

Appendix 1. Environmental variables used in analysis

Parts of variable names used in computer designations and in illustrations in this report are shown in **bold**.

1. **Horse**

Sites with horse or donkey (i.e. equid) grazing were given "1", others "0".

2. **Cattle**

Sites with cattle grazing were given "1", others "0". Since sites were either horse or cattle grazed, this variable is redundant for analysis and CANOCO was instructed to ignore it (because the same information is given by "Horse" alone).

3. **Intensity**

A subjective but quantified variable on a scale of 1 to 3. Grazing intensity was determined before data were gathered and referred to intensity in previous years in the few cases where it was known to have been changed in 1996. The intensity classes used were:

a. **Light grazing**

Although the site is grazed, the grazing level is such that the growth level is not reduced to the accepted figure of 2-5cm sward height at the end of the grazing season. There may be litter build up and tussock formation. A farmer would consider that the land was stocked under capacity.

2 **Moderate grazing**

The site is grazed and the sward height is reduced to 2-5cm sward height at the end of the grazing season. Some localised damage to the sward may occur. A farmer would consider the land stocked at capacity without the need to resort to supplementary feeding in the course of a normal seasonal grazing regime.

3 **Heavy grazing**

Sward damage occurs and supplementary feeding would be necessary at times to maintain stock on the land.

4. **Hay**

Given "1" for hay cut, "0" for none.

5. **Height**

Vegetation height in centimetres as estimated from the arithmetic mean of three dropped-disc measures in a square metre.

6. **HeightRange**
Difference between the smallest and largest of the three dropped disc height estimates.
7. **Bare ground**
The percentage of a quadrat occupied by bare ground.
8. **Litter**
The percentage of a quadrat occupied by litter judged to be remaining from the previous years' (ie 1995) growth.
9. **Latrine**
Presence (1) or absence (0) of a horse latrine area. Latrines only occurred within horse grazed sites with intensity 3 (heavy grazing).
10. **Altitude**
The median height above sea level in metres of a site, taken from the site cards.
11. **Area of MG5 grassland**
The total area in hectares of MG5 grassland reported from a whole site (i.e. one or a collection of contiguous fields) on the site cards.
12. **Easting**
National Grid easting, with 100 km square grid letters converted to numbers using an origin at the southwest corner of square SX.
13. **Northing**
National Grid northing, derived in the same way as the easting.
14. **Water deficit**
Average summer potential water deficit, as used by Averis (1991) from Page (1982)
15. **February temperature**
February mean daily temperature, from the same source as 14.
16. **Temperature range**
Average annual temperature range from the same source as 14.

17. **Cloudiness**

Percentage daytime cloudiness from the same source as 14.

18. **SO₂ concentration**

Annual average arithmetic mean sulphur dioxide concentration, from the same source as 14.

19. **Oceanicity index**

Climatic oceanicity index expressed as the number of wet days divided by annual temperature range from the same source as 14.

The use of further climatic variables was explored but proved either to have too small a range to be useful within the occurrence range of MG5, or were too highly correlated with the set described above.

20. **Urban distance**

The distance of a site from the nearest town covering more than 5 square kilometres of continuous built-up area.

Appendix 2. Species list of all species from all sites

Note:

Abbreviation = seven-letter acronym used in Figures and analyses

ID = Species ID number, as used in the analyses

Abbreviation	Latin name	English name	I D
ACHIMIL	<i>Achillea millefolium</i>	Yarrow	12
AGRCAPI	<i>Agrostis capillaris</i>	Common Bent-grass	1
AGRIMEU	<i>Agrimonia eupatoria</i>	Agrimony	39
AGRSTOL	<i>Agrostis stolonifera</i>	Creeping Bent	60
AJUGREP	<i>Ajuga reptans</i>	Bugle	108
ALCHVES	<i>Alchemilla vulgaris</i> agg.	Lady's mantle	109
ALLIVIN	<i>Allium vineale</i>	Crow Garlic	132
ALOPRAT	<i>Alopecurus pratensis</i>	Meadow Foxtail	53
ANEMNEM	<i>Anemone nemorosa</i>	Wood Anemone	106
ANGSYLV	<i>Angelica sylvestris</i>	Wild Angelica	150
ANTHODO	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	28
ARRELAT	<i>Arrhenatherum elatius</i>	False Oat-grass	10
AVEUPRA	<i>Avenula pratensis</i>	Meadow Oat-grass	139
AVEUPUB	<i>Avenula pubescens</i>	Downy Oat-grass	81
BELPERR	<i>Bellis perennis</i>	Common Daisy	57
BRASYLV	<i>Brachypodium sylvaticum</i>	False-brome	146
BRIMEDI	<i>Briza media</i>	Quaking-grass	2
BROCOMM	<i>Bromus commutatus</i>	Meadow Brome	65
BROMERE	<i>Bromus erectus</i>	Upright Brome	56
BROMOLL	<i>Bromus hordeaceus hordeaceus</i>	Lop grass	11
BROSTER	<i>Bromus sterilis</i>	Barren Brome	131
CAMPROT	<i>Campanula rotundifolia</i>	Harebell	133
CARDFLE	<i>Cardamine flexuosa</i>	Wavy Bitter-cress	85
CARDPRA	<i>Cardamine pratensis</i>	Cuckoo Flower	103
CARECAR	<i>Carex caryophylla</i>	Spring Sedge	110
CAREDEM	<i>Carex demissa</i>	Common Yellow-sedge	137
CAREFLA	<i>Carex flacca</i>	Glaucous Sedge	13
CAREHIR	<i>Carex hirta</i>	Hairy Sedge	68
CAREOVA	<i>Carex ovalis</i>	Oval Sedge	75
CAREPAN	<i>Carex panicea</i>	Carnation Sedge	124
CAREPUL	<i>Carex pulicaris</i>	Flea Sedge	142
CENTERY	<i>Centaureum erythraea</i>	Common Centaury	94
CENTNIG	<i>Centaurea nigra</i>	Hardheads	14
CERFONT	<i>Cerastium fontanum triviale</i>	Common mouse-ear	51
CIRACAU	<i>Cirsium acaule</i>	Stemless Thistle	145
CIRARVE	<i>Cirsium arvense</i>	Creeping Thistle	35
CIRSPAL	<i>Cirsium palustre</i>	Marsh Thistle	100
CIRVULG	<i>Cirsium vulgare</i>	Spear Thistle	58
CONOMAJ	<i>Conopodium majus</i>	Pignut	80
CONVARV	<i>Convolvulus arvensis</i>	Field Bindweed	111
CRATMON	<i>Crataegus monogyna</i> (g)	Hawthorn	46
CREPBI	<i>Crepis biennis</i>	Rough Hawksbeard	130
CREPCAP	<i>Crepis capillaris</i>	Smooth Hawksbeard	116
CYNCRIS	<i>Cynosurus cristatus</i>	Crested Dogstail	3
DACGLOM	<i>Dactylis glomerata</i>	Cocksfoot	4

Species list, continued

Abbreviation	Latin name	English name	I D
DACTFUC	<i>Dactylorhiza fuchsii</i>	Common Spotted Orchid	91
DANTDEC	<i>Danthonia decumbens</i>	Heath Grass	87
DAUCARO	<i>Daucus carota</i>	Wild Carrot	114
DESCAES	<i>Dechampsia caespitosa</i>	Tufted hair-grass	107
ELYREPE	<i>Elymus repens</i>	Couch-grass	47
EQUIARV	<i>Equisetum arvense</i>	Field Horsetail	90
EUPHRAS	<i>Euphrasia officinalis</i> agg	Eyebright	89
FESARUN	<i>Festuca arundinacea</i>	Tall Fescue	149
FESLOLI	<i>Festuca x loliacea</i>	Hybrid fescue	141
FESOVIN	<i>Festuca ovina</i>	Sheep's Fescue	86
FESPRAT	<i>Festuca pratensis</i>	Meadow Fescue	5
FESRUBR	<i>Festuca rubra</i>	Red Fescue	6
FILIULM	<i>Filipendula ulmaria</i>	Meadowsweet	76
FILVULG	<i>Filipendula vulgaris</i>	Dropwort	84
FRAXEXC	<i>Fraxinus excelsior</i> (g)	Ash	98
GALPALU	<i>Galium palustre</i>	Marsh Bedstraw	136
GALVERU	<i>Galium verum</i>	Lady's Bedstraw	30
GAUDFRA	<i>Gaudinia fragilis</i>	French oat grass	127
GENTINC	<i>Genista tinctoria</i>	Dyer's greenweed	74
GERDISS	<i>Geranium dissectum</i>	Cut-leaved Cranesbill	73
HERASPH	<i>Heracleum sphondylium</i>	Hogweed	31
HIERPIL	<i>Hieracium pilosella</i>	Mouse-ear Hawkweed	99
HOLCLAN	<i>Holcus lanatus</i>	Yorkshire Fog	7
HORDSEC	<i>Hordeum secalinum</i>	Meadow Barley	50
HYPORAD	<i>Hypochaeris radicata</i>	Cat's-ear	62
HYPPERF	<i>Hypericum perforatum</i>	Perforate St John's-wort	115
JUNCACU	<i>Juncus acutiflorus</i>	Sharp-flowered Rush	118
JUNCART	<i>Juncus articulatus</i>	Jointed Rush	69
JUNCBUF	<i>Juncus bufonius</i>	Toad Rush	102
JUNCCON	<i>Juncus conglomeratus</i>	Compact Rush	123
JUNCINF	<i>Juncus inflexus</i>	Hard Rush	96
KOELMAC	<i>Koeleria macrantha</i>	Crested Hair-grass	38
LATHMON	<i>Lathyrus montanus</i>	Bitter Vetch	135
LATHPRA	<i>Lathyrus pratensis</i>	Meadow Vetchling	32
LEONAUT	<i>Leontodon autumnalis</i>	Autumnal Hawkbit	40
LEONHIS	<i>Leontodon hispidus</i>	Rough Hawkbit	15
LEONTAR	<i>Leontodon taraxacoides</i>	Hairy Hawkbit	101
LEUCVUL	<i>Leucanthemum vulgare</i>	Ox-eye daisy	16
LINUCAT	<i>Linum catharticum</i>	Fairy Flax	45
LISTOVA	<i>Listera ovata</i>	Twayblade	128
LOLPERR	<i>Lolium perenne</i>	Perennial Rye-grass	8
LOTORN	<i>Lotus corniculatus</i>	Common Birdsfoot-trefoil	17
LOTULIG	<i>Lotus uliginosus</i>	Large Birdsfoot-trefoil	72
LUZCAMP	<i>Luzula campestris</i>	Field Woodrush	18
MEDILUP	<i>Medicago lupulina</i>	Black Medick	43
MYOSARV	<i>Myosotis arvensis</i>	Field Forget-me-not	64
NARCPSE	<i>Narcissus pseudonarcissus</i>	Wild daffodils	66
OENPIMP	<i>Oenanthe pimpinelloides</i>	Corky-fruited water dropwort	120

Species list, continued

Abbreviation	Latin name	English name	I D
ONONSPI	<i>Ononis spinosa</i>	Spiny Restharrow	121
OPHIVUL	<i>Ophioglossum vulgatum</i>	Adder's-tongue Fern	92
ORCHMOR	<i>Orchis morio</i>	Green-winged Orchid	67
PEDISYL	<i>Pedicularis sylvatica</i>	Lousewort	125
PHLEPRA	<i>Phleum pratense</i>	Cat's-tail	59
PIMPSAX	<i>Pimpinella saxifraga</i>	Burnet Saxifrage	61
PLANLAN	<i>Plantago lanceolata</i>	Ribwort Plantain	19
PLANMAJ	<i>Plantago major</i>	Greater Plantain	54
PLANMED	<i>Plantago media</i>	Hoary Plantain	44
POAANNU	<i>Poa annua</i>	Annual Meadow-grass	93
POAPRAT	<i>Poa pratensis</i>	Smooth Meadow-grass	29
POATRIV	<i>Poa trivialis</i>	Rough Meadow-grass	119
POLAVIC	<i>Polygonum aviculare</i>	Knotgrass	129
POLSERP	<i>Polygala serpyllifolia</i>	Heath Milkwort	134
POLVULG	<i>Polygala vulgaris</i>	Common Milkwort	143
POTEREC	<i>Potentilla erecta</i>	Tormentil	88
POTREPT	<i>Potentilla reptans</i>	Creeping Cinquefoil	26
POTSTER	<i>Potentilla sterilis</i>	Barren Strawberry	144
PRIMVER	<i>Primula veris</i>	Cowslip	27
PRUSPIN	<i>Prunus spinosa</i> (g)	Blackthorn	83
PRUVULG	<i>Prunella vulgaris</i>	Selfheal	20
PULIDYS	<i>Pulicaria dysenterica</i>	Fleabane	122
QUERCRO	<i>Quercus</i> seedling/sp	Oak	95
RANACRI	<i>Ranunculus acris</i>	Meadow Buttercup	21
RANBULB	<i>Ranunculus bulbosus</i>	Bulbous Buttercup	22
RANREPE	<i>Ranunculus repens</i>	Creeping Buttercup	34
RHINMIN	<i>Rhinanthus minor</i>	Yellow Rattle	41
ROSACAN	<i>Rosa canina</i> (g)	Wild rose	140
RUMACET	<i>Rumex acetosa</i>	Sorrel	33
SAGPROC	<i>Sagina procumbens</i>	Procumbent Pearlwort	147
SANGMIN	<i>Sanguisorba minor</i>	Salad burnet	49
SCROAUR	<i>Scrophularia auriculata</i>	Water Figwort	97
SENERUC	<i>Senecio erucifolius</i>	Hoary Ragwort	112
SENJACO	<i>Senecio jacobaea</i>	Ragwort	48
SERRTIN	<i>Serratula tinctoria</i>	Saw-wort	77
SILASIL	<i>Silaum silaus</i>	Pepper Saxifrage	55
STACOFF	<i>Stachys officinalis</i>	Betony	79
STELGRA	<i>Stellaria graminea</i>	Lesser Stitchwort	71
STELMED	<i>Stellaria media</i>	Chickweed	138
SUCCPRA	<i>Succisa pratensis</i>	Devil's-bit Scabious	78
TARXOFF	<i>Taraxacum</i> seedling/sp	Dandelion	23
TRAGPRA	<i>Tragopogon pratensis</i>	Goat's-Beard	42
TRIFDUB	<i>Trifolium dubium</i>	Lesser Trefoil	63
TRIFMED	<i>Trifolium medium</i>	Zigzag Clover	117
TRIFPRA	<i>Trifolium pratense</i>	Red Clover	24
TRIFREP	<i>Trifolium repens</i>	White Clover	25
TRISFLA	<i>Trisetum flavescens</i>	Yellow Oat-grass	9
ULEXGAL	<i>Ulex gallii</i>	Western Gorse	126

Species list, continued

Abbreviation	Latin name	English name	I D
VERARVE	<i>Veronica arvensis</i>	Wall Speedwell	148
VERCHAM	<i>Veronica chamaedrys</i>	Germander Speedwell	37
VEROFFI	<i>Veronica officinalis</i>	Heath Speedwell	113
VERSERP	<i>Veronica serpyllifolia</i>	Thyme-leaved Speedwell	70
VICICRA	<i>Vicia cracca</i>	Tufted Vetch	36
VICISAT	<i>Vicia sativa nigra</i>	Common vetch	82
VICISEP	<i>Vicia sepium</i>	Bush Vetch	105
VIOHIRT	<i>Viola hirta</i>	Hairy Violet	52
VIORIVI	<i>Viola riviniana</i>	Common Dog-violet	104

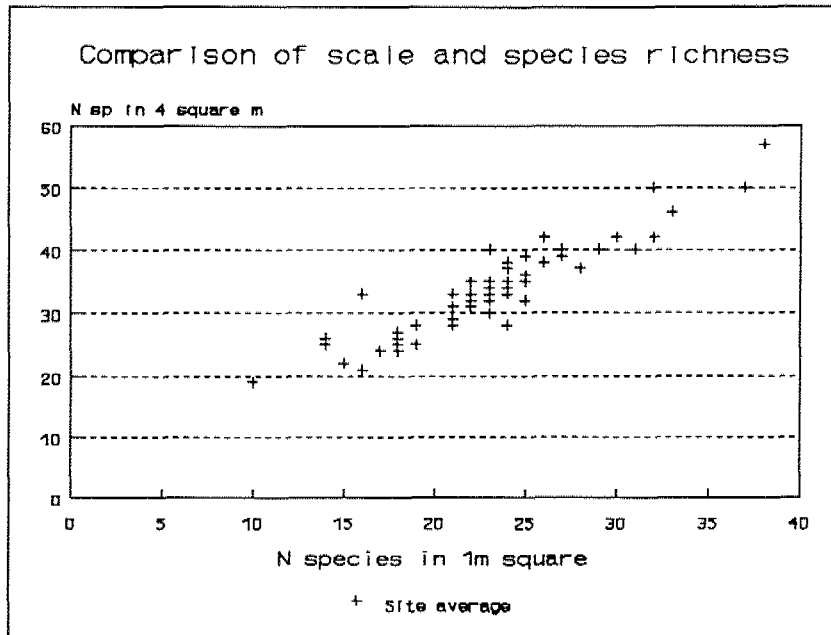
Appendix 3. Comparison of richness on 1m² and NVC scales

Averages for each sample series are given, in descending order of richness. The NVC scale is derived from the first four 1m square quadrats taken in each series.

Series	Name	Species m ⁻²	Species per 4m ²
GF	Grove Farm	38	57
EM	Eades Meadow	37	50
WVF	Whitevine Farm	32.6	46
KWM	Kingweston	31.6	50
THB	Trickses Hole B	31.6	42
PFS	Portway Farm south	30.6	40
RCS	Rookery Cottage South	29.625	42
PFN	Portway Farm north	29	40
PMN	Poolhay Meadow	28.2	37
THD	Trickses Hole D	27.8	37
DY	Duke of York	27.2	39
BF	Buckeridge	26.625	40
DFD	Distillery Farm D	26.5	40
BI	Bull Ings	26.4	42
THC	Trickses Hole C	26	38
SMM	Stocking Meadows meadow	25.8	38
SMP	Stocking Meadows pasture	25.4	39
HBG	Hawthorn Bush	25.2	36
LWMB	Lords Wood Meadows B	25.2	32
NH	Napleton Meadows	24.8	35
BGM	Brotheridge Green	24.625	32
SCF	South Close Field	24.6	35
MXM	Muxton Meadows	24.4	34
MMP	Marden Meadow	24.33	37
LWMA	Lords Wood Meadows A	24.2	38
HFPU	Hurst Farm light grazed	24.2	33
HFPP	Hurst Farm heavy grazed	24	35
RMFA	Romsley Manor Farm A	24	28
RMFC	Romsley Manor Farm C	23.6	33

Series	Name	Species m ⁻²	Species per 4m ²
LBV	Leigh Brook Valley	23.4	34
POA	Penorchard A	23.4	30
WCG	Woodland Cottage grazed	23	35
POC	Penorchard C	23	30
THA	Trickses Hole A	22.8	35
RSE	Rye Street East	22.8	33
RSW	Rye Street West	22.75	35
RCN	Rookery Cottage North	22.625	40
LWMC	Lords Wood Meadows C	22.6	32
PORG	Penorchard RG	22.6	30
RMFB	Romsley Manor Farm B	22	33
SFA	Spring Farm A	21.8	35
RMFD	Romsley Manor Farm B	21.8	31
SYM	Sylvias Meadow	21.67	32
FIMA	Fox Inn Meadow A	21.2	29
FIMB	Fox Inn Meadow B	21	31
SFB	Spring Farm B	21	28
PRFP	Priory Road pasture	20.6	33
BMD	Berry Mound D	19	25
BMAA	Berry Mound AA	18.83	28
PORL	Penorchard RL	18.4	25
CFM	Corfe Mullen	18.2	26
DFE	Distillery Farm E	18	27
BMA	Berry Mound A	17.67	24
HF	Huntsfield Farm	17.4	24
PRFL	Priory Road latrines	16.4	33
FFL	Feckenham Forest <i>Lotus</i>	15.6	21
POD	Penorchard D	15.4	22
WCL	Woodland Cottage latrine	14	25
POB	Penorchard B	13.8	26
FFT	Feckenham Forest T	9.8	19

Graphical illustration of relationship



Appendix 4. Mesotrophic grassland indicator species

Species Name	Mesotrophic Indicator score
<i>Achillea ptarmica</i>	1
<i>Agrimonia eupatoria</i>	1
<i>Agrimonia procera</i>	1
<i>Ajuga reptans</i>	1
<i>Alchemilla filicaulis</i>	4
<i>Alchemilla glabra</i>	4
<i>Alchemilla monticola</i>	8
<i>Alchemilla xanthochlora</i>	4
<i>Allium vineale</i>	1
<i>Alopecurus bulbosus</i>	4
<i>Anemone nemorosa</i>	2
<i>Avenula pubescens</i>	1
<i>Blysmus compressus</i>	2
<i>Botrychium lunaria</i>	2
<i>Brachypodium sylvaticum</i>	1
<i>Briza media</i>	2
<i>Bromus commutatus</i>	4
<i>Bromus racemosus</i>	4
<i>Caltha palustris</i>	1
<i>Campanula rotundifolia</i>	2
<i>Cardamine pratensis</i>	1
<i>Carex acutiformis</i>	1
<i>Carex caryophyllea</i>	2
<i>Carex demissa</i>	2
<i>Carex diandra</i>	2
<i>Carex distans</i>	2
<i>Carex disticha</i>	2
<i>Carex divisa</i>	4
<i>Carex echinata</i>	2
<i>Carex flacca</i>	2
<i>Carex hostiana</i>	2
<i>Carex muricata</i>	4
<i>Carex nigra</i>	2
<i>Carex ovalis</i>	2
<i>Carex pallescens</i>	2
<i>Carex panicea</i>	2
<i>Carex pilulifera</i>	2
<i>Carex pulicaris</i>	2
<i>Carex spicata</i>	2
<i>Carex tomentosa</i>	8
<i>Carex vesicaria</i>	2
<i>Carum verticillatum</i>	2
<i>Centaurea nigra</i>	1
<i>Centaureum erythraea</i>	1

<i>Cirsium dissectum</i>	4
<i>Cirsium helenioides</i>	4
<i>Coeloglossum viride</i>	1
<i>Colchicum autumnale</i>	4
<i>Conopodium majus</i>	1
<i>Crepis paludosa</i>	2
<i>Dactylorhiza fuchsii</i>	1
<i>Dactylorhiza incarnata</i>	2
<i>Dactylorhiza maculata</i>	2
<i>Dactylorhiza maculata</i> x <i>D. fuchsii</i>	2
<i>Dactylorhiza majalis</i>	4
<i>Dactylorhiza purpurella</i>	4
<i>Dactylorhiza traunsteineri</i>	2
<i>Danthonia decumbens</i>	2
<i>Eleocharis palustris</i>	1
<i>Epilobium palustre</i>	1
<i>Epilobium parviflorum</i>	1
<i>Epipactis palustris</i>	2
<i>Equisetum palustre</i>	1
<i>Equisetum pratense</i>	2
<i>Equisetum sylvaticum</i>	1
<i>Euphrasia anglica</i>	2
<i>Euphrasia arctica</i> ssp <i>borealis</i>	8
<i>Euphrasia nemorosa</i> (incl <i>E. curta</i>)	2
<i>Euphrasia rostkoviana</i> ssp <i>rostkoviana</i>	8
<i>Festulolium loliaceum</i>	1
<i>Filipendula vulgaris</i>	2
<i>Fritillaria meleagris</i>	8
<i>Galium palustre</i>	1
<i>Galium uliginosum</i>	1
<i>Galium verum</i>	1
<i>Genista tinctoria</i>	2
<i>Gentianella campestris</i>	1
<i>Geranium pratense</i>	2
<i>Geranium sylvaticum</i>	4
<i>Geum rivale</i>	4
<i>Gymnadenia conopsea</i>	2
<i>Hieracium pilosella</i> (group)	1
<i>Hordeum secalinum</i>	1
<i>Hyacinthoides nonscripta</i>	1
<i>Hydrocotyle vulgaris</i>	1
<i>Hypericum maculatum</i>	1
<i>Hypericum tetrapterum</i>	1
<i>Isolepis setacea</i>	2
<i>Juncus compressus</i>	4
<i>Juncus subnodulosus</i>	1
<i>Knautia arvensis</i>	1
<i>Koeleria macrantha</i>	2
<i>Lathyrus montanus</i>	1

<i>Lathyrus nissolia</i>	4
<i>Lathyrus pratensis</i>	1
<i>Leontodon hispidus</i>	2
<i>Leontodon taraxacoides</i>	2
<i>Leucanthemum vulgare</i>	1
<i>Linum catharticum</i>	1
<i>Listera ovata</i>	2
<i>Lotus corniculatus</i>	1
<i>Lotus tenuis</i>	1
<i>Lotus uliginosus</i>	1
<i>Luzula campestris</i>	1
<i>Luzula multiflora</i>	1
<i>Lychnis flos-cuculi</i>	1
<i>Lysimachia nummularia</i>	1
<i>Meum athamanticum</i>	4
<i>Molinia caerulea</i>	1
<i>Myosotis discolor</i>	1
<i>Myosotis secunda</i>	1
<i>Narcissus pseudonarcissus</i>	1
<i>Oenanthe fistulosa</i>	1
<i>Oenanthe pimpinelloides</i>	8
<i>Oenanthe silaifolia</i>	8
<i>Ononis repens</i>	1
<i>Ononis spinosa</i>	2
<i>Ophioglossum vulgatum</i>	2
<i>Orchis mascula</i>	2
<i>Orchis morio</i>	4
<i>Oxalis acetosella</i>	1
<i>Parentucillia viscosa</i>	4
<i>Parnassia palustris</i>	2
<i>Pedicularis palustris</i>	1
<i>Pimpinella saxifraga</i>	2
<i>Plantago media</i>	1
<i>Platanthera bifolia</i>	2
<i>Platanthera chlorantha</i>	2
<i>Polygala serpyllifolia</i>	2
<i>Polygala vulgaris</i>	2
<i>Polygonum bistorta</i>	8
<i>Polygonum viviparum</i>	2
<i>Potentilla anglica</i>	1
<i>Potentilla erecta</i>	1
<i>Potentilla palustris</i>	2
<i>Primula farinosa</i>	2
<i>Primula veris</i>	2
<i>Primula veris</i> x <i>P. vulgaris</i>	2
<i>Primula vulgaris</i>	2
<i>Pulicaria dysenterica</i>	1
<i>Ranunculus auricomus</i>	2
<i>Ranunculus bulbosus</i>	1

<i>Ranunculus ficaria</i>	1
<i>Ranunculus flammula</i>	1
<i>Rhinanthus minor</i>	1
<i>Sagina nodosa</i>	1
<i>Sanguisorba minor</i>	1
<i>Sanguisorba officinalis</i>	8
<i>Saxifraga granulata</i>	2
<i>Senecio aquaticus</i>	1
<i>Senecio erucifolius</i>	1
<i>Serratula tinctoria</i>	2
<i>Silaum silaus</i>	8
<i>Stachys officinalis</i>	2
<i>Stellaria graminea</i>	1
<i>Stellaria palustris</i>	1
<i>Succisa pratensis</i>	2
<i>Thalictrum flavum</i>	2
<i>Thymus praecox</i> ssp <i>arcticus</i>	2
<i>Trifolium fragiferum</i>	8
<i>Trifolium medium</i>	1
<i>Trifolium ochroleucon</i>	8
<i>Triglochin palustris</i>	4
<i>Trisetum flavescens</i>	1
<i>Trollius europaeus</i>	4
<i>Valeriana dioica</i>	4
<i>Valeriana officinalis</i>	1
<i>Veronica officinalis</i>	1
<i>Veronica scutellata</i>	2
<i>Vicia orobus</i>	4
<i>Vicia tenuissima</i>	1
<i>Vicia tetrasperma</i>	1
<i>Viola canina</i>	2
<i>Viola hirta</i>	2
<i>Viola riviniana</i>	2

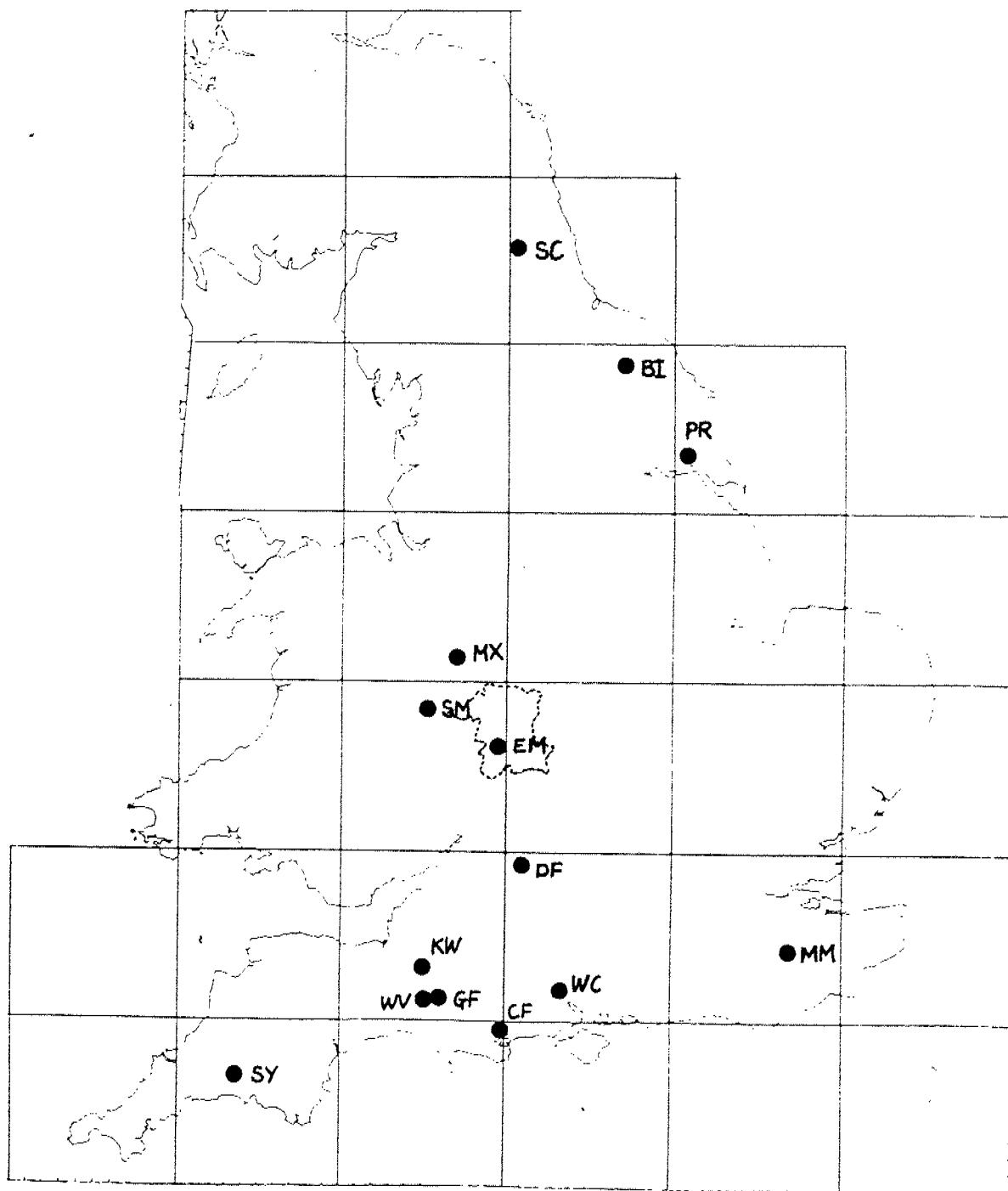
175 species listed

English Nature
28th August 1996

Figure 1: Sites sampled for geographical range extension in 1996

Prepared by: **Bioscan (UK) Ltd**
 Standingford House, Cave Street,
 St Clemets, Oxford OX4 1BA
 Tel: 01865 794464 Fax: 01865 794480

BI	Bull Ings	MX	Muxton Meadow
CF	Corfe Mullen	PR	Priory Road Fields
DF	Distillery Farm	SC	South Close Field
EM	Eades Meadow	SM	Stocking Meadows
GF	Grove Farm	SY	Sylvia's Meadows
KW	Kingweston Farm	WV	Whitevine Farm
MM	Marden Meadow	WC	Woodland Cottage Meadow
----- Worcestershire County boundary			



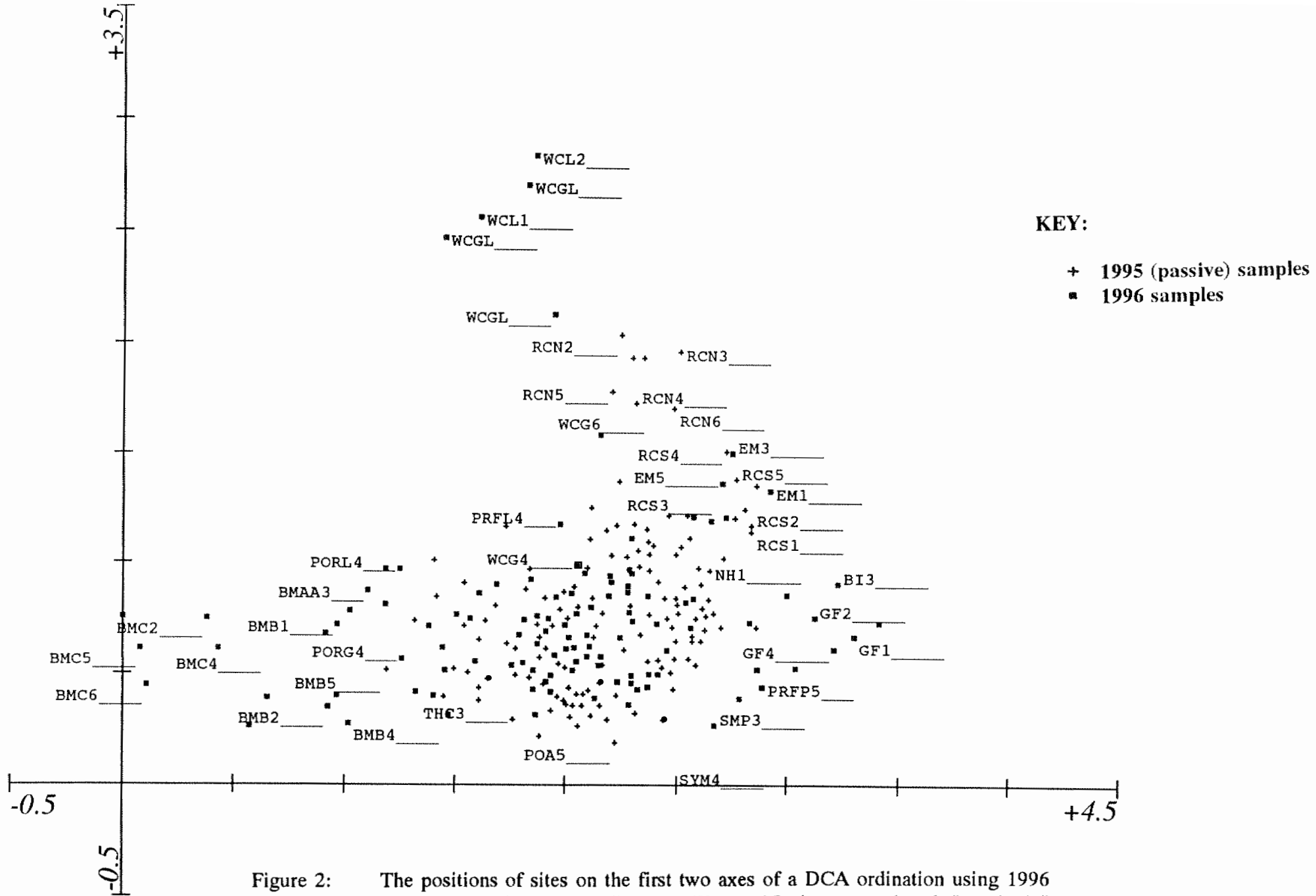


Figure 2: The positions of sites on the first two axes of a DCA ordination using 1996 data to calculate the ordination. The 1995 data are placed "passively" according to their positions on the basis of the new data. Quadrats are labelled by acronyms where these can be fitted on the Figure: site examples are explained in the text.

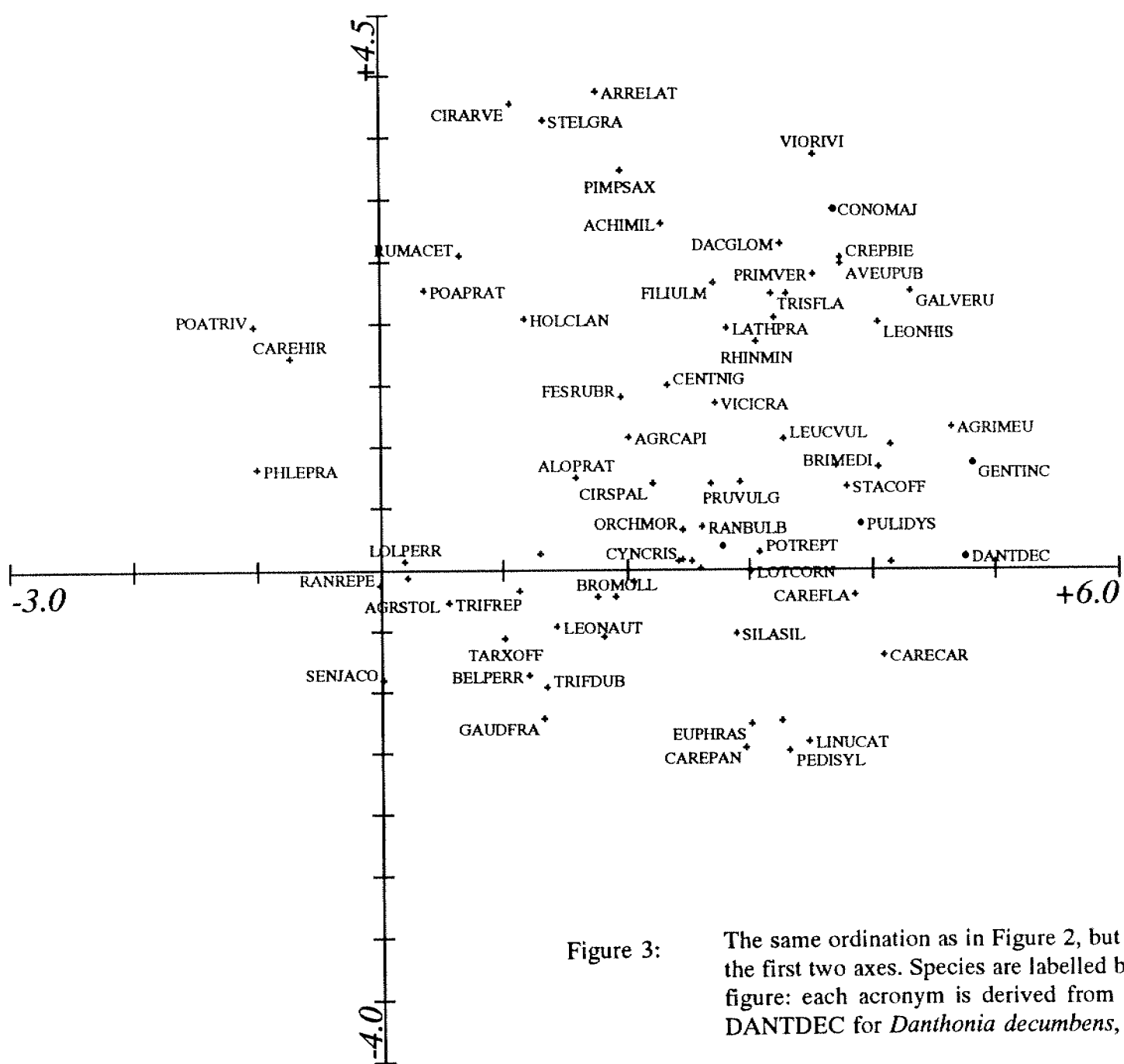


Figure 3: The same ordination as in Figure 2, but showing the distribution of species on the first two axes. Species are labelled by their acronyms when these fit on the figure: each acronym is derived from the genus and species name, such as DANTDEC for *Danthonia decumbens*, CAREHIR for *Carex hirta*.

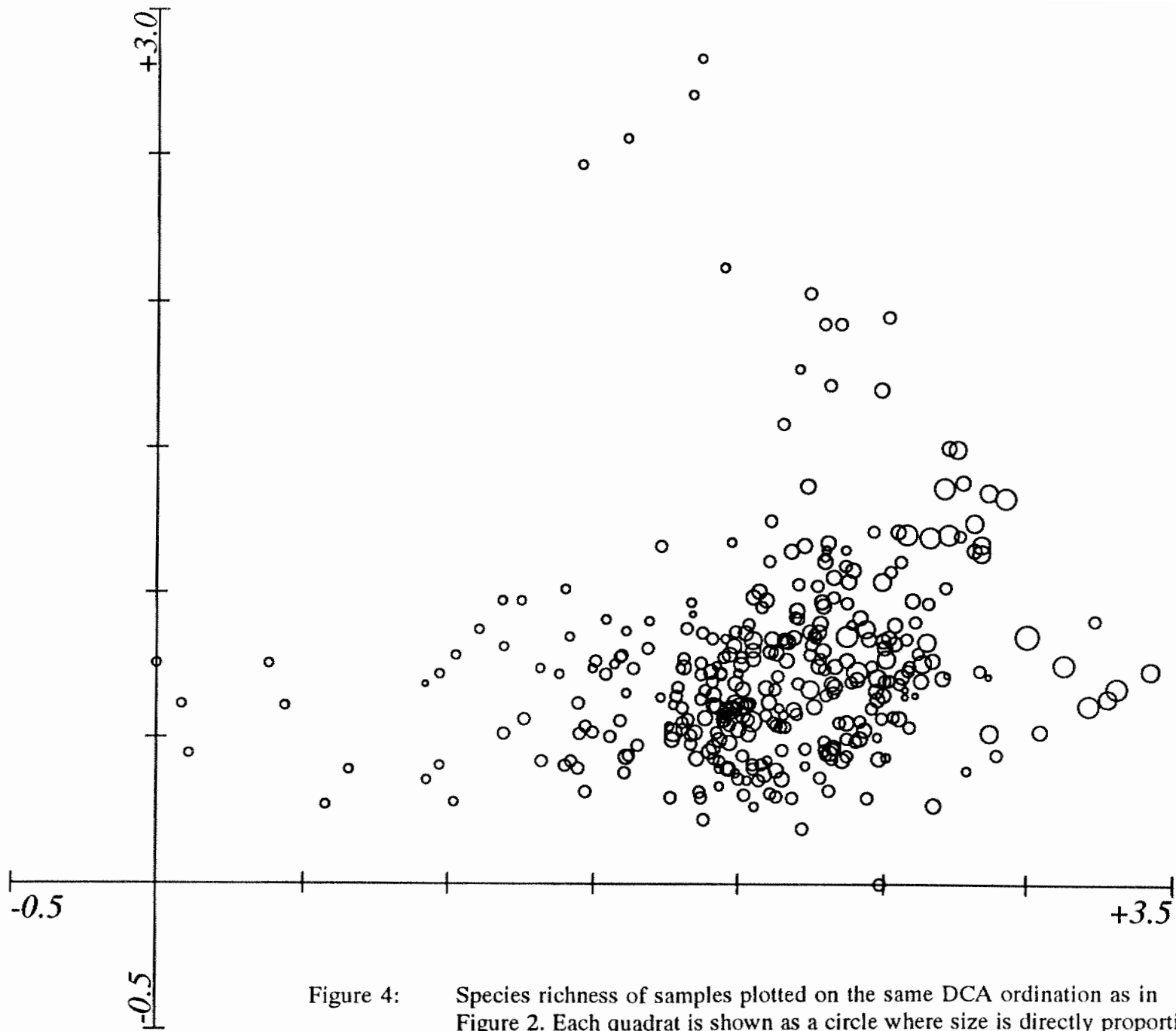


Figure 4: Species richness of samples plotted on the same DCA ordination as in Figure 2. Each quadrat is shown as a circle where size is directly proportional to the number of species.

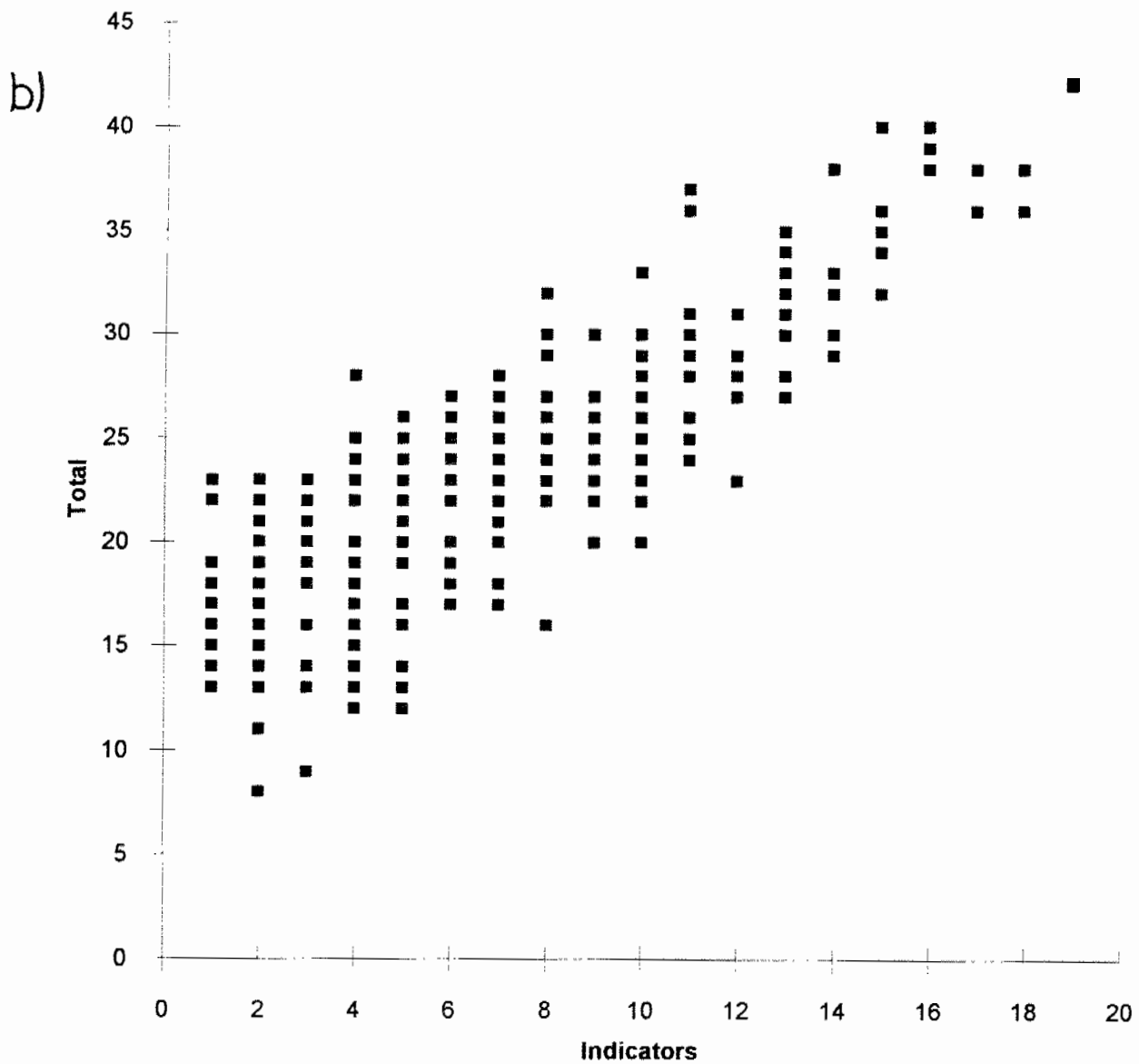
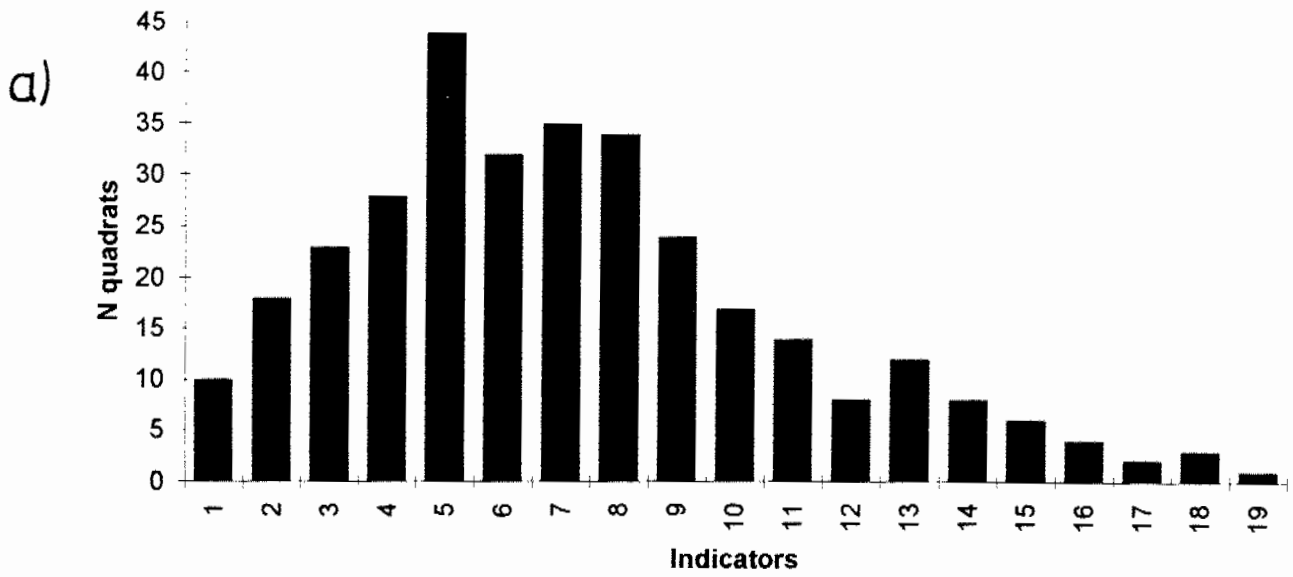


Figure 5: Frequency distributions of indicator and total species amongst quadrats.
 a) Univariate distribution of indicator species.
 b) Bivariate plot of indicator and total species.

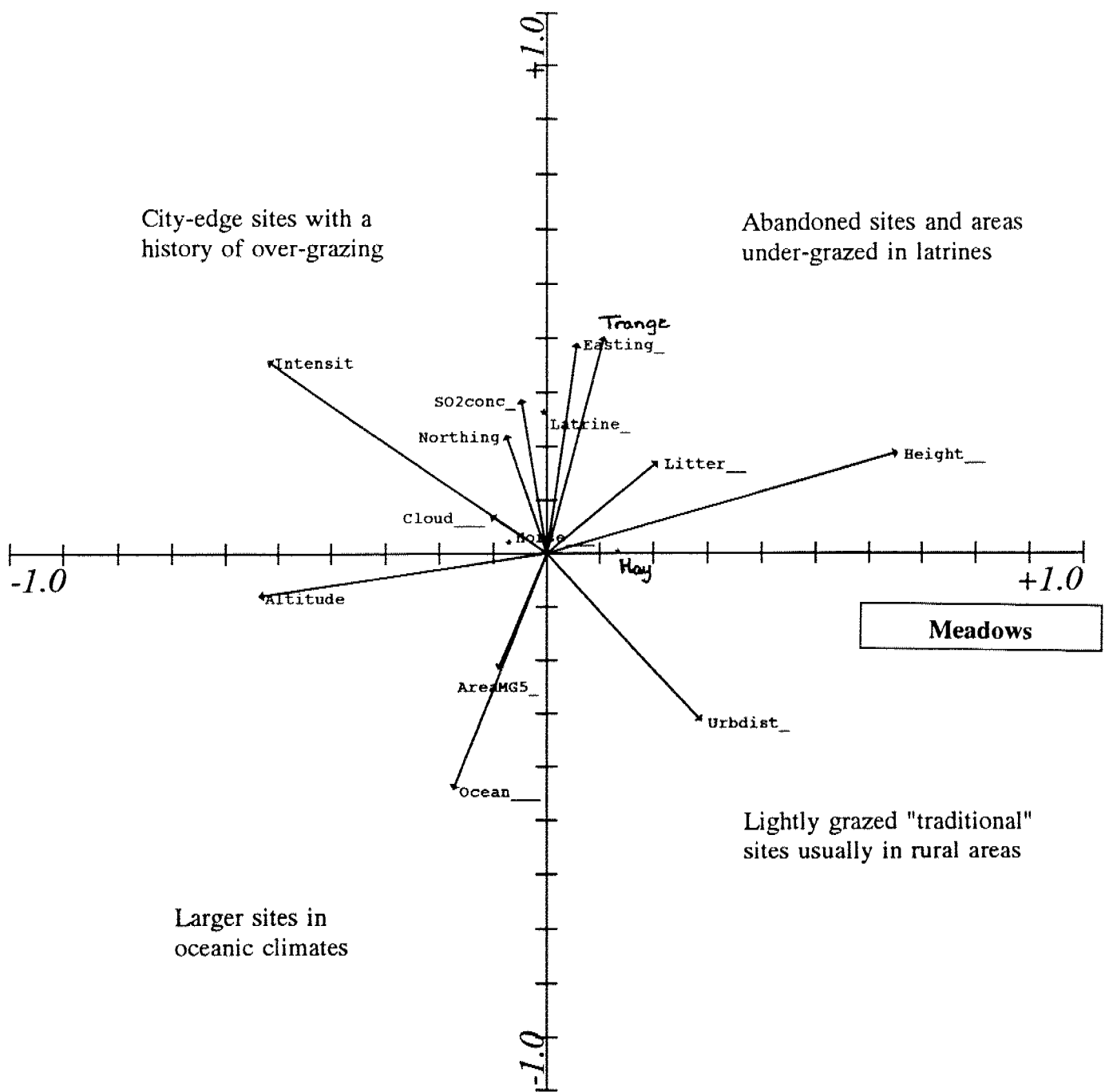


Figure 6: The influence of all environmental variables significant at $p \leq 0.01$ on the first two axes of a DCCA ordination of all samples and species. Quantitative variables are shown as biplot arrows, nominal variables by their centroids (points).