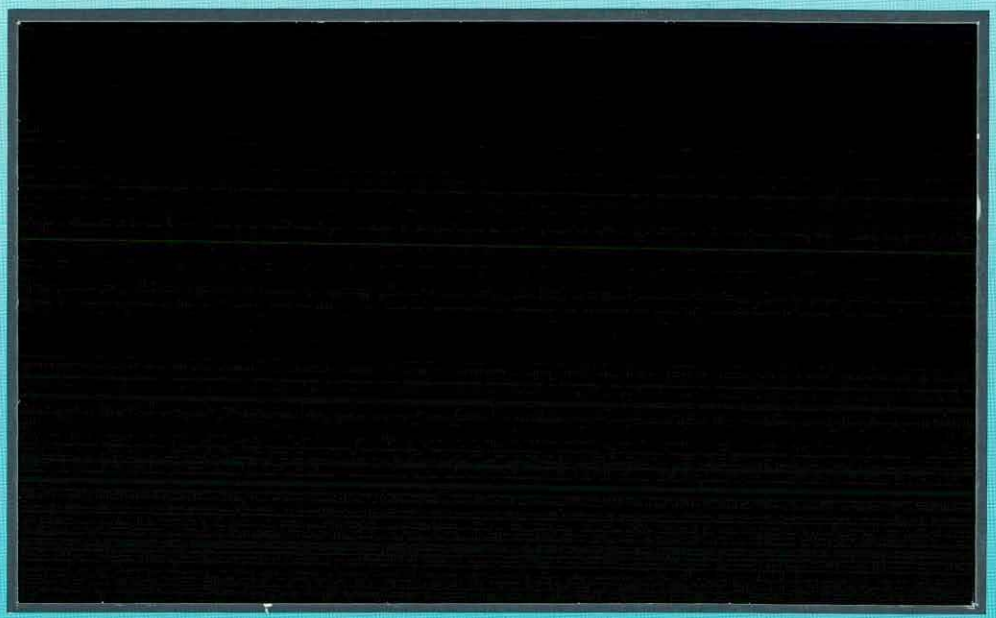
Institute of Terrestrial Ecology



Natural Environment Research Council

ITE has administrative headquarters north and south, and the geographical distribution of its 250 staff in six Research Stations throughout Britain allows efficient use of resources for regional studies and provides an understanding of local ecological and land use characteristics.

ITE NORTH

Edinburgh Research Station
(Admin HQ for ITE North)
Bush Estate
Penicuik
Midlothian EH26 0QB
Tel: 031 445 4343; Telex 72579
Fax: 031 445 3943

Banchory Research Station
Hill of Brathens
Glassel
Banchory
Kincardineshire AB31 4BY
Tel: 033 02 3434
Fax: 033 02 3303

Merlewood Research Station
Grange-over-Sands
Cumbria LA11 6JU
Tel: 05395 32264; Telex 65102
Fax: 05395 34705

ITE SOUTH

Monks Wood Experimental Station
(Admin HQ for ITE South)
Abbots Ripton
Huntingdon
Cambs PE17 2LS
Tel: 048 73 381; Telex 32416
Fax: 048 73 467

Bangor Research Unit
University College of North Wales
Deiniol Road
Bangor
Gwynedd LL57 2UP
Tel: 0248 370045; Telex 61224
Fax: 0248 355365

Furzebrook Research Station
Wareham
Dorset BH20 5AS
Tel: 0929 551518
Fax: 0929 551087

The ITE Research Marketing Officers for ITE North and South are based at Banchory and Monks Wood, respectively.

A FINAL REPORT TO THE JOINT NATURE CONSERVATION COMMITTEE (JNCC) ON WORK COMPLETED UNDER CONTRACT TO THE FORMER NATURE CONSERVANCY COUNCIL (NCC) AS PART OF 'COUNTRYSIDE SURVEY 1990'.

COUNTRYSIDE SURVEY 1990

Collection of vegetation data from quadrats and linear plots

(Working paper for internal use by JNCC, EN, DOE and ITE only)

Bob Bunce, Caroline Hallam and Colin Barr

Institute of Terrestrial Ecology
Merlewood Research Station
Grange over Sands
Cumbria LA11 6JU

October 1991

CONTENTS

1 INTRODUCTION

1.1 This report summarises work which formed part of 'Countryside Survey 1990' and which was funded by the then Nature Conservancy Council (NCC) and the Natural Environment Research Council (NERC). This report to the Joint Nature Conservation Committee (JNCC) follows a progress report submitted to NCC in March 1991, which included contractual details and methods of survey, and which is included as Annex A to this report.

1.2 The report is structured according to a letter from ITE to NCC of 26 April 1991 which clarified the tasks specified in the contract Schedule of Work. The main activities are given in quotes at the start of each section within this report. There has been close liaison and agreement between ITE and the earlier Nominated Officer for NCC (Dr I MacLean - now of English Nature) and the current Nominated Officer for JNCC (Dr E Bignall).

1.3 It should be noted that the contract was primarily for the collection of data, rather than for subsequent interpretation. With this in mind, Sections 2 to 6 of the report summarise the principle characteristics of plots surveyed during Countryside Survey 1990, and Sections 7 to 10 indicate the type and range of future analyses that can be carried out.

1.4 Although it is not a confidential document, this report is for use within the funding organisations of Countryside Survey 1990 and should not be used for citation or reference purposes, except by agreement.

Section 1 ends.

2 METHODS OF SURVEY

"Summarise the methods of the survey"

2.1 A full description of the methods of survey is given in the March 1991 progress report which is included here as Annex A.

2.2 In summary, ITE surveyed 508 1x1 km squares throughout Great Britain in a four-month period between June and October 1990. In each square, as part of the broader work programme, the land cover and landscape features were recorded and mapped (this work being funded by DOE and NERC). At a more detailed level, vegetation was recorded in up to 27 plots in each square. These plots were of three types:

a) Five 200m2 quadrats in five random locations
b) Five 4m2 quadrats placed within semi-natural habitats only
c) Up to 17 1x10m linear plots placed alongside field boundaries, watercourses, roads/tracks, and hedges.

2.3 Table 1 shows the numbers of vegetation plots that were recorded during the survey. Of the 11,557 plots that were surveyed, 6,788 were funded jointly by NCC and NERC (hereinafter referred to as 'NCC plots'). The balance formed part of the wider DOE/NERC work programme.

Section 2 continues ...

Table 1: Breakdown of types of plots, shown by funding organisations.

	DOE/NERC		NCC/NERC
2,531	Random plots (200m2)	2,529	Habitat plots (4m2)
564	Hedge plots (10x1m)	1,807	Field Boundary plots (10x1m)
789	Road verge plots (10x1m)	1,165	Additional verge plots (10x1m)
885	Streamside plots (10x1m)	1,287	Additional stream plots (10x1m)
4,769		6,788	

2.4 The data resulting from survey of the vegetation plots has been entered onto computer (punched twice, cross-checked and edited) and resides in an Oracle database where it can be interrogated as required. A copy of the 'NCC plot' data has been made available to English Nature.

Section 2 ends.

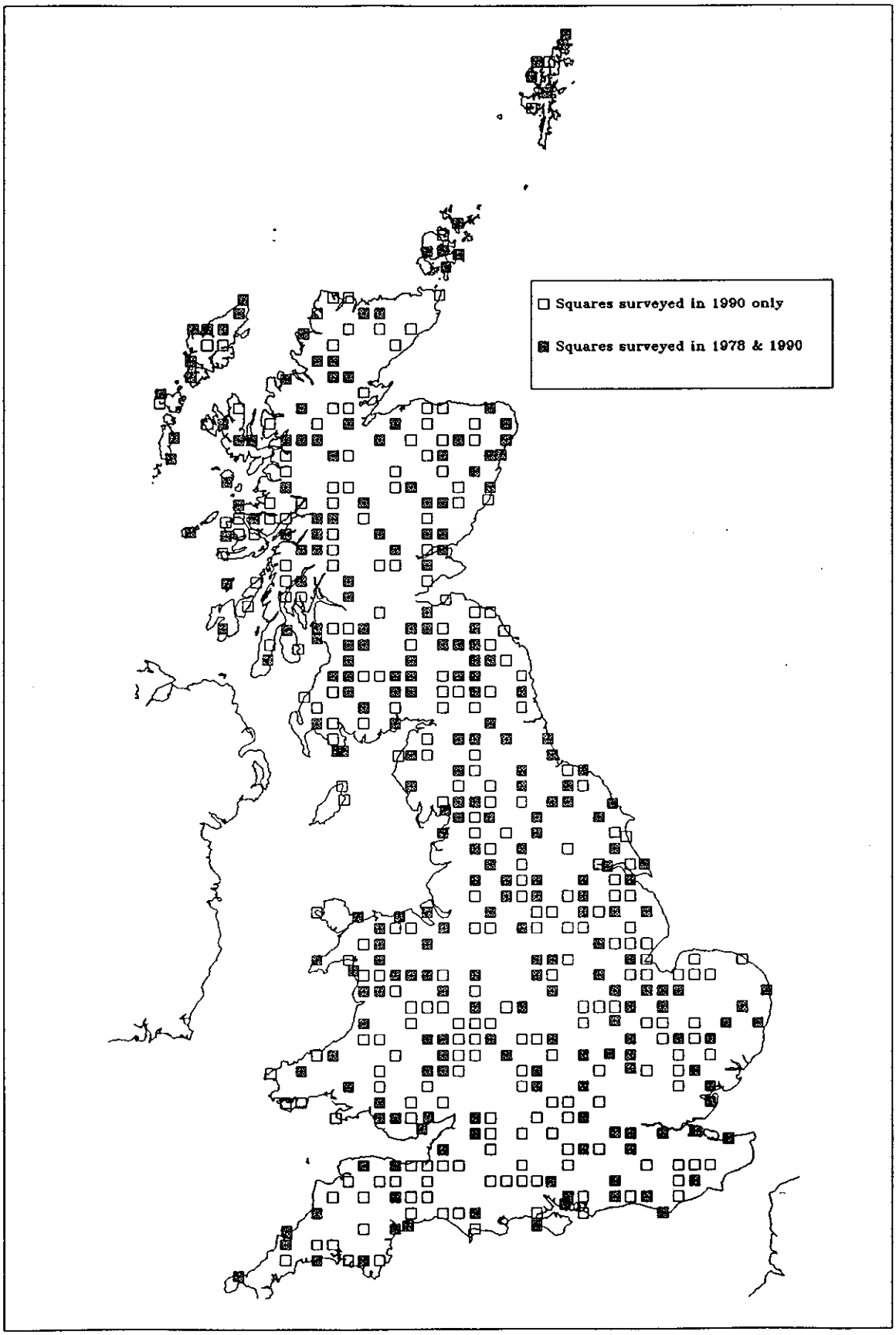
3 CHARACTERISTICS OF SAMPLE SQUARES

"Describe the general location and characteristics of the 512 sample squares"

3.1 The location of sites (each being a 1x1 km square) surveyed in Great Britain in 1978 and 1990 is given in Figure 1. The 1977/8 survey was completed in a stratified random sample of 256 squares (eight squares from each of the 32 ITE Land Classes). In 1990, the same sample was surveyed, together with an additional sample of 252 squares which were apportioned according to the size of the Land Classes.

Section 3 continues ...

Figure 1 Location of the 1 x 1 km squares in Great Britain in 1978 and 1990.



3.2 Table 2 provides, for every field survey square, the grid reference (shown as Eastings and Northings to within 10 km), the ITE Land Class (according to the most recent classification), and the presence of designated areas, where appropriate.

3.3 Data on designated areas were obtained from the different agencies during autumn 1988 and have not been updated since. Vector data were obtained from digitising the boundaries of the sites, but were converted to presence within a given square, using an appropriate algorithm. Of the 508 field survey squares, 207 contained some form of designation. This analysis was carried out to demonstrate the ability of the system to link streams of data; in this instance, survey sites with designated areas.

Section 3 continues ...

Table 2 National grid reference to within 10 x 10 km, ITE Land Class and the presence of 6 types of designated area within the 1 x 1 km of the 1990 survey.

10KM EASTING	10KM NORTHING	LAND CLASS	SSSI	NNR	NPARK	AONB	NSA	ESA
14	03	6	0	0	0	1	0	1
19	05	6	0	0	0	0	0	0
22	05	6	0	0	0	0	0	0
25	05	6	0	0	0	0	0	0
26	05	6	0	0	0	0	0	0
28	05	6	0	0	0	0	0	0
19	06	6	0	0	0	0	0	0
22	06	6	0	0	0	1	0	0
23	06	6	0	0	0	0	0	0
19	08	7	1	0	0	1	0	0
26	08	17	1	0	1	0	0	0
29	08	8	1	0	0	0	0	0
30	08	7	1	0	0	1	0	0
37	08	1	1	0	0	1	0	0
43	08	7	1	0	0	1	0	0
22	09	6	0	0	0	0	0	0
31	09	1	0	0	0	1	0	0
34	09	1	0	0	0	1	0	0
35	09	1	0	0	0	1	0	0
37	09	2	0	0	0	1	0	0
43	09	1	1	0	0	0	0	0
47	09	8	1	0	0	1	0	0
55	09	7	1	0	0	1	0	1
45	10	8	1	0	0	0	0	0
23	11	6	0	0	0	0	0	0
26	11	5	0	0	0	0	0	0
29	11	6	0	0	0	0	0	0
31	11	6	0	0	0	1	0	0
32	11	1	0	0	0	1	0	0
46	11	2	0	0	0	0	0	0
47	11	2	0	0	0	1	0	1
50	11	2	1	0	0	1	0	1
52	11	2	0	0	0	1	0	0
53	11	2	1	0	0	1	0	1
56	11	4	0	0	0	1	0	0
25	12	6	0	0	0	0	0	0
28	12	6	0	0	0	0	0	0
29	12	6	0	0	1	0	0	0
32	12	1	0	0	0	0	0	0
38	12	2	0	0	0	1	0	0
40	12	2	0	0	0	1	0	0
41	12	1	0	0	0	0	0	0
43	12	2	0	0	0	0	0	1
44	12	2	0	0	0	0	0	0
50	12	3	0	0	0	0	0	0
56	12	3	0	0	0	1	0	0
58	12	3	0	0	0	1	0	0
26	14	17	0	0	1	0	0	0
29	14	6	0	0	1	0	0	0
31	14	5	1	0	0	1	0	0
32	14	8	0	0	0	0	0	0
34	14	4	0	0	0	0	0	1
35	14	1	0	0	0	0	0	0
41	14	2	0	0	0	0	0	0

46	14	2	0	0	0	0	0	0
53	14	3	0	0	0	0	0	0
56	14	3	0	0	0	1	0	0
58	14	3	0	0	0	0	0	0
59	14	3	0	0	0	0	0	0
34	15	5	0	0	0	0	0	0
38	15	5	0	0	0	0	0	0
46	15	1	0	0	0	0	0	0
47	15	2	0	0	0	0	0	0
49	15	2	0	0	0	0	0	0
52	15	2	0	0	0	0	0	0
61	16	8	0	0	0	0	0	0
32	17	8	1	0	0	0	0	0
37	17	1	0	0	0	1	0	0
38	17	2	0	0	0	0	0	0
41	17	2	0	0	0	1	0	0
44	17	2	0	0	0	1	0	0
50	17	2	0	0	0	0	0	0
52	17	1	1	0	0	0	0	0
55	17	2	0	0	0	0	0	0
58	17	8	1	0	0	0	0	0
24	18	7	1	1	0	1	0	0
28	18	6	0	0	0	0	0	0
29	18	6	0	0	0	0	0	0
31	18	17	0	0	0	0	0	0
32	18	5	0	0	0	0	0	0
37	18	1	0	0	0	0	0	0
38	18	2	0	0	0	1	0	0
43	18	1	0	0	0	1	0	0
46	18	2	1	0	0	1	0	0
47	18	2	0	0	0	1	0	0
19	20	6	0	0	0	0	0	0
20	20	6	0	0	0	0	0	0
28	20	5	0	0	0	0	0	0
31	20	17	0	0	0	0	0	0
34	20	4	0	0	0	0	0	0
44	20	11	0	0	0	0	0	0
46	20	1	1	0	0	0	0	0
49	20	2	0	0	0	1	0	0
59	20	3	0	0	0	0	0	0
25	21	15	0	0	0	0	0	0
28	21	17	1	0	1	0	0	0
32	21	17	1	0	1	0	0	0
41	21	11	0	0	0	1	0	0
43	21	11	0	0	0	0	0	0
47	21	1	0	0	0	0	0	0
56	21	3	0	0	0	0	0	0
59	21	4	0	0	0	0	0	0
17	23	7	0	0	1	0	0	0
20	23	17	1	0	1	0	0	0
28	23	18	0	0	1	0	0	0
32	23	17	1	0	1	0	0	0
34	23	1	0	0	0	0	0	0
35	23	1	0	0	0	1	0	0
41	23	11	0	0	0	1	0	0
43	23	11	0	0	0	0	0	0
49	23	11	0	0	0	0	0	0
52	23	3	0	0	0	0	0	0
53	23	3	0	0	0	0	0	0
56	23	3	0	0	0	0	0	0
58	23	3	0	0	0	0	0	0
22	24	6	0	0	0	0	0	0
23	24	15	0	0	0	0	0	0
29	24	17	0	0	0	0	0	0

34	24	9	0	0	0	0	0	0
35	24	1	0	0	0	0	0	0
37	24	1	0	0	0	0	0	0
40	24	1	0	0	0	0	0	0
44	24	9	0	0	0	0	0	0
47	24	11	0	0	0	0	0	0
50	24	12	0	0	0	0	0	0
52	24	11	0	0	0	0	0	0
56	24	3	0	0	0	0	0	0
59	24	3	0	0	0	0	0	0
26	26	15	1	1	0	0	0	0
28	26	17	1	0	0	0	0	1
32	26	17	0	0	0	0	0	0
34	26	9	0	0	0	0	0	0
35	26	1	0	0	0	0	0	0
37	26	1	0	0	0	0	0	0
38	26	1	1	0	0	0	0	0
41	26	1	0	0	0	0	0	0
43	26	1	0	0	0	0	0	0
44	26	9	0	0	0	0	0	0
52	26	12	0	0	0	0	0	0
55	26	3	0	0	0	0	0	0
56	26	3	0	0	0	0	0	0
58	26	3	0	0	0	0	0	0
59	26	3	0	0	0	0	0	0
26	27	15	0	0	0	0	0	0
31	27	17	0	0	0	0	0	0
35	27	17	0	0	0	1	0	0
37	27	1	0	0	0	0	0	0
38	27	1	0	0	0	0	0	0
47	27	11	0	0	0	0	0	0
50	27	11	0	0	0	0	0	0
53	27	3	0	0	0	0	0	0
55	27	3	0	0	0	0	0	0
58	27	3	0	0	0	0	0	1
61	27	3	0	0	0	0	0	0
64	27	3	0	0	0	0	0	1
31	29	15	0	0	0	0	0	0
32	29	15	0	0	0	0	0	0
34	29	17	0	0	0	1	0	0
37	29	9	0	0	0	0	0	0
40	29	9	0	0	0	0	0	0
41	29	9	0	0	0	0	0	0
47	29	11	0	0	0	0	0	0
49	29	11	0	0	0	0	0	0
50	29	12	0	0	0	0	0	0
52	29	12	0	0	0	0	0	0
55	29	8	1	0	0	0	0	0
62	29	3	0	0	0	0	0	0
26	30	15	0	0	1	0	0	0
28	30	17	0	0	0	0	0	0
29	30	17	0	0	0	0	0	0
34	30	10	0	0	0	0	0	0
37	30	10	0	0	0	0	0	0
44	30	9	0	0	0	0	0	0
50	30	11	0	0	0	0	0	0
53	30	4	0	0	0	0	0	0
55	30	4	0	0	0	0	0	0
56	30	3	0	0	0	0	0	0
65	30	4	0	0	0	0	0	1
25	32	8	0	0	1	0	0	0
26	32	17	0	0	1	0	0	0
28	32	18	0	0	1	0	0	0
29	32	18	1	0	0	1	0	0

31	32	17	0	0	0	0	0	0
32	32	15	2	0	0	0	0	0
34	32	15	0	0	0	0	0	0
37	32	10	0	0	0	0	0	0
43	32	10	1	0	0	0	0	0
44	32	10	0	0	0	0	0	0
49	32	11	0	0	0	0	0	0
52	32	12	0	0	0	0	0	0
53	32	4	0	0	0	0	0	0
56	32	3	1	0	0	0	0	0
58	32	3	0	0	0	0	0	0
59	32	3	0	0	0	0	0	0
22	33	7	0	0	0	1	0	1
25	33	7	1	0	0	0	0	1
28	33	23	0	0	1	0	0	0
43	33	11	0	0	0	0	0	0
44	33	11	0	0	0	0	0	0
46	33	12	0	0	0	0	0	0
52	33	12	0	0	0	0	0	0
53	33	8	1	0	0	0	0	0
58	33	3	0	0	0	0	0	0
62	33	4	0	0	0	1	0	0
26	35	17	0	0	1	0	0	0
28	35	17	0	0	1	0	0	0
32	35	18	0	0	0	0	0	0
49	35	11	0	0	0	0	0	0
50	35	11	0	0	0	0	0	0
52	35	12	0	0	0	0	0	0
53	35	4	0	0	0	0	0	0
28	36	17	0	0	0	0	0	0
29	36	17	0	0	0	0	0	0
31	36	17	0	0	0	1	0	0
34	36	13	0	0	0	0	0	0
37	36	13	0	0	0	0	0	0
38	36	10	0	0	0	0	0	0
41	36	17	0	0	1	0	0	0
43	36	17	0	0	0	0	0	0
46	36	9	1	0	0	0	0	0
47	36	12	0	0	0	0	0	0
52	36	11	0	0	0	0	0	0
26	37	7	1	0	0	1	0	0
30	37	13	0	0	0	0	0	0
22	38	6	1	0	0	1	0	0
32	38	13	0	0	0	0	0	0
38	38	13	0	0	0	0	0	0
43	38	9	0	0	0	0	0	0
44	38	10	0	0	0	0	0	0
47	38	11	0	0	0	0	0	0
49	38	11	0	0	0	0	0	0
50	38	12	1	0	0	0	0	0
53	38	11	0	0	0	0	0	0
37	39	13	0	0	0	0	0	0
40	39	18	0	0	1	0	0	1
41	39	18	0	0	1	0	0	1
43	39	10	0	0	0	0	0	0
46	39	10	0	0	0	0	0	0
47	39	9	0	0	0	0	0	0
50	39	9	0	0	0	0	0	0
52	39	9	0	0	0	1	0	0
37	41	16	0	0	0	0	0	0
40	41	17	0	0	0	0	0	0
41	41	10	0	0	0	0	0	0
43	41	10	0	0	0	0	0	0
47	41	9	0	0	0	0	0	0

50	41	9	0	0	0	0	0	0
52	41	9	0	0	0	0	0	0
38	42	18	0	0	0	0	0	0
41	42	10	0	0	0	0	0	0
49	42	9	0	0	0	0	0	0
50	42	10	1	0	0	0	0	0
52	42	16	0	0	0	0	0	0
53	42	14	0	0	0	0	0	0
37	44	16	0	0	0	1	0	0
38	44	17	0	0	0	0	0	0
41	44	10	0	0	0	0	0	0
46	44	10	0	0	0	0	0	0
50	44	9	0	0	0	0	0	0
34	45	16	0	0	0	0	0	0
37	45	20	0	0	0	1	0	0
40	45	19	0	0	1	0	0	0
43	45	10	0	0	0	0	0	0
50	45	16	0	0	0	0	0	0
51	45	14	0	0	0	0	0	0
34	47	16	1	0	1	0	0	0
35	47	16	0	0	0	0	0	0
37	47	19	1	0	1	0	0	0
38	47	23	0	0	1	0	0	0
43	47	10	0	0	0	0	0	0
49	47	9	0	0	0	0	0	0
24	48	7	0	0	0	0	0	0
34	48	16	1	0	1	0	0	0
35	48	27	0	0	0	0	0	0
37	48	20	0	0	1	0	0	1
38	48	23	0	0	1	0	0	0
41	48	10	0	0	0	0	0	0
44	48	10	0	0	1	0	0	0
46	48	9	0	0	1	0	0	0
50	48	14	1	0	0	0	0	0
24	50	8	0	0	0	0	0	0
31	50	13	0	0	1	0	0	0
35	50	19	0	0	0	0	0	0
38	50	22	0	0	1	0	0	0
41	50	10	0	0	0	0	0	0
46	50	19	0	0	1	0	0	0
47	50	19	0	0	1	0	0	0
35	51	19	0	0	0	0	0	0
37	51	28	0	0	0	0	0	0
41	51	10	0	0	0	0	0	0
46	51	13	0	0	0	0	0	0
47	51	13	0	0	1	0	0	0
24	53	7	0	0	0	0	0	0
24	53	8	0	0	0	0	0	0
30	53	8	0	0	0	0	0	0
31	53	16	0	0	1	0	0	0
32	53	22	1	0	1	0	0	0
37	53	23	0	1	0	1	0	0
44	53	9	0	0	0	0	0	0
23	54	13	0	0	0	0	0	0
32	54	13	0	0	0	0	0	0
35	54	18	0	0	0	1	0	0
37	54	22	0	0	0	1	0	0
40	54	22	0	0	0	1	0	0
44	54	14	1	0	0	0	0	0
22	56	16	0	0	0	0	0	0
23	56	13	0	0	0	0	0	0
26	56	26	0	0	0	0	0	0
29	56	16	0	0	0	0	1	0
38	56	25	0	0	0	0	0	0

22	57	26	0	0	0	0	0	0
26	57	28	0	0	0	0	0	1
29	57	26	0	0	0	0	0	0
34	57	25	0	0	0	0	0	0
37	57	22	1	0	1	0	0	0
41	57	27	0	0	0	0	0	0
21	58	14	1	0	0	0	0	0
23	59	22	0	0	0	0	0	0
25	59	22	0	0	0	0	0	0
29	59	28	0	0	0	0	0	0
31	59	28	0	0	0	0	0	0
34	59	22	1	0	0	0	0	0
35	59	22	0	0	0	0	0	0
37	59	22	0	0	0	0	0	0
38	59	25	0	0	1	0	0	0
41	59	25	0	0	0	0	0	0
23	60	25	0	0	0	0	0	0
25	60	21	0	0	0	0	0	0
26	60	22	0	0	0	0	0	0
28	60	21	0	0	0	0	0	0
29	60	22	0	0	0	0	0	0
31	60	22	0	0	0	0	0	0
34	60	27	1	0	0	0	0	0
35	60	27	1	0	0	0	0	0
37	60	22	0	0	1	0	0	0
41	60	10	0	0	0	0	0	0
17	62	8	0	0	0	0	0	0
25	62	28	0	0	0	0	0	0
31	62	23	0	0	0	0	0	0
37	62	25	0	0	0	0	0	0
38	62	23	0	0	1	0	0	0
40	62	25	0	0	0	0	0	0
17	63	18	0	0	0	0	0	0
20	63	7	1	0	0	0	0	0
25	63	26	0	0	0	0	0	0
26	63	22	0	0	0	0	0	0
31	63	22	0	0	0	0	1	0
34	63	27	0	0	0	0	0	0
35	63	27	1	0	0	0	1	1
37	63	25	1	0	0	0	0	0
38	63	26	0	0	0	0	0	0
22	64	14	0	0	0	0	0	0
13	65	13	0	0	0	0	0	0
19	65	7	1	0	0	0	1	0
22	65	18	0	0	0	0	0	0
23	65	27	0	0	0	0	0	0
25	65	25	0	0	0	0	0	0
26	65	25	0	0	0	0	0	0
31	65	22	1	0	0	0	0	0
32	65	20	0	0	0	0	0	0
34	65	20	0	0	0	0	0	0
37	65	25	0	0	0	0	0	0
40	65	25	0	0	0	0	0	0
28	66	27	0	0	0	0	0	0
32	66	27	0	0	0	0	0	0
37	66	19	0	0	0	0	0	0
38	66	17	0	0	0	0	0	0
15	67	30	0	0	0	0	1	0
34	67	26	0	0	0	0	0	0
19	68	13	0	0	0	0	0	0
20	68	18	0	0	0	0	0	0
25	68	26	0	0	0	0	0	0
13	69	13	0	0	0	0	0	0
16	69	30	0	0	0	0	0	0

19	69	28	0	0	0	0	0	0
20	69	21	0	0	0	0	0	0
25	69	26	0	0	0	0	0	0
32	69	26	0	0	0	0	0	0
19	71	18	0	0	0	0	0	0
23	71	24	0	0	0	0	0	0
28	71	25	0	0	0	0	0	0
29	71	27	0	0	0	0	0	0
32	71	26	0	0	0	0	0	0
13	72	13	0	0	0	0	0	0
20	72	24	1	0	0	0	0	0
22	72	24	0	0	0	0	0	0
23	72	21	0	0	0	0	0	0
29	72	25	0	0	0	0	0	0
32	72	26	0	0	0	0	0	0
34	72	26	0	0	0	0	0	0
10	74	13	0	0	0	0	0	0
13	74	29	0	0	0	0	1	0
14	74	18	0	0	0	0	1	0
16	74	25	0	0	0	0	0	0
19	74	29	0	0	0	0	1	0
22	74	24	0	0	0	0	1	0
23	74	24	0	0	0	0	0	0
28	74	23	0	0	0	0	0	0
32	74	27	0	0	0	0	0	0
34	74	27	0	0	0	0	0	0
13	75	30	0	0	0	0	0	0
14	75	30	0	0	0	0	0	0
16	75	29	0	0	0	0	0	0
17	75	24	0	0	0	0	0	0
19	75	29	0	0	0	0	0	0
22	75	24	0	0	0	0	1	0
23	75	23	0	0	0	0	1	0
26	75	22	0	0	0	0	1	1
32	75	22	0	0	0	0	0	0
14	77	30	0	0	0	0	1	0
17	77	21	0	0	0	0	1	0
20	77	29	0	0	0	0	0	0
23	77	23	0	0	0	0	0	0
26	77	23	0	0	0	0	0	0
32	77	23	1	0	0	0	0	0
34	77	23	0	0	0	0	0	0
35	77	25	0	0	0	0	0	0
38	77	25	0	0	0	0	0	0
19	78	24	0	0	0	0	0	0
23	78	23	0	0	0	0	0	0
25	78	24	0	0	0	0	0	0
29	78	23	0	0	0	0	1	0
31	78	23	0	0	0	0	1	0
35	78	22	0	0	0	0	0	0
38	78	26	0	0	0	0	0	0
13	79	24	0	1	0	0	1	0
19	80	24	0	0	0	0	1	0
29	80	23	1	1	0	0	1	0
34	80	22	0	0	0	0	0	0
37	80	25	0	0	0	0	0	0
8	81	30	0	0	0	0	0	0
19	81	24	0	0	0	0	1	0
23	81	21	0	0	0	0	0	0
25	81	21	0	0	0	0	0	0
32	81	23	1	0	0	0	0	0
34	81	22	0	0	0	0	0	0
38	81	25	0	0	0	0	0	0
39	81	25	0	0	0	0	0	0

8	83	30	0	0	0	0	0	0
14	83	30	0	0	0	0	0	0
16	83	29	0	0	0	0	0	0
19	83	21	0	0	0	0	0	0
20	83	24	0	0	0	0	0	0
22	83	24	1	0	0	0	0	0
28	83	21	0	0	0	0	0	0
31	83	22	0	0	0	0	0	0
34	83	22	0	0	0	0	0	0
35	83	22	0	0	0	0	0	0
37	83	27	0	0	0	0	0	0
40	83	26	1	0	0	0	0	0
11	84	30	0	0	0	0	0	0
13	84	30	0	0	0	0	0	0
17	84	21	1	0	0	0	1	0
22	84	24	0	0	0	0	0	0
25	84	25	0	0	0	0	0	0
29	84	28	0	0	0	0	0	0
32	84	25	0	0	0	0	0	0
37	84	25	0	0	0	0	0	0
40	84	26	0	0	0	0	0	0
7	86	30	0	0	0	0	0	1
14	86	30	0	0	0	0	1	0
20	86	21	0	0	0	0	1	0
23	86	28	0	0	0	0	0	0
25	86	21	0	0	0	0	0	0
32	86	25	0	0	0	0	0	0
34	86	28	0	0	0	0	0	0
38	86	27	0	0	0	0	0	0
7	87	29	0	0	0	0	1	1
26	87	28	1	0	0	0	0	0
10	89	30	0	0	0	0	1	0
19	89	29	0	0	0	0	1	0
23	89	21	0	0	0	0	0	0
25	89	28	0	0	0	0	0	0
10	90	29	1	0	0	0	1	0
22	90	21	0	0	0	0	0	0
23	90	21	0	0	0	0	0	0
11	92	32	0	0	0	0	0	0
13	92	32	0	0	0	0	0	0
23	92	21	0	0	0	0	0	0
29	92	21	0	0	0	0	0	0
10	93	32	0	0	0	0	1	0
11	93	29	0	0	0	0	0	0
13	93	32	0	0	0	0	0	0
20	93	29	0	0	0	0	1	0
25	93	28	0	0	0	0	0	0
28	93	21	1	0	0	0	0	0
31	93	27	1	0	0	0	0	0
14	95	30	0	0	0	0	0	0
22	95	32	0	0	0	0	0	0
26	95	28	0	0	0	0	0	0
28	95	28	0	0	0	0	0	0
15	96	31	0	0	0	0	0	0
23	96	31	1	0	0	0	0	0
25	96	21	0	0	0	0	0	0
33	96	31	1	0	0	0	0	0
34	99	31	0	0	0	0	0	0
35	100	31	0	0	0	0	0	0
32	101	32	1	0	0	0	1	0
34	101	32	0	0	0	0	0	0
34	102	31	0	0	0	0	0	0
35	103	31	0	0	0	0	0	0
42	114	31	0	0	0	0	0	0

44	116	32	0	0	0	0	0	0
42	117	31	0	0	0	0	1	0
43	119	32	0	0	0	0	1	0
44	119	32	0	0	0	0	0	0
45	120	31	0	0	0	0	0	0
46	121	31	0	0	0	0	0	0

3.4 Table 3 provides abbreviated, one-line, descriptions of each of the ITE Land Classes. More detailed information on the Land Classes is given in Merlewood Research and Development Paper No 86 (currently under revision).

Section 3 continues ...

Table 3 One line descriptions of each of the 32 ITE Land Classes, as provided in Merlewood Research and Development Paper No.86.

1	Undulating country, varied agriculture, mainly grassland
2	Open gentle slopes, often lowland, varied agriculture
3	Flat arable land, mainly cereals, little native vegetation
4	Flat, intensive agriculture, otherwise mainly built-up
5	Lowland, somewhat enclosed land, varied agriculture and vegetation
6	Gently rolling enclosed country, mainly fertile pastures
7	Coastal with variable morphology and vegetation
8	Coastal, often estuarine, mainly pasture, otherwise built-up
9	Fairly flat, open intensive agriculture, often built-up
10	Flat plains with intensive farming, often arable/grass mixtures
11	Rich alluvial plains, mainly open with arable or pasture
12	Very fertile coastal plains with very productive crops
13	Somewhat variable land forms, mainly flat, heterogeneous land use
14	Level coastal plains with arable, otherwise often urbanised
15	Valley bottoms with mixed agriculture, predominantly pastural
16	Undulating lowlands, variable agriculture and native vegetation
17	Rounded intermediate slopes, mainly improvable permanent pasture
18	Rounded hills, some steep slopes, varied moorlands
19	Smooth hills, mainly heather moors, often afforested
20	Midvalley slopes, wide range of vegetation types
21	Upper valley slopes, mainly covered with bogs
22	Margins of high mountains, moorlands, often afforested
23	High mountain summits, with well drained moorlands
24	Upper, steep mountain slopes, usually bog covered
25	Lowlands with variable land use, mainly arable
26	Fertile lowlands with intensive agriculture
27	Fertile lowland margins with mixed agriculture
28	Varied lowland margins with heterogeneous land use
29	Sheltered coasts with varied land use, often crofting
30	Open coasts with low hills dominated by bogs
31	Cold exposed coasts with variable land use and crofting
32	Bleak undulating surfaces mainly covered with bogs

3.5 Table 4 shows the number of squares in each Land Class that contain Sites of Special Scientific Interest, and the percentage frequency of such squares in the Land Class.

3.6 The occurrences of SSSIs are unevenly distributed in the ITE Land Classes. The coastal Land Classes, 7, 8 and 14 have the highest proportions, probably due to the extensive nature of SSSIs in estuaries. The lowland Land Classes have between 7% and 10% percentage frequencies while upland Land Classes have between 11% and 28%. This pattern represents in part the large size of the SSSIs in Land Classes in the uplands, contrasting with the scarcity of available areas for wildlife conservation in the lowlands. A high proportion of coastal and mountain areas are therefore protected in some way.

3.7 This distribution pattern links to the inherant character of landscapes, with the uplands having extensive semi-natural ecosystems and the lowlands having fragmented islands. In the latter case therefore, the importance of the wider countryside, and the distribution of the residual habitats (eg linear features) needs to be well considered in the development of a broad conservation strategy.

Section 3 ends.

Table 4 The number and percentage frequency of 1 x 1 km squares that fall within the SSSI's in the 32 Land Classes, based on 1988 information.

Land class	No. of squares	%
1	1068	7.5
2	1676	11.6
3	1103	7.1
4	1216	13.4
5	358	9.2
6	815	7.9
7	1268	50.1
8	2042	46.3
9	834	7.1
10	796	5.7
11	402	4.5
12	215	6.1
13	765	10.5
14	294	31.5
15	322	7.7
16	228	7.4
17	2600	20.0
18	1083	16.1
19	753	13.8
20	521	20.7
21	1454	15.0
22	1708	13.6
23	1950	28.1
24	1559	21.6
25	703	6.6
26	645	9.3
27	809	11.8
28	650	8.7
29	982	18.0
30	593	13.9
31	520	17.2
32	561	14.9

4 SPECIES DATA RECORDS

"List the records of vegetation from the c 7,000 plus quadrats (both as hard copy and in machine-readable form)"

Species identification

4.1 In 1978, ITE's botanical survey was carried out by just six ITE staff people (with some additional assistance). Furthermore, the majority of sites were surveyed by a group of survey teams, working together in each region of the country, and comparing and validating plant identification. Further validation was carried out during the preparation of the data. From experience, it was recognised that certain combinations could not be identified consistently to species level in the field. That is not to say that a good specimen could not be identified, but rather, under many field conditions, consistant species identification would not be possible. As a result, certain combinations of species were combined to genus, or aggregate, level.

4.2 Some of the groupings described below are widely recognised to be difficult, eg *Hieracium*, whatever the quality of specimens, because of inherent taxonomic problems. Others, eg *Epilobium*, are more easily identified but experience of broadscale ecological surveys in British woodlands, and the wider countryside in Cumbria, have suggested that such groupings were realistic. Some further inconsistancies have emerged during comparison of 1978 and 1990 species lists and these are considered separately below.

4.3 In many ecological analyses involving vegetation, taxonomic problems are relatively unimportant, as confusion is likely to reduce correlation and not be directional. Inadequately recorded species will also tend not to be identified consistently and are unlikely to be significant to the analysis. However, the analysis of change introduces another dimension and requires a precise knowledge of what is being compared; otherwise a change could be derived that was actually due to a difference in species identification.

4.4 The approach adopted to reduce such problems is to consider species under categories which reflect confidence of identification:

(1) Species which can confidently be regarded as consistently recorded
(2) Species complexes, aggregates or where known problems occur
(3) Naturalised species
(4) Planted species
(5) Species that were recorded at only one survey date

4.5 The species-list from quadrats recorded as part of Countryside Survey 1990 is given in Annex B, and is structured according to the categories described above.

4.6 The comparison of some species in the second group may well be useful, eg *Rhinanthus*, whereas others such as *Salix* are so complicated as to be of little value. Separation in this way does, however, ensure that the reader can make his own decisions within the framework provided. The lists of composites recognised in the 1977/8 and the 1990 surveys are given in Table 5.

Section 4 continues ...

Table 5 Composite species and aggregates recognised in the 1977/78 and 1990 surveys.

Composites recognised in 1978	Composites recognised in 1990
Agrostis canina alone was recorded in 1978	In 1990 it was divided into *A. canina* *A. vinealis* The latter is possibly confused with *A. stolonifera*, however the frequency data suggest that *canina + vinealis* 1978 *canina* (11.6% c. 12.7%) whereas *A. stolonifera* has increased from 24.8% to 34.0% suggesting that it has been included more than adequately in 1990.
Arctium sp. *lappa + minus*. The latter consists of 3 spp. Distinction of immature plants difficult.	As 1978
Betula sp. Taxonomic status subject to discussion with many intermediates.	As 1978
Callitriche sp. A taxonomically difficult group owing to environmental influence of leaf shape.	As 1978
Cardamine hirsuta/flexuosa Small specimens difficult to distinguish.	Separated in some cases only 1990. Majority remain as composite.
Epilobium tetragonum/obscurum Experience in the GB survey of woodlands showed that these species were in many case impossible to separate. In 1990 further difficulties were encountered (see below). *E. montanum* was also included as *Epilobium* spp.	In some cases these were separated but there was still a number of plants included as *Epilobium* sp. *E. montanum* was however separated. For comparative purposes therefore *Epilobium* sp. 1978 = *tetragonum, obscurum, montanum* & *Epilobium* sp. in 1990.
Small *Euphorbia sp.* The few small annual species are difficult to separate because of environmental influences.	Some of the species were separated but a number of plants were still included as a group. The comparison can therefore only be made as a group.
Euphrasia sp. A taxonomically difficult group which also differs between environments and hosts.	As 1978
Hieracium sp. An inherently difficult taxonomic group.	As 1978

Juncus articulatus/acutifloras These species hybridise with the former also being extremely variable. Good specimens can be readily attributed but overall it was decided that it was realistic to group them.	The majority of specimens were left in this group but both species were recognised in some instances. The comparison can only therefore be made as a group.
Luzula multiflora/campestris Vegetative specimens cannot be readily attributed to either species because although *campestris* is stoloniferous many specimens are isolated.	As with *Juncus* & *Euphorbia*. Treated as a group.
Mentha sp. The two main species *arvensis* and *aquatica* are difficult to distinguish and there are also a variety of different hybrids.	Treated as a group
Myosotis sp. Includes the common annual weeds, ie mainly probably *arvensis, discolor, laxa* and *secunda* which are difficult to distinguish because of environmental influences.	Treated as a group
Poa trivialis/nemoralis Juvenile specimens of the former are readily confused with the latter in woodlands but elsewhere they can be readily separated. The former is much more frequent.	Treated as a group but could be compared between 1990 and subsequent surveys.
Polygala serpyllifolia/vulgaris The two species are difficult to separate and were therefore grouped.	Can only be treated as a group for comparative purposes.
Quercus sp. The two common species can be readily separated in many cases but are equally difficult in many other situations.	As 1978
Rhinanthus sp. An inherently difficult taxonomic group.	As 1978
Rosa sp. Many species are difficult to identify without flowers so that it was decided to group them.	As 1978, but some specimens identified to species level.
Rubus fructicosus agg. An inherently difficult taxonomic group.	As 1978

Rumex conglomerates/sanguineus Many specimens growing in shade/ semi-shade are difficult to distinguish.	As 1978, but some species identified to species level.
Sagina sp. An inherently difficult taxonomic group.	As 1978
Taraxacum agg. Impossible for non-specialists to distinguish.	As 1978
Viola riviniana/reichenbachiana It is only possible to distinguish these exactly in the spring.	Some specimens identified to species, but not consistantly.
Ulmus sp. These are notorius to distinguish although *glabra* is more reliable.	As 1978 except that *Ulmus* spp should join *U. procera*.

4.7 The composite groups are useful for comparison but should not be taken at the same level as species for which there is complete confidence. The trends in the composites can be examined separately to see if they they confirm the main trends identified.

4.8 Although many of the difficult species were separated to a greater degree in 1990 than in 1978, there was in all cases a rump of aggregated records.

4.9 The complete list of species contains many that are of low interest to nature conservation. In the Ecological Consequences of Land Use Change project, it was shown that species characteristic of specific habitats were changing differentially. It was therefore discussed that methods of restricting the list should be demonstrated. An example of such a list was provided by the Biological Records Centre (BRC) for 320 species that occurred in between 16 and 100 10x10 km squares in GB. In the Countryside Survey 1990, 50 of these species were recorded (listed in Table 6). In addition, some 30 species from the BRC list were recorded as aggregates (eg *Euphrasia* and *Salix*), resulting in some 18% of these 'semi-rare' species being recorded within the 1990 survey.

4.10 Table 6 lists those species that occur in 16 - 100 10x10 km squares in GB, and which were recorded during Countryside Survey 1990.

Section 4 continues ...

Table 6 - Species occuring in 16-100 10x10km squares in GB, and which were recorded during Countryside survey 1990.

Alopecurus aequalis
Andromeda polifolia
Arctostaphylos alpinus
Carex capillaris
Carex divisa
Carex humilis
Carex vulpina
Cerastium alpinum
Cerastium arcticum
Circaea alpina
Daphne mezereum
Dryas octopetala
Equisetum pratense
Festuca altissima
Fumaria bastardii
Fumaria capreolata
Galeopsis angustifolia
Galium sterneri
Goodyera repens
Hordelymus europaeus
Hydrocharis morsus-ranae
Inula crithmoides
Lepidium latifolium
Limonium humile
Marrubium vulgare
Melittis melissophyllum
Minuartia verna
Phyteuma orbiculare
Polygala calcarea
Polygonum mite
Primula elatior
Puccinellia fasciculata
Ranunculus parviflorus
Rumex maritimus
Rumex palustris
Scilla autumnalis
Sedum forsteranum
Sedum villosum
Senecio integrifolius
Sesleria albicans
Sibthorpia europaea
Sonchus palustris
Suaeda vera
Subularia aquatica
Thesium humifusum
Tilia platyphyllos
Tofieldia pusilla
Trifolium squamosum
Vicia bithynica
Wolffia arrhiza

4.11 Further species should probably be removed from the list (eg *Zostera*), as they could not be covered by the survey method. The calculation of the likelihood is confused by several factors, in particular, whether a species is locally common (ie occurs in many 1km squares within a 10x10 km block, or whether it occurs in only one or two. BRC are currently using recent data, which is by six-figure grid reference, to establish the approximate number of squares covered. Knowledge of the species concerned suggests that the majority of the species covered come into the 'locally common' category (eg *Andromeda polifolia* and *Goodyera repens*) but currently these cannot be quantified. In general however, it would be generally expected that the rarer species would be adequately covered by BRC records, although this may be uneven in that some species characteristic of more remote areas could well be unevenly recorded.

4.12 It is therefore not possible to draw statistical conclusions but only to use the extraction of the species as a demonstration of the usefulness of the data in providing information on species of conservation interest.

Changes in species groups

4.13 Another method of detecting change in overall species composition is to use species groups, that is groups of species which commonly occur together, eg species typical of short chalk grassland turf.

4.14 The number of groups, and the proportion of species in each, may change over time, reflecting either succession or management practices. For instance, the species composition of an unimproved permanent pasture will change, if it is drained or regularly fertilised, and this will be reflected by a decline in species groups representing those species vulnerable to these changes and an increase in species favoured by the changing conditions. Similarly, a recently ploughed field will contain mainly arable weeds, probably all present in the same species group, but if the field is left, then over time, other species will colonise and the number of species groups and their relative importance will change.

4.15 The overall frequency of species recorded in 1978 and 1990 were calculated and compared. For a brief summary, the species that occurred in over 5% of the quadrats and those that had changed more than 1% over the 2 periods of time were extracted. In order to summarise their affinities they are presented according to the species groups given in Table 7.

Section 4 continues ...

Table 7 Species that occurred in over 5% of quadrats and had changed over 1% between 1978 and 1990 and their occurrence in species groups determined by Ward's minimal variance clustering procedure on the first five DECORANA scores from 1978 data. Brief descriptions of the groups are provided together with 2 typical species.

Species group	Number of spp Incr.	Decr.	Description
1	-	1	**Bog**, eg bogbean, sundew
2	-	4	**Bog/moorland**, eg deergrass, bog asphodel
3	-	2	**Moorland/bog**, eg heather, purple moor grass
4	1	3	**Upland flush/upland grassland**, eg devil's bit scabious, tormentil
5	-	1	**Moorland/bog**. eg mat-grass, marsh violet
6	-	2	**Moorland grassland/upland grassland**, eg bilberry, wavy hair grass
7	-	2	**Upland grassland**, eg mountain fern, heath bedstraw
8	-	-	**Upland scrub/upland grassland**, eg rowan, golden rod
9	2	1	**Scrub/upland grassland**, eg broom, bracken
10	-	9	**Upland grassland/enriched flushes**, eg sheep's fescue, wild thyme
11	2	2	**Upland flush**, eg sneezewort, marsh thistle
12	1	5	**Upland grassland/upland meadow**, eg bent grass, pignut
13	4	1	**Scrub/woodland**, eg hawthorn, bluebell
14	1	1	**Marshland/meadow**, eg ragged robin, cuckoo flower
15	-	2	**Neutral woodland**, eg hazel, bugle
16	2	1	**Calcareous woodland**, eg wild arum, dog's mercury
17	-	-	**Calcareous scrub/meadow**, eg dogwood, cowslip
18	1	2	**Marshland/moist woodland**, eg canary grass, yellow pimpernel
19	-	-	**Calcareous grassland**, eg salad burnet, rockrose
20	-	7	**Mesotrophic meadow/calcareous meadow**, eg yarrow, quaking grass
21	-	3	**Mesotrophic meadow**, eg bistort, germander speedwell
22	-	1	**Moist meadow**, eg meadowsweet, marsh marigold
23	1	8	**Improved permanent pasture/old pasture**, eg daisy, ox-eye daisy
24	3	2	**Marginal habitats**, eg silverweed, tufted vetch
25	2	7	**Agricultural grassland**, eg rye grass, spear thistle
26	5	1	**Coarse grasslands, marginal habitats**, eg cow parsley, hogweed
27	1	-	**Maritime**, eg thrift, sea plantain
28	1	3	**Weeds**, mostly perennial, eg broadleaved dock, sow thistle
29	2	2	**Marginal habitats**, eg hemlock, butterbur
30	8	5	**Arable weeds**, mainly annuals, eg wild oats, shepherd's purse

4.16 Table 7 indicates that the species that are declining in frequency are from upland habitats, grasslands and mesotrophic pastures, together with some weed species. The species that are increasing are from scrub areas or from weed groups. The latter interchange with the declining species and are probably due to changing spray regimes. This table suggests that this approach is worth developing further partly from a more sophisticated analysis by region and Land Class and also could benefit from the application of plant strategy theory. In this way the initial hypothesis that on the one hand the agricultural land is intensifying, whereas on the other the marginal habitats are declining in management through dereliction and lack of input, could be confirmed.

4.17 The use of species groups helps to detect a real shift in species composition, as opposed to alternation between species which occupy a similar niche. In this study, the species groups have been derived statistically using DECORANA to 'order' species along the principle gradient (described above) and then cluster analysis (Ward's minimum distance) to divide them into groups. Within phytosociological studies, eg NVC, comparable groups are recognised within the association tables and help to breakdown details of the composition of the vegetation.

4.18 Species groups have been produced in this study from the quadrat data recorded on agricultural land in 1978; they are listed in Table 7. The number of classes chosen is arbitrary, but aims to achieve ecologically meaningful groups. These species groups can be used to assess diversity within vegetation, for instance, species in the arable fields tend to be concentrated into one or two groups, whilst in vegetation from pastures and rough grazing, many groups are more evenly represented.

Section 4 ends.

5 HABITAT TYPES SURVEYED

"Include an initial analysis of the distribution of selected vegetation/ habitat types between the 32 Land Classes"

5.1 The first major survey linking vegetation sampling to ITE Land Classes used 16 random 200m2 quadrats within 1km squares. However, in intensively farmed landscapes, highly modified vegetation was oversampled and linear features were missed. In the GB ecological survey of 1977/78, only five random quadrats were used and two 10x1m plots were placed at random alongside each of hedgerows, streams and roads. In 1990, these were supplemented by three further quadrats alongside each of streams and roads, placed to cover the range of variation of each type. Similar plots were also placed on boundaries adjacent to the 200m2 random plots in order to obtain an estimate of the relative contribution of the boundaries to species heterogeneity. In addition, 2x2m quadrats were placed in the centre of habitats not covered by any other plot type, using a random allocation procedure.

5.2 This section demonstrates the coverage of the main habitats included in the random 200m2 plots and the additional coverage provided by the 2x2m plots. The coverage of different types of streams and roads is given before concluding with the breakdown of the relative frequency of different types of boundaries.

5.3 Table 8 summarises the distribution of random plots ('X plots') in the sample sites. A well-defined pattern emerges of samples belonging to arable habitats in the Land Classes which are dominated by crops, followed by the concentration of plots from lowland grass gradually merging into bog, heath and moorland categories. It should be borne in mind that the Land Classes contained unequal numbers of squares, hence the low numbers in classes 7, 5 and 8. Conversion to percentage would simplify the interpretation but would not show the full number of plots surveyed.

Section 5 continues ...

Table 8 Distribution of the 5 random plots (X plots) in each of the 508 sample 1 x 1 km squares by habitat category and Land Class ordered in a lowland to upland gradient.

Habitat Category	Lowland						Land Classes																									Upland	
	12	4	11	3	25	14	8	1	9	10	15	26	16	27	13	2	7	6	5	17	20	31	28	19	22	18	32	29	24	21	23	30	Total
Lowland Agric. Grass	2	16	19	26	46	7	30	75	11	43	25	19	31	24	37	38	25	69	14	54	7	14	15	5	10	10	8	4	0	0	0	1	685
Upland Grass	0	0	1	0	10	1	2	1	0	0	4	1	2	5	3	1	15	3	3	18	4	11	3	5	11	15	3	6	2	12	11	5	158
Moorland Grass	0	0	0	0	2	0	0	0	0	0	1	0	3	2	6	0	1	0	1	27	5	4	3	4	16	3	4	6	22	6	11	5	132
Maritime Vegetation	0	0	0	0	0	1	11	1	4	0	0	0	3	0	1	0	2	3	0	0	0	5	0	0	0	0	0	2	0	0	0	5	38
Lowland Heath	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Bog	0	0	0	0	3	0	0	0	0	0	0	0	1	8	13	0	0	0	0	5	1	12	16	2	16	11	30	25	28	56	26	43	296
Marsh	0	0	0	0	0	1	5	1	0	0	4	1	1	1	1	0	0	1	0	1	0	0	1	1	4	0	0	1	0	0	0	0	24
Unmanaged Grass	0	0	1	1	1	2	2	0	1	3	0	2	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
Woodland	3	4	10	15	21	0	1	27	11	9	4	14	3	8	6	22	1	15	3	12	2	1	23	2	43	17	0	6	15	14	1	8	321
Amenity	1	0	4	1	1	4	2	3	4	0	0	1	0	0	0	3	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	28
Arable	41	30	72	103	27	8	19	27	62	48	6	35	11	21	12	47	14	12	6	6	0	1	4	2	0	0	2	0	0	0	0	0	616
Ley	3	0	3	2	3	0	0	5	6	5	1	1	0	2	2	7	2	5	1	2	1	0	3	0	0	1	1	0	0	0	0	0	56
Vacant	0	0	0	1	0	0	3	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	8
Dwarf Shrub Heath	0	0	0	0	6	0	0	0	0	1	0	0	0	1	2	0	1	0	0	12	0	7	1	14	25	8	2	5	8	7	35	3	138
Total	50	50	110	150	120	24	75	140	100	109	45	75	55	74	85	120	65	116	30	139	20	55	70	35	125	65	50	55	75	95	84	70	2531

5.4 Table 9 shows the distribution of the habitat plots ('Y plots') in the Land Classes. The habitat types covered show a similar overall pattern to that of the previous table except that restricted habitats such as flushes and unmanaged grass in the lowlands are picked up to a greater degree. The table shows the increased coverage of habitats from retricted areas which are not adequately covered by the random plots but also a different balance in the upland areas from moorland grass to upland grass, reflecting that in this situation there is greater variation in the latter category. Some habitats, eg lowland heath and saltmarsh are so restricted that the cover is only marginally increased. In such situations the only way to increase the coverage is to increase sample size in the appropriate Land Classes.

Section 5 continues ...

Table 9 Distribution of the 5 habitat plots (Y plots) in each of the 508 sample 1 x 1 km sample squares by habitat category and Land Class ordered in a lowland to upland gradient.

	Lowland																														Upland	
Habitat Category	Land Classes 12	4	11	3	25	14	8	1	9	10	15	26	16	27	13	2	7	6	5	17	20	31	28	19	22	18	32	29	24	21	23	30	Total
Lowland Agric. Grass	18	18	23	43	20	10	13	42	26	27	10	15	10	12	10	29	16	26	9	20	1	1	7	2	4	2	1	0	0	0	0	2	417
Upland Grass	0	0	4	1	7	1	1	0	2	4	1	4	4	6	3	0	2	9	0	40	1	5	8	4	29	12	9	8	19	17	13	16	230
Moorland Grass	0	0	0	0	4	0	0	2	0	1	2	3	1	3	3	1	0	4	0	11	1	2	6	5	17	8	3	3	7	4	12	1	104
Moorland Shrub Heath	0	0	1	1	11	0	0	1	0	1	2	2	0	2	5	2	1	2	1	13	0	5	12	5	19	9	9	3	12	21	20	7	167
Calcareous Grassland	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	12	3	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	24
Maritime Vegetation	0	0	0	0	2	5	8	0	0	3	0	0	0	0	0	0	10	1	0	0	0	16	0	0	0	0	1	11	1	2	0	9	69
Lowland Heath	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	5	1	2	3	1	0	0	0	0	0	1	0	0	0	0	0	1	16
Aquatic Macrophytes	3	1	1	5	0	1	6	1	3	1	3	1	3	0	5	0	2	2	1	1	0	0	0	0	0	1	1	0	2	1	1	0	46
Aquatic Marginal Veg.	1	2	3	1	7	0	2	8	5	4	1	2	2	1	9	2	1	2	0	2	0	2	2	1	2	1	1	3	3	2	0	2	74
Raised Bog	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	1	1	4	0	0	0	0	0	0	0	10
Blanket Bog	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	2	2	0	0	0	4	0	5	10	6	3	3	7	5	9	5	66
Valley Bog	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	4	0	6	1	1	0	0	2	0	1	21
Fen	0	0	0	0	0	0	0	2	0	0	0	1	0	1	2	0	1	4	0	1	0	0	0	0	0	1	0	0	0	4	0	0	17
Marsh	1	2	2	2	9	1	3	5	4	6	0	6	2	4	5	3	5	12	1	8	5	2	5	6	6	5	3	2	1	0	0	3	119
Flush	0	0	2	0	17	1	0	6	0	5	2	1	3	8	5	3	6	6	0	13	6	11	6	4	15	5	12	13	15	29	25	18	237
Saltmarsh	0	2	0	0	0	1	15	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	27
Unmanaged Grass	8	13	22	35	11	0	14	14	21	25	8	20	9	14	8	17	5	10	3	5	2	2	5	0	1	2	3	1	1	0	0	0	279
Tall Herb Grass	8	2	18	11	7	4	6	5	10	4	4	11	3	8	7	7	3	5	2	2	1	0	0	0	1	1	2	1	1	3	0	1	138
Woodland	10	9	29	44	18	0	5	45	25	28	11	8	13	10	13	30	1	20	9	21	1	3	8	1	10	9	1	5	6	3	1	0	397
Scrub	1	1	4	7	4	1	1	5	4	1	1	1	2	4	2	9	4	8	0	0	0	1	6	0	1	1	0	0	0	1	0	1	71
Total	50	50	109	150	120	25	75	140	100	110	45	75	55	75	85	120	65	115	30	139	20	55	70	35	125	65	50	55	75	95	81	70	2529

5.5 Table 10 shows the distribution of streamside plots (S plots) of which 2 are randomly located in each kilometre square and three additional plots (W plots) placed in the squares to increase the coverage. 60% of plots came in the second category reflecting the increased inensity of sampling and in addition a wider range of stream sizes was covered.

Section 5 continues ...

Table 10 Distribution of the streamside plots (S & W plots) in the 32 Land Classes ordered in a lowland to upland gradient.

	Lowland																																
	Land Classes																																Upland
Plot Type	12	4	11	3	25	14	8	1	9	10	15	26	16	27	13	2	7	6	5	17	20	31	28	19	22	18	32	29	24	21	23	30	Total
S	20	18	38	49	44	8	22	52	32	28	16	30	22	30	32	18	20	42	8	54	6	13	28	12	52	26	18	20	30	36	33	28	885
W	30	28	56	69	63	10	30	76	47	38	20	45	33	45	45	25	27	63	12	81	9	19	42	18	74	36	25	30	45	54	50	42	1287
Total	50	46	94	118	107	18	52	128	79	66	36	75	55	75	77	43	47	105	20	135	15	32	70	30	126	62	43	50	75	90	83	70	2172

5.6 Table 11 shows that rivers are present throughout but are concentrated in the lowlands. Streamside plots show a tendancy to be more frequently recorded in the uplands but are also widespread in the lowlands. Plots alongside ditches are very common in the lowland series and are scarce in the uplands. The remaining categories are scarce and would therefore need to be specifically targetted.

Section 5 continues ...

Table 11 Distribution of all streamside plots in different sizes of watercourse in the 32 Land Classes ordered in a lowland to upland gradient.

	Lowland																															Upland	
Habitat Category	Land Classes																																
	12	4	11	3	25	14	8	1	9	10	15	26	16	27	13	2	7	6	5	17	20	31	28	19	22	18	32	29	24	21	23	30	Total
River	9	12	16	13	5	0	3	23	9	9	11	7	13	17	7	7	3	7	5	16	2	1	9	2	9	7	0	4	5	19	4	6	260
Stream	9	2	23	27	64	12	12	76	21	34	19	27	21	39	43	12	30	90	12	99	10	22	42	25	93	52	37	42	62	67	78	59	1261
Canal	1	0	0	0	0	0	0	0	9	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	15
Ditch	26	27	47	62	35	6	31	26	35	18	4	39	17	17	25	21	11	5	2	17	3	5	18	3	21	3	5	2	5	3	1	5	545
Road Ditch	5	5	8	12	2	0	6	0	5	3	0	2	4	2	2	2	1	1	0	1	0	4	1	0	2	0	1	1	3	1	0	0	74
Other	0	0	0	4	1	0	0	3	0	0	0	0	0	0	0	1	2	2	1	2	0	0	0	0	0	0	0	1	0	0	0	0	17
Total	50	46	94	118	107	18	52	128	79	66	36	75	55	75	77	43	47	105	20	135	15	32	70	30	126	62	43	50	75	90	83	70	2172

5.7 Table 12 gives the occurrence of plots on the different sizes of watercourse, through the landclass groups. These groups are Land Classes grouped together into:

1 Classes dominated by cropped land (2,3,4,9,11,12,14,25,26)
2 Classes dominated by lowland grassland (1,5,6,7,8,10,13,15,16,27)
3 Marginal upland classes (17,18,19,20,28,31)
4 Upland classes (21,22,23,24,29,30,32)

5.8 In Table 12, the contrasts appear more pronounced when grouped into the four major series, with the uplands being similar to the marginal uplands, whereas the two lowland series are similarly comparable. The variation apparent between Land Classes is masked, but the presentation emphasises the major divisions in British landscapes.

5.9 The lowland groups have a wider range of watercourses present, with rivers and ditches being more common, whereas in the uplands, drainage is dominated by streams.

Section 5 continues ...

Table 12 Distribution of streamside plots (S & W plots) on the different sizes of watercourse in the 4 Land Class groups defined in section 5.7.

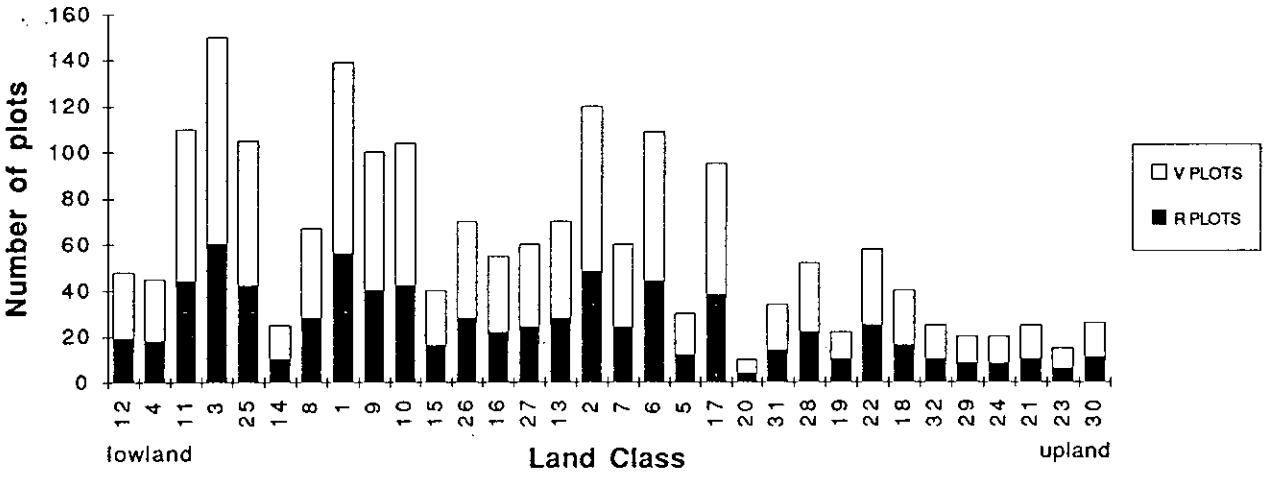
Habitat Category	Land Class Group				Total
	1	2	3	4	GB
River	78	98	37	47	260
Stream	197	376	250	438	1261
Canal	10	4	0	1	15
Ditch	298	156	49	42	545
Road Ditch	41	19	6	8	74
Other	6	8	2	1	17
Total	630	661	344	537	2172

5.10 Figure 2 presents the distribution of verge plots by Land Class. The lowland Land Classes have more verges than the upland because of the wider occurrence of roads.

5.11 The further plots within the NCC contract ('V' plots) have greatly increased the number of samples available. The variability between classes is in part due to their inherent ecological character, and in part to the number of 1km squares surveyed. The upland Land Classes have fewer roads and have verges of different character (cf Section 7).

Section 5 continues ...

Figure 2 Distribution of the verge plots (R & V plots) in the 32 Land Classes ordered in a lowland to upland gradient.



5.12 Table 13 shows the verge plots surveyed between the R plots which are the two random plots in every square where roads are present as the plots are placed in road sizes not covered by the R plots. As a result a considerably increased coverage of road types is found.

5.13 The data in Table 13 provide the figures for Fig 3 and show the even distribution of the 'R' and 'V' plots through the sizes of roads and shows how the method of sampling has produced a balanced stratification.

Section 5 continues ...

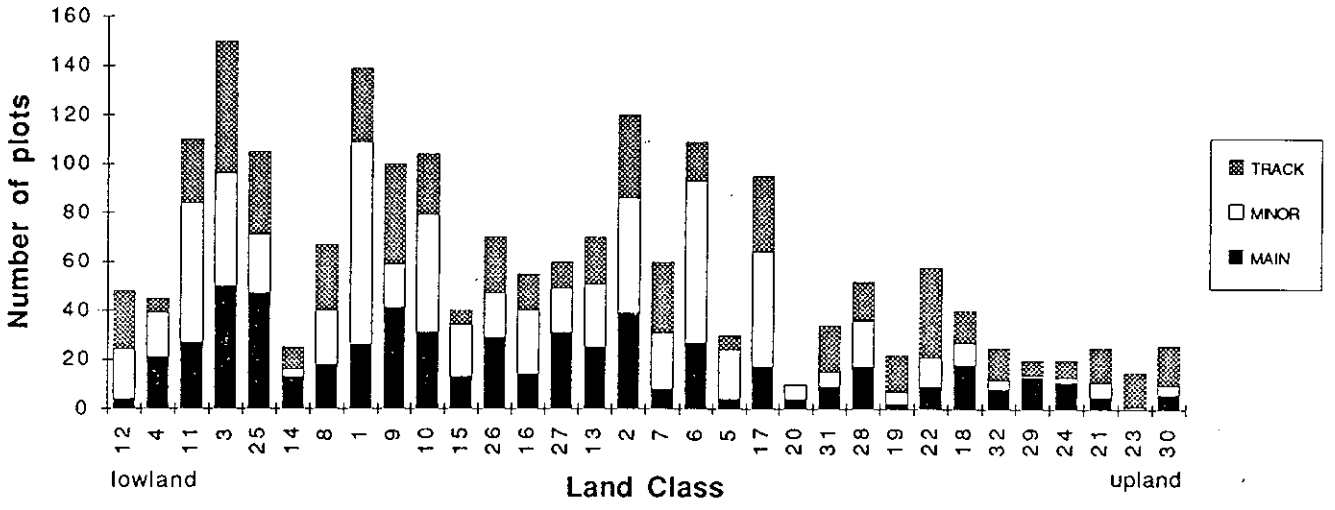
Table 13 Distribution of the verge plots (R & V plots) in the 3 road types.

PLOT TYPE	ROAD TYPE			
	MAIN	MINOR	TRACK	TOTAL
R PLOTS	256	304	229	789
V PLOTS	336	422	407	1165
TOTAL	592	726	636	1954

5.14 Figure 3 shows the distribution of verge plots by road type and by Land Class. Plots on tracks are spread evenly through the series, whereas those on minor roads are mainly in the lowlands. Although main roads are more common in the lowlands, they also occur widely in the uplands. This figure shows the potential for analysing the data by road size and character.

Section 5 continues ...

Figure 3 Distribution of verge plots (R & V plots) by the 3 road types in the 32 Land Classes ordered in a lowland to upland gradient.



5.15 Table 14 presents the results from the hedge plots which were surveyed as well as those boundary plots which are located along hedgerows.

5.16 This table shows the contrasts between random sampling of boundaries and those specifically placed alongside hedgerows. The former series is weighted according to the abundance of hedgerows, whereas the latter gives more even coverage.

Section 5 continues ...

Table 14 Distribution of all plots placed along hedgerows where present, in the Land Classes, ordered on a lowland to upland gradient.

Land Class	Boundary Plot	Hedge Plot	Total
12	15	21	36
4	5	18	23
11	47	41	88
3	48	58	106
25	4	20	24
14	3	6	9
8	6	15	21
1	49	55	104
9	44	41	85
10	36	44	80
15	8	18	26
26	9	18	27
16	11	22	33
27	5	16	21
13	13	18	31
2	25	45	70
7	8	12	20
6	29	43	72
5	3	12	15
17	11	27	38
28	2	4	6
18	5	10	15
Total	386	564	950

5.17 Table 15 presents the hedge plots which were situated in the four Land Class groups. A comparable number are present in both lowland groups whereas the marginal upland has relatively few hedgerows and the upland none at all.

5.18 The hedge plots, and those boundary plots which are hedges, show a similar breakdown at the Land Class group level with virtually all samples being in the lowland series. The uneven distribution shown in Table 11 is therefore masked at a higher level of organisation.

Section 5 continues ...

Table 15 Distribution of plots (H and where appropriate B) placed along hedgerows in the 4 Land Class groups defined in section 5.7.

Land Class Group	H Plots	B Plots	Total Hedge Plots
Lowland Arable	268	200	468
Lowland Grass	255	168	423
Marginal Upland	41	18	59
Upland	0	0	0
Total GB	564	386	950

5.19 Table 16 presents the different sort of boundary plots which were located next to the 5 random plots by Land Class. Lowland Land Classes are dominated by hedge and fence, and walls in the intermediate classes, whereas the waterside boundary plots occurred mainly in the lowlands.

5.20 Water and grass strips both form boundaries, mainly in the lowlands, as do hedgerows but more frequently. Fences are concentrated in the centre of the series, because in the cereal lands, these are often not necessary and in the uplands there are open moorlands. The interpretation of these data will enable the relative contribution of boundaries to landscape heterogeneity to be compared.

Section 5 continues ...

Table 16 Distribution of the types of boundary plots (B plots) placed adjacent to the random (X plots) in the 32 Land Classes ordered in a lowland to upland gradient.

Land Class	Hedge	Fence	Wall	Water	Grass Strip	Bank	Verge	Other	Total
12	15	5	0	19	2	0	8	1	50
4	5	9	2	26	0	1	6	0	49
11	47	21	2	21	5	0	11	1	108
3	48	27	1	31	8	7	24	3	149
25	4	81	15	2	0	0	0	0	102
14	3	9	6	1	0	1	4	0	24
8	6	24	6	18	1	8	3	0	66
1	49	58	3	9	1	7	3	4	134
9	44	19	0	14	4	2	7	0	90
10	36	41	8	4	6	0	7	4	106
15	8	24	1	0	2	2	0	1	38
26	9	41	10	4	0	1	3	0	68
16	11	23	13	1	0	0	1	0	49
27	5	32	22	2	1	1	2	0	65
13	13	39	9	4	1	0	0	0	66
2	25	53	3	9	5	3	16	3	117
7	8	24	17	1	0	3	1	0	54
6	29	49	3	8	0	17	5	1	112
5	3	19	0	0	0	5	1	0	28
17	11	61	16	2	0	1	1	0	92
20	0	5	9	1	0	1	0	0	16
31	0	21	3	0	0	0	0	0	24
28	2	24	4	4	0	0	2	0	36
19	0	3	11	0	0	0	2	0	16
22	0	23	11	3	0	0	1	0	38
18	5	12	8	1	0	0	0	1	27
29	0	12	3	0	0	0	1	0	16
30	0	12	5	0	0	0	0	0	17
32	0	21	1	0	0	0	0	0	22
24	0	8	0	0	0	0	0	0	8
21	0	7	1	3	0	0	0	0	11
23	0	2	7	0	0	0	0	0	9
Total	386	809	200	188	36	60	109	19	1807

5.21 Table 17 presents the boundary plot types by Land Class groups showing the dominance of the hedge series in the two lowland groups, whereas fences extend into the marginal uplands and uplands; walls are present throughout, whereas most of the other types are dominated in the two lowland groups.

5.22 This table characterises the four groups which each show different patterns reflecting their ecological character. Thus the uplands have few boundaries reflecting the continuous nature of the semi-natural vegetation. the marginal uplands are dominated by fences and walls, showing a degree of dissection. The lowland grass series is dominated by fences but with many hedgerwos and contributions from the other types. The lowland arable series also has fences most commonly but with a high proportion of hedges and water - perhaps surprisingly, as it is often considered that the arable areas have a lower number of hedgerows.

Section 5 ends.

Table 17 Distribution of the boundary plot types (B plots) within the 4 Land Class groups defined in section 5.7.

Land Class Group	Hedge	Fence	Wall	Water	Grass Strip	Bank	Verge	Other	Total
Lowland Arable	200	265	39	127	24	15	79	8	757
Lowland Grass	168	333	82	47	12	43	23	10	718
Marginal Upland	18	126	51	8	0	2	5	1	211
Upland	0	85	28	6	0	0	2	0	121
Total GB	386	809	200	188	36	60	109	19	1807

6. DISTRIBUTION OF SPECIES

"Maps showing the distribution of selected species of particular interest will be included"

6.1 Figures 4-14 are to demonstrate the ability of the survey to show distributions of (a) a particular type, the hedges, Figure 4 and (b) Figures 5-14 different species. These are only presence or absence data and the species were selected arbitrarily to cover a range of distribution types throughout GB.

6.2 The potential of this mapping routine is to show the distribution of species habitats, species cover and changes throughout GB. As well as straight distribution these cover values can be contoured to show concentrations of ranges not only on an individual square basis but also on a Land Class basis to smooth the distribution patterns.

Section 6 ends.

Figure 4 Distribution of the 1 x 1 km squares containing hedgerows in the 508 1 x 1 km squares surveyed in Great Britain.

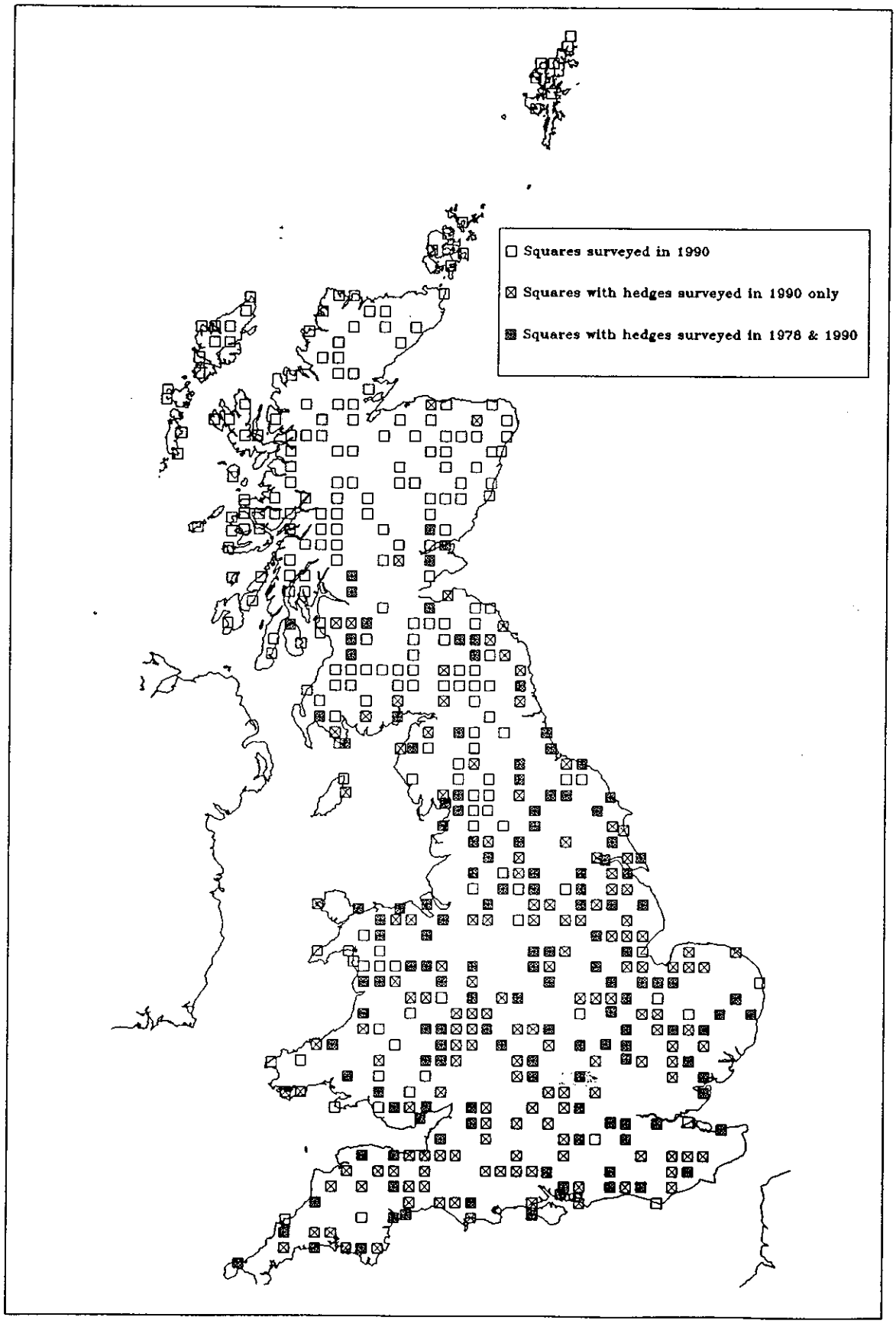


Figure 5 Distribution of the 1 x 1 km squares containing *Alopecurus myosuroides* in the 508 1 x 1 km squares surveyed in Great Britain.

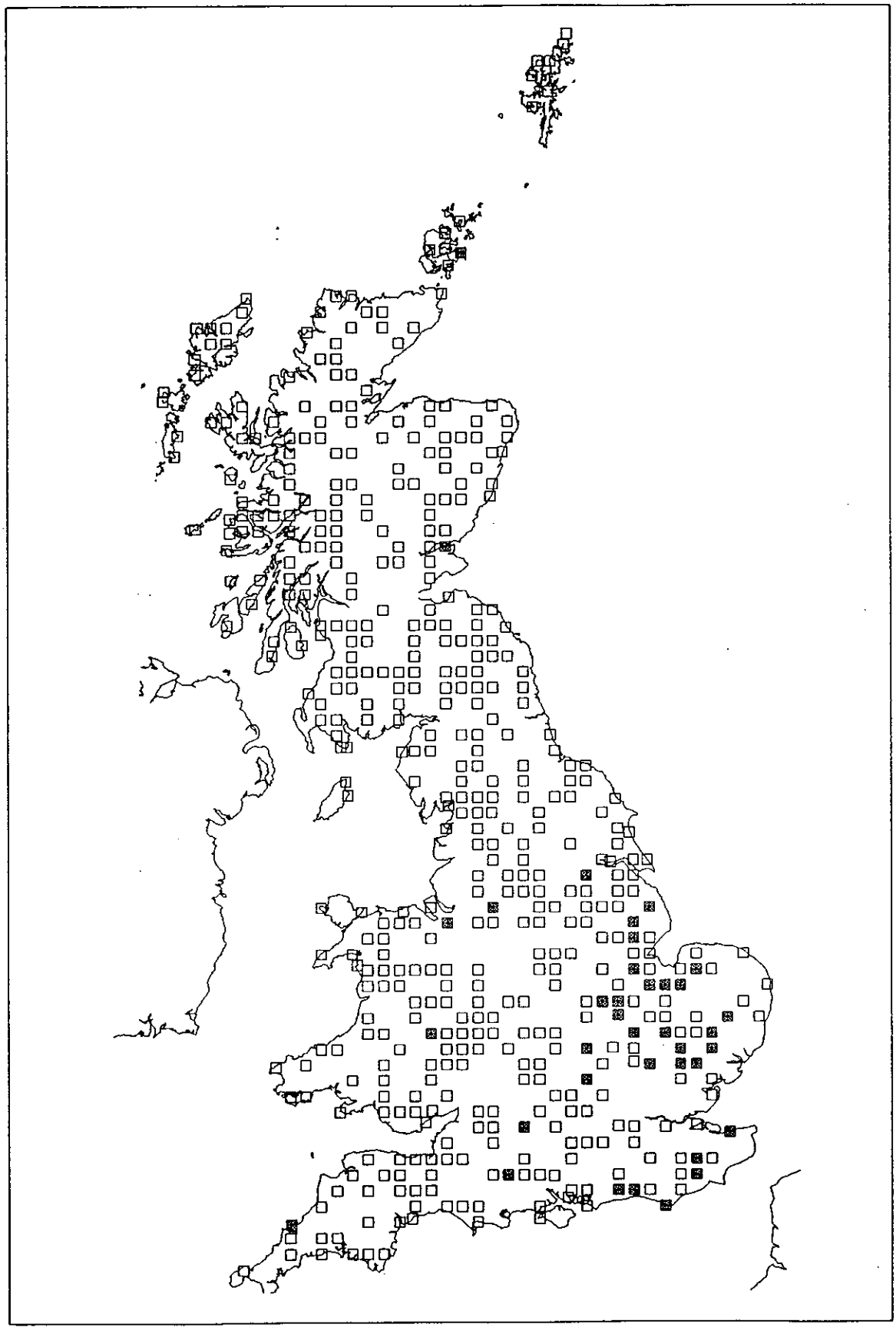


Figure 6 Distribution of the 1 x 1 km squares containing *Lolium perenne* in the 508 1 x 1 km squares surveyed in Great Britain.

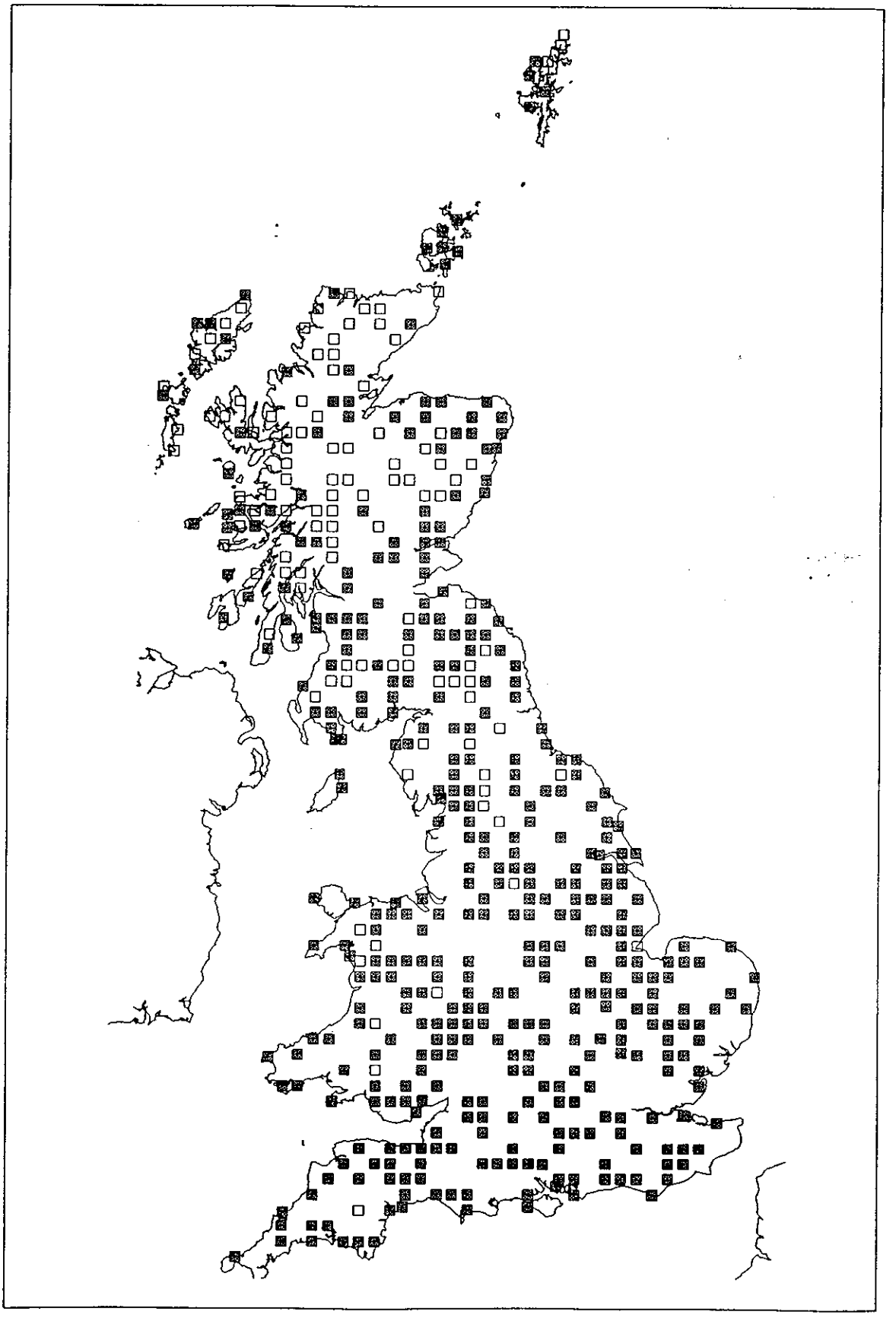


Figure 7 Distribution of the 1 x 1 km squares cotaining *Anthricus sylvestris* in the 508 1 x 1 km squares surveyed in Great Britain.

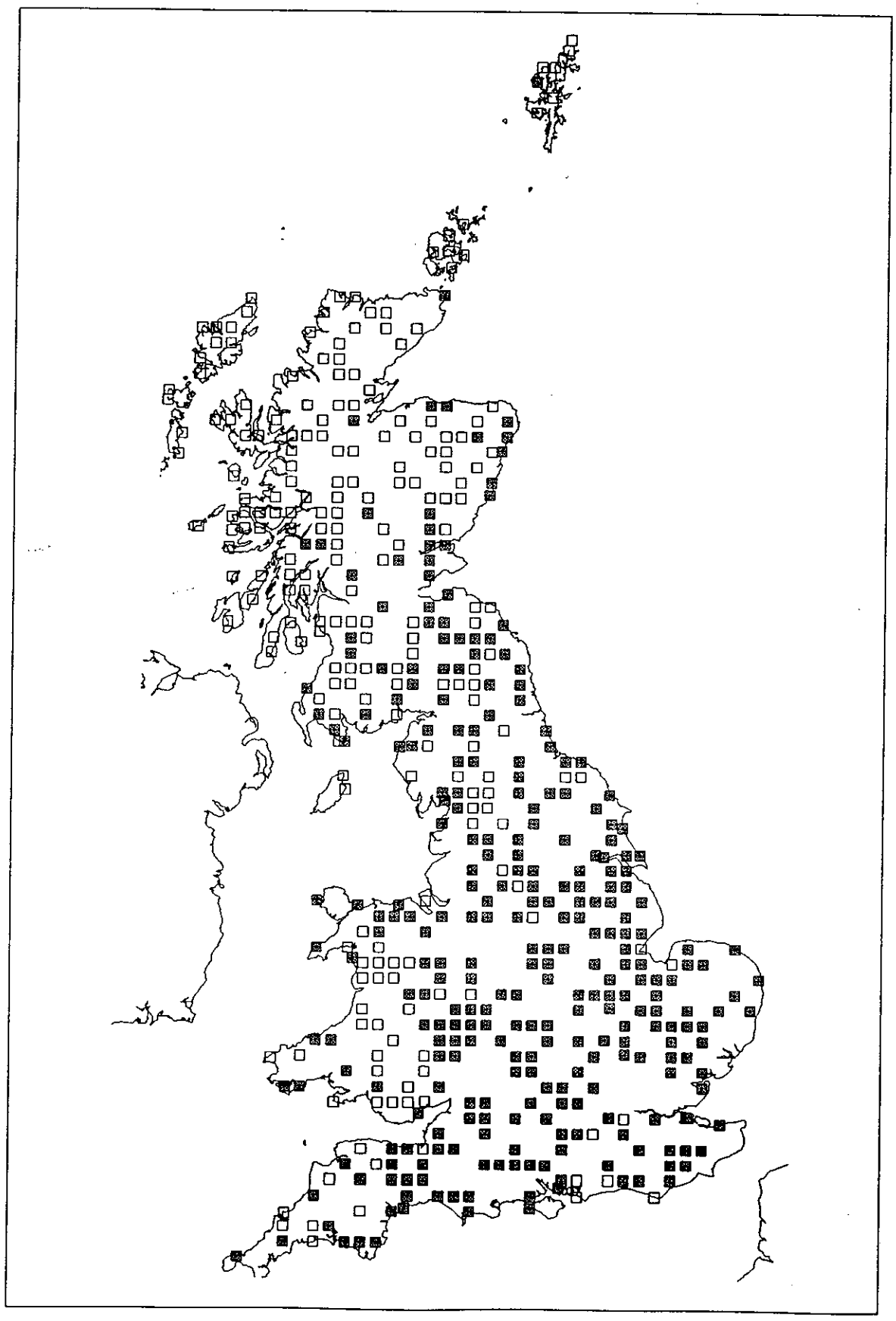


Figure 8 Distribution of the 1 x 1 km squares containing *Cerastium fontanum* in the 508 1 x 1 km squares surveyed in Great Britain.

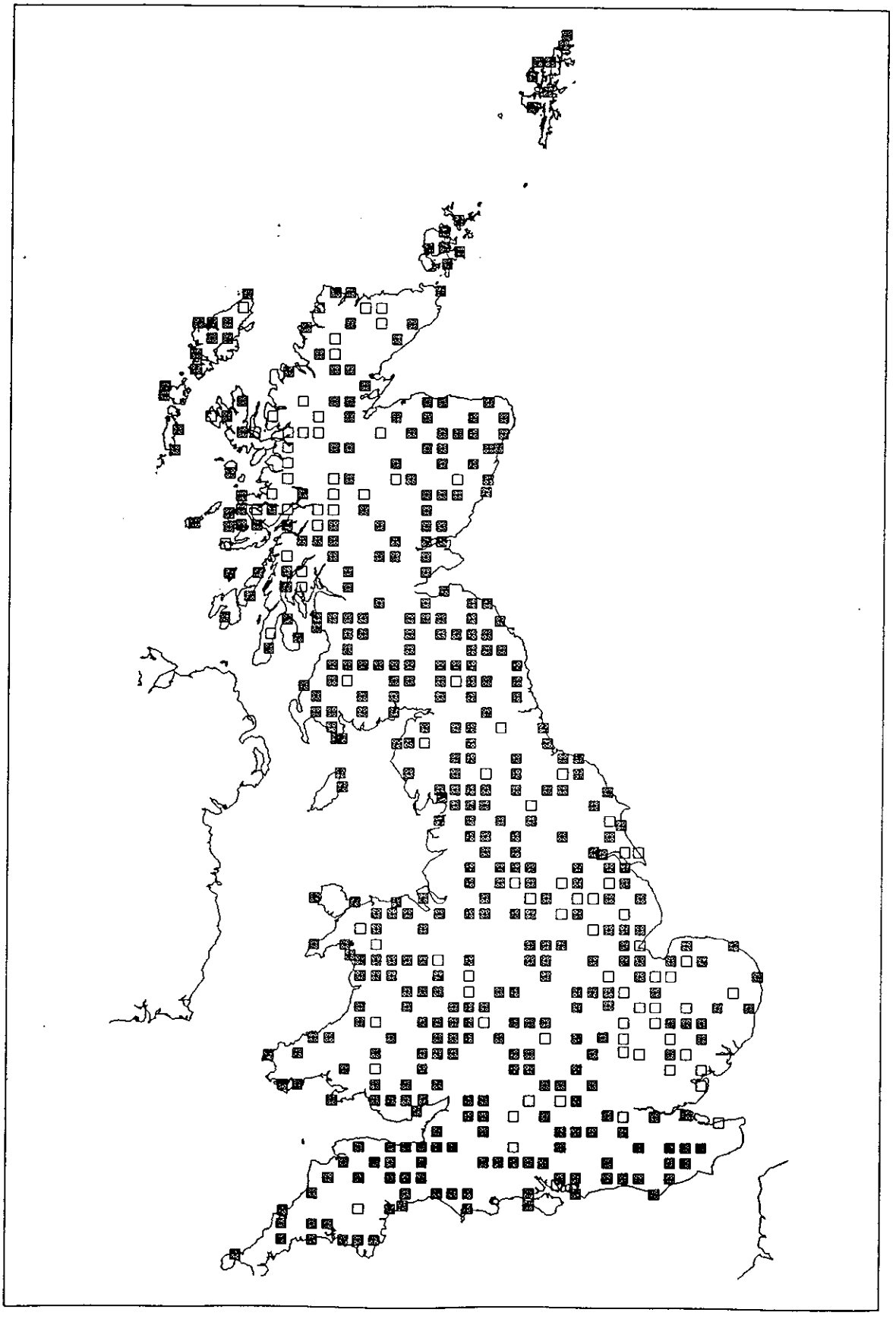


Figure 9 Distribution of the 1 x 1 km squares containing *Heracleum sphondylium* in the 508 1 x 1 km squares surveyed in Great Britain.

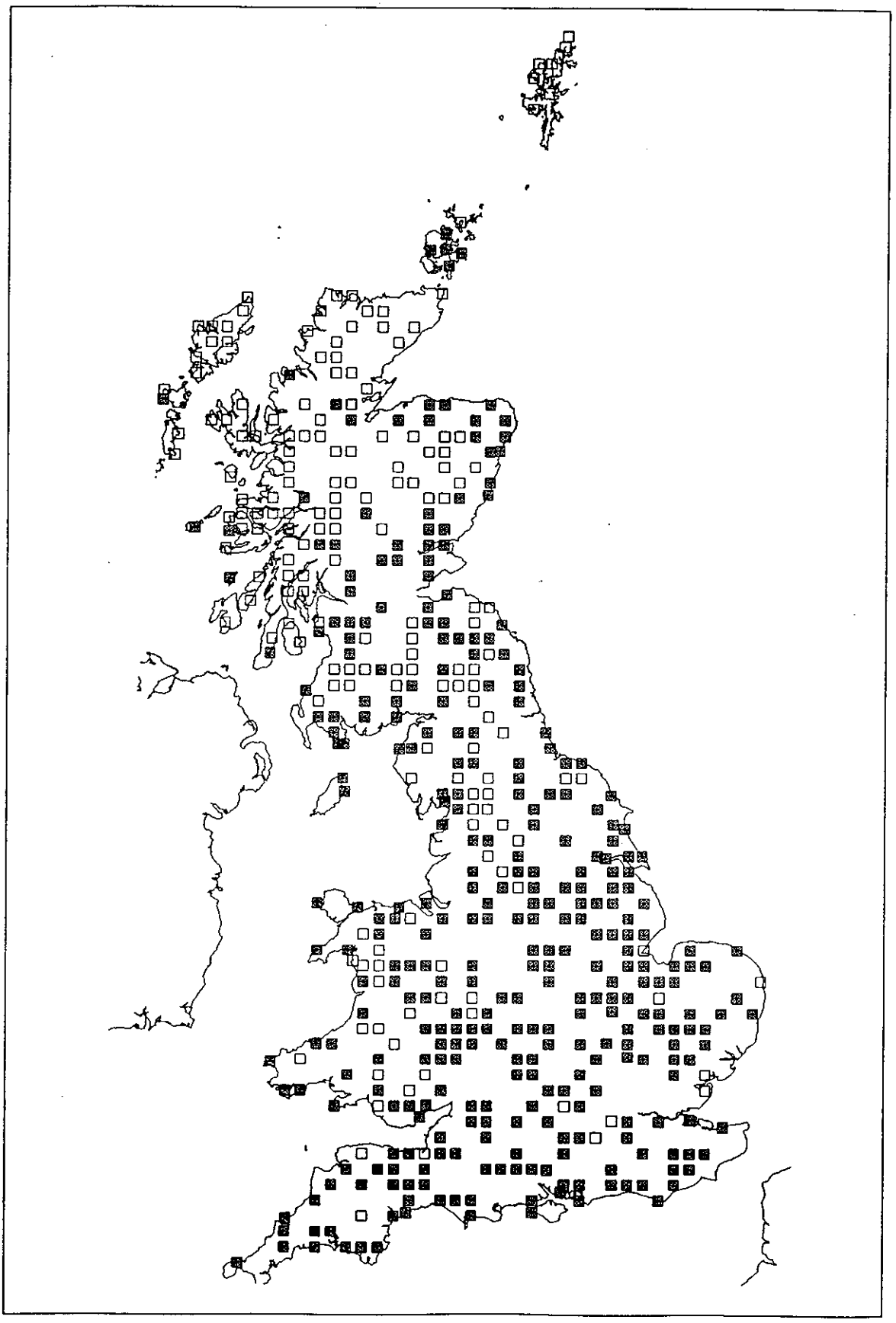


Figure 10 Distribution of the 1 x 1 km squares containing *Deschampsia flexuosa* in the 508 1 x 1 km squares surveyed in Great Britain.

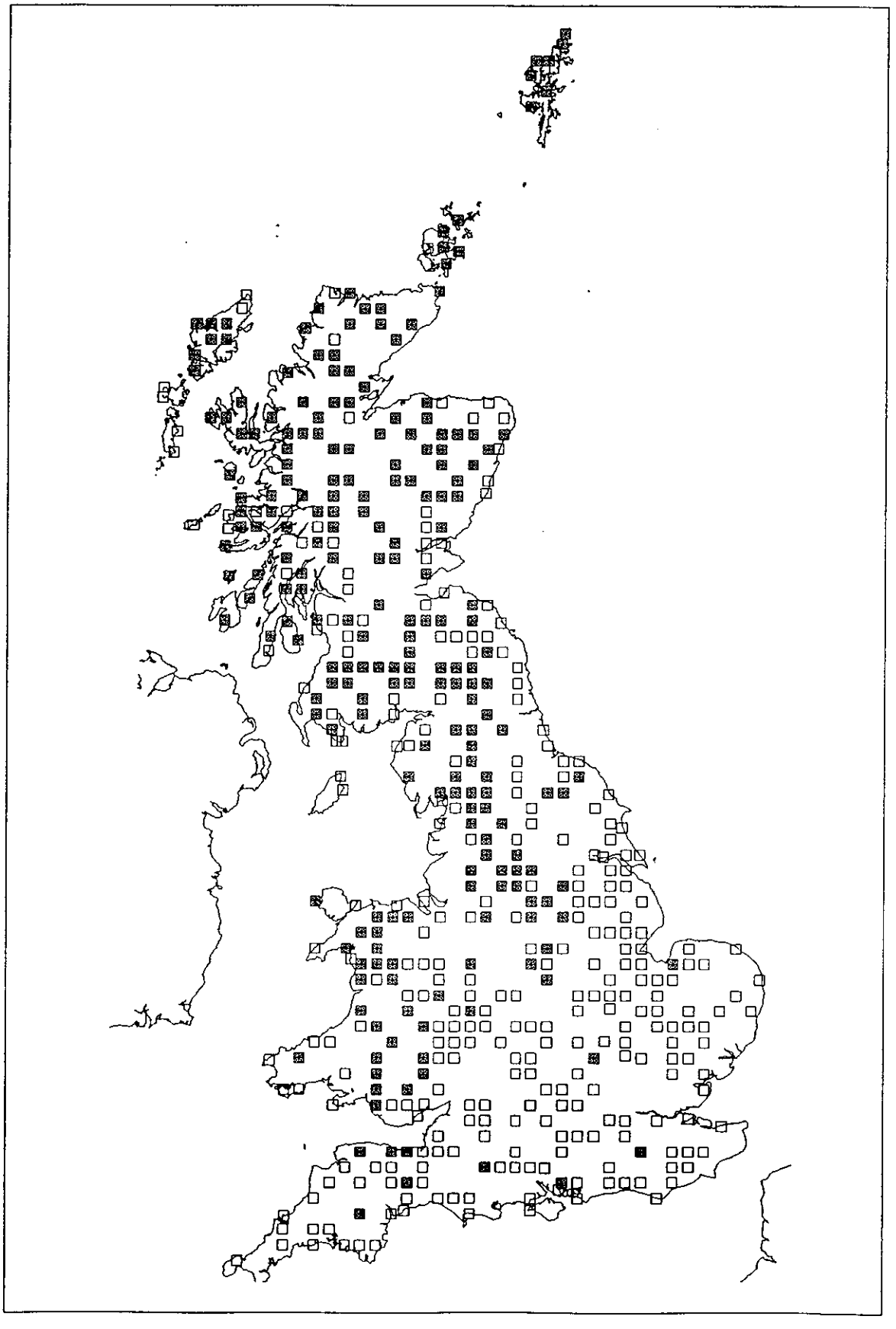


Figure 11 Distribution of the 1 x 1 km squares containing *Potentilla erecta* in the 508 1 x 1 km squares surveyed in Great Britain.

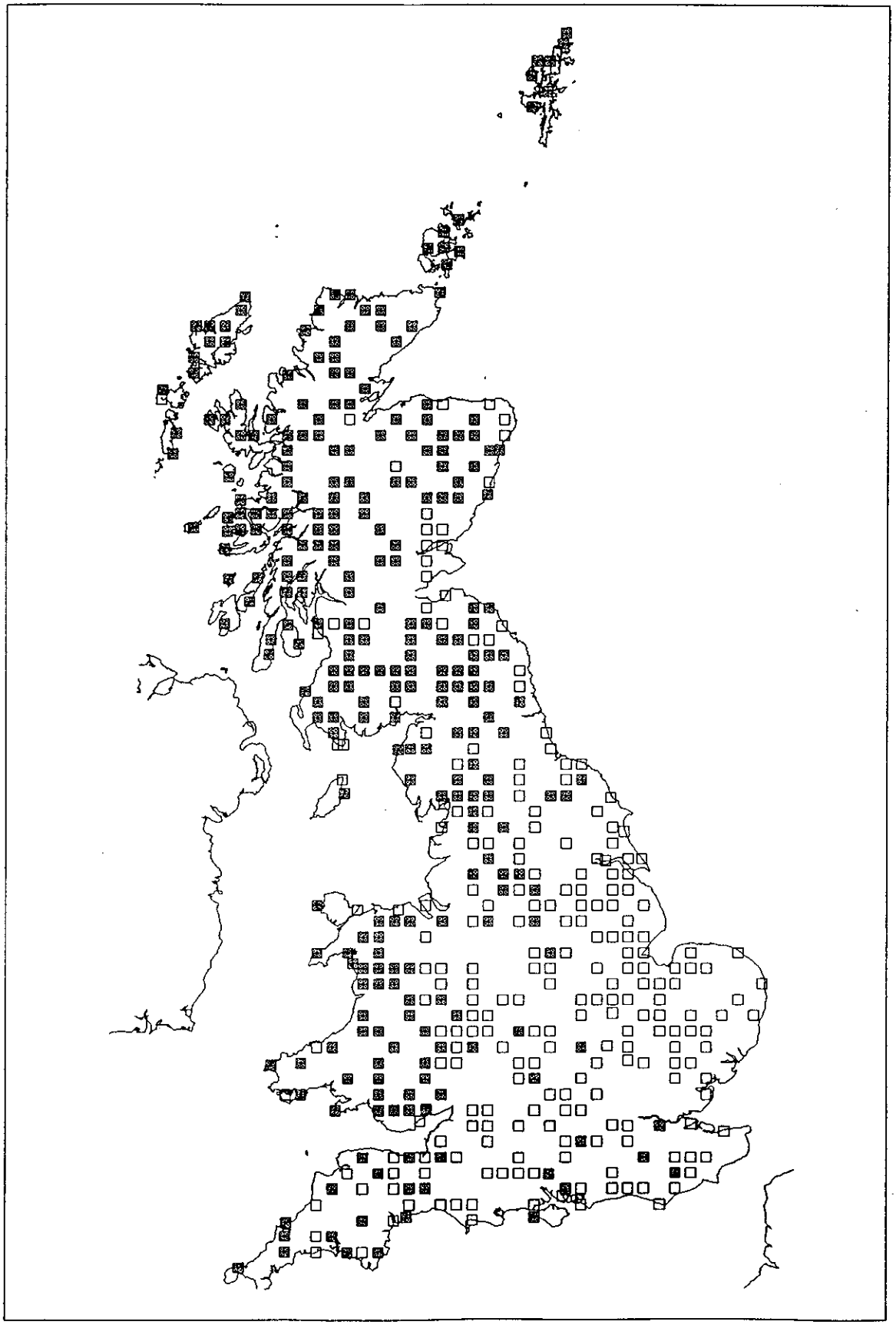


Figure 12 Distribution of the 1 x 1 km squares containing *Eriophorum vaginatum* in the 508 1 x 1 km squares surveyed in Great Britain.

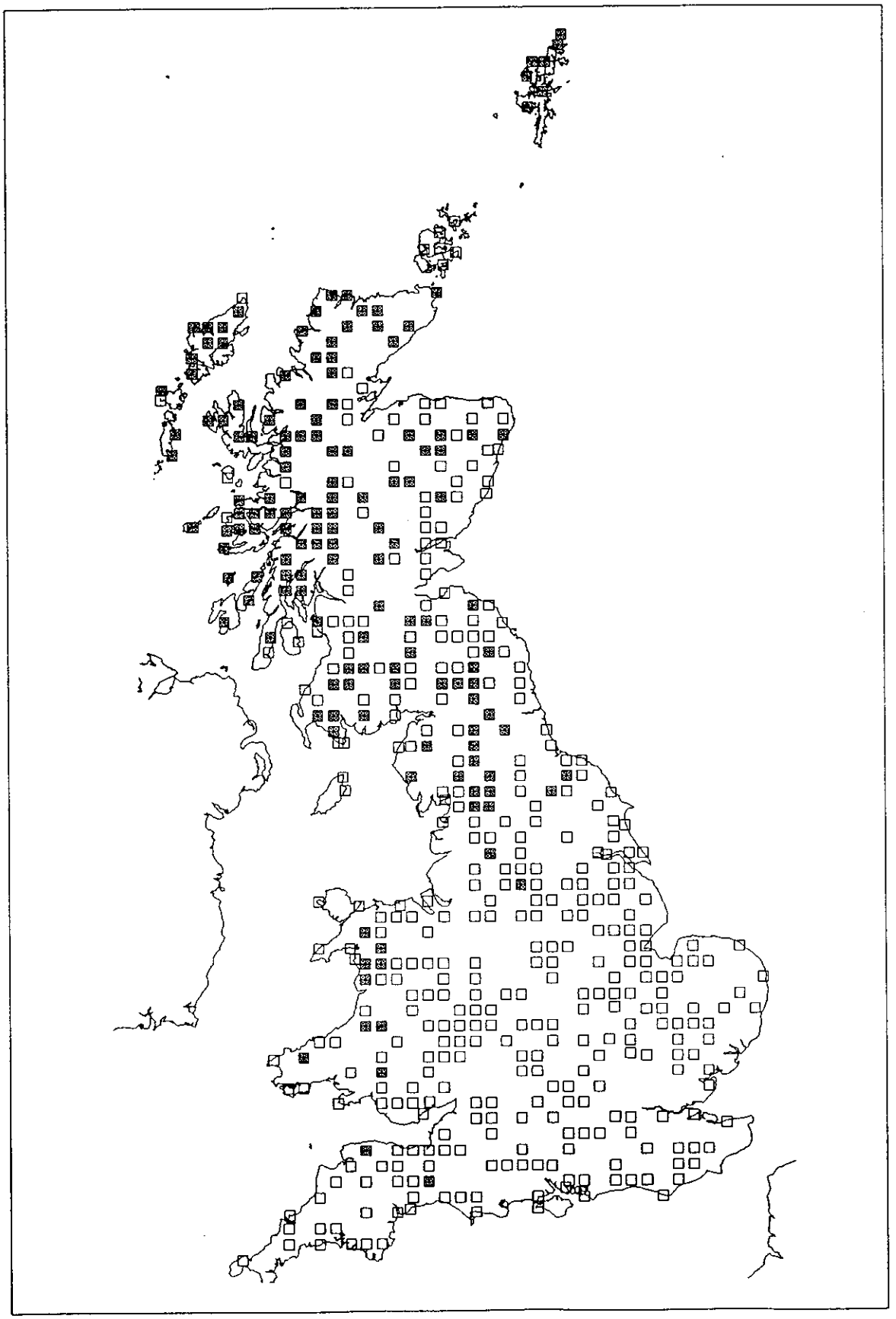


Figure 13 Distribution of the 1 x 1 km squares containing *Juncus squarrosus* in the 508 1 x 1 km squares surveyed in Great Britain.

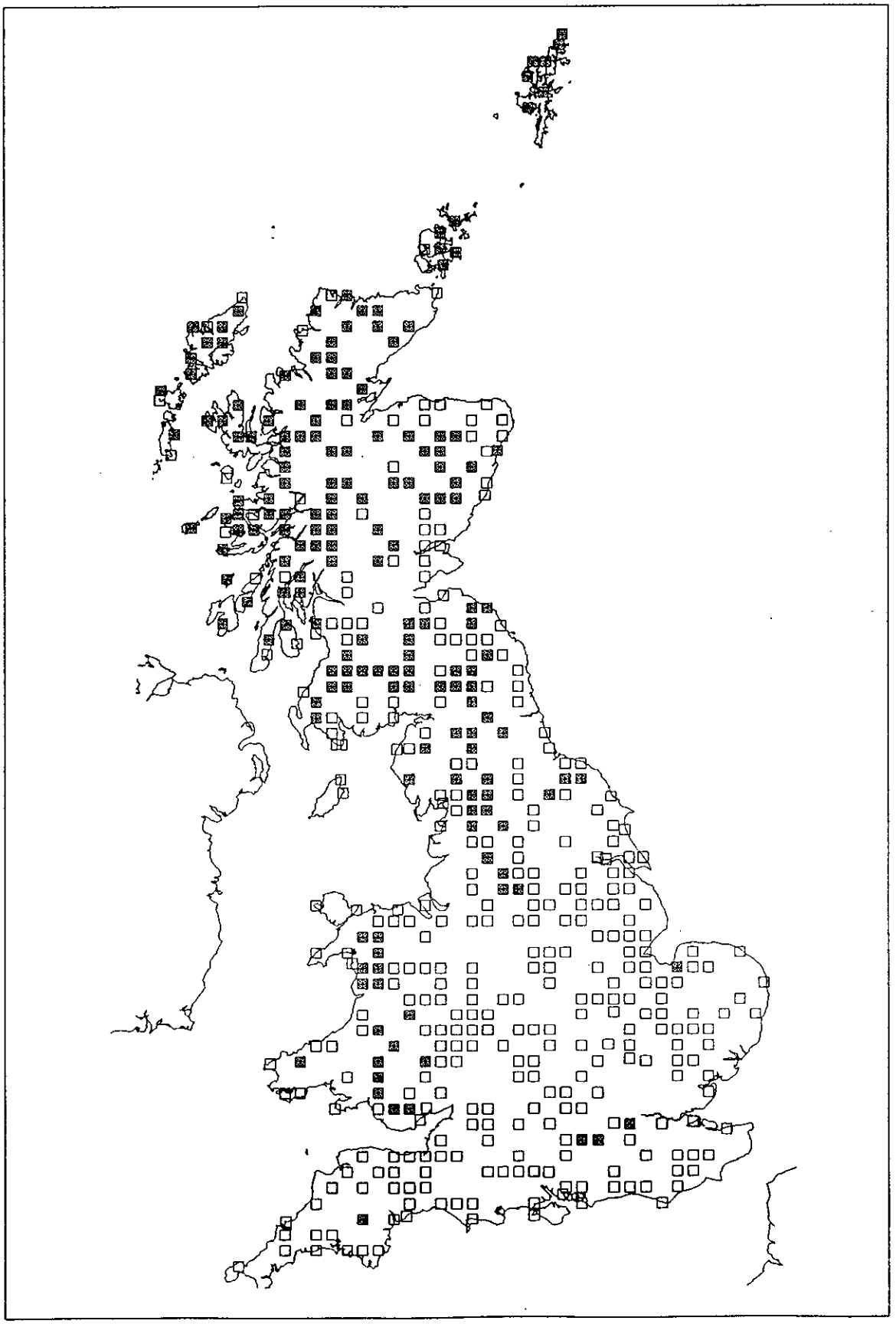
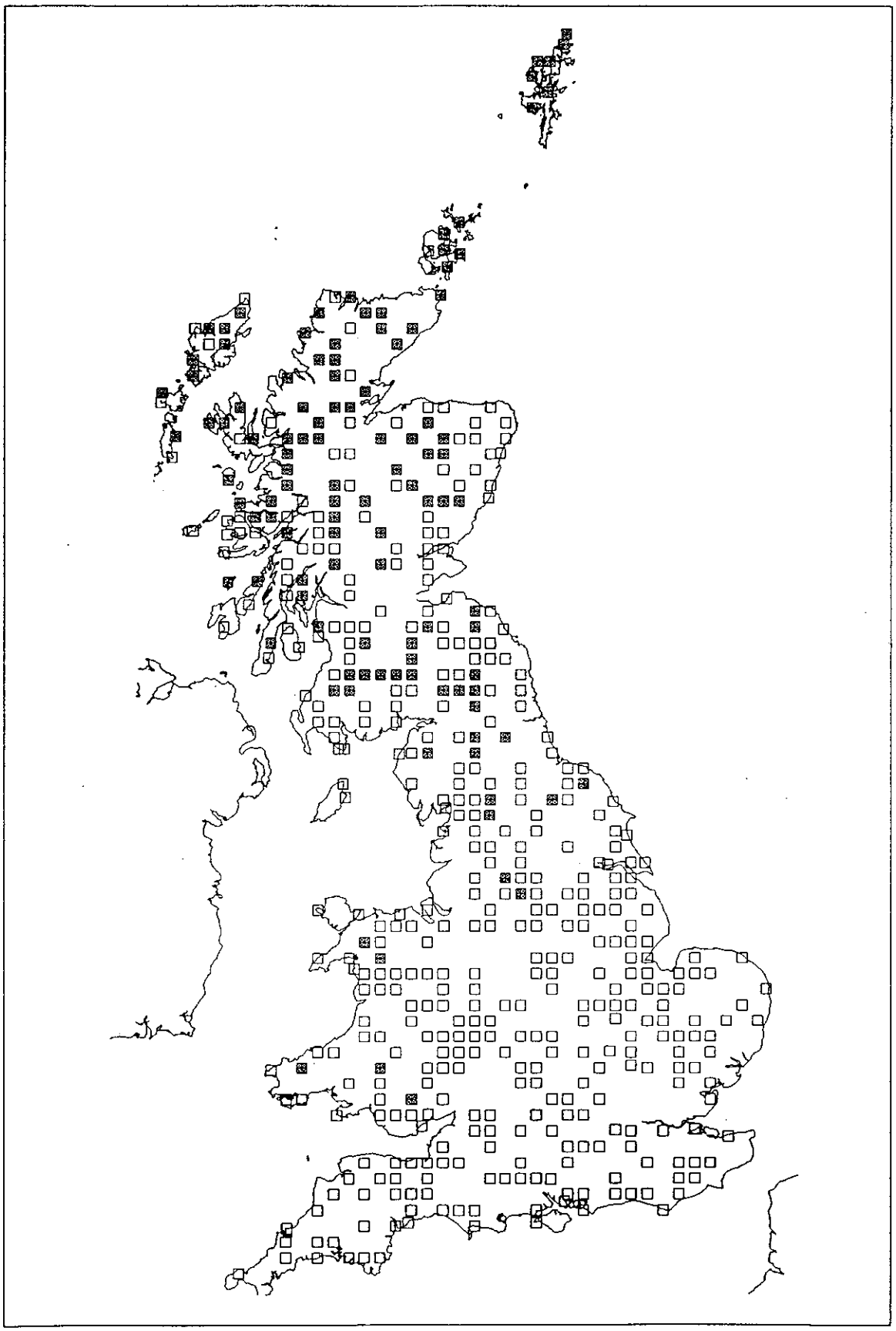


Figure 14 Distribution of the 1 x 1 km squares containing *Empetrum nigrum* in the 508 1 x 1 km squares surveyed in Great Britain.



7 PATTERN OF VEGETATION TYPES IN VERGES

"Include a much fuller analysis of the pattern of vegetation types"

7.1 The species that are recorded by the quadrats are associated with each other in different ways. In recent years many techniques of computer analysis have been developed to determine the groupings present and their associated gradients. This section applies two of the most widely used techniques for such analyses, TWINSPAN, which classifies the quadrats into groups, and DECORANA, which analyses the main gradients. More recent techniques will be applied but results are presented in order to show the main types of analysis involved.

7.2 Figure 15 shows a TWINSPAN classification of the 746 verge plots that were surveyed in 1978 and repeated in 1989. The numbers at each division of the hierarchy in bold type are total number of plots, the smaller figures above are, on the left, the number of plots in that group in 1978 and on the right the number of plots in that group in 1990. At the higher levels of the hierarchy there is little difference between the two groupings suggesting that the situation is relatively stable in overall numbers. However, these are the gross movements and could well, if examined plot by plot, show much greater variation because plots may be moving from one class to another in both directions.

7.3 At the lower levels some greater discrepancies are seen, notably in Group 1 where there is a tendency towards woodland formation. Some of the other divisions need further investigation to interpret the division. The main separation at the highest level is between the lowland verges dominated by aggressive species such as *Dactylis* and *Heracleum* as opposed to the acidic upland verges. The next division on the lowland side separates those plots that have more shade-tolerant species such as *Hedera* and *Galium* as opposed to those typical of mesotrophic grasslands. The next division shows further separations, largely probably accordingly to management.

Section 7 continues ...

7.4 Figure 16 shows the TWINSPAN hierarchy for all 2313 verge plots. The major divisions of the two classifications are very similar and suggest that a high level the pattern of roadside verges in Britain has a comparable degree of division and suggests a stability. This classification presents all the information and will be the most useful in assigning roadside plots to the classification framework and for examining the distribution of these types throughout GB. However, for change purposes, the hierarchy involving only those plots repeated is more likely to be interpretable in that with a wider number of plots some outside the original range may be included which could lead to difficulties in interpretation.

7.5 The TWINSPAN approach is useful in dividing up the variation and in examining the major patterns in vegetation. This process will be repeated for the other types of vegetation, ie hedges, streamsides, boundary plots and the main plots for vegetation from the targetted and random points.

Section 7 continues ...

Figure 15 TWINSPAN classification of the 746 verges (R plots) surveyed in 1978 and 1990. Divisions were terminated if less than 20 plots were split off.

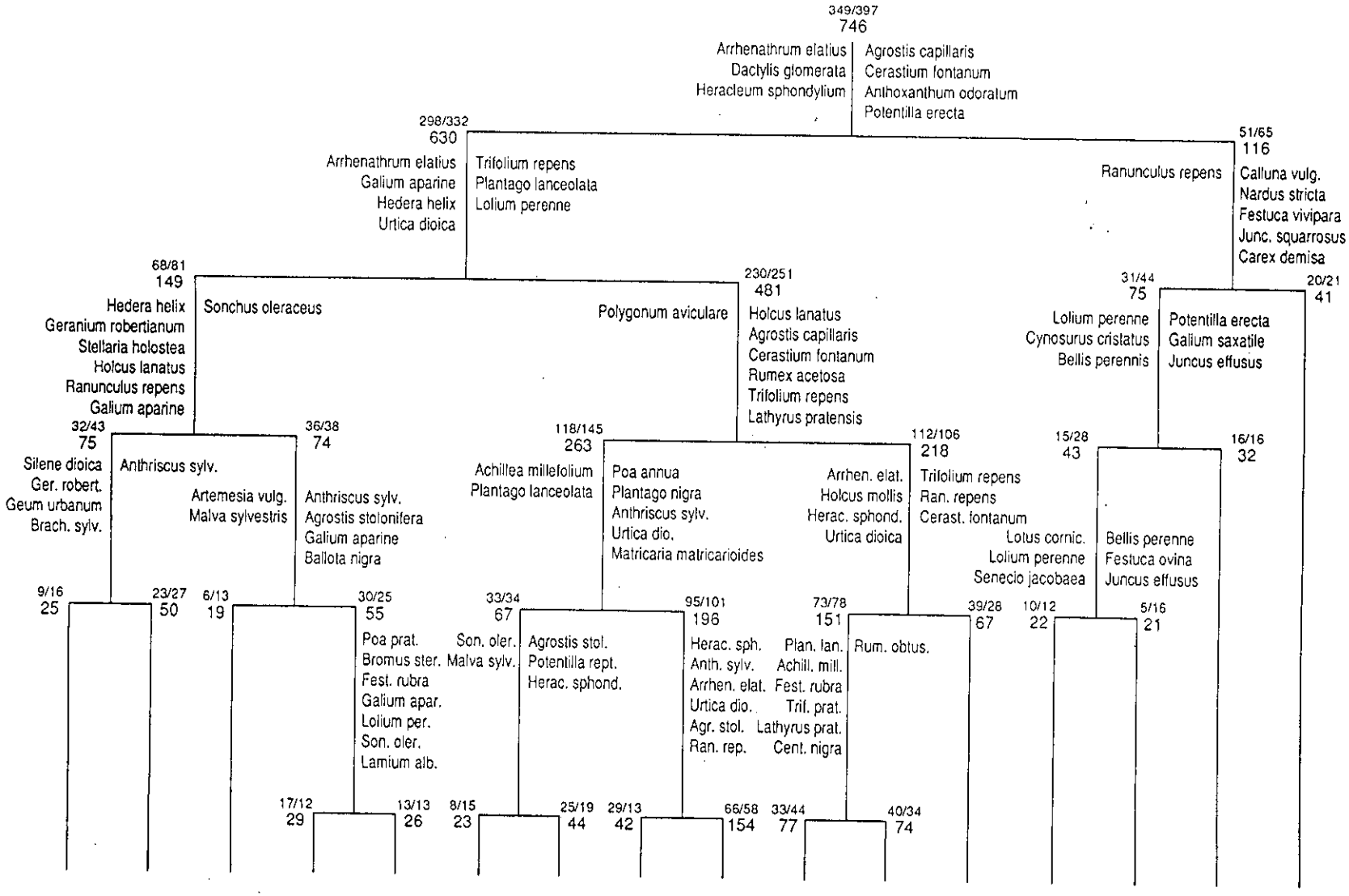
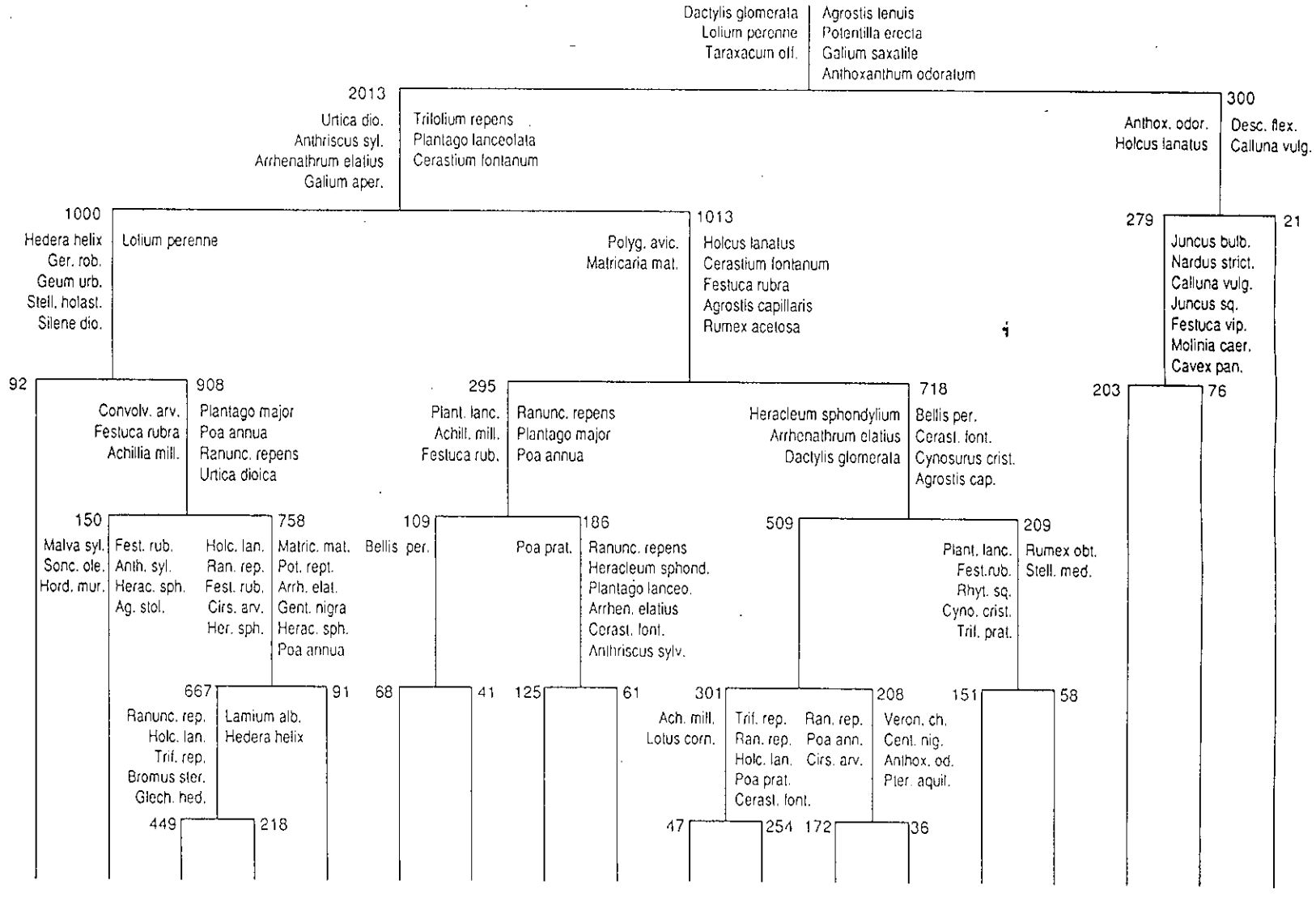


Figure 16 TWINSPAN classification of all 2313 verges (V & R plots) surveyed in both 1978 and 1990. Divisions were terminated if less than 40 plots were split off.



7.6 Table 18 shows the species at either extreme of the axes of the DECORANA analysis of the 2313 verge quadrats. The principal species on the first 3 axis are identified to demonstrate the gradients involved. These gradients are interpretable in environmental factors and these are given in this table. This approach enables samples to be assigned to positions on the gradient but, more importantly, enables changes along those gradients to be assessed. Thus, in axis 1 can be interpreted in terms of eutrophication and this is likely to be a major factor.

Section 7 continues ...

Table 18 Species at either end of the 3 main axes of the DECORANA analysis, together with an environmental interpretation of the factors associated with the vegetation axes.

	AXIS 1	AXIS 2	AXIS 3
	Upland	Shaded	Dry
High scores	Northern	Calcareous	Calcareous
	Oligotrophic		Grassland
	Loiseleuria procumbens	*Daphne laureola*	*Sanguisorba minor*
	Empetrum nigrum	*Milium effusum*	*Helianthemum cham.*
	Eriophorum angustifolium	*Carex sylvatica*	*Briza media*
	Hordeum murinum	*Papava rhoeas*	*Senecio aquatica*
	Lamium album	*Veronica polita*	*Veronica beccabunga*
	Ballota nigrum	*Avena fatua*	*Cardamine amara*
	Malva sylvatica	*Veronica agrestis*	*Glyceria fluitans*
	Lowland	Open	Wet
Low scores	Southern	Disturbed	Acidic/neutral
	Eutrophic		Ditchsides

4.10 Table 6 lists those species that occur in 16 - 100 10x10 km squares in

7.7 A further comparison of the DECORANA analysis of all 2313 road plots with the analysis of plots only surveyed in 1978 and 1990 showed that the first axis was highly correlated with 8 out of 10 species at one extreme of the gradient being the same. The second and third axes differed however showing that the smaller dataset incorporates the risk of individual species having too much influence on the minor axes. It is therefore preferable to use the whole analyses because it is likely to be more stable and reflect more accurately the changes along the gradient of the sample plots. The comparison of DECORANA scores between 78 and 90 can be used to indicate the direction of change that is taking place. A subset of 32 quadrats was taken to demonstrate the potential of this approach; 18 showed a decline in first axis scores suggesting eutrophication as they were moving down the gradient towards the eutrophic end.

7.8 A comparable analysis was carried out to that of Table 7. Species that occurred in more than 5% of quadrats were examined and those that had declined or increased by more than 2% presented in Table 19.

7.9 More species declined that increased and those species were concentrated on those groups that had meadow and mesotrophic species as opposed to those with mainly weed species present.

Section 7 continues ...

Table 19 Species that occurred in more than 5% of the verge plots and had changed over 2% between 1978 and 1990 and their occurrence in species groups determined by Ward's mineral variance on the first five DECORANA axis scores from 1978 data. Brief descriptions of the groups are provided together with two typical species.

Species group	Number of spp Incr.	Decr.	Description
1	-	-	**Bog**, eg bogbean, sundew
2	-	-	**Bog/moorland**, eg deergrass, bog asphodel
3	-	-	**Moorland/bog**, eg heather, purple moor grass
4	-	1	**Upland flush/upland grassland**, eg devil's bit scabious, tormentil
5	-	-	**Moorland/bog**. eg mat-grass, marsh violet
6	-	1	**Moorland grassland/upland grassland**, eg bilberry, wavy hair grass
7	-	1	**Upland grassland**, eg mountain fern, heath bedstraw
8	-	-	**Upland scrub/upland grassland**, eg rowan, golden rod
9	-	-	**Scrub/upland grassland**, eg broom, bracken
10	-	-	**Upland grassland/enriched flushes**, eg sheep's fescue, wild thyme
11	-	1	**Upland flush**, eg sneezewort, marsh thistle
12	-	3	**Upland grassland/upland meadow**, eg bent grass, pignut
13	1	1	**Scrub/woodland**, eg hawthorn, bluebell
14	-	-	**Marshland/meadow**, eg ragged robin, cuckoo flower
15	-	-	**Neutral woodland**, eg hazel, bugle
16	-	1	**Calcareous woodland**, eg wild arum, dog's mercury
17	-	-	**Calcareous scrub/meadow**, eg dogwood, cowslip
18	-	-	**Marshland/moist woodland**, eg canary grass, yellow pimpernel
19	-	-	**Calcareous grassland**, eg salad burnet, rockrose
20	2	2	**Mesotrophic meadow/calcareous meadow**, eg yarrow, quaking grass
21	-	2	**Mesotrophic meadow**, eg bistort, germander speedwell
22	-	1	**Moist meadow**, eg meadowsweet, marsh marigold
23	-	4	**Improved permanent pasture/old pasture**, eg daisy, ox-eye daisy
24	2	1	**Marginal habitats**, eg silverweed, tufted vetch
25	1	2	**Agricultural grassland**, eg rye grass, spear thistle
26	1	3	**Coarse grasslands, marginal habitats**, eg cow parsley, hogweed
27	1	-	**Maritime**, eg thrift, sea plantain
28	-	3	**Weeds, mostly perennial**, eg broadleaved dock, sow thistle
29	1	2	**Marginal habitats**, eg hemlock, butterbur
30	1	3	**Arable weeds**, mainly annuals, eg wild oats, shepherd's purse

7.10 Table 20 presents the species that occurred in over 20% frequency of occurrence between 1978 and 1990. The figures are closely comparable suggesting a high degree of stability between the 2 dates. More species are declining than increasing.

Section 7 ends.

Table 20 Frequency of species that occurred in over 20% of the verge plots in 1978 and 1990.

	1978	1990	Increase/Decrease (+/-)
Achillea millefolium	31.8	25.1	-
Agrostis capillaris	31.5	26.4	-
Anthriscus sylvestris	22.3	31.1	+
Arrhenatherum elatius	42.9	42.6	-
Cerastium fontanum	28.1	23.8	-
Cirsium arvense	22.0	23.0	+
Festuca rubra	37.3	51.4	+
Galium aparine	21.8	17.6	-
Heracleum sphondylium	44.6	39.5	-
Holcus lanatus	46.2	47.0	+
Lolium perenne	65.5	64.3	-
Matricaria matricoides	27.3	16.3	-
Plantago lanceolata	43.7	41.9	-
Plantago major	45.7	45.2	-
Poa annua	51.8	46.8	-
Polygonum aviculare	25.9	28.2	+
Ranunculus repens	35.3	38.8	+
Rumex obtusifolius	23.9	21.7	-
Trifolium repens	45.7	43.8	-
Urtica dioica	37.6	34.4	-

8 SPECIES DISTRIBUTION IN VERGES

"Distribution and abundance of selected species"

8.1 Figures 17-26 are maps showing the geographical distribution, in roadside verges, of species which were identified as indicators in the TWINSPAN analyses. They present contrasting distribution patterns reflecting the main patterns of distribution of verge types in GB. As with the previous distribution patterns presented above these demonstrate the ability of the data to show distribution patterns throughout GB.

Section 8 ends.

Figure 17 Distribution of the 1 x 1 km squares containing *Cenairea nigra* in any verge plots in the 508 squares surveyed in Great Britain.

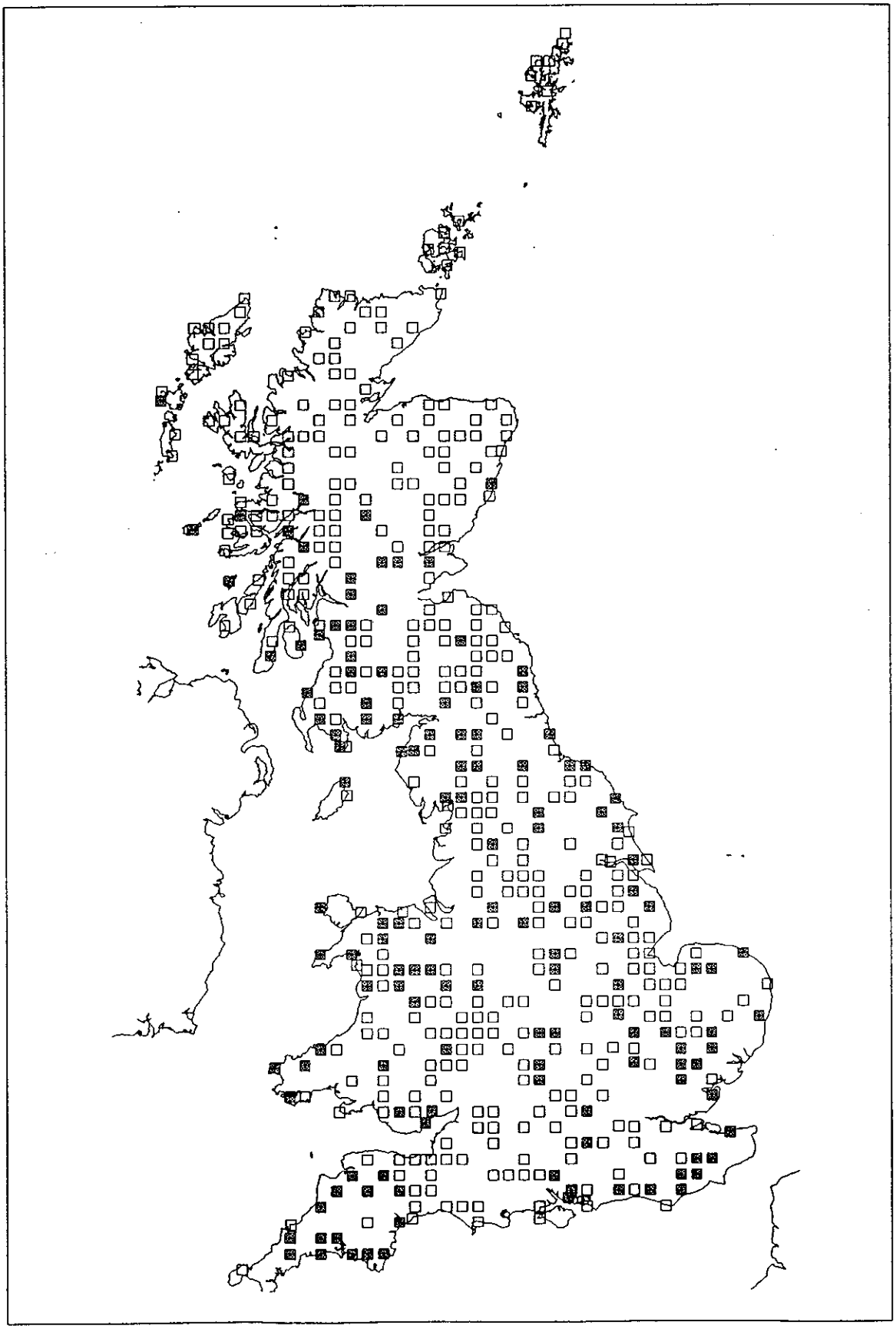


Figure 18 Distribution of the 1 x 1 km squares containing *Achillea millefolium* in any verge plots in the 508 squares surveyed in Great Britain.

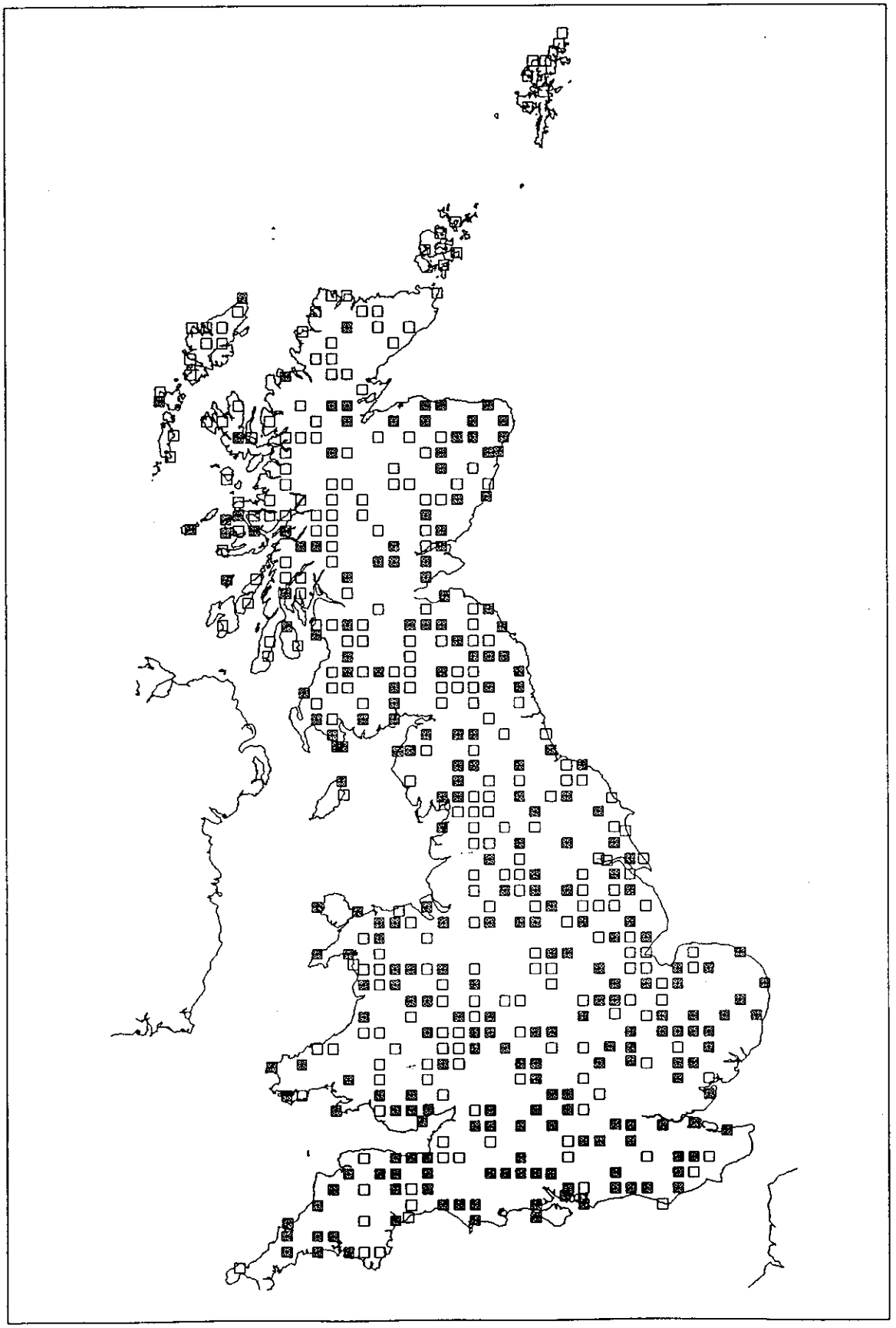


Figure 19 Distribution of the 1 x 1 km squares containing *Urtica dioica* in any verge plots in the 508 squares surveyed in Great Britain.

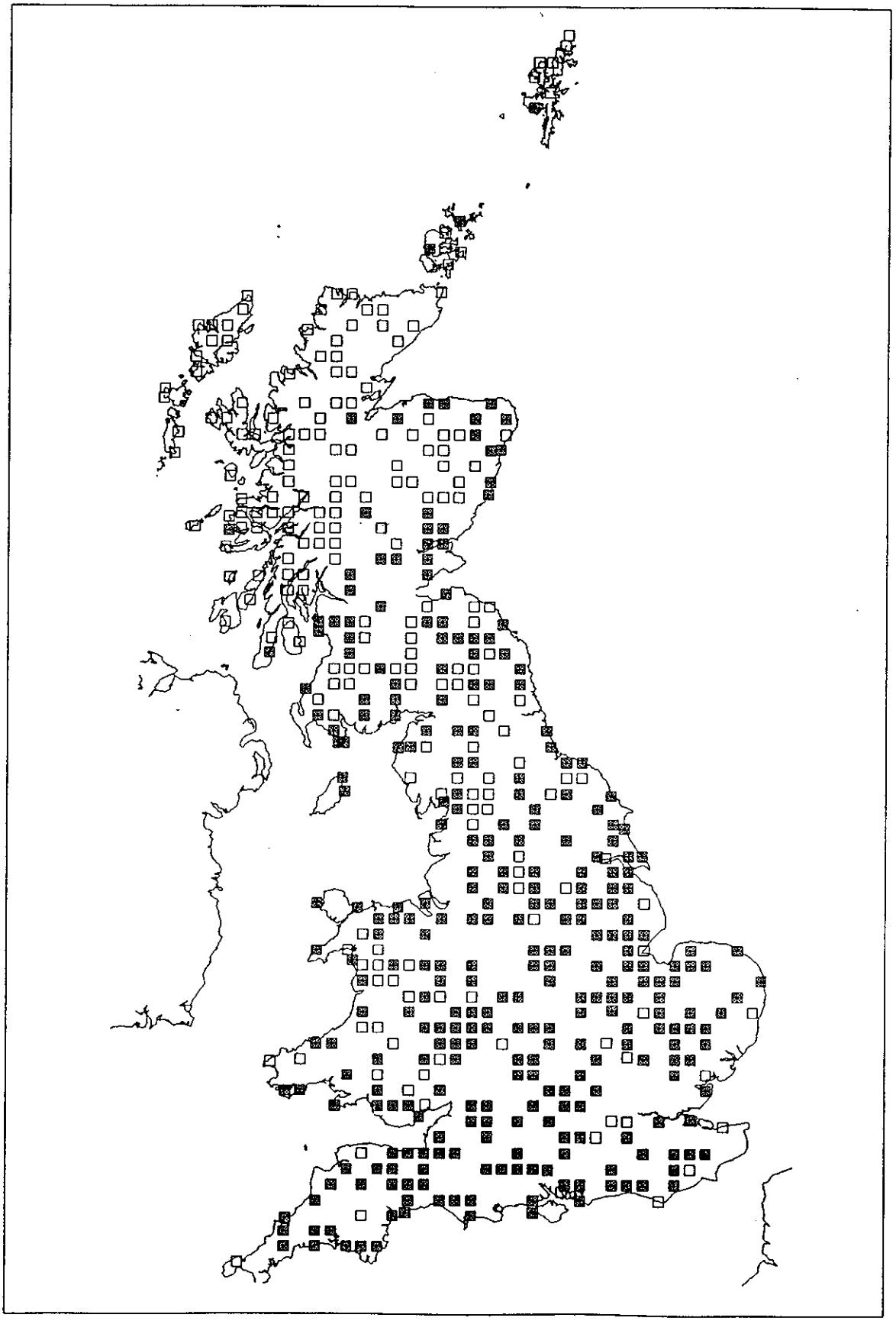


Figure 20 Distribution of the 1 x 1 km squares containing *Trifolium repens* in any verge plots in the 508 squares surveyed in Great Britain.

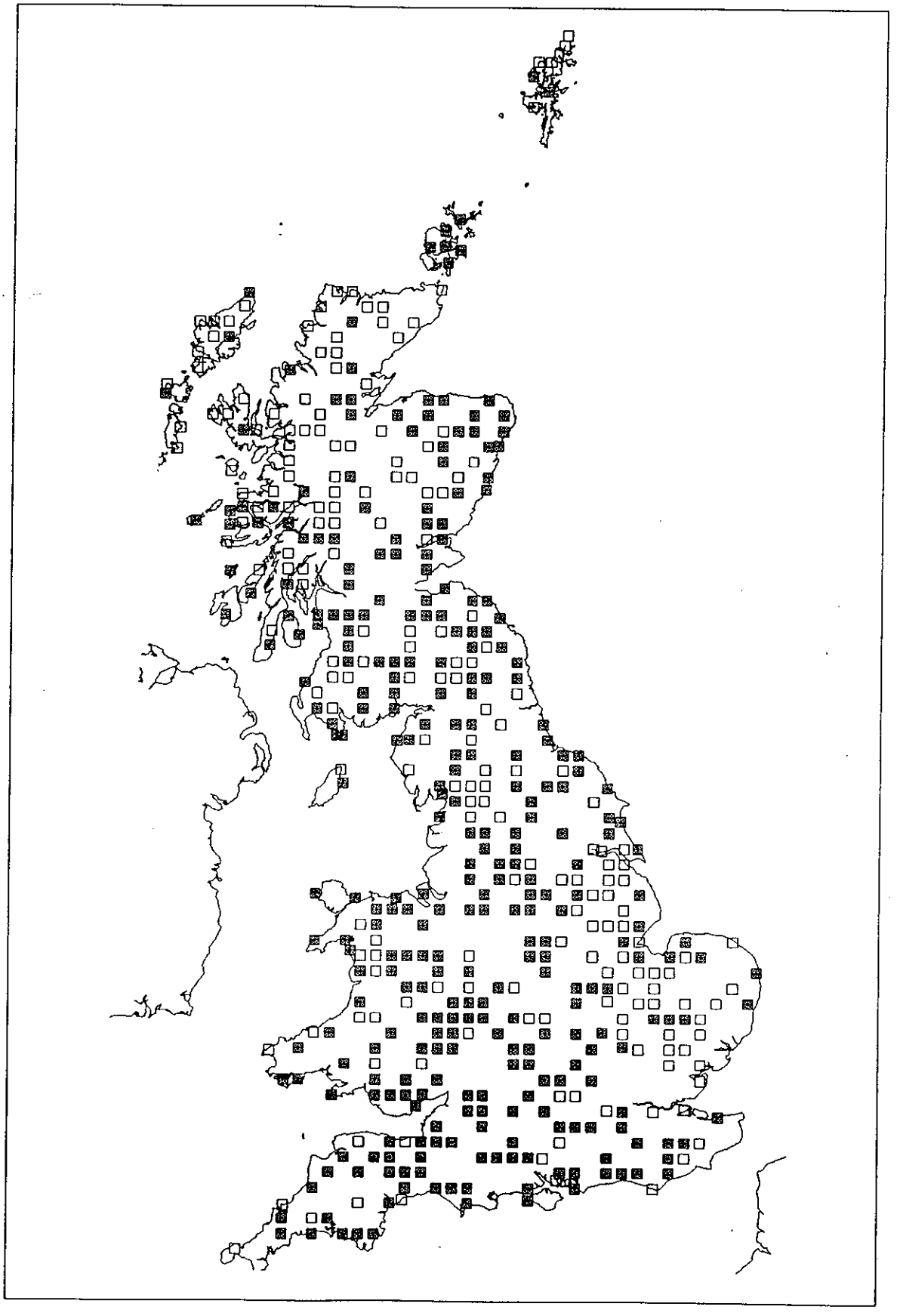


Figure 21 Distribution of the 1 x 1 km squares containing *Calluna vulgaris* in any verge plots in the 508 squares surveyed in Great Britain.

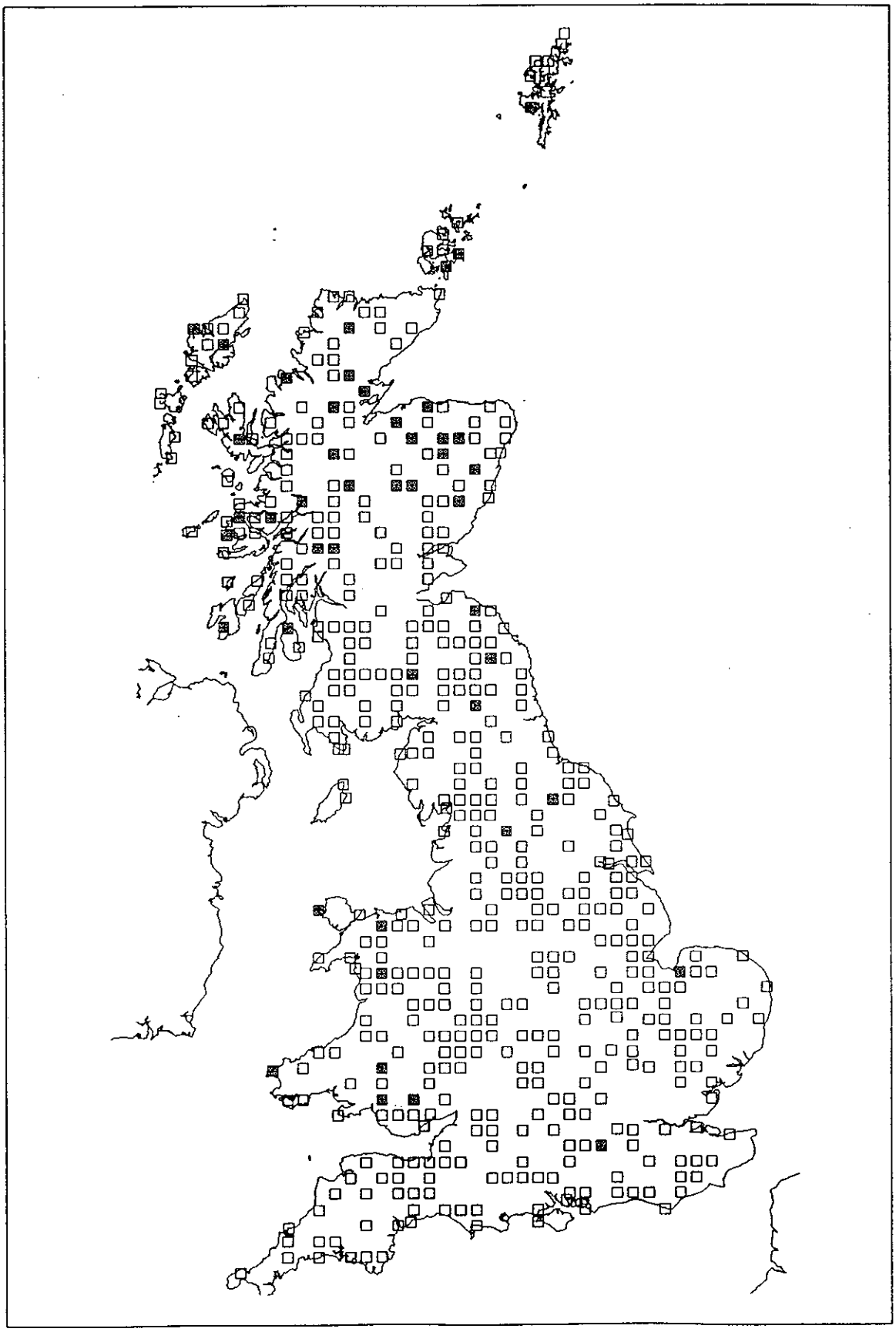


Figure 22 Distribution of the 1 x 1 km squares containing *Galium saxatile* in any verge plots in the 508 squares surveyed in Great Britain.

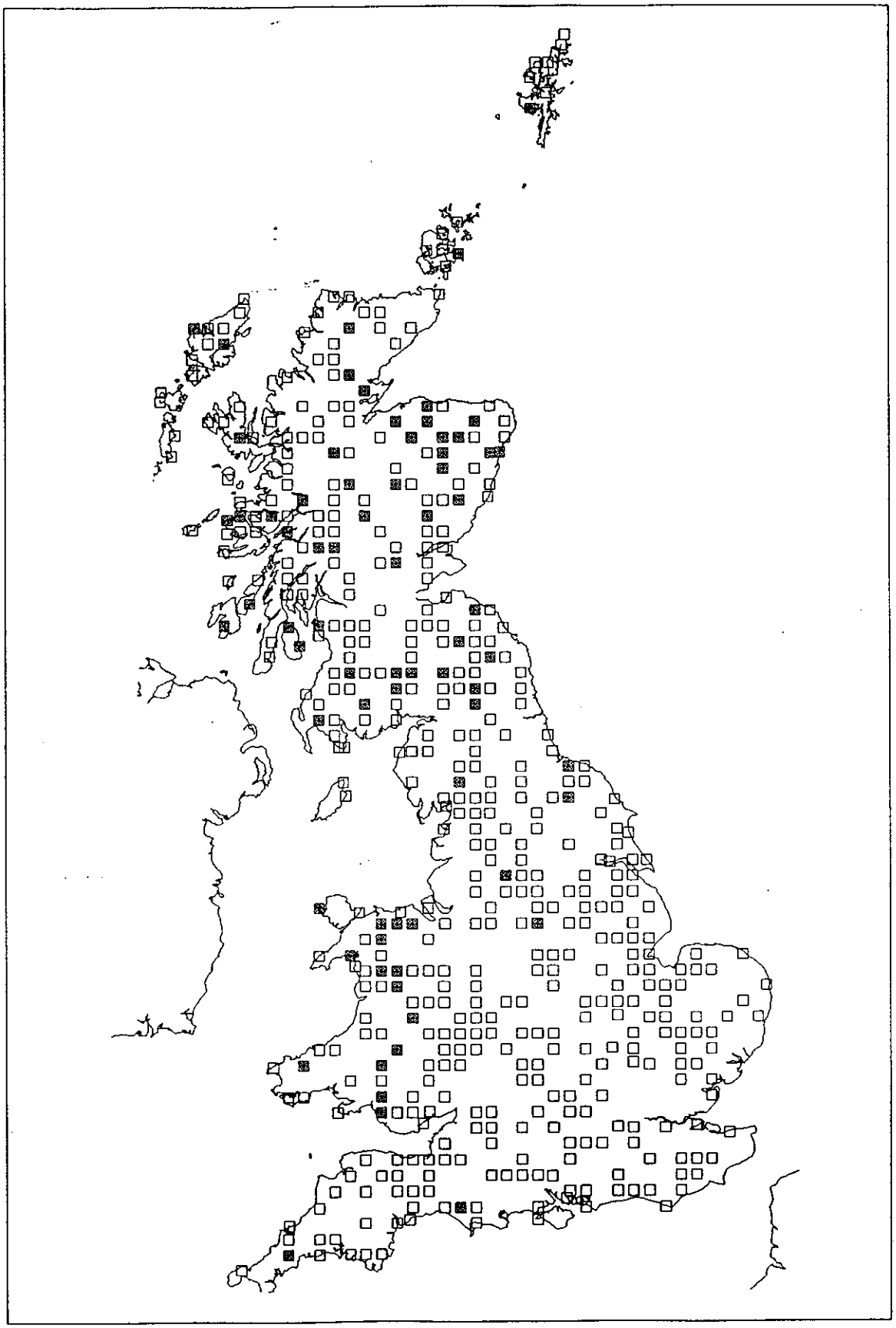


Figure 23 Distribution of the 1 x 1 km squares containing *Trifolium pratense* in any verge plots in the 508 squares surveyed in Great Britain.

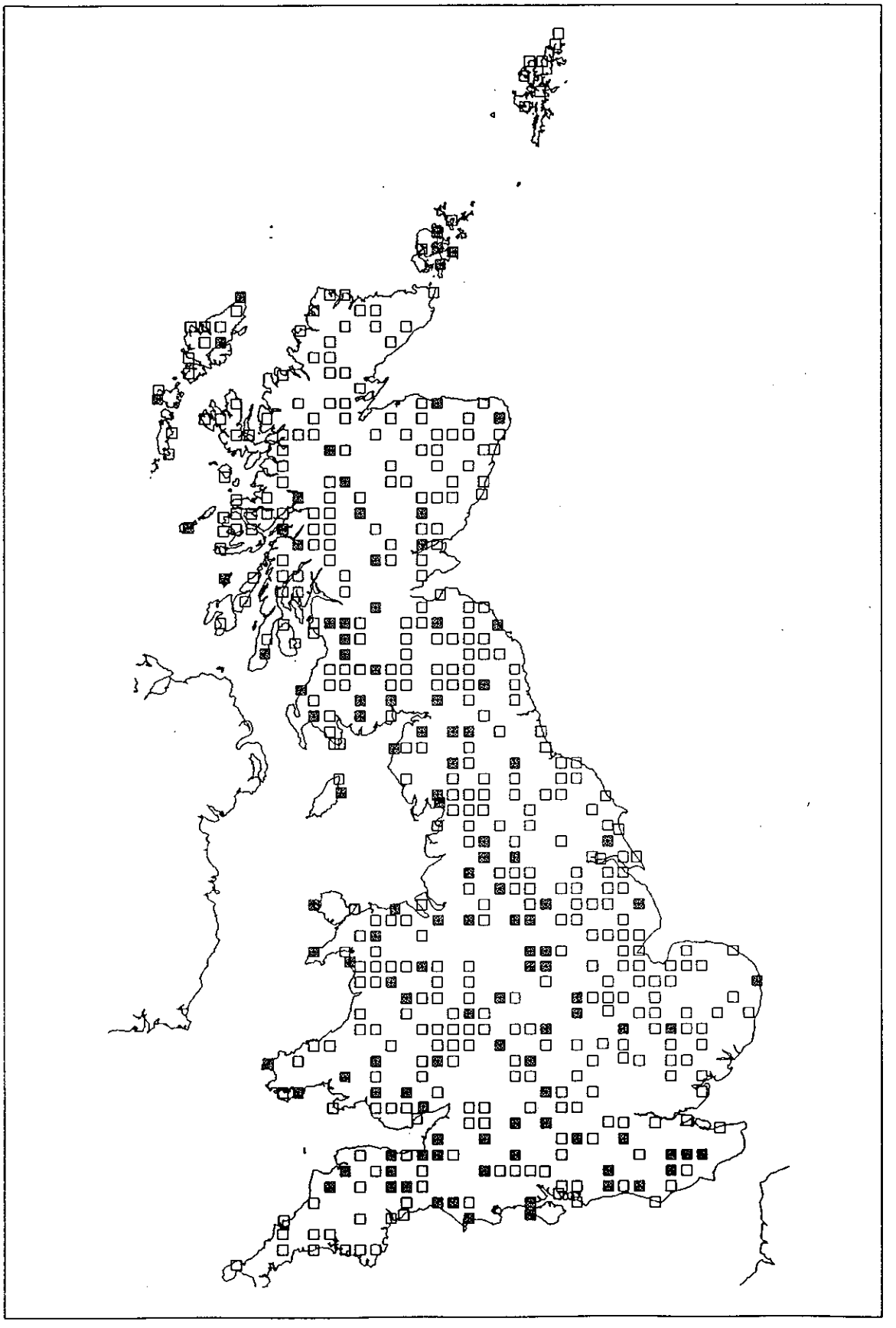


Figure 24 Distribution of the 1 x 1 km squares containing *Lotus corniculatus* in any verge plots in the 508 squares surveyed in Great Britain.

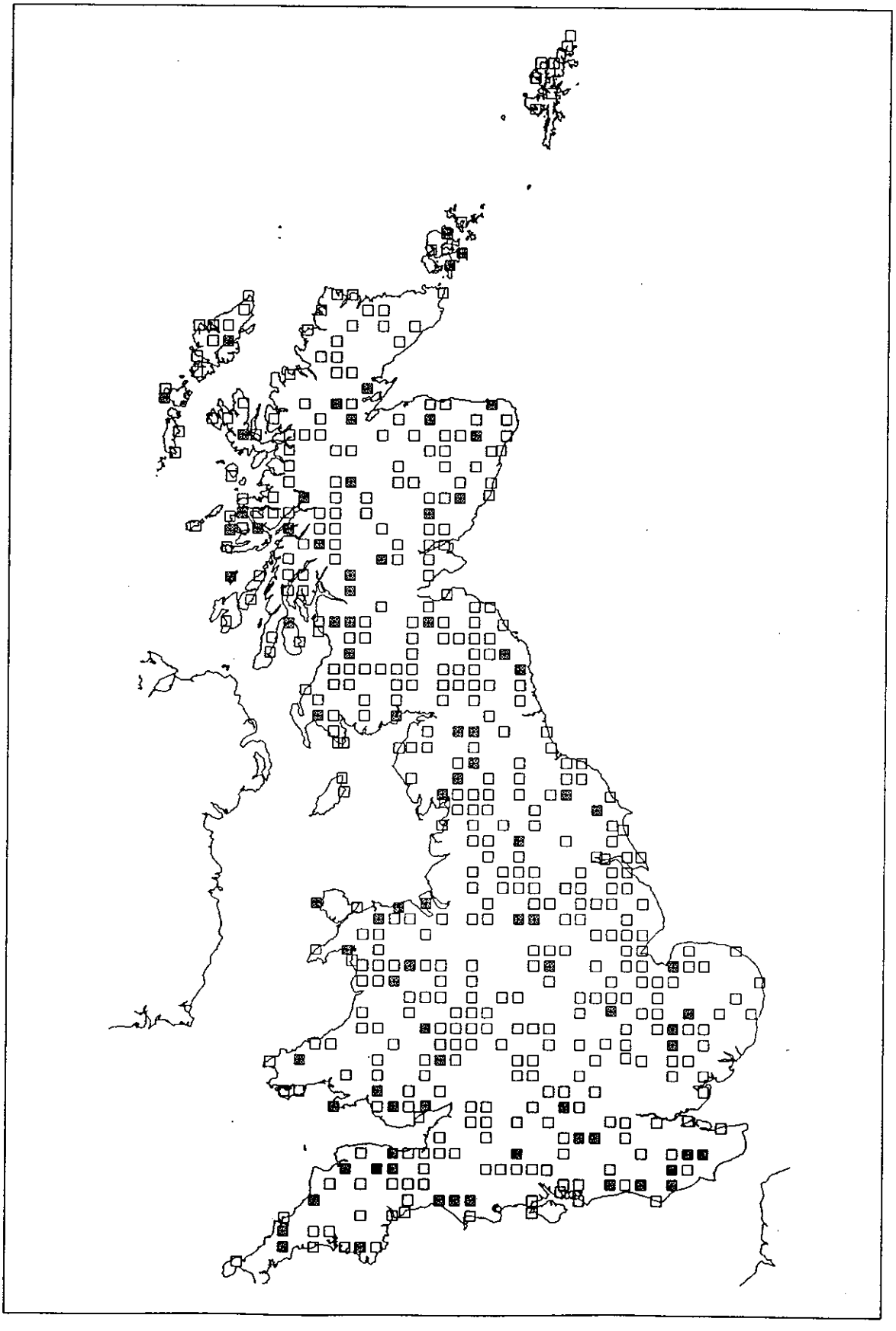


Figure 25 Distribution of the 1 x 1 km squares containing *Heracleum sphondylium* in any verge plots in the 508 squares surveyed in Great Britain.

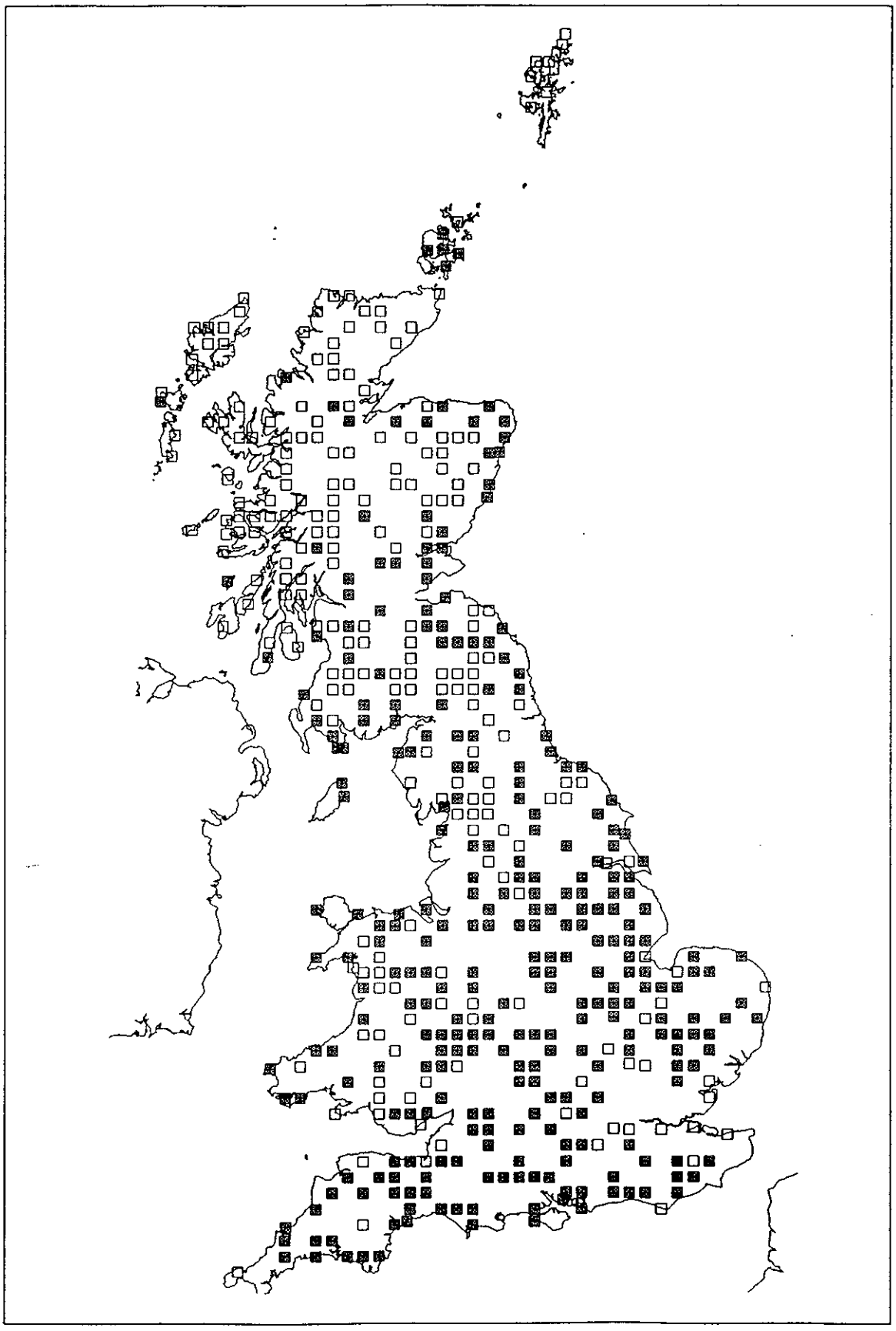
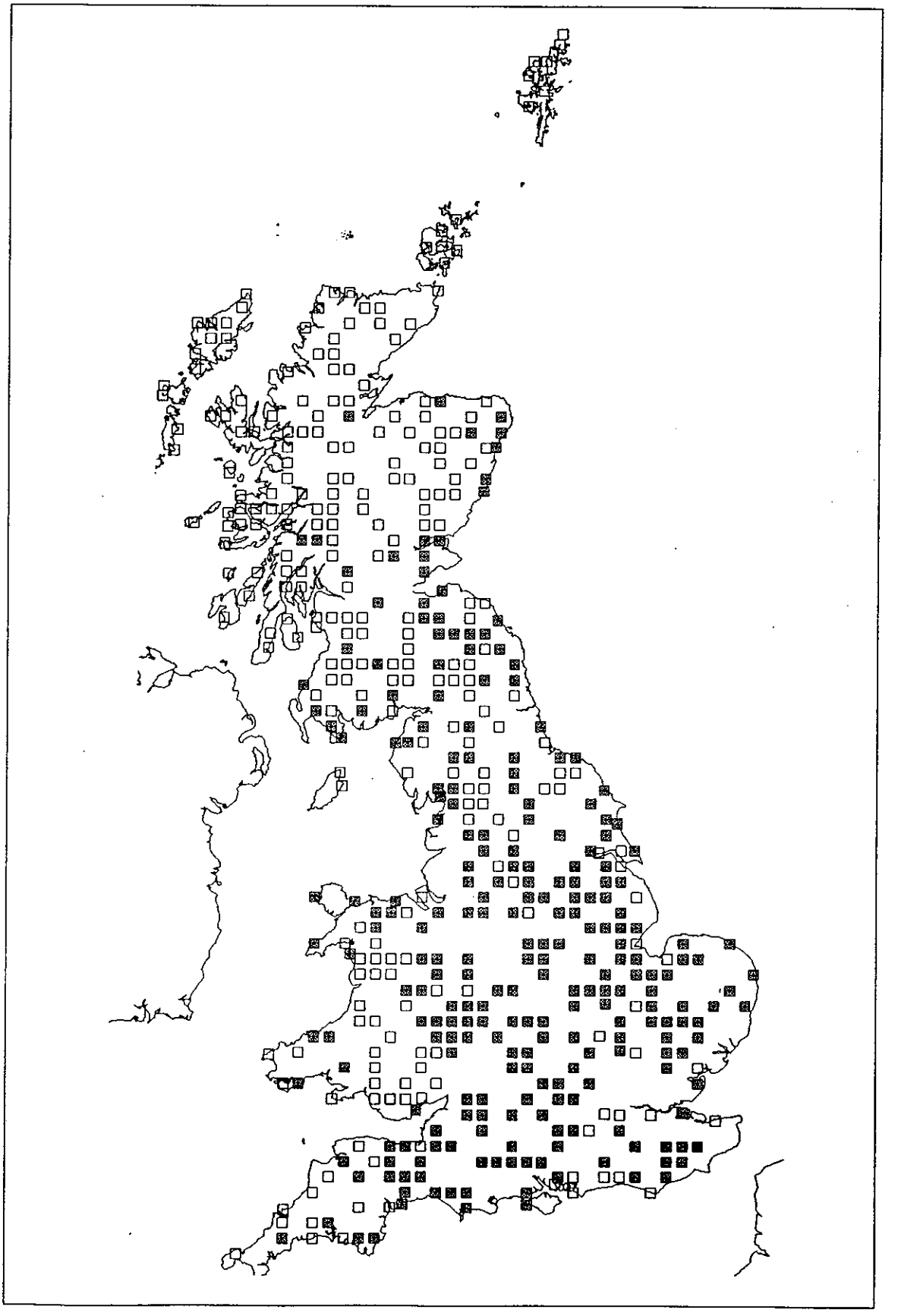


Figure 26 Distribution of the 1 x 1 km squares containing *Anthriscus sylvestris* in any verge plots in the 508 squares surveyed in Great Britain.



9 TRENDS IN SPECIES DIVERSITY IN VERGES

"The trends in species diversity for the vegetation samples"

9.1 Various diversity indices have been proposed in recent years but it is now generally considered that there are strong statistical limitations to their use. However, species diversity is widely recognised as a fundamental criterion in the assessment of the wildlife resource. It has therefore been concluded that direct species numbers, using standard methods of the present survey, provide an unbiassed assessment of diversity. Other measures that can be validly used are the number of vegetation types, as described in the previous section, and species groups. Such analyses need to be carried out within consistent vegetation otherwise significant changes can be masked, as shown in the analysis below.

9.2 Table 21 presents the average number of species in 1978 compared with the 2 sets from 1990.

(a) Those recorded in 1978 and
(b) Those recorded in all squares.

9.3 The species numbers are very similar between the 2 dates.

Section 9 continues ...

Table 21 The average number of species recorded in the 359 verge plots in 1978, the same squares in 1990 and the 789 verge plots recorded in 1990.

	1978 squares	1978 squares recorded in 1990	All 1990 squares
N =	359	388	789
Mean =	18.79	20.43	19.19
SD =	7.6	7.3	7.2
Range =	5.46	3.49	1.52
SE =	0.40	0.37	0.26

9.4 Table 22 presents the data from the individual Land Classes on a lowland to upland gradient. The figures for 1978 are in the first column, and for 1990 in the second. The data show that in this case there are wide differences between the two dates, emphasising that bulking the plots over the whole of GB and over all sites is masking local variations. Nineteen of the Land Classes show a decline in species number.

Section 9 ends.

Table 22 Average number of species recorded in the verge plots in 1978 and 1990 ordered in a lowland to upland gradient.

Land Class	Mean no Species 1977	Mean no Species 1977 plots in 1990	Increase/ decrease
12	11.0	11.6	+
4	8.2	12.7	+
11	13.9	12.8	-
3	13.4	13.0	-
25	18.5	13.3	-
14	20.0	9.7	-
8	14.0	12.9	-
1	10.3	10.5	+
9	12.8	11.8	-
10	9.7	14.9	+
15	17.2	15.6	-
26	19.6	13.9	-
16	15.4	14.3	-
27	17.4	15.0	-
13	16.6	18.3	+
2	14.7	16.9	+
7	22.7	18.2	-
6	19.4	19.2	-
5	19.5	16.8	-
17	17.5	18.9	+
20	19.0	19.5	+
31	13.3	16.9	+
28	20.2	15.2	-
19	11.0	8.9	-
22	18.5	14.9	-
18	16.7	15.8	-
32	16.9	19.0	+
29	26.5	21.3	-
24	17.5	20.7	+
21	18.0	18.5	+
23	No verges		
30	22.0	26.0	+

10 COMPARISON OF HABITAT PLOTS WITH THE RANDOM SAMPLE

"Include results from a full examination of the distribution of semi-natural vegetation types within the sample squares"

10.1 Comparisons of the relative occurrence of the 5 random (200 m^2) plots with the 5 (4 m^2) habitat plots within the 4 Land Class groups are given in Table 23.

10.2 The results show the extended coverage of habitats from the habitat plots with a shift away from extensive intensively managed vegetation on the one hand and uniform moorlands on the other, to relatively species-rich habitats that occupy small areas, eg flushes. The range of habitats covered differs according to the type of countryside, as emphasised in the Summary below.

10.3 The method of locating the habitat plots is described in Section 5 and was designed to increase the range of habitats covered by the survey which might be of wildlife interest to NCC. The analysis carried out in the present section demonstrates the effectiveness of this strategy and reflects not only the increased coverage but also how it relates to the ecological character of the landscape.

Classes dominated by cropped land

10.4 The main coverage of the random plots is of ruderal species on cropped land. Plots in lowland agricultural grassland are also very frequent as, to a lesser degree, are those in woodland. The habitat plots double the coverage of woodland and greatly extend those placed in unmanaged grassland, as well as maintaining many plots in lowland agricultural grassland. Further breakdown of these types would probably reveal that more diverse types, eg chalk grassland, were covered and that many more species were recorded. In addition, coverage is also extended to some degree into other scarce habitats, such as marshes and heath.

Classes dominated by lowland grassland

10.5 The random plots cover a more extensive range of types from that described above, because of their greater frequency through the countryside. There is a greatly extended coverage of woodland and unmanaged grass together with other scarce habitats such as marshes, flushes and aquatic. However, the coverage of lowland heath, moorland grass and upland grass hardly alters, suggesting that the random plots cover these quite well since they occur over large areas, albeit infrequently. If extended cover of the scarce habitats were required it would be necessary to increase the sample size in classes where they were known to occur from the intial sample.

Class characteristic of the marginal uplands

10.6 Although the range of types is covered more evenly by the random plots because of the greater dispersion of habitats of interest in the landscape, there is a marked shift from lowland grassland into restricted habitats such as marshes, unmanaged grassland and flushes. Otherwise, the major categories such as woodland, upland grass and heath are sampled in comparable intensities.

Table 23 Comparison of the distribution of the random (X plots) and habitat (Y plots) in the 4 Land Class groups defined in section 5.7.

	X	Y	X	Y	X	Y	X	Y	X	Y	Y AS % TOTAL
ARABLE	425	-	176	-	13	-	2	-	616	-	0
LOWLAND AGRICULTURAL GRASS	228	290	404	231	112	39	24	17	769	599	44
LOWLAND HEATH	3	6	9	7	-	2	-	1	12	16	57
AQUATIC	-	28	-	54	-	10	-	18	-	120	100
MARSH	2	31	14	53	3	33	5	19	24	136	85
UNMANAGED GRASS	11	147	14	110	3	16	5	6	27	279	91
WOODLAND	100	205	77	188	57	41	77	29	321	468	59
MARITIME	5	10	21	41	5	16	7	29	38	96	72
UPLAND GRASS	14	19	38	30	56	70	50	111	158	230	61
MOORLAND GRASS	2	8	14	16	46	33	70	47	132	104	44
BOG/HEATH	9	19	27	29	89	69	309	147	434	264	38
FLUSH	-	24	-	41	-	45	-	127	-	237	100

Class characteristics of the uplands

10.7 Bog and heath habitats are covered by the majority of random plots, whereas the habitat plots are concentrated in flushes and upland grass, because in the upalnds species variability is greater in these situations. Otherwise there is a minor increase in numbers (although high in percentage terms) into scarce habitats such as marshes and maritime vegetation.

Total figures

10.8 These demonstrate the extended coverage of the habitat plots throughout the series into flushes, marshes, unmanaged grass and aquatic habitats as compared with the dominance of arable, lowland grass and heath in the random plots. These are likely to therefore extend the value of the survey in identifying areas of conservation interest in the wider landscape. It is noticeable, however, that the coverage of the extremely scarce habitat of lowland heath is hardly extended. Further coverage of this type will have to target the habitat specifically and suggests that a comparable approach would be needed for other such exceptional situations. However, in general, such special sites are probably well covered by existing designations, as they are readily recognisable and well known. This links with the coverage of rare species in Section 2 which are probably well recorded and covered, either by local knowledge through Naturalists Trusts or the BSBI mapping scheme.

11 SUMMARY AND FUTURE WORK PROGRAMME

11.1 This summary is designed to identify the principle characteristics of the survey and is used to identify suggested topics for a future work programme, of relevance to wildlife conservation. Each summary point is therefore followed by future research topics, most of which are analytical and could use the current database.

11.2 The report is laid out in the sequence specified by NCC. The primary objective was to collect the data and the report summarises the range of data that were obtained within the contract. Some interpretation is added in order to demonstrate the potential of further analysis of the data for the conservation agencies. In particular, there is a role in linking information from the conservation agencies at the national level.

Section 2 - Methods of survey

11.3 Previous surveys had placed 5 random 200 m^2 plots and 2 random 1 x 10 m quadrats along hedges, streams and roadside verges. Within this contract 1 x 10 m plots were laid out and adjacent to the nearest boundary from the random plots and 3 further 1 x 10 m quadrats along streams and roadside verge types not covered by the initial 2 samples. In addition, 5, 2 x 2 m habitat plots were placed in vegetation not covered by any of the preceding samples.

Future work

i Assessment of the effectiveness of the survey method in relation to conservation agency requirements.

ii Development of a consistent vegetation recording system for NNRs and SSSIs for the assessment of vegetation resources and as a basis for monitoring.

Section 3 - Characteristics of sample squares

11.4 A map was provided of the survey site locations in Great Britain together with the grid references within 10 x 10 km squares, Land Class and 5 types of designation (SSSI, NNR, ESA, AONB, NSA and NP). The occurrence of SSSIs within all squares in Great Britain was examined in relation to the Land Classes with frequencies varying from 50%, in coastal areas, to 7% in lowland cropped land.

Future work

i Provision of access to the Land Classes for linking nature conservation policy to site designation in the new agencies.

ii Provision of access to the Land Classes for research and policy initiatives.

iii Analysis of the pattern of designation of NNRs and SSSIs according to the principle types of landscape in Great Britain.

iv Application of the Land Classes for linking Phase I habitat surveys and as a basis for developing a monitoring system at a local and national level.

Section 4 - Species data records

11.5 The taxonomic problems encountered in 1978 and 1990 were discussed and it was decided that for change statistics and diversity that only species that were consistently recorded taxonomically should be used. Accordingly, the species were divided into five groups and listed (1) Consistent species, (2) Species complexes, (3) Naturalised species, (4) Planted species and (5) Species only recorded at one time. Future analyses will treat these groups separately. Some of the species complexes, eg *Rhinanthus* and *Euphrasia* will be useful and the separation of naturalised species will enable possible expansion to be examined. All species data were punched twice and cross-checked and the database is now complete.

11.6 A list of some 320 species that occurred in between 16 and 100 10 x 10 squares in the BRC database was searched for species recorded during the survey. After removal of complexes not covered, approximately 18% of those species had been recorded. Whilst statistical conclusions cannot be drawn from this analysis, it shows how species of defined interest from a conservation viewpoint can be extracted from the database.

11.7 The overall frequency of species between 1978 and 1990 was examined and the species with major changes identified. These were mainly from upland habitats, and mesotrophic grasslands and were similar to those reported in the trial survey of 1988.

Future work

i Extraction of the species of conservation interest and identify changes in diversity, as expressed by:

(a) Species number
(b) Species frequency
(c) Species groups

ii The dispersion of rare and uncommon species in the wider landscape according to defined criteria.

Section 5 - Habitat types surveyed

11.8 2531 random plots were recorded mainly from arable, lowland grassland, woodland and dwarf shrub vegetation. 2529 habitat plots were recorded but were mainly from lowland grasslands, woodlands, unmanaged grass and flushes reflecting the further coverage achieved by the additional plots. 885 plots were recorded by streams using the initial method with a further 1287 from the supplementary series. 789 plots were recorded by roadsides using the initial method and a further 1165 from the supplementary series. In both bases, the range of types covered increased proportionately. 1807 plots were recorded along boundaries which were mainly fences, hedges and walls. In all, 950 plots were placed along hedges. Details were presented to show the breakdown of all these plot types and their distribution within the Land Class series.

Future work

i Detailed analysis of the coverage of species, species groups and vegetation types according to the different types of plot.

ii Spatial analysis of the landcover mapping and the composition of vegetation as expressed by the plots.

iii Comparison of the composition of the boundary plots with the agricultural systems of the associated fields.

iv Extraction of the 4 m^2 quadrat data from the random plots combined with the habitat plots and identification of NVC types.

Section 6 - Distribution of species

11.9 The distribution of 10 contrasting species in Britain was presented in order to show the potential for mapping out the national level. The patterns are comparable to the BRC maps but can be expanded to show cover and frequency classes.

Future work

i Interpolation of the probability of distribution of species throughout all squares in Great Britain using the Land Class framework.

ii Contouring of the relative frequency of indicator species and their cover throughout Great Britain.

Section 7 - Pattern of vegetation types in verges

11.10 TWINSPAN and DECORANA analyses were carried out on the data from the roadside verges in order to demonstrate the methods that will be used to measure change and examine the patterns within the vegetation.

11.11 The principal division was between verges from beside upland roads, where the vegetation is typically moorland, whereas in the lowlands the divisions are largely dependent upon management practices, such as cutting or dereliction. At high levels in the hierarchy in the joint analysis of plots sampled in 1978 and 1990 there was little gross difference between the balance of plots in 1978 and 1990 but this would mask changes that were taking place in alternate directions or at a more detailed level. For example, within a group of plots with low management there was evidence of a shift towards woodland rather than more open scrub conditions.

Future work

i The types of analysis shown in the verge data can be extended to the other plot types to:

(a) Examine the distribution and composition of the major types of vegetation in Britain and their relationships with conservation objectives.

(b) To analyse the changes in species patterns and assemblages between 1978/1990.

(c) To examine the relationships of the CSR strategy theory to vegetation changes that have taken place between 1978 and 1990.

(d) To examine the relationship between NVC coverage and the analyses described above.

(e) Production of procedures for classifying subsequent samples into the classifications produced for the different types of plot.

ii Although TWINSPAN provides a key to the classes, new statistical methods could provide more efficient procedures for assigning new members to classes.

Section 8 - Species distribution in verges

11.12 The change in species frequency was examined between 1978 and 1990. Eight of the top ten species remained the same, suggesting stability in recording and vegetation. More species were declining than increasing and were mainly from mesotrophic grasslands type habitats.

11.13 The distribution of 10 species identified as indicators in the TWINSPAN analysis were plotted in GB to demonstrate the ability to map different categories at a national level.

Future work

i The distribution of key indicator species identified from the analysis of change and habitat preference.

ii The contouring of the overall trends of change and species assemblages throughout Great Britain and its overlay with NNRs and SSSIs.

Section 9 - Trends in species diversity in verges

11.14 Grouping all the roadside verge plots together that were recorded in 1978 and 1990, the number of species (without separation of the 5 categories of section (1)) showed no evidence of change in diversity. However, such gross analyses can mask changes as indicated in Section 7. The species number was then broken down into Land Class in which case 19 classes had declined in numbers. Further statistical analysis is required to determine whether the changes are significant but an important principle is to compare changes within consistent ecological units.

Future work

i Objective assessment of the relative diversity of the major vegetation series in Great Britain both within, and between, habitats.

ii The setting of environmental standards in terms of vegetation, species groups and species, against which the status of individual sites can be compared.

Section 10 - Comparison of habitat plots with the random sample

11.15 The increased number of plots covered habitats differentially through the Land Class series and reflecting the occurrence of habitats of interest in different types of countryside. In lowlands dominated by cropping systems the main extended coverage is into woodlands, various types of managed grasslands and unmanaged grassland. In lowlands where the main agricultural systems are grasslands a wider spectrum of types was recorded reflecting greater variation with marshes, woodlands and flushes having extended coverage. In the marginal uplands the wider dispersion of habitats is reflected in comparable coverage of habitat and random plots. In the uplands, however, there is a pronounced shift away from bog and moorland vegetation into habitat plots covering flushes and upland grassland.

Future work

i Comparison of the range of species/species groups/vegetation types covered by the different types of plots.

ii Relationship of the different categories of plot with the underlying character of the countryside.

iii Development, in conjunction with graphic artists/popular writers, of indicative material and information on countryside in Great Britain, incorporating a variety of data from the different sections.

11.16 **Links to other databases**

(a) Link between waterside macrophytes and streamside plots, with the data from the freshwater invetebrate studies of IFE.

(b) Links of critical plant species for conservation, to other databases, for example the Phytophagous insect databank, in order to predict distribution of dependant species.

(c) Links to other databases of conservation interest, eg moths (Dr I Woiwod), birds (Dr M Avery).

(d) Links to extant monitoring exercises eg the butterfly monitoring scheme, to assess cover, identify gaps and extend the results to national predictions.

(e) Links to soil databases (as held by ITE, SSLRC and MLURI).

Section 11 ends.

Annex A

Report to NCC of progress at 5 March 1991

COUNTRYSIDE SURVEY 1990

Report to NCC of progress at 5 March 1991

1. This paper summarises progress since the start of the Countryside Survey 1990 with special reference to parts of the project funded by the NCC. The paper has been prepared at short notice and some figures given in the paper and its Annexes may be provisional. All information is provided in good faith and is a best estimate of the current status of the project.

Background

2. The background to the Countryside Survey 1990 project is summarised in the NCC/ITE Contract [given here in Annex A].

3. The methods employed during the survey are based on those used previously in surveys conducted by ITE and aspects concerned with vegetation recording are given in Annex B to this paper.

4. Aspects of quality control and quality assurance are presented in Annex C.

Planning and Training

Tasks:

5. Planning for the survey started in October 1989 and involved discussions with all Government Agencies and many Departments. Discussions on funding took place between ITE and DOE in the second half of 1989, and between ITE and NCC during early 1990.

6. A field handbook of methods was drafted in April/May 1990 and was revised during the course of the Field Training Course for surveyors.

7. A two-week Field Training Course was held in late May [further details are given in Annex C].

Outputs:

Field methods manual

8. The fourth draft of the Field Handbook (which includes details of methods and definitions of data categories) has been produced and is available for information and comment.

Field Survey

Tasks:

9. The total number of squares which have been surveyed is 533 (508 squares in predominantly rural locations and 25 urban squares). The survey took place between June and October 1990.

10. A preliminary search of the data sheets indicates that species were recorded in 11,484 plots as part of the survey, of which 6,728 were surveyed as a direct result of NCC support.

11. Annex D is a table showing a preliminary estimate of the number of plots which were recorded in each square. It can be summarised as follows:

Plot type	Potential per square	Potential overall	Surveyed	% of overall potential
X (200m2) (random)	5	2540	2523	99.3
* Y (4m2) (semi-natural)	5	2540	2478	97.6
* B (10x1m) (field edges)	5	2540	1816	71.5
H (10x1m) (hedges)	2	1016	576	56.7
S (10x1m) (waterside)	2	1016	875	86.1
* W (10x1m) (waterside)	3	1524	1275	83.7
R (10x1m) (roadside)	2	1016	782	77.0
* V (10x1m) (roadside)	3	1524	1159	76.0
Total	27	13716	11484	83.7
* NCC funded	16	8128	6728	82.8

12. The number of surveyed squares may not match the potential in the following circumstances:

a) where most of the square has become built up
b) where no semi-natural habitats occur (Y plots)
c) where no field edges occur (B plots)
d) where no linear features exist (H, S, W, R V plots)

Quality Assurance

13. A quality assurance exercise was undertaken during October and November 1990, involving a repeat survey of sites. It had been intended to visit 30 sites, but adverse weather conditions (including lying snow in Scotland) meant that 21 sites only were visited. The re-survey was carried out by project management staff (Dr Bob Bunce with other staff) and by consultants (Bangor Ecological Consultants).

14. At each site, a grid of 9 points was superimposed over one quarter of the square. At each point the land cover was coded for the mappable unit in which the point lay. The characteristics for the nearest boundary to each point (if within 100 metres) were coded. The coding procedure was identical to that used in the main survey.

15. Where present, one of each type of vegetation plot was located and a species list made.

16. An initial analysis, concentrating on any differences between data recorded during the main survey and those recorded as part of the QA exercise, and the reasons for these, is being completed by Dr Ian Taylor (consultant).

Outputs:

Documententation

17. All Field Assessment Books (FABs) have been returned to Merlewood. Each FAB has been checked on return for completeness.

Data preparation and storage

Tasks:

Define format for database

18. Details of data format, and the use of an Oracle Database Management System and ARC/Info Geographical Information System, to standardise the format and application of the data, have been developed.

Data checking

19. The numeric code information on all c. 2,500 map pages in the FABs has been checked for legibility and consistancy, and especially to standardise plant species nomenclature.

20. All c.12,000 vegetation recording sheets have been checked for legibility and consistancy. In addition, an initial check has been made on the likelihood of certain species combinations being present. Dubious records were found in less than 4% of the vegetation plots and these will be flagged in the data base.

21. As an independant way of checking the accuracy of species records, the species records from the Countryside Survey 1990 are to be tested against the data base of the Biological Records Centre (BRC) at ITE Monks Wood. A feasability study is under way and a test set of data, comprising records of five species from c. 40 squares, has been supplied to the BRC.

Data punching

22. The punching of the species data is under way. It is intended that all code data punching will be completed by March 1991.

Document and archive original field sheets

23. All FABs are being stored in a fire-resistant room and microfilming of all data sheets is to be carried out as FABs become available from other activities.

Outputs:

Revised species list

24. As a result of the checking of the vegetation data, a new master species list has been generated. The species list is held on computer (both Latin names and English equivalents) and runs to 1,290 records.

Sample outputs

25. The format of outputs has been discussed.

Data analysis and interpretation.

26. Discussion and some early conclusions on the way data might be interpreted, and limits to their use, has taken place as part of a two-day 'Wash-up' meeting of ITE Survey Coordinators, held on 3/4 December 1990. A document is being prepared which gives the recommendations of the meeting for future surveys, and highlights areas which need consideration before any other similar surveys are carried out.

Synthesis and Report Production

27. A draft structure for the final report is being discussed.

ITE
5 March 1991

Overall species lists from quadrats recorded as part of Countryside Survey 1990, presented in five categories:

1. Species which can confidently be regarded as consistently recorded.

2. Species complexes, aggregates or where known problems occur.

3. Naturalised species.

4. Planted species.

5. Species that were recorded at only one survey date.

CATEGORY 1 - SPECIES FOR ANALYSIS

NAME

Acer campestre (Field Maple)
Achillea millefolium (Yarrow)
Achillea ptarmica (Sneezewort)
Acinos arvensis (Basil Thyme)
Adoxa moschatellina (Moschatel)
Aethusa cynapium (Fool's Parsley)
Agrimonia eupatoria (Agrimony)
Agrimonia procera (Fragrant Agrimony)
Agrostis capillaris (Common Bent)
Agrostis curtisii (Bristle Bent)
Agrostis gigantea (Black Bent)
Agrostis stolonifera (Creeping Bent)
Aira caryophyllea (Silver Hair-grass)
Aira praecox (Early Hair-grass)
Ajuga reptans (Bugle)
Alchemilla alpina (Alpine Lady's-mantle)
Alisma plantago-aquatica (Water-plantain)
Alliaria petiolata (Garlic Mustard)
Allium ursinum (Ramsons)
Allium vineale (Wild Onion)
Alnus glutinosa (Alder)
Alopecurus aequalis (Orange Foxtail)
Alopecurus geniculatus (Marsh Foxtail)
Alopecurus myosuroides (Black-grass)
Alopecurus pratensis (Meadow Foxtail)
Ammophila arenaria (Marram)
Anacamptis pyramidalis (Pyramidal Orchid)
Anagallis arvensis (Scarlet Pimpernel)
Anagallis minima ()
Anagallis tenella (Bog Pimpernel)
Anchusa arvensis (Bugloss)
Andromeda polifolia (Bog-rosemary)
Anemone nemorosa (Wood Anemone)
Angelica sylvestris (Wild Angelica)
Antennaria dioica (Mountain Everlasting)
Anthemis arvensis (Corn Chamomile)
Anthemis cotula (Stinking Mayweed)
Anthoxanthum odoratum (Sweet Vernal-Grass)
Anthriscus caucaulis (Bur Chervil)
Anthriscus sylvestris (Cow Parsley)
Anthyllis vulneraria (Kidney Vetch)
Apium graveolens (Wild Celery)
Apium inundatum (Lesser Marshwort)
Apium nodiflorum (Fool's Water-cress)
Aquilegia vulgaris (Columbine)
Arabidopsis thaliana (Thale Cress)
Arabis hirsuta (Hairy Rock-cress)
Arctostaphylos alpinus (Alpine Bearberry)
Arctostaphylos uva-ursi (Bearberry)
Arenaria serpyllifolia (Thyme-leaved Sandwort)
Armeria maritima (Thrift)
Arrhenathrum elatius (False Oat-grass)
Artemisia absinthium (Wormwood)
Artemisia campestris (Field Southernwood)
Artemisia maritima (Sea Wormwood)

Artemisia vulgaris (Mugwort)
Arum maculatum (Lords-and-Ladies)
Asparagus officinalis (Asparagus)
Asperula cynanchica (Squinancywort)
Asplenium adiantum-nigrum (Black Spleenwort)
Asplenium marinum (Sea Spleenwort)
Asplenium ruta-muria (Wall-Rue)
Asplenium scolopendrium (Hart's-tongue)
Asplenium trichomanes (Maidenhair Spleenwort)
Asplenium viride (Green Spleenwort)
Aster tripolium (Sea Aster)
Athyrium filix-femina (Lady-fern)
Atrichum undulatum (Wavy-leaved Thread Moss)
Atropa belladonna (Deadly Nightshade)
Aulacomnium palustre (Bog Thread Moss)
Avena fatua (Wild-oat)
Avena strigosa (Black Oat)
Avenula pratensis (Meadow Oat-grass)
Avenula pubescens (Downy Oat-grass)
Ballota nigra (Black Horehound)
Barbarea vulgaris (Winter-cress)
Bellis perennis (Daisy)
Berula erecta (Lesser Water-parsnip)
Bidens cernua (Nodding Bur-marigold)
Bidens tripartita (Trifid Bur-marigold)
Blackstonia perfoliata (Yellow-wort)
Blechnum spicant (Hard Fern)
Botrychium lunaria (Moonwort)
Brachypodium pinnatum (Tor-grass)
Brachypodium sylvaticum (False Brome)
Breutelia chrysocoma (moss)
Briza media (Quaking-grass)
Bromus commutatus (Meadow Brome)
Bromus erectus (Upright Brome)
Bromus hordeaceus (Soft-brome)
Bromus racemosus (Smooth Brome)
Bromus ramosus (Hairy Brome)
Bromus rigidus ()
Bromus sterilis (Barren Brome)
Bryonia cretica (White Bryony)
Butomus umbellatus (Flowering Rush)
Calamagrostis epigejos (Wood Small-reed)
Calamintha ascendens (Common Calaminth)
Calluna vulgaris (Heather)
Caltha palustris (Marsh-marigold)
Calystegia sepium (Hairy Bindweed)
Calystegia soldanella (Sea Bindweed)
Campanula glomerata (Clustered Bellflower)
Campanula latifolia (Giant Bellflower)
Campanula rotundifolia (Harebell)
Campanula trachelium (Nettle-leaved Bellflower)
Capsella bursa-pastoris (Sheperd's Purse)
Cardamine amara (Large Bitter-cress)
Cardamine impatiens (Narrow-leaved Bitter-cress)
Cardamine pratensis (Cuckooflower)
Carduus acanthoidies (Welted Thistle)
Carduus nutans (Musk Thistle)
Carduus tenuiflorus (Slender Thistle)
Carex acutiformis (Lesser Pond-Sedge)

Carex aquatilis (Water Sedge)
Carex arenaria (Sand-Sedge)
Carex bigelowii (Stiff Sedge)
Carex binervis (Green-ribbed Sedge)
Carex capillaris (Hair Sedge)
Carex caryophyllea (Spring-sedge)
Carex curta (White Sedge)
Carex demissa (Common Yellow-sedge)
Carex diandra (Lesser Tussock-sedge)
Carex dioica (Dioecious Sedge)
Carex distans (Distant Sedge)
Carex disticha (Brown Sedge)
Carex divisa (Divided Sedge)
Carex divulsa (Grey Sedge)
Carex echinata (Star Sedge)
Carex extensa (Long bracted Sedge)
Carex flacca (Glaucous Sedge)
Carex hirta (Hairy Sedge)
Carex hostiana (Tawny Sedge)
Carex humilis (Dwarf Sedge)
Carex laevigata (Smooth-stalked Sedge)
Carex lepidocarpa (Long-stalked Yellow-sedge)
Carex limosa (Bog-sedge)
Carex muricata agg (Prickly Sedge)
Carex nigra (Common Sedge)
Carex otrubae (False Fox-sedge)
Carex ovalis (Oval Sedge)
Carex pallescens (Pale Sedge)
Carex panicea (Carnation Sedge)
Carex paniculata (Greater Tussock-sedge)
Carex pauciflora (Few-flowered Sedge)
Carex pendula (Pendulous Sedge)
Carex pilulifera (Pill Sedge)
Carex pseudocyperus (Cyperus Sedge)
Carex remota (Remote Sedge)
Carex riparia (Great Pond-sedge)
Carex rostrata (Bottle Sedge)
Carex serotina (Small-fruited Yellow-sedge)
Carex strigosa (Thin-spiked Wood-sedge)
Carex sylvatica (Wood-sedge)
Carex vesicaria (Bladder Sedge)
Carex vulpina (True Fox-sedge)
Carlina vulgaris (Carline Thistle)
Carpinus betulus (Hornbeam)
Carum verticillatum (Whorled Caraway)
Catabrosa aquatica (Water Whorl-grass)
Centaurea calcitrapa (Red Star-thistle)
Centaurea nemoralis (Slender Knapweed)
Centaurea nigra (Common Knapweed)
Centaurea scabiosa (Greater Knapweed)
Centaurium erythraea (Common Centaury)
Cerastium alpinum (Alpine Mouse-ear)
Cerastium arcticum (Arctic Mouse-ear)
Cerastium arvense (Field Mouse-ear)
Cerastium diffusum (Sea Mouse-ear)
Cerastium fontanum (Common Mouse-ear)
Cerastium glomeratum (Sticky Mouse-ear)
Cerastium semidecandrum (Little Mouse-ear)
Ceratophyllum demersum (Soft Hornwort)

Chaenorhinum minus (Small Toadflax)
Chaerophyllum temulentum (Rough Chervil)
Chamaemelum nobile (Chamomile)
Chamaenerion angustifolium (Rosebay Willowherb)
Chelidonium majus (Greater Celandine)
Chrysanthemum segetum (Corn Marigold)
Chrysosplenium alternifolium (Alternate-leaved Golden-saxifrage)
Chrysosplenium oppositifolium (Opposite-leaved Golden-saxifrage)
Cichorium intybus (Chicory)
Circaea alpina (Alpine Echanter's-nightshade)
Circaea lutetiana (Enchanter's-nightshade)
Cirsium acaule (Dwarf Thistle)
Cirsium arvense (Creeping Thistle)
Cirsium dissectum (Meadow Thistle)
Cirsium eriophorum (Woolly Thistle)
Cirsium helenioides (Melancholy Thistle)
Cirsium palustre (Marsh Thistle)
Cirsium vulgare (Spear Thistle)
Cladium mariscus (Great Fen-sedge)
Cladonia arbuscula (lichen)
Cladonia furcata (lichen)
Cladonia impexa (lichen)
Cladonia uncialis (lichen)
Clematis vitalba (Traveller's-joy)
Clinopodium vulgare (Wild Basil)
Cochlearia officinalis (Common Scurvygrass)
Coeloglossum viride (Frog Orchid)
Colchicum autumnale (Autumn Crocus)
Conium maculatum (Hemlock)
Conopodium majus (Pignut)
Convallaria majalis (Lily of the valley)
Convolvulus arvensis (Field Bindweed)
Cornus sanguinea (Dogwood)
Cornus suecica (Dwarf Cornel)
Coronopus didymus (Lesser Swine-cress)
Coronopus squamatus (Swine-cress, Wart-cress)
Corydalis claviculata (Climbing Corydalis)
Corylus avellana (Hazel)
Crataegus laevigata (Midland Hawthorn)
Crataegus laevigata X monogyna (Hawthorn hybrids)
Crataegus monogyna (Hawthorn)
Crepis biennis (Rough Hawk's Beard)
Crepis capillaris (Smooth Hawk's-beard)
Crepis paludosa (Marsh Hawk's-beard)
Crepis vesicaria (Beaked Hawk's beard)
Crithmum maritimum (Rock Samphire)
Cruciata laevipes (Crosswort)
Cryptogramma crispa (Parsley Fern)
Cuscuta epithymum (Dodder)
Cynoglossum officinale (Hound's Tongue)
Cynosurus cristatus (Crested Dog's-tail)
Cystopteris fragilis (Brittle Bladder-fern)
Cytisus scoparius (Broom)
Dactylis glomerata (Cock's-foot)
Danthonia decumbens (Heath Grass)
Daphne laureola (Spurge-laurel)
Daphne mezereum (Mezereon)
Daucus carota (Wild Carrot)
Deschampsia cespitosa (Tufted Hair-grass)

Deschampsia flexuosa (Wavy Hair-grass)
Desmazeria rigida (Fern-grass)
Dicranella heteromalla (Silky fork moss)
Dicranum majus (Greater fork moss)
Dicranum scoparium (Lesser fork moss)
Digitalis purpurea (Foxglove)
Diphasiastrum alpinum (Alpine-clubmoss)
Diplotaxis muralis (Annual Wall-rocket)
Diplotaxis tenuifolia (Perennial Wall-Rocket)
Dipsacus fullonum (Fuller's Teasel)
Drosera anglica (Great Sundew)
Drosera intermedia (Oblong-leaved Sundew)
Drosera rotundifolia (Round-leaved Sundew)
Dryas octopetala (Mountain Avens)
Echium vulgare (Viper's-bugloss)
Eleocharis multicaulis (Many-stalked Spike-rush)
Eleocharis palustris (Common Spike-rush)
Eleocharis quinqueflora (Few-flowered Spike-rush)
Eleocharis uniglumis ()
Eleogiton fluitans (Floating Clubrush)
Elymus farctus (Sand Couch-grass)
Elymus pycnanthus (Sea Couch)
Empetrum nigrum (Crowberry)
Epilobium anagallidifolium (Alpine Willow-herb)
Epilobium hirsutum (Great Willowherb)
Epilobium palustre (Marsh Willowherb)
Epipactis helleborine (Broad Helleborine)
Equisetum arvense (Field Horsetail)
Equisetum fluviatile (Water Horsetail)
Equisetum palustre (Marsh Horsetail)
Equisetum pratense (Shady Horsetail)
Equisetum sylvaticum (Wood Horsetail)
Equisetum telemateia (Great Horsetail)
Erica cinerea (Bell Heather)
Erica tetralix (Cross-leaved Heather)
Erigeron acer (Blue Fleabane)
Eriophorum angustifolium (Common Cottongrass)
Eriophorum vaginatum (Hare's-tail Cottongrass)
Erodium cicutarium (Common Stork's-bill)
Erophila verna (Common Whitlowgrass)
Erysimum cheiranthoides (Treacle Mustard)
Euonymus europaeus (Spindle)
Eupatorium cannabinum (Hemp-agrimony)
Euphorbia amygdaloides (Wood Spurge)
Fallopia convolvulus (Black-bindweed)
Festuca altissima (Wood Fescue)
Festuca arundinacea (Tall Fescue)
Festuca gigantea (Giant Fescue)
Festuca ovina (Sheep's-fescue)
Festuca pratensis (Meadow Fescue)
Festuca rubra (Red Fescue)
Festuca tenuifolia (Fine-leaved Sheep's Fescue)
Festuca vivipara (Viviparous Fescue)
Festulolium hybrid (Hybrid Fescue)
Filago lutescens (Common Cudweed)
Filago minima (Small Cudweed)
Filago vulgaris (Cudweed)
Filipendula ulmaria (Meadowsweet)
Filipendula vulgaris (Dropwort)

Fragaria vesca (Wild Stawberry)
Fraxinus excelsior (Ash)
Fumaria bastardii (Tall Ramping-fumitory)
Fumaria capreolata (White Ramping-fumitory)
Fumaria officinalis (Common Fumitory)
Galeopsis angustifolia (Red Hemp-nettle)
Galeopsis segetum (Downy Hemp-nettle)
Galeopsis speciosa (Large-flowered Hemp-nettle)
Galeopsis tetrahit (Common Hemp-nettle)
Galium aparine (Cleavers)
Galium boreale (Northern Bedstraw)
Galium mollugo (Hedge-bedstraw)
Galium odoratum (Woodruff)
Galium palustre (Common Marsh-bedstraw)
Galium pumilum (Slender Bedstraw)
Galium saxatile (Heath Bedstraw)
Galium sterneri (Limestone Bedstraw)
Galium tricornutum (Corn Cleavers)
Galium uliginosum (Fen Bedstraw)
Galium verum (Lady's Bedstraw)
Genista anglica (Petty Whin)
Genista tinctoria (Dyer's Greenweed)
Gentianella amarella (Autumn Gentian, Felwort)
Gentianella campestris (Field Gentian)
Geranium columbinium (Long-stalked Crane's-bill)
Geranium dissectum (Cut-leaved Crane's-bill)
Geranium lucidum (Shining Crane's-bill)
Geranium molle (Dove's-foot Crane's-bill)
Geranium pratense (Meadow Crane's-bill)
Geranium pusillum (Small-flowered Crane's-bill)
Geranium pyrenaicum (Hedgerow Crane's-bill)
Geranium robertianum (Herb-Robert)
Geranium sanguineum (Bloody Crane's-bill)
Geranium sylvaticum (Woody Crane's-bill)
Geum rivale (Water Avens)
Geum urbanum (Wood Avens)
Geum x intermedium (Hybrid Avens)
Glaucium flavum (Yellow Horned-poppy)
Glaux maritima (Sea-milkwort)
Glechoma hederacea (Ground-ivy)
Glyceria declinata (Small Sweet-grass)
Glyceria fluitans (Floating Sweet-grass)
Glyceria maxima (Reed Sweet-grass)
Glyceria plicata (Plicate Sweet-grass)
Gnaphalium supinum (Dwarf Cudweed)
Gnaphalium sylvaticum (Heath Cudweed)
Gnaphalium uliginosum (Marsh Cudweed)
Goodyera repens (Creeping Lady's Tresses)
Gymnadenia conopsea (Fragrant Orchid)
Gymnocarpium dryopteris (Oak Fern)
Halimione portulacoides (Sea Purslane)
Hedera helix (Ivy)
Helianthemum nummularium (Common Rock-rose)
Heracleum sphondylium (Hogweed)
Hieracium pilosella (Mouse-ear Hawkweed)
Hippocrepis comosa (Horseshoe Vetch)
Hippuris vulgaris (Mare's-tail)
Holcus lanatus (Yorkshire-fog)
Holcus mollis (Creeping Soft-grass)

Honkenya peploides (Sea sandwort)
Hordelymus europaeus (Wood Barley)
Hordeum murinum (Wall Barley)
Hordeum secalinum (Meadow Barley)
Humulus lupulus (Hop)
Huperzia selago (Fir Clubmoss)
Hyacinthoides non-scripta (Bluebell)
Hydrocharis morsus-ranae (Frogbit)
Hydrocotyle vulgaris (Marsh Pennywort)
Hylocomium splendens (Glittering feather moss)
Hypericum androsaemum (Tutsan)
Hypericum calycinum (Rose-of-Sharon)
Hypericum elodes (Marsh St John's-wort)
Hypericum hirsutum (Hairy St John's-wort)
Hypericum humifusum (Trailing St John's-wort)
Hypericum maculatum (Imperforate St John's-wort)
Hypericum montanum (Pale St John's-wort)
Hypericum perforatum (Perforate St John's-wort)
Hypericum pulchrum (Slender St John's-wort)
Hypericum tetrapterum (Square-stalked St John's-wort)
Hypericum undulatum (Wavy St John's-wort)
Ilex aquifolium (Holly)
Inula conyza (Ploughman's-spikenard)
Inula crithmoides (Golden Samphire)
Iris foetidissima (Stinking Iris)
Iris pseudocorus (Yellow Iris)
Isoetes lacustris (Quillwort)
Isolepis cernua (Slender Club-rush)
Isolepis setacea (Bristle Club-rush)
Jasione montana (Sheep's-bit)
Juncus ambiguus ()
Juncus bufonius (Toad Rush)
Juncus bulbosus (Bulbous Rush)
Juncus castaneus (Chesnut Rush)
Juncus conglomeratus (Compact Rush)
Juncus effusus (Soft-rush)
Juncus gerardi (Saltmarsh Rush)
Juncus inflexus (Hard Rush)
Juncus maritimus (Sea Rush)
Juncus squarrosus (Heath Rush)
Juncus subnodulosus (Blunt-flowered Rush)
Juncus tenuis (Slender Rush)
Juncus trifidus (Three-leaved Rush)
Juncus triglumis (Three-flowered Rush)
Juniperus communis (Juniper)
Kickxia elantine (Sharp-leaved Fluellen)
Kickxia spuria (Round-leaved Fluellen)
Knautia arvensis (Field Scabios)
Koeleria macrantha (Crested Hair-grass)
Lactuca saligna (Least Lettuce)
Lactuca serriola (Prickly Lettuce)
Lamiastrum galeobdolon (Yellow Archangel)
Lamium album (White Dead-nettle)
Lamium amplexicaule (Henbit Dead-nettle)
Lamium hybridum (Cut-leaved Dead-nettle)
Lamium purpureum (Red Dead-nettle)
Lapsana communis (Nipplewort)
Lathyrus montanus (Bitter-vetch)
Lathyrus nissolia (Grass Vetchling)

Lathyrus pratensis (Meadow Vetchling)
Legousia hybrida (Venus's Looking-glass)
Lemna minor (Common Duckweed)
Lepidium campestre (Field Pepperwort)
Lepidium heterophyllum (Smith's Cress)
Lepidium latifolium (Dittander, Broad-leaved Pepperwort)
Leucanthemum vulgare (Oxeye Daisy)
Leucobryum glaucum (White fork moss)
Leymus arenarius (Lyme-grass)
Ligusticum scoticum (Scots Lovage)
Ligustrum vulgare (Wild Privet)
Lilium martagon (Martagon Lily)
Limonium humile (Lax-flowered Sea Lavender)
Limonium vulgare (Common Sea-lavender)
Linaria vulgaris (Common Toadflax)
Linum bienne (Pale Flax)
Linum catharticum (Fairy Flax)
Liparis loeselii (Fen Orchid)
Listera cordata (Lesser Twayblade)
Listera ovata (Common Twayblade)
Lithospermum arvense (Corn Gromwell)
Litorella uniflora (Shore-weed)
Lobelia dortmanna (Water Lobelia)
Loiseleuria procumbens (Trailing Azalea)
Lolium perenne (Perennial Rye-grass)
Lonicera periclymenum (Honeysuckle)
Lotus corniculatus (Common Bird's-foot-trefoil)
Lotus subbiflorus (Hairy Bird's-foot-trefoil)
Lotus tenuis (Narrow-leaved Bird's-foot-trefoil)
Lotus uliginosus (Greater Bird's-foot-trefoil)
Luzula pilosa (Hairy Wood-rush)
Luzula spicata (Spiked Wood-rush)
Luzula sylvatica (Great Wood-rush)
Lychnis flos-cuculi (Ragged-Robin)
Lycopodium clavatum (Stag's-horn Clubmoss)
Lycopsis arvensis (Bugloss)
Lycopus europaeus (Gipsywort)
Lysimachia nemorum (Yellow Pimpernel)
Lysimachia nummularia (Creeping Jenny)
Lysimachia vulgaris (Yellow Loosestrife)
Lythrum portula (Water Purslane)
Lythrum salicaria (Purple-loosestrife)
Malus sylvestris (Crab Apple)
Malva moschata (Musk Mallow)
Malva neglecta (Dwarf Mallow)
Malva sylvestris (Common Mallow)
Marrubium vulgare (White Horehound)
Matricaria matricarioides (Pineappleweed)
Matricaria recutita (Scented Mayweed)
Meconopsis cambrica (Welsh Poppy)
Medicago arabica (Spotted Medick)
Medicago lupulina (Black Medick)
Melampyrum pratense (Common Cow-wheat)
Melica uniflora (Wood Melick)
Melittis melissophyllum (Bastard Balm)
Menyanthes trifoliata (Bogbean)
Mercurialis perennis (Dog's Mercury)
Milium effusum (Wood Millet)
Minuartia verna (Vernal Sandwort)

Mnium hornum (Swan's neck thread moss)
Moehringia trinervia (Three-nerved Sandwort)
Molinia caerulea (Purple Moor-grass)
Moneses uniflora (One-flowered Wintergreen)
Montia fontana (Blinks)
Mycelis muralis (Wall Lettuce)
Myosoton aquaticum (Water Chickweed)
Myrica gale (Bog-myrtle)
Myriophyllum alternifolia (Alternate-flowered Water-milfoil)
Myriophyllum spicata (Spiked Water-milfoil)
Mysotis arvensis (Field Forget-me-not)
Nardus stricta (Mat-grass)
Narthecium ossifragum (Bog Asphodel)
Nasturtium microphyllum (Winter Cress)
Nasturtium officinale (Water-cress)
Nuphar lutea (Yellow Water-lily)
Nymphaea alba (White Water-lily)
Odontites verna (Red Bartsia)
Oenanthe crocata (Hemlock Water-dropwort)
Oenanthe fistulosa (Tubular Water-dropwort)
Ononis repens (Common Restharrow)
Ononis spinosa (Spiny Restharrow)
Ophioglossum vulgatum (Adder's-tongue)
Ophrys apifera (Bee Orchid)
Orchis mascula (Early-purple Orchid)
Oreopteris limbosperma (Lemon-scented Fern)
Origanum vulgare (Marjoram)
Ornithopus perpusillus (Bird's-foot)
Orobanche minor (Common Broomrape)
Osmunda regalis (Royal Fern)
Oxalis acetosella (Wood-sorrel)
Oxyria digyna (Mountain Sorrel)
Papaver dubium (Long-headed Poppy)
Papaver rhoeas (Common Poppy)
Parapholis strigosa (Hard-grass)
Parentucellia viscosa (Yellow Bartsia)
Parietaria judacia (Pellitory-of-the-wall)
Parnassia palustris (Grass-of-Parnassus)
Pastinaca sativa (Wild Parsnip)
Pedicularis palustris (Marsh Lousewort)
Pedicularis sylvatica (Lousewort)
Peltigera canina (lichen)
Petasites hybridus (Butterbur)
Petroselinum segetum (Corn Parsley)
Phalaris arundinacea (Reed Canary-grass)
Phalaris canariensis (Canary-grass)
Phalaris minor (Lesser Canary-grass)
Phegopteris connectilis (Beech Fern)
Phragmites australis (Common Reed)
Phyteuma orbiculare (Round-headed Rampion)
Picris echioides (Bristly Oxtongue)
Picris hieraciodes (Hawkweed Ox-tongue)
Pimpinella major (Greater Burnet-saxifrage)
Pimpinella saxifraga (Burnet-saxifrage)
Pinguicula lusitanica (Pale Butterwort)
Pinguicula vulgaris (Common Butterwort)
Plagiomnium undulatum (moss)
Plagiothecium denticulatum (Sharp fern-like feather moss)
Plagiothecium undulatum (moss)

Plantago coronopus (Buck's-horn Plantain)
Plantago lanceolata (Ripwort Plantain)
Plantago major (Greater Plantain)
Plantago maritima (Sea Plantain)
Plantago media (Hoary Plantain)
Platanthera bifolia (Lesser Butterfly Orchid)
Platanthera chlorantha (Greater Butterfly-orchid)
Pleurozium schreberi (Red stemmed feather moss)
Poa angustifolia (Narrow-leaved Meadow-grass)
Poa annua (Annual Meadow-grass)
Poa compressa (Flattened Meadow-grass)
Poa pratensis (Smooth Meadow-grass)
Poa subcaerulea (Spreading Meadow-grass)
Polygala calcarea (Chalk Milkwort)
Polygonatum multiflorum (Solomon's-seal)
Polygonum amphibium (Amphibious Bisort)
Polygonum arenastrum (Small-leaved Knotgrass)
Polygonum aviculare (Knotgrass)
Polygonum bistorta (Common Bistort)
Polygonum hydropiper (Water-pepper)
Polygonum lapathifolium (Pale Persicaria)
Polygonum mite (Tasteless Water-pepper)
Polygonum persicaria (Redshank)
Polygonum viviparum (Alpine Bistort)
Polypodium vulgare (Polypody)
Populus tremula (Aspen)
Potamogeton natans (Broad-leaved Pondweed)
Potamogeton polygonifolius (Bog Pondweed)
Potentilla anglica (Trailing Tormentil)
Potentilla anserina (Silverweed)
Potentilla erecta (Tormentil)
Potentilla palustris (Marsh Cinquefoil)
Potentilla reptans (Creeping Cinquefoil)
Potentilla sterilis (Barren Strawberry)
Primula elatior (Oxlip)
Primula veris (Cowslip)
Primula vulgaris (Primrose)
Prunella vulgaris (Selfheal)
Prunus avium (Wild Cherry)
Prunus padus (Bird Cherry)
Prunus spinosa (Blackthorn)
Pseudorchis albida (Small-white Orchid)
Pseudoscleropodium purum (Neat meadow feather moss)
Pteridium aquilinum (Bracken)
Puccinellia distans (Reflexed Saltmarsh-grass)
Puccinellia fasciculata (Borrer's Saltmarsh-grass)
Puccinellia maritima (Common Saltmarsh-grass)
Pulicaria dysenterica (Common Fleabane)
Pulmonaria officinalis (Lungwort)
Pyrola minor (Common Wintergreen)
Ranunculus acris (Meadow Buttercup)
Ranunculus aquatilis (Common Water-crowfoot)
Ranunculus arvensis (Corn Crowfoot)
Ranunculus auricomus (Wood Crowfoot, Goldilocks)
Ranunculus bulbosus (Bulbous Buttercup)
Ranunculus ficaria (Lesser Celandine)
Ranunculus flammula (Lesser Spearwort)
Ranunculus fluitans ()
Ranunculus hederaceus (Ivy-leaved Crowfoot)

Ranunculus lingua (Great Spearwort)
Ranunculus omiophyllus ()
Ranunculus parviflorus (Small-flowered Buttercup)
Ranunculus peltatus ()
Ranunculus penicillatus ()
Ranunculus repens (Creeping Buttercup)
Ranunculus sardous (Hairy Buttercup)
Ranunculus sceleratus (Celery-leaved Buttercup)
Ranunculus trichophyllus ()
Raphanus maritimus (Sea Radish)
Raphanus raphanistrum (Wild Radish)
Reseda lutea (Wild Mignonette)
Rhacomitrium lanuginosum (Woolly fringe moss)
Rhamnus catharticus (Buckthorn)
Rhizomnium punctatum (moss)
Rhynchospora alba (White Beak-sedge)
Rhytidiadelphus loreus (moss)
Rhytidiadelphus squarrosus (Drooping-leaved feather moss)
Rhytidiadelphus triquetrus (Triangular-leaved feather moss)
Ribes uva-crispa (Gooseberry)
Rorippa amphibia (Great Yellow-cress)
Rorippa islandica (Northern Marsh Yellow-cress)
Rorippa palustris (Common Marsh Yellow-cress)
Rorippa sylvestris (Creeping Yellow-cress)
Rubia peregrina (Wild Madder)
Rubus caesius (Dewberry)
Rubus chamaemorus (Cloudberry)
Rubus idaeus (Rasberry)
Rubus saxatilis (Stone Bramble)
Rumex acetosa (Common Sorrel)
Rumex acetosella (Sheep's Sorrel)
Rumex crispus (Curled Dock)
Rumex hydrolapathum (Water Dock)
Rumex longifolius (Northern Dock)
Rumex maritimus (Golden Dock)
Rumex obtusifolius (Broad-leaved Dock)
Rumex palustris (Marsh Dock)
Rumex pulcher (Fiddle Dock)
Rumex rupestris (Shore Dock)
Ruscus aculeatus (Butcher's-broom)
Sagittaria sagittifolia (Arrowhead)
Sambucus nigra (Elder)
Samolus valerandi (Brookweed)
Sanguisorba minor (Salad Burnet)
Sanguisorba officinalis (Great Burnet)
Sanicula europaea (Sanicle)
Sarcocornia perennis ()
Saxifraga aizoides (Yellow Saxifrage)
Saxifraga granulata (Meadow Saxifrage)
Saxifraga hypnoides (Mossy Saxifrage)
Saxifraga oppositifolia (Purple Saxifrage)
Saxifraga stellaris (Starry Saxifrage)
Scabiosa columbaria (Small Scabious)
Schoenoplectus lacustris (Common Club-rush)
Schoenus nigricans (Black Bog-rush)
Scilla autumnalis (Autumn Squill)
Scilla verna (Spring Squill)
Scirpus maritimus (Sea Club-rush)
Scirpus sylvaticus (Wood Club-rush)

Scrophularia auriculata (Water Figwort)
Scrophularia nodosa (Common Figwort)
Scutellaria galericulata (Skullcap)
Scutellaria minor (Lesser Skullcap)
Sedum album (White Stonecrop)
Sedum forsteranum (Rock Stonecrop)
Sedum rosea (Roseroot)
Sedum telephinum (Orpine)
Sedum villosum (Hairy Stonecrop)
Selaginella selaginoides (Lesser Clubmoss)
Senecio aquaticus (Marsh Ragwort)
Senecio congestus (Marsh Fleawort)
Senecio erucifolius (Hoary Ragwort)
Senecio integrifolius (Field Fleawort)
Senecio jacobaea (Common Ragwort)
Senecio sylvaticus (Wood Groundsel)
Senecio viscosus (Sticky Groundsel)
Senecio vulgaris (Groundsel)
Serratula tinctoria (Saw-wort)
Seseli libanotis (Moon Carrot)
Sesleria albicans (Blue Moor-grass)
Sherardia arvensis (Field Madder)
Sibthorpia europaea (Cornish Moneywort)
Silaum silaus (Pepper-saxifrage)
Silene dioica (Red Campion)
Silene latifolia (White Campion)
Silene maritima (Sea Campion)
Silene vulgaris (Bladder Campion)
Sison amomum (Stone Parsley)
Sisymbrium altissimum (Tall Rocket)
Sisymbrium officinale (Hedge Mustard)
Smyrnium olusatrum (Alexanders)
Solidago virgaurea (Goldenrod)
Sonchus arvensis (Perennial Sow-thistle)
Sonchus asper (Prickly Sow-thistle)
Sonchus oleraceus (Smooth Sow-thistle)
Sonchus palustris (Marsh Sow-thistle)
Sorbus aria (Common Whitebeam)
Sorbus aucuparia (Rowan)
Sorbus torminalis (Wild Service Tree)
Sparganium emersum (Unbranched Bur-reed)
Sparganium erectum (Branched Bur-reed)
Spergularia marginata (Greater Sea-spurrey)
Spergularia marina (Lesser Sea-spurrey)
Spergularia rubra (Sand-spurrey)
Spiranthes spiralis (Autumn Lady's Tresses)
Stachys ambigua ()
Stachys arvensis (Field Woundwort)
Stachys officinalis (Betony)
Stachys palustris (Marsh Woundwort)
Stachys sylvatica (Hedge Woundwort)
Stellaria alsine (Bog Stitchwort)
Stellaria graminea (Lesser Stitchwort)
Stellaria holostea (Greater Stitchwort)
Stellaria media (Common Chickweed)
Stellaria neglecta (Greater Chickweed)
Stellaria nemorum (Wood Stitchwort)
Stellaria palustris (Marsh Stitchwort)
Suaeda maritima (Annual Sea-blite)

Suaeda vera (Shrubby Seablite)
Subularia aquatica (Awlwort)
Succisa pratensis (Devils'-bit Scabious)
Symphytum officinale (Common Comfrey)
Symphytum tuberosum (Tuberous Comfrey)
Symphytum uplandicum (Russian Comfrey)
Tamus communis (Black Bryony)
Tanacetum vulgare (Tansy)
Taxus baccata (Yew)
Teucrium scorodonia (Wood Sage)
Thesium humifusum (Bastard Toadflax)
Thlaspi arvense (Field Penny-cress)
Thuidium tamariscinum (moss)
Tilia cordata (Small-leaved Lime)
Tilia platyphyllos (Large-leaved Lime)
Tofieldia pusillata (Scottish Asphodel)
Torilis japonica (Upright Hedge-parsley)
Torilis nodusa (Knotted Hedge-parsley)
Tragopogon pratensis (Goat's-beard)
Trichophorum caespitosum (Deergrass)
Trientalis europaea (Chickweed Wintergreen)
Trifolium arvense (Hare's-foot Clover)
Trifolium campestre (Hop Trefoil)
Trifolium dubium (Lesser Trefoil)
Trifolium fragiferum (Strawberry Clover)
Trifolium medium (Zigzag Clover)
Trifolium micranthum (Slender Trefoil)
Trifolium pratense (Red Clover)
Trifolium repens (White Clover)
Trifolium squamosum (Sea Clover)
Trifolium striatum (Knotted Clover)
Triglochin maritima (Sea Arrowgrass)
Triglochin palustris (Marsh Arrowgrass)
Trisetum flavescens (Yellow Oat-grass)
Tussilago farfara (Colt's-foot)
Typha angustifolium (Lesser Bulrush)
Typha latifolia (Bulrush)
Ulex europaeus (Gorse)
Umbilicus rupestris (Navelwort)
Urtica dioica (Common Nettle)
Urtica urens (Small Nettle)
Utricularia intermedia (Intermediate Bladderwort)
Utricularia minor (Lesser Bladderwort)
Vaccinium myrtillus (Bilberry)
Vaccinium oxycoccus (Cranberry)
Vaccinium uliginosum (Bog Bilberry)
Vaccinium vitis-idaea (Cowberry)
Valeriana dioica (Marsh Valerian)
Valeriana officinalis (Common Valerian)
Verbascum nigrum (Dark Mullein)
Verbascum thapsus (Great Mullein)
Veronica agrestis (Green Field-speedwell)
Veronica anagallis-aquatica (Blue Water-speedwell)
Veronica arvensis (Wall Speedwell)
Veronica beccabunga (Brooklime)
Veronica catenata (Pink Water-speedwell)
Veronica chamaedrys (Germander Speedwell)
Veronica filiformis (Slender Speedwell)
Veronica hederifolia (Ivy-leaved Speedwell)

Veronica montana (Wood Speedwell)
Veronica officinalis (Heath Speedwell)
Veronica persica (Common Field-speedwell)
Veronica polita (Grey Field-speedwell)
Veronica scutellata (Marsh Speedwell)
Veronica serpyllifolia (Thyme-leaved Speedwell)
Vibernum lantana (Wayfaring-tree)
Viburnum opulus (Guelder-rose)
Vicia bithynica (Bithynian Vetch)
Vicia cracca (Tufted Vetch)
Vicia hirsuta (Hairy Tare)
Vicia sativa (Common Vetch)
Vicia sepium (Bush Vetch)
Vicia sylvatica (Wood Vetch)
Vicia tetrasperma (Smooth Tare)
Vinca minor (Lesser Periwinkle)
Viola arvensis (Field Pansy)
Viola canina (Heath Dog-violet)
Viola hirta (Hairy Violet)
Viola lutea (Mountain Pansy)
Viola odorata (Sweet Violet)
Viola palustris (Marsh Violet)
Víola tricolor (Wild Pansy)
Viscum album (Mistletoe)
Vulpia bromoides (Squirreltail Fescue)
Vulpia myuros (Rat's-tail-Fescue)
Wahlenbergia hederacea (Ivy-leaved Bellflower)
Wolffia arrhiza (Rootless Duckweed)
Zannichellia palustris (Horned Pondweed)

792 records selected.

CATEGORY 2 - AGGREGATES AND IDENTIFICATION DIFFICULTIES

NAME

Agrostis canina (Velvet Bent)
Agrostis sp (Bent-grass sp)
Agrostis vinealis (Brown Bent-grass)
Alchemilla vulgaris agg./glabra (Lady's-mantle)
Anagallis sp ()
Anthemis sp. (Chamomile/Stinking Mayweed)
Aphanes spp. (Parsley-piert)
Arctium spp. (Burdock)
Arenaria sp (Sea Sandwort)
Artemisia sp (Wormwood sp)
Asplenium sp ()
Atriplex glabriuscula (Babington's Orache)
Atriplex hastata (Spear-leaved Orache)
Atriplex laciniata (Frosted Orache)
Atriplex littoralis (Grass-leaved Orache)
Atriplex patula (Common Orache)
Atriplex prostrata (Hastate Orache)
Atriplex sp (Orache sp)
Avena sp (Oat sp)
Bare ground/rock ()
Beta spp. (Beet)
Betula spp. (Birch)
Bidens sp (Bur-marigold sp)

Brachythecium rutabulum (Rough-stalked feather moss)
Brachythecium sp. (moss)
Bromus sp (Brome sp)
Bryum spp. (moss)
Calamintha sp ((Calaminth sp))
Calliergon cuspidatum (moss)
Calliergon sp (moss)
Calliergon stramineum (moss)
Callitriche spp. (Water-starwort)
Calystegia sp (Bindweed)
Campanula sp (Bellflower sp)
Campylopus atrovirens (moss)
Campylopus fragilis (moss)
Campylopus introflexus (moss)
Campylopus paradoxus (moss)
Campylopus pyriformis/flexuosa (Fragile leaved moss)
Cardamine flexuosa (Wood Bitter-cress)
Cardamine hirsuta (Hairy Bitter-cress)
Cardamine hirsuta/flexuosa (Hairy Bitter-cress)
Cardamine sp (Bitter-cress sp)
Carduus sp (Thistle sp)
Carex pulicaris (Flea Sedge)
Carex pulicaris/serotina (Flea Sedge)
Carex spicata (Spiked Sedge)
Carex spp. (Sedge sp)
Centaurea sp (Knapweed sp)
Cerastium sp (Mouse-ear sp)
Chenopodium album/polyspermum (Fat-hen/Many-seeded Goosefoot)
Chenopodium bonus-henricus (Good King Henry)
Chenopodium ficifolium (Fig-leaved Goosefoot)
Chenopodium hybridium (Maple-leaved Goosefoot)
Chenopodium polyspermum (Many-seeded Goosefoot)
Chenopodium rubrum (Red Goosefoot)
Chenopodium sp (Goosefoot sp)
Chrysanthemum sp ()
Cirsium sp (Thistle sp)
Cladonia pyxidata/coccifera (lichen)
Cladonia sp (lichen)
Cornus sp ()
Coronopus sp (Swinecress sp)
Corydalis sp (Corydalis sp)
Crepis spp. (Hawk's-beard spp)
Dactylorhiza incarnata (Early Marsh Orchid)
Dactylorhiza maculata agg. (Heath Spotted-orchid)
Dactylorhiza majalis (Northern Marsh-orchid)
Dactylorhiza sp (Orchid)
Dicranum sp (moss)
Draba sp (Whitlow Grass)
Dryopteris aemula (Hay-scented Buckler-fern)
Dryopteris affinis (Scaly Male-fern)
Dryopteris carthusiana (Narrow Buckler-fern)
Dryopteris dilatata (Broad Buckler-fern)
Dryopteris dilatata/carthusiana (Buckler-fern)
Dryopteris expansa (Northern Buckler-fern)
Dryopteris filix-mas (Male-fern)
Dryopteris sp (Fern sp)
Eleocharis spp. (Spike-rush spp)
Elymus caninus (Bearded Couch-grass)
Elymus repens (Twitch)

Elymus sp (Couch-grass sp)
Epilobium brunescens ()
Epilobium lanceolatum (Spear-leaved Willow-herb)
Epilobium montanum (Broad-leaved Willowherb)
Epilobium obscurum ()
Epilobium parviflorum (Small-flowered Hairy Willow-herb)
Epilobium roseum (Pale Willowherb)
Epilobium spp. (Willowherb spp)
Epilobium tetragonum (Square-stemmed Willow-herb)
Equisetum spp. (Horsetail spp)
Eriophorum sp (Cottongrass sp)
Euphorbia agg. (Spurge)
Euphorbia exigua (Dwarf Spurge)
Euphorbia helioscopia (Sun Spurge)
Euphorbia peplus (Petty Spurge)
Euphrasia spp. (Eyebright)
Eurhynchium praelongum (Long trailing feather moss)
Eurhynchium spp. (moss)
Festuca sp (Fescue sp)
Filago sp (Cudweed sp)
Filipendula sp ()
Fumaria sp (Fumitory sp)
Galeopsis sp (Hemp-nettle sp)
Galium sp (Bedstraw sp)
Geranium sp (Crane's-bill sp)
Glyceria sp (Sweet-grass sp)
Gnaphalium sp (Cudweed sp)
Hieracium spp. (Hawkweed spp)
Hymenophyllum sp (Filmy-fern sp)
Hypericum sp (St John's-wort sp)
Hypnum cupressiforme (Cypress-leaved feather moss)
Hypochoeris glabra (Smooth Cat's Ear)
Hypochoeris radicata (Common Cat's Ear)
Hypochoeris spp. (Cat's Ear sp)
Hypochoeris spp./Leontodon spp. (Cat's-ear spp./Hawkbit spp.)
Juncus acutiflorus (Sharp-flowered Rush)
Juncus articulatus (Jointed Rush)
Juncus articulatus/acutiflora (Jointed/Sharp-flowered Rush)
Juncus hybrids ()
Juncus sp (Rush sp)
Koeleria sp (Hair-grass)
Lamium sp (Dead-nettle sp)
Lathyrus sp (Vetchling sp)
Lemna sp (Duckweed sp)
Leontodon autumnalis (Autumnal Hawkbit)
Leontodon hispidus (Rough Hawkbit)
Leontodon spp. (Hawkbit sp)
Leontodon taraxoides (Hairy Hawkbit)
Linum sp (Flax sp)
Lophocolea spp. (moss)
Lotus sp (Bird's-foot-trefoil)
Luzula campestris (Sweep's Brush, Field Wood-rush)
Luzula multiflora (Heath Wood-rush)
Luzula multiflora/campestris (Heath/Field Wood-rush)
Luzula sp (Wood-rush sp)
Lycopodium sp (Clubmoss sp)
Marchantia spp. (moss)
Medicago sp (Medick sp)
Mentha aquatica (Water Mint)

Mentha arvensis (Corn Mint)
Mentha spp. (Mint spp)
Mentha suaveolens (Round-leaved Mint)
Mnium spp. (moss)
Myosotis arvensis (Field Forget-me-not)
Myosotis discolor (Changing Forget-me-not)
Myosotis laxa (Tufted Forget-me-not)
Myosotis ramosissima (Early Forget-me-not)
Myosotis scorpioides (Water Forget-me-not)
Myosotis secunda (Creeping Forget-me-not)
Myosotis spp. (Forget-me-not spp)
Myriophyllum sp (Water-milfoil sp)
Nasturtium sp ()
Oenanthe sp (Water-dropwort sp)
Open water ()
Orobanche sp (Broomrape sp)
Parmelia sp ()
Pellia spp. (liverwort)
Phleum bertolonii (Smaller Cat's-tail)
Phleum pratense (Timothy)
Phleum sp (Cat's Tail sp)
Plagiothecium sp (moss)
Poa nemoralis (Wood Meadow-grass)
Poa nemoralis/trivialis (Wood/Rough Meadow-grass)
Poa sp (Meadow-grass sp)
Poa trivialis (Rough Meadow-grass)
Pohlia sp ()
Polygala serpyllifolia (Heath Milkwort)
Polygala vulgaris (Common Milkwort)
Polygala vulgaris/serpyllifolia (Common/Heath Milkwort)
Polygonum sp (Knotgrass sp)
Polystichum aculeatum (Hard Shield-fern)
Polystichum setiferum (Soft Shield-fern)
Polystichum setiferum/aculeatum (Soft/Hard Shield-fern)
Polystichum sp (Shield-fern sp)
Polytrichum commune (Common bank hair moss)
Polytrichum formosum (Bank hair moss)
Potamogeton sp (Pondweed sp)
Potentilla sp (Cinquefoil sp)
Primula scotica/farinosa (Scottish/Bird's-eye Primrose)
Prunus sp (Cherry sp)
Puccinellia sp (Saltmarsh-grass sp)
Quercus spp. (Oak spp)
Ranunculus sp (Buttercup, Crowfoot sp)
Raphanus sp (Radish sp)
Rhacomitrium spp. (moss)
Rhinanthus spp. (Yellow-rattle)
Ribes nigrum/rubrum (Black/Red Currant)
Ribes rubrum (Red Currant)
Ribes sp (Currant sp)
Rorippa sp (Yellow-cress sp)
Rosa spp. (Rose spp)
Rubus fruticosus (Bramble)
Rumex conglomeratus (Sharp Dock)
Rumex conglomeratus/sanguineus (Clustered/Blood-veined Dock)
Rumex sanguineus (Red-veined Dock)
Rumex sp (Dock sp)
Sagina spp. (Pearlwort spp)
Salicornia dolichostachya ()

Salicornia ramosissima/europaea (Glasswort)
Salicornia sp (Glasswort sp)
Salix alba (White Willow)
Salix atrocinerea (Rusty Willow)
Salix aurita (Eared Willow)
Salix caprea (Goat Willow)
Salix cinerea (Grey Willow)
Salix fragilis (Crack Willow)
Salix herbacea (Dwarf Willow)
Salix lapponum (Downy Willow)
Salix myrsinifolia (Dark-leaved Willow)
Salix phylicifolia (Tea-leaved Willow)
Salix repens (Creeping Willow)
Salix reticulata (Net-leaved Willow)
Salix spp. (Willow spp)
Salix viminalis (Osier)
Scirpus sp (Club-rush sp)
Scrophularia sp (Figwort sp)
Sedum acre (Biting Stonecrop)
Sedum anglicum (English Stonecrop)
Sedum anglicum/acre (English/Biting Stonecrop)
Sedum sp (Stonecrop sp)
Senecio sp (Ragwort)
Silene sp (Campion sp)
Sinapis arvensis/alba (Charlock/White Mustard)
Solanum dulcamara/nigra (Bittersweet/Black Nightshade)
Sonchus sp (Sow-thistle sp)
Sparganium sp (Bur-reed sp)
Spartina spp. (Cord-grass spp)
Spergula arvensis/Spergularia rupicola (Corn Spurrey)
Spergularia sp (Spurrey sp)
Sphagnum (green/fat) (bog mosses)
Sphagnum (green/thin) (bog mosses)
Sphagnum (red/fat) (bog mosses)
Sphagnum (red/thin) (bog mosses)
Sphagnum spp. (bog mosses)
Stachys sp (Woundwort sp)
Stellaria sp (Stitchwort sp)
Symphytum sp (Comfrey sp)
Taraxacum agg. (Dandelion)
Thalictrum alpinum (Alpine Meadow-rue)
Thalictrum flavum (Common Meadow-rue)
Thalictrum minus (Lesser Meadow-rue)
Thymus praecox (Common Thyme)
Thymus praecox/serpyllum (Common/Breckland Thyme)
Thymus serpyllum (Breckland Thyme)
Tilia sp (Lime sp)
Total bryophyte ()
Total lichen ()
Trifolium sp (Clover sp)
Tripleurospermum inodorum (Scentless Mayweed)
Tripleurospermum maritimum (Sea Mayweed)
Tripleurospermum maritimum/inodorum (Sea/Scentless Mayweed)
Ulex gallii (Western Gorse)
Ulex minor (Dwarf Gorse)
Ulmus carpinifolia (Small-leaved Elm)
Ulmus glabra (Wych Elm)
Ulmus minor (English Elm)
Ulmus sp (Elm)

Utricularia sp (Bladderwort sp)
Verbascum sp (Mullein sp)
Veronica sp. (Speedwell spp)
Vicia sp (Vetch sp)
Viola reichenbachiana (Early Dog-violet)
Viola riviniana (Common Dog-violet)
Viola riviniana/reichenbachiana (Dog-violet)
Viola sp. (Violet spp)
Vulpia sp (Fescue)

268 records selected.

CATEGORY 3 - NATURALIZED

NAME

Acer platanoides (Norway Maple)
Acer pseudoplatanus (Sycamore)
Aegopodium podagraria (Ground-elder)
Allium carinatum ()
Apera sp (Silky Bent)
Armoracia rusticana (Horse-radish)
Asarum europaeum (Asarabacca)
Azolla filiculoides (Water Fern)
Brassica nigra (Black Mustard)
Buddleja davidii (Butterfly Tree)
Cardaria draba (Hoary Cress, Hoary Pepperwort)
Castanea sativa (Sweet Chestnut)
Centranthus ruber (Red Valerian)
Conyza canadensis (Canadian Fleabane)
Cotoneaster microphyllus (Small-leaved Cotoneaster)
Cymbalaria muralis (Ivy-leaved Toadflax)
Doronicum spp. (Leopard's-bane)
Elodea canadensis (Canadian Waterweed)
Elodea nuttallii ()
Elodea sp (Pondweed sp)
Epilobium ciliatum (American Willowherb)
Epilobium nerterioides (New Zealand Willowherb)
Fagus sylvatica (Beech)
Galega officinalis (Goat's-rue, French Lilar)
Galinsoga ciliata (Shaggy Soldier)
Galinsoga parviflora (Gallant Soldier, Joey Hooker)
Heracleum mantegazzianum (Giant Hogweed)
Hesperis matronalis (Dame's Violet)
Impatiens capensis (Orange Balsam)
Impatiens glandulifera (Indian Balsam)
Impatiens parviflora (Small Balsam)
Larix spp. (Larch spp)
Lathyrus latifolius (Everlasting-pea)
Lathyrus tuberosus (Tuberous Pea)
Linaria repens (Pale Toadflax)
Lolium multiflorum (Italian Rye-grass)
Lolium perenne X multiflorum (Rye-grass hybrid)
Mahonia aquifoilium (Oregon Grape)
Mahonia japonica ()
Malva pusilla (Small Mallow)
Medicago sativa (Lucerne)
Melilotus altissima (Tall Melilot)
Melilotus sp (Melilot sp)

Mentha spicata (Spear Mint)
Mimulus guttatus (Monkey flower)
Mimulus luteus (Blood-drop-emlets)
Mimulus sp (Monkey flower sp)
Montbretia sp ()
Montia perfoliata (Springbeauty)
Montia sibirica (Pink Purslane)
Myrrhis odorata (Sweet Cicely)
Narcissus pseudonarcissus (Wild Daffodill)
Narcissus spp. (Daffodil spp)
Onobrychis viciifolia (Sainfoin)
Onopordum acanthium (Cotton Thistle)
Ornithogalum sp (Star-of-Bethlehem sp)
Oxalis corymbosa ()
Papaver argemone (Long Prickly-headed Poppy)
Papaver somniferum (Opium Poppy)
Papaver sp (Poppy sp)
Pentaglottis sempervirens (Green Alkanet)
Petasites albus (White Butterbur)
Petroselinum crispum (Garden Parsley)
Picea sitchensis (Sitka Spruce)
Picea sp (Spruce sp)
Pinus sylvestris (Scots Pine)
Poa chaixii (Broad-leaved Meadow-grass)
Prunus domestica (Wild Plum)
Prunus laurocerasus (Cherry Laurel)
Quercus cerris (Turkey Oak)
Reynoutria japonica (Japanese Knotweed)
Rhododendron ponticum (Rhododendron)
Rhododendron spp. ()
Sambucus racemosa (Red-berried Elder)
Saponaria officinalis (Soapwort, Bouncing Bett)
Saxifraga spathularis (London Pride)
Senecio squalidus (Oxford Ragwort)
Sinapis alba (White Mustard)
Solidago canadensis ()
Symphoricarpus albus (Snowberry)
Symphoricarpus sp ()
Tanacetum parthenium (Feverfew)
Tanacetum sp ()
Tolmiea menziesii ()
Trifolium hybridum (Alsike Clover)
Trifolium incarnatum (Crismen Clover)
Vicia villosa (Fodder Vetch)

87 records selected.

CATEGORY 4 - PLANTED

NAME

Abies alba (Silver Fir)
Abies sp (Fir sp)
Acorus calamus (Sweet Flag)
Aesculus hippocastanum (Horse-chestnut)
Allium cepa (Onion)
Berberis sp ()
Beta vulgaris (Sugar Beet)
Brassica hirta (White Mustard)

Brassica oleracea (Cabbage)
Brassica oleracea (Kale)
Brassica sp (Mustard sp)
Buxus sempervirens (Box)
Calendula officinalis ()
Chamaecyparis lawsoniana (Lawson's Cypress)
Cornus mas (Cornelian Cherry)
Cultivated flowers ()
Cupressus sp (Cypress sp)
Daucus carota (crop) (Carrot)
Delphinium sp ()
Fagopyrum esculentum (Buckwheat)
Field bean ()
Fragaria X ananassa (Garden Strawberry)
Fuchsia magellanica (Hedge Fuchsia)
Helianthus annuus (Common Sunflower)
Helianthus tuberosus (Jerusalem Artichoke)
Hordeum distichon (2-rowed Barley)
Hordeum vulgare (Barley)
Inula helenium (Elecampane)
Juglans regia (Walnut)
Kerria japonica ()
Laburnum anagyroides (Laburnum)
Ligustrum ovalifolium (Garden Privet)
Ligustrum sp (Privet sp)
Lilium speciosum ()
Linum usitatissimum (Linseed, Flax)
Lycopersicon esculentum ()
Malus domestica (Cultivated apples)
Millet (Millet)
Picea abies (Norway Spruce)
Pinus contorta (Lodgepole Pine)
Pinus nigra (Austrian Pine)
Pinus sp (Pine sp)
Pisum sativum (Garden/Field Pea)
Populus nigra (Black Poplar)
Populus sp (Poplar sp)
Pseudotsuga menziesii (Douglas Fir)
Pseudotsuga spp. (Fir spp)
Pyrus cultivar (Pear)
Reseda phyteuma ()
Rheum sp ()
Rubus spectabilis ()
Secale cereale (Rye)
Senecio smithii ()
Sequoia giganteum (Wellingtonia)
Solanum tuberosum (Pototo)
Sorbus intermedia (Swedish Whitebeam)
Syringa vulgaris (Lilac)
Tamarix spp. (Tamarisk)
Thuja spp. (Cedar)
Tilia hybrids (Lime hybrids)
Triticum aestivum (Wheat)
Tsuga heterophylla (Western Hemlock-spruce)
Tulipa sp (Tulip)
Vicia faba (Broad Bean)
Zea mays (Maize)

65 records selected.

CATEGORY 5 - BRYOPHYTES AND NOVELITIES

NAME

Amblystegium serpens (moss)
Aneura pinguis ()
Aulacomnium androgynum (Bud-headed Thread Moss)
Barbula sp (Beard mosses)
Bazzania sp ()
Blindia acuta (moss)
Brachythecium rivulare (moss)
Calypogeia sp ()
Campylium sp (moss)
Cephalozia sp ()
Ceratodon sp (moss)
Cetraria sp ()
Cirriphyllum sp (moss)
Cladonia rangiformis (lichen)
Climacium dendroides (moss)
Conocephalium conium (Great scented liverwort)
Cornicularia aculeata ()
Cratoneuron commutatum (moss)
Cratoneuron filicinum (moss)
Ctenidium molluscum (Plumy crested feather moss)
Dicranella palustris (moss)
Dicranella sp (moss)
Dicranum bonjeanii (moss)
Diplophyllum albicans (moss)
Ditrichum sp (moss)
Drepanocladus revolvens (moss)
Drepanocladus spp. (moss)
Drepanocladus uncinatus (moss)
Fissidens sp (Fork moss)
Fontinalis antipyretica (Willow moss)
Fucus sp ()
Fucus spiralis ()
Fucus vesiculosus ()
Funaria hygrometrica (Common cord moss)
Grimmia sp (moss)
Homalothecium lutescens (moss)
Hookeria lucens (moss)
Hypnum jutlandicum (moss)
Hypogymnia physodes (moss)
Hypogymnia sp (moss)
Isopterygium sp (moss)
Isothecium myosuroides (moss)
Lunularia cruciata (Crescent cup liverwort)
Mylia taylori ()
Myurium hochstetteri (moss)
Nardia scalaris ()
Neckera crispa (moss)
Oligotrichum sp (moss)
Pelvetia canescens ()
Phascum cuspidatum (moss)
Philonotis fontanum (Fountain apple moss)
Plagiochila sp ()
Plagiomnium affine (moss)
Pleurozia purpurea ()
Pognatum aloides (moss)

Polytrichum alpestre (moss)
Polytrichum alpinum (moss)
Polytrichum juniperinum (Juniper-leaved hair moss)
Polytrichum juniperinum/piliferum (moss)
Polytrichum piliferum (Bristle-pointed hair moss)
Polytrichum sp (moss)
Polytrichum urnigerum (moss)
Pottia sp (moss)
Ptilium crista-castrensis (Ostrich-plume feather moss)
Ramalina sp ()
Rhynchostegium ripariodes (moss)
Riccardia sp ()
Scapania sp ()
Scorpidium scorpiodes (moss)
Splachnum sp (moss)
Tetraphis pellucida (moss)
Thamnobryum alopecurum (Fox tail feather moss)
Tortula sp (Screw moss)

73 records selected.

Natural
Environment
Research
Council