

MERLEWOOD RESEARCH AND DEVELOPMENT PAPER

Number 61

**Centre for Ecology and Hydrology
Bush Estate
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Midlothian
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BECKSIDE FARM: A BOTANICAL SURVEY AND EVALUATION

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**R. & D. 74/61
December 1974**

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Beckside farm consists of approximately 105 ha of land lying between the 150 ft (45 m) and 550 ft (167 m) contours in south Cumbria (National Grid Reference SD 31 85).

The Survey

For survey purposes the farm was divided into 5 "habitat" types, as in Figure 1, namely:

Woodland	20 ha
Re-seeded pastures	36 ha
Pastures not re-seeded	40 ha
Hedgerows	0.45 ha
Stream banks	0.45 ha

In each of the first three habitat types 15 sample plots were located by reference to random co-ordinates, and in the last two habitat types samples were taken at 200 m and 100 m intervals respectively. The randomly-located sample plots were 200 m², with sub-samples of 4 m² and 1 m² within them, and the hedgerow and stream bank plots were 16 m long and the width of the hedgerow or bank.

A total of 219 vascular plant species was recorded, as follows:

Woodland	101 species, of which 20 occurred only in that habitat
Re-seeded pastures	56 species, of which 0 occurred only in that habitat
Pastures not re-seeded	116 species, of which 25 occurred only in that habitat
Hedgerows	106 species, of which 8 occurred only in that habitat
Stream banks	121 species, of which 22 occurred only in that habitat

The relative number of occurrences of each plant species on the farm was estimated from the number of sample plots in which they were recorded, greater weight being given to occurrences in 1 m² quadrats than to occurrences in 200 m² quadrats, and the estimated numbers for each habitat type

being related to the total area of that habitat. (It was assumed that, if a species occurred in every quadrat of whatever size over an area of 40 hectares, then that species had a frequency of about 10,000 units, and a species which occurred in only one 200 m² quadrat had a frequency of 1 unit. Occurrences in 1 m² quadrats were rated 3 times as highly as occurrences in 200 m² quadrats, and occurrences in 4 m² quadrats twice as highly. In the case of the hedgerows and stream banks with areas of about 0.4 ha, a species occurring in all samples was assumed to have a frequency of about 100 units and a species occurring in only 1 sample a frequency of 0.1 unit. Species recorded outside quadrats or sample areas were given lower ratings). The estimated numbers are given in Table 1.

Table 1 also lists the frequency of each species in a "region" of 84 10 x 10 km grid squares and in the British Isles as a whole, taken from the Atlas of the British Flora (Perring and Walters, 1962). From this a "score" is calculated for each species, as in previous studies (e.g. Helliwell, 1974a) to indicate the relative value of the different species for conservation purposes. Introduced (i.e. non-native) species have been given similar ratings to the commonest species.

If this procedure is followed for each habitat type separately, the total score for these habitats is as follows:

Woodland	2607
Re-seeded pastures	518
Pastures not re-seeded	1267
Hedgerows	481
Stream banks	816

Thus, using this method of valuation, the 0.45 ha of hedgerows are almost as valuable for the conservation of vascular plants as the 36 ha of re-seeded pasture, the stream banks are more valuable than either, and the non-re-seeded pasture and the woodland account for the greatest amount of value. A rather similar situation is also likely to exist for the groups of plants and animals not surveyed; - the stream banks and hedgerows

supporting a relatively diverse population of birds, butterflies, etc., per hectare and the re-seeded pastures supporting relatively few species.

One point which is perhaps worth noting is that, of the total number of species recorded, 34 per cent occur in only one of the 5 habitat types.

A further point, which may require some explanation, is the somewhat arbitrary choice of the farm boundary as the boundary of the area to be studied. Due to the non-linear nature of the number-of-occurrences/value curve used in the valuation method, the size of the area selected can affect the apparent value per hectare, and it is, therefore, unwise to compare evaluations of areas of different size or shape without some degree of caution (see Helliwell 1974a and b).

If the farm is evaluated as a whole, the total score obtained is 4,252 units, whereas if each habitat type is evaluated separately and the totals for each are added together a figure of 5,689 units is obtained.

If the farm is divided into two:-

	<u>Northern part</u>	<u>Southern part</u>
Woodland	15 ha	13 ha
Re-seeded pasture	20 ha	16 ha
Non-re-seeded pasture	7 ha	33 ha
Hedgerows	0.35 ha	0.1 ha
Streambanks	0.25 ha	0.2 ha
	<u>43 ha</u>	<u>62 ha</u>

the northern part is valued at 2,510 units and the southern part at 3,444 units, making a total of 5,954 units.

The discrepancies in these total scores are due to the differences between the number-of-species/area relationship and the number-of-occurrences/value curve used in valuation. In some cases (see Helliwell, 1973) the relationship between area and value is linear, but in cases where areas are contiguous this is not usual. In this instance, 162 of the 219 species on the farm occur in the northern part and 196 in the southern part. If these two areas had been isolated by a stretch of water or some other barrier, the number of species common to both parts would probably have been smaller, making the total value of the farm more nearly equal to the simple sum of the two parts.

Implications for future management

If it is thought that the existing conservation value should be at least maintained, if not increased, there are two possible courses of action:

- a) continue to manage all parts of the farm as at present
or
- b) ensure that the value of some areas is increased to compensate for losses due to any changes in the management of other areas.

If, for example, it were technically and economically feasible to improve the grazing capacity of a greater area of pasture by re-seeding and fertilizing, there would be some loss in the conservation value of that area. The re-seeding of, say, a further 20 hectares may result in an overall loss of about 400 to 500 units of value, on the above scale of valuation. Such a loss could, however, probably be made up by the positive management of a fairly small area of land for wildlife conservation. If, for example, a woodland area of about 2 hectares were to be created in the more fertile low-lying part of the farm, consisting predominantly of mixed native tree species, and permanently fenced to exclude farm stock, it is likely that the eventual increase in numbers of species would be sufficient to compensate for the losses involved in re-seeding, as at present there is no woodland on the relatively fertile parts of the farm and such woodland would be likely to contain some species not present in the larger existing woodland.

Alternatively, or additionally, the construction of a pond, with a surrounding area of reeds and swamp (with farm stock excluded from most of the area) would also be a positive contribution to the diversity of plant and animal species on the farm, and would provide a type of habitat not present at the moment. If it were sited in the low-lying part of the farm, an area of about 0.5 hectare would probably be sufficient to compensate for the losses involved in re-seeding and, if sited elsewhere, 1-2 hectares may be sufficient.

The planting of a small area of woodland may also have additional benefits such as helping to screen new farm buildings; and an area of open water could provide an attractive visual feature and possibly some duck shooting or a reserve supply of water in case of exceptional drought.

The management of the 28 ha of existing woodland may present some problems. At present the woodland is largely unmanaged, being an old coppiced wood in which there has been little cutting during the past 30 years except for an area at the southern end. It is fenced against farm stock, but cattle are admitted at times and obtain some grazing and shelter. Their impact on the vegetation does not appear to be very great at the present time; but there is also some browsing by deer, which would be more difficult to control and may make the planting or natural regeneration of trees difficult or expensive. From the point of view of wildlife conservation, this woodland would probably be best left as it is, at least for the next few decades; but it may be thought that it should produce more in terms of timber or food production. Conversion to grazing land would result in an appreciable fall in the conservation value of the farm, and should be resisted if possible. The planting of other tree species, or the selective favouring of the better existing trees would be a more acceptable alternative, if done with care. In particular, the locations where the rarest* plant species occur should be identified and left untouched. At present, the seven rarest species account for almost 60 per cent of the estimated conservation value of the woodland, even though they do not occur in very large numbers. These are, in descending order of rarity:

Small-leaved lime	<i>Tilia cordata</i>
Smooth-stalked sedge	<i>Carex laevigata</i>
Wild daffodil	<i>Narcissus pseudonarcissus</i>
Large-flowered hemp-nettle	<i>Gaelopsis speciosa</i>
Tutsan	<i>Hypericum androsaemum</i>
Climbing corydalis	<i>Corydalis claviculata</i>
Beech fern	<i>Thelypteris phegopteris</i>

* that is, rare in the region and/or the British Isles

In order to ensure the conservation of these species, it would be desirable to leave undisturbed areas of sufficient size to avoid affecting the amount of light reaching the ground within them, and, if possible, to avoid the separation of these undisturbed areas by continuous areas of planted exotics. The "enrichment" of the woodland by the planting of groups of trees in small clearings would perhaps be the most appropriate means of increasing the commercial productivity of this woodland without undue detriment to wildlife conservation. This may be regarded as uneconomic in terms of current economic orthodoxy, but, in the opinion of the writer, this orthodoxy is basically unsound (see Helliwell, 1974c), and if a suitable species could be found which is not unduly susceptible to damage by hares or deer, this could well be a relatively cheap means of bringing this woodland into a commercially productive condition.

In the case of the non-re-seeded pasture land, the seven rarest species account for 44 per cent of the estimated conservation value, on the stream banks the comparable figure is 46 per cent, and in the hedgerows 39 per cent. As in the case of the wooded area, the identification of the relatively small areas where these species grow would be of great assistance in minimizing the harmful effects of any intended changes in management, drainage, re-seeding, levelling, etc.

Acknowledgements

Thanks are due to Mr. W. Phillipson for permission to carry out this survey on his farm.

REFERENCES

- Helliwell, D. R. 1973. An examination of the effects of size and isolation on the wildlife conservation value of wooded sites. I. Birds. Merlewood R. & D. paper No. 49.
- Helliwell, D. R. 1974a. The value of vegetation for conservation. I. Four land areas in Britain. J. Environ. Manage. 2, 51-74.
- Helliwell, D. R. 1974b. The value of vegetation for conservation. II. M1 Motorway area. J. Environ. Manage. 2, 75-78.
- Helliwell, D. R. 1974c. Discount rates in land-use planning. Forestry 47(2).
- Perring, F. H. and Walters, S. M. (Editors). 1962. Atlas of the British Flora. Lond: Nelson.

Table 1. Species present, their relative numbers and "values"

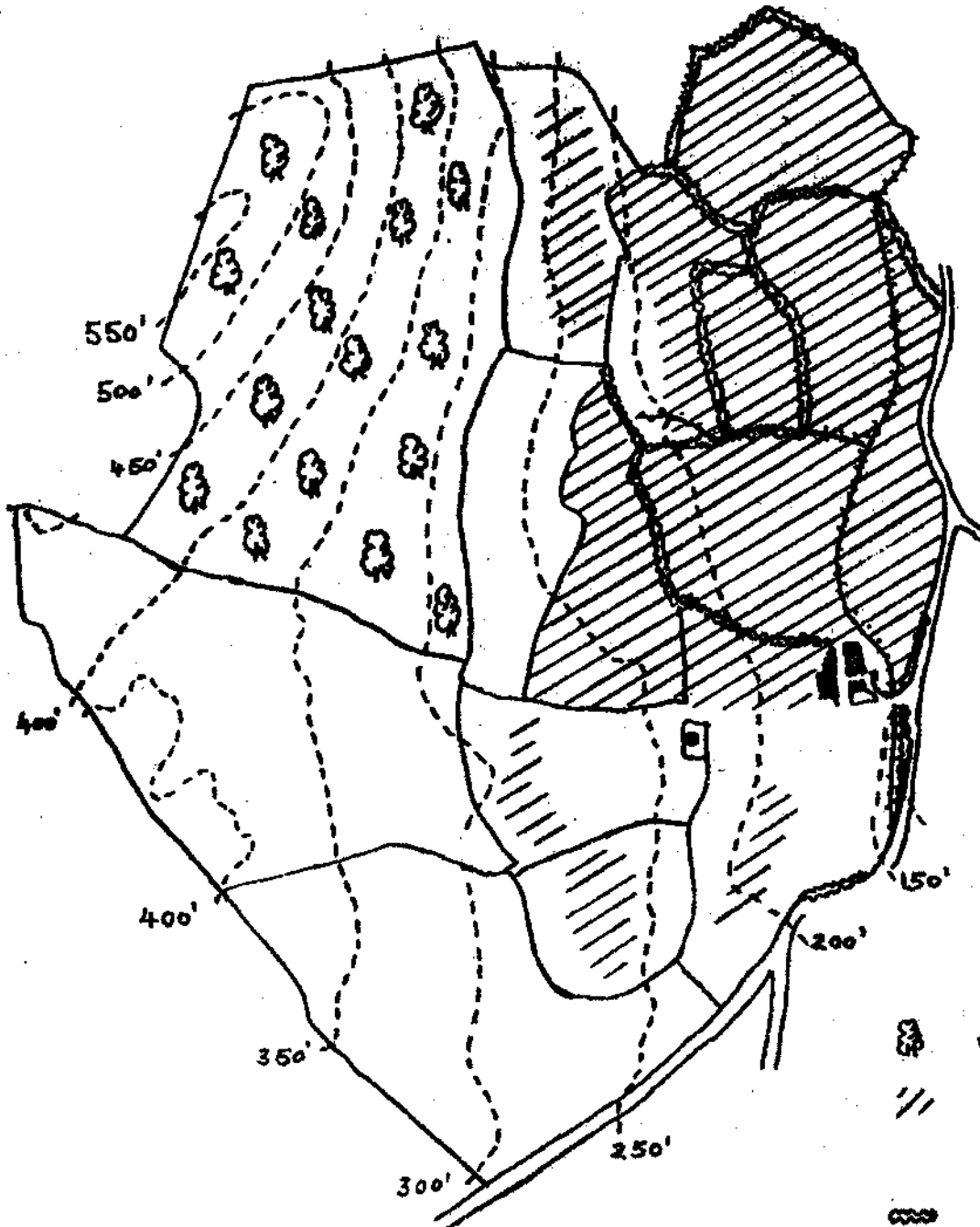
	Relative numbers	Presence in 10 x 10 km squares		Relative "value"
	in the area studied	in the region	in the British Isles	
<i>Acer pseudoplatanus</i>	2.15	84	3100	2.6
<i>Achillea millefolium</i>	52.1	84	3000	8.6
<i>Achillea ptarmica</i>	3.56	82	2000	6.6
<i>Aegopodium podagraria</i>	0.1	84	3100	0.9
<i>Agropyron caninum</i>	0.5	40	900	28.7
<i>Agropyron repens</i>	0.4	68	2400	2.4
<i>Agrostis canina</i>	7.8	48	1700	20.2
<i>Agrostis tenuis</i>	844	77	2600	30.0
<i>Ajuga reptans</i>	0.9	73	2500	2.9
<i>Alchemilla glabra</i>	6.5	71	2000	8.9
<i>Alliaria petiolata</i>	0.9	54	1600	9.0
<i>Allium ursinum</i>	1.7	67	1600	9.5
<i>Alnus glutinosa</i>	1.7	73	3000	2.9
<i>Alopecurus geniculatus</i>	2.0	48	2200	8.8
<i>Alopecurus pratensis</i>	2.9	64	2300	5.8
<i>Anagallis tenella</i>	4	32	800	85.9
<i>Anemone nemorosa</i>	1.3	73	2100	4.4
<i>Angelica sylvestris</i>	4.2	75	3000	3.9
<i>Anthoxanthum odoratum</i>	356	80	3000	17.9
<i>Anthriscus sylvestris</i>	0.8	72	2600	2.6
<i>Arctium minus</i>	1	62	2500	3.7
<i>Arum maculatum</i>	0.1	68	1700	2.9
<i>Arrhenatherum elatius</i>	18.1	77	2900	6.6
<i>Athyrium filix-femina</i>	5.2	72	2600	5.2
<i>Bellis perennis</i>	23	84	3100	6.2
<i>Betonica officinalis</i>	0.9	67	1400	10.5
<i>Betula pubescens</i>	63	49	2000	32.8
<i>Blechnum spicant</i>	1.4	67	1800	6.8
<i>Brachypodium sylvaticum</i>	1	64	1900	5.6
<i>Bromus mollis</i>	9.5	52	2400	12.1
<i>Callitriche stagnalis</i>	3.9	34	2000	25.5
<i>Calluna vulgaris</i>	0.1	82	2400	1.2
<i>Caltha palustris</i>	0.1	77	2500	1.2
<i>Campanula rotundifolia</i>	3.2	83	2200	5.1
<i>Capsella bursa-pastoris</i>	4.4	76	2800	4.2
<i>Cardamine flexuosa</i>	8.4	68	2700	6.3
<i>Cardamine hirsuta</i>	0.1	56	2100	2.4
<i>Cardamine pratensis</i>	5	77	2800	4.3
<i>Carex caryophyllea</i>	0.1	57	1200	7.3
<i>Carex echinata</i>	1.3	68	1900	5.8
<i>Carex laevigata</i>	1.7	4	500	404.0
<i>Carex ovalis</i>	1.6	61	2000	6.3
<i>Carex panicea</i>	1.6	71	2300	4.1
<i>Carex remota</i>	0.1	41	1600	5.9
<i>Carex sp.</i>	1.6	71	2300	4.1

	Relative	Presence in		Relative
	numbers	10 x 10 km squares		
	in the	in the	in the	
	area	region	British	
	studied		Isles	
<i>Centaurea nigra</i>	6.9	84	3000	4.1
<i>Cerastium fontanum</i>	314	84	3100	15.9
<i>Chenopodium album</i>	1.7	53	2500	6.0
<i>Chrysanthemum leucanthemum</i>	6.4	78	2700	4.9
<i>Chrysosplenium oppositifolium</i>	0.1	70	1900	2.2
<i>Circaea lutetiana</i>	1.6	64	1900	6.6
<i>Cirsium arvense</i>	6.9	83	3000	4.2
<i>Cirsium palustre</i>	5.3	78	3000	4.0
<i>Cirsium vulgare</i>	25.1	83	3100	6.5
<i>Conopodium majus</i>	3.3	70	2400	5.1
<i>Corydalis claviculata</i>	1.3	32	600	86.8
<i>Corylus avellana</i>	13.2	74	2800	6.4
<i>Crataegus monogyna</i>	18.9	81	2900	6.6
<i>Cynosurus cristatus</i>	42.1	81	3100	8.0
<i>Dactylis glomerata</i>	5023	84	3000	44.3
<i>Deschampsia flexuosa</i>	159	70	1800	36.0
<i>Deschampsia cespitosa</i>	11.6	74	2800	6.1
<i>Digitalis purpurea</i>	44.8	81	2700	9.4
<i>Dryopteris dilatata</i>	503	67	2200	37.7
<i>Dryopteris filix-mas</i>	12.5	74	3000	5.9
<i>Endymion non-scriptus</i>	1005	76	2200	42.9
<i>Epilobium montanum</i>	1.5	73	2700	3.1
<i>Epilobium obscurum</i>	9.0	34	1600	41.3
<i>Epilobium palustre</i>	2.8	66	2200	5.9
<i>Equisetum arvense</i>	1.6	72	3000	2.9
<i>Euphrasia</i> sp.	3.3	82	2600	3.9
<i>Erica cinerea</i>	1.6	56	1900	7.7
<i>Festuca arundinacea</i>	0.1	21	1200	23.6
<i>Festuca gigantea</i>	1.0	47	1400	14.0
<i>Festuca ovina</i>	29.1	77	2900	7.8
<i>Festuca pratensis</i>	1.3	61	1500	10.6
<i>Filipendula ulmaria</i>	13.9	80	3000	5.6
<i>Fragaria vesca</i>	0.1	76	2600	1.2
<i>Fraxinus excelsior</i>	3.3	79	3000	3.4
<i>Galeopsis speciosa</i>	1.0	13	650	146.2
<i>Galeopsis tetrahit</i>	7.8	62	2300	8.7
<i>Galium aparine</i>	19.8	76	2900	6.9
<i>Galium palustre</i>	5.0	71	2700	4.9
<i>Galium saxatile</i>	69.5	76	2500	13.1
<i>Genista tinctoria</i>	0.1	30	450	50.6
<i>Geranium molle</i>	1.0	61	2000	5.3
<i>Geranium dissectum</i>	3.0	40	1900	17.1
<i>Geranium robertianum</i>	4.5	78	2900	3.9
<i>Geum urbanum</i>	1.7	74	2500	3.5
<i>Glechoma hederacea</i>	1.7	69	2500	11.0
<i>Glyceria fluitans</i>	2.1	63	2100	6.1
<i>Gnaphalium uliginosum</i>	2.3	44	2100	11.6
<i>Hedera helix</i>	5.7	78	2900	4.3
<i>Heracleum sphondylium</i>	5.0	77	3000	4.0
<i>Hieracium vulgatum</i>	1.0	51	500	89.0
<i>Holcus lanatus</i>	839	78	3000	25.0
<i>Hydrocotyle vulgaris</i>	1.0	65	1600	8.0








	Relative	Presence in		Relative
	numbers	10 x 10 km squares		
	in the	in the	in the	
	area	region	British	
	studied		Isles	
<i>Hypericum androsaemum</i>	1.0	19	1000	71.2
<i>Hypericum perforatum</i>	2.6	62	1700	10.2
<i>Hypericum pulchrum</i>	1.3	60	2200	5.1
<i>Ilex aquifolium</i>	7.7	73	2300	7.1
<i>Juncus articulatus</i>	6.3	70	2800	5.3
<i>Juncus bufonius</i>	0.1	66	2700	1.3
<i>Juncus conglomeratus</i>	1.3	65	2500	3.8
<i>Juncus effusus</i>	9.2	78	3000	4.9
<i>Lapsana communis</i>	4.6	75	2800	4.3
<i>Lathyrus montanus</i>	0.1	58	1700	3.4
<i>Lathyrus pratensis</i>	5.0	77	2900	4.1
<i>Leontodon autumnalis</i>	3.6	77	2800	3.8
<i>Leontodon hispidus</i>	6.4	83	1500	16.6
<i>Lolium perenne</i>	16169	80	3000	70.6
<i>Lonicera periclymenum</i>	317	73	2900	19.7
<i>Lotus corniculatus</i>	2.9	84	3100	2.9
<i>Lotus uliginosus</i>	8.4	70	2300	7.6
<i>Luzula campestris</i>	2.4	69	2400	4.6
<i>Luzula multiflora</i>	1.6	61	1900	6.9
<i>Luzula pilosa</i>	10.0	46	1300	37.8
<i>Lychnis flos-cuculi</i>	1.3	65	2300	4.3
<i>Lysimachia nemorum</i>	2.2	67	2100	5.8
<i>Matricaria matricarioides</i>	2.8	76	2800	3.5
<i>Melica uniflora</i>	1.0	48	1400	13.7
<i>Mentha aquatica</i>	2.6	68	2600	4.3
<i>Mercurialis perennis</i>	3.3	76	2000	6.7
<i>Mimulus guttatus</i>	0.1	84	3100	0.9
<i>Molinia caerulea</i>	2.5	69	2000	6.5
<i>Myosotis caespitosa</i>	2.6	43	1600	17.7
<i>Myosotis scorpioides</i>	0.1	63	2500	1.6
<i>Myosotis secunda</i>	1.0	32	1500	22.3
<i>Narcissus pseudonarcissus</i>	2.6	27	400	193.2
<i>Nardus stricta</i>	1.3	76	1600	8.1
<i>Nasturtium officinale</i>	1.7	59	2300	5.4
<i>Oenanthe crocata</i>	8.2	46	1300	35.2
<i>Oxalis acetosella</i>	1001	74	2500	35.2
<i>Pentaglottis sempervirens</i>	1.0	84	3100	2.0
<i>Phalaris arundinacea</i>	9.1	62	2600	7.9
<i>Phleum nodosum</i>	2.8	72	2600	4.1
<i>Phleum pratense</i>	22.1	72	2600	8.7
<i>Pilosella officinarum</i>	1.6	83	2900	2.6
<i>Pimpinella saxifraga</i>	1.3	62	1500	10.5
<i>Plantago lanceolata</i>	80.7	83	3100	9.8
<i>Plantago major</i>	14.4	81	3100	5.4
<i>Poa annua</i>	194	83	3100	13.5
<i>Poa nemoralis</i>	7.9	33	1300	52.5
<i>Poa pratensis</i>	9.9	75	2800	5.7
<i>Poa trivialis</i>	131	62	2600	20.5
<i>Polygonum arenastrum</i>	3.6	77	2700	4.0
<i>Polygonum aviculare</i>	2.8	77	2700	3.6
<i>Polygonum bistorta</i>	0.1	57	600	29.2
<i>Polygonum hydropiper</i>	1.6	46	1800	11.2
<i>Polygonum persicaria</i>	4.1	67	2700	5.0

	Relative	Presence in		Relative
	numbers	10 x 10 km squares		
	in the	in the	in the	"value"
	area	region	British	
	studied		Isles	
Potentilla anserina	2.1	78	2900	3.0
Potentilla erecta	9.9	79	2900	5.2
Potentilla reptans	0.1	68	2100	1.9
Potentilla sterilis	1.7	61	2200	5.5
Primula vulgaris	1.4	62	2300	4.7
Prunella vulgaris	11.8	80	3000	5.2
Prunus avium	1.3	46	1400	15.8
Prunus spinosa	2.0	64	2700	4.2
Pteridium aquilinum	132	80	2700	14.1
Quercus petraea	1260	51	1300	197.4
Ranunculus acris	39.3	83	3100	7.6
Ranunculus ficaria	0.4	68	2200	2.8
Ranunculus flammula	3.5	69	2700	4.5
Ranunculus repens	1796	83	3100	30.0
Rosa spp.	18.5	65	2400	10.4
Rubus fruticosus	331	83	2900	17.4
Rubus idaeus	5.0	65	2400	6.5
Rumex acetosa	108	79	3000	11.8
Rumex acetosella	14.0	74	2600	7.1
Rumex obtusifolius	50.5	63	2800	13.2
Sagina procumbens	1.6	76	2900	2.8
Salix capraea	2.1	63	2100	6.1
Salix fragilis	0.1	33	1400	9.9
Sambucus nigra	1.4	76	2800	2.8
Scrophularia nodosa	1.5	72	2500	3.5
Sedum anglicum	1.0	30	700	66.3
Sedum telephium	0.2	37	500	53.3
Senecio aquaticus	6.4	66	2400	7.0
Senecio jacobaea	0.1	84	3000	0.9
Sieglingia decumbens	1.7	57	1700	9.5
Silene dioica	11.4	78	2000	10.3
Solidago virgaurea	0.1	62	1800	2.8
Sorbus aucuparia	33.0	79	2500	9.7
Stachys palustris	0.1	60	2100	2.2
Stachys sylvatica	4.8	80	2700	4.3
Stellaria alsine	3.4	62	2600	5.5
Stellaria graminea	11.5	67	2600	7.6
Stellaria holostea	30.4	66	2400	12.2
Stellaria media	212	74	3000	16.2
Succisa pratensis	1.7	76	2900	2.9
Tamus communis	2.5	25	1200	57.7
Taraxacum officinale	1011	79	3100	25.6
Teucrium scorodonia	3.1	72	2300	5.2
Thelypteris phegopteris	1.3	35	600	83.2
Thymus drucei	1.3	77	1900	5.3
Tilia cordata	2.0	4	150	635.6
Torilis japonica	1.1	72	2400	3.3
Trifolium pratense	3.2	84	3000	3.1
Trifolium repens	557	84	3100	19.5
Trisetum flavescens	1.3	41	1200	23.6
Trollius europaeus	0.1	42	350	60.8

	Relative numbers	Presence in 10 x 10 km squares		Relative "value"
	in the area studied	in the region	in the British Isles	
<i>Tussilago farfara</i>	1.6	81	3000	2.5
<i>Typha latifolia</i>	0.1	27	1500	13.2
<i>Ulex europaeus</i>	2.6	75	2900	3.4
<i>Urtica dioica</i>	12.2	83	3100	5.0
<i>Vaccinium myrtillus</i>	1.4	75	2000	5.0
<i>Valeriana officinalis</i>	6.1	69	2500	6.1
<i>Veronica arvensis</i>	4.0	61	2500	6.3
<i>Veronica beccabunga</i>	2.6	74	2200	5.1
<i>Veronica chamaedrys</i>	31.5	79	3100	7.4
<i>Veronica officinalis</i>	1.3	76	2400	3.3
<i>Veronica montana</i>	1.0	51	1200	17.9
<i>Veronica serpyllifolia</i>	18.4	70	2600	8.4
<i>Viburnum opulus</i>	0.4	55	1900	4.8
<i>Vicia cracca</i>	2.1	72	2800	3.4
<i>Vicia sepium</i>	6.6	76	2600	5.3
<i>Viola palustris</i>	2.8	52	2000	9.7
<i>Viola riviniana</i>	5.8	73	3000	4.5
<i>Viola tricolor</i>	1.0	44	1200	20.1



0 100 200 300 400 500
METRES

-  WOODLAND.
-  RE-SEEDED PASTURE.
-  PERMANENT PASTURE.
-  HEDGE ROW.
-  STREAM.
-  STONE DYKES, AND FENCES.
-  CONTOUR LINES.