice stems and saplings. However if coppice stems are removed from these data (Table 14) then young ash maidens can be shown to have actually declined from 8 to 0. The age profile for ash 1998 showed no stems >20cm. DBH, whether these have been felled or not is unclear, certainly those in the 31-40cm cohort in 1971 should have appeared in the >40cm. cohort in 1998, as this was not the case their fate is uncertain.

Although oak regeneration at Winster House shows signs of a decline in 1998 it is clear that there has been a movement through the profile of those younger trees in 1971 to higher age classes in 1998. This tends to imply that ash has been selectively felled whilst oak has been left to mature. The profile for birch shows a dramatic decline in stem numbers for all age classes. Whether this is a natural response to increased shading or the result of felling is unclear, although the former explanation would be acceptable in light of the large increase in total basal area (all trees and shrubs). Sycamore showed a substantial decline in young stems in 1998 compared to 1971, but those stems <30cm. DBH in 1971 have been allowed to mature to age classes 4 and 5 in 1998.

The field layer constituents of Hall Brow and Birks Brow have shown a similar decline for most species apart from; *Anthoxanthum odoratum* which declined at Hall Brow but increased at Birks Brow, and *Viola* species which showed a marginal increase at Hall Brow, but a substantial decline at Birks Brow. If it is noted that bracken increased substantially at Hall Brow but declined in frequency at Birks Brow, then an increased canopy cover at Birks Brow could account for these changes, with

Viola and bracken being shaded out in some areas at Birks Brow. The increase in *Anthoxanthum* at Birks Brow is less easy to explain. In quadrats 100 and 103 (Appen. 4), two of the three quadrats where bracken had the highest cover for this wood in 1998, there was a corresponding appearance of *Anthoxanthum* amongst the bracken, when in 1971 it was absent. Although it has been suggested that these two species are mutually beneficial in some way, *Anthoxanthum* may not be able to proliferate in certain environments without the initial presence of bracken, and thus must wait until bracken is well established before it can colonise the litter underneath the bracken fronds. This means that there is a time lag between the invasion of bracken and the subsequent colonisation of *Anthoxanthum.* And although bracken is now starting to decline in some areas of Birks Brow this time lag means that *Anthoxanthum* is still increasing in abundance.

The decline in abundance of *Anthoxanthum* at Hall Brow is possible to explain in respect of two quadrats (75 &79). At these quadrats bracken had increased in cover from Domin values of 3 and 4 in 1971 to 9 and 9 respectively in 1998. At this level of cover it is conceivable that *Anthoxanthum* is not able to survive due to shading and deep litter, and hence *its* cover value falls in response. However the other two quadrats, where *Anthoxanthum* has declined have also shown a decline in bracken cover. It is possibly competition with bilberry (*Vaccinium myrtillus*), which has appeared in the field layer at relatively high cover values in these quadrats, that accounts for the decline in both bracken and *Anthoxanthum* here. Indeed bilberry had a frequency of IV in 1998 compared to only I in 1971 and has shown a remarkable proliferation over 27 years at Hall Brow.

Birks Brow like its neighbour Winster House, is benefiting from non intervention by the substantial increase in total basal area of trees and shrubs, with more mature stems of oak and sycamore in 1998 than in 1971, although birch regeneration as a consequence has suffered. Hall Brow as well has benefited from *its* management by an increase in total basal area of trees and shrubs, although the increase was about ¼ of that at Birks Brow (Tables 1 & 2). Hall Brow has seen an increase in mature oaks at the expense of birch, with the appearance of a few young ash trees. Bilberry and

bracken have proliferated throughout the wood (Appen. 4) and as a consequence of this and increased canopy cover ten species recorded in 1971 were not recorded in 1998. These missing species include ivy (*Hedera helix*), primrose (*Primula vulgaris*), red campion (*Silene dioica*), the horsetail *Equisetum sylvaticum* and two tree species; goat willow (*Salix caprea*) and crab apple (*Malus sylvestris*).

GREAT KNOTT, HAVERIGG HOLME AND SEATOLLER

These three acid woods have all suffered considerable declines in total basal area. Great Knott and Seatoller, saw falls of 48% and 62%, whilst Haverigg Holme suffered a decline of 68%. Alongside Tynron (see below) these figures were by far the greatest falls in basal area, and hence canopy cover encountered during this survey. As well as this fall in basal areas there was a corresponding fall in stem numbers and frequencies for shrubs and trees. Although hazel declined to some extent at Great Knott, its decline was of a similar magnitude to that at Eden Gorge and far less than at many of the other woods. Young beech (*Fagus sylvatica*) trees were recorded at Great Knott in 1998 which were not evident in 1971 (Tables 1 & 2), and although the number of mature oaks in 1998 was similar to that in 1971, there were fewer young oaks <20cm. DBH in 1998 compared to 1971 (Fig. 1), indeed the survey revealed evidence of the felling of young oaks of this age class at two of the sample locations.

Bracken was recorded in each of the eight quadrats at Great Knott in 1998 as it also was in 1971, giving it a frequency value of V on both occasions (Appen. 4). Although it was widespread in 1971 its cover value had increased from a mean Domin value of 3.8 per quadrat in 1971 to a mean of 4.8 in 1998, representing a substantial proliferation of this species over 27 years. This wood experienced the smallest fall in species richness of all twelve woods (Appen. 4). Those species that have flourished include *Anthoxanthum odoratum, Galium saxatile* and foxglove (*Digitalis purpurea*), whilst those species which declined included *Deschampsia flexuosa, Lonicera periclymenum, Rubus fruticosus, Dryopteris filix-mas* and *Teucrium scorodonia.* Of the species in decline the last two are very palatable to deer and would be eaten during the summer, whilst the two woody species; bramble (*Rubus*) and honeysuckle

(*Lonicera*) would tend to be nibbled during the winter months when green herbage is scarce. The fall in *Deschampsia* can be attributed to an increase in the density of bracken to cover values too high for this grass but not for *Holcus mollis,* which increased in frequency from III to V, and in mean Domin value from 1.6 to 3.9. The increase in abundance of *Anthoxanthum* is difficult to explain in light of the high cover values for bracken, but if the time lag mentioned earlier is applicable here, then it is possible that even though bracken has high cover values in this wood, *Anthoxanthum* is still increasing in response to earlier cover values for bracken which have since been exceeded.

Seatoller saw a huge decline in trees and shrubs over 27 years. Ash, elm, rowan, holly and hazel were all recorded in 1971, but in 1998 none of these species were recorded. If the disappearance of elm is attributed to Dutch elm disease and the lack of ash stems attributed to recording error (misplaced quadrats), some of this decline can be explained. However the huge fall in stem numbers of oak (15-2) and birch (11-1), with a corresponding fall in the basal area for oak of 49% (Tables 1 & 2), can only be the result of management. It should be noted that this wood is not only browsed by deer, but also grazed by sheep, which would account for the lack of regeneration here and also possibly the elimination of some shrubs. But it must be assumed that the management of this wood has resulted in the felling of a substantial number of mature trees leaving only the largest (>40cm. DBH) oaks and birches (Fig. 6).

The field layer at Seatoller has also changed substantially over 28 years with bracken increasing in both frequency and cover (Appen. 4). Species diversity however showed a small decline (Great Knott had a marginally lower decline). Of the ten commonest species found throughout all twelve woods both *Anthoxanthum* and *Viola spp.* alongside bracken showed an increase in abundance at Seatoller. As the cover values for bracken at the eight sample points never exceeded a Domin value of 8, *Anthoxanthum* was able to grow quite easily amongst the fronds and subsequently values for *Holcus mollis* were low (Appen. 4).

Species more often associated with grasslands and open woods increased in abundance over the 28 years. These included *Nardus stricta, Plantago lanceolata, Potentilla erecta* and *Cirsium palustre.* At the same time essentially woodland species such as *Dryopteris filix-mas, Teucrium scorodonia, Lonicera periclymenum* and *Rubus fruticosus* all declined considerably. These trends are not surprising in view of the loss of trees and shrubs and the subsequent opening up of the canopy. Additional stress imposed by deer on these latter species (all of which are palatable), would also hasten their decline. Paradoxically in those areas where yew trees have flourished (Eaves Wood and Whitbarrow), the dense shade cast by these trees will also prevent these woodland field layer species from flourishing.

To summarise botanical change in these three woods it is possible to say that they have all experienced a thinning out of trees and hence an opening up of the canopies. At Haverigg Holme this thinning out of trees has been taken one stage further to the complete removal of large areas of woodland. Bracken has invaded both Seatoller and Great Knott to high levels of cover in both instances. Deer browsing (and sheep grazing at Seatoller) has resulted in the decline of certain palatable species, notably ferns other than bracken plus bramble and honeysuckle, which offer 'bite' during the winter months. However the increase in light incident on the field layer may well have encouraged some species to flourish hence slowing down the decrease in species richness which was greater in many of the other woods.

Evidence from the DECORANA sample plot (axis 1, 1971 v 1998, Fig. 21) also suggests that the acid woods with high axis 1 values are shifting towards more open communities. When axis 2 values for both years were plotted the regression line suggests that some of these acid woods are becoming wetter. This could be as a result of decreased interception of precipitation by trees and shrubs, and until meteorological data are consulted any alternative explanation cannot be substantiated.

TYNRON

Tynron will be treated separately being the only example of juniper wood included in this survey. Since 1987 a large area of previously juniper scrub has been put 'under the plough' and is now improved pasture. Although a relatively large area remains which is now protected from grazing by a fence only two of the quadrats taken during this survey were inside this boundary and one of these was so close to the boundary fence that it was outside the area covered by juniper. If all 16 original sample points had been revisited then another 2 would have been within the area covered by juniper. However another 4 would have been taken on the improved pasture and the overall picture of massive juniper decline would have been similar. The area now covered by dense juniper is roughly half that of 1971. A fire at some date prior to 1987 may well have prompted the improvement of the area that is now pasture (SNH pers. comm.). The area of juniper that is fenced off is now very dense in parts and virtually impenetrable and as such is the largest area of juniper wood in Britain. However large as it may be this area was previously far bigger and unfortunately has been lost to agricultural improvement.

OVERALL CHANGES

If botanical change is examined over all twelve woods then certain trends are evident. For example if Table 4 is consulted it is evident that certain tree and shrub species have declined whilst others have flourished. The only species to increase in respect of stem numbers, DBH and basal area were; yew, spruce and cherry. However alder and Scots pine also showed substantial increases in basal area. Oak, ash and birch decreased in basal area, stem number and DBH. If it is accepted that management sympathetic to conservation has influenced these figures then yew, cherry and alder could well have benefited in certain instances. However it is unlikely that this kind of management would have favoured spruce which is a fast growing cash crop and not native to Britain. In this case it is more likely that economic considerations have allowed spruce to mature, for future harvesting.

Of the tree species to decline, ash oak and birch are the most notable in absolute terms (Tables 3 & 4). Although elm and beech declined in DBH and basal area by larger percentages, in absolute terms this involved a change in stem numbers of only eight beech stems and thirty three elm stems, hence playing a very minor role in community composition when compared to birch, oak and ash. The decline in stem numbers, DBH and basal area for ash oak and birch is of more concern as they are represented in the canopy layer by an order of magnitude 5-10 times that of beech and elm. A similar decline of birch and elm is described by Kirby *et al.* (1996) for Wytham Woods in Oxfordshire. Although the reason for the decline in elm in both instances is undoubtedly Dutch elm disease the reason for the decline of birch is given as windthrow by Kirby *et al.* Although this factor has not been investigated during this survey it should not be completely discounted. It was at Seatoller and Birk's Brow where ash declined the most, disappearing completely from the records for 1998 at Seatoller. Birch however declined throughout eight of the woods (Great Knott, Hall Brow, Eden Gorge, Winster House, Seatoller, Birks Brow, Whitbarrow and Haverigg Holme) regardless of management or light regime, hence this cannot be attributed to 'self thinning'. The fate of these trees is uncertain without reference to detailed management records, but it is clear that this trend, if unchecked will alter the very nature of these essentially semi-natural ancient woods, reducing diversity and 'naturalness'.

Although not shown in Tables 1 and 2, aspen (*Populus tremula*) and goat willow (*Salix caprea*) were recorded in low numbers in 1971, but in 1998 these two species were not evident (Appen. 4). A similar loss of these species at Monks Wood was reported by Stutter (1996) over a period of thirty two years, although it is not clear whether the factors responsible for these losses were the same for both localities.

The drastic decline in shrubs (especially hazel), from these woods is of perhaps greater concern than the decline of ash, oak and birch. Again, without recourse to the examination of management archives it is difficult to ascertain the reason for these huge declines. But the very fabric of these ancient woods has changed considerably in

this respect and if this trend proves to be widespread then measures should be taken to bring it to a halt and hopefully reverse it at some time in the future. Indeed Kirby *et al.* (1996) noted a substantial fall in the abundance of shrubs at Wytham Woods (Oxfordshire) between 1974 and 1991which they attributed to deer damage.

Although the fall by 58% in the numbers of saplings recorded since 1971 (Table 5) has been mentioned in passing a deeper discussion will follow. It is known that young trees have been felled as a management prescription to satisfy an uncertain objective. However the writer is unaware of any management objectives which demand the uprooting of broadleaved saplings (except perhaps sycamore). From the data collected during these surveys it appears that deer, notably roe, are the main culprits responsible for sapling losses. Only two of the twelve woods surveyed were intensively grazed by sheep (Seatoller and Haverigg Holme). They too will have played a role at these sites, although the decline in saplings was evident throughout all the woods except Eden Gorge, where it has been noted that a remarkable period of regeneration is under way. From the data presented in Table 5 it can be seen that all species except beech, larch, Scots pine and elm declined, with ash, lime and birch numbers falling the most. If this trend can be extrapolated to reflect deer feeding patterns, then ash, lime and birch seedlings and saplings seem to be their favourite winter food whilst beech, which actually increased in numbers, is actively avoided. Stutter (1996 p.34) supports this finding stating that beech and conifers are the only woody species not eaten by muntjac deer (*Muntiacus reevesi*). This tendency to favour birch and ash may well explain why the regeneration of these species throughout these woods has declined (Table 6). The presence of young beech trees at Great Knott may well be attributable to this dislike by deer of beech saplings. In 1971 no beech trees were evident at this site but in 1998 six young stems were recorded.

Of the ten field layer species most frequently encountered throughout the woods, only one showed any increase which was in cover value only, namely *Viola spp.* However bracken increased in both mean cover value and frequency throughout five of the acid oak/birch woods in the Lake District (Great Knott, Hall Brow, Winster House, Seatoller and Birks Brow). This increase was +2 (frequency) and +6.5 (mean cover

value per quadrat). Associated with this increase was an increase in the frequency and cover of the grass *Anthoxanthum odoratum* of +2 and +3.1 respectively. The relationship between these species is discussed elsewhere suffice to say their occurrence is correlated throughout these 5 woods. As mentioned earlier it appears that *Anthoxanthum, Deschampsia flexuosa* and *Holcus mollis* all thrive under bracken fronds. However this increase in density of bracken appears to have favoured *Anthoxanthum* over *Deschampsia.* And if Appendix 4 is consulted it can be seen that *Holcus mollis* has increased in both frequency and cover in these woods by a similar degree as *Anthoxanthum* and bracken.

The two species that appear to have declined the most throughout all twelve woods are male fern *Dryopteris filix-mas* and broad buckler fern *Dryopteris dilatata.* Having large fleshy leaves these species will be favoured by deer in the summer months, which may well be the cause of their decline. Likewise wood sage *Teucrium scorodonia* has relatively large leaves that would appeal to foraging deer, and this species also showed a substantial decline in both frequency and cover. These large losses of palateable plants and saplings indicate a corresponding increase in deer numbers over 27 years, and although this study has not involved the direct monitoring of deer numbers, it is a factor that needs to be assessed for this survey area in order to positively define the causes of these botanical changes. Mitchell-Jones and Kirby (1997), confirm that deer numbers in Britain have risen substantially in the last 150 years, giving reasons such as increased woodland cover, less hunting pressure and less disturbance than in the past.

The TWINSPAN analysis (Fig. 18) depicts a movement towards the two extremes of open canopy in the case of acid woods and closed canopy in basic woods. The open acid woods are represented by six samples from Seatoller 1998 and three from Seatoller 1971 and the closed canopy is represented by five samples from Whitbarrow 1998 and two from Whitbarrow 1971. Whilst woods at the two extremes of the continuum are changing substantially those towards the centre are remaining remarkably stable (end groups 27-31). From this evidence it would appear that it is the upland acid woods that are under threat from grazing/browsing and unsympathetic

management. If this trend is found to be endemic then a concerted effort must be made to preserve these woods or else they will all succumb to tree losses and a gradual conversion to semi improved pasture, with Haverigg Holme acting as a role model.

By plotting DECORANA sample scores for 1971 against those for 1998, two scatter graphs resulted (Figs. 21 & 22), one for axis 1 and one for axis 2. The plot for axis 1 shows a slight shift towards higher scores in 1998 for those samples with high axis 1 scores, whilst those samples with low axis 1 scores have remained stable. The samples with high axis 1 scores were the acidic communities and this graph depicts a movement towards more open communities for the acid woods.

The plot for axis 2 depicts a shift towards lower scores for those samples with high axis 2 scores and a shift towards higher scores for those samples with lower axis 2 scores. This reflects a movement of the drier woods towards wet woods and wet woods towards dry woods. This is difficult to explain in ecological terms but if the previously dry woods were woods with a dense canopy and the wet woods were those woods with an open canopy then changes in canopy cover over the 27 years may have influenced these changes in soil moisture. Whatever the reasons are it is apparent that the differences in soil moisture throughout these twelve woods that was evident 27 years ago are becoming less marked and soil moisture is becoming more uniform throughout this woodland.

Conclusion

Although this survey involved the resurveying of only 96 sample locations, a substantial amount of data were collected and when compared to those collected in 1971 a remarkably clear picture has emerged of changes relating to the botanical composition of the understorey and canopy, and the age structure of the tree and shrub species comprising these woods. It is clear that in terms of conservation some of these woods are suffering from huge losses of shrubs and certain tree species. There has

been a decline in species richness throughout all twelve woods, with increased shading accentuating this decline in certain woods.

If it is assumed that increased deer browsing is evenly spread over the twelve woods, then this could account for the declines found in those woods managed privately. The larger declines found in those woods managed by NGOs however must by default be attributable to management practices. If it is also recognised that a dense canopy will have underneath it a species poor field layer, then a balance has to be struck between species richness and dense woodland, the latter which is more 'natural' and also from the evidence collected here, becoming more scarce.

It is recommended that if this survey is extended to cover the remainder of the woods surveyed in 1971, then rather than eight quadrats, all sixteen of the original quadrat locations should be visited. This would allow a far more detailed analysis to take place with greater statistical accuracy. As well as this an allocation of Ellenberg scores to all the species found in the woods should be attempted. This would give a more accurate picture of environmental trends.

Acknowledgements

I would like to thank the following people for their help:

Dr.Bob Bunce at ITE, Merlewood, for supervising this thesis and offering help and guidance throughout the project.

Dr. Andrew Malloch, Lancaster University, for supervising this thesis and arranging the payment of expenses.

Dr.Jenny Duckworth, previously at ITE, Merlewood, for assistance with the VESPAN computer package.

Niki Carpenter, for help in the field.

Pete Buchanan, Alston, for help in the field and assistance with identification.

.My daughters Mariela and Catalina, for helping prepare the TWINSPAN dendrogram.

Joanne Stott and other members of staff at Lancaster University, for academic support.

The following landowners for permission to carry out the survey;
The National Trust, The Forestry Commission, The Lake District National Park Authority, Scottish Natural Heritage, Nunnery Hotel, Kirkoswald, Carter Jonas for Witherslack Hall Estate, Mr. Brian Scowcroft, Winster House, Mr. D. Stapleton, Lazonby Estate, Mr. D. Rimmington, Haverigg Holme and Mrs. J. Frankland, Ravenstonedale.

NERC for funding the project.

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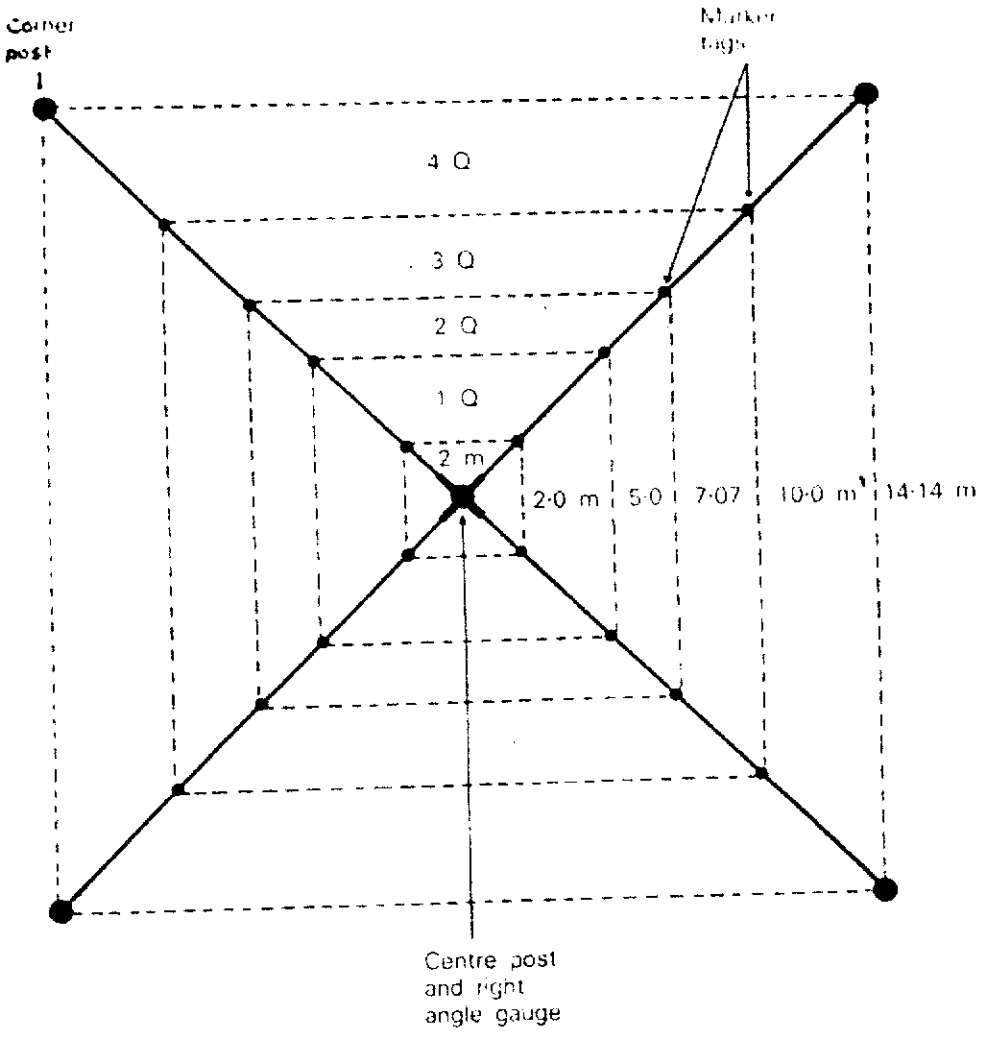
Appendix 1 Diagram showing the layout of the 200sq.m. quadrat used in the survey, showing the four nested quadrats within the 14.14m. X 14.14m. quadrat.

Distance string position from centre = ½ diagonal
2 m quadrat (4 m^2) = 1·42 m
1 Q* = 25 m^2 (5·00 × 5·00 m) = 3·54 m
2 Q = 50 m^2 (7·07 × 7·07 m) = 5·00 m
3 Q = 100 m^2 (10·0 × 10·0 m) = 7·07 m
4 Q = 200 m^2 (14·14 × 14·14 m) = 10·0 m



* 1Q, 2Q, 3Q and 4Q, designation of quadrats illustrated in diagram

Appendix 2 Copy of data sheet for recording diameter of trees, saplings and shrubs using the method described by Bunce and Shaw (1973).

TREE, SAPLING AND SHRUB DATA

Site No 11 Plot No 8 Recorder SKM/JMS Date [illegible]

Q No.		Species	Diameter Breast Height (cm)	Ht (m)
1				
	TREES	Field maple	6 4 9	
		Oak	[illegible] 7	
	SAPS	English elm	4	
	SHRB	Spindle	1	
		Elder	3	
2				
	TREES	Oak	25 [illegible] [illegible] 36 36	
		Field maple	7	
3				
	TREES	English elm	8 10 4 3 3	
		Gean	11	
	SAPS	Field maple	2	
		Gean	4	
	SHRB	Hawthorn	2 2	
		Spindle	3 2	
4				
	TREES	Gean	7 5	
		Oak	30 48	

D, dead

Appendix 3 Copy of data sheet for recording the cover of field layer species. The first column is used for recording the nested quadrat number (1-5) nearest the centre of the largest quadrat wher the species first occurs. The second column is for recording the cover value (%) in that quadrat. The third column is for recording the cover value of the species for the largest (200sq.m.) quadrat

	Q	%	%		Q	%	%		Q	%	%		Q	%	%		Q	%	%
Bare ground				153 Eno vag				118 Crat mon				311 Ping vul				446 Tnf dub			
213 Barley				228 Junc a/a				121 Crep sp.				315 Plan lan				448 Tnf pra			
454 Wheat				230 Junc bul				590 Dact mac				316 Plan maj				449 Tnf rep			
GRASSES				231 Junc con				132 Digi pur				324 Poly avi				841 Trip mar			
10 Agro can				232 Junc eff				136 Dros rot				328 Poly per				458 Ulex eur			
8 Agro rep				235 Junc squ				140 Empe nig				833 Poly vul				462 Urti dio			
11 Agro sto				*260 Luzu c/m*				141 Endy non				336 Pote ans				463 Vacc myr			
12 Agro ten				443 Tric cae				143 Epil hir				337 Pote ere				467 Vero arv			
20 Alop gen				*FERNS etc*				747 Epil mon				339 Pote rep				469 Vero cha			
21 Alop pra				41 Athy fil				144 Epil pal				342 Prim vul				471 Vero off			
28 Anth odo				53 Blec spi				150 Eric cin				343 Prun vul				472 Vero ser			
37 Arrh ela				137 Dryo dil				151 Eric tet				346 Prun spi				477 Vici sep			
562 Aven fat				138 Dryo fil				160 Euph sp.				350 Quer sp.				482 Viol pal			
55 Brac syl				147 Equi arv				168 Fili ulm				351 Ranu acr				849 Viol r/r			
58 Brom mol				348 Pter aqu				170 Frax exc				354 Ranu fic				490 Vero per			
61 Brom ste				*FORBS/WOODY Sp.*				177 Gali apa				355 Ranu fla				*MOSSES/LICHENS*			
123 Cyno cri				*2 Acer pse*				182 Gali pal				357 Ranu rep				850 Brac sp.			
124 Dact glo				4 Achi mil				183 Gali sax				370 Rosa sp.				512 Clad imp			
129 Desc ces				5 Achi pta				190 Gera mol				373 Rubu fru				106 Clad pyx			
130 Desc fle				18 Alli pet				193 Gera rob				375 Rum a'sa				513 Clad unc			
165 Fest ovi				26 Ange syl				195 Geum urb				376 Rum a'la				519 Dicr het			
166 Fest rub				29 Anth syl				197 Glec hed				837 Rume con				131 Dicr sco			
209 Holc lan				587 Arum mac				204 Hede hel				378 Rume cri				161 Eurh sp.			
210 Holc mol				47 Bell per				206 Hera sph				380 Rume obt				216 Hylo spl			
253 Loli mul				50 Betu sp.				207 Hier pil				381 Sagi sp.				222 Hypn cup			
254 Loli per				64 Call vul				208 Hier sp.				386 Samb nig				530 Loph sp			
283 Moli cae				68 Camp rot				220 Hype pul				401 Sene jac				280 Mniu hor			
287 Nard str				69 Caps bur				223 Hypo/Leo				402 Sene vul				282 Mniu und			
304 Phle pra				70 Card hir				238 Lami alb				405 Sile dio				535 Pell sp			
319 Poa ann				71 Card pra				239 Lami pur				413 Sonc asp				314 Plag und			
321 Poa pra				92 Cent nig				240 Laps com				414 Sonc ole				318 Pleu sch			
847 Poa triv				96 Cera fon				243 Lath pra				415 Sorb auc				331 Poly com			
404 Sieg dec				97 Cham ang				255 Loni per				420 Stac syl				843 Poly jun			
SEDGES/RUSHES				98 Chen alb				256 Lotu cor				421 Stel als				279 Pseu pur			
74 Care bin				101 Chry opp				273 Matr mat				423 Stel hol				543 Rhac lan			
76 Care dem				103 Cirs arv				277 Merc per				424 Stel med				364 Rhyt lor			
78 Care ech				104 Cirs pal				286 Myri gal				427 Succ pra				365 Rhyt squ			
81 Care nig				105 Cirs vul				288 Nart oss				430 Tara agg				558 Spha g/f			
85 Care pan				113 Cono maj				296 Oxal ace				845 Thym dru				559 Spha g/t			
86 Care pil				114 Conv arv				302 Pedi syl				441 Ton jap				561 Spha r/t			
152 Eno ang				117 Cory ave				307 Pice sit				443 Tric cae				439 Thui tam			

OTHER SPECIES	Q	%	%		Q	%	%		Q	%	%

Appendix 4.

Tabulated Vegetation species Data For All 192 Samples
Showing Domin Values, Frequency and Associated Statistics.

Great Knott 1971

Sample number		1	2	3	4	5	6	7	8	0
478	Deschampsia flexuosa	6	6	3	8	9	7	4	5	V
499	Dryopteris dilatata	1	1	1	1	1	1	1	1	V
932	Oxalis acetosella	1	3	1	1	1	3	3	1	V
1066	Pteridium aquilinum	1	1	6	5	1	3	4	4	V
798	Lonicera periclymenum (g)	1	3	3	1	1	1			IV
810	Luzula pilosa	1	1	1	1	1			1	IV
1136	Rubus fruticosus agg.	1	1	1	1			1	1	IV
680	Holcus lanatus	1		3	4			1	5	IV
1321	Teucrium scorodonia			1		1	1	1	1	IV
2597	Sorbus aucuparia (s)	1	1	1		1	1			IV
120	Agrostis canina			1		3		3	1	III
500	Dryopteris filix-mas	1	1	1			1			III
610	Galium saxatile					3	1	1	1	III
681	Holcus mollis	4		5	3				1	III
2627	Quercus robur (s)	1	1	1	1					III
123	Agrostis capillaris	1	3		3					II
171	Anthoxanthum odoratum						1	1	4	II
236	Betula pubescens (c)						3	4	4	II
477	Deschampsia cespitosa cespitos	1						1	1	II
1046	Potentilla erecta	1		3				1		II
1077	Quercus petraea (c)						4	4	7	II
1375	Vaccinium myrtillus				1	3	1			II
127	Ajuga reptans	2						1		II
242	Blechnum spicant						1	1		II
359	Carex sylvatica	1		1						II
482	Digitalis purpurea		1				1			II
613	Galium verum	2			3					II
1015	Polypodium vulgare			1		1				II
2604	Betula pubescens (s)			1	1					II
2625	Quercus petraea (s)					1	1			II
122	Agrostis stolonifera							1		I
215	Athyrium filix-femina							1		I
247	Brachypodium sylvaticum							3		I
292	Cardamine flexuosa	1								I
343	Carex pendula							1		I
414	Circaea lutetiana	1								I
418	Cirsium palustre							1		I
439	Corydalis claviculata				1					I
707	Ilex aquifolium (s)		1							I
730	Juncus effusus							1		I
825	Lysimachia nemorum							1		I
990	Poa trivialis		1							I
995	Polygala vulgaris		1							I
1326	Gymnocarpium dryopteris							1		I
1368	Urtica dioica	1								I
1381	Valeriana officinalis							1		I
1429	Viola riviniana							1		I
2606	Betula pendula (s)	1								I
2757	Corylus avellana (c)						3			I
3167	Larix sp.(s)	1								I
	Number of species per sample	23	15	18	15	13	17	26	15	0

Mean and standard error for complete data set.
Mean number of species per releve = 17.75; standard error of the mean = 1.590

lgtknott
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
478	Deschampsia flexuosa	100.00	6.0	3	9	2.00	.71	8
499	Dryopteris dilatata	100.00	1.0	1	1	.00	.00	8
932	Oxalis acetosella	100.00	1.8	1	3	1.04	.37	8

1066	Pteridium aquilinum	100.00	3.1	1	6	1.96	.69	8
798	Lonicera periclymenum (g)	75.00	1.3	1	3	1.16	.41	6
810	Luzula pilosa	75.00	.8	1	1	.46	.16	6
1136	Rubus fruticosus agg.	75.00	.8	1	1	.46	.16	6
680	Holcus lanatus	62.50	1.9	1	5	1.98	.70	5
1321	Teucrium scorodonia	62.50	.6	1	1	.52	.18	5
2597	Sorbus aucuparia (s)	62.50	.6	1	1	.52	.18	5
120	Agrostis canina	50.00	1.0	1	3	1.31	.46	4
500	Dryopteris filix-mas	50.00	.5	1	1	.53	.19	4
610	Galium saxatile	50.00	.8	1	3	1.04	.37	4
681	Holcus mollis	50.00	1.6	1	5	2.07	.73	4
2627	Quercus robur (s)	50.00	.5	1	1	.53	.19	4
123	Agrostis capillaris	37.50	.9	1	3	1.36	.48	3
171	Anthoxanthum odoratum	37.50	.8	1	4	1.39	.49	3
236	Betula pubescens (c)	37.50	1.4	3	4	1.92	.68	3
477	Deschampsia cespitosa cespit	37.50	.4	1	1	.52	.18	3
1046	Potentilla erecta	37.50	.6	1	3	1.06	.38	3
1077	Quercus petraea (c)	37.50	1.9	4	7	2.75	.97	3
1375	Vaccinium myrtillus	37.50	.6	1	3	1.06	.38	3
127	Ajuga reptans	25.00	.4	1	2	.74	.26	2
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
359	Carex sylvatica	25.00	.3	1	1	.46	.16	2
482	Digitalis purpurea	25.00	.3	1	1	.46	.16	2
613	Galium verum	25.00	.6	2	3	1.19	.42	2
1015	Polypodium vulgare	25.00	.3	1	1	.46	.16	2
2604	Betula pubescens (s)	25.00	.3	1	1	.46	.16	2
2625	Quercus petraea (s)	25.00	.3	1	1	.46	.16	2
122	Agrostis stolonifera	12.50	.1	1	1	.35	.13	1
215	Athyrium filix-femina	12.50	.1	1	1	.35	.13	1
247	Brachypodium sylvaticum	12.50	.4	3	3	1.06	.38	1
292	Cardamine flexuosa	12.50	.1	1	1	.35	.13	1
343	Carex pendula	12.50	.1	1	1	.35	.13	1
414	Circaea lutetiana	12.50	.1	1	1	.35	.13	1
418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
439	Corydalis claviculata	12.50	.1	1	1	.35	.13	1
707	Ilex aquifolium (s)	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.1	1	1	.35	.13	1
825	Lysimachia nemorum	12.50	.1	1	1	.35	.13	1
990	Poa trivialis	12.50	.1	1	1	.35	.13	1
995	Polygala vulgaris	12.50	.1	1	1	.35	.13	1
1326	Gymnocarpium dryopteris	12.50	.1	1	1	.35	.13	1
1368	Urtica dioica	12.50	.1	1	1	.35	.13	1
1381	Valeriana officinalis	12.50	.1	1	1	.35	.13	1
1429	Viola riviniana	12.50	.1	1	1	.35	.13	1
2606	Betula pendula (s)	12.50	.1	1	1	.35	.13	1
2757	Corylus avellana (c)	12.50	.4	3	3	1.06	.38	1
3167	Larix sp.(s)	12.50	.1	1	1	.35	.13	1

Eden Gorge 1971

Sample Number	9	10	11	12	13	14	15	16	
Dryopteris dilatata		1	1	1	3	1	1	1	V
Agrostis capillaris		1	1	1	3	5	1		IV
Galium saxatile			1	1	1	1	1	1	IV
Holcus lanatus	3		3	1	1	1	1		IV
Holcus mollis	3		4	1	4	6	3		IV
Oxalis acetosella	1	1		1	1	1	1		IV
Pteridium aquilinum			1	1	3	4	7	8	IV
Deschampsia flexuosa				4	1	1	1	4	IV
Dryopteris filix-mas	3	1	3		4	1			IV
Juncus effusus	1		1		1	1	1		IV
Rubus idaeus		1	1		1	1	1		IV
Betula pubescens (c)	2	3				4		7	III
Deschampsia cespitosa cespitos	7			1	1		1		III
Digitalis purpurea			1		1	1	1		III
Epilobium montanum	1		1			1	1		III
Quercus petraea (c)	1	2		3	3				III
Ranunculus repens		1	1			1	1		III
Teucrium scorodonia				1	1	1	1		III
Urtica dioica	1	1	1	1					III
Sorbus aucuparia (g)			1	1	1			1	III
Anthoxanthum odoratum					1	4	1		II
Cirsium palustre	1					1	1		II
Luzula sylvatica	1	1		1					II
Prunella vulgaris		1	1				1		II
Rubus fruticosus agg.		1	1	1					II
Viola riviniana	1		1			1			II
Arrhenatherum elatius			1	1					II
Athyrium filix-femina	1		1						II
Blechnum spicant		1			1				II
Brachypodium sylvaticum			1	1					II
Calluna vulgaris							1	4	II
Epilobium angustifolium	1			1					II
Circaea lutetiana	1		1						II
Dactylis glomerata				1			1		II
Fagus sylvatica (c)		3		7					II
Festuca rubra			1	1					II
Fragaria vesca			1				1		II
Fraxinus excelsior (c)			2		2				II
Galium aparine	1		1						II
Galium palustre	1					1			II
Hypericum pulchrum						1	1		II
Lonicera periclymenum (g)			1		3				II
Plantago major		1					1		II
Poa nemoralis	1		1						II
Potentilla erecta						1	1		II
Ranunculus acris	1						1		II
Silene dioica	1		1						II
Stachys sylvatica			1			1			II
Stellaria alsine	1					1			II
Stellaria holostea	1					1			II
Stellaria media			1				1		II
Thelypteris limbosperma						1	1		II
Vaccinium myrtillus				1				8	II
Veronica chamaedrys			1			1			II
Viola palustris						1	1		II
Sorbus aucuparia (s)		1	1						II
Acer pseudoplatanus (s)		1				1			II
Crataegus monogyna (g)			1				1		II
Quercus petraea (g)			1					1	II
Ulmus glabra (g)		1	1						II
Taraxacum seedling/sp				1			1		II
Acer pseudoplatanus (c)			6						I
Agrostis canina							4		I
Agrostis stolonifera							1		I
Angelica sylvestris	3								I
Arctium minus			1						I
Cardamine hirsuta							1		I
Carex binervis		1							I
Cerastium fontanum triviale							1		I
Chrysosplenium oppositifolium	1								I
Cirsium arvense				1					I
Conopodium majus						1			I
Hyacinthoides nonscripta			1						I
Equisetum sylvaticum	5								I
Festuca gigantea			1						I
Filipendula ulmaria				1					I
Galium mollugo			1						I
Geranium robertianum							1		I
Geum urbanum			1						I
Hedera helix (g)		1							I

Juncus acutiflorus						1			I
Juncus conglomeratus						1			I
Lapsana communis				1					I
Luzula pilosa						1			I
Mercurialis perennis	1								I
Molinia caerulea							1		I
Myosotis scorpioides			1						I
Plantago lanceolata				1					I
Populus nigra	4								I
Potentilla sterilis			1						I
Rosa canina agg.	1								I
Rumex obtusifolius				1					I
Scrophularia nodosa			1						I
Senecio jacobaea						1			I
Sorbus aucuparia (c)	1								I
Trifolium repens						1			I
Ulmus glabra (c)	2								I
Valeriana officinalis	1								I
Veronica montana			1						I
Acer pseudoplatanus (g)			1						I
Betula pubescens (g)						1			I
Fagus sylvatica (g)			1						I
Fraxinus excelsior (s)			2						I
Fraxinus excelsior (g)						1			I
Ilex aquifolium (g)							1		I
Sambucus nigra (g)			1						I
Lonicera periclymenum (s)				1					I
Ilex aquifolium (c)					1				I
Rhododendron ponticum (c)		9							I
Rhododendron ponticum (g)		1							I
Larix sp.(c)			1						I

Number of species per sample 32 22 50 29 21 30 42 11 0

Mean and standard error for complete data set.
Mean number of species per releve = 29.63; standard error of the mean = 4.338

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Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
499	Dryopteris dilatata	87.50	1.1	1	3	.83	.30	7
123	Agrostis capillaris	75.00	1.5	1	5	1.69	.60	6
610	Galium saxatile	75.00	.8	1	1	.46	.16	6
680	Holcus lanatus	75.00	1.3	1	3	1.16	.41	6
681	Holcus mollis	75.00	2.6	1	6	2.13	.75	6
932	Oxalis acetosella	75.00	.8	1	1	.46	.16	6
1066	Pteridium aquilinum	75.00	3.0	1	8	3.12	1.10	6
478	Deschampsia flexuosa	62.50	1.4	1	4	1.69	.60	5
500	Dryopteris filix-mas	62.50	1.5	1	4	1.60	.57	5
730	Juncus effusus	62.50	.6	1	1	.52	.18	5
1137	Rubus idaeus	62.50	.6	1	1	.52	.18	5
236	Betula pubescens (c)	50.00	2.0	2	7	2.56	.91	4
477	Deschampsia cespitosa cespit	50.00	1.3	1	7	2.38	.84	4
482	Digitalis purpurea	50.00	.5	1	1	.53	.19	4
522	Epilobium montanum	50.00	.5	1	1	.53	.19	4
1077	Quercus petraea (c)	50.00	1.1	1	3	1.36	.48	4
1095	Ranunculus repens	50.00	.5	1	1	.53	.19	4
1321	Teucrium scorodonia	50.00	.5	1	1	.53	.19	4
1368	Urtica dioica	50.00	.5	1	1	.53	.19	4
2634	Sorbus aucuparia (g)	50.00	.5	1	1	.53	.19	4
171	Anthoxanthum odoratum	37.50	.8	1	4	1.39	.49	3
418	Cirsium palustre	37.50	.4	1	1	.52	.18	3
812	Luzula sylvatica	37.50	.4	1	1	.52	.18	3
1059	Prunella vulgaris	37.50	.4	1	1	.52	.18	3
1136	Rubus fruticosus agg.	37.50	.4	1	1	.52	.18	3
1429	Viola riviniana	37.50	.4	1	1	.52	.18	3
197	Arrhenatherum elatius	25.00	.3	1	1	.46	.16	2
215	Athyrium filix-femina	25.00	.3	1	1	.46	.16	2
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
247	Brachypodium sylvaticum	25.00	.3	1	1	.46	.16	2
278	Calluna vulgaris	25.00	.6	1	4	1.41	.50	2
391	Epilobium angustifolium	25.00	.3	1	1	.46	.16	2
414	Circaea lutetiana	25.00	.3	1	1	.46	.16	2
465	Dactylis glomerata	25.00	.3	1	1	.46	.16	2
570	Fagus sylvatica (c)	25.00	1.3	3	7	2.55	.90	2
576	Festuca rubra	25.00	.3	1	1	.46	.16	2
587	Fragaria vesca	25.00	.3	1	1	.46	.16	2
589	Fraxinus excelsior (c)	25.00	.5	2	2	.93	.33	2

605	Galium aparine	25.00	.3	1	1	.46	.16	2
609	Galium palustre	25.00	.3	1	1	.46	.16	2
702	Hypericum pulchrum	25.00	.3	1	1	.46	.16	2
798	Lonicera periclymenum (g)	25.00	.5	1	3	1.07	.38	2
974	Plantago major	25.00	.3	1	1	.46	.16	2
986	Poa nemoralis	25.00	.3	1	1	.46	.16	2
1046	Potentilla erecta	25.00	.3	1	1	.46	.16	2
1081	Ranunculus acris	25.00	.3	1	1	.46	.16	2
1254	Silene dioica	25.00	.3	1	1	.46	.16	2
1293	Stachys sylvatica	25.00	.3	1	1	.46	.16	2
1295	Stellaria alsine	25.00	.3	1	1	.46	.16	2
1297	Stellaria holostea	25.00	.3	1	1	.46	.16	2
1298	Stellaria media	25.00	.3	1	1	.46	.16	2
1327	Thelypteris limbosperma	25.00	.3	1	1	.46	.16	2
1375	Vaccinium myrtillus	25.00	1.1	1	8	2.80	.99	2
1396	Veronica chamaedrys	25.00	.3	1	1	.46	.16	2
1427	Viola palustris	25.00	.3	1	1	.46	.16	2
2597	Sorbus aucuparia (s)	25.00	.3	1	1	.46	.16	2
2600	Acer pseudoplatanus (s)	25.00	.3	1	1	.46	.16	2
2611	Crataegus monogyna (g)	25.00	.3	1	1	.46	.16	2
2626	Quercus petraea (g)	25.00	.3	1	1	.46	.16	2
2641	Ulmus glabra (g)	25.00	.3	1	1	.46	.16	2
2982	Taraxacum seedling/sp	25.00	.3	1	1	.46	.16	2
103	Acer pseudoplatanus (c)	12.50	.8	6	6	2.12	.75	1
120	Agrostis canina	12.50	.5	4	4	1.41	.50	1
122	Agrostis stolonifera	12.50	.1	1	1	.35	.13	1
167	Angelica sylvestris	12.50	.4	3	3	1.06	.38	1
186	Arctium minus	12.50	.1	1	1	.35	.13	1
293	Cardamine hirsuta	12.50	.1	1	1	.35	.13	1
308	Carex binervis	12.50	.1	1	1	.35	.13	1
384	Cerastium fontanum triviale	12.50	.1	1	1	.35	.13	1
408	Chrysosplenium oppositifoliu	12.50	.1	1	1	.35	.13	1
415	Cirsium arvense	12.50	.1	1	1	.35	.13	1
431	Conopodium majus	12.50	.1	1	1	.35	.13	1
516	Hyacinthoides nonscripta	12.50	.1	1	1	.35	.13	1
537	Equisetum sylvaticum	12.50	.6	5	5	1.77	.63	1
573	Festuca gigantea	12.50	.1	1	1	.35	.13	1
583	Filipendula ulmaria	12.50	.1	1	1	.35	.13	1
607	Galium mollugo	12.50	.1	1	1	.35	.13	1
630	Geranium robertianum	12.50	.1	1	1	.35	.13	1
634	Geum urbanum	12.50	.1	1	1	.35	.13	1
652	Hedera helix (g)	12.50	.1	1	1	.35	.13	1
719	Juncus acutiflorus	12.50	.1	1	1	.35	.13	1
729	Juncus conglomeratus	12.50	.1	1	1	.35	.13	1
754	Lapsana communis	12.50	.1	1	1	.35	.13	1
810	Luzula pilosa	12.50	.1	1	1	.35	.13	1
864	Mercurialis perennis	12.50	.1	1	1	.35	.13	1
876	Molinia caerulea	12.50	.1	1	1	.35	.13	1
889	Myosotis scorpioides	12.50	.1	1	1	.35	.13	1
973	Plantago lanceolata	12.50	.1	1	1	.35	.13	1
1021	Populus nigra	12.50	.5	4	4	1.41	.50	1
1051	Potentilla sterilis	12.50	.1	1	1	.35	.13	1
1122	Rosa canina agg.	12.50	.1	1	1	.35	.13	1
1147	Rumex obtusifolius	12.50	.1	1	1	.35	.13	1
1220	Scrophularia nodosa	12.50	.1	1	1	.35	.13	1
1239	Senecio jacobaea	12.50	.1	1	1	.35	.13	1
1275	Sorbus aucuparia (c)	12.50	.1	1	1	.35	.13	1
1350	Trifolium repens	12.50	.1	1	1	.35	.13	1
1365	Ulmus glabra (c)	12.50	.3	2	2	.71	.25	1
1381	Valeriana officinalis	12.50	.1	1	1	.35	.13	1
1400	Veronica montana	12.50	.1	1	1	.35	.13	1
2601	Acer pseudoplatanus (g)	12.50	.1	1	1	.35	.13	1
2605	Betula pubescens (g)	12.50	.1	1	1	.35	.13	1
2613	Fagus sylvatica (g)	12.50	.1	1	1	.35	.13	1
2614	Fraxinus excelsior (s)	12.50	.3	2	2	.71	.25	1
2615	Fraxinus excelsior (g)	12.50	.1	1	1	.35	.13	1
2616	Ilex aquifolium (g)	12.50	.1	1	1	.35	.13	1
2633	Sambucus nigra (g)	12.50	.1	1	1	.35	.13	1
2646	Lonicera periclymenum (s)	12.50	.1	1	1	.35	.13	1
2740	Ilex aquifolium (c)	12.50	.1	1	1	.35	.13	1
2743	Rhododendron ponticum (c)	12.50	1.1	9	9	3.18	1.13	1
2946	Rhododendron ponticum (g)	12.50	.1	1	1	.35	.13	1
3166	Larix sp.(c)	12.50	.1	1	1	.35	.13	1

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Sample number	17	18	19	20	21	22	23	24	
Anthoxanthum odoratum	5	1	3	4	4	3	4	1	V
Deschampsia flexuosa	4	1	1	3	3	3	3	1	V
Dryopteris dilatata	1	1	1	1	1	1	1	1	V
Oxalis acetosella	3	3	1	1	1	1	1	1	V
Quercus petraea (c)	3	3	5	4	3	4	2	10	V
Sorbus aucuparia (g)	1	1	1	1	1	1	1	1	V
Lonicera periclymenum (s)	1	1	1	1	1	1	1	1	V
Agrostis capillaris	3	1	4	4	1		1	1	V
Betula pubescens (c)	9	4	5	7	3	7	9		V
Galium saxatile	1		1	1	1	1	1	1	V
Luzula pilosa	1	1	1	1	1	1	1		V
Digitalis purpurea	1		1	1	1		1	1	IV
Pteridium aquilinum	3		5		1	6	1	8	IV
Rubus fruticosus agg.	1	1	1	1	1		1		IV
Teucrium scorodonia	1		1	1	1	1	1		IV
Dryopteris filix-mas		1	1	1	1		1		IV
Carex sylvatica		1		1		1	1		III
Holcus mollis	1		3	1				1	III
Viola riviniana			1	1	1		1		III
Fraxinus excelsior (g)			1	1	1		1		III
Corylus avellana (c)		4		2	4		6		III
Lysimachia nemorum		1		1			1		II
Stellaria holostea	1		1	1					II
Acer pseudoplatanus (g)			1			1	1		II
Crataegus monogyna (g)				1	1		1		II
Agrostis canina	1				1				II
Athyrium filix-femina		1		1					II
Blechnum spicant				1		1			II
Brachypodium sylvaticum				1			1		II
Cardamine hirsuta		1		1					II
Circaea lutetiana		1		1					II
Hyacinthoides nonscripta	1				1				II
Holcus lanatus	1		3						II
Luzula multiflora			1		1				II
Poa nemoralis		1		1					II
Scrophularia nodosa		1		1					II
Thelypteris limbosperma	1				1				II
Corylus avellana (g)	1							1	II
Ilex aquifolium (g)					1			1	II
Agrostis stolonifera		1							I
Ajuga reptans		1							I
Alnus glutinosa (c)		2							I
Chrysosplenium oppositifolium		1							I
Conopodium majus							1		I
Dactylis glomerata					1				I
Deschampsia cespitosa cespitos		1							I
Epilobium montanum		1							I
Equisetum sylvaticum		1							I
Fagus sylvatica (c)					5				I
Fraxinus excelsior (c)		2							I
Hedera helix (g)		1							I
Juncus effusus				1					I
Polypodium vulgare				1					I
Populus tremula		5							I
Primula vulgaris				1					I
Rubus idaeus			1						I
Rumex acetosella			1						I
Silene dioica			1						I
Gymnocarpium dryopteris							1		I
Vaccinium myrtillus						1			I
Veronica montana		1							I
Veronica officinalis					1				I
Prunus spinosa (g)	1								I
Taxus baccata (g)					1				I
Salix caprea (c)		2							I
Malus sylvestris (c)							1		I

Number of species per sample	23	32	26	33	29	16	27	14	0

Mean and standard error for complete data set.
Mean number of species per releve = 25.00; standard error of the mean = 2.464

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Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
171	Anthoxanthum odoratum	100.00	3.1	1	5	1.46	.52	8
478	Deschampsia flexuosa	100.00	2.4	1	4	1.19	.42	8
499	Dryopteris dilatata	100.00	1.0	1	1	.00	.00	8
902	Oxalis acetosella	100.00	1.5	1	3	.93	.33	8
1077	Quercus petraea (c)	100.00	4.3	2	10	2.49	.88	8
2634	Sorbus aucuparia (g)	100.00	1.0	1	1	.00	.00	8
2646	Lonicera periclymenum (s)	100.00	1.0	1	1	.00	.00	8
123	Agrostis capillaris	87.50	1.9	1	4	1.55	.55	7
236	Betula pubescens (c)	87.50	5.5	3	9	3.12	1.10	7
610	Galium saxatile	87.50	.9	1	1	.35	.13	7
810	Luzula pilosa	87.50	.9	1	1	.35	.13	7
482	Digitalis purpurea	75.00	.8	1	1	.46	.16	6
1066	Pteridium aquilinum	75.00	3.0	1	8	3.02	1.07	6
1136	Rubus fruticosus agg.	75.00	.8	1	1	.46	.16	6
1321	Teucrium scorodonia	75.00	.8	1	1	.46	.16	6
500	Dryopteris filix-mas	62.50	.6	1	1	.52	.18	5
359	Carex sylvatica	50.00	.5	1	1	.53	.19	4
681	Holcus mollis	50.00	.8	1	3	1.04	.37	4
1429	Viola riviniana	50.00	.5	1	1	.53	.19	4
2615	Fraxinus excelsior (g)	50.00	.5	1	1	.53	.19	4
2757	Corylus avellana (c)	50.00	2.0	2	6	2.39	.85	4
825	Lysimachia nemorum	37.50	.4	1	1	.52	.18	3
1297	Stellaria holostea	37.50	.4	1	1	.52	.18	3
2601	Acer pseudoplatanus (g)	37.50	.4	1	1	.52	.18	3
2611	Crataegus monogyna (g)	37.50	.4	1	1	.52	.18	3
120	Agrostis canina	25.00	.3	1	1	.46	.16	2
215	Athyrium filix-femina	25.00	.3	1	1	.46	.16	2
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
247	Brachypodium sylvaticum	25.00	.3	1	1	.46	.16	2
293	Cardamine hirsuta	25.00	.3	1	1	.46	.16	2
414	Circaea lutetiana	25.00	.3	1	1	.46	.16	2
516	Hyacinthoides nonscripta	25.00	.3	1	1	.46	.16	2
680	Holcus lanatus	25.00	.5	1	3	1.07	.38	2
809	Luzula multiflora	25.00	.3	1	1	.46	.16	2
986	Poa nemoralis	25.00	.3	1	1	.46	.16	2
1220	Scrophularia nodosa	25.00	.3	1	1	.46	.16	2
1327	Thelypteris limbosperma	25.00	.3	1	1	.46	.16	2
2610	Corylus avellana (g)	25.00	.3	1	1	.46	.16	2
2616	Ilex aquifolium (g)	25.00	.3	1	1	.46	.16	2
122	Agrostis stolonifera	12.50	.1	1	1	.35	.13	1
127	Ajuga reptans	12.50	.1	1	1	.35	.13	1
153	Alnus glutinosa (c)	12.50	.3	2	2	.71	.25	1
408	Chrysosplenium oppositifoliu	12.50	.1	1	1	.35	.13	1
431	Conopodium majus	12.50	.1	1	1	.35	.13	1
465	Dactylis glomerata	12.50	.1	1	1	.35	.13	1
477	Deschampsia cespitosa cespit	12.50	.1	1	1	.35	.13	1
522	Epilobium montanum	12.50	.1	1	1	.35	.13	1
537	Equisetum sylvaticum	12.50	.1	1	1	.35	.13	1
570	Fagus sylvatica (c)	12.50	.6	5	5	1.77	.63	1
589	Fraxinus excelsior (c)	12.50	.3	2	2	.71	.25	1
652	Hedera helix (g)	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.1	1	1	.35	.13	1
1015	Polypodium vulgare	12.50	.1	1	1	.35	.13	1
1022	Populus tremula	12.50	.6	5	5	1.77	.63	1
1058	Primula vulgaris	12.50	.1	1	1	.35	.13	1
1137	Rubus idaeus	12.50	.1	1	1	.35	.13	1
1140	Rumex acetosella	12.50	.1	1	1	.35	.13	1
1254	Silene dioica	12.50	.1	1	1	.35	.13	1
1326	Gymnocarpium dryopteris	12.50	.1	1	1	.35	.13	1
1375	Vaccinium myrtillus	12.50	.1	1	1	.35	.13	1
1400	Veronica montana	12.50	.1	1	1	.35	.13	1
1401	Veronica officinalis	12.50	.1	1	1	.35	.13	1
2624	Prunus spinosa (g)	12.50	.1	1	1	.35	.13	1
2636	Taxus baccata (g)	12.50	.1	1	1	.35	.13	1
2741	Salix caprea (c)	12.50	.3	2	2	.71	.25	1
2751	Malus sylvestris (c)	12.50	.1	1	1	.35	.13	1

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Sample number	25	26	27	28	29	30	31	32	
Dryopteris filix-mas	1	1	1	1	4	1	1	1	V
Agrostis capillaris	3	3	1	4	1	3		1	V
Betula pubescens (c)		9	8	10	2	5	5	4	V
Dryopteris dilatata	1	1	1	1	1	1		1	V
Oxalis acetosella	1	1		1	1	3	3	1	V
Galium saxatile	1	1	1	1		1	1		IV
Poa nemoralis		1		3	1	3	1	1	IV
Rubus fruticosus agg.	1	1			1	1	1	1	IV
Teucrium scorodonia	1	1	1	1	1	1			IV
Lonicera periclymenum (s)	1	1	1			1	1	1	IV
Hyacinthoides nonscripta	1				1	1	1	1	IV
Lysimachia nemorum		1			1	1	1	1	IV
Pteridium aquilinum	6	5	9	7	3				IV
Digitalis purpurea	1	1			1		1		III
Festuca ovina		1	3	3				1	III
Holcus lanatus		4		1	1	4			III
Mercurialis perennis		1				1	1	3	III
Quercus petraea (c)	7		4			3		5	III
Viola riviniana		1				1	1	1	III
Acer pseudoplatanus (c)					7		8	7	II
Ajuga reptans		1				1	1		II
Deschampsia flexuosa		1	1	4					II
Thelypteris phegopteris		1			1			1	II
Fraxinus excelsior (g)		1			1		1		II
Corylus avellana (c)						7	8	6	II
Anthoxanthum odoratum	1	1							II
Circaea lutetiana						1		1	II
Deschampsia cespitosa cespitos		1				1			II
Fragaria vesca		1				1			II
Fraxinus excelsior (c)						3		4	II
Galium palustre		1				1			II
Holcus mollis	3	1							II
Potentilla sterilis						1		1	II
Veronica chamaedrys						1		1	II
Acer pseudoplatanus (g)	1	1							II
Quercus petraea (g)				1	1				II
Sorbus aucuparia (g)	1						1		II
Salix caprea (c)						3		4	II
Agrostis canina				3					I
Arctium minus		1							I
Athyrium filix-femina							1		I
Blechnum spicant	1								I
Brachypodium sylvaticum		3							I
Cirsium palustre		1							I
Corydalis claviculata	1								I
Crataegus monogyna (s)								1	I
Festuca rubra	1								I
Geranium robertianum						1			I
Glechoma hederacea						1			I
Hedera helix (g)							1		I
Juncus effusus	1								I
Luzula pilosa								1	I
Mentha aquatica		1							I
Potentilla erecta		1							I
Primula vulgaris							1		I
Ranunculus lingua					7				I
Ranunculus repens		1							I
Rumex acetosella	1								I
Scrophularia nodosa		1							I
Solidago virgaurea					1				I
Stellaria holostea		1							I
Stellaria media							1		I
Taxus baccata (c)	3								I
Urtica dioica					1				I
Veronica montana								1	I
Betula pubescens (g)	1								I
Corylus avellana (g)	1								I
Crataegus monogyna (g)						1			I
Fagus sylvatica (g)	1								I
Taxus baccata (g)		1							I
Crataegus monogyna (c)							3		I
Sambucus nigra (c)					1				I

Number of species per sample 25 36 11 14 21 29 22 25 0

Mean and standard error for complete data set.
Mean number of species per releve = 22.88; standard error of the mean = 2.812

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Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
500	Dryopteris filix-mas	100.00	1.4	1	4	1.06	.38	8
123	Agrostis capillaris	87.50	2.0	1	4	1.41	.50	7
236	*Betula pubescens (c)*	87.50	5.4	2	10	3.46	1.22	7
499	Dryopteris dilatata	87.50	.9	1	1	.35	.13	7
932	Oxalis acetosella	87.50	1.4	1	3	1.06	.38	7
610	Galium saxatile	75.00	.8	1	1	.46	.16	6
986	Poa nemoralis	75.00	1.3	1	3	1.16	.41	6
1136	Rubus fruticosus agg.	75.00	.8	1	1	.46	.16	6
1321	Teucrium scorodonia	75.00	.8	1	1	.46	.16	6
2646	Lonicera periclymenum (s)	75.00	.8	1	1	.46	.16	6
516	Hyacinthoides nonscripta	62.50	.6	1	1	.52	.18	5
825	Lysimachia nemorum	62.50	.6	1	1	.52	.18	5
1066	Pteridium aquilinum	62.50	3.8	3	9	3.54	1.25	5
482	Digitalis purpurea	50.00	.5	1	1	.53	.19	4
574	Festuca ovina	50.00	1.0	1	3	1.31	.46	4
680	Holcus lanatus	50.00	1.3	1	4	1.75	.62	4
864	Mercurialis perennis	50.00	.8	1	3	1.04	.37	4
1077	Quercus petraea (c)	50.00	2.4	3	7	2.77	.98	4
1429	Viola riviniana	50.00	.5	1	1	.53	.19	4
103	Acer pseudoplatanus (c)	37.50	2.8	7	8	3.81	1.35	3
127	Ajuga reptans	37.50	.4	1	1	.52	.18	3
478	Deschampsia flexuosa	37.50	.8	1	4	1.39	.49	3
1329	Thelypteris phegopteris	37.50	.4	1	1	.52	.18	3
2615	Fraxinus excelsior (g)	37.50	.4	1	1	.52	.18	3
2757	Corylus avellana (c)	37.50	2.6	6	8	3.66	1.29	3
171	Anthoxanthum odoratum	25.00	.3	1	1	.46	.16	2
414	Circaea lutetiana	25.00	.3	1	1	.46	.16	2
477	Deschampsia cespitosa cespit	25.00	.3	1	1	.46	.16	2
587	Fragaria vesca	25.00	.3	1	1	.46	.16	2
589	Fraxinus excelsior (c)	25.00	.9	3	4	1.64	.58	2
609	Galium palustre	25.00	.3	1	1	.46	.16	2
681	Holcus mollis	25.00	.5	1	3	1.07	.38	2
1051	Potentilla sterilis	25.00	.3	1	1	.46	.16	2
1396	Veronica chamaedrys	25.00	.3	1	1	.46	.16	2
2601	Acer pseudoplatanus (g)	25.00	.3	1	1	.46	.16	2
2626	Quercus petraea (g)	25.00	.3	1	1	.46	.16	2
2634	Sorbus aucuparia (g)	25.00	.3	1	1	.46	.16	2
2741	Salix caprea (c)	25.00	.9	3	4	1.64	.58	2
120	Agrostis canina	12.50	.4	3	3	1.06	.38	1
186	Arctium minus	12.50	.1	1	1	.35	.13	1
215	Athyrium filix-femina	12.50	.1	1	1	.35	.13	1
242	Blechnum spicant	12.50	.1	1	1	.35	.13	1
247	Brachypodium sylvaticum	12.50	.4	3	3	1.06	.38	1
418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
439	Corydalis claviculata	12.50	.1	1	1	.35	.13	1
445	Crataegus monogyna (s)	12.50	.1	1	1	.35	.13	1
576	Festuca rubra	12.50	.1	1	1	.35	.13	1
630	Geranium robertianum	12.50	.1	1	1	.35	.13	1
637	Glechoma hederacea	12.50	.1	1	1	.35	.13	1
652	Hedera helix (g)	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.1	1	1	.35	.13	1
810	Luzula pilosa	12.50	.1	1	1	.35	.13	1
855	Mentha aquatica	12.50	.1	1	1	.35	.13	1
1046	Potentilla erecta	12.50	.1	1	1	.35	.13	1
1058	Primula vulgaris	12.50	.1	1	1	.35	.13	1
1093	Ranunculus lingua	12.50	.9	7	7	2.47	.88	1
1095	Ranunculus repens	12.50	.1	1	1	.35	.13	1
1140	Rumex acetosella	12.50	.1	1	1	.35	.13	1
1220	Scrophularia nodosa	12.50	.1	1	1	.35	.13	1
1270	Solidago virgaurea	12.50	.1	1	1	.35	.13	1
1297	Stellaria holostea	12.50	.1	1	1	.35	.13	1
1298	Stellaria media	12.50	.1	1	1	.35	.13	1
1319	Taxus baccata (c)	12.50	.4	3	3	1.06	.38	1
1368	Urtica dioica	12.50	.1	1	1	.35	.13	1

1400	Veronica montana	12.50	.1	1	1	.35	.13	1
2605	Betula pubescens (g)	12.50	.1	1	1	.35	.13	1
2610	Corylus avellana (g)	12.50	.1	1	1	.35	.13	1
2611	Crataegus monogyna (g)	12.50	.1	1	1	.35	.13	1
2613	Fagus sylvatica (g)	12.50	.1	1	1	.35	.13	1
2636	Taxus baccata (g)	12.50	.1	1	1	.35	.13	1
2750	Crataegus monogyna (c)	12.50	.4	3	3	1.06	.38	1
4314	Sambucus nigra (c)	12.50	.1	1	1	.35	.13	1

Seatoller 1971

Sample number	33	34	35	36	37	38	39	40	
Anthoxanthum odoratum	4	3	1	1	1	1	3	3	V
Galium saxatile	1	1	1	1	1	1	1	3	V
Agrostis canina	3	1			3	3	1	1	IV
Athyrium filix-femina		1	1	1	1	1	1		IV
Deschampsia flexuosa		1	1	1		3	3	1	IV
Oxalis acetosella			1	1	1	1	1	1	IV
Pteridium aquilinum		4	3	1	8		1	3	IV
Agrostis capillaris			3	3		1	4	6	IV
Dryopteris filix-mas		1	3	1		6	3		IV
Festuca ovina	1			1	1		1	1	IV
Lysimachia nemorum	1	1	1	1	1				IV
Potentilla erecta	1	1	1		1		1		IV
Quercus petraea (c)		5	2			5	7	9	IV
Thelypteris limbosperma	4	3	3				1	3	IV
Viola riviniana			1	1	1		1	1	IV
Cirsium palustre	1	1	1		1				III
Digitalis purpurea			1	1		1	1		III
Holcus lanatus	1	3	1		1				III
Rubus fruticosus agg.			3	1			1	1	III
Teucrium scorodonia			1		1	1	1		III
Corylus avellana (c)			5	7		2	4		III
Betula pubescens (c)		4	6				3		II
Circaea lutetiana			1	1	1				II
Epilobium montanum		1	1	1					II
Filipendula ulmaria		1	1		1				II
Fraxinus excelsior (c)			3		7		2		II
Geranium robertianum			1	1	1				II
Molinia caerulea	4	4			1				II
Primula vulgaris			1	1	1				II
Ranunculus repens		1	1		1				II
Sorbus aucuparia (c)				2		7	2		II
Vaccinium myrtillus		1				3	1		II
Crataegus monogyna (c)			3	4	5				II
Ajuga reptans		1			1				II
Brachypodium sylvaticum			1	1					II
Calluna vulgaris						1	1		II
Campanula rotundifolia					3	1			II
Carex echinata	1	1							II
Cynosurus cristatus	1				1				II
Dactylis glomerata			1		1				II
Festuca vivipara						1	1		II
Fragaria vesca			1		1				II
Galium aparine			1		1				II
Juncus bulbosus	1	1							II
Melampyrum pratense		1				1			II
Narthecium ossifragum	1	1							II
Plantago lanceolata	1	1							II
Polypodium vulgare						1	1		II
Ranunculus flammula	1	1							II
Solidago virgaurea						1	1		II
Succisa pratensis	1	3							II
Ulmus glabra (c)				5			3		II
Veronica chamaedrys			1	1					II
Veronica montana			1	1					II
Viola palustris	1	1							II
Fraxinus excelsior (g)				1				1	II
Sorbus aucuparia (g)		1						1	II
Lonicera periclymenum (s)						1	1		II
Taraxacum seedling/sp	1				1				II
Blechnum spicant						1			I
Cardamine hirsuta			1						I
Carex binervis		1							I
Carex flacca					1				I
Carex panicea	1								I
Corydalis claviculata					1				I
Crepis paludosa		1							I
Cryptogramma crispa						1			I
Deschampsia cespitosa cespitos			1						I
Drosera rotundifolia	1								I
Dryopteris dilatata						1			I
Empetrum nigrum nigrum	1								I
Epilobium palustre	1								I
Erica cinerea							1		I

Eriophorum angustifolium	1								I
Euphrasia officinalis agg	1								I
Galium odoratum			1						I
Galium palustre		1							I
Geum urbanum			1						I
Hymenophyllum wilsonii			1						I
Hypericum pulchrum						1			I
Juncus acutiflorus	6								I
Juncus articulatus		3							I
Juncus effusus		3							I
Lotus uliginosus	1								I
Luzula sylvatica						1			I
Mercurialis perennis			1						I
Nardus stricta	1								I
Parnassia palustris		1							I
Pedicularis sylvatica	1								I
Poa nemoralis				1					I
Potentilla sterilis					1				I
Prunella vulgaris					1				I
Ranunculus acris	1								I
Rubus idaeus						1			I
Sanicula europaea					1				I
Scirpus cespitosus	1								I
Danthonia decumbens	1								I
Stachys sylvatica					1				I
Thelypteris phegopteris						1			I
Thymus praecox arcticus					1				I
Valeriana officinalis					1				I
Acer pseudoplatanus (g)			1						I
Betula pubescens (g)								1	I
Corylus avellana (g)		1							I
Crataegus monogyna (g)							1		I
Prunus avium (g)			1						I
Quercus petraea (g)	1								I
Ulmus glabra (g)			1						I
Ilex aquifolium (c)							4		I
Rosa canina (g)							1		I

Number of species per sample 33 36 43 26 36 28 32 15 0

Mean and standard error for complete data set.
Mean number of species per releve = 31.13; standard error of the mean = 2.955

1seatoll
Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
171	Anthoxanthum odoratum	100.00	2.1	1	4	1.25	.44	8
610	Galium saxatile	100.00	1.3	1	3	.71	.25	8
120	Agrostis canina	75.00	1.5	1	3	1.31	.46	6
215	Athyrium filix-femina	75.00	.8	1	1	.46	.16	6
478	Deschampsia flexuosa	75.00	1.3	1	3	1.16	.41	6
932	Oxalis acetosella	75.00	.8	1	1	.46	.16	6
1066	Pteridium aquilinum	75.00	2.5	1	8	2.67	.94	6
123	Agrostis capillaris	62.50	2.1	1	6	2.23	.79	5
500	Dryopteris filix-mas	62.50	1.8	1	6	2.12	.75	5
574	Festuca ovina	62.50	.6	1	1	.52	.18	5
825	Lysimachia nemorum	62.50	.6	1	1	.52	.18	5
1046	Potentilla erecta	62.50	.6	1	1	.52	.18	5
1077	Quercus petraea (c)	62.50	3.5	2	9	3.51	1.24	5
1327	Thelypteris limbosperma	62.50	1.8	1	4	1.67	.59	5
1429	Viola riviniana	62.50	.6	1	1	.52	.18	5
418	Cirsium palustre	50.00	.5	1	1	.53	.19	4
482	Digitalis purpurea	50.00	.5	1	1	.53	.19	4
680	Holcus lanatus	50.00	.8	1	3	1.04	.37	4
1136	Rubus fruticosus agg.	50.00	.8	1	3	1.04	.37	4
1321	Teucrium scorodonia	50.00	.5	1	1	.53	.19	4
2757	Corylus avellana (c)	50.00	2.3	2	7	2.76	.98	4
236	Betula pubescens (c)	37.50	1.6	3	6	2.39	.84	3
414	Circaea lutetiana	37.50	.4	1	1	.52	.18	3
522	Epilobium montanum	37.50	.4	1	1	.52	.18	3
583	Filipendula ulmaria	37.50	.4	1	1	.52	.18	3
589	Fraxinus excelsior (c)	37.50	1.5	2	7	2.51	.89	3

630	Geranium robertianum	37.50	.4	1	1	.52	.18	3
876	Molinia caerulea	37.50	1.1	1	4	1.81	.64	3
1058	Primula vulgaris	37.50	.4	1	1	.52	.18	3
1095	Ranunculus repens	37.50	.4	1	1	.52	.18	3
1275	Sorbus aucuparia (c)	37.50	1.4	2	7	2.45	.86	3
1375	*Vaccinium myrtillus*	37.50	.6	1	3	1.06	.38	3
2750	Crataegus monogyna (c)	37.50	1.5	3	5	2.14	.76	3
127	Ajuga reptans	25.00	.3	1	1	.46	.16	2
247	Brachypodium sylvaticum	25.00	.3	1	1	.46	.16	2
278	Calluna vulgaris	25.00	.3	1	1	.46	.16	2
288	Campanula rotundifolia	25.00	.5	1	3	1.07	.38	2
319	Carex echinata	25.00	.3	1	1	.46	.16	2
460	Cynosurus cristatus	25.00	.3	1	1	.46	.16	2
465	Dactylis glomerata	25.00	.3	1	1	.46	.16	2
578	Festuca vivipara	25.00	.3	1	1	.46	.16	2
587	Fragaria vesca	25.00	.3	1	1	.46	.16	2
605	Galium aparine	25.00	.3	1	1	.46	.16	2
726	Juncus bulbosus	25.00	.3	1	1	.46	.16	2
846	Melampyrum pratense	25.00	.3	1	1	.46	.16	2
901	Narthecium ossifragum	25.00	.3	1	1	.46	.16	2
973	Plantago lanceolata	25.00	.3	1	1	.46	.16	2
1015	Polypodium vulgare	25.00	.3	1	1	.46	.16	2
1089	Ranunculus flammula	25.00	.3	1	1	.46	.16	2
1270	Solidago virgaurea	25.00	.3	1	1	.46	.16	2
1305	Succisa pratensis	25.00	.5	1	3	1.07	.38	2
1365	Ulmus glabra (c)	25.00	1.0	3	5	1.93	.68	2
1396	Veronica chamaedrys	25.00	.3	1	1	.46	.16	2
1400	Veronica montana	25.00	.3	1	1	.46	.16	2
1427	Viola palustris	25.00	.3	1	1	.46	.16	2
2615	Fraxinus excelsior (g)	25.00	.3	1	1	.46	.16	2
2634	Sorbus aucuparia (g)	25.00	.3	1	1	.46	.16	2
2646	Lonicera periclymenum (s)	25.00	.3	1	1	.46	.16	2
2982	Taraxacum seedling/sp	25.00	.3	1	1	.46	.16	2
242	*Blechnum spicant*	12.50	.1	1	1	.35	.13	1
293	Cardamine hirsuta	12.50	.1	1	1	.35	.13	1
308	Carex binervis	12.50	.1	1	1	.35	.13	1
323	Carex flacca	12.50	.1	1	1	.35	.13	1
339	Carex panicea	12.50	.1	1	1	.35	.13	1
439	Corydalis claviculata	12.50	.1	1	1	.35	.13	1
449	Crepis paludosa	12.50	.1	1	1	.35	.13	1
456	Cryptogramma crispa	12.50	.1	1	1	.35	.13	1
477	Deschampsia cespitosa cespit	12.50	.1	1	1	.35	.13	1
494	Drosera rotundifolia	12.50	.1	1	1	.35	.13	1
499	Dryopteris dilatata	12.50	.1	1	1	.35	.13	1
515	Empetrum nigrum nigrum	12.50	.1	1	1	.35	.13	1
525	Epilobium palustre	12.50	.1	1	1	.35	.13	1
541	Erica cinerea	12.50	.1	1	1	.35	.13	1
546	Eriophorum angustifolium	12.50	.1	1	1	.35	.13	1
568	Euphrasia officinalis agg	12.50	.1	1	1	.35	.13	1
608	Galium odoratum	12.50	.1	1	1	.35	.13	1
609	Galium palustre	12.50	.1	1	1	.35	.13	1
634	Geum urbanum	12.50	.1	1	1	.35	.13	1
692	Hymenophyllum wilsonii	12.50	.1	1	1	.35	.13	1
702	Hypericum pulchrum	12.50	.1	1	1	.35	.13	1
719	Juncus acutiflorus	12.50	.8	6	6	2.12	.75	1
722	Juncus articulatus	12.50	.4	3	3	1.06	.38	1
730	Juncus effusus	12.50	.4	3	3	1.06	.38	1
802	Lotus uliginosus	12.50	.1	1	1	.35	.13	1
812	Luzula sylvatica	12.50	.1	1	1	.35	.13	1
864	Mercurialis perennis	12.50	.1	1	1	.35	.13	1
900	Nardus stricta	12.50	.1	1	1	.35	.13	1
944	*Parnassia palustris*	12.50	.1	1	1	.35	.13	1
947	Pedicularis sylvatica	12.50	.1	1	1	.35	.13	1
986	Poa nemoralis	12.50	.1	1	1	.35	.13	1
1051	Potentilla sterilis	12.50	.1	1	1	.35	.13	1
1059	Prunella vulgaris	12.50	.1	1	1	.35	.13	1
1081	Ranunculus acris	12.50	.1	1	1	.35	.13	1
1137	Rubus idaeus	12.50	.1	1	1	.35	.13	1
1191	Sanicula europaea	12.50	.1	1	1	.35	.13	1
1210	Scirpus cespitosus	12.50	.1	1	1	.35	.13	1
1249	Danthonia decumbens	12.50	.1	1	1	.35	.13	1
1293	Stachys sylvatica	12.50	.1	1	1	.35	.13	1
1329	Thelypteris phegopteris	12.50	.1	1	1	.35	.13	1
1333	Thymus praecox arcticus	12.50	.1	1	1	.35	.13	1
1381	Valeriana officinalis	12.50	.1	1	1	.35	.13	1
2601	Acer pseudoplatanus (g)	12.50	.1	1	1	.35	.13	1
2605	Betula pubescens (g)	12.50	.1	1	1	.35	.13	1

2610	Corylus avellana (g)	12.50	.1	1	1	.35	.13	1
2611	Crataegus monogyna (g)	12.50	.1	1	1	.35	.13	1
2622	Prunus avium (g)	12.50	.1	1	1	.35	.13	1
2626	Quercus petraea (g)	12.50	.1	1	1	.35	.13	1
2641	Ulmus glabra (g)	12.50	.1	1	1	.35	.13	1
2740	Ilex aquifolium (c)	12.50	.5	4	4	1.41	.50	1
2754	Rosa canina (g)	12.50	.1	1	1	.35	.13	1

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Sample number	41	42	43	44	45	46	47	48	
Deschampsia flexuosa	4	5	1	4	1	1	1	1	V
Lonicera periclymenum (s)	1	1	3	1	1	1	1	1	V
Betula pubescens (c)	4	5	2	9		5	7	4	V
Dryopteris dilatata	1	1	1	1		1	1	1	V
Oxalis acetosella		1	1	1	1	1	1	3	V
Pteridium aquilinum	1	1	7	8	4	1	9		V
Teucrium scorodonia	1		1		1	1	1	1	IV
Quercus petraea (c)	9	7				7	4	7	IV
Rubus fruticosus agg.		1	1		3		1	1	IV
Sorbus aucuparia (g)		1	1			1	1	1	IV
Agrostis capillaris	1		1			1	1		III
Dryopteris filix-mas		1	4		1			1	III
Ajuga reptans			1		1			1	II
Anemone nemorosa			1				1	1	II
Galium saxatile		1		1			1		II
Holcus lanatus			1		1		1		II
Mercurialis perennis			1		5			1	II
Potentilla sterilis			1		1			1	II
Thelypteris phegopteris			3		1			1	II
Vaccinium myrtillus	5	5		1					II
Viola riviniana			1		1			1	II
Acer pseudoplatanus (g)	1					1		1	II
Agrostis stolonifera				1	1				II
Athyrium filix-femina			1		1				II
Blechnum spicant	1			1					II
Cardamine hirsuta					1			1	II
Circaea lutetiana			1		1				II
Digitalis purpurea			1		1				II
Festuca ovina	1		1						II
Fragaria vesca					1			1	II
Galium aparine			1		1				II
Geranium robertianum			1		1				II
Holcus mollis			5					1	II
Juncus effusus					1		1		II
Luzula multiflora						1	1		II
Lysimachia nemorum					1			1	II
Poa nemoralis					1			1	II
Stellaria media			1		1				II
Urtica dicica			1		3				II
Crataegus monogyna (g)			1					1	II
Fraxinus excelsior (g)							1	1	II
Ilex aquifolium (g)			1			1			II
Quercus petraea (g)			1		1				II
Corylus avellana (c)			7					5	II
Acer pseudoplatanus (c)					2				I
Alnus glutinosa (c)								2	I
Anthoxanthum odoratum			1						I
Campanula rotundifolia	1								I
Carex sylvatica					1				I
Chrysosplenium oppositifolium					1				I
Cirsium arvense			1						I
Cirsium palustre			1						I
Deschampsia cespitosa cespitos								1	I
Hyacinthoides nonscripta			1						I
Epilobium montanum					1				I
Filipendula ulmaria					1				I
Fraxinus excelsior (c)					9				I
Galeopsis tetrahit			1						I
Galium palustre					1				I
Geum urbanum					1				I
Hypericum perforatum					1				I
Hypericum pulchrum					1				I
Luzula pilosa						1			I
Moehringia trinervia			1						I
Plantago major					1				I
Primula vulgaris								1	I
Ranunculus repens					1				I
Rubus idaeus					1				I
Rumex acetosella							1		I
Scrophularia nodosa					1				I
Senecio jacobaea					1				I
Solidago virgaurea	1								I
Stachys sylvatica					1				I

Stellaria holostea			3						I
Salix caprea (c)								3	I
Crataegus monogyna (c)				1					I
Sambucus nigra (c)			3						I

Number of species per sample 14 12 39 11 43 14 18 29 0

Mean and standard error for complete data set.
Mean number of species per releve = 22.50; standard error of the mean = 4.516

lbirks
Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
478	Deschampsia flexuosa	100.00	2.3	1	5	1.75	.62	8
2646	Lonicera periclymenum (s)	100.00	1.3	1	3	.71	.25	8
236	Betula pubescens (c)	87.50	4.5	2	9	2.78	.98	7
499	Dryopteris dilatata	87.50	.9	1	1	.35	.13	7
932	Oxalis acetosella	87.50	1.1	1	3	.83	.30	7
1066	Pteridium aquilinum	87.50	3.9	1	9	3.64	1.29	7
1321	Teucrium scorodonia	75.00	.8	1	1	.46	.16	6
1077	Quercus petraea (c)	62.50	4.3	4	9	3.77	1.33	5
1136	Rubus fruticosus agg.	62.50	.9	1	3	.99	.35	5
2634	Sorbus aucuparia (g)	62.50	.6	1	1	.52	.18	5
123	Agrostis capillaris	50.00	.5	1	1	.53	.19	4
500	Dryopteris filix-mas	50.00	.9	1	4	1.36	.48	4
127	Ajuga reptans	37.50	.4	1	1	.52	.18	3
166	Anemone nemorosa	37.50	.4	1	1	.52	.18	3
610	Galium saxatile	37.50	.4	1	1	.52	.18	3
680	Holcus lanatus	37.50	.4	1	1	.52	.18	3
864	Mercurialis perennis	37.50	.9	1	5	1.73	.61	3
1051	Potentilla sterilis	37.50	.4	1	1	.52	.18	3
1329	Thelypteris phegopteris	37.50	.6	1	3	1.06	.38	3
1375	Vaccinium myrtillus	37.50	1.4	1	5	2.26	.80	3
1429	Viola riviniana	37.50	.4	1	1	.52	.18	3
2601	Acer pseudoplatanus (g)	37.50	.4	1	1	.52	.18	3
122	Agrostis stolonifera	25.00	.3	1	1	.46	.16	2
215	Athyrium filix-femina	25.00	.3	1	1	.46	.16	2
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
293	Cardamine hirsuta	25.00	.3	1	1	.46	.16	2
414	Circaea lutetiana	25.00	.3	1	1	.46	.16	2
482	Digitalis purpurea	25.00	.3	1	1	.46	.16	2
574	Festuca ovina	25.00	.3	1	1	.46	.16	2
587	Fragaria vesca	25.00	.3	1	1	.46	.16	2
605	Galium aparine	25.00	.3	1	1	.46	.16	2
630	Geranium robertianum	25.00	.3	1	1	.46	.16	2
681	Holcus mollis	25.00	.8	1	5	1.75	.62	2
730	Juncus effusus	25.00	.3	1	1	.46	.16	2
809	Luzula multiflora	25.00	.3	1	1	.46	.16	2
825	Lysimachia nemorum	25.00	.3	1	1	.46	.16	2
986	Poa nemoralis	25.00	.3	1	1	.46	.16	2
1298	Stellaria media	25.00	.3	1	1	.46	.16	2
1368	Urtica dioica	25.00	.5	1	3	1.07	.38	2
2611	Crataegus monogyna (g)	25.00	.3	1	1	.46	.16	2
2615	Fraxinus excelsior (g)	25.00	.3	1	1	.46	.16	2
2616	Ilex aquifolium (g)	25.00	.3	1	1	.46	.16	2
2626	Quercus petraea (g)	25.00	.3	1	1	.46	.16	2
2757	Corylus avellana (c)	25.00	1.5	5	7	2.83	1.00	2
103	Acer pseudoplatanus (c)	12.50	.3	2	2	.71	.25	1
153	Alnus glutinosa (c)	12.50	.3	2	2	.71	.25	1
171	Anthoxanthum odoratum	12.50	.1	1	1	.35	.13	1
288	Campanula rotundifolia	12.50	.1	1	1	.35	.13	1
359	Carex sylvatica	12.50	.1	1	1	.35	.13	1
408	Chrysosplenium oppositifoliu	12.50	.1	1	1	.35	.13	1
415	Cirsium arvense	12.50	.1	1	1	.35	.13	1
418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
477	Deschampsia cespitosa cespit	12.50	.1	1	1	.35	.13	1
516	Hyacinthoides nonscripta	12.50	.1	1	1	.35	.13	1
522	Epilobium montanum	12.50	.1	1	1	.35	.13	1
583	Filipendula ulmaria	12.50	.1	1	1	.35	.13	1
589	Fraxinus excelsior (c)	12.50	1.1	9	9	3.18	1.13	1
602	Galeopsis tetrahit	12.50	.1	1	1	.35	.13	1
609	Galium palustre	12.50	.1	1	1	.35	.13	1

634	Geum urbanum	12.50	.1	1	1	.35	.13	1
701	Hypericum perforatum	12.50	.1	1	1	.35	.13	1
702	Hypericum pulchrum	12.50	.1	1	1	.35	.13	1
810	Luzula pilosa	12.50	.1	1	1	.35	.13	1
875	Moehringia trinervia	12.50	.1	1	1	.35	.13	1
974	Plantago major	12.50	.1	1	1	.35	.13	1
1058	Primula vulgaris	12.50	.1	1	1	.35	.13	1
1095	Ranunculus repens	12.50	.1	1	1	.35	.13	1
1137	Rubus idaeus	12.50	.1	1	1	.35	.13	1
1140	Rumex acetosella	12.50	.1	1	1	.35	.13	1
1220	Scrophularia nodosa	12.50	.1	1	1	.35	.13	1
1239	Senecio jacobaea	12.50	.1	1	1	.35	.13	1
1270	Solidago virgaurea	12.50	.1	1	1	.35	.13	1
1293	Stachys sylvatica	12.50	.1	1	1	.35	.13	1
1297	Stellaria holostea	12.50	.4	3	3	1.06	.38	1
2741	Salix caprea (c)	12.50	.4	3	3	1.06	.38	1
2750	Crataegus monogyna (c)	12.50	.1	1	1	.35	.13	1
4314	Sambucus nigra (c)	12.50	.4	3	3	1.06	.38	1

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Sample number	49	50	51	52	53	54	55	56	
Mercurialis perennis	1	1	1		4	7	1	1	V
Rubus fruticosus agg.	4	1	1	1	1	1	1		V
Viola riviniana	1	1	1		1	1	1	1	V
Corylus avellana (c)	6	3	8		5	7	7	5	V
Dryopteris filix-mas	1	1	1	1		1		1	IV
Fraxinus excelsior (c)		3	6		3	7	4	3	IV
Betula pubescens (c)			3	2	3	4	4		IV
Fragaria vesca	1		1		1	1	1		IV
Pteridium aquilinum	4	1		1	3	1			IV
Solidago virgaurea	1	1	1	1	1				IV
Brachypodium sylvaticum	1		1		3	1			III
Dryopteris dilatata	1		1	1		1			III
Quercus petraea (c)		5	2		1		2		III
Taxus baccata (c)		6			3		5	6	III
Acer pseudoplatanus (c)			6		1			1	II
Crataegus monogyna (s)		1	1		1				II
Lysimachia nemorum	1		1			1			II
Potentilla sterilis	1		1			1			II
Prunella vulgaris	1		1			1			II
Rubus idaeus	1				1	1			II
Tamus communis					1	1	1		II
Teucrium scorodonia	1		1	1					II
Ilex aquifolium (g)		1			1			1	II
Sorbus aucuparia (g)		1	1				1		II
Agrostis capillaris	3			1					II
Carex flacca	1				1				II
Carex sylvatica	1		1						II
Circaea lutetiana	1					1			II
Filipendula ulmaria			1			1			II
Geum urbanum		1	1						II
Hypericum pulchrum	1		1						II
Oxalis acetosella	1			1					II
Primula vulgaris	1						1		II
Rubus saxatilis					1	1			II
Lonicera periclymenum (s)			1	1					II
Crataegus monogyna (c)						4	2		II
Agrostis stolonifera	1								I
Anemone nemorosa					1				I
Arctium minus	1								I
Arrhenatherum elatius					1				I
Athyrium filix-femina	1								I
Blechnum spicant	1								I
Carex demissa	1								I
Cirsium palustre	1								I
Dactylis glomerata	1								I
Deschampsia cespitosa cespitos				1					I
Deschampsia flexuosa				3					I
Hyacinthoides nonscripta				1					I
Epipactis atrorubens					1				I
Galium saxatile				1					I
Hedera helix (g)			1						I
Holcus lanatus				1					I
Ilex aquifolium (s)						2			I
Juncus bulbosus	1								I
Juncus conglomeratus	1								I
Juncus effusus	1								I
Melica nutans			1						I
Melica uniflora						1			I
Mentha aquatica	1								I
Plantago major	1								I
Platanthera bifolia					1				I
Potentilla erecta	1								I
Prunus avium (c)			1						I
Rhamnus catharticus					1				I
Rosa canina agg.			1						I
Sorbus aria								2	I
Succisa pratensis					1				I
Ulmus glabra (c)								2	I
Viburnum opulus			1						I
Sorbus aucuparia (s)					2				I
Acer pseudoplatanus (g)							1		I
Betula pubescens (s)	2								I
Crataegus monogyna (g)	1								I

Fraxinus excelsior (s)	2								I
Prunus spinosa (g)		1							I
Quercus petraea (g)					1				I
Taxus baccata (g)		1							I
Ilex aquifolium (c)						2			I
Salix caprea (c)				2					I
Picea abies (c)			9						I
Taraxacum seedling/sp	1								I

Number of species per sample	39	14	31	16	27	23	15	10	0

Mean and standard error for complete data set.
Mean number of species per releve = 21.88; standard error of the mean = 3.507

lwhitbar
Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
864	Mercurialis perennis	87.50	2.0	1	7	2.33	.82	7
1136	Rubus fruticosus agg.	87.50	1.3	1	4	1.16	.41	7
1429	Viola riviniana	87.50	.9	1	1	.35	.13	7
2757	Corylus avellana (c)	87.50	5.1	3	8	2.59	.91	7
500	Dryopteris filix-mas	75.00	.8	1	1	.46	.16	6
589	Fraxinus excelsior (c)	75.00	3.3	3	7	2.49	.88	6
236	Betula pubescens (c)	62.50	2.0	2	4	1.77	.63	5
587	Fragaria vesca	62.50	.6	1	1	.52	.18	5
1066	Pteridium aquilinum	62.50	1.3	1	4	1.49	.53	5
1270	Solidago virgaurea	62.50	.6	1	1	.52	.18	5
247	Brachypodium sylvaticum	50.00	.8	1	3	1.04	.37	4
499	Dryopteris dilatata	50.00	.5	1	1	.53	.19	4
1077	Quercus petraea (c)	50.00	1.3	1	5	1.75	.62	4
1319	Taxus baccata (c)	50.00	2.5	3	6	2.83	1.00	4
103	Acer pseudoplatanus (c)	37.50	1.0	1	6	2.07	.73	3
445	Crataegus monogyna (s)	37.50	.4	1	1	.52	.18	3
825	Lysimachia nemorum	37.50	.4	1	1	.52	.18	3
1051	Potentilla sterilis	37.50	.4	1	1	.52	.18	3
1059	Prunella vulgaris	37.50	.4	1	1	.52	.18	3
1137	Rubus idaeus	37.50	.4	1	1	.52	.18	3
1313	Tamus communis	37.50	.4	1	1	.52	.18	3
1321	Teucrium scorodonia	37.50	.4	1	1	.52	.18	3
2616	Ilex aquifolium (g)	37.50	.4	1	1	.52	.18	3
2634	Sorbus aucuparia (g)	37.50	.4	1	1	.52	.18	3
123	Agrostis capillaris	25.00	.5	1	3	1.07	.38	2
323	Carex flacca	25.00	.3	1	1	.46	.16	2
359	Carex sylvatica	25.00	.3	1	1	.46	.16	2
414	Circaea lutetiana	25.00	.3	1	1	.46	.16	2
583	Filipendula ulmaria	25.00	.3	1	1	.46	.16	2
634	Geum urbanum	25.00	.3	1	1	.46	.16	2
702	Hypericum pulchrum	25.00	.3	1	1	.46	.16	2
932	Oxalis acetosella	25.00	.3	1	1	.46	.16	2
1058	Primula vulgaris	25.00	.3	1	1	.46	.16	2
1138	Rubus saxatilis	25.00	.3	1	1	.46	.16	2
2646	Lonicera periclymenum (s)	25.00	.3	1	1	.46	.16	2
2750	Crataegus monogyna (c)	25.00	.8	2	4	1.49	.53	2
122	Agrostis stolonifera	12.50	.1	1	1	.35	.13	1
166	Anemone nemorosa	12.50	.1	1	1	.35	.13	1
186	Arctium minus	12.50	.1	1	1	.35	.13	1
197	Arrhenatherum elatius	12.50	.1	1	1	.35	.13	1
215	Athyrium filix-femina	12.50	.1	1	1	.35	.13	1
242	Blechnum spicant	12.50	.1	1	1	.35	.13	1
312	Carex demissa	12.50	.1	1	1	.35	.13	1
418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
465	Dactylis glomerata	12.50	.1	1	1	.35	.13	1
477	Deschampsia cespitosa cespit	12.50	.1	1	1	.35	.13	1
478	Deschampsia flexuosa	12.50	.4	3	3	1.06	.38	1
516	*Hyacinthoides nonscripta*	12.50	.1	1	1	.35	.13	1
528	Epipactis atrorubens	12.50	.1	1	1	.35	.13	1
610	Galium saxatile	12.50	.1	1	1	.35	.13	1
652	Hedera helix (g)	12.50	.1	1	1	.35	.13	1
680	Holcus lanatus	12.50	.1	1	1	.35	.13	1
707	Ilex aquifolium (s)	12.50	.3	2	2	.71	.25	1
726	Juncus bulbosus	12.50	.1	1	1	.35	.13	1
729	Juncus conglomeratus	12.50	.1	1	1	.35	.13	1

730	Juncus effusus	12.50	.1	1	1	.35	.13	1
848	Melica nutans	12.50	.1	1	1	.35	.13	1
849	Melica uniflora	12.50	.1	1	1	.35	.13	1
855	Mentha aquatica	12.50	.1	1	1	.35	.13	1
974	Plantago major	12.50	.1	1	1	.35	.13	1
977	Platanthera bifolia	12.50	.1	1	1	.35	.13	1
1046	Potentilla erecta	12.50	.1	1	1	.35	.13	1
1060	Prunus avium (c)	12.50	.1	1	1	.35	.13	1
1105	Rhamnus catharticus	12.50	.1	1	1	.35	.13	1
1122	Rosa canina agg.	12.50	.1	1	1	.35	.13	1
1274	Sorbus aria	12.50	.3	2	2	.71	.25	1
1305	Succisa pratensis	12.50	.1	1	1	.35	.13	1
1365	Ulmus glabra (c)	12.50	.3	2	2	.71	.25	1
1409	Viburnum opulus	12.50	.1	1	1	.35	.13	1
2597	Sorbus aucuparia (s)	12.50	.3	2	2	.71	.25	1
2601	Acer pseudoplatanus (g)	12.50	.1	1	1	.35	.13	1
2604	Betula pubescens (s)	12.50	.3	2	2	.71	.25	1
2611	Crataegus monogyna (g)	12.50	.1	1	1	.35	.13	1
2614	Fraxinus excelsior (s)	12.50	.3	2	2	.71	.25	1
2624	Prunus spinosa (g)	12.50	.1	1	1	.35	.13	1
2626	Quercus petraea (g)	12.50	.1	1	1	.35	.13	1
2636	Taxus baccata (g)	12.50	.1	1	1	.35	.13	1
2740	Ilex aquifolium (c)	12.50	.3	2	2	.71	.25	1
2741	Salix caprea (c)	12.50	.3	2	2	.71	.25	1
2759	Picea abies (c)	12.50	1.1	9	9	3.18	1.13	1
2982	Taraxacum seedling/sp	12.50	.1	1	1	.35	.13	1

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Sample Number	113	114	115	116	117	118	119	120	
Deschampsia flexuosa	3	2	5	2	4	4	2	2	V
Galium saxatile	2	1	1	1	2	1	4	2	V
Rubus fruticosus agg.	2	1	1	1	1	2	2	2	V
Anthoxanthum odoratum	2	2	1	2	1	1	2		V
Quercus petraea (g)	1	1	1	1	1	1	2		V
Agrostis canina		4	4	2	2	1	2		IV
Agrostis capillaris	2	4		1	2	2	4		IV
Dryopteris dilatata			4	2	1	2	2	2	IV
Oxalis acetosella	2	1	1	1		2	2		IV
Pteridium aquilinum		7	4		9	2	8	5	IV
Vaccinium myrtillus		1	5		4	8	2	4	IV
Dryopteris filix-mas	2	1	1	4		2			IV
Betula pubescens (g)		1	1		1		2	1	IV
Calluna vulgaris			1		4	1		8	III
Digitalis purpurea	1	1		2	1				III
Luzula pilosa			1		1		2	2	III
Quercus petraea (c)	8					9	4	6	III
Sorbus aucuparia (g)			1		1	1	2		III
Cardamine hirsuta	1	1		1					II
Polypodium vulgare			1	1	1				II
Teucrium scorodonia			1	2	1				II
Viola riviniana	2	2		1					II
Athyrium filix-femina	2			4					II
Betula pubescens (c)							5	5	II
Blechnum spicant		1		1					II
Carex binervis						1	2		II
Cerastium fontanum triviale		1		1					II
Erica cinerea					1	1			II
Festuca ovina		5			1				II
Hedera helix (g)			1	1					II
Holcus lanatus				1	1				II
Holcus mollis						1	4		II
Hypericum pulchrum		1		1					II
Juncus effusus		1			1				II
Lonicera periclymenum (g)				1	1				II
Luzula multiflora				1			2		II
Poa trivialis	2	2							II
Potentilla erecta		1			1				II
Ranunculus repens		2		1					II
Rubus idaeus		1						1	II
Rumex acetosa	2				2				II
Rumex acetosella		1		1					II
Urtica dioica	1			1					II
Taraxacum seedling/sp		1		1					II
Agrostis stolonifera	1								I
Aira praecox				1					I
Bellis perennis		1							I
Cardamine flexuosa	1								I
Carex panicea		1							I
Cirsium palustre		1							I
Cirsium vulgare		1							I
Corylus avellana (s)	5								I
Dactylis glomerata		1							I
Hyacinthoides nonscripta							2		I
Fragaria vesca	1								I
Galeopsis tetrahit				1					I
Galium aparine				1					I
Geranium robertianum				1					I
Leontodon autumnalis		1							I
Lysimachia nemorum	2								I
Mercurialis perennis	1								I
Molinia caerulea					4				I
Mycelis muralis				1					I
Hieracium pilosella group		1							I
Poa annua				1					I
Poa nemoralis				1					I
Poa pratensis		2							I
Polygala serpyllifolia					1				I
Potentilla sterilis	1								I
Prunella vulgaris		1							I
Prunus avium (c)				4					I

Ranunculus acris	1								I
Rumex sanguineus	1								I
Solidago virgaurea					1				I
Stachys sylvatica				1					I
Stellaria holostea							2		I
Thelypteris limbosperma	2								I
Trifolium repens		4							I
Veronica agrestis		1							I
Veronica chamaedrys		2							I
Veronica officinalis		1							I
Vulpia bromoides		1							I
Acer pseudoplatanus (g)				1					I
Fraxinus excelsior (g)	1								I
Rubus idaeus (g)					1				I

Number of species per sample 27 40 18 37 28 18 21 12 0

Mean and standard error for complete data set.
Mean number of species per releve = 25.13; standard error of the mean = 3.446

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lhaverigg71
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
478	Deschampsia flexuosa	100.00	3.0	2	5	1.20	.42	8
610	Galium saxatile	100.00	1.8	1	4	1.04	.37	8
1136	Rubus fruticosus agg.	100.00	1.5	1	2	.53	.19	8
171	Anthoxanthum odoratum	87.50	1.4	1	2	.74	.26	7
2626	Quercus petraea (g)	87.50	1.0	1	2	.53	.19	7
120	Agrostis canina	75.00	1.9	1	4	1.55	.55	6
123	Agrostis capillaris	75.00	1.9	1	4	1.55	.55	6
499	Dryopteris dilatata	75.00	1.6	1	4	1.30	.46	6
932	Oxalis acetosella	75.00	1.1	1	2	.83	.30	6
1066	Pteridium aquilinum	75.00	4.4	2	9	3.50	1.24	6
1375	Vaccinium myrtillus	75.00	3.0	1	8	2.78	.98	6
500	Dryopteris filix-mas	62.50	1.3	1	4	1.39	.49	5
2605	Betula pubescens (g)	62.50	.8	1	2	.71	.25	5
278	Calluna vulgaris	50.00	1.8	1	8	2.87	1.01	4
482	Digitalis purpurea	50.00	.6	1	2	.74	.26	4
810	Luzula pilosa	50.00	.8	1	2	.89	.31	4
1077	Quercus petraea (c)	50.00	3.4	4	9	3.89	1.38	4
2634	Sorbus aucuparia (g)	50.00	.6	1	2	.74	.26	4
293	Cardamine hirsuta	37.50	.4	1	1	.52	.18	3
1015	Polypodium vulgare	37.50	.4	1	1	.52	.18	3
1321	Teucrium scorodonia	37.50	.5	1	2	.76	.27	3
1429	Viola riviniana	37.50	.6	1	2	.92	.32	3
215	Athyrium filix-femina	25.00	.8	2	4	1.49	.53	2
236	Betula pubescens (c)	25.00	1.3	5	5	2.31	.82	2
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
308	Carex binervis	25.00	.4	1	2	.74	.26	2
384	Cerastium fontanum triviale	25.00	.3	1	1	.46	.16	2
541	Erica cinerea	25.00	.3	1	1	.46	.16	2
574	Festuca ovina	25.00	.8	1	5	1.75	.62	2
652	Hedera helix (g)	25.00	.3	1	1	.46	.16	2
680	Holcus lanatus	25.00	.3	1	1	.46	.16	2
681	Holcus mollis	25.00	.6	1	4	1.41	.50	2
702	Hypericum pulchrum	25.00	.3	1	1	.46	.16	2
730	Juncus effusus	25.00	.3	1	1	.46	.16	2
798	Lonicera periclymenum (g)	25.00	.3	1	1	.46	.16	2
809	Luzula multiflora	25.00	.4	1	2	.74	.26	2
990	Poa trivialis	25.00	.5	2	2	.93	.33	2
1046	Potentilla erecta	25.00	.3	1	1	.46	.16	2
1095	Ranunculus repens	25.00	.4	1	2	.74	.26	2
1137	Rubus idaeus	25.00	.3	1	1	.46	.16	2
1139	Rumex acetosa	25.00	.5	2	2	.93	.33	2
1140	Rumex acetosella	25.00	.3	1	1	.46	.16	2
1368	Urtica dioica	25.00	.3	1	1	.46	.16	2
2982	Taraxacum seedling/sp	25.00	.3	1	1	.46	.16	2
122	Agrostis stolonifera	12.50	.1	1	1	.35	.13	1
125	Aira praecox	12.50	.1	1	1	.35	.13	1
230	Bellis perennis	12.50	.1	1	1	.35	.13	1
292	Cardamine flexuosa	12.50	.1	1	1	.35	.13	1
339	Carex panicea	12.50	.1	1	1	.35	.13	1

418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
419	Cirsium vulgare	12.50	.1	1	1	.35	.13	1
441	Corylus avellana (s)	12.50	.6	5	5	1.77	.63	1
465	Dactylis glomerata	12.50	.1	1	1	.35	.13	1
516	Hyacinthoides nonscripta	12.50	.3	2	2	.71	.25	1
587	Fragaria vesca	12.50	.1	1	1	.35	.13	1
602	Galeopsis tetrahit	12.50	.1	1	1	.35	.13	1
605	Galium aparine	12.50	.1	1	1	.35	.13	1
630	Geranium robertianum	12.50	.1	1	1	.35	.13	1
768	Leontodon autumnalis	12.50	.1	1	1	.35	.13	1
825	Lysimachia nemorum	12.50	.3	2	2	.71	.25	1
864	Mercurialis perennis	12.50	.1	1	1	.35	.13	1
876	Molinia caerulea	12.50	.5	4	4	1.41	.50	1
882	Mycelis muralis	12.50	.1	1	1	.35	.13	1
965	Hieracium pilosella group	12.50	.1	1	1	.35	.13	1
981	Poa annua	12.50	.1	1	1	.35	.13	1
986	Poa nemoralis	12.50	.1	1	1	.35	.13	1
988	Poa pratensis	12.50	.3	2	2	.71	.25	1
994	Polygala serpyllifolia	12.50	.1	1	1	.35	.13	1
1051	Potentilla sterilis	12.50	.1	1	1	.35	.13	1
1059	Prunella vulgaris	12.50	.1	1	1	.35	.13	1
1060	Prunus avium (c)	12.50	.5	4	4	1.41	.50	1
1081	Ranunculus acris	12.50	.1	1	1	.35	.13	1
1148	Rumex sanguineus	12.50	.1	1	1	.35	.13	1
1270	Solidago virgaurea	12.50	.1	1	1	.35	.13	1
1293	Stachys sylvatica	12.50	.1	1	1	.35	.13	1
1297	Stellaria holostea	12.50	.3	2	2	.71	.25	1
1327	Thelypteris limbosperma	12.50	.3	2	2	.71	.25	1
1350	Trifolium repens	12.50	.5	4	4	1.41	.50	1
1390	Veronica agrestis	12.50	.1	1	1	.35	.13	1
1396	Veronica chamaedrys	12.50	.3	2	2	.71	.25	1
1401	Veronica officinalis	12.50	.1	1	1	.35	.13	1
1433	Vulpia bromoides	12.50	.1	1	1	.35	.13	1
2601	Acer pseudoplatanus (g)	12.50	.1	1	1	.35	.13	1
2615	Fraxinus excelsior (g)	12.50	.1	1	1	.35	.13	1
2764	Rubus idaeus (g)	12.50	.1	1	1	.35	.13	1

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Sample Number	121	122	123	124	125	126	127	128	
Oxalis acetosella	2	2	2	2	2	4	1	4	V
Agrostis capillaris	2	4	2		4	1	5	5	V
Dryopteris dilatata	2	2	2	4	2	2		1	V
Rubus fruticosus agg.	2	1	2	2	2	2		1	V
Anthoxanthum odoratum	1	4	2	2			1	5	IV
Athyrium filix-femina	2	4	2	1	1	1			IV
Deschampsia cespitosa cespitos	2	1			2	9	4	2	IV
Deschampsia flexuosa	4	4	1	1			1	2	IV
Digitalis purpurea	1	2	1		2		1	1	IV
Dryopteris filix-mas	1	1	2	1	2	1			IV
Hyacinthoides nonscripta	1	4	2	4		2		2	IV
Fraxinus excelsior (g)	2	2	1	2	2	1			IV
Circaea lutetiana	2	4	4	2		1			IV
Corylus avellana (s)	2	3	4	7	4				IV
Lonicera periclymenum (g)	5	2		2		1		1	IV
Luzula pilosa	2	4	2		2	1			IV
Quercus petraea (c)	6	7	3	3		2			IV
Silene dioica	1		1	2	2			1	IV
Veronica montana	2	2	1	4	2				IV
Acer pseudoplatanus (g)	1	2	1	2	1				IV
Quercus petraea (g)	1		1	1	1			1	IV
Alnus glutinosa (c)	4		4	2	5				III
Betula pubescens (c)	2			4		2		6	III
Chrysosplenium oppositifolium	2		1	2	1				III
Crataegus monogyna (s)				2	2		5	1	III
Fraxinus excelsior (c)		2	5	4	1				III
Galium saxatile		1			2	1		4	III
Geranium robertianum	2	1	2		2				III
Geum urbanum	2	1	2	4					III
Holcus lanatus	1					1	5	5	III
Holcus mollis		4		2	4	1			III
Mercurialis perennis	5	1	4	4					III
Ranunculus repens	1		1				4	1	III
Salix caprea (c)		2	3	4	3				III
Acer pseudoplatanus (c)	5			4		5			II
Ajuga reptans			1	2	1				II
Brachypodium sylvaticum			2	1	1				II
Dactylis glomerata					1		1	1	II
Hedera helix (g)		1	1		1				II
Hieracium 'indeterminate'		1	1					1	II
Lysimachia nemorum			1	1	2				II
Melica uniflora	2				1	1			II
Rumex acetosa					1		2	4	II
Sambucus nigra (s)				2	2			2	II
Stellaria holostea				2		2		1	II
Teucrium scorodonia	2	2	1						II
Viola riviniana		1		1			1		II
Corylus avellana (g)		1		1	1				II
Ilex aquifolium (g)		1	1	1					II
Sorbus aucuparia (g)		1	1		1				II
Blechnum spicant	1		1						II
Cardamine pratensis	1						1		II
Epilobium montanum	2		2						II
Poa trivialis					1			1	II
Potentilla erecta					1		1		II
Potentilla sterilis			1	1					II
Prunella vulgaris				1			1		II
Rosa canina agg.				1				1	II
Rubus idaeus	2			4					II
Sorbus aucuparia (c)		4	7						II
Stachys sylvatica				1				1	II
Urtica dioica				1				2	II
Veronica chamaedrys							1	1	II
Betula pubescens (g)	1	1							II
Prunus padus (g)	1		1						II
Ilex aquifolium (c)		2			3				II
Achillea millefolium							2		I
Allium ursinum	2								I
Anemone nemorosa					1				I
Angelica sylvestris							1		I
Bellis perennis							1		I

Campanula rotundifolia							1		I
Cardamine hirsuta	1								I
Carex sylvatica			1						I
Centaurea nigra						1			I
Cerastium fontanum triviale						1			I
Epilobium angustifolium							1		I
Cirsium arvense						2			I
Cirsium palustre						1			I
Crepis paludosa	1								I
Cynosurus cristatus						5			I
Epilobium hirsutum			1						I
Epipactis helleborine				1					I
Equisetum arvense			1						I
Festuca gigantea					1				I
Filipendula ulmaria			2						I
Fragaria vesca			1						I
Galium aparine	1								I
Heracleum sphondylium							1		I
Hypericum pulchrum		1							I
Juncus conglomeratus							1		I
Juncus effusus						2			I
Leontodon autumnalis						2			I
Lolium perenne						4			I
Luzula sylvatica	2								I
Mycelis muralis			1						I
Phyllitis scolopendrium	1								I
Plantago lanceolata						1			I
Plantago major						2			I
Poa annua						1			I
Poa nemoralis			1						I
Polygonum hydropiper						1			I
Primula vulgaris				1					I
Pteridium aquilinum		1							I
Ranunculus acris			1						I
Ribes uva-crispa	1								I
Sanicula europaea	1								I
Senecio aquaticus				1					I
Solidago virgaurea		1							I
Stellaria media						1			I
Succisa pratensis						1			I
Trifolium pratense						1			I
Trifolium repens						4			I
Ulmus glabra (c)		2							I
Veronica beccabunga				1					I
Sorbus aucuparia (s)					2				I
Crataegus monogyna (g)						1			I
Fraxinus excelsior (s)	2								I
Ulmus glabra (s)	1								I
Ulmus glabra (g)			1						I
Rhododendron ponticum (g)	1								I
Taraxacum seedling/sp						1			I
Number of species per sample	49	40	45	45	41	22	37	31	0

Mean and standard error for complete data set.
Mean number of species per releve = 38.75; standard error of the mean = 3.087

1pikegill71
Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
932	Oxalis acetosella	100.00	2.4	1	4	1.06	.38	8
123	Agrostis capillaris	87.50	2.9	1	5	1.89	.67	7
499	Dryopteris dilatata	87.50	1.9	1	4	1.13	.40	7
1136	Rubus fruticosus agg.	87.50	1.5	1	2	.76	.27	7
171	Anthoxanthum odoratum	75.00	1.9	1	5	1.81	.64	6
215	Athyrium filix-femina	75.00	1.4	1	4	1.30	.46	6
477	Deschampsia cespitosa cespit	75.00	2.5	1	9	2.93	1.04	6
478	Deschampsia flexuosa	75.00	1.6	1	4	1.60	.56	6
482	Digitalis purpurea	75.00	1.0	1	2	.76	.27	6
500	Dryopteris filix-mas	75.00	1.0	1	2	.76	.27	6
516	Hyacinthoides nonscripta	75.00	1.9	1	4	1.55	.55	6
2615	Fraxinus excelsior (g)	75.00	1.3	1	2	.89	.31	6

414	Circaea lutetiana	62.50	1.6	1	4	1.69	.60	5
441	Corylus avellana (s)	62.50	2.5	2	7	2.51	.89	5
798	Lonicera periclymenum (g)	62.50	1.4	1	5	1.69	.60	5
810	Luzula pilosa	62.50	1.4	1	4	1.41	.50	5
1077	Quercus petraea (c)	62.50	2.6	2	7	2.72	.96	5
1254	Silene dioica	62.50	.9	1	2	.83	.30	5
1400	Veronica montana	62.50	1.4	1	4	1.41	.50	5
2601	Acer pseudoplatanus (g)	62.50	.9	1	2	.83	.30	5
2626	Quercus petraea (g)	62.50	.6	1	1	.52	.18	5
153	Alnus glutinosa (c)	50.00	1.9	2	5	2.17	.77	4
236	Betula pubescens (c)	50.00	1.8	2	6	2.25	.80	4
408	Chrysosplenium oppositifoliu	50.00	.8	1	2	.89	.31	4
445	Crataegus monogyna (s)	50.00	1.3	1	5	1.75	.62	4
589	Fraxinus excelsior (c)	50.00	1.5	1	5	2.00	.71	4
610	Galium saxatile	50.00	1.0	1	4	1.41	.50	4
630	Geranium robertianum	50.00	.9	1	2	.99	.35	4
634	Geum urbanum	50.00	1.1	1	4	1.46	.52	4
680	Holcus lanatus	50.00	1.5	1	5	2.20	.78	4
681	Holcus mollis	50.00	1.4	1	4	1.77	.63	4
864	Mercurialis perennis	50.00	1.8	1	5	2.19	.77	4
1095	Ranunculus repens	50.00	.9	1	4	1.36	.48	4
2741	Salix caprea (c)	50.00	1.5	2	4	1.69	.60	4
103	Acer pseudoplatanus (c)	37.50	1.8	4	5	2.43	.86	3
127	Ajuga reptans	37.50	.5	1	2	.76	.27	3
247	Brachypodium sylvaticum	37.50	.5	1	2	.76	.27	3
465	Dactylis glomerata	37.50	.4	1	1	.52	.18	3
652	Hedera helix (g)	37.50	.4	1	1	.52	.18	3
675	Hieracium 'indeterminate'	37.50	.4	1	1	.52	.18	3
825	Lysimachia nemorum	37.50	.5	1	2	.76	.27	3
849	Melica uniflora	37.50	.5	1	2	.76	.27	3
1139	Rumex acetosa	37.50	.9	1	4	1.46	.52	3
1187	Sambucus nigra (s)	37.50	.8	2	2	1.04	.37	3
1297	Stellaria holostea	37.50	.6	1	2	.92	.32	3
1321	Teucrium scorodonia	37.50	.6	1	2	.92	.32	3
1429	Viola riviniana	37.50	.4	1	1	.52	.18	3
2610	Corylus avellana (g)	37.50	.4	1	1	.52	.18	3
2616	Ilex aquifolium (g)	37.50	.4	1	1	.52	.18	3
2634	Sorbus aucuparia (g)	37.50	.4	1	1	.52	.18	3
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
295	Cardamine pratensis	25.00	.3	1	1	.46	.16	2
522	Epilobium montanum	25.00	.5	2	2	.93	.33	2
990	Poa trivialis	25.00	.3	1	1	.46	.16	2
1046	Potentilla erecta	25.00	.3	1	1	.46	.16	2
1051	Potentilla sterilis	25.00	.3	1	1	.46	.16	2
1059	Prunella vulgaris	25.00	.3	1	1	.46	.16	2
1122	Rosa canina agg.	25.00	.3	1	1	.46	.16	2
1137	Rubus idaeus	25.00	.8	2	4	1.49	.53	2
1275	Sorbus aucuparia (c)	25.00	1.4	4	7	2.67	.94	2
1293	Stachys sylvatica	25.00	.3	1	1	.46	.16	2
1368	Urtica dioica	25.00	.4	1	2	.74	.26	2
1396	Veronica chamaedrys	25.00	.3	1	1	.46	.16	2
2605	Betula pubescens (g)	25.00	.3	1	1	.46	.16	2
2623	Prunus padus (g)	25.00	.3	1	1	.46	.16	2
2740	Ilex aquifolium (c)	25.00	.6	2	3	1.19	.42	2
104	Achillea millefolium	12.50	.3	2	2	.71	.25	1
151	Allium ursinum	12.50	.3	2	2	.71	.25	1
166	Anemone nemorosa	12.50	.1	1	1	.35	.13	1
167	Angelica sylvestris	12.50	.1	1	1	.35	.13	1
230	Bellis perennis	12.50	.1	1	1	.35	.13	1
288	Campanula rotundifolia	12.50	.1	1	1	.35	.13	1
293	Cardamine hirsuta	12.50	.1	1	1	.35	.13	1
359	Carex sylvatica	12.50	.1	1	1	.35	.13	1
371	Centaurea nigra	12.50	.1	1	1	.35	.13	1
384	Cerastium fontanum triviale	12.50	.1	1	1	.35	.13	1
391	Epilobium angustifolium	12.50	.1	1	1	.35	.13	1
415	Cirsium arvense	12.50	.3	2	2	.71	.25	1
418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
449	Crepis paludosa	12.50	.1	1	1	.35	.13	1
460	Cynosurus cristatus	12.50	.6	5	5	1.77	.63	1
521	Epilobium hirsutum	12.50	.1	1	1	.35	.13	1
530	Epipactis helleborine	12.50	.1	1	1	.35	.13	1
532	Equisetum arvense	12.50	.1	1	1	.35	.13	1
573	Festuca gigantea	12.50	.1	1	1	.35	.13	1
583	Filipendula ulmaria	12.50	.3	2	2	.71	.25	1
587	Fragaria vesca	12.50	.1	1	1	.35	.13	1
605	Galium aparine	12.50	.1	1	1	.35	.13	1
661	Heracleum sphondylium	12.50	.1	1	1	.35	.13	1

702	Hypericum pulchrum	12.50	.1	1	1	.35	.13	1
729	Juncus conglomeratus	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.3	2	2	.71	.25	1
768	Leontodon autumnalis	12.50	.3	2	2	.71	.25	1
796	Lolium perenne	12.50	.5	4	4	1.41	.50	1
812	Luzula sylvatica	12.50	.3	2	2	.71	.25	1
882	Mycelis muralis	12.50	.1	1	1	.35	.13	1
962	Phyllitis scolopendrium	12.50	.1	1	1	.35	.13	1
973	Plantago lanceolata	12.50	.1	1	1	.35	.13	1
974	Plantago major	12.50	.3	2	2	.71	.25	1
981	Poa annua	12.50	.1	1	1	.35	.13	1
986	Poa nemoralis	12.50	.1	1	1	.35	.13	1
1004	Polygonum hydropiper	12.50	.1	1	1	.35	.13	1
1058	Primula vulgaris	12.50	.1	1	1	.35	.13	1
1066	Pteridium aquilinum	12.50	.1	1	1	.35	.13	1
1081	Ranunculus acris	12.50	.1	1	1	.35	.13	1
1114	Ribes uva-crispa	12.50	.1	1	1	.35	.13	1
1191	Sanicula europaea	12.50	.1	1	1	.35	.13	1
1236	Senecio aquaticus	12.50	.1	1	1	.35	.13	1
1270	Solidago virgaurea	12.50	.1	1	1	.35	.13	1
1298	Stellaria media	12.50	.1	1	1	.35	.13	1
1305	Succisa pratensis	12.50	.1	1	1	.35	.13	1
1349	Trifolium pratense	12.50	.1	1	1	.35	.13	1
1350	Trifolium repens	12.50	.5	4	4	1.41	.50	1
1365	Ulmus glabra (c)	12.50	.3	2	2	.71	.25	1
1394	Veronica beccabunga	12.50	.1	1	1	.35	.13	1
2597	Sorbus aucuparia (s)	12.50	.3	2	2	.71	.25	1
2611	Crataegus monogyna (g)	12.50	.1	1	1	.35	.13	1
2614	Fraxinus excelsior (s)	12.50	.3	2	2	.71	.25	1
2640	Ulmus glabra (s)	12.50	.1	1	1	.35	.13	1
2641	Ulmus glabra (g)	12.50	.1	1	1	.35	.13	1
2946	Rhododendron ponticum (g)	12.50	.1	1	1	.35	.13	1
2982	Taraxacum seedling/sp	12.50	.1	1	1	.35	.13	1

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Sample Number	129	130	131	132	133	134	135	136	
Dryopteris dilatata	7	4	4	4	4	4	2	5	V
Acer pseudoplatanus (g)	1	1	1	1	1	1	1	1	V
Fraxinus excelsior (g)	2	1	2	1	2	1	1	2	V
Athyrium filix-femina	1	1	1	2	2		2	2	V
Dryopteris filix-mas	4	4	4	4	2	1		2	V
Oxalis acetosella	1	1	4		4	2	4	1	V
Agrostis capillaris	1	2	4	1	1		8		IV
Acer pseudoplatanus (c)		2	8	4	3			4	IV
Deschampsia cespitosa cespitos		1	1	1	1		1		IV
Digitalis purpurea		1		1	1		1	1	IV
Rubus fruticosus agg.	1	4	2	5	2				IV
Ulmus glabra (g)	1		1	1	1		1		IV
Circaea lutetiana	2	1	1		2				III
Hyacinthoides nonscripta	2		2		2			2	III
Epilobium montanum	1	2		1	2				III
Mercurialis perennis	1	2			2			1	III
Poa nemoralis	1	1			2		1		III
Rubus idaeus		1	4	4	2				III
Ulmus glabra (c)	6	5		5	7				III
Urtica dioica	2	2			1		1		III
Crataegus monogyna (g)		1	1			1		1	III
Fagus sylvatica (g)	1		1	1				1	III
Ilex aquifolium (g)		1	1	1				1	III
Sorbus aucuparia (g)			1	1			1	1	III
Epilobium angustifolium		1	1	1					II
Deschampsia flexuosa		1				6	4		II
Fagus sylvatica (c)				3		4	3		II
Fraxinus excelsior (c)	2	2			4				II
Holcus lanatus	1	1					4		II
Quercus petraea (g)			1			1		1	II
Dactylis glomerata			1	1					II
Galium saxatile						1	1		II
Geum urbanum		1			1				II
Holcus mollis		2	4						II
Larix decidua (c)						6	6		II
Moehringia trinervia		1						1	II
Quercus petraea (c)	2							4	II
Ranunculus acris		1					2		II
Thelypteris limbosperma		1		1					II
Veronica montana		1	1						II
Abies alba		4	3						II
Agrostis stolonifera			1						I
Blechnum spicant		1							I
Cardamine hirsuta	1								I
Cardamine pratensis					1				I
Chrysosplenium oppositifolium					1				I
Crataegus monogyna (s)					2				I
Lonicera periclymenum (g)								1	I
Lysimachia nemorum			2						I
Prunus padus (s)	1								I
Pteridium aquilinum		1							I
Silene dioica			1						I
Stachys sylvatica		1							I
Stellaria alsine							1		I
Stellaria graminea		1							I
Stellaria holostea								1	I
Stellaria media		2							I
Gymnocarpium dryopteris								1	I
Viola riviniana		1							I
Sorbus aucuparia (s)								2	I
Betula pubescens (g)		1							I
Rosa canina (g)		1							I
Rhododendron ponticum (g)		1							I
Taraxacum seedling/sp		1							I
Number of species per sample	22	41	27	21	25	11	19	21	0

Mean and standard error for complete data set.
Mean number of species per releve = 23.38; standard error of the mean = 3.023

lrottenbutts71
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
499	Dryopteris dilatata	100.00	4.3	2	7	1.39	.49	8
2601	Acer pseudoplatanus (g)	100.00	1.0	1	1	.00	.00	8
2615	Fraxinus excelsior (g)	100.00	1.5	1	2	.53	.19	8
215	Athyrium filix-femina	87.50	1.4	1	2	.74	.26	7
500	Dryopteris filix-mas	87.50	2.6	1	4	1.60	.56	7
932	Oxalis acetosella	87.50	2.1	1	4	1.64	.58	7
123	Agrostis capillaris	75.00	2.1	1	8	2.70	.95	6
103	Acer pseudoplatanus (c)	62.50	2.6	2	8	2.77	.98	5
477	Deschampsia cespitosa cespit	62.50	.6	1	1	.52	.18	5
482	Digitalis purpurea	62.50	.6	1	1	.52	.18	5
1136	Rubus fruticosus agg.	62.50	1.8	1	5	1.91	.67	5
2641	Ulmus glabra (g)	62.50	.6	1	1	.52	.18	5
414	Circaea lutetiana	50.00	.8	1	2	.89	.31	4
516	Hyacinthoides nonscripta	50.00	1.0	2	2	1.07	.38	4
522	Epilobium montanum	50.00	.8	1	2	.89	.31	4
864	Mercurialis perennis	50.00	.8	1	2	.89	.31	4
986	Poa nemoralis	50.00	.6	1	2	.74	.26	4
1137	Rubus idaeus	50.00	1.4	1	4	1.77	.63	4
1365	Ulmus glabra (c)	50.00	2.9	5	7	3.14	1.11	4
1368	Urtica dioica	50.00	.8	1	2	.89	.31	4
2611	Crataegus monogyna (g)	50.00	.5	1	1	.53	.19	4
2613	Fagus sylvatica (g)	50.00	.5	1	1	.53	.19	4
2616	Ilex aquifolium (g)	50.00	.5	1	1	.53	.19	4
2634	Sorbus aucuparia (g)	50.00	.5	1	1	.53	.19	4
391	Epilobium angustifolium	37.50	.4	1	1	.52	.18	3
478	Deschampsia flexuosa	37.50	1.4	1	6	2.33	.82	3
570	Fagus sylvatica (c)	37.50	1.3	3	4	1.75	.62	3
589	Fraxinus excelsior (c)	37.50	1.0	2	4	1.51	.53	3
680	Holcus lanatus	37.50	.8	1	4	1.39	.49	3
2626	Quercus petraea (g)	37.50	.4	1	1	.52	.18	3
465	Dactylis glomerata	25.00	.3	1	1	.46	.16	2
610	Galium saxatile	25.00	.3	1	1	.46	.16	2
634	Geum urbanum	25.00	.3	1	1	.46	.16	2
681	Holcus mollis	25.00	.8	2	4	1.49	.53	2
755	Larix decidua (c)	25.00	1.5	6	6	2.78	.98	2
875	Moehringia trinervia	25.00	.3	1	1	.46	.16	2
1077	Quercus petraea (c)	25.00	.8	2	4	1.49	.53	2
1081	Ranunculus acris	25.00	.4	1	2	.74	.26	2
1327	Thelypteris limbosperma	25.00	.3	1	1	.46	.16	2
1400	Veronica montana	25.00	.3	1	1	.46	.16	2
3365	Abies alba	25.00	.9	3	4	1.64	.58	2
122	Agrostis stolonifera	12.50	.1	1	1	.35	.13	1
242	Blechnum spicant	12.50	.1	1	1	.35	.13	1
293	Cardamine hirsuta	12.50	.1	1	1	.35	.13	1
295	Cardamine pratensis	12.50	.1	1	1	.35	.13	1
408	Chrysosplenium oppositifoliu	12.50	.1	1	1	.35	.13	1
445	Crataegus monogyna (s)	12.50	.3	2	2	.71	.25	1
798	Lonicera periclymenum (g)	12.50	.1	1	1	.35	.13	1
825	Lysimachia nemorum	12.50	.3	2	2	.71	.25	1
1064	Prunus padus (s)	12.50	.1	1	1	.35	.13	1
1066	Pteridium aquilinum	12.50	.1	1	1	.35	.13	1
1254	Silene dioica	12.50	.1	1	1	.35	.13	1
1293	Stachys sylvatica	12.50	.1	1	1	.35	.13	1
1295	Stellaria alsine	12.50	.1	1	1	.35	.13	1
1296	Stellaria graminea	12.50	.1	1	1	.35	.13	1
1297	Stellaria holostea	12.50	.1	1	1	.35	.13	1
1298	Stellaria media	12.50	.3	2	2	.71	.25	1
1326	Gymnocarpium dryopteris	12.50	.1	1	1	.35	.13	1
1429	Viola riviniana	12.50	.1	1	1	.35	.13	1
2597	Sorbus aucuparia (s)	12.50	.3	2	2	.71	.25	1
2605	Betula pubescens (g)	12.50	.1	1	1	.35	.13	1
2754	Rosa canina (g)	12.50	.1	1	1	.35	.13	1
2946	Rhododendron ponticum (g)	12.50	.1	1	1	.35	.13	1
2982	Taraxacum seedling/sp	12.50	.1	1	1	.35	.13	1

Eaves Wood 1971

Sample Number	137	138	139	140	141	142	143	144	
Mercurialis perennis	4	1	5	2	1	4	2	4	V
Rubus fruticosus agg.	1	2	2	2	2	2	2	4	V
Viola riviniana	1	1	1	2	2	2	2	2	V
Fraxinus excelsior (g)	1	1	2	2	1	1	1	1	V
Taxus baccata (g)	1	1	1	1	2	1	2	1	V
Corylus avellana (s)	4	4	5	5	5	7	7		V
Fragaria vesca	2	1			4	2	2	1	IV
Brachypodium sylvaticum				1	2	2	1	4	IV
Dryopteris filix-mas	1	1		1	1			1	IV
Fraxinus excelsior (c)	5	3				2	5	6	IV
Rosa canina agg.	1	1		1	1			1	IV
Taxus baccata (c)		4			7	4	6	6	IV
Teucrium scorodonia			1		2	1	2	2	IV
Ilex aquifolium (g)		1	1	1		1	1		IV
Acer pseudoplatanus (c)	4	4	4	7					III
Carex sylvatica	1			1		1		1	III
Epilobium montanum	1	1			1			1	III
Festuca rubra				1	1		2	1	III
Lonicera periclymenum (g)	2	1				4		1	III
Phyllitis scolopendrium	2	1			2	1			III
Pinus sylvestris (c)				4	4	4	2		III
Potentilla sterilis	1			1		1		1	III
Solidago virgaurea			1		1		2	2	III
Acer pseudoplatanus (g)		1	1	1				1	III
Crataegus monogyna (g)		1			1		1	1	III
Sorbus aucuparia (g)		1			1		1	1	III
Ligustrum vulgare (g)		1			4		1	4	III
Agrostis stolonifera	1			1				2	II
Convallaria majalis	1					2		1	II
Geum urbanum	1			1	1				II
Hedera helix (g)	5	2						1	II
Pteridium aquilinum				2		2	4		II
Quercus petraea (c)	2	4					3		II
Senecio jacobaea			1		1			1	II
Tamus communis						1	1	1	II
Quercus petraea (g)					2	1		1	II
Taraxacum seedling/sp	1			1				1	II
Anemone nemorosa	1	1							II
Arum maculatum	1	1							II
Carex flacca				1				1	II
Circaea lutetiana	1			1					II
Crataegus monogyna (s)						1		1	II
Dactylis glomerata	1			1					II
Dryopteris dilatata	1	1							II
Hyacinthoides nonscripta	1					1			II
Filipendula ulmaria							1	1	II
Geranium robertianum	2							1	II
Larix decidua (c)						3		3	II
Melica uniflora						1	2		II
Polypodium vulgare	1	1							II
Potentilla erecta				1				1	II
Primula vulgaris	1							2	II
Tilia cordata	5	4							II
Veronica officinalis	1				1				II
Corylus avellana (g)				1			1		II
Agrostis capillaris					2				I
Asplenium ruta-muraria							1		I
Bromus ramosus								1	I
Campanula rotundifolia					1				I
Cardamine pratensis	1								I
Centaurea nigra								1	I
Cirsium palustre								1	I
Cirsium vulgare								1	I
Daphne mezereum		1							I
Epipactis helleborine							1		I
Fagus sylvatica (c)			3						I
Galium aparine	1								I
Glechoma hederacea	1								I
Helianthemum nummularium					1				I
Hieracium 'indeterminate'								1	I
Holcus lanatus								1	I
Hypericum perforatum								1	I

Hypericum pulchrum							2	I
Inula conyza							1	I
Moehringia trinervia	2							I
Poa annua			1					I
Poa pratensis				2				I
Polygonatum odoratum		1						I
Prunella vulgaris							2	I
Prunus spinosa (s)							3	I
Ranunculus repens							1	I
Rhamnus catharticus	1							I
Ribes uva-crispa			1					I
Rubus idaeus			1					I
Sambucus nigra (s)			2					I
Sesleria albicans					2			I
Sorbus aucuparia (c)		2						I
Trifolium pratense							1	I
Trifolium repens							1	I
Tussilago farfara							1	I
Ulmus glabra (c)	3							I
Urtica dioica	1							I
Sorbus aucuparia (s)							4	I
Betula pubescens (s)							4	I
Betula pubescens (g)				1				I
Fagus sylvatica (g)							1	I
Larix decidua (g)				1				I
Pinus sylvestris (g)				2				I
Prunus avium (g)							1	I
Sambucus nigra (g)		1						I
Ulmus glabra (g)	1							I
Salix caprea (c)							1	I
Rosa canina (g)						1		I
Cornus sanguinea (g)			1					I
Euonymus europaeus (g)		1						I

Number of species per sample 41 32 13 30 31 25 28 56 0

Mean and standard error for complete data set.
Mean number of species per releve = 32.00; standard error of the mean = 4.408

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eaveswood71
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
864	Mercurialis perennis	100.00	2.9	1	5	1.55	.55	8
1136	Rubus fruticosus agg.	100.00	2.1	1	4	.83	.30	8
1429	Viola riviniana	100.00	1.6	1	2	.52	.18	8
2615	Fraxinus excelsior (g)	100.00	1.3	1	2	.46	.16	8
2636	Taxus baccata (g)	100.00	1.3	1	2	.46	.16	8
441	Corylus avellana (s)	87.50	4.6	4	7	2.20	.78	7
587	Fragaria vesca	75.00	1.5	1	4	1.31	.46	6
247	Brachypodium sylvaticum	62.50	1.3	1	4	1.39	.49	5
500	Dryopteris filix-mas	62.50	.6	1	1	.52	.18	5
589	Fraxinus excelsior (c)	62.50	2.6	2	6	2.50	.89	5
1122	Rosa canina agg.	62.50	.6	1	1	.52	.18	5
1319	Taxus baccata (c)	62.50	3.4	4	7	2.97	1.05	5
1321	Teucrium scorodonia	62.50	1.0	1	2	.93	.33	5
2616	Ilex aquifolium (g)	62.50	.6	1	1	.52	.18	5
103	Acer pseudoplatanus (c)	50.00	2.4	4	7	2.72	.96	4
359	Carex sylvatica	50.00	.5	1	1	.53	.19	4
522	Epilobium montanum	50.00	.5	1	1	.53	.19	4
576	Festuca rubra	50.00	.6	1	2	.74	.26	4
798	Lonicera periclymenum (g)	50.00	1.0	1	4	1.41	.50	4
962	Phyllitis scolopendrium	50.00	.8	1	2	.89	.31	4
971	Pinus sylvestris (c)	50.00	1.8	2	4	1.98	.70	4
1051	Potentilla sterilis	50.00	.5	1	1	.53	.19	4
1270	Solidago virgaurea	50.00	.8	1	2	.89	.31	4
2601	Acer pseudoplatanus (g)	50.00	.5	1	1	.53	.19	4
2611	Crataegus monogyna (g)	50.00	.5	1	1	.53	.19	4
2634	Sorbus aucuparia (g)	50.00	.5	1	1	.53	.19	4
2868	Ligustrum vulgare (g)	50.00	1.3	1	4	1.75	.62	4
122	Agrostis stolonifera	37.50	.5	1	2	.76	.27	3
432	Convallaria majalis	37.50	.5	1	2	.76	.27	3
634	Geum urbanum	37.50	.4	1	1	.52	.18	3

652	Hedera helix (g)	37.50	1.0	1	5	1.77	.63	3
1066	Pteridium aquilinum	37.50	1.0	2	4	1.51	.53	3
1077	Quercus petraea (c)	37.50	1.1	2	4	1.64	.58	3
1239	Senecio jacobaea	37.50	.4	1	1	.52	.18	3
1313	Tamus communis	37.50	.4	1	1	.52	.18	3
2626	Quercus petraea (g)	37.50	.5	1	2	.76	.27	3
2982	Taraxacum seedling/sp	37.50	.4	1	1	.52	.18	3
166	Anemone nemorosa	25.00	.3	1	1	.46	.16	2
201	Arum maculatum	25.00	.3	1	1	.46	.16	2
323	Carex flacca	25.00	.3	1	1	.46	.16	2
414	Circaea lutetiana	25.00	.3	1	1	.46	.16	2
445	Crataegus monogyna (s)	25.00	.3	1	1	.46	.16	2
465	Dactylis glomerata	25.00	.3	1	1	.46	.16	2
499	Dryopteris dilatata	25.00	.3	1	1	.46	.16	2
516	Hyacinthoides nonscripta	25.00	.3	1	1	.46	.16	2
583	Filipendula ulmaria	25.00	.3	1	1	.46	.16	2
630	Geranium robertianum	25.00	.4	1	2	.74	.26	2
755	Larix decidua (c)	25.00	.8	3	3	1.39	.49	2
849	Melica uniflora	25.00	.4	1	2	.74	.26	2
1015	Polypodium vulgare	25.00	.3	1	1	.46	.16	2
1046	Potentilla erecta	25.00	.3	1	1	.46	.16	2
1058	Primula vulgaris	25.00	.4	1	2	.74	.26	2
1334	Tilia cordata	25.00	1.1	4	5	2.10	.74	2
1401	Veronica officinalis	25.00	.3	1	1	.46	.16	2
2610	Corylus avellana (g)	25.00	.3	1	1	.46	.16	2
123	Agrostis capillaris	12.50	.3	2	2	.71	.25	1
206	Asplenium ruta-muraria	12.50	.1	1	1	.35	.13	1
260	Bromus ramosus	12.50	.1	1	1	.35	.13	1
288	Campanula rotundifolia	12.50	.1	1	1	.35	.13	1
295	Cardamine pratensis	12.50	.1	1	1	.35	.13	1
371	Centaurea nigra	12.50	.1	1	1	.35	.13	1
418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
419	Cirsium vulgare	12.50	.1	1	1	.35	.13	1
473	Daphne mezereum	12.50	.1	1	1	.35	.13	1
530	Epipactis helleborine	12.50	.1	1	1	.35	.13	1
570	Fagus sylvatica (c)	12.50	.4	3	3	1.06	.38	1
605	Galium aparine	12.50	.1	1	1	.35	.13	1
637	Glechoma hederacea	12.50	.1	1	1	.35	.13	1
654	Helianthemum nummularium	12.50	.1	1	1	.35	.13	1
675	Hieracium 'indeterminate'	12.50	.1	1	1	.35	.13	1
680	Holcus lanatus	12.50	.1	1	1	.35	.13	1
701	Hypericum perforatum	12.50	.1	1	1	.35	.13	1
702	Hypericum pulchrum	12.50	.3	2	2	.71	.25	1
711	Inula conyza	12.50	.1	1	1	.35	.13	1
875	Moehringia trinervia	12.50	.3	2	2	.71	.25	1
981	Poa annua	12.50	.1	1	1	.35	.13	1
988	Poa pratensis	12.50	.3	2	2	.71	.25	1
997	Polygonatum odoratum	12.50	.1	1	1	.35	.13	1
1059	Prunella vulgaris	12.50	.3	2	2	.71	.25	1
1065	Prunus spinosa (s)	12.50	.4	3	3	1.06	.38	1
1095	Ranunculus repens	12.50	.1	1	1	.35	.13	1
1105	Rhamnus catharticus	12.50	.1	1	1	.35	.13	1
1114	Ribes uva-crispa	12.50	.1	1	1	.35	.13	1
1137	Rubus idaeus	12.50	.1	1	1	.35	.13	1
1187	Sambucus nigra (s)	12.50	.3	2	2	.71	.25	1
1245	Sesleria albicans	12.50	.3	2	2	.71	.25	1
1275	Sorbus aucuparia (c)	12.50	.3	2	2	.71	.25	1
1349	Trifolium pratense	12.50	.1	1	1	.35	.13	1
1350	Trifolium repens	12.50	.1	1	1	.35	.13	1
1360	Tussilago farfara	12.50	.1	1	1	.35	.13	1
1365	Ulmus glabra (c)	12.50	.4	3	3	1.06	.38	1
1368	Urtica dioica	12.50	.1	1	1	.35	.13	1
2597	Sorbus aucuparia (s)	12.50	.5	4	4	1.41	.50	1
2604	Betula pubescens (s)	12.50	.5	4	4	1.41	.50	1
2605	Betula pubescens (g)	12.50	.1	1	1	.35	.13	1
2613	Fagus sylvatica (g)	12.50	.1	1	1	.35	.13	1
2618	Larix decidua (g)	12.50	.1	1	1	.35	.13	1
2620	Pinus sylvestris (g)	12.50	.3	2	2	.71	.25	1
2622	Prunus avium (g)	12.50	.1	1	1	.35	.13	1
2633	Sambucus nigra (g)	12.50	.1	1	1	.35	.13	1
2641	Ulmus glabra (g)	12.50	.1	1	1	.35	.13	1
2741	Salix caprea (c)	12.50	.1	1	1	.35	.13	1
2754	Rosa canina (g)	12.50	.1	1	1	.35	.13	1
2983	Cornus sanguinea (g)	12.50	.1	1	1	.35	.13	1
3138	Euonymus europaeus (g)	12.50	.1	1	1	.35	.13	1

Tynron 1971

Sample Number	145	146	147	148	149	150	151	152	
Deschampsia flexuosa	4	2	4	5	4	2	4	4	V
Pteridium aquilinum	2	5	10	1	7	5	8	8	V
Rubus fruticosus agg.	2	4	2	2	1	4	2	4	V
Viola riviniana	2	2	2	2	2	2	2	1	V
Agrostis canina	6	4	4	5	5		6	4	V
Dryopteris dilatata	1	2	2		2	2	2	2	V
Dryopteris filix-mas		2	2	1	1	2	2	1	V
Galium saxatile	4	4	2	2	4		1	2	V
Holcus lanatus	4	5	4	4	5	2	4		V
Rubus idaeus	1	2	2	1		2	2	2	V
Anthoxanthum odoratum	4	4		4		2	2	4	IV
Juniperus communis communis		7	8		8	8	8	8	IV
Oxalis acetosella		4	2		4	2	4	4	IV
Potentilla erecta	4	2	2	2		2		2	IV
Teucrium scorodonia	2	2	2	2		4		2	IV
Agrostis capillaris	6	4				4	6	4	IV
Calluna vulgaris	4	2	2	6				2	IV
Rosa canina agg.	1	2				2	1	1	IV
Vaccinium myrtillus	4	2	4		2			1	IV
Fraxinus excelsior (g)	1	2			1	2	2		IV
Epilobium angustifolium	2		2	2	1				III
Dactylis glomerata	2		2	1	2				III
Deschampsia cespitosa cespitos		1		2		2	1		III
Hypericum pulchrum	2			2		1		2	III
Agrostis stolonifera		4	2				1		II
Athyrium filix-femina		1			2		2		II
Digitalis purpurea		1			1	1			II
Festuca ovina	4	2		4					II
Holcus mollis					2	4	2		II
Ranunculus repens	2	2	1						II
Arrhenatherum elatius	2			2					II
Campanula rotundifolia	2			2					II
Cirsium palustre			1		1				II
Fraxinus excelsior (c)						4	6		II
Galium aparine			2			2			II
Geranium robertianum			1				2		II
Lonicera periclymenum (g)						2		1	II
Polygala serpyllifolia	1							1	II
Prunus avium (c)		5				4			II
Rumex acetosella	2			2					II
Urtica dioica			2					1	II
Veronica montana			1				1		II
Veronica officinalis	2			2					II
Betula pubescens (g)	1	1							II
Prunus avium (g)							1	1	II
Hieracium pilosella (pil)	1			2					II
Achillea millefolium				2					I
Angelica sylvestris		2							I
Cerastium fontanum triviale					1				I
Cynosurus cristatus		1							I
Hypochoeris radicata				1					I
Juncus effusus								1	I
Lysimachia nemorum		2							I
Mercurialis perennis		2							I
Molinia caerulea				1					I
Nardus stricta	4								I
Plantago lanceolata				1					I
Polypodium vulgare								2	I
Scrophularia nodosa			1						I
Stachys sylvatica		1							I
Stellaria holostea		2							I
Succisa pratensis						1			I
Trifolium repens		1							I
Veronica chamaedrys		1							I
Acer pseudoplatanus (g)						1			I
Corylus avellana (g)							1		I
Quercus petraea (g)							1		I
Sambucus nigra (g)	1								I
Sorbus aucuparia (g)	1								I
Rosa canina (g)				1					I

Rubus idaeus (g)					2				I
Euphrasia salisburgensis		1							I
Number of species per sample	32	37	26	28	21	26	26	25	0

Mean and standard error for complete data set.
Mean number of species per releve = 27.63; standard error of the mean = 1.721

ltynron1971
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
478	Deschampsia flexuosa	100.00	3.6	2	5	1.06	.38	8
1066	Pteridium aquilinum	100.00	5.8	1	10	3.11	1.10	8
1136	Rubus fruticosus agg.	100.00	2.6	1	4	1.19	.42	8
1429	Viola riviniana	100.00	1.9	1	2	.35	.13	8
120	Agrostis canina	87.50	4.3	4	6	1.91	.67	7
499	Dryopteris dilatata	87.50	1.6	1	2	.74	.26	7
500	Dryopteris filix-mas	87.50	1.4	1	2	.74	.26	7
610	Galium saxatile	87.50	2.4	1	4	1.51	.53	7
680	Holcus lanatus	87.50	3.5	2	5	1.69	.60	7
1137	Rubus idaeus	87.50	1.5	1	2	.76	.27	7
171	Anthoxanthum odoratum	75.00	2.5	2	4	1.77	.63	6
740	Juniperus communis communis	75.00	5.9	7	8	3.64	1.29	6
932	Oxalis acetosella	75.00	2.5	2	4	1.77	.63	6
1046	Potentilla erecta	75.00	1.8	2	4	1.28	.45	6
1321	Teucrium scorodonia	75.00	1.8	2	4	1.28	.45	6
123	Agrostis capillaris	62.50	3.0	4	6	2.62	.93	5
278	Calluna vulgaris	62.50	2.0	2	6	2.14	.76	5
1122	Rosa canina agg.	62.50	.9	1	2	.83	.30	5
1375	Vaccinium myrtillus	62.50	1.6	1	4	1.69	.60	5
2615	Fraxinus excelsior (g)	62.50	1.0	1	2	.93	.33	5
391	Epilobium angustifolium	50.00	.9	1	2	.99	.35	4
465	Dactylis glomerata	50.00	.9	1	2	.99	.35	4
477	Deschampsia cespitosa cespit	50.00	.8	1	2	.89	.31	4
702	Hypericum pulchrum	50.00	.9	1	2	.99	.35	4
122	Agrostis stolonifera	37.50	.9	1	4	1.46	.52	3
215	Athyrium filix-femina	37.50	.6	1	2	.92	.32	3
482	Digitalis purpurea	37.50	.4	1	1	.52	.18	3
574	Festuca ovina	37.50	1.3	2	4	1.83	.65	3
681	Holcus mollis	37.50	1.0	2	4	1.51	.53	3
1095	Ranunculus repens	37.50	.6	1	2	.92	.32	3
197	Arrhenatherum elatius	25.00	.5	2	2	.93	.33	2
288	Campanula rotundifolia	25.00	.5	2	2	.93	.33	2
418	Cirsium palustre	25.00	.3	1	1	.46	.16	2
589	Fraxinus excelsior (c)	25.00	1.3	4	6	2.38	.84	2
605	Galium aparine	25.00	.5	2	2	.93	.33	2
630	Geranium robertianum	25.00	.4	1	2	.74	.26	2
798	Lonicera periclymenum (g)	25.00	.4	1	2	.74	.26	2
994	Polygala serpyllifolia	25.00	.3	1	1	.46	.16	2
1060	Prunus avium (c)	25.00	1.1	4	5	2.10	.74	2
1140	Rumex acetosella	25.00	.5	2	2	.93	.33	2
1368	Urtica dioica	25.00	.4	1	2	.74	.26	2
1400	Veronica montana	25.00	.3	1	1	.46	.16	2
1401	Veronica officinalis	25.00	.5	2	2	.93	.33	2
2605	Betula pubescens (g)	25.00	.3	1	1	.46	.16	2
2622	Prunus avium (g)	25.00	.3	1	1	.46	.16	2
3635	Hieracium pilosella (pil)	25.00	.4	1	2	.74	.26	2
104	Achillea millefolium	12.50	.3	2	2	.71	.25	1
167	Angelica sylvestris	12.50	.3	2	2	.71	.25	1
384	Cerastium fontanum triviale	12.50	.1	1	1	.35	.13	1
460	Cynosurus cristatus	12.50	.1	1	1	.35	.13	1
706	Hypochoeris radicata	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.1	1	1	.35	.13	1
825	Lysimachia nemorum	12.50	.3	2	2	.71	.25	1
864	Mercurialis perennis	12.50	.3	2	2	.71	.25	1
876	Molinia caerulea	12.50	.1	1	1	.35	.13	1
900	Nardus stricta	12.50	.5	4	4	1.41	.50	1
973	Plantago lanceolata	12.50	.1	1	1	.35	.13	1
1015	Polypodium vulgare	12.50	.3	2	2	.71	.25	1
1220	Scrophularia nodosa	12.50	.1	1	1	.35	.13	1
1293	Stachys sylvatica	12.50	.1	1	1	.35	.13	1
1297	Stellaria holostea	12.50	.3	2	2	.71	.25	1

1305	Succisa pratensis	12.50	.1	1	1	.35	.13	1
1350	Trifolium repens	12.50	.1	1	1	.35	.13	1
1396	Veronica chamaedrys	12.50	.1	1	1	.35	.13	1
2601	Acer pseudoplatanus (g)	12.50	.1	1	1	.35	.13	1
2610	Corylus avellana (g)	12.50	.1	1	1	.35	.13	1
2626	Quercus petraea (g)	12.50	.1	1	1	.35	.13	1
2633	Sambucus nigra (g)	12.50	.1	1	1	.35	.13	1
2634	Sorbus aucuparia (g)	12.50	.1	1	1	.35	.13	1
2754	Rosa canina (g)	12.50	.1	1	1	.35	.13	1
2764	Rubus idaeus (g)	12.50	.3	2	2	.71	.25	1
3338	Euphrasia salisburgensis	12.50	.1	1	1	.35	.13	1

Great Knott 1998
Sample Numbers

	57	58	59	60	61	62	63	64	
Holcus mollis	3	8	3	3	3	3	1	7	V
Pteridium aquilinum	4	7	6	3	1	8	1	8	V
Anthoxanthum odoratum	4	1	3	3		1	3	3	V
Deschampsia flexuosa	5		1	3	5	1	6	3	V
Dryopteris dilatata	1		3	1	1	1	1	1	V
Quercus petraea (c)	8	4	4		1	7	8	7	V
Galium saxatile	3		1		1	1	1	1	IV
Oxalis acetosella	3		3	3	3		1	1	IV
Betula pubescens (c)			4	6	6	3		5	IV
Digitalis purpurea	1	1	1	1				1	IV
Hyacinthoides nonscripta	3	1	1	1				1	IV
Agrostis capillaris	3		3	3		1			III
Fagus sylvatica (g)	1	1					1	1	III
Sorbus aucuparia (g)	1			1	1	1			III
Juncus effusus	3			5		3			II
Rubus fruticosus agg.	1	1						1	II
Vaccinium myrtillus					4	1	8		II
Lonicera periclymenum (s)	3		1					1	II
Blechnum spicant					1		1		II
Fagus sylvatica (c)				3	6				II
Festuca ovina					3		3		II
Luzula pilosa							1	1	II
Potentilla erecta	1				3				II
Ilex aquifolium (g)	1	1							II
Ajuga reptans	1								I
Blysmus compressus	1								I
Calamagrostis canescens					3				I
Carex sylvatica						1			I
Cirsium palustre	1								I
Deschampsia cespitosa cespitos	1								I
Dryopteris filix-mas			1						I
Festuca rubra				1					I
Hypericum pulchrum					1				I
Luzula multiflora								1	I
Poa subcaerulea				3					I
Poa trivialis						1			I
Ranunculus repens	1								I
Rumex acetosella	3								I
Rumex obtusifolius	1								I
Teucrium scorodonia							1		I
Urtica dioica	1								I
Corylus avellana (g)	1								I
Quercus petraea (g)				1					I
Corylus avellana (c)			3						I
Picea sitchensis (g)					1				I
Larix sp.(g)							1		I

Number of species per sample	27	9	15	16	17	14	15	16	0

Mean and standard error for complete data set.
Mean number of species per releve = 16.13; standard error of the mean = 1.777

lgtknott
Analysis of 8 samples in the complete data.

Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
681 Holcus mollis	100.00	3.9	1	8	2.36	.83	8
1066 Pteridium aquilinum	100.00	4.8	1	8	2.92	1.03	8
171 Anthoxanthum odoratum	87.50	2.3	1	4	1.39	.49	7
478 Deschampsia flexuosa	87.50	3.0	1	6	2.20	.78	7
499 Dryopteris dilatata	87.50	1.1	1	3	.83	.30	7
1077 Quercus petraea (c)	87.50	4.9	1	8	3.14	1.11	7
610 Galium saxatile	75.00	1.0	1	3	.93	.33	6
932 Oxalis acetosella	75.00	1.8	1	3	1.39	.49	6
236 Betula pubescens (c)	62.50	3.0	3	6	2.67	.94	5

482	Digitalis purpurea	62.50	.6	1	1	.52	.18	5
516	Hyacinthoides nonscripta	62.50	.9	1	3	.99	.35	5
123	Agrostis capillaris	50.00	1.3	1	3	1.49	.53	4
2613	Fagus sylvatica (g)	50.00	.5	1	1	.53	.19	4
2634	Sorbus aucuparia (g)	50.00	.5	1	1	.53	.19	4
730	Juncus effusus	37.50	1.4	3	5	2.00	.71	3
1136	Rubus fruticosus agg.	37.50	.4	1	1	.52	.18	3
1375	Vaccinium myrtillus	37.50	1.6	1	8	2.92	1.03	3
2646	Lonicera periclymenum (s)	37.50	.6	1	3	1.06	.38	3
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
570	Fagus sylvatica (c)	25.00	1.1	3	6	2.23	.79	2
574	Festuca ovina	25.00	.8	3	3	1.39	.49	2
810	Luzula pilosa	25.00	.3	1	1	.46	.16	2
1046	Potentilla erecta	25.00	.5	1	3	1.07	.38	2
2616	Ilex aquifolium (g)	25.00	.3	1	1	.46	.16	2
127	Ajuga reptans	12.50	.1	1	1	.35	.13	1
243	Blysmus compressus	12.50	.1	1	1	.35	.13	1
269	Calamagrostis canescens	12.50	.4	3	3	1.06	.38	1
359	Carex sylvatica	12.50	.1	1	1	.35	.13	1
418	Cirsium palustre	12.50	.1	1	1	.35	.13	1
477	Deschampsia cespitosa cespit	12.50	.1	1	1	.35	.13	1
500	Dryopteris filix-mas	12.50	.1	1	1	.35	.13	1
576	Festuca rubra	12.50	.1	1	1	.35	.13	1
702	Hypericum pulchrum	12.50	.1	1	1	.35	.13	1
809	Luzula multiflora	12.50	.1	1	1	.35	.13	1
989	Poa subcaerulea	12.50	.4	3	3	1.06	.38	1
990	Poa trivialis	12.50	.1	1	1	.35	.13	1
1095	Ranunculus repens	12.50	.1	1	1	.35	.13	1
1140	Rumex acetosella	12.50	.4	3	3	1.06	.38	1
1147	Rumex obtusifolius	12.50	.1	1	1	.35	.13	1
1321	Teucrium scorodonia	12.50	.1	1	1	.35	.13	1
1368	Urtica dioica	12.50	.1	1	1	.35	.13	1
2610	Corylus avellana (g)	12.50	.1	1	1	.35	.13	1
2626	Quercus petraea (g)	12.50	.1	1	1	.35	.13	1
2757	Corylus avellana (c)	12.50	.4	3	3	1.06	.38	1
3047	Picea sitchensis (g)	12.50	.1	1	1	.35	.13	1
3168	Larix sp.(g)	12.50	.1	1	1	.35	.13	1

Eden Gorge 1998
Sample number

	65	66	67	68	69	70	71	72	
Pteridium aquilinum		1	3	3	7	6	8	8	V
Rubus fruticosus agg.	3		3	3	3	3	4		IV
Holcus mollis	3			6	1	5	4		IV
Oxalis acetosella	3		3	1	1		1		IV
Viola riviniana	3		3	3		1	1		IV
Dryopteris filix-mas	3		1	1	3				III
Hyacinthoides nonscripta	1		1		1	1			III
Silene dioica			1	1	1	1			III
Quercus petraea (g)			1		1	1		1	III
Lonicera periclymenum (s)	4			4	4	1			III
Crataegus monogyna (c)	3		2	3			3		III
Acer pseudoplatanus (c)	4			4	5				II
Brachypodium sylvaticum			1	1	1				II
Deschampsia cespitosa cespitos	7				6		1		II
Dryopteris dilatata			1		3			1	II
Festuca rubra				1		1		1	II
Galium aparine			1	1	1				II
Galium saxatile						1	1	1	II
Geum urbanum	1		1	1					II
Holcus lanatus			1		3	1			II
Quercus petraea (c)	4	5		4					II
Stellaria holostea					3	3	1		II
Teucrium scorodonia			3			3	1		II
Ulmus glabra (c)	2		2	3					II
Urtica dioica	3		1	1					II
Anthoxanthum odoratum				1		3			II
Athyrium filix-femina	3				1				II
Betula pubescens (c)		2		2					II
Circaea lutetiana			1		1				II
Cirsium palustre			1				1		II
Dactylis glomerata	3		3						II
Digitalis purpurea			1				1		II
Fagus sylvatica (c)	1			4					II
Fraxinus excelsior (c)			5		4				II
Luzula sylvatica				1				1	II
Myosotis scorpioides	3			1					II
Veronica chamaedrys			1			3			II
Veronica serpyllifolia serpyll						1	1		II
Sorbus aucuparia (s)	1							3	II
Betula pubescens (s)			3					3	II
Crataegus monogyna (g)					1	1			II
Ilex aquifolium (g)			1		1				II
Sorbus aucuparia (g)				1	1				II
Corylus avellana (c)	1			4					II
Taraxacum anglicum (pal)			1	1					II
Adoxa moschatellina	3								I
Agrostis stolonifera						3			I
Alliaria petiolata				1					I
Alnus glutinosa (c)					6				I
Alopecurus pratensis				1					I
Anemone nemorosa						3			I
Angelica sylvestris	3								I
Anthriscus sylvestris				1					I
Arrhenatherum elatius				1					I
Calluna vulgaris								1	I
Cardamine hirsuta	1								I
Cardamine pratensis	3								I
Cerastium fontanum triviale						1			I
Epilobium angustifolium								1	I
Chrysosplenium oppositifolium	3								I
Cicuta virosa				1					I
Conopodium majus						1			I
Corydalis claviculata								1	I
Cynosurus cristatus						1			I
Deschampsia flexuosa						1			I
Equisetum sylvaticum	3								I
Filipendula ulmaria				1					I
Geranium robertianum	1								I

Geum rivale			1						I
Glechoma hederacea			1						I
Juncus effusus						1			I
Juncus inflexus						1			I
Luzula pilosa					1				I
Mercurialis perennis	3								I
Petasites hybridus			1						I
Plantago lanceolata					1				I
Plantago major					1				I
Poa annua					3				I
Poa nemoralis			1						I
Potentilla erecta					1				I
Potentilla sterilis	3								I
Ranunculus ficaria	1								I
Ranunculus repens					1				I
Rumex acetosella					1				I
Rumex obtusifolius	3								I
Rumex sanguineus	3								I
Sambucus nigra (s)			3						I
Senecio jacobaea					1				I
Stachys sylvatica				1					I
Trifolium repens					1				I
Ulex europaeus (s)			2						I
Vaccinium myrtillus								7	I
Valeriana officinalis				1					I
Vicia sepium				1					I
Betula pubescens (g)					1				I
Fagus sylvatica (s)			1						I
Fraxinus excelsior (s)	4								I
Fraxinus excelsior (g)				1					I
Rhododendron ponticum (c)		9							I
Rhododendron ponticum (g)	3								I
Picea sitchensis (c)			5						I

Number of species per sample 34 4 32 37 23 33 15 12 0

Mean and standard error for complete data set.
Mean number of species per releve = 23.75; standard error of the mean = 4.308

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leden
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
1066	Pteridium aquilinum	87.50	4.5	1	8	3.16	1.12	7
1136	Rubus fruticosus agg.	75.00	2.4	3	4	1.51	.53	6
681	Holcus mollis	62.50	2.4	1	6	2.45	.86	5
932	Oxalis acetosella	62.50	1.1	1	3	1.25	.44	5
1429	Viola riviniana	62.50	1.4	1	3	1.41	.50	5
500	Dryopteris filix-mas	50.00	1.0	1	3	1.31	.46	4
516	Hyacinthoides nonscripta	50.00	.5	1	1	.53	.19	4
1254	Silene dioica	50.00	.5	1	1	.53	.19	4
2626	Quercus petraea (g)	50.00	.5	1	1	.53	.19	4
2646	Lonicera periclymenum (s)	50.00	1.6	1	4	2.00	.71	4
2750	*Crataegus monogyna* (c)	50.00	1.4	2	3	1.51	.53	4
103	Acer pseudoplatanus (c)	37.50	1.6	4	5	2.26	.80	3
247	Brachypodium sylvaticum	37.50	.4	1	1	.52	.18	3
477	Deschampsia cespitosa cespit	37.50	1.8	1	7	2.96	1.05	3
499	Dryopteris dilatata	37.50	.6	1	3	1.06	.38	3
576	Festuca rubra	37.50	.4	1	1	.52	.18	3
605	Galium aparine	37.50	.4	1	1	.52	.18	3
610	Galium saxatile	37.50	.4	1	1	.52	.18	3
634	Geum urbanum	37.50	.4	1	1	.52	.18	3
680	Holcus lanatus	37.50	.6	1	3	1.06	.38	3
1077	Quercus petraea (c)	37.50	1.6	4	5	2.26	.80	3
1297	Stellaria holostea	37.50	.9	1	3	1.36	.48	3
1321	Teucrium scorodonia	37.50	.9	1	3	1.36	.48	3
1365	*Ulmus glabra* (c)	37.50	.9	2	3	1.25	.44	3
1368	Urtica dioica	37.50	.6	1	3	1.06	.38	3
171	Anthoxanthum odoratum	25.00	.5	1	3	1.07	.38	2
215	Athyrium filix-femina	25.00	.5	1	3	1.07	.38	2
236	Betula pubescens (c)	25.00	.5	2	2	.93	.33	2
414	Circaea lutetiana	25.00	.3	1	1	.46	.16	2
418	Cirsium palustre	25.00	.3	1	1	.46	.16	2

Hall Brow 1998
Sample number

	73	74	75	76	77	78	79	80	
Pteridium aquilinum	7	3	9	6	3	1	9	6	V
Deschampsia flexuosa	1	3		4	3	3	1	7	V
Quercus petraea (c)	5	6		5	8	7	4	6	V
Anthoxanthum odoratum	4	3		3	1	1		3	IV
Galium saxatile	1		1	3	1		1	1	IV
Oxalis acetosella	3	3		4	1	3		1	IV
Lonicera periclymenum (s)	1	1		3	1		1	3	IV
Betula pubescens (c)	2	4		6	4			4	IV
Brachypodium sylvaticum	3	3			1	1		1	IV
Dryopteris dilatata	1	1		1	1			1	IV
Vaccinium myrtillus				3	8	4	1	4	IV
Digitalis purpurea	3	1		1	1				III
Teucrium scorodonia	1	1			1			1	III
Viola riviniana	1	3				1		1	III
Sorbus aucuparia (g)				1	1	1		1	III
Blechnum spicant		1		1				1	II
Deschampsia cespitosa cespitos		1		1		1			II
Dryopteris filix-mas	1	1		1					II
Lysimachia nemorum	3	3				1			II
Poa trivialis	1			1	1				II
Rubus fruticosus agg.		1	3		1				II
Agrostis capillaris		6				1			II
Hyacinthoides nonscripta	3	1							II
Holcus lanatus	1							1	II
Holcus mollis			1			3			II
Thelypteris limbosperma	1							1	II
Betula pubescens (g)		1				1			II
Agrostis stolonifera							1		I
Ajuga reptans		1							I
Alnus glutinosa (c)		4							I
Anemone nemorosa	1								I
Carex remota		1							I
Epilobium angustifolium			1						I
Chrysosplenium oppositifolium		1							I
Cirsium palustre		1							I
Conopodium majus	3								I
Dactylis *glomerata*				1					I
Filipendula ulmaria		1							I
Fraxinus excelsior (c)								4	I
Galium aparine		1							I
Galium palustre		1							I
Juncus effusus		1							I
Pinus sylvestris (c)								3	I
Ranunculus repens		1							I
Scutellaria minor		1							I
Taxus baccata (c)						5			I
Gymnocarpium dryopteris								1	I
Valeriana officinalis		1							I
Veronica montana		1							I
Betula pubescens (s)			4						I
Fagus sylvatica (s)			3						I
Fraxinus excelsior (g)		1							I
Ilex aquifolium (g)						1			I
Taxus baccata (g)				1					I
Crataegus monogyna (c)								3	I
Corylus avellana (c)		2							I

Number of species per sample 21 35 7 18 16 16 7 21 0

Mean and standard error for complete data set.
Mean number of species per releve = 17.63; standard error of the mean = 3.151

lhall
Analysis of 8 samples in the complete data.

Winster House 1998
Sample number

	81	82	83	84	85	86	87	88	
Hyacinthoides nonscripta	4	1		1	3	3	3	1	V
Anthoxanthum odoratum		1	1	1		4	1	1	IV
Dryopteris dilatata	1		1	1		1	1		IV
Oxalis acetosella	1	1	1				3	1	IV
Pteridium aquilinum	7	3	5	3	9				IV
Acer pseudoplatanus (c)			4			4	4	8	III
Deschampsia flexuosa	3	1	6			7			III
Digitalis purpurea	3			1		3	1		III
Dryopteris filix-mas	3	1	1			1			III
Holcus lanatus				6	1	1		1	III
Poa trivialis				3	3	1	3		III
Teucrium scorodonia	1	1		1		3			III
Urtica dioica				3	1		1	3	III
Viola riviniana		1				1	1	1	III
Betula pubescens (c)		7				6	1		II
Cerastium fontanum triviale				1		1		3	II
Fraxinus excelsior (c)						5	5	4	II
Galium aparine		1			1			1	II
Galium saxatile		1		3		1			II
Holcus mollis	1	8			8				II
Quercus petraea (c)	6		7			5			II
Ranunculus repens				3		1		3	II
Rumex obtusifolius				1	1			3	II
Ilex aquifolium (g)	1		1				1		II
Agrostis capillaris	3	1							II
Ajuga reptans		1					1		II
Cirsium palustre				1				1	II
Dactylis glomerata				1	1				II
Lysimachia nemorum		1					3		II
Mercurialis perennis		1					7		II
Ranunculus acris				1				3	II
Rubus fruticosus agg.	1	1							II
Rumex acetosella				3		1			II
Stachys sylvatica					1		1		II
Trifolium repens				3				1	II
Veronica chamaedrys		1		3					II
Quercus petraea (g)		1					1		II
Sorbus aucuparia (g)	1		1						II
Lonicera periclymenum (s)		1				1			II
Elymus repens				1					I
Arum maculatum							1		I
Athyrium filix-femina							1		I
Blechnum spicant	1								I
Brachypodium sylvaticum		1							I
Cardamine pratensis								3	I
Circaea lutetiana							3		I
Conopodium majus								3	I
Crepis paludosa		1							I
Cynosurus cristatus				3					I
Deschampsia cespitosa cespitos		1							I
Festuca pratensis				3					I
Geranium robertianum							1		I
Geum urbanum							1		I
Ilex aquifolium (s)						1			I
Juncus effusus				1					I
Juncus inflexus				1					I
Luzula sylvatica		1							I
Poa annua								4	I
Prunella vulgaris		1							I
Prunus avium (c)							1		I
Ranunculus ficaria					1				I
Rumex sanguineus					1				I
Cytisus scoparius (s)				3					I
Sorbus aucuparia (c)						2			I
Stellaria media								1	I
Taxus baccata (c)		5							I
Trifolium pratense				3					I

Seatoller 1998
Sample Number

	89	90	91	92	93	94	95	96	
Anthoxanthum odoratum	3	3	3	5	3	3	3	3	V
Potentilla erecta	7	4		3	4	3	3	3	V
Pteridium aquilinum		5	4	8	8	3	4	6	V
Festuca rubra	4	1		3		3	4	3	IV
Viola riviniana	1			1	3	1	1	1	IV
Cirsium palustre	1	1			1	1		1	IV
Plantago lanceolata	3		1		1	1		1	IV
Thelypteris limbosperma	3	3				1	3	3	IV
Fraxinus excelsior (g)		1	1	1	1		1		IV
Carex demissa					1	3	1	1	III
Carex echinata	4	1				3		3	III
Carex panicea	4					3	3	1	III
Festuca ovina					3	3	4	3	III
Galium aparine	1	1			1			1	III
Galium saxatile				3	3		3	3	III
Holcus mollis	1				1	3		1	III
Nardus stricta	1					3	3	1	III
Narthecium ossifragum	4					4	3	3	III
Oxalis acetosella		1		1	3			1	III
Rumex acetosella			3		1	1		1	III
Scirpus cespitosus	1					3	3	1	III
Carex binervis						1	1	1	II
Carex pilulifera					1		1	1	II
Conopodium majus			1	1	1				II
Dactylis glomerata			3		3		1		II
Juncus acutiflorus	5	3				3			II
Lysimachia nemorum	1		4		1				II
Pedicularis sylvatica	1					3	3		II
Pinguicula vulgaris	1					1		1	II
Thymus praecox arcticus					1		3	1	II
Veronica serpyllifolia serpyll			1	1	1				II
Agrostis capillaris		4				1			II
Anthriscus sylvestris	1	1							II
Campanula rotundifolia							1	1	II
Carex pulicaris						1		1	II
Centaurea nigra					1		1		II
Cerastium fontanum triviale			3		1				II
Crepis paludosa	1	3							II
Cryptogramma crispa							1	1	II
Dactylorhiza fuchsii	1	1							II
Digitalis purpurea						1		3	II
Drosera rotundifolia						1		1	II
Juncus effusus	1							1	II
Leontodon hispidus					1		1		II
Lotus corniculatus	1				1				II
Polygala serpyllifolia						1	3		II
Ranunculus acris					1			1	II
Ranunculus ficaria			3		1				II
Ranunculus repens			1		1				II
Danthonia decumbens					1	1			II
Succisa pratensis						1		1	II
Viola palustris						1		1	II
Acer pseudoplatanus (g)	1							1	II
Quercus petraea (g)	1	1							II
Crataegus monogyna (c)					4	3			II
Taraxacum anglicum (pal)			1		1				II
Agrostis stolonifera			5						I
Aira praecox							1		I
Bellis perennis					1				I
Betula pubescens (c)		5							I
Calluna vulgaris							1		I
Cardamine pratensis						1			I
Carex nigra								1	I
Carex remota					1				I
Cirsium arvense			1						I
Cynosurus cristatus					1				I
Deschampsia flexuosa						1			I
Dryopteris filix-mas				1					I
Epilobium palustre	1								I
Filipendula ulmaria					1				I

Galium palustre								1	I
Geranium robertianum				1					I
Holcus lanatus								1	I
Leontodon autumnalis				1					I
Luzula pilosa	1								I
Chamomilla suaveolens		1							I
Hieracium pilosella group						1			I
Plantago major		1							I
Polygala vulgaris			1						I
Potentilla reptans		1							I
Potentilla sterilis				3					I
Sanguisorba minor				1					I
Quercus petraea (c)			7						I
Ranunculus flammula								1	I
Rubus saxatilis						1			I
Rumex acetosa				1					I
Rumex crispus		1							I
Stellaria media		6							I
Teucrium scorodonia						1			I
Thalictrum minus				1					I
Trifolium repens		1							I
Urtica dioica		1							I
Valeriana officinalis	1								I
Veronica montana				1					I
Crataegus monogyna (g)			1						I
Ilex aquifolium (g)	1								I
Sorbus aucuparia (g)					1				I
Euphrasia salisburgensis					1				I

Number of species per sample 26 20 22 14 41 34 29 38 0

Mean and standard error for complete data set.
Mean number of species per releve = 28.00; standard error of the mean = 3.290

lseatoller
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
171	Anthoxanthum odoratum	100.00	3.3	3	5	.71	.25	8
1046	Potentilla erecta	87.50	3.4	3	7	1.92	.68	7
1066	Pteridium aquilinum	87.50	4.8	3	8	2.66	.94	7
576	Festuca rubra	75.00	2.3	1	4	1.67	.59	6
1429	Viola riviniana	75.00	1.0	1	3	.93	.33	6
418	Cirsium palustre	62.50	.6	1	1	.52	.18	5
973	Plantago lanceolata	62.50	.9	1	3	.99	.35	5
1327	Thelypteris limbosperma	62.50	1.6	1	3	1.51	.53	5
2615	Fraxinus excelsior (g)	62.50	.6	1	1	.52	.18	5
312	Carex demissa	50.00	.8	1	3	1.04	.37	4
319	Carex echinata	50.00	1.4	1	4	1.69	.60	4
339	Carex panicea	50.00	1.4	1	4	1.69	.60	4
574	Festuca ovina	50.00	1.6	3	4	1.77	.63	4
605	Galium aparine	50.00	.5	1	1	.53	.19	4
610	Galium saxatile	50.00	1.5	3	3	1.60	.57	4
681	Holcus mollis	50.00	.8	1	3	1.04	.37	4
900	Nardus stricta	50.00	1.0	1	3	1.31	.46	4
901	Narthecium ossifragum	50.00	1.8	3	4	1.91	.67	4
932	Oxalis acetosella	50.00	.8	1	3	1.04	.37	4
1140	Rumex acetosella	50.00	.8	1	3	1.04	.37	4
1210	Scirpus cespitosus	50.00	1.0	1	3	1.31	.46	4
308	Carex binervis	37.50	.4	1	1	.52	.18	3
344	Carex pilulifera	37.50	.4	1	1	.52	.18	3
431	Conopodium majus	37.50	.4	1	1	.52	.18	3
465	Dactylis glomerata	37.50	.9	1	3	1.36	.48	3
719	Juncus acutiflorus	37.50	1.4	3	5	2.00	.71	3
825	Lysimachia nemorum	37.50	.8	1	4	1.39	.49	3
947	Pedicularis sylvatica	37.50	.9	1	3	1.36	.48	3
970	Pinguicula vulgaris	37.50	.4	1	1	.52	.18	3
1333	Thymus praecox arcticus	37.50	.6	1	3	1.06	.38	3
1406	Veronica serpyllifolia serpy	37.50	.4	1	1	.52	.18	3
123	Agrostis capillaris	25.00	.6	1	4	1.41	.50	2
173	Anthriscus sylvestris	25.00	.3	1	1	.46	.16	2
288	Campanula rotundifolia	25.00	.3	1	1	.46	.16	2
347	Carex pulicaris	25.00	.3	1	1	.46	.16	2

371	Centaurea nigra	25.00	.3	1	1	.46	.16	2
384	Cerastium fontanum triviale	25.00	.5	1	3	1.07	.38	2
449	Crepis paludosa	25.00	.5	1	3	1.07	.38	2
456	Cryptogramma crispa	25.00	.3	1	1	.46	.16	2
466	Dactylorhiza fuchsii	25.00	.3	1	1	.46	.16	2
482	Digitalis purpurea	25.00	.5	1	3	1.07	.38	2
494	Drosera rotundifolia	25.00	.3	1	1	.46	.16	2
730	Juncus effusus	25.00	.3	1	1	.46	.16	2
769	Leontodon hispidus	25.00	.3	1	1	.46	.16	2
800	Lotus corniculatus	25.00	.3	1	1	.46	.16	2
994	Polygala serpyllifolia	25.00	.5	1	3	1.07	.38	2
1081	Ranunculus acris	25.00	.3	1	1	.46	.16	2
1088	Ranunculus ficaria	25.00	.5	1	3	1.07	.38	2
1095	Ranunculus repens	25.00	.3	1	1	.46	.16	2
1249	Danthonia decumbens	25.00	.3	1	1	.46	.16	2
1305	Succisa pratensis	25.00	.3	1	1	.46	.16	2
1427	Viola palustris	25.00	.3	1	1	.46	.16	2
2601	Acer pseudoplatanus (g)	25.00	.3	1	1	.46	.16	2
2626	Quercus petraea (g)	25.00	.3	1	1	.46	.16	2
2750	Crataegus monogyna (c)	25.00	.9	3	4	1.64	.58	2
4056	Taraxacum anglicum (pal)	25.00	.3	1	1	.46	.16	2
122	Agrostis stolonifera	12.50	.6	5	5	1.77	.63	1
125	Aira praecox	12.50	.1	1	1	.35	.13	1
230	Bellis perennis	12.50	.1	1	1	.35	.13	1
236	Betula pubescens (c)	12.50	.6	5	5	1.77	.63	1
278	Calluna vulgaris	12.50	.1	1	1	.35	.13	1
295	Cardamine pratensis	12.50	.1	1	1	.35	.13	1
333	Carex nigra	12.50	.1	1	1	.35	.13	1
350	Carex remota	12.50	.1	1	1	.35	.13	1
415	Cirsium arvense	12.50	.1	1	1	.35	.13	1
460	Cynosurus cristatus	12.50	.1	1	1	.35	.13	1
478	Deschampsia flexuosa	12.50	.1	1	1	.35	.13	1
500	Dryopteris filix-mas	12.50	.1	1	1	.35	.13	1
525	Epilobium palustre	12.50	.1	1	1	.35	.13	1
583	Filipendula ulmaria	12.50	.1	1	1	.35	.13	1
609	Galium palustre	12.50	.1	1	1	.35	.13	1
630	Geranium robertianum	12.50	.1	1	1	.35	.13	1
680	Holcus lanatus	12.50	.1	1	1	.35	.13	1
768	Leontodon autumnalis	12.50	.1	1	1	.35	.13	1
810	Luzula pilosa	12.50	.1	1	1	.35	.13	1
839	Chamomilla suaveolens	12.50	.1	1	1	.35	.13	1
965	Hieracium pilosella group	12.50	.1	1	1	.35	.13	1
974	Plantago major	12.50	.1	1	1	.35	.13	1
995	Polygala vulgaris	12.50	.1	1	1	.35	.13	1
1050	Potentilla reptans	12.50	.1	1	1	.35	.13	1
1051	Potentilla sterilis	12.50	.4	3	3	1.06	.38	1
1053	Sanguisorba minor	12.50	.1	1	1	.35	.13	1
1077	Quercus petraea (c)	12.50	.9	7	7	2.47	.88	1
1089	Ranunculus flammula	12.50	.1	1	1	.35	.13	1
1138	Rubus saxatilis	12.50	.1	1	1	.35	.13	1
1139	Rumex acetosa	12.50	.1	1	1	.35	.13	1
1143	Rumex crispus	12.50	.1	1	1	.35	.13	1
1298	Stellaria media	12.50	.8	6	6	2.12	.75	1
1321	Teucrium scorodonia	12.50	.1	1	1	.35	.13	1
1324	Thalictrum minus	12.50	.1	1	1	.35	.13	1
1350	Trifolium repens	12.50	.1	1	1	.35	.13	1
1368	Urtica dioica	12.50	.1	1	1	.35	.13	1
1381	Valeriana officinalis	12.50	.1	1	1	.35	.13	1
1400	Veronica montana	12.50	.1	1	1	.35	.13	1
2611	Crataegus monogyna (g)	12.50	.1	1	1	.35	.13	1
2616	Ilex aquifolium (g)	12.50	.1	1	1	.35	.13	1
2634	Sorbus aucuparia (g)	12.50	.1	1	1	.35	.13	1
3338	Euphrasia salisburgensis	12.50	.1	1	1	.35	.13	1

Birk's Brow 1998
Sample number

	97	98	99	100	101	102	103	104	
Deschampsia flexuosa	4	4	1	5	3		3	1	V
Oxalis acetosella		1	3	3		1	1	1	IV
Pteridium aquilinum	1	1	8	9	1		8		IV
Lonicera periclymenum (s)		1	3	3	1		1	1	IV
Betula pubescens (c)	3	4	5	8			5		IV
Quercus petraea (c)	9	8			8		5	2	IV
Dryopteris borreri			1		1	1		1	III
Dryopteris dilatata			1	1		1		1	III
Holcus mollis		5	3	1			1		III
Anthoxanthum odoratum				3			3	1	II
Dryopteris filix-mas			3		1			1	II
Rubus fruticosus agg.			1		1			1	II
Teucrium scorodonia			3				1	1	II
Acer pseudoplatanus (c)						8		7	II
Agrostis gigantea		1	1						II
Arum maculatum						1		1	II
Athyrium filix-femina			1		1				II
Hyacinthoides nonscripta			4	1					II
Galium saxatile		1	1						II
Tilia x vulgaris (c)					3			4	II
Vaccinium myrtillus	9	1							II
Corylus avellana (g)		1	1						II
Agrostis capillaris							3		I
Anemone nemorosa			1						I
Blechnum spicant				1					I
Carex remota						1			I
Corydalis claviculata			1						I
Dactylis glomerata								1	I
Digitalis purpurea			1						I
Fagus sylvatica (c)					3				I
Fraxinus excelsior (c)						2			I
Hedera helix (g)					1				I
Ilex aquifolium (s)								1	I
Luzula sylvatica								1	I
Mercurialis perennis						1			I
Senecio jacobaea								1	I
Stellaria holostea			3						I
Ulmus glabra (c)						2			I
Viola riviniana								1	I
Crataegus monogyna (g)								1	I
Fraxinus excelsior (g)								1	I
Ilex aquifolium (g)					1				I
Quercus petraea (g)			1						I
Sorbus aucuparia (g)				1					I
Corylus avellana (c)						4			I
Number of species per sample	5	11	21	11	12	10	10	20	0

Mean and standard error for complete data set.
Mean number of species per releve = 12.50; standard error of the mean = 1.899

lbirksbrow
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
478	Deschampsia flexuosa	87.50	2.6	1	5	1.77	.63	7
932	Oxalis acetosella	75.00	1.3	1	3	1.16	.41	6
1066	Pteridium aquilinum	75.00	3.5	1	9	4.04	1.43	6
2646	Lonicera periclymenum (s)	75.00	1.3	1	3	1.16	.41	6
236	Betula pubescens (c)	62.50	3.1	3	8	2.95	1.04	5
1077	Quercus petraea (c)	62.50	4.0	2	9	3.96	1.40	5
498	Dryopteris borreri	50.00	.5	1	1	.53	.19	4
499	Dryopteris dilatata	50.00	.5	1	1	.53	.19	4
681	Holcus mollis	50.00	1.3	1	5	1.83	.65	4
171	Anthoxanthum odoratum	37.50	.9	1	3	1.36	.48	3
500	Dryopteris filix-mas	37.50	.6	1	3	1.06	.38	3
1136	Rubus fruticosus agg.	37.50	.4	1	1	.52	.18	3
1321	Teucrium scorodonia	37.50	.6	1	3	1.06	.38	3
103	Acer pseudoplatanus (c)	25.00	1.9	7	8	3.48	1.23	2

121	Agrostis gigantea	25.00	.3	1	1	.46	.16	2
201	Arum maculatum	25.00	.3	1	1	.46	.16	2
215	Athyrium filix-femina	25.00	.3	1	1	.46	.16	2
516	Hyacinthoides nonscripta	25.00	.6	1	4	1.41	.50	2
610	Galium saxatile	25.00	.3	1	1	.46	.16	2
1335	Tilia x vulgaris (c)	25.00	.9	3	4	1.64	.58	2
1375	Vaccinium myrtillus	25.00	1.3	1	9	3.15	1.11	2
2610	Corylus avellana (g)	25.00	.3	1	1	.46	.16	2
123	Agrostis capillaris	12.50	.4	3	3	1.06	.38	1
166	Anemone nemorosa	12.50	.1	1	1	.35	.13	1
242	Blechnum spicant	12.50	.1	1	1	.35	.13	1
350	Carex remota	12.50	.1	1	1	.35	.13	1
439	Corydalis claviculata	12.50	.1	1	1	.35	.13	1
465	Dactylis glomerata	12.50	.1	1	1	.35	.13	1
482	Digitalis purpurea	12.50	.1	1	1	.35	.13	1
570	Fagus sylvatica (c)	12.50	.4	3	3	1.06	.38	1
589	Fraxinus excelsior (c)	12.50	.3	2	2	.71	.25	1
652	Hedera helix (g)	12.50	.1	1	1	.35	.13	1
707	Ilex aquifolium (s)	12.50	.1	1	1	.35	.13	1
812	Luzula sylvatica	12.50	.1	1	1	.35	.13	1
864	Mercurialis perennis	12.50	.1	1	1	.35	.13	1
1239	Senecio jacobaea	12.50	.1	1	1	.35	.13	1
1297	Stellaria holostea	12.50	.4	3	3	1.06	.38	1
1365	Ulmus glabra (c)	12.50	.3	2	2	.71	.25	1
1429	Viola riviniana	12.50	.1	1	1	.35	.13	1
2611	Crataegus monogyna (g)	12.50	.1	1	1	.35	.13	1
2615	Fraxinus excelsior (g)	12.50	.1	1	1	.35	.13	1
2616	Ilex aquifolium (g)	12.50	.1	1	1	.35	.13	1
2626	Quercus petraea (g)	12.50	.1	1	1	.35	.13	1
2634	Sorbus aucuparia (g)	12.50	.1	1	1	.35	.13	1
2757	Corylus avellana (c)	12.50	.5	4	4	1.41	.50	1

Whitbarrow 1998
Sample number

	105	106	107	108	109	110	111	112	
Fraxinus excelsior (c)	5	1	2		4	6	3	7	V
Mercurialis perennis	3		3		1	4	3	3	IV
Brachypodium sylvaticum	4	1	4		3	3			IV
Circaea lutetiana	1				1	4	3	3	IV
Rubus fruticosus agg.	7		1	1		1	1		IV
Taxus baccata (c)		7	7		3		8	5	IV
Viola riviniana	3		1		1	3	1		IV
Corylus avellana (c)	4		4		3	5		4	IV
Betula pubescens (c)		4			3	3	1		III
Ilex aquifolium (g)			1	1		1	1		III
Arum maculatum			1			1		1	II
Athyrium filix-femina			1	3		1			II
Carex flacca		1	1			1			II
Dryopteris filix-mas	3		1	1					II
Fragaria vesca	1		1			1			II
Lysimachia nemorum	1			1		3			II
Pteridium aquilinum	3		1	3					II
Acer pseudoplatanus (c)	4			3					II
Ajuga reptans	1			1					II
Allium ursinum						1		1	II
Anemone nemorosa						1	3		II
Arrhenatherum elatius	1					1			II
Carex remota	1			1					II
Crataegus monogyna (s)	1					1			II
Dryopteris dilatata				1		1			II
Hyacinthoides nonscripta				1		1			II
Filipendula ulmaria	1			1					II
Geum urbanum	1					1			II
Oxalis acetosella				3		1			II
Potentilla sterilis	1					1			II
Quercus petraea (c)					3		4		II
Acer pseudoplatanus (g)			1					1	II
Betula pubescens (g)			1					1	II
Crataegus monogyna (g)			1					1	II
Quercus petraea (g)	1		1						II
Lonicera periclymenum (s)				3		1			II
Agrostis capillaris				3					I
Anthoxanthum odoratum				1					I
Cardamine amara				1					I
Cardamine impatiens		1							I
Corylus avellana (s)							1		I
Deschampsia flexuosa				8					I
Digitalis purpurea						1			I
Epilobium hirsutum	1								I
Equisetum arvense	1								I
Festuca gigantea	1								I
Galium palustre				1					I
Galium saxatile				1					I
Geranium columbinum		1							I
Holcus mollis				1					I
Ilex aquifolium (s)					8				I
Juncus effusus	1								I
Juncus filiformis	1								I
Ligustrum vulgare	1								I
Melica uniflora						1			I
Molinia caerulea		3							I
Poa trivialis				1					I
Polypodium vulgare				1					I
Sanguisorba minor		1							I
Primula vulgaris					1				I
Ranunculus repens				1					I
Rubus idaeus	1								I
Scutellaria galericulata				1					I
Sesleria albicans		8							I
Danthonia decumbens		1							I
Sisymbrium altissimum		1							I
Sorbus aria					1				I
Teucrium scorodonia		1							I

Thymus praecox arcticus		1							I
Corylus avellana (g)								1	I
Sorbus aucuparia (g)				1					I
Prunus padus (c)								4	I
Picea sitchensis (c)				8					I
Euphrasia salisburgensis		1							I
Hieracium maculatum group		1							I

Number of species per sample 27 16 18 27 12 26 11 12 0

Mean and standard error for complete data set.
Mean number of species per releve = 18.63; standard error of the mean = 2.492

lwhitbarrow
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
589	Fraxinus excelsior (c)	87.50	3.5	1	7	2.45	.87	7
864	Mercurialis perennis	75.00	2.1	1	4	1.55	.55	6
247	Brachypodium sylvaticum	62.50	1.9	1	4	1.81	.64	5
414	Circaea lutetiana	62.50	1.5	1	4	1.60	.57	5
1136	Rubus fruticosus agg.	62.50	1.4	1	7	2.33	.82	5
1319	Taxus baccata (c)	62.50	3.8	3	8	3.45	1.22	5
1429	Viola riviniana	62.50	1.1	1	3	1.25	.44	5
2757	Corylus avellana (c)	62.50	2.5	3	5	2.14	.76	5
236	Betula pubescens (c)	50.00	1.4	1	4	1.69	.60	4
2616	Ilex aquifolium (g)	50.00	.5	1	1	.53	.19	4
201	Arum maculatum	37.50	.4	1	1	.52	.18	3
215	Athyrium filix-femina	37.50	.6	1	3	1.06	.38	3
323	Carex flacca	37.50	.4	1	1	.52	.18	3
500	Dryopteris filix-mas	37.50	.6	1	3	1.06	.38	3
587	Fragaria vesca	37.50	.4	1	1	.52	.18	3
825	Lysimachia nemorum	37.50	.6	1	3	1.06	.38	3
1066	Pteridium aquilinum	37.50	.9	1	3	1.36	.48	3
103	Acer pseudoplatanus (c)	25.00	.9	3	4	1.64	.58	2
127	Ajuga reptans	25.00	.3	1	1	.46	.16	2
151	Allium ursinum	25.00	.3	1	1	.46	.16	2
166	Anemone nemorosa	25.00	.5	1	3	1.07	.38	2
197	Arrhenatherum elatius	25.00	.3	1	1	.46	.16	2
350	Carex remota	25.00	.3	1	1	.46	.16	2
445	Crataegus monogyna (s)	25.00	.3	1	1	.46	.16	2
499	Dryopteris dilatata	25.00	.3	1	1	.46	.16	2
516	Hyacinthoides nonscripta	25.00	.3	1	1	.46	.16	2
583	Filipendula ulmaria	25.00	.3	1	1	.46	.16	2
634	Geum urbanum	25.00	.3	1	1	.46	.16	2
932	Oxalis acetosella	25.00	.5	1	3	1.07	.38	2
1051	Potentilla sterilis	25.00	.3	1	1	.46	.16	2
1077	Quercus petraea (c)	25.00	.9	3	4	1.64	.58	2
2601	Acer pseudoplatanus (g)	25.00	.3	1	1	.46	.16	2
2605	Betula pubescens (g)	25.00	.3	1	1	.46	.16	2
2611	Crataegus monogyna (g)	25.00	.3	1	1	.46	.16	2
2626	Quercus petraea (g)	25.00	.3	1	1	.46	.16	2
2646	Lonicera periclymenum (s)	25.00	.5	1	3	1.07	.38	2
123	Agrostis capillaris	12.50	.4	3	3	1.06	.38	1
171	Anthoxanthum odoratum	12.50	.1	1	1	.35	.13	1
291	Cardamine amara	12.50	.1	1	1	.35	.13	1
294	Cardamine impatiens	12.50	.1	1	1	.35	.13	1
441	Corylus avellana (s)	12.50	.1	1	1	.35	.13	1
478	Deschampsia flexuosa	12.50	1.0	8	8	2.83	1.00	1
482	Digitalis purpurea	12.50	.1	1	1	.35	.13	1
521	Epilobium hirsutum	12.50	.1	1	1	.35	.13	1
532	Equisetum arvense	12.50	.1	1	1	.35	.13	1
573	Festuca gigantea	12.50	.1	1	1	.35	.13	1
609	Galium palustre	12.50	.1	1	1	.35	.13	1
610	Galium saxatile	12.50	.1	1	1	.35	.13	1
621	Geranium columbinum	12.50	.1	1	1	.35	.13	1
681	Holcus mollis	12.50	.1	1	1	.35	.13	1
707	Ilex aquifolium (s)	12.50	1.0	8	8	2.83	1.00	1
730	Juncus effusus	12.50	.1	1	1	.35	.13	1
731	Juncus filiformis	12.50	.1	1	1	.35	.13	1
776	Ligustrum vulgare	12.50	.1	1	1	.35	.13	1
849	Melica uniflora	12.50	.1	1	1	.35	.13	1
876	Molinia caerulea	12.50	.4	3	3	1.06	.38	1

990	Poa trivialis	12.50	.1	1	1	.35	.13	1
1015	Polypodium vulgare	12.50	.1	1	1	.35	.13	1
1053	Sanguisorba minor	12.50	.1	1	1	.35	.13	1
1058	Primula vulgaris	12.50	.1	1	1	.35	.13	1
1095	Ranunculus repens	12.50	.1	1	1	.35	.13	1
1137	Rubus idaeus	12.50	.1	1	1	.35	.13	1
1223	Scutellaria galericulata	12.50	.1	1	1	.35	.13	1
1245	Sesleria albicans	12.50	1.0	8	8	2.83	1.00	1
1249	Danthonia decumbens	12.50	.1	1	1	.35	.13	1
1264	Sisymbrium altissimum	12.50	.1	1	1	.35	.13	1
1274	Sorbus aria	12.50	.1	1	1	.35	.13	1
1321	Teucrium scorodonia	12.50	.1	1	1	.35	.13	1
1333	Thymus praecox arcticus	12.50	.1	1	1	.35	.13	1
2610	Corylus avellana (g)	12.50	.1	1	1	.35	.13	1
2634	Sorbus aucuparia (g)	12.50	.1	1	1	.35	.13	1
2752	Prunus padus (c)	12.50	.5	4	4	1.41	.50	1
3122	Picea sitchensis (c)	12.50	1.0	8	8	2.83	1.00	1
3338	Euphrasia salisburgensis	12.50	.1	1	1	.35	.13	1
3627	Hieracium maculatum group	12.50	.1	1	1	.35	.13	1

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Sample Number	153	154	155	156	157	158	159	160	
Agrostis capillaris	4	4	7	5	5	4	5	4	V
Galium saxatile	1	1	4	1	4	4	1	5	V
Deschampsia flexuosa	1		5	5	5	4	4	4	V
Potentilla erecta		4	4	1	4	1	1	4	V
Rumex acetosella	4	4	4		4	4	1	4	V
Cerastium fontanum triviale		1		1		1	4	1	IV
Dryopteris dilatata			4	1	1	1		1	IV
Festuca ovina		4			1	4	4	1	IV
Ranunculus repens	1	4				1	4	1	IV
Trifolium repens	1	4				4	6	6	IV
Cynosurus cristatus	1	4				1	6		III
Digitalis purpurea	4		1	1	4				III
Dryopteris filix-mas		1		6	1	1			III
Holcus mollis	1					6	1	1	III
Leontodon hispidus	1	4	4		4				III
Veronica chamaedrys		4			1		1	1	III
Anthoxanthum odoratum	4	4			4				II
Blechnum spicant			4	1	1				II
Calluna vulgaris			4		1	1			II
Cirsium palustre		4					1	1	II
Hypochoeris radicata	1	4	4						II
Juncus effusus					1		4	4	II
Molinia caerulea		4	1	4					II
Polygala serpyllifolia					1	1	1		II
Rubus fruticosus agg.			1	1	1				II
Teucrium scorodonia				5	1	1			II
Vaccinium myrtillus			4		4	1			II
Quercus petraea (g)			1	1	1				II
Cystopteris fragilis	1		1						II
Erica cinerea					1			1	II
Holcus lanatus	5				4				II
Leontodon autumnalis					1	1			II
Oxalis acetosella	1			1					II
Polypodium vulgare			4	1					II
Ranunculus bulbosus	1	4							II
Viola riviniana		1		1					II
Achillea millefolium	1								I
Athyrium filix-femina				6					I
Avena strigosa		1							I
Bellis perennis		1							I
Corylus avellana (s)				2					I
Dactylis glomerata	1								I
Hyacinthoides nonscripta	1								I
Epilobium montanum				1					I
Fraxinus excelsior (c)	4								I
Geranium robertianum				1					I
Lolium perenne	1								I
Lonicera periclymenum (g)				1					I
Luzula multiflora		1							I
Mercurialis perennis	4								I
Plantago lanceolata					1				I
Poa pratensis		4							I
Poa trivialis	5								I
Polygala vulgaris		1							I
Potentilla sterilis		1							I
Prunella vulgaris		4							I
Prunus avium (c)				6					I
Pteridium aquilinum	1								I
Rumex obtusifolius	1								I
Danthonia decumbens		1							I
Solidago virgaurea				1					I
Stellaria media	4								I
Urtica dioica							1		I
Veronica serpyllifolia serpyll		4							I
Acer pseudoplatanus (g)				1					I
Fagus sylvatica (g)				1					I
Quercus petraea (s)					3				I
Sorbus aucuparia (g)						1			I
Number of species per sample	26	27	17	25	25	19	16	15	0

Mean and standard error for complete data set.
Mean number of species per releve = 21.25; standard error of the mean = 1.760

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lhaverigg98
Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
123	Agrostis capillaris	100.00	4.8	4	7	1.04	.37	8
610	Galium saxatile	100.00	2.6	1	5	1.77	.63	8
478	Deschampsia flexuosa	87.50	3.5	1	5	1.93	.68	7
1046	Potentilla erecta	87.50	2.4	1	4	1.77	.63	7
1140	Rumex acetosella	87.50	3.1	1	4	1.64	.58	7
384	Cerastium fontanum triviale	62.50	1.0	1	4	1.31	.46	5
499	Dryopteris dilatata	62.50	1.0	1	4	1.31	.46	5
574	Festuca ovina	62.50	1.8	1	4	1.91	.67	5
1095	Ranunculus repens	62.50	1.4	1	4	1.69	.60	5
1350	Trifolium repens	62.50	2.6	1	6	2.67	.94	5
460	Cynosurus cristatus	50.00	1.5	1	6	2.27	.80	4
482	Digitalis purpurea	50.00	1.3	1	4	1.75	.62	4
500	Dryopteris filix-mas	50.00	1.1	1	6	2.03	.72	4
681	Holcus mollis	50.00	1.1	1	6	2.03	.72	4
769	Leontodon hispidus	50.00	1.6	1	4	2.00	.71	4
1396	Veronica chamaedrys	50.00	.9	1	4	1.36	.48	4
171	Anthoxanthum odoratum	37.50	1.5	4	4	2.07	.73	3
242	Blechnum spicant	37.50	.8	1	4	1.39	.49	3
278	Calluna vulgaris	37.50	.8	1	4	1.39	.49	3
418	Cirsium palustre	37.50	.8	1	4	1.39	.49	3
706	Hypochoeris radicata	37.50	1.1	1	4	1.81	.64	3
730	Juncus effusus	37.50	1.1	1	4	1.81	.64	3
876	Molinia caerulea	37.50	1.1	1	4	1.81	.64	3
994	Polygala serpyllifolia	37.50	.4	1	1	.52	.18	3
1136	Rubus fruticosus agg.	37.50	.4	1	1	.52	.18	3
1321	Teucrium scorodonia	37.50	.9	1	5	1.73	.61	3
1375	Vaccinium myrtillus	37.50	1.1	1	4	1.81	.64	3
2626	Quercus petraea (g)	37.50	.4	1	1	.52	.18	3
463	Cystopteris fragilis	25.00	.3	1	1	.46	.16	2
541	Erica cinerea	25.00	.3	1	1	.46	.16	2
680	Holcus lanatus	25.00	1.1	4	5	2.10	.74	2
768	Leontodon autumnalis	25.00	.3	1	1	.46	.16	2
932	Oxalis acetosella	25.00	.3	1	1	.46	.16	2
1015	Polypodium vulgare	25.00	.6	1	4	1.41	.50	2
1086	Ranunculus bulbosus	25.00	.6	1	4	1.41	.50	2
1429	Viola riviniana	25.00	.3	1	1	.46	.16	2
104	Achillea millefolium	12.50	.1	1	1	.35	.13	1
215	Athyrium filix-femina	12.50	.8	6	6	2.12	.75	1
223	Avena strigosa	12.50	.1	1	1	.35	.13	1
230	Bellis perennis	12.50	.1	1	1	.35	.13	1
441	Corylus avellana (s)	12.50	.3	2	2	.71	.25	1
465	Dactylis glomerata	12.50	.1	1	1	.35	.13	1
516	Hyacinthoides nonscripta	12.50	.1	1	1	.35	.13	1
522	Epilobium montanum	12.50	.1	1	1	.35	.13	1
589	Fraxinus excelsior (c)	12.50	.5	4	4	1.41	.50	1
630	Geranium robertianum	12.50	.1	1	1	.35	.13	1
796	Lolium perenne	12.50	.1	1	1	.35	.13	1
798	Lonicera periclymenum (g)	12.50	.1	1	1	.35	.13	1
809	Luzula multiflora	12.50	.1	1	1	.35	.13	1
864	Mercurialis perennis	12.50	.5	4	4	1.41	.50	1
973	Plantago lanceolata	12.50	.1	1	1	.35	.13	1
988	Poa pratensis	12.50	.5	4	4	1.41	.50	1
990	Poa trivialis	12.50	.6	5	5	1.77	.63	1
995	Polygala vulgaris	12.50	.1	1	1	.35	.13	1
1051	Potentilla sterilis	12.50	.1	1	1	.35	.13	1
1059	Prunella vulgaris	12.50	.5	4	4	1.41	.50	1
1060	Prunus avium (c)	12.50	.8	6	6	2.12	.75	1
1066	Pteridium aquilinum	12.50	.1	1	1	.35	.13	1
1147	Rumex obtusifolius	12.50	.1	1	1	.35	.13	1
1249	Danthonia decumbens	12.50	.1	1	1	.35	.13	1
1270	Solidago virgaurea	12.50	.1	1	1	.35	.13	1
1298	Stellaria media	12.50	.5	4	4	1.41	.50	1
1368	Urtica dioica	12.50	.1	1	1	.35	.13	1
1406	Veronica serpyllifolia serpy	12.50	.5	4	4	1.41	.50	1
2601	Acer pseudoplatanus (g)	12.50	.1	1	1	.35	.13	1
2613	Fagus sylvatica (g)	12.50	.1	1	1	.35	.13	1

2625	Quercus petraea (s)	12.50	.4	3	3	1.06	.38	1
2634	Sorbus aucuparia (g)	12.50	.1	1	1	.35	.13	1

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Sample Number	161	162	163	164	165	166	167	168	
Deschampsia cespitosa cespitos	1	4	4	5	5	5	1	4	V
Dryopteris filix-mas	1	4	1	1	5	4		1	V
Oxalis acetosella	1	1	4	4	4	4		5	V
Rubus fruticosus agg.	4	1	1	1	4	1		4	V
Dryopteris dilatata	1	4	1	1		4		4	IV
Fraxinus excelsior (g)	1	1	1	1		1		1	IV
Acer pseudoplatanus (c)	6		7	7	6			2	IV
Corylus avellana (s)	5	4	7				7	2	IV
Geranium robertianum	1			4	4	1		4	IV
Geum urbanum	1			1	1	1		1	IV
Veronica montana				1	1	1	1	4	IV
Athyrium filix-femina	1			1	1			1	III
Betula pubescens (c)	3					7	5	2	III
Cardamine pratensis	1				1	1	1		III
Chrysosplenium oppositifolium	1				1	1		1	III
Circaea lutetiana	1		1	1		1			III
Crataegus monogyna (s)		4		3		3	4		III
Hyacinthoides nonscripta				1	1	1		1	III
Fraxinus excelsior (c)			6	2	3			3	III
Ilex aquifolium (s)	1	4		3			2		III
Mercurialis perennis	4		1	6	1				III
Potentilla sterilis			1	1			1	1	III
Quercus petraea (c)	5	5		3		4			III
Sanicula europaea		1		1	1			1	III
Stellaria holostea		1		1	1			1	III
Agrostis stolonifera						5	6	5	II
Alnus glutinosa (c)	4			4	3				II
Brachypodium sylvaticum		4	1	1					II
Digitalis purpurea					1	1		1	II
Hedera helix (g)	1	1		1					II
Luzula sylvatica	4	1		1					II
Stachys sylvatica			1	1	1				II
Viola riviniana				1			1	1	II
Myosotis seedling/sp				1	1			1	II
Blechnum spicant	1				1				II
Cystopteris fragilis	1		1						II
Galium saxatile						1		1	II
Lonicera periclymenum (g)	1	1							II
Lysimachia nemorum						1		1	II
Milium effusum		1		1					II
Ranunculus repens	1						1		II
Ulmus glabra (c)		6	1						II
Veronica chamaedrys	1		1						II
Betula pubescens (g)							1	1	II
Carex panicea								7	I
Carex sylvatica		1							I
Cerastium fontanum triviale							1		I
Dactylis glomerata				1					I
Epilobium montanum	1								I
Fagus sylvatica (c)		3							I
Festuca rubra		1							I
Filipendula ulmaria								1	I
Glechoma hederacea			1						I
Holcus mollis		1							I
Juncus effusus							1		I
Leontodon autumnalis							1		I
Lolium perenne							1		I
Polystichum setiferum	1								I
Prunus avium (c)					3				I
Ribes uva-crispa	4								I
Rosa canina agg.		1							I
Rumex obtusifolius						1			I
Sambucus nigra (s)						2			I
Teucrium scorodonia	1								I
Trifolium repens							1		I
Urtica dioica						1			I
Valeriana officinalis								1	I
Sorbus aucuparia (s)		1							I
Crataegus monogyna (g)	1								I
Fagus sylvatica (g)	1								I
Ilex aquifolium (g)								1	I

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Quercus petraea (g)                    1                              I
Sorbus aucuparia (g)                       1                          I
Picea abies (c)                                                   4   I
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Number of species per sample      32  25  19  30  22  23  17  31   0

Mean and standard error for complete data set.
Mean number of species per releve = 24.88; standard error of the mean =  1.995

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1pike98
Analysis of    8 samples in the complete data.
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Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
477	Deschampsia cespitosa cespit	100.00	3.6	1	5	1.69	.60	8
500	Dryopteris filix-mas	87.50	2.1	1	5	1.89	.67	7
932	Oxalis acetosella	87.50	2.9	1	5	1.89	.67	7
1136	Rubus fruticosus agg.	87.50	2.0	1	4	1.69	.60	7
499	Dryopteris dilatata	75.00	1.9	1	4	1.81	.64	6
2615	Fraxinus excelsior (g)	75.00	.8	1	1	.46	.16	6
103	Acer pseudoplatanus (c)	62.50	3.5	2	7	3.30	1.16	5
441	Corylus avellana (s)	62.50	3.1	2	7	3.04	1.08	5
630	Geranium robertianum	62.50	1.8	1	4	1.91	.67	5
634	Geum urbanum	62.50	.6	1	1	.52	.18	5
1400	Veronica montana	62.50	1.0	1	4	1.31	.46	5
215	Athyrium filix-femina	50.00	.5	1	1	.53	.19	4
236	Betula pubescens (c)	50.00	2.1	2	7	2.70	.95	4
295	Cardamine pratensis	50.00	.5	1	1	.53	.19	4
408	Chrysosplenium oppositifoliu	50.00	.5	1	1	.53	.19	4
414	Circaea lutetiana	50.00	.5	1	1	.53	.19	4
445	Crataegus monogyna (s)	50.00	1.8	3	4	1.91	.67	4
516	Hyacinthoides nonscripta	50.00	.5	1	1	.53	.19	4
589	Fraxinus excelsior (c)	50.00	1.8	2	6	2.19	.77	4
707	Ilex aquifolium (s)	50.00	1.3	1	4	1.58	.56	4
864	Mercurialis perennis	50.00	1.5	1	6	2.27	.80	4
1051	Potentilla sterilis	50.00	.5	1	1	.53	.19	4
1077	Quercus petraea (c)	50.00	2.1	3	5	2.36	.83	4
1191	Sanicula europaea	50.00	.5	1	1	.53	.19	4
1297	Stellaria holostea	50.00	.5	1	1	.53	.19	4
122	Agrostis stolonifera	37.50	2.0	5	6	2.78	.98	3
153	Alnus glutinosa (c)	37.50	1.4	3	4	1.92	.68	3
247	Brachypodium sylvaticum	37.50	.8	1	4	1.39	.49	3
482	Digitalis purpurea	37.50	.4	1	1	.52	.18	3
652	Hedera helix (g)	37.50	.4	1	1	.52	.18	3
812	Luzula sylvatica	37.50	.8	1	4	1.39	.49	3
1293	Stachys sylvatica	37.50	.4	1	1	.52	.18	3
1429	Viola riviniana	37.50	.4	1	1	.52	.18	3
2723	Myosotis seedling/sp	37.50	.4	1	1	.52	.18	3
242	Blechnum spicant	25.00	.3	1	1	.46	.16	2
463	Cystopteris fragilis	25.00	.3	1	1	.46	.16	2
610	Galium saxatile	25.00	.3	1	1	.46	.16	2
798	Lonicera periclymenum (g)	25.00	.3	1	1	.46	.16	2
825	Lysimachia nemorum	25.00	.3	1	1	.46	.16	2
867	Milium effusum	25.00	.3	1	1	.46	.16	2
1095	Ranunculus repens	25.00	.3	1	1	.46	.16	2
1365	Ulmus glabra (c)	25.00	.9	1	6	2.10	.74	2
1396	Veronica chamaedrys	25.00	.3	1	1	.46	.16	2
2605	Betula pubescens (g)	25.00	.3	1	1	.46	.16	2
339	Carex panicea	12.50	.9	7	7	2.47	.88	1
359	Carex sylvatica	12.50	.1	1	1	.35	.13	1
384	Cerastium fontanum triviale	12.50	.1	1	1	.35	.13	1
465	Dactylis glomerata	12.50	.1	1	1	.35	.13	1
522	Epilobium montanum	12.50	.1	1	1	.35	.13	1
570	Fagus sylvatica (c)	12.50	.4	3	3	1.06	.38	1
576	Festuca rubra	12.50	.1	1	1	.35	.13	1
583	Filipendula ulmaria	12.50	.1	1	1	.35	.13	1
637	Glechoma hederacea	12.50	.1	1	1	.35	.13	1
681	Holcus mollis	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.1	1	1	.35	.13	1
768	Leontodon autumnalis	12.50	.1	1	1	.35	.13	1
796	Lolium perenne	12.50	.1	1	1	.35	.13	1
1018	Polystichum setiferum	12.50	.1	1	1	.35	.13	1
1060	Prunus avium (c)	12.50	.4	3	3	1.06	.38	1
1114	Ribes uva-crispa	12.50	.5	4	4	1.41	.50	1

1122	Rosa canina agg.	12.50	.1	1	1	.35	.13	1
1147	Rumex obtusifolius	12.50	.1	1	1	.35	.13	1
1187	Sambucus nigra (s)	12.50	.3	2	2	.71	.25	1
1321	Teucrium scorodonia	12.50	.1	1	1	.35	.13	1
1350	Trifolium repens	12.50	.1	1	1	.35	.13	1
1368	Urtica dioica	12.50	.1	1	1	.35	.13	1
1381	Valeriana officinalis	12.50	.1	1	1	.35	.13	1
2597	Sorbus aucuparia (s)	12.50	.1	1	1	.35	.13	1
2611	Crataegus monogyna (g)	12.50	.1	1	1	.35	.13	1
2613	Fagus sylvatica (g)	12.50	.1	1	1	.35	.13	1
2616	Ilex aquifolium (g)	12.50	.1	1	1	.35	.13	1
2626	Quercus petraea (g)	12.50	.1	1	1	.35	.13	1
2634	Sorbus aucuparia (g)	12.50	.1	1	1	.35	.13	1
2759	Picea abies (c)	12.50	.5	4	4	1.41	.50	1

Rotten Butts 1998

Sample Number		169	170	171	172	173	174	175	176	
499	Dryopteris dilatata	1	1	1	1	1	1	4	1	V
123	Agrostis capillaris	1		5	4	5	7	4	1	V
932	Oxalis acetosella		1	4	1	1	4	4	4	V
2615	Fraxinus excelsior (g)	1		1		1	1	1	1	IV
500	Dryopteris filix-mas	1		4		1	1		4	IV
2616	Ilex aquifolium (g)	1		1	1			1	1	IV
482	Digitalis purpurea	1		1			1		1	III
516	Hyacinthoides nonscripta			4		4	4		5	III
2634	Sorbus aucuparia (g)	1	1					1	1	III
408	Chrysosplenium oppositifolium	1				1	1			II
465	Dactylis glomerata	1				4			1	II
477	Deschampsia cespitosa cespitos			1		1	1			II
570	Fagus sylvatica (c)		3		3			4		II
755	Larix decidua (c)		8		10			9		II
1136	Rubus fruticosus agg.	1		4			1			II
103	Acer pseudoplatanus (c)	4							7	II
215	*Athyrium filix-femina*	1					1			II
295	Cardamine pratensis					1	4			II
681	Holcus mollis			1			4			II
1064	Prunus padus (s)	3					2			II
1077	Quercus petraea (c)			5					5	II
1275	Sorbus aucuparia (c)			5					2	II
1368	Urtica dioica	1				1				II
1400	Veronica montana					1	4			II
127	Ajuga reptans					1				I
153	Alnus glutinosa (c)	4								I
205	Asplenium billotii						1			I
236	Betula pubescens (c)			7						I
242	Blechnum spicant		1							I
463	Cystopteris fragilis						1			I
478	Deschampsia flexuosa				9					I
522	Epilobium montanum	1								I
576	Festuca rubra							8		I
610	Galium saxatile							1		I
652	Hedera helix (g)	1								I
707	Ilex aquifolium (s)	1								I
730	Juncus effusus						1			I
825	Lysimachia nemorum					1				I
864	Mercurialis perennis					5				I
971	Pinus sylvestris (c)	5								I
1095	Ranunculus repens	1								I
1107	Rhododendron ponticum		5							I
1298	Stellaria media	1								I
1326	Gymnocarpium dryopteris								4	I
1350	Trifolium repens	1								I
1365	Ulmus glabra (c)						6			I
2605	Betula pubescens (g)			1						I
2614	Fraxinus excelsior (s)	4								I
2617	Larix decidua (s)	1								I
2626	Quercus petraea (g)		1							I
2946	Rhododendron ponticum (g)		1							I
3122	Picea sitchensis (c)		5							I
	Number of species per sample	24	10	15	7	15	19	10	14	0

Mean and standard error for complete data set.
Mean number of species per releve = 14.25; standard error of the mean = 1.925

lrotten98
Analysis of 8 samples in the complete data.

Species number and name		% Const	Mean	Min	Max	St.dev.	S.E.M.	N
499	Dryopteris dilatata	100.00	1.4	1	4	1.06	.38	8
123	Agrostis capillaris	87.50	3.4	1	7	2.45	.86	7
932	Oxalis acetosella	87.50	2.4	1	4	1.77	.63	7
2615	Fraxinus excelsior (g)	75.00	.8	1	1	.46	.16	6

500	Dryopteris filix-mas	62.50	1.4	1	4	1.69	.60	5
2616	Ilex aquifolium (g)	62.50	.6	1	1	.52	.18	5
482	Digitalis purpurea	50.00	.5	1	1	.53	.19	4
516	Hyacinthoides nonscripta	50.00	3.1	4	5	2.30	.81	4
2634	Sorbus aucuparia (g)	50.00	.5	1	1	.53	.19	4
408	Chrysosplenium oppositifoliu	37.50	.4	1	1	.52	.18	3
465	Dactylis glomerata	37.50	.8	1	4	1.39	.49	3
477	Deschampsia cespitosa cespit	37.50	.4	1	1	.52	.18	3
570	Fagus sylvatica (c)	37.50	1.3	3	4	1.75	.62	3
755	Larix decidua (c)	37.50	3.4	8	10	4.69	1.66	3
1136	Rubus fruticosus agg.	37.50	.8	1	4	1.39	.49	3
103	Acer pseudoplatanus (c)	25.00	1.4	4	7	2.67	.94	2
215	Athyrium filix-femina	25.00	.3	1	1	.46	.16	2
295	Cardamine pratensis	25.00	.6	1	4	1.41	.50	2
681	Holcus mollis	25.00	.6	1	4	1.41	.50	2
1064	Prunus padus (s)	25.00	.6	2	3	1.19	.42	2
1077	Quercus petraea (c)	25.00	1.3	5	5	2.31	.82	2
1275	Sorbus aucuparia (c)	25.00	.9	2	5	1.81	.64	2
1368	Urtica dioica	25.00	.3	1	1	.46	.16	2
1400	Veronica montana	25.00	.6	1	4	1.41	.50	2
127	Ajuga reptans	12.50	.1	1	1	.35	.13	1
153	Alnus glutinosa (c)	12.50	.5	4	4	1.41	.50	1
205	Asplenium billotii	12.50	.1	1	1	.35	.13	1
236	Betula pubescens (c)	12.50	.9	7	7	2.47	.88	1
242	Blechnum spicant	12.50	.1	1	1	.35	.13	1
463	Cystopteris fragilis	12.50	.1	1	1	.35	.13	1
478	Deschampsia flexuosa	12.50	1.1	9	9	3.18	1.13	1
522	Epilobium montanum	12.50	.1	1	1	.35	.13	1
576	Festuca rubra	12.50	1.0	8	8	2.83	1.00	1
610	Galium saxatile	12.50	.1	1	1	.35	.13	1
652	Hedera helix (g)	12.50	.1	1	1	.35	.13	1
707	Ilex aquifolium (s)	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.1	1	1	.35	.13	1
825	Lysimachia nemorum	12.50	.1	1	1	.35	.13	1
864	Mercurialis perennis	12.50	.6	5	5	1.77	.63	1
971	Pinus sylvestris (c)	12.50	.6	5	5	1.77	.63	1
1095	Ranunculus repens	12.50	.1	1	1	.35	.13	1
1107	Rhododendron ponticum	12.50	.6	5	5	1.77	.63	1
1298	Stellaria media	12.50	.1	1	1	.35	.13	1
1326	Gymnocarpium dryopteris	12.50	.5	4	4	1.41	.50	1
1350	Trifolium repens	12.50	.1	1	1	.35	.13	1
1365	Ulmus glabra (c)	12.50	.8	6	6	2.12	.75	1
2605	Betula pubescens (g)	12.50	.1	1	1	.35	.13	1
2614	Fraxinus excelsior (s)	12.50	.5	4	4	1.41	.50	1
2617	Larix decidua (s)	12.50	.1	1	1	.35	.13	1
2626	Quercus petraea (g)	12.50	.1	1	1	.35	.13	1
2946	Rhododendron ponticum (g)	12.50	.1	1	1	.35	.13	1
3122	Picea sitchensis (c)	12.50	.6	5	5	1.77	.63	1

Eaves Wood 1998

Sample Number		177	178	179	180	181	182	183	184	
1136	Rubus fruticosus agg.	5	4	1	4	1	1	4	4	V
1077	Quercus petraea (c)	6	4	2		4	5	3	8	V
1429	Viola riviniana	4	4	1	5		1	4	4	V
2615	Fraxinus excelsior (g)	5		1	1	1	1	1	1	V
2616	Ilex aquifolium (g)	1		1	1	1	1	1	1	V
247	Brachypodium sylvaticum	6	4		8		1	4	6	IV
589	Fraxinus excelsior (c)	5	3	5	6	3		7		IV
1319	Taxus baccata (c)		8	8		10	5	6	4	IV
441	Corylus avellana (s)	2	1	7	2		4			IV
445	Crataegus monogyna (s)	3	4		1	4			5	IV
1051	Potentilla sterilis	4	1		4			4	4	IV
1122	Rosa canina agg.	1			1		2	1	1	IV
103	Acer pseudoplatanus (c)		3	3			6		2	III
755	Larix decidua (c)		4		7		4	4		III
798	Lonicera periclymenum (g)		4		1		1	4		III
2626	Quercus petraea (g)	1			1			1	1	III
414	Circaea lutetiana	1			1			1		II
500	Dryopteris filix-mas				1			1	4	II
652	Hedera helix (g)	4	4						4	II
776	Ligustrum vulgare		5					1	4	II
1401	Veronica officinalis	1	1					1		II
2597	Sorbus aucuparia (s)		3					1	4	II
2601	Acer pseudoplatanus (g)	1			1			1		II
2605	Betula pubescens (g)	1			1			1		II
2611	Crataegus monogyna (g)	1			1				1	II
2634	Sorbus aucuparia (g)		1					1	1	II
123	Agrostis capillaris			1	1					II
323	Carex flacca							6	4	II
477	Deschampsia cespitosa cespitos	1			1					II
499	Dryopteris dilatata			1	1					II
576	Festuca rubra				1			4		II
587	Fragaria vesca			1				1		II
864	Mercurialis perennis		1					1		II
986	Poa nemoralis							1	1	II
2614	Fraxinus excelsior (s)						4		3	II
2624	Prunus spinosa (g)	1						4		II
2997	Viburnum lantana (s)		4						1	II
3491	Cotoneaster horizantalis	1	1							II
122	Agrostis stolonifera								1	I
163	Anagallis tenella	1								I
197	Arrhenatherum elatius	1								I
215	Athyrium filix-femina				1					I
236	Betula pubescens (c)			2						I
282	Calystegia silvatica								1	I
310	Carex caryophyllea	1								I
391	Epilobium angustifolium	1								I
421	Clematis vitalba								1	I
443	Cotoneaster simonsii								4	I
463	Cystopteris fragilis			1						I
522	Epilobium montanum	1								I
574	Festuca ovina							1		I
630	Geranium robertianum				4					I
633	Geum rivale	1								I
634	Geum urbanum	1								I
694	Hypericum androsaemum	1								I
700	Hypericum montanum	1								I
768	Leontodon autumnalis		1							I
848	Melica nutans							1		I
962	Phyllitis scolopendrium		1							I
971	Pinus sylvestris (c)		4							I
1058	Primula vulgaris								1	I
1065	Prunus spinosa (s)							4		I
1239	Senecio jacobaea							1		I
1245	Sesleria albicans							4		I
1274	Sorbus aria								3	I
1275	Sorbus aucuparia (c)						2			I
1321	Teucrium scorodonia		1							I
2600	Acer pseudoplatanus (s)	4								I

2604	Betula pubescens (s)							1	I
2613	Fagus sylvatica (g)				1				I
2620	Pinus sylvestris (g)	1							I
2636	Taxus baccata (g)					1			I
2723	Myosotis seedling/sp				1				I
3740	Ilex aquifolium (c)		3						I

Number of species per sample	32	25	14	26	8	14	32	29	0

Mean and standard error for complete data set.
Mean number of species per releve = 22.50; standard error of the mean = 3.262

leaves98
Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
1136	Rubus fruticosus agg.	100.00	3.0	1	5	1.69	.60	8
1077	Quercus petraea (c)	87.50	4.0	2	8	2.45	.87	7
1429	Viola riviniana	87.50	2.9	1	5	1.89	.67	7
2615	Fraxinus excelsior (g)	87.50	1.4	1	5	1.51	.53	7
2616	Ilex aquifolium (g)	87.50	.9	1	1	.35	.13	7
247	Brachypodium sylvaticum	75.00	3.6	1	8	3.02	1.07	6
589	Fraxinus excelsior (c)	75.00	3.6	3	7	2.62	.92	6
1319	Taxus baccata (c)	75.00	5.1	4	10	3.68	1.30	6
441	Corylus avellana (s)	62.50	2.0	1	7	2.45	.87	5
445	Crataegus monogyna (s)	62.50	2.1	1	5	2.10	.74	5
1051	Potentilla sterilis	62.50	2.1	1	4	2.03	.72	5
1122	Rosa canina agg.	62.50	.8	1	2	.71	.25	5
103	Acer pseudoplatanus (c)	50.00	1.8	2	6	2.19	.77	4
755	Larix decidua (c)	50.00	2.4	4	7	2.72	.96	4
798	Lonicera periclymenum (g)	50.00	1.3	1	4	1.75	.62	4
2626	Quercus petraea (g)	50.00	.5	1	1	.53	.19	4
414	Circaea lutetiana	37.50	.4	1	1	.52	.18	3
500	Dryopteris filix-mas	37.50	.8	1	4	1.39	.49	3
652	Hedera helix (g)	37.50	1.5	4	4	2.07	.73	3
776	Ligustrum vulgare	37.50	1.3	1	5	2.05	.73	3
1401	Veronica officinalis	37.50	.4	1	1	.52	.18	3
2597	Sorbus aucuparia (s)	37.50	1.0	1	4	1.60	.57	3
2601	Acer pseudoplatanus (g)	37.50	.4	1	1	.52	.18	3
2605	Betula pubescens (g)	37.50	.4	1	1	.52	.18	3
2611	Crataegus monogyna (g)	37.50	.4	1	1	.52	.18	3
2634	Sorbus aucuparia (g)	37.50	.4	1	1	.52	.18	3
123	Agrostis capillaris	25.00	.3	1	1	.46	.16	2
323	Carex flacca	25.00	1.3	4	6	2.38	.84	2
477	Deschampsia cespitosa cespit	25.00	.3	1	1	.46	.16	2
499	Dryopteris dilatata	25.00	.3	1	1	.46	.16	2
576	Festuca rubra	25.00	.6	1	4	1.41	.50	2
587	Fragaria vesca	25.00	.3	1	1	.46	.16	2
864	Mercurialis perennis	25.00	.3	1	1	.46	.16	2
986	Poa nemoralis	25.00	.3	1	1	.46	.16	2
2614	Fraxinus excelsior (s)	25.00	.9	3	4	1.64	.58	2
2624	Prunus spinosa (g)	25.00	.6	1	4	1.41	.50	2
2997	Viburnum lantana (s)	25.00	.6	1	4	1.41	.50	2
3491	Cotoneaster horizantalis	25.00	.3	1	1	.46	.16	2
122	Agrostis stolonifera	12.50	.1	1	1	.35	.13	1
163	Anagallis tenella	12.50	.1	1	1	.35	.13	1
197	Arrhenatherum elatius	12.50	.1	1	1	.35	.13	1
215	Athyrium filix-femina	12.50	.1	1	1	.35	.13	1
236	Betula pubescens (c)	12.50	.3	2	2	.71	.25	1
282	Calystegia silvatica	12.50	.1	1	1	.35	.13	1
310	Carex caryophyllea	12.50	.1	1	1	.35	.13	1
391	Epilobium angustifolium	12.50	.1	1	1	.35	.13	1
421	Clematis vitalba	12.50	.1	1	1	.35	.13	1
443	Cotoneaster simonsii	12.50	.5	4	4	1.41	.50	1
463	Cystopteris fragilis	12.50	.1	1	1	.35	.13	1
522	Epilobium montanum	12.50	.1	1	1	.35	.13	1
574	Festuca ovina	12.50	.1	1	1	.35	.13	1
630	Geranium robertianum	12.50	.5	4	4	1.41	.50	1
633	Geum rivale	12.50	.1	1	1	.35	.13	1
634	Geum urbanum	12.50	.1	1	1	.35	.13	1
694	Hypericum androsaemum	12.50	.1	1	1	.35	.13	1
700	Hypericum montanum	12.50	.1	1	1	.35	.13	1
768	Leontodon autumnalis	12.50	.1	1	1	.35	.13	1

848	Melica nutans	12.50	.1	1	1	.35	.13	1
962	Phyllitis scolopendrium	12.50	.1	1	1	.35	.13	1
971	Pinus sylvestris (c)	12.50	.5	4	4	1.41	.50	1
1058	Primula vulgaris	12.50	.1	1	1	.35	.13	1
1065	Prunus spinosa (s)	12.50	.5	4	4	1.41	.50	1
1239	Senecio jacobaea	12.50	.1	1	1	.35	.13	1
1245	Sesleria albicans	12.50	.5	4	4	1.41	.50	1
1274	Sorbus aria	12.50	.4	3	3	1.06	.38	1
1275	Sorbus aucuparia (c)	12.50	.3	2	2	.71	.25	1
1321	Teucrium scorodonia	12.50	.1	1	1	.35	.13	1
2600	Acer pseudoplatanus (s)	12.50	.5	4	4	1.41	.50	1
2604	Betula pubescens (s)	12.50	.1	1	1	.35	.13	1
2613	Fagus sylvatica (g)	12.50	.1	1	1	.35	.13	1
2620	Pinus sylvestris (g)	12.50	.1	1	1	.35	.13	1
2636	Taxus baccata (g)	12.50	.1	1	1	.35	.13	1
2723	Myosotis seedling/sp	12.50	.1	1	1	.35	.13	1
2740	Ilex aquifolium (c)	12.50	.4	3	3	1.06	.38	1

Tynron 1998

Sample Number	185	186	187	188	189	190	191	192	
Agrostis capillaris		5	4	7	5			5	IV
Digitalis purpurea	1	1		1		4	1		IV
Ranunculus repens			4	4	1		4	1	IV
Veronica chamaedrys	1		1	4	1			1	IV
Cirsium arvense	1		1		1		1		III
Dactylis glomerata				5	1		4	5	III
Holcus mollis	6		4		1	4			III
Trifolium repens			1		4	4		5	III
Urtica dioica		1		1		1	4		III
Viola riviniana	1	4	1	4					III
Cardamine pratensis			1	1			1		II
Cerastium fontanum triviale	1		4	1					II
Cirsium palustre	1		1			1			II
Dryopteris dilatata		1				1	1		II
Galium saxatile	5	1	1						II
Holcus lanatus			4		4	4			II
Lolium perenne					4	4		5	II
Molinia caerulea			1	1	1				II
Polygonum aviculare	1		1		1				II
Potentilla erecta	1	1	1						II
Pteridium aquilinum	5	8	5						II
Rubus fruticosus agg.	1	1		1					II
Rumex acetosa	1		4		1				II
Stellaria media	1	4		1					II
Achillea millefolium			1		1				II
Agrostis stolonifera						4	7		II
Athyrium filix-femina						1	4		II
Cirsium vulgare			1		1				II
Cynosurus cristatus					7			6	II
Dryopteris filix-mas	1	1							II
Epilobium montanum						1	1		II
Fraxinus excelsior (c)		7		9					II
Lonicera periclymenum (g)	1	4							II
Oxalis acetosella		4		1					II
Rumex acetosella	4		4						II
Stellaria holostea	1	4							II
Teucrium scorodonia	4	4							II
Alnus glutinosa (c)							6		I
Aphanes arvensis			1						I
Calluna vulgaris	1								I
Chrysosplenium oppositifolium							4		I
Deschampsia flexuosa					1				I
Hyacinthoides nonscripta		4							I
Fragaria vesca	1								I
Galium palustre						1			I
Geranium robertianum							1		I
Geum urbanum							4		I
Hydrocotyle vulgaris						1			I
Hypochoeris radicata			4						I
Inula conyza	1								I
Juncus effusus						6			I
Juniperus communis communis	8								I
Lamium purpureum						1			I
Leontodon autumnalis					1				I
Luzula campestris			1						I
Lysimachia nemorum						1			I
Mentha aquatica						1			I
Plantago lanceolata			4						I
Polygala serpyllifolia			1						I
Polygonum hydropiper						1			I
Potentilla sterilis			1						I
Primula vulgaris	1								I
Prunella vulgaris			4						I
Prunus avium (c)							6		I
Ranunculus hederaceus						4			I
Rosa canina agg.	3								I
Rubus idaeus		1							I
Rumex obtusifolius							1		I
Rumex sanguineus						1			I
Senecio jacobaea			1						I
Succisa pratensis	1								I

Corylus avellana (g) 1 I

Number of species per sample 26 18 28 14 17 20 17 7 0

Mean and standard error for complete data set.
Mean number of species per releve = 18.38; standard error of the mean = 2.337

leaves98
Analysis of 8 samples in the complete data.

	Species number and name	% Const	Mean	Min	Max	St.dev.	S.E.M.	N
123	Agrostis capillaris	62.50	3.3	4	7	2.82	1.00	5
482	Digitalis purpurea	62.50	1.0	1	4	1.31	.46	5
1095	Ranunculus repens	62.50	1.8	1	4	1.91	.67	5
1396	Veronica chamaedrys	62.50	1.0	1	4	1.31	.46	5
415	Cirsium arvense	50.00	.5	1	1	.53	.19	4
465	Dactylis glomerata	50.00	1.9	1	5	2.36	.83	4
681	Holcus mollis	50.00	1.9	1	6	2.42	.85	4
1350	Trifolium repens	50.00	1.8	1	5	2.19	.77	4
1368	Urtica dioica	50.00	.9	1	4	1.36	.48	4
1429	Viola riviniana	50.00	1.3	1	4	1.75	.62	4
295	Cardamine pratensis	37.50	.4	1	1	.52	.18	3
384	Cerastium fontanum triviale	37.50	.8	1	4	1.39	.49	3
418	Cirsium palustre	37.50	.4	1	1	.52	.18	3
499	Dryopteris dilatata	37.50	.4	1	1	.52	.18	3
610	Galium saxatile	37.50	.9	1	5	1.73	.61	3
680	Holcus lanatus	37.50	1.5	4	4	2.07	.73	3
796	Lolium perenne	37.50	1.6	4	5	2.26	.80	3
876	Molinia caerulea	37.50	.4	1	1	.52	.18	3
999	Polygonum aviculare	37.50	.4	1	1	.52	.18	3
1046	Potentilla erecta	37.50	.4	1	1	.52	.18	3
1066	Pteridium aquilinum	37.50	2.3	5	8	3.24	1.15	3
1136	Rubus fruticosus agg.	37.50	.4	1	1	.52	.18	3
1139	Rumex acetosa	37.50	.8	1	4	1.39	.49	3
1298	Stellaria media	37.50	.8	1	4	1.39	.49	3
104	Achillea millefolium	25.00	.3	1	1	.46	.16	2
122	Agrostis stolonifera	25.00	1.4	4	7	2.67	.94	2
215	Athyrium filix-femina	25.00	.6	1	4	1.41	.50	2
419	Cirsium vulgare	25.00	.3	1	1	.46	.16	2
460	Cynosurus cristatus	25.00	1.6	6	7	3.02	1.07	2
500	Dryopteris filix-mas	25.00	.3	1	1	.46	.16	2
522	Epilobium montanum	25.00	.3	1	1	.46	.16	2
589	Fraxinus excelsior (c)	25.00	2.0	7	9	3.74	1.32	2
798	Lonicera periclymenum (g)	25.00	.6	1	4	1.41	.50	2
932	Oxalis acetosella	25.00	.6	1	4	1.41	.50	2
1140	Rumex acetosella	25.00	1.0	4	4	1.85	.65	2
1297	Stellaria holostea	25.00	.6	1	4	1.41	.50	2
1321	Teucrium scorodonia	25.00	1.0	4	4	1.85	.65	2
153	Alnus glutinosa (c)	12.50	.8	6	6	2.12	.75	1
177	Aphanes arvensis	12.50	.1	1	1	.35	.13	1
278	Calluna vulgaris	12.50	.1	1	1	.35	.13	1
408	Chrysosplenium oppositifoliu	12.50	.5	4	4	1.41	.50	1
478	Deschampsia flexuosa	12.50	.1	1	1	.35	.13	1
516	Hyacinthoides nonscripta	12.50	.5	4	4	1.41	.50	1
587	Fragaria vesca	12.50	.1	1	1	.35	.13	1
609	Galium palustre	12.50	.1	1	1	.35	.13	1
630	Geranium robertianum	12.50	.1	1	1	.35	.13	1
634	Geum urbanum	12.50	.5	4	4	1.41	.50	1
690	Hydrocotyle vulgaris	12.50	.1	1	1	.35	.13	1
706	Hypochoeris radicata	12.50	.5	4	4	1.41	.50	1
711	Inula conyza	12.50	.1	1	1	.35	.13	1
730	Juncus effusus	12.50	.8	6	6	2.12	.75	1
740	Juniperus communis communis	12.50	1.0	8	8	2.83	1.00	1
753	Lamium purpureum	12.50	.1	1	1	.35	.13	1
768	Leontodon autumnalis	12.50	.1	1	1	.35	.13	1
807	Luzula campestris	12.50	.1	1	1	.35	.13	1
825	Lysimachia nemorum	12.50	.1	1	1	.35	.13	1
855	Mentha aquatica	12.50	.1	1	1	.35	.13	1
973	Plantago lanceolata	12.50	.5	4	4	1.41	.50	1
994	Polygala serpyllifolia	12.50	.1	1	1	.35	.13	1
1004	Polygonum hydropiper	12.50	.1	1	1	.35	.13	1
1051	Potentilla sterilis	12.50	.1	1	1	.35	.13	1
1058	Primula vulgaris	12.50	.1	1	1	.35	.13	1

1059	Prunella vulgaris	12.50	.5	4	4	1.41	.50	1
1060	Prunus avium (c)	12.50	.8	6	6	2.12	.75	1
1091	Ranunculus hederaceus	12.50	.5	4	4	1.41	.50	1
1122	Rosa canina agg.	12.50	.4	3	3	1.06	.38	1
1137	Rubus idaeus	12.50	.1	1	1	.35	.13	1
1147	Rumex obtusifolius	12.50	.1	1	1	.35	.13	1
1148	Rumex sanguineus	12.50	.1	1	1	.35	.13	1
1239	Senecio jacobaea	12.50	.1	1	1	.35	.13	1
1305	Succisa pratensis	12.50	.1	1	1	.35	.13	1
2610	Corylus avellana (g)	12.50	.1	1	1	.35	.13	1

Appendix 5.

DECORANA
Species scores

N	Name	Axis 1	Axis 2	Axis 3	Axis 4
1	103	34	27	197	129
2	104	455	87	335	29
3	109	79	-134	416	-54
4	118	473	25	389	-137
5	120	364	145	242	296
6	121	235	224	55	6
7	122	220	-41	213	284
8	123	308	137	311	143
9	125	464	116	257	340
10	127	157	62	194	59
11	144	130	41	341	8
12	151	-33	48	84	129
13	153	67	-28	119	198
14	158	130	41	341	8
15	163	-65	323	54	189
16	166	93	93	84	7
17	167	201	-115	336	57
18	171	351	166	168	81
19	173	465	157	243	211
20	177	478	192	156	316
21	186	179	23	231	0
22	197	196	165	198	212
23	201	-80	59	35	9
24	205	147	-176	192	108
25	206	-63	207	175	351
26	215	150	16	295	179
27	223	508	182	137	-20
28	230	464	134	277	9
29	236	210	291	43	122
30	242	252	350	171	185
31	243	327	144	249	60
32	247	17	175	278	156
33	260	20	203	457	378
34	269	352	387	34	300
35	278	383	229	145	356
36	282	-132	249	368	174
37	288	371	168	142	313
38	291	200	197	512	16
39	292	220	84	350	180
40	293	178	49	180	68
41	294	49	435	69	248
42	295	186	-66	229	16
43	308	454	448	-2	284
44	310	-65	323	54	189
45	312	513	195	160	302
46	319	548	219	145	323
47	323	-32	242	393	210

48	333	529	254	79	385
49	339	487	91	87	424
50	343	262	171	181	191
51	344	507	212	162	344
52	347	549	239	109	367
53	350	152	92	352	-2
54	359	104	128	205	159
55	371	426	158	376	198
56	384	421	62	258	-13
57	391	283	109	372	337
58	408	91	-80	168	222
59	411	130	41	341	8
60	414	36	37	141	79
61	415	392	41	345	-34
62	418	426	108	250	89
63	419	418	134	395	211
64	421	-132	249	368	174
65	431	316	57	190	-106
66	432	-80	124	412	343
67	439	279	165	301	160
68	441	-12	86	197	299
69	443	-132	249	368	174
70	445	30	124	227	155
71	449	445	213	98	253
72	456	484	235	65	349
73	460	484	29	382	-60
74	463	143	65	115	138
75	465	308	-6	361	-2
76	466	526	211	189	316
77	473	-128	106	40	305
78	477	137	-7	215	341
79	478	296	218	288	263
80	482	275	81	214	106
81	494	560	217	125	255
82	498	64	166	16	-14
83	499	185	155	304	282
84	500	148	97	190	215
85	515	583	172	161	-42
86	516	160	37	187	155
87	521	6	60	70	84
88	522	107	26	194	155
89	525	581	167	230	96
90	528	-40	199	8	-2
91	530	13	41	250	296
92	532	5	69	85	159
93	537	118	-161	232	51
94	541	390	235	110	311
95	546	583	172	161	-42
96	568	491	344	120	151
97	570	171	422	461	204
98	573	66	-30	232	157
99	574	448	207	143	249
100	575	473	25	389	-137
101	576	365	263	440	305

102	578	209	186	19	50
103	583	147	117	233	229
104	587	27	106	168	155
105	589	47	77	187	84
106	602	209	-8	171	9
107	605	273	27	274	117
108	607	121	-107	370	13
109	608	187	84	39	-10
110	609	325	75	275	84
111	610	356	170	221	276
112	613	314	105	431	337
113	621	49	435	69	248
114	630	100	0	202	364
115	633	35	195	176	85
116	634	54	0	161	234
117	637	27	6	133	84
118	652	-28	294	101	204
119	654	-76	138	284	384
120	661	313	18	374	168
121	675	116	60	342	254
122	680	345	73	322	200
123	681	298	100	255	88
124	690	457	-128	393	67
125	692	187	84	39	-10
126	694	-65	323	54	189
127	700	-65	323	54	189
128	701	59	62	418	232
129	702	285	139	258	290
130	706	472	205	166	218
131	707	-17	130	22	-5
132	711	201	134	425	347
133	719	552	189	187	162
134	722	464	315	4	149
135	726	469	187	84	13
136	729	300	56	286	83
137	730	388	117	248	106
138	731	-16	76	57	65
139	733	419	26	354	-55
140	740	335	42	354	343
141	753	457	-128	393	67
142	754	254	336	462	164
143	755	59	384	516	328
144	768	389	108	346	82
145	769	472	216	175	232
146	776	-122	238	411	254
147	796	472	-64	417	-81
148	798	101	116	364	276
149	800	512	145	282	182
150	802	583	172	161	-42
151	807	478	192	156	316
152	809	320	214	132	48
153	810	220	140	156	177
154	812	89	382	24	215
155	825	197	46	134	14

156	839	421	-41	231	-349
157	846	371	263	8	110
158	848	-43	226	333	217
159	849	0	70	180	238
160	855	321	16	249	12
161	864	16	53	116	63
162	867	-20	114	86	297
163	875	33	12	154	99
164	876	446	235	133	143
165	882	139	10	204	149
166	889	97	-93	398	-29
167	900	524	219	177	357
168	901	554	222	153	344
169	932	193	129	282	218
170	944	464	315	4	149
171	947	564	219	174	335
172	952	134	-79	508	270
173	962	-85	109	241	334
174	965	500	213	217	357
175	970	559	214	166	357
176	971	-34	143	337	266
177	973	490	178	229	170
178	974	331	429	38	-57
179	977	-40	199	8	-2
180	981	282	-37	319	-92
181	986	116	40	268	90
182	988	422	170	203	165
183	989	339	257	416	85
184	990	314	64	286	-41
185	994	491	208	197	357
186	995	410	200	254	29
187	997	-128	106	40	305
188	999	468	71	356	105
189	1004	454	-41	392	-32
190	1015	298	177	255	305
191	1018	-12	162	-2	276
192	1021	156	-213	131	176
193	1022	66	14	23	47
194	1046	452	177	219	280
195	1050	421	-41	231	-349
196	1051	62	128	305	189
197	1053	257	372	150	138
198	1058	82	93	165	47
199	1059	351	346	98	104
200	1060	199	-61	248	287
201	1064	55	-73	217	53
202	1065	-28	257	462	359
203	1066	311	185	216	150
204	1077	173	333	63	74
205	1081	343	47	371	-10
206	1086	491	142	167	-48
207	1088	361	-29	310	-200
208	1089	526	251	57	189
209	1091	457	-128	393	67

210	1093	86	-190	170	385
211	1095	366	131	241	13
212	1105	-66	118	24	65
213	1107	-7	464	580	259
214	1114	0	138	29	295
215	1122	118	111	349	306
216	1136	126	121	251	277
217	1137	179	174	203	223
218	1138	259	190	23	54
219	1139	394	95	290	137
220	1140	447	147	222	122
221	1143	421	-41	231	-349
222	1147	234	-52	359	-75
223	1148	207	-77	383	-39
224	1187	112	-13	425	256
225	1191	83	14	95	401
226	1193	473	25	389	-137
227	1210	560	223	162	345
228	1220	178	33	168	49
229	1223	200	197	512	16
230	1224	191	115	70	23
231	1236	87	-127	323	200
232	1239	134	116	314	224
233	1245	0	407	284	295
234	1249	485	281	149	81
235	1254	132	-28	334	152
236	1264	49	435	69	248
237	1270	88	136	74	410
238	1274	-147	195	171	75
239	1275	107	86	84	97
240	1293	153	-13	250	114
241	1295	241	76	427	155
242	1296	104	-101	401	85
243	1297	196	37	183	167
244	1298	295	-26	274	-118
245	1305	462	196	99	149
246	1313	-43	176	157	89
247	1319	-70	218	181	144
248	1321	226	127	208	260
249	1324	436	128	263	39
250	1326	127	84	149	72
251	1327	462	195	130	160
252	1329	142	36	64	-3
253	1333	475	268	156	337
254	1334	-108	65	44	230
255	1335	55	276	4	34
256	1349	419	66	412	-60
257	1350	464	57	344	10
258	1360	20	203	457	378
259	1363	134	-79	508	270
260	1365	66	-11	272	109
261	1368	204	71	295	17
262	1375	332	290	53	227
263	1381	248	40	124	365

264	1390	448	178	269	281
265	1394	87	-127	323	200
266	1396	374	55	295	-3
267	1400	114	-39	128	340
268	1401	189	213	284	331
269	1406	460	126	203	-44
270	1409	-22	150	8	85
271	1416	130	41	341	8
272	1427	497	207	113	171
273	1429	146	111	277	146
274	1433	448	178	269	281
275	2597	65	325	332	284
276	2600	41	460	-15	147
277	2601	123	118	265	172
278	2604	177	122	466	364
279	2605	183	139	203	285
280	2606	255	56	431	332
281	2610	166	116	144	129
282	2611	96	123	253	109
283	2612	237	23	504	401
284	2613	151	119	301	185
285	2614	9	44	384	64
286	2615	108	97	269	223
287	2616	68	156	324	183
288	2617	-11	-28	199	7
289	2618	-76	138	284	384
290	2620	-73	206	189	362
291	2622	199	120	307	251
292	2623	41	42	130	238
293	2624	-7	269	404	249
294	2625	407	250	172	332
295	2626	187	154	374	224
296	2627	293	112	419	311
297	2633	155	70	192	262
298	2634	182	207	317	125
299	2636	-10	157	196	270
300	2640	53	40	183	339
301	2641	88	412	102	152
302	2646	194	149	147	117
303	2723	38	-1	214	420
304	2740	68	104	183	93
305	2741	53	50	84	73
306	2743	113	506	-69	162
307	2750	223	65	187	-4
308	2751	177	195	9	-84
309	2752	-204	46	31	-40
310	2754	174	118	198	261
311	2757	55	95	40	-27
312	2759	204	-62	-42	489
313	2764	377	128	313	356
314	2868	-41	168	387	375
315	2946	74	447	451	52
316	2982	282	101	346	118
317	2983	-106	-21	97	284

318	2997	-144	248	428	300
319	3047	352	387	34	300
320	3122	134	358	525	124
321	3138	-128	106	40	305
322	3166	121	-107	370	13
323	3167	255	56	431	332
324	3168	347	346	-4	190
325	3338	331	-22	343	343
326	3365	105	-103	386	117
327	3491	-106	287	306	263
328	3627	49	435	69	248
329	3635	431	197	215	380
330	4056	304	12	431	-50
331	4314	155	-42	72	2

Sample Scores

N	Name	Axis 1	Axis 2	Axis 3	Axis 4
1	1	239	128	286	211
2	2	227	156	279	203
3	3	267	147	270	216
4	4	285	153	293	219
5	5	290	199	238	261
6	6	229	208	188	178
7	7	237	170	204	185
8	8	263	195	193	170
9	9	184	22	228	162
10	10	169	350	125	158
11	11	168	85	253	141
12	12	234	213	290	180
13	13	220	148	236	175
14	14	287	147	220	139
15	15	295	130	232	164
16	16	291	235	158	205
17	17	251	191	189	160
18	18	137	102	148	126
19	19	250	172	203	149
20	20	211	167	185	137
21	21	210	196	218	153
22	22	245	223	163	155
23	23	196	174	155	117
24	24	236	220	178	132
25	25	225	185	209	150
26	26	227	144	203	149
27	27	266	226	150	159
28	28	271	188	200	182
29	29	149	46	197	199
30	30	159	118	178	121
31	31	129	106	162	96
32	32	116	117	144	103
33	33	459	180	182	164
34	34	347	200	151	151
35	35	198	128	179	132
36	36	162	83	193	109
37	37	241	118	214	153

38	38	220	172	149	182
39	39	206	162	169	150
40	40	275	204	192	156
41	41	242	257	129	176
42	42	237	251	143	175
43	43	197	101	189	110
44	44	259	215	167	170
45	45	153	86	215	132
46	46	204	238	150	136
47	47	249	205	174	148
48	48	139	144	150	116
49	49	192	126	221	144
50	50	71	173	157	125
51	51	92	128	166	133
52	52	220	81	129	314
53	53	82	155	152	116
54	54	101	118	144	86
55	55	78	153	138	81
56	56	11	123	167	91
57	57	267	162	216	143
58	58	255	164	210	122
59	59	237	176	185	136
60	60	277	197	257	150
61	61	282	260	206	211
62	62	267	208	181	127
63	63	283	243	150	184
64	64	255	196	180	135
65	65	144	50	263	107
66	66	154	411	0	131
67	67	173	95	315	165
68	68	171	133	227	119
69	69	158	80	219	186
70	70	276	107	234	125
71	71	269	119	232	142
72	72	264	223	230	238
73	73	236	154	189	117
74	74	205	140	194	147
75	75	252	135	315	252
76	76	249	203	178	163
77	77	247	240	143	162
78	78	184	207	185	157
79	79	272	210	173	156
80	80	223	196	185	155
81	81	229	173	210	160
82	82	204	165	192	145
83	83	198	219	241	155
84	84	370	80	303	44
85	85	281	89	257	81
86	86	209	156	179	137
87	87	114	63	178	110
88	88	227	39	257	31
89	89	452	176	207	241
90	90	350	182	196	185
91	91	325	56	241	9

92	92	293	200	205	149
93	93	322	129	240	134
94	94	440	186	190	232
95	95	432	197	193	274
96	96	412	182	195	225
97	97	257	290	98	164
98	98	239	231	151	132
99	99	220	142	192	160
100	100	257	202	188	159
101	101	159	264	172	136
102	102	57	63	171	85
103	103	264	215	176	140
104	104	112	143	164	127
105	105	95	102	203	143
106	106	113	302	177	197
107	107	42	138	197	127
108	108	212	168	303	156
109	109	42	162	113	66
110	110	85	103	171	108
111	111	43	159	151	109
112	112	0	96	133	72
113	113	203	138	217	153
114	114	343	147	244	162
115	115	269	189	218	239
116	116	231	96	247	186
117	117	323	183	211	225
118	118	260	231	169	194
119	119	264	188	197	176
120	120	269	232	147	215
121	121	130	106	200	193
122	122	166	118	204	171
123	123	118	89	188	158
124	124	118	95	200	177
125	125	149	72	224	182
126	126	149	95	221	217
127	127	337	86	289	79
128	128	260	118	255	171
129	129	136	93	236	160
130	130	158	75	257	157
131	131	160	86	252	177
132	132	149	120	262	195
133	133	115	71	231	161
134	134	177	248	358	255
135	135	219	179	335	200
136	136	132	132	233	176
137	137	56	96	188	172
138	138	38	130	174	188
139	139	50	82	198	203
140	140	100	114	261	196
141	141	63	143	246	240
142	142	41	137	257	215
143	143	71	155	212	205
144	144	111	151	281	215
145	145	327	164	229	236

146	146	267	99	247	214
147	147	285	125	250	226
148	148	327	156	228	244
149	149	296	122	273	226
150	150	236	103	261	219
151	151	242	112	261	218
152	152	286	145	256	239
153	153	295	88	246	77
154	154	413	156	219	99
155	155	341	196	218	231
156	156	222	108	243	222
157	157	353	172	222	207
158	158	360	147	250	164
159	159	399	115	280	91
160	160	385	139	261	157
161	161	96	127	153	183
162	162	100	145	222	194
163	163	81	69	217	185
164	164	86	74	180	184
165	165	120	39	204	226
166	166	166	104	198	199
167	167	158	90	195	179
168	168	180	58	184	283
169	169	96	59	252	136
170	170	100	366	479	231
171	171	182	157	178	164
172	172	188	278	389	259
173	173	180	53	232	124
174	174	182	40	240	157
175	175	205	258	398	259
176	176	143	112	194	140
177	177	70	183	202	185
178	178	28	190	269	201
179	179	45	143	188	171
180	180	90	142	290	220
181	181	22	191	183	143
182	182	51	162	248	176
183	183	70	198	301	212
184	184	36	188	259	175
185	185	300	112	261	195
186	186	206	105	243	154
187	187	377	143	245	131
188	188	239	83	265	73
189	189	407	67	339	51
190	190	347	25	297	92
191	191	186	0	231	166
192	192	407	35	357	0

Appendix 6.
TWINSPAN Printout

Program TWINSPAN, PC version 1.21, 1992
Dimensioned to accept 700 samples, 900 species and 15500 non-zero data items.

Reading data matrix.

nick

Number of samples = 192
Number of species = 331
Length of raw data array = 9072

You may remove the disc containing data from drive; press <return>.
No samples to be omitted.
Pseudospecies cut levels set at .00 2.00 4.00 7.00
Minimum group size for division = 5
Maximum number of indicator species = 7
Maximum number of species in final table = 100
Maximum level of divisions = 5
No diagrams of divisions.
No machine-readable solution to be written.
Pseudospecies all given the same weight.
All pseudospecies available as indicator species.
All species available as indicator species.

Length of data array after defining pseudospecies is 7356.
Total number of species and pseudospecies is 672
Number of species, excluding pseudospecies and ones with no occurrences, = 331
1

**** Sample classification ****

****

1. Division of the 192 items in group *

Eigenvalue is .384 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
478 (1) - * 610 (1) - * 864 (1) + * 1066 (1) - *
589 (1) + * 103 (1) + *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 114 items in the negative group 2,
i.e. group *0
Names or true numbers given.

1	2	3	4	5	6	7
8	12	13	14	15	16	17
19	20	21	22	23	24	25
26	27	28	33	34	37	38
39	40	41	42	43	44	46
47	52	57	58	59	60	61
62	63	64	66	70	71	72
73	74	75	76	77	78	79
80	81	82	83	84	85	86
89	90	91	92	93	94	95
96	97	98	99	100	101	103
108	113	114	115	116	117	118
119	120	127	128	134	135	145
146	147	148	149	150	151	152
153	154	155	156	157	158	159
160	172	175	185	186	187	189
190	192					

There are 8 borderline negatives, viz:

20	37	43	74	101	113	134
175						

There are 4 misclassified negatives, viz:

86	89	190	192

There are 78 items in the positive group 3,
i.e. group *1
Names or true numbers given.

9	10	11	18	29	30	31
32	35	36	45	48	49	50
51	53	54	55	56	65	67
68	69	87	88	102	104	105
106	107	109	110	111	112	121
122	123	124	125	126	129	130
131	132	133	136	137	138	139
140	141	142	143	144	161	162
163	164	165	166	167	168	169
170	171	173	174	176	177	178
179	180	181	182	183	184	188
191						

There are 4 borderline positives, viz:

10	88	170	188

There are 4 misclassified positives, viz:

35	36	122	166

End of level 1

****

2. Division of the 114 items in group *0

Eigenvalue is .356 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.

1046 (1) - * 1077 (1) + * 1140 (1) - * 1350 (1) - *
499 (1) + * 932 (1) + * 418 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 29 items in the negative group 4,
i.e. group *00
Names or true numbers given.

15	33	34	37	70	84	89
90	91	93	94	95	96	114
127	145	148	153	154	155	157
158	159	160	185	187	189	190
192						

There are 2 borderline negatives, viz:

34 155

There are 85 items in the positive group 5,
i.e. group *01
Names or true numbers given.

1	2	3	4	5	6	7
8	12	13	14	16	17	19
20	21	22	23	24	25	26
27	28	38	39	40	41	42
43	44	46	47	52	57	58
59	60	61	62	63	64	66
71	72	73	74	75	76	77
78	79	80	81	82	83	85
86	92	97	98	99	100	101
103	108	113	115	116	117	118
119	120	128	134	135	146	147
149	150	151	152	156	172	175
186						

There are 5 borderline positives, viz:

14 71 85 92 146

****

3. Division of the 78 items in group *1

Eigenvalue is .338 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.

932 (1) - * 1319 (1) + * 499 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 52 items in the negative group 6,
i.e. group *10
Names or true numbers given.

9	10	11	18	29	30	31
32	35	36	45	48	49	54
65	67	68	69	87	88	102
104	110	121	122	123	124	125
126	129	130	131	132	133	136
137	161	162	163	164	165	166
167	168	169	170	171	173	174
176	188	191				

There are 3 borderline negatives, viz:
54 110 137
There are 1 misclassified negatives, viz:
167

There are 26 items in the positive group 7,
i.e. group *11
Names or true numbers given.

50	51	53	55	56	105	106
107	109	111	112	138	139	140
141	142	143	144	177	178	179
180	181	182	183	184		

There are 1 borderline positives, viz:
140
There are 2 misclassified positives, viz:
51 180

End of level 2

****

4. Division of the 29 items in group *00

Eigenvalue is .477 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
1350 (1) + * 1327 (1) - * 319 (1) - * 901 (1) - *
1396 (1) + * 1140 (2) + * 605 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 9 items in the negative group 8,

i.e. group *000
Names or true numbers given.
33 34 37 89 90 93 94
95 96

There are 20 items in the positive group 9,
i.e. group *001
Names or true numbers given.
15 70 84 91 114 127 145
148 153 154 155 157 158 159
160 185 187 189 190 192

****

5. Division of the 85 items in group *01

Eigenvalue is .253 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
1077 (1) - * 236 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 52 items in the negative group 10,
i.e. group *010
Names or true numbers given.
6 7 8 12 16 17 19
20 21 22 23 24 25 27
28 40 41 42 44 46 47
52 57 58 59 60 61 62
63 64 66 73 74 76 77
78 79 80 81 82 83 86
92 97 98 99 100 101 103
118 119 120
There are 3 borderline negatives, viz:
12 74 119

There are 33 items in the positive group 11,
i.e. group *011
Names or true numbers given.
1 2 3 4 5 13 14
26 38 39 43 71 72 75
85 108 113 115 116 117 128
134 135 146 147 149 150 151
152 156 172 175 186
There are 6 borderline positives, viz:
4 5 72 75 108 115
There are 8 misclassified positives, viz:
13 14 26 38 39 43 113
128

****

6. Division of the 52 items in group *10

Eigenvalue is .249 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
2757 (2) - * 1429 (1) - * 477 (1) + * 499 (2) + *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 21 items in the negative group 12,
i.e. group *100
Names or true numbers given.

11	18	29	30	31	32	35
36	45	48	49	54	67	68
87	88	102	104	110	137	188

There are 2 misclassified negatives, viz:
18 29

There are 31 items in the positive group 13,
i.e. group *101
Names or true numbers given.

9	10	65	69	121	122	123
124	125	126	129	130	131	132
133	136	161	162	163	164	165
166	167	168	169	170	171	173
174	176	191				

****

7. Division of the 26 items in group *11

Eigenvalue is .333 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
2615 (1) - * 1136 (2) - * 1429 (2) - * 445 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 19 items in the negative group 14,
i.e. group *110
Names or true numbers given.

50	51	53	105	138	139	140
141	142	143	144	177	178	179
180	181	182	183	184		

There are 3 borderline negatives, viz:
50 179 181

There are 7 items in the positive group 15,
i.e. group *111
Names or true numbers given.
55 56 106 107 109 111 112

End of level 3

****

8. Division of the 9 items in group *000

Eigenvalue is .459 at iteration 3

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
630 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 2 items in the negative group 16,
i.e. group *0000
Names or true numbers given.
37 93

There are 7 items in the positive group 17,
i.e. group *0001
Names or true numbers given.
33 34 89 90 94 95 96

****

9. Division of the 20 items in group *001

Eigenvalue is .398 at iteration 3

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
574 (1) + * 478 (2) + * 610 (2) + * 500 (1) + *
1046 (2) + * 278 (1) + *

Maximum indicator score for negative group is 2.
Minimum indicator score for positive group is 3.

There are 11 items in the negative group 18,
i.e. group *0010
Names or true numbers given.
15 70 84 91 127 153 159
187 189 190 192

There are 9 items in the positive group 19,
i.e. group *0011
Names or true numbers given.

114	145	148	154	155	157	158
160	185					

****

10. Division of the 52 items in group *010

Eigenvalue is .198 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.

516 (1) + *	1375 (1) - *	1136 (1) + *	482 (1) + *
123 (1) + *	1429 (1) + *		

Maximum indicator score for negative group is 1.
Minimum indicator score for positive group is 2.

There are 27 items in the negative group 20,
i.e. group *0100
Names or true numbers given.

6	8	16	22	27	28	41
42	44	46	61	62	63	66
76	77	78	79	80	83	97
98	100	101	103	118	120	

There are 5 borderline negatives, viz:

6	8	28	78	103

There are 25 items in the positive group 21,
i.e. group *0101
Names or true numbers given.

7	12	17	19	20	21	23
24	25	40	47	52	57	58
59	60	64	73	74	81	82
86	92	99	119			

There are 1 borderline positives, viz:

24

There are 2 misclassified positives, viz:

12	92

****

11. Division of the 33 items in group *011

Eigenvalue is .338 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.

570 (1) + *

Maximum indicator score for negative group is 0.
Minimum indicator score for positive group is 1.

There are 29 items in the negative group 22,
i.e. group *0110
Names or true numbers given.

1	2	3	4	5	13	14
26	38	39	43	71	72	75
85	108	113	115	116	117	128
146	147	149	150	151	152	156
186						

There are 4 items in the positive group 23,
i.e. group *0111
Names or true numbers given.

134	135	172	175

****

12. Division of the 21 items in group *100

Eigenvalue is .334 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
384 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 2 items in the negative group 24,
i.e. group *1000
Names or true numbers given.

88	188

There are 19 items in the positive group 25,
i.e. group *1001
Names or true numbers given.

11	18	29	30	31	32	35
36	45	48	49	54	67	68
87	102	104	110	137		

****

13. Division of the 31 items in group *101

Eigenvalue is .311 at iteration 3

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
755 (1) + *

Maximum indicator score for negative group is 0.
Minimum indicator score for positive group is 1.

There are 30 items in the negative group 26,
i.e. group *1010
Names or true numbers given.

9	10	65	69	121	122	123
124	125	126	129	130	131	132
133	136	161	162	163	164	165
166	167	168	169	171	173	174
176	191					

There are 1 items in the positive group 27,
i.e. group *1011
Names or true numbers given.
170

****

14. Division of the 19 items in group *110

Eigenvalue is .315 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
1429 (3) + * 864 (1) - * 587 (1) - * 1270 (1) - *
1051 (2) + *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 12 items in the negative group 28,
i.e. group *1100
Names or true numbers given.

50	51	53	105	138	139	140
141	142	143	144	179		

There are 7 items in the positive group 29,
i.e. group *1101
Names or true numbers given.

177	178	180	181	182	183	184

****

15. Division of the 7 items in group *111

Eigenvalue is .605 at iteration 1

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
294 (1) + *

Maximum indicator score for negative group is 0.
Minimum indicator score for positive group is 1.

There are 6 items in the negative group 30,
i.e. group *1110
Names or true numbers given.
55 56 107 109 111 112

There are 1 items in the positive group 31,
i.e. group *1111
Names or true numbers given.
106

End of level 4

****

16. Division of the 2 items in group *0000
Division fails - there are too few items.

****

17. Division of the 7 items in group *0001

Eigenvalue is .482 at iteration 1

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
120 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 2 items in the negative group 34,
i.e. group *00010
Names or true numbers given.
33 34

There are 5 items in the positive group 35,
i.e. group *00011
Names or true numbers given.
89 90 94 95 96

****

18. Division of the 11 items in group *0010

Eigenvalue is .445 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show

whether positive or negative.
123 (2) + * 1066 (2) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 4 items in the negative group 36,
i.e. group *00100
Names or true numbers given.
15 70 84 91

There are 7 items in the positive group 37,
i.e. group *00101
Names or true numbers given.
127 153 159 187 189 190 192

****

19. *Division of the 9 items in group* *0011

Eigenvalue is .429 at iteration 3

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
680 (1) + *

Maximum indicator score for negative group is 0.
Minimum indicator score for positive group is 1.

There are 6 items in the negative group 38,
i.e. group *00110
Names or true numbers given.
114 154 155 158 160 185

There are 3 items in the positive group 39,
i.e. group *00111
Names or true numbers given.
145 148 157

****

20. Division of the 27 items in group *0100

Eigenvalue is .203 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
610 (1) + * 236 (3) + *

Maximum indicator score for negative group is 0.
Minimum indicator score for positive group is 1.

There are 5 items in the negative group 40,
i.e. group *01000
Names or true numbers given.
66 78 83 97 101
There are 1 borderline negatives, viz:
97

There are 22 items in the positive group 41,
i.e. group *01001
Names or true numbers given.
6 8 16 22 27 28 41
42 44 46 61 62 63 76
77 79 80 98 100 103 118
120

****

21. Division of the 25 items in group *0101

Eigenvalue is .217 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
1066 (3) - * 1321 (1) + * 247 (1) + *

Maximum indicator score for negative group is 0.
Minimum indicator score for positive group is 1.

There are 14 items in the negative group 42,
i.e. group *01010
Names or true numbers given.
19 24 25 40 47 57 58
59 60 64 81 92 99 119
There are 1 borderline negatives, viz:
47

There are 11 items in the positive group 43,
i.e. group *01011
Names or true numbers given.
7 12 17 20 21 23 52
73 74 82 86

****

22. Division of the 29 items in group *0110

Eigenvalue is .286 at iteration 4

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
171 (1) - * 1429 (1) - * 123 (1) - * 482 (1) - *
500 (2) - * 810 (1) + *

Maximum indicator score for negative group is -2.
Minimum indicator score for positive group is -1.

There are 19 items in the negative group 44,
i.e. group *01100
Names or true numbers given.
13 14 26 38 39 43 108
113 116 117 128 146 147 149
150 151 152 156 186
There are 2 borderline negatives, viz:
13 117

There are 10 items in the positive group 45,
i.e. group *01101
Names or true numbers given.
1 2 3 4 5 71 72
75 85 115
There are 1 misclassified positives, viz:
71

****

23. Division of the 4 items in group *0111
Division fails - there are too few items.

****

24. Division of the 2 items in group *1000
Division fails - there are too few items.

****

25. Division of the 19 items in group *1001

Eigenvalue is .285 at iteration 3

Indicator species (with pseudospecies level in brackets) and sign to show
whether positive or negative.
605 (1) - * 1066 (2) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 8 items in the negative group 50,
i.e. group *10010
Names or true numbers given.
11 29 35 45 49 67 68
137

There are 11 items in the positive group 51,
i.e. group *10011

Names or true numbers given.
18 30 31 32 36 48 54
87 102 104 110

****

26. Division of the 30 items in group *1010

Eigenvalue is .259 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
500 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 28 items in the negative group 52,
i.e. group *10100
Names or true numbers given.
9 10 65 69 121 122 123
124 125 126 129 130 131 132
133 136 161 162 163 164 165
166 168 169 171 173 174 176

There are 2 items in the positive group 53,
i.e. group *10101
Names or true numbers given.
167 191

****

27. Division of the 1 items in group *1011
Division fails - there are too few items.

****

28. Division of the 12 items in group *1100

Eigenvalue is .361 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
2615 (1) - * 2636 (1) - *

Maximum indicator score for negative group is -2.
Minimum indicator score for positive group is -1.

There are 7 items in the negative group 56,
i.e. group *11000
Names or true numbers given.
138 139 140 141 142 143 144

There are 5 items in the positive group 57,
i.e. group *11001
Names or true numbers given.
50 51 53 105 179

****

29. Division of the 7 items in group *1101

Eigenvalue is .389 at iteration 2

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
414 (1) + *

Maximum indicator score for negative group is 0.
Minimum indicator score for positive group is 1.

There are 4 items in the negative group 58,
i.e. group *11010
Names or true numbers given.
178 181 182 184

There are 3 items in the positive group 59,
i.e. group *11011
Names or true numbers given.
177 180 183

****

30. Division of the 6 items in group *1110

Eigenvalue is .407 at iteration 1

Indicator species (with pseudospecies level in brackets) and sign to show whether positive or negative.
236 (1) - *

Maximum indicator score for negative group is -1.
Minimum indicator score for positive group is 0.

There are 3 items in the negative group 60,
i.e. group *11100
Names or true numbers given.
55 109 111

There are 3 items in the positive group 61,
i.e. group *11101
Names or true numbers given.
56 107 112

****

31. Division of the 1 items in group *1111
Division fails - there are too few items.

End of level 5

This is the end of the divisions requested.

****

1

**** Species classification ****

****

1. Division of the 319 items in group *

Appendix 7.

Maiden Stem Numbers 5-10 cm. DBH.
and Mature Trees >40 cm.DBH. For 1971.

	Gt. Knott		Hall Brow		Eden Gorge		Winster Ho.		Seatoller		Birks Brow	
	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40
Ash	Nil		Nil		0	1	8	0	1	2	3	0
Oak	1	3	7	2	0	2	3	0	2	7	15	1
Birch	24	0	41	1	2	0	31	0	3	0	33	0
Yew	Nil		Nil		Nil		0	1	Nil		Nil	
Sycamore	Nil		Nil		1	0	6	0	Nil		2	0
Elm	Nil		Nil		Nil		Nil		0	1	Nil	
Beech	Nil		0	1	0	3	Nil		Nil		Nil	
Willow	Nil		1	0	Nil		2	0	Nil		2	0
Aspen	Nil		8	0	Nil		Nil		Nil		Nil	
Poplar	Nil		Nil		2	0	Nil		Nil		Nil	
Rowan	Nil		1	0	Nil		Nil		Nil		Nil	
Total	25	3	58	4	5	6	50	1	6	10	55	1
	Whitbarrow		Haveriggs H.		Pike Gill		Rotten Butts		Eaves Wood		Tynron	
	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40
Ash	23	0	Nil		3	0	Nil		7	0	1	0
Oak	Nil		5	0	1	0	0	3	Nil		Nil	
Birch	11	0	10	0	1	0	Nil		Nil		Nil	
Yew	0	2	Nil		Nil		Nil		3	1	Nil	
Alder	Nil		Nil		2	0	Nil		Nil		Nil	
Sycamore	2	0	Nil		2	0	0	3	1	0	Nil	
Larch	Nil		Nil		Nil		Nil		0	1	Nil	
Elm	Nil		Nil		Nil		1	2	0	1	Nil	
Beech	Nil		Nil		Nil		Nil		0	1	Nil	
Willow	1	0	Nil		1	0	Nil		Nil		Nil	
Spruce	1	0	Nil		Nil		Nil		Nil		Nil	
Fir	Nil		Nil		Nil		0	2	Nil		Nil	
Cherry	1	0	0	1	Nil		Nil		Nil		1	2
Rowan	Nil		Nil		6	0	Nil		Nil		Nil	
Whiteb.	1	0	Nil		Nil		Nil		Nil		Nil	
Total	40	2	15	1	16	0	1	10	11	4	2	2

Appendix 8.

Maiden Stem Numbers 5-10 cm. DBH
And Mature Trees >40 cm.DBH For 1998.

	Gt. Knott		Hall Brow		Eden Gorge		Winster Ho.		Seatoller		Birks Brow	
	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40
Ash	Nil		Nil		10	1	Nil		Nil		Nil	
Oak	4	2	1	1	0	4	0	1	0	2	21	1
Birch	5	0	5	0	4	0	1	0	Nil		10	0
Yew	Nil		Nil		Nil		0	1	Nil		Nil	
Sycamore	Nil		Nil		3	0	2	0	Nil		Nil	
Elm	Nil		Nil		2	0	Nil		Nil		Nil	
Beech	4	0	Nil		Nil		Nil		Nil		Nil	
Spruce	Nil		Nil		8	0	0	1	Nil		Nil	
Scots	Nil		0	1	Nil		Nil		Nil		Nil	
Lime	Nil		Nil		Nil		Nil		Nil		2	0
Total	13	2	6	2	27	5	3	3	0	2	33	1

	Whitbarrow		Haveriggs H.		Pike Gill		Rotten Butts		Eaves Wood		Tynron	
	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40	5-10	>40
Ash	9	0	Nil		2	0	Nil		13	0	4	0
Oak	1	1	Nil		Nil		0	1	6	1	Nil	
Birch	6	0	Nil		0	1	Nil		Nil		Nil	
Yew	0	3	Nil		Nil		Nil		7	0	Nil	
Sycamore	1	0	Nil		4	0	Nil		5	0	Nil	
Larch	Nil		Nil		Nil		1	0	3	0	Nil	
Elm	Nil		Nil		2	0	Nil		Nil		Nil	
Beech	Nil		Nil		Nil		4	0	Nil		Nil	
Spruce	Nil		Nil		0	1	Nil		Nil		Nil	
Scots	Nil		Nil		Nil		0	1	Nil		Nil	
Cherry	3	0	0	1	0	1	2	0	Nil		Nil	
Whiteb.	Nil		Nil		Nil		Nil		1	0	Nil	
Rowan	Nil		Nil		Nil		2	0	3	0	Nil	
Total	20	4	0	1	8	3	9	2	25	1	4	0