

BSBI and BRC/CEH: an enduring partnership

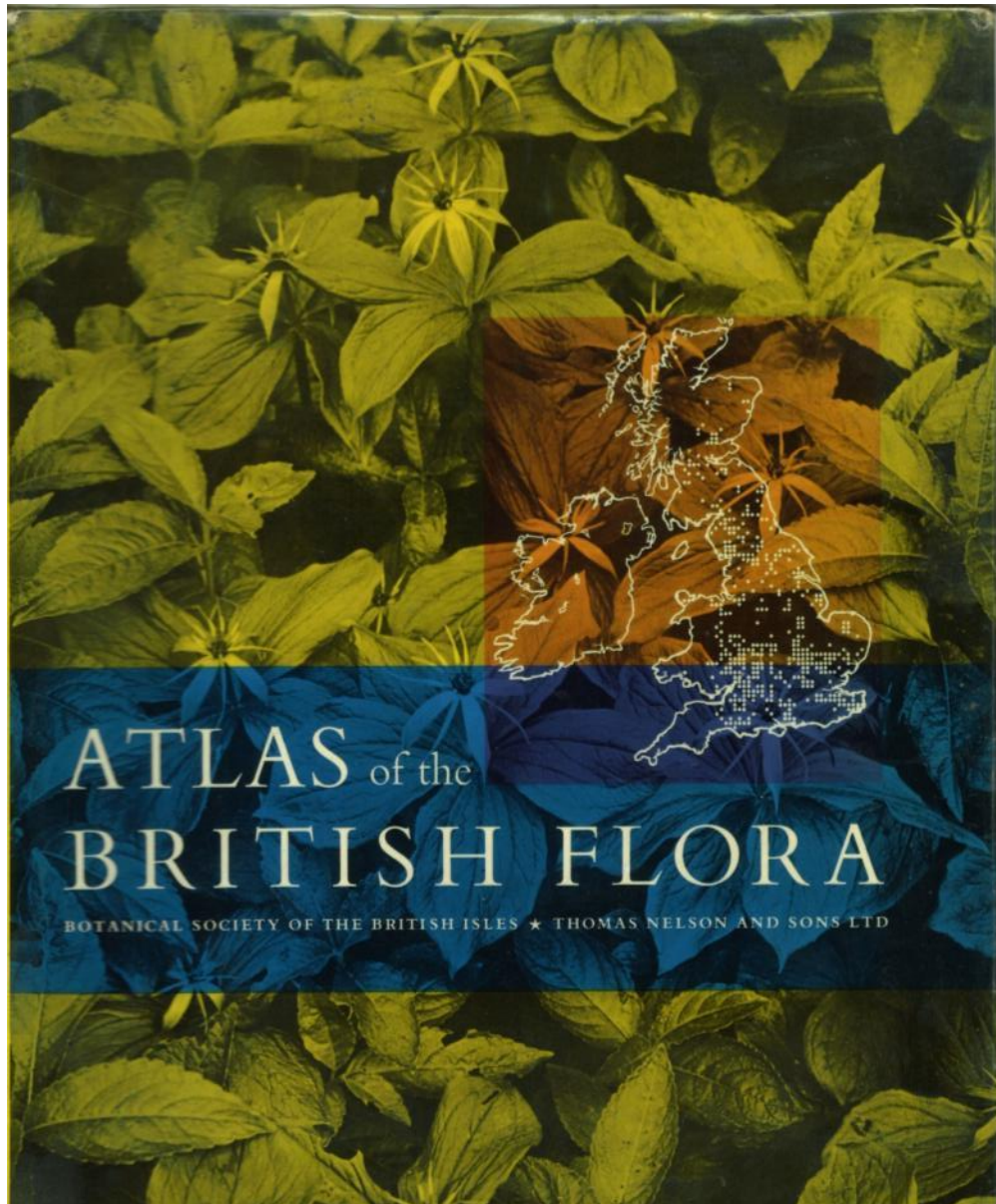


Chris Preston
BRC (ret'd) and BSBI

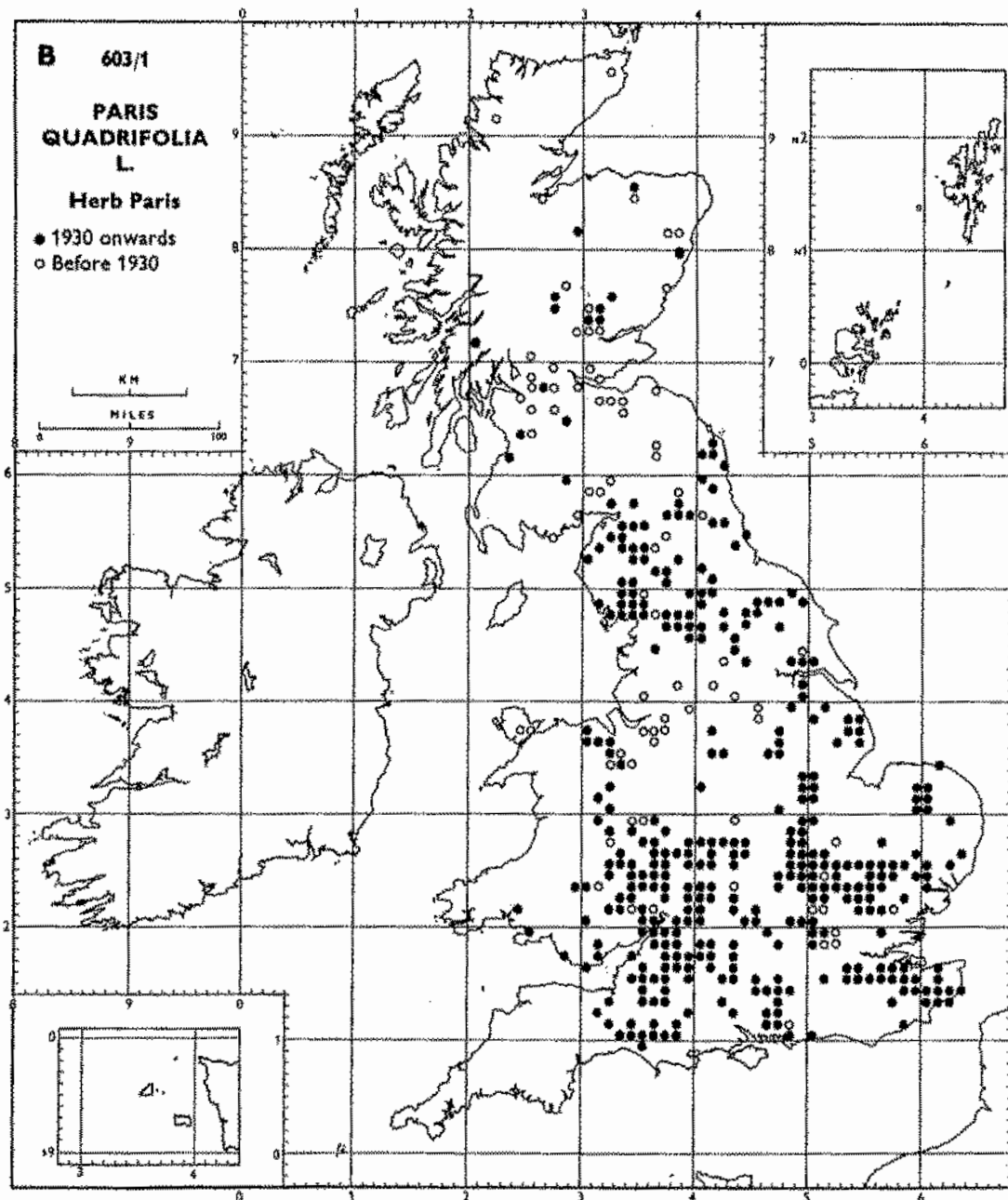
<i>plenium adiantum-nigrum</i>	Aspl	N	n	0.35	45	p	hc	h	0	8	3	2146	708	14				
<i>plenium maritimum</i>	Aspl	N	n	0.02	35	p	hc	h	0	8	2	530	172	12				
<i>plenium obovatum</i>	Aspl	N	s	-0.18	30	p	hc	h	0	9	1	135	19	11				
<i>plenium onopteris</i>	Aspl	N	o		45	p	hc	h	0	9	1	0	34	0				
<i>plenium ruta-muraria</i>	Aspl	N	n	0.15	12	p	hc	h	0	7	6	2184	898	11				
<i>plenium septentrionale</i>	Aspl	N	s	-0.08	15	p	hc	h	0	7	3	55	2	0				
<i>plenium trichomanes</i>	Aspl	N	n	0.07	35	p	hc	h	0	8	6	2294	911	12				
<i>plenium viride</i>	Aspl	N	n	0.21	20	p	hc	h	0	4	5	135	43	0				
<i>ter (alien N</i>													53	5				
<i>ter lanceola</i>													5	0				
<i>ter lanceola</i>																		
<i>x salignus)</i>													9	0				
<i>ter linosyris</i>													0	0				
<i>ter novae-a</i>													0	1				
<i>ter novi-bel</i>													12	3				
<i>ter tripolium</i>													267	3				
<i>tragalus alp</i>													0	0				
<i>tragalus danicus</i>	Faba	N	n	-0.88	30	p	hc	h	0	7	6	342	2	0				
<i>tragalus glycyphyllos</i>	Faba	N	n	-0.36	100	p	hc	h	0	7	3			0				
<i>hyrium dissentifolium</i>	Wood	N	s	0.38	30	p	hc	h	0	1	6			0				
<i>hyrium filix-femina</i>	Wood	N	n	0.25	90	p	hc	h	0	5	6			12				
<i>hyrium</i>			r		20	p	hc	h	0	1	1			0				
<i>riplex g</i>			n	-0.93	33	a	Th	h	0	5	2			10				
<i>riplex l</i>			n	0.38	30	a	Th	h	0	7	1			13				
<i>riplex littoralis</i>	Chen	N	n	1.59	100	a	Th	h	0	7	6			3				
<i>riplex longipes</i>	Chen	N	s		90	a	Th	h	0	4	3			0				
<i>riplex patula</i>												2318	787	12				
<i>riplex pedunculata</i>												20	0	0				
<i>riplex portulacoides</i>												322	68	10				
<i>riplex praecox</i>												62	0	0				
<i>riplex prostrata</i>												1847	349	5				
<i>ropa belladonna</i>												414	0	0				
<i>ena fatua</i>												1556	170	5				
<i>ena sativa</i>												728	131	4				
<i>ena strigosa</i>												270	72	6				
<i>olla filiculoides</i>												660	21	9				
<i>ldellia ranunculoides</i>												536	344	6				
<i>illota nigra</i>	Lami	AR		-0.37	100	p	hc	h	Rhiz2	8	3	1365	70	12				
<i>rbarea intermedia</i>	Bras	AN		1.92	60	b	hc	h	0			Eur	735	207	7			
<i>rbarea stricta</i>	Bras	AN		0.50	100	h	n	hc	h	0	5	4	c	Eur	As1	104	1	0



The Battle of Waterloo 1815 *William Sadler II*



(1962)



- mapping in grid squares
- covered all species
- recruited volunteers
- field records accepted
- mechanised mapping



Demonstration of equipment at launch of Atlas, 1954

LOCALITY

Headington Wick

HABITAT

dry and grassland + Herodictyon

SOUTH WEST

Date 6.54 V.C. No. 23
 V.C. Oxon
 Alt. 300 Code No. 200

E.F. Warburg

Acer cam 176	Arum mac 350	Carex bin 528	Clema vit 758	Eryng mar 949	Halim por 952
pse 177	neg 355	car 530	Clino vul 759	Erysi che 952	Heder hel 955
Achil mil 179	Aspar off 357	con 532	Cochl ang 762	Euony eur 955	Helia cha 961
pta 182	Asper cyn 366	533	dau 763	Eupat can 961	Helic pra

R.A. Graham & R.M. Harley

LOCALITY

Purbeus of Goring station.

HABITAT

Roadside hedgerows and a little rough ground. Chalky.

SOUTH EAST

Date 28/5/55
 V.C. No. 23 V.C. Oxon
 Alt. 101/62

Grid Ref. 4160150

3 Acer cam 207	Astra dan 361	Carex dem 538	Colch aut 771	Eupho exi 961	Helic pra 962
5 pse 208	gly 363	dia 540	Coniu mac 772	hel 962	pub 968
6 Acera ant 211	Athyra fil 366	distans 541	Conop maj 777	peplus 968	Herac sph 976
7 Achil mil 212	Atrip gla 367	disticha 544	Convo arv 783	ang 979	Hiera pil 980
9 pta 214	has 368	divisa 548	Coron sar 798	nem 980	Hippo rha 981
12 Acino arv 217	lit 369	divulsa 550	Coron var 798	pse 981	Hippu vul 983
15 Acoru cal 218	pat 370	ech 551	Coron did 801	ros 983	Holcu lan 984
19 Adoxa mos 216	sab 371	ela 552	Coron squ 804		mol 988
20 Aegop pod 220	Avena fat 373	eri 555	Coryd cla 804		Honke pep 989
2241 Aescu hip 221	lud 374	ext 556	lut 804		Horde eur 991
21 Aethu cyn 224	Balde ran 381	flacca 557	Coryl ave 810	Fagus syl 813	Horde mar 992
22 Agrim cup 225	Ballo nig 382	hir 569	Crata mon 816	Festu aru 821	mur 993
23 odo 229	Barba vul 385	hos 570	oxy 816	gig 821	sec 995
26 Agrop can 231	Belli per 386	las 571	Crepi bie 823	*ovi 824	Hotto pal 996
28 jun 232	Berber vul 387	lep 572	cap 824	pra 824	*rub 996
32 pun 232	Berber vul 393	lep 578	tar 824	ger 830	Humul lup 998
33 rep 234	Berul ere 396	nig 588	Cuscu epi 831	Filag ger 831	Hydro mor 999
35 Agros can 235	Beta mar 397	otr 589	epith 833	min 834	Hydro vul 1003
36 g'g 240	Betul pub 397	ova 592	Cymba mur 834	Filip ulm 834	Hyper and 1004
39 sto 241	Biden cer 399	pal 596	Cynog off 835	vul 836	cal 1008
40 ten 242	tri 400	pal 597	Cynos cri 836	Foeni vul 836	dub 1010
41 Aira car 243	Black per 401	panicca 607	Fraga ana 838	ana 838	elo 1011
42 pra 244	Blech spi 404	panicula 617	Dacty glo 839	ves 841	hir 1014
46 Ajuga rep 245	Blysm com 405	pen 620	Daphn lau 841	aln 847	hum 1015
57 Alche ves 248	Botry lun 406	pil 627	Daucu car 847	exe 849	per 1016
60 xan 250	Brach pin 407	pol 628	Desch cae 854	cap 854	pul 1018
62 Alism lan 251	Brass nap 412	pse 630	Desma mar 855	mle 855	tet 1020
63 pla 252	nig 413	pul 630	Desma mar 856	off 858	Hypoc gla 1022
64 Allia pet 253	ole 414	rem 640	Digit pur 858	vai 858	rad 1023
75 Alliu urs 254	rap 419	rip 644	Diplo mur 858		ama 1023
76 vin 254		ser 644			lex au

POST CARD



CIVIL SERVICE
JOINTLY
POSTAGE

The Botanical Society of the British Isles
Botany School

Downing St.
Cambridge

Lady's Tresses
(Antennaria)

Bournemouth
16.9.55.

I doubt if the following information is of any
use for your records - but send it in case.

Between 1889 + 1891 ^{being then 9-11 years old.} (inclusive), I found several
plants each year on common land near Bournemouth
during the last week of August or first ^{half} of ^{the} week of
September. (It was then known as *Neottia spiralis*)
In after years I never revisited this district nor
any other likely spot at the right season,
until ^{September} 1951 when I saw 2 or 3 tall specimens 8-10 inches,
on the cliffs a little west of Swanage. ^{End}





1. OBJECT

To collect data on and prepare maps of the distribution of the Flowering Plants and Trees in the British Isles.



2. BASIS

Presence or absence of the species within each 10-mile square and squares of the National Grid, of which there are about 1,300 covering the British Isles. A 2 1/2" map covers each square exactly.

3. COLLECTION OF DATA

(a) The majority of the records are collected in the form of lists, on regional record cards, sent in by amateur and professional botanists throughout the country. Each of the seven different regional cards carries the Latin names in abbreviated form, of most of the species likely to be found in the area.

(b) Data are sent in on herbaria and literature on individual species. A special form is used in particular cases.



Card sorter installed at BRC, Maggie Horrill operating it

B. LIST OF SURVEYS AND SCHEMES INVOLVING THE B.R.C.

Subject	Responsibility	Period	BRC	
M	DISTRIBUTION MAP SCHEMES			
M1	Flowering plants and ferns	BSBI/NC	1954-68	FHP
M2	Lepidoptera	NC/BRC	1967-77	JH
M3	Bryophytes	BBS	1960-	FHP
M4	Lichens	BLS	1966-	FHP
M5	Deer	FDS	1967-	FHP
M6	Reptiles and Amphibians	NC/BRC	1965-70	FHP
M7	Birds	BTO	1968-72	FHP
M8	Freshwater Fish	NC	1966-	FHP
M9	Fleas	Mr. R. George	1950-	FHP
M10	Spiders	BSSG	1964-	FHP
M11	Dragonflies	NC/BRC	1968-	JH
M12	Molluscs	Conch Soc	1962-	FHP
M13	Leeches	Mr. T. T. Mann	1950-	FHP
M14	Simuliidae	Mr. L. Davies	1950-	FHP
M15	Ants	Mr. K. Barrett	1964-	FHP
M16	Ticks	Mr. G. Thompson	1945-	FHP
M17	Cave Life	Cave Research Group	1938-	FHP
M18	Bryophyte communities	Mr. P. D. Coker	1967	FHP
E	EUROPEAN MAPPING SCHEMES			
E1	Flora Europea	Committee	1967-	FHP, MNH
E2	Insecta Europea	IE Working Party	1968-?88	JH
S	SPECIES			

S1 Ringing recoveri (From paper prepared by F.H. Perring, G.F. Peterken & G.L. Radford
S2 Ringing counts for BRC Advisory Sub-Committee, 15 October 1968)

Critical supplement (1968)

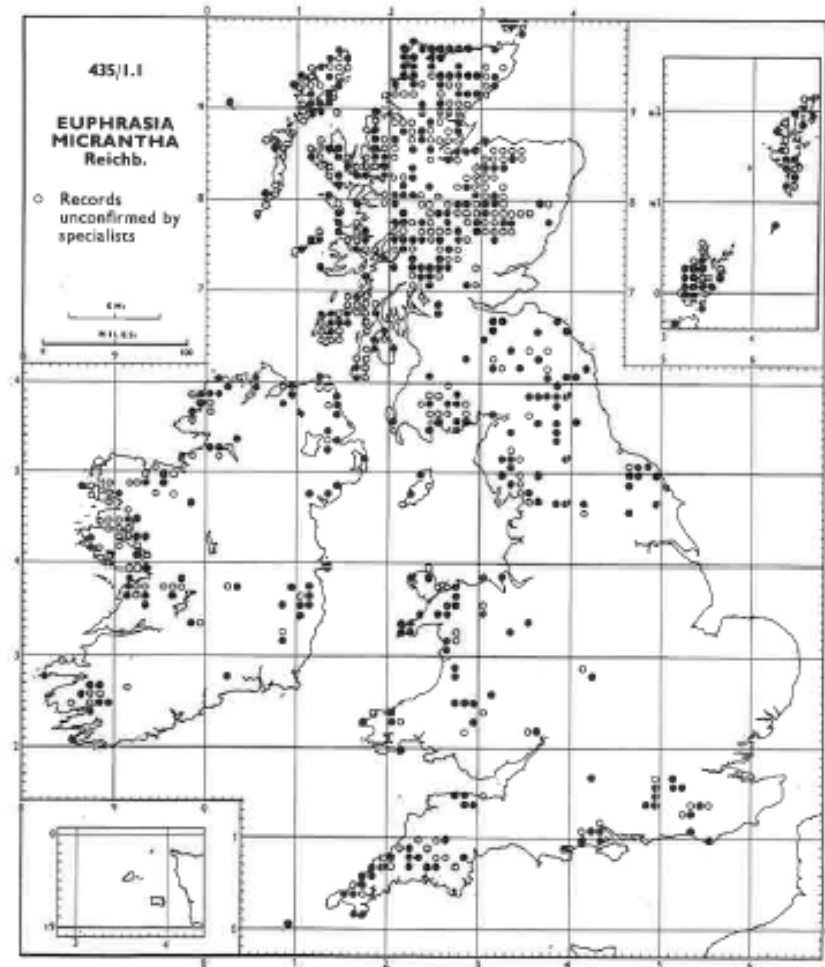
435 EUPHRASIA L.

The preparation of the maps of this difficult genus would not have been possible without the great contribution made by P. D. Sell, E. F. Warburg and P. F. Yeo in determining the many specimens which have been brought to them, or which they have themselves collected during the last decade. I am especially grateful to Dr Yeo, who had the misfortune to be the most accessible expert to me, but who bore the brunt of the identification, and in addition generously made available extensive notes and a card index of records which he has collected together from the literature and from herbarium material which he has seen.

The maps are based on material seen by these three experts, and by H. W. Pugsley in the past. Data from the monograph by Pugsley (1930) have been included as well as some records supplied by E. O. Callen. For a number of common and widespread species field records have been accepted when they are from a 10 km. square adjacent to a square from which a record passed by an authority has been obtained.

The notes on the species which follow were prepared in collaboration with P. F. Yeo.

435 EUPHRASIA



VASCULAR PLANTS

Compiled by

F. H. PERRING and L. FARRELL

Biological Records Centre
Institute of Terrestrial Ecology



(Badger)



(Frog orchid)



(Panda)

Mentha pulegium L.

Pennyroyal

This creeping perennial of pond and lake margins and of damp grassland near the sea was formerly scattered throughout the lowlands of England and Wales where it was recorded from 55 of the the 71 vice-counties. It was also known from 13 out of 40 Irish vice-counties, mainly in the south but with a few localities around L. Neagh in the north, and from three of the Channel Isles. However it has declined rapidly in the first half of this century with improved drainage and the filling in of ponds or the cessation of goose and duck grazing round their margins. Since 1960 Pennyroyal has only been recorded from about 14 localities in Cornwall, Devon, Dorset, Hampshire, Sussex, Surrey, Berkshire, Brecon, Leicestershire and from Jersey in the Channel Isles. There are no recent records from Ireland.

14/∞ GB post 1960
1/3 S post 1970
0/32 H post 1960

1 FSCR

TN = 10 V

Published by

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with the financial support of THE WORLD WILDLIFE FUND

1977

1978-1980 –a very rocky patch

BSBI News September 1978

NEWS FROM MONKS WOOD

Revision of the Atlas of the British Isles

Following the publication earlier this year of the *Atlas of Ferns*, work is beginning on the second of a series of Atlases to be published over the next 10 years which, when complete, will constitute a complete revision of the *Atlas of the British Flora*.

F.H. PERRING

1978-1980 –a very rocky patch

BSBI News December 1978

FRANK SPEAKING

This will be the last 'News from Monks Wood' which I shall sign. I am leaving at the end of the year to succeed Ted Smith as General Secretary of the Society for the Promotion of Nature Conservation.

I shall be sorry in many ways not to be able to devote so much of my time in future to work of direct interest to the BSBI: it is now 25 years all but a few months since I was appointed as Dr Walters' assistant on the Maps Scheme, and all that I have done since stems from those early happy days. However, I shall not be giving up botany completely,

1978-1980 –a very rocky patch

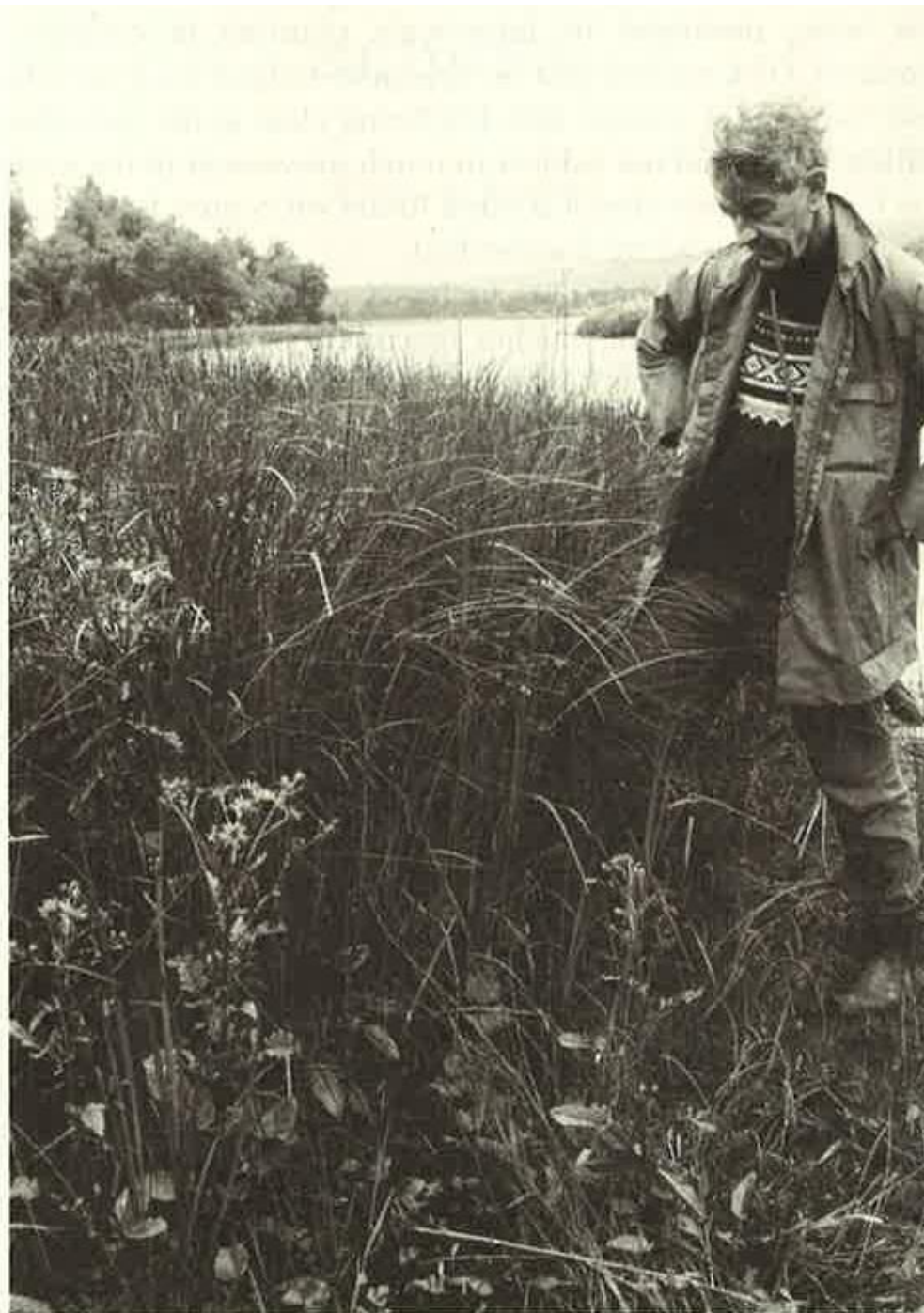
BSBI News December 1980

A message from the President [Dick David]

PROBLEM SOLVING

Many of us have been alarmed, and despondent, about what seemed to be happening, or not happening, to the plant records at Monks Wood after Frank Perring transferred to the SPNC: records on which the indispensable *Atlas of the British Flora* was based, and which derived almost entirely from the efforts of BSBI members. Not only, with Frank gone, was there no one at Monks Wood capable of answering queries about records; there was evidence that more recent records were not finding their way into the data-bank, and my own work on distribution maps for the new edition of *British Sedges* uncovered a host of omissions and inaccuracies in the existing files. There was no sign of a replacement for Frank, and one began to wonder whether, in view of financial cuts, the vacancy would ever be filled or the records saved from total decay.

The turning-point came early in 1980 (over a year after Frank's departure) when, at the invitation of Mr John Heffers, the Director of the Institute of Terrestrial Ecology (the body officially responsible for Monks Wood), there was a meeting of officers of

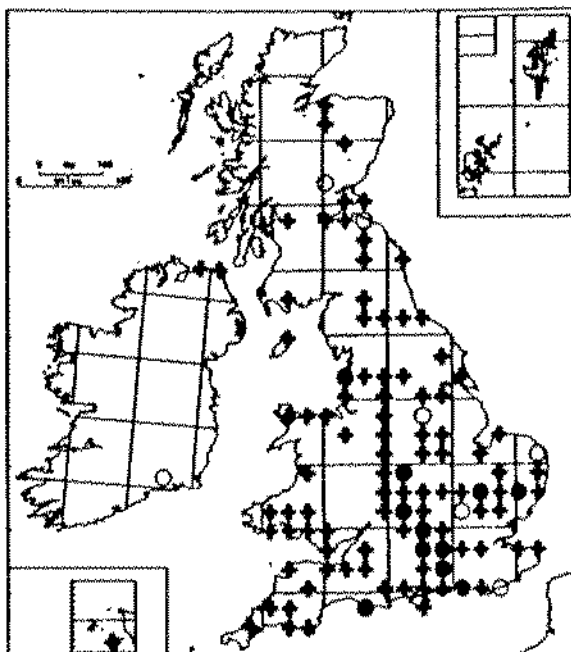


Dick David and
Carex recta,
1973



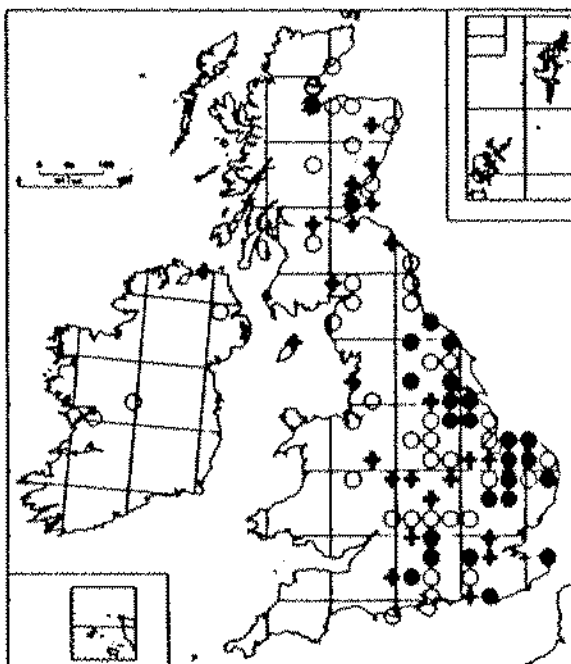
Cerastium tomentosum sens.lat.

	Atlas	M.S.	Change	Significance
Engld	15	74	116%	Increase
Wales	0	13	100%	Increase
Scotd	2	11	113%	Increase
R.Ire	1	0	-100%	Not significant
N.Ire	0	2	100%	Not significant
Britn	17	99	125%	Increase
Ireld	1	2	-14%	Not significant
Total	18	101	117%	Increase



Cerastium arvense

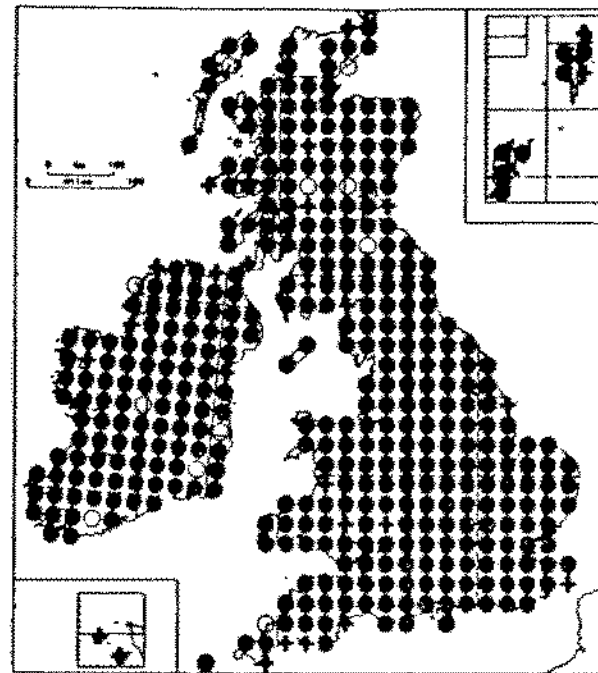
	Atlas	M.S.	Change	Significance
Engld	51	38	-18%	Decrease
Scotd	12	10	-17%	Not significant
R.Ire	3	0	-100%	Decrease
N.Ire	1	1	-100%	Decrease
Britn	64	48	-20%	Decrease
Ireld	4	1	-100%	Decrease
Total	68	49	-23%	Decrease



T.C.G. Rich & E.R.
Woodruff (1990)
*BSBI Monitoring
Scheme 1987-1988*

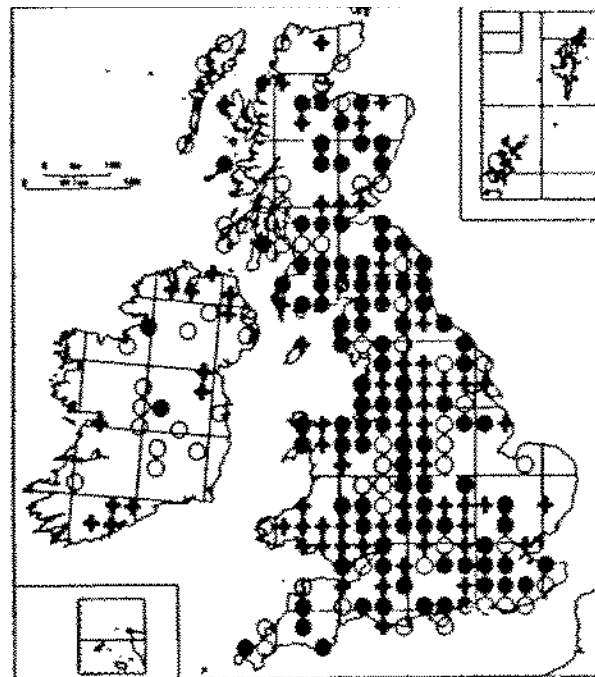
Trifolium pratense

	Atlas	M.S.	Change	Significance
Engld	157	168	0%	Not significant
Wales	25	29	1%	Not significant
Scotd	102	107	0%	Not significant
R.Ire	86	89	-1%	Not significant
N.Ire	16	20	0%	Not significant
Britn	288	303	0%	Not significant
Ireld	105	105	-1%	Not significant
Total	393	408	0%	Not significant



Trifolium medium

	Atlas	M.S.	Change	Significance
Engld	89	91	-4%	Not significant
Wales	7	20	17%	Not significant
Scotd	47	40	-12%	Not significant
R.Ire	11	9	-13%	Not significant
N.Ire	4	5	-35%	Not significant
Britn	147	149	-4%	Not significant
Ireld	16	14	-18%	Not significant
Total	163	163	-6%	Not significant



T.C.G. Rich & E.R. Woodruff (1990)
BSBI Monitoring Scheme 1987-1988

A general method for measuring relative change in range size from biological atlas data

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Methods in Ecology and Evolution



Methods in Ecology and Evolution

doi: 10.1111/j.2041-210X.2011.00146.x

Local frequency as a key to interpreting species occurrence data when recording effort is not known

Mark O. Hill*†

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Methods in Ecology and Evolution



Methods in Ecology and Evolution 2014, 5, 1052–1060

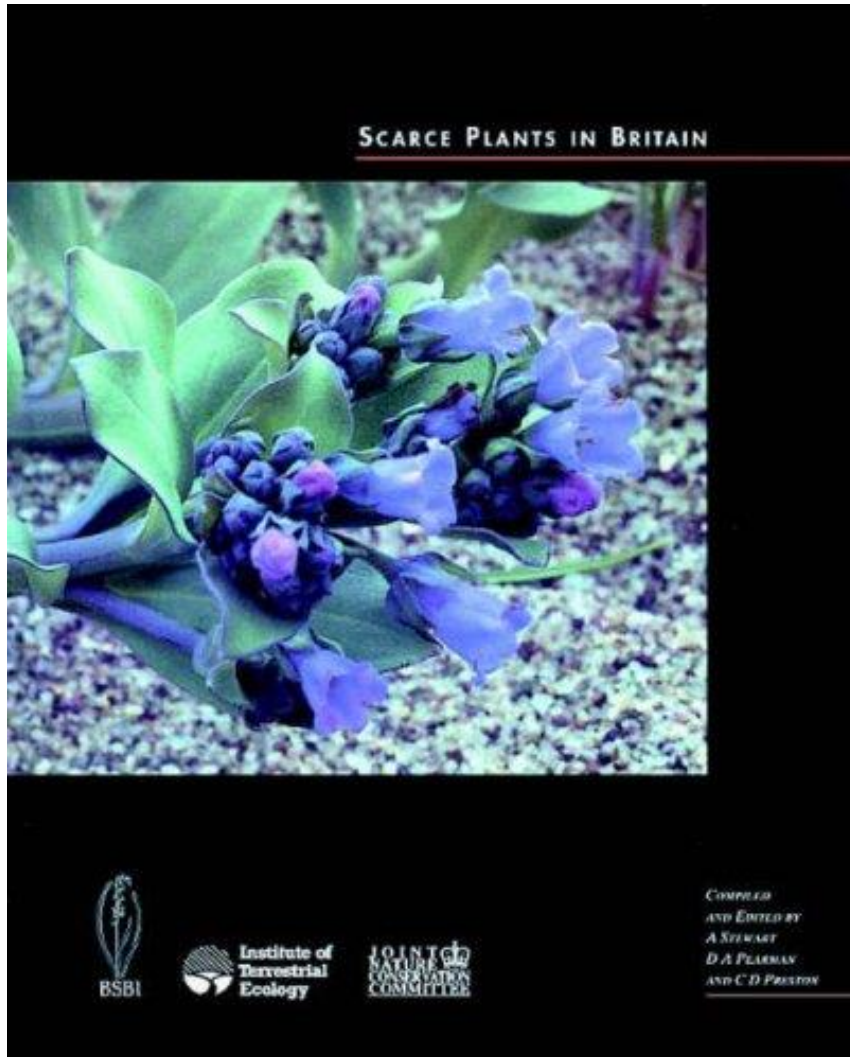
doi: 10.1111/2041-210X.12254

Statistics for citizen science: extracting signals of change from noisy ecological data

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Scarce plants in Britain (1994)



Carex humilis Leysser

Dwarf sedge

Status: scarce

This species is locally abundant in closed turf on close-grazed chalk downland, with a few outliers in more open conditions on Carboniferous limestone rocks to the west. It is now almost restricted to steeper slopes and earthworks, out of reach of ploughing. It favours southerly and south-westerly aspects as it is able to withstand drought, and in such situations competition from other species is presumably much reduced. Associated species on chalk downland occasionally include the nationally scarce species *Tephrosia integrifolia* and *Thesium humifusum*. On the Carboniferous limestone it occurs in a community with a large number of nationally rare and scarce species, including *Helianthemum apenninum*, *Koeleria vollesiana*, *Trinia glauca* and the moss *Scorpiurium circinnatum*. Experimental studies in the Avon Gorge indicate that *C. humilis* benefits from the addition of mineral nutrient mixtures which are deficient in phosphorus (Willis 1989). It is confined to the lowlands.

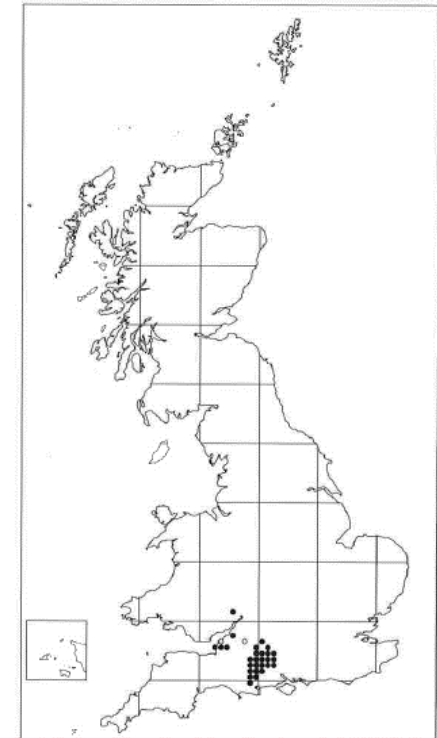
C. humilis is a long-lived perennial, gradually spreading vegetatively to form mats 15 cm or more across. Recent observations have shown that ripe seed is spread by ants and seedlings are occasionally found on bare ground in the Avon Gorge (Lovatt 1982) and at Brea Down. It is also able to spread by the re-rooting of detached pieces (David 1979a; Lovatt 1982), especially on steeper slopes, and possibly where it is ploughed, and its presence on ancient earthworks may result from this, unless they were thatched with turves. Although the species rarely behaves as a colonist, at Blandford Camp it has succeeded in establishing itself on a variety of man-made habitats, including recreation fields and the central reservations of roads.

Although the map shows little contraction of range, very many individual sites have been lost. In Dorset 17 out of a total of 49 sites were lost between 1860 and 1990, and many others in Dorset and Wiltshire much reduced in size. This reduction is continuing where sites are not being grazed or where cattle, with their extra weight, rather than sheep, are used. Aerial fertilising has also reduced some populations, especially in Wiltshire. In the Wye Valley trampling has completely destroyed some sites. It has been much reduced but not completely eliminated by public pressure at Stonehenge.

It is widespread in Europe, except Scandinavia, and extends east to Manchuria.

For a detailed account of the British distribution, see David (1979a, 1982a).

D. A. Pearman



Current map	No	Atlas	No
1970 →	28	1930 →	22
Pre-1970	2	Pre-1930	1
Introductions	0	Introductions	0

continued →



Extending Ellenberg's indicator values to a new area: an algorithmic approach

MARK O. HILL, DAVID B. ROY, J. OWEN MOUNTFORD and
ROBERT G. H. BUNCE*

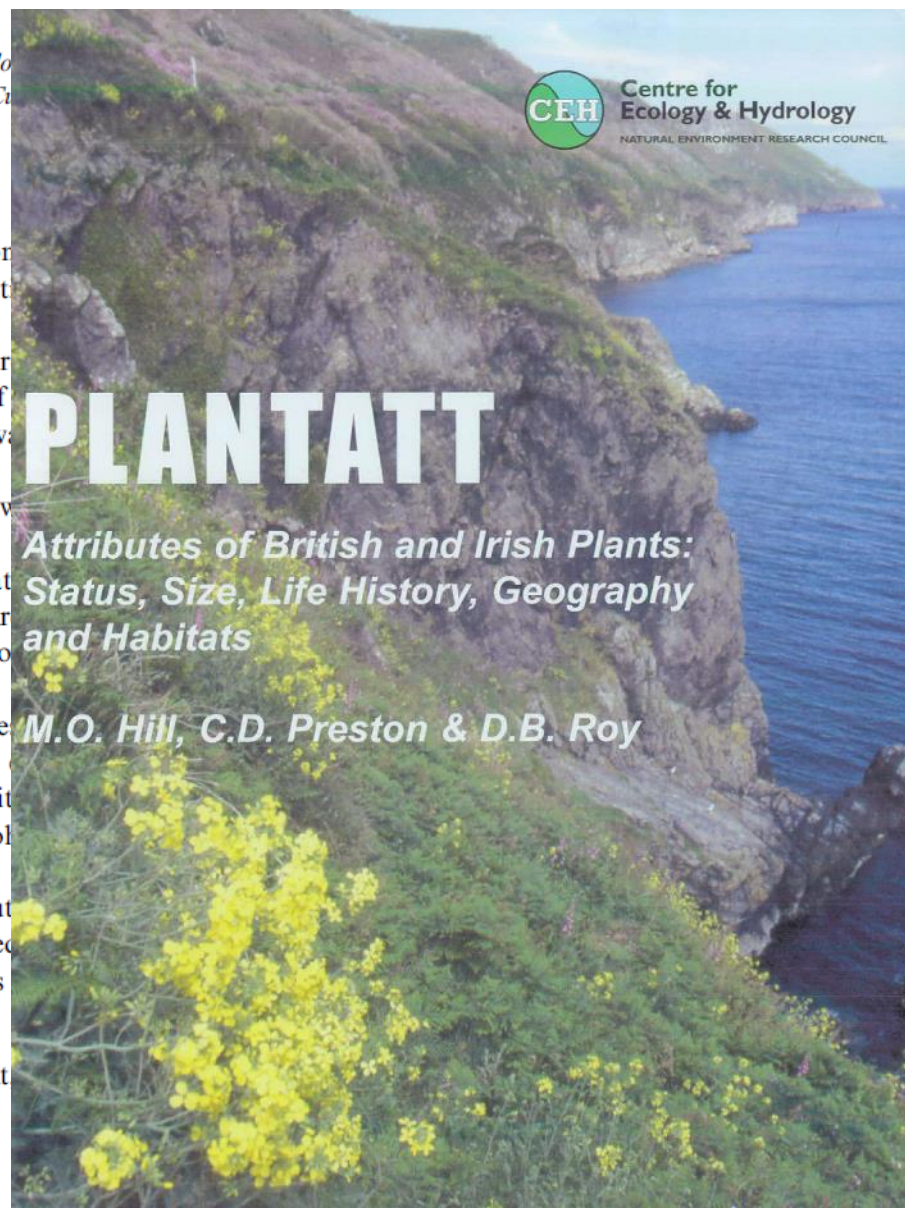
*Institute of Terrestrial Ecology, Monks Wood, Abbots Ripton, Huntingdon
Terrestrial Ecology, Merlewood Research Station, Grange-over-Sands, Cumbria*

Summary

1. Ellenberg's indicator values scale the flora of a region for light, temperature, continentality, moisture, soil pH, fertility and can be used to monitor environmental change.
2. Ellenberg values can be extended from central Europe as defined, to nearby parts of Europe. Given a database of values from central Europe, values in Britain can be repredicted by a simple algorithm consisting of two-way regression followed by local regression.
3. A database of British samples was assembled from 1960–1990 and values were repredicted.
4. Except for the indicator of continentality, the correlation between original and repredicted values was in the range 0.72 (light) to 0.91 (moisture). The indicator of continentality could not be adequately repredicted by the algorithm in Britain.
5. Discrepancies between original and repredicted values were due to various causes, including wrong original values, differing environmental conditions in Britain and central Europe, biased sampling of the British flora, the occurrence of small plants in shaded or basic microclimates in unrepresented or predominantly acid quadrats.
6. The repredicted values were generally reliable, but were sometimes clearly wrong. Wrong values were due to either inadequate representation of realized niches in Britain or sampling with quadrats that did not include species that were not close associates.

Key-words: Britain, environmental tolerance, gradient analysis, plant, Zeigerwerte.

Journal of Applied Ecology (2000) **37**, 3–15



CEH
Centre for
Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

PLANTATT

*Attributes of British and Irish Plants:
Status, Size, Life History, Geography
and Habitats*

M.O. Hill, C.D. Preston & D.B. Roy



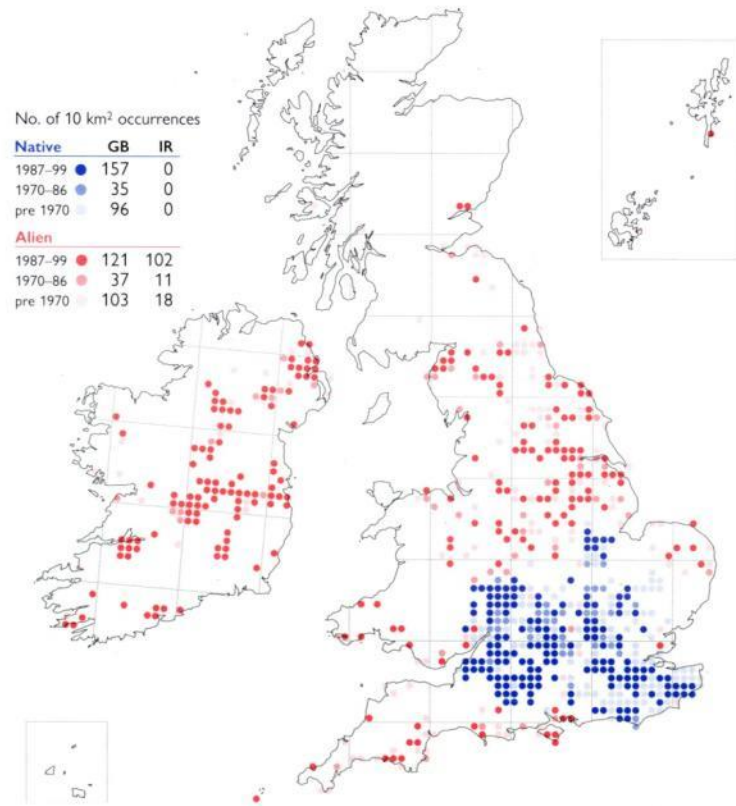
Launch of New Atlas at Kew, 2002 – Walters, Dines, Preston, Pearman and Perring



NEW ATLAS OF THE BRITISH & IRISH FLORA

D. PRESTON, D. A. PEARMAN & T. D. DINES

Crepis biennis Rough Hawk's-beard



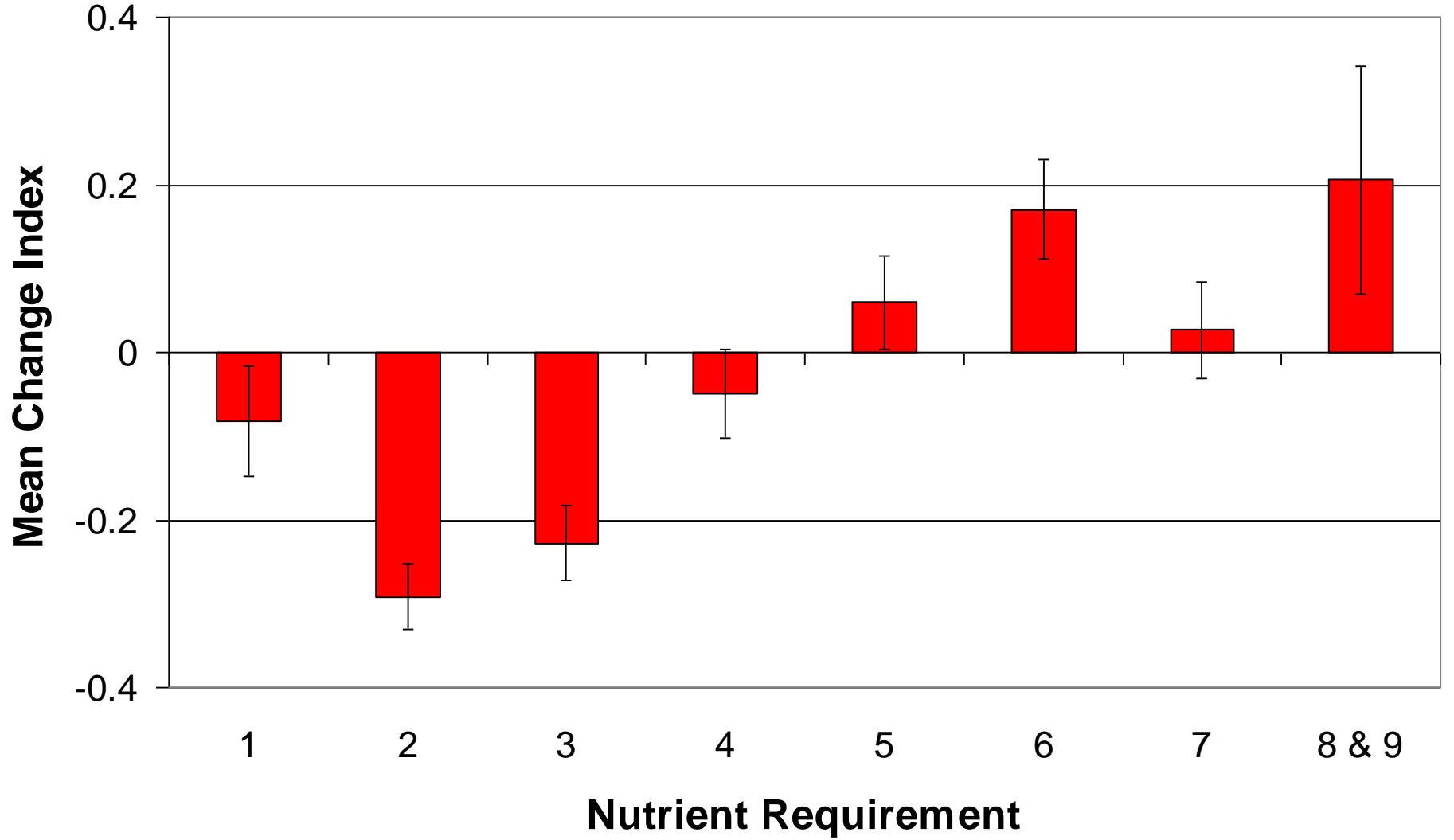
A stout, biennial herb of rough grassland and woodland margins on chalk soils in S.E. England, but elsewhere introduced, often with grass seed, and persisting locally in pastures, in arable fields and on field margins, roadsides, dry banks and waste ground. Lowland.

Native (change -0.02). Since the 1962 *Atlas C. biennis* has consolidated its native range, and spread as an alien elsewhere, especially in Ireland; it was first recorded in Shetland in 1999. In N. and W. Britain it is usually only casual. There have, however, been losses from native sites in Kent and Sussex since the 1962 *Atlas*, the reasons for which are unclear.

European Temperate element.

References: *Atlas* (299d), Hultén & Fries (1986), Meusel & Jäger (1992).

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Atmospheric nitrogen deposition explains patterns of plant species loss

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A phylogenetically-informed trait-based analysis of range change in the vascular plant flora of Britain

Gary D. Powney · Giovanni Rapacciuolo · Christopher D. Preston · Andy Purvis · David B. Roy

Relative roles of life-form, land use and climate in recent dynamics of alien plant distributions in the British Isles

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Summa

Climate c
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Disappearance of boreal plants in southern Britain: habitat loss or climate change?

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Hybrid Flora of THE BRITISH ISLES



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Dryopteris × adspirosa, Catfield Great Fen, East Norfolk, July 2006.
David Holyoak.

Dryopteris carthusiana (Vill.) H.P. Fuchs × *D. dilatata* (Hoffm.)
A. Gray
= *Dryopteris × deweveri* (J.T. Jansen) Jansen & Wacht.

Although closer to *D. dilatata* in size, the hybrid is intermediate between its parents in morphology. It differs from that species in having more stiffly erect fronds which arise from a creeping rhizome, with the stipes being half the length of the frond (compared with a third the length in *D. dilatata*). It differs from *D. carthusiana* in having a faint dark stripe in the centre of the rachis scales, and flat pinnules which are intermediate in tooting and dissection between those of the parent species. The hybrid can often be found in a mixed population of the parents by looking for large plants which have the erect habit of *D. carthusiana*, then by checking the scale colour of such plants, and finally confirming hybridity by examination of the spores. Dutch hybrids were described by Segal (1971). The hybrid possesses pteroyluclinal compounds about equally derived from both parents, but not completely additive (Widén & Sorsa 1966, Sorsa & Widén 1968).

This is perhaps the most frequent *Dryopteris* hybrid, recorded from a range of rather acidic habitats including tracks and ditches in conifer plantations, deciduous woodland, alder and willow carrs, lake shores, stream-sides, wet heathland, acidic flushes, valley mires and raised bogs. It often grows with both parents, but it may also be found in the absence of one parent. It will, for example, persist in former wetlands after *D. carthusiana* succumbs to drying out and the consequent development of secondary woodland. There is a wide overlap in Europe between the distribution of the European Temperate *D. dilatata* and the Euro-Siberian Boreo-temperate *D. carthusiana*, and the hybrid is widespread in W. and C. Europe.

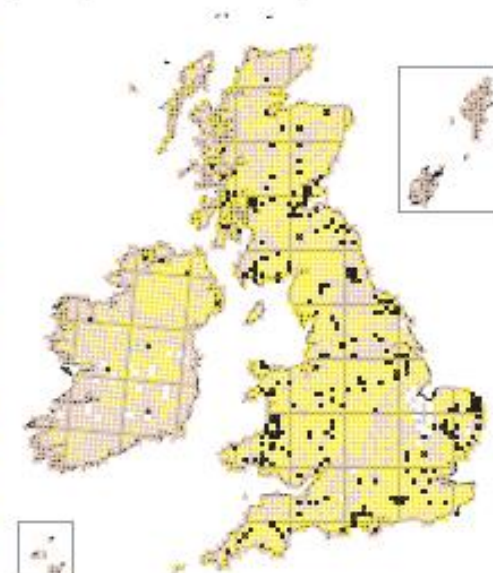
Illustrations: Manton (1950), p. 68 (as *D. spinulosa* × *D. dilatata*); Walker (1955); Widén et al. (1967); Sorsa & Widén (1968); Segal (1971); Page (1982), p. 209; Page (1997), p. 225.

Both parents and hybrid 2n = 164.

The spores are mostly abortive but often a few are fully formed. This means that the small localised populations which may persist after *D. carthusiana* has died out as a result of drying of the habitat are sometimes self-perpetuating. There are approximately 41 bivalents and 82 univalents

at meiosis (Manton 1950, Sorsa & Widén 1968, Walker 1955); Walker's best spreads had 32-35 bivalents.

The hybrid was produced artificially by Walker (1955), with *D. carthusiana* used as female, but the plants did not mature and did not produce fertile fronds. Later crosses (Jermy & Walker in Stace 1975, A. Sleep unpubl.) produced plants that were similar to wild specimens.



	Britain - Heccaads			Ireland - Heccaads		
	Hybrid	No hybrid	% hybrid	Hybrid	No hybrid	% hybrid
Both parents	224	1438	13	6	307	2
<i>Dryopteris carthusiana</i>	0	4	0	0	3	0
<i>Dryopteris dilatata</i>	21	1025	2	2	619	0
Neither parent	0	140	0	0	70	0

Dryopteris carthusiana (Vill.) H.P. Fuchs × *D. expansa* (C. Presl.) Fraser-Jenk. & Jermy

= *Dryopteris × sarvelae* Fraser-Jenk. & Jermy

Tending to be larger than either of its parents, the hybrid is intermediate between them in most characteristics. The fronds are broader and more arching than those of *D. carthusiana*, with the delicate texture and pale green colour of *D. expansa*, but the pinnules have the prominent teeth of *D. carthusiana*, and the rhizome is prostrate, as in that species. Many plants have the longer first and second basiscopical pinnules on the basal pinnae that is a feature of *D. expansa*, whilst in others the length of the pinnules tapers gradually from base to tip, as in *D. carthusiana*. Its pteroyluclinal compounds are derived from both parents, but more from the tetraploid *D. carthusiana* (Sorsa & Widén 1968). A plant recently found in the Den of Riechip, East Fife, has the unique character of producing up to four large glands on the head of many of the sporangia. (K.T. unpubl.)

The hybrid was discovered at Clonaig Woods, Kintyre, by H.V. Corley in 1978 (Corley & Gibby 1981). It is abundant there in the absence of *D. carthusiana*. It has subsequently been found at An Cnap near Salen, Westernness, in 1981, growing in small quantity in a moist streamside hollow in woodland; at Den of Riechip, in 2005; and at East Ardsieff Wood, North-east Yorkshire, in 2008. It was originally described from Finland (Espoo) and it is now known from Norway, Sweden, France and Germany. The parents are widespread in the Boreal (*D. expansa*) and Boreo-temperate (*D. carthusiana*) zones of the northern hemisphere.

Illustrations: Walker (1955); Sorsa & Widén (1968); Page (1982), p. 217; Page (1997), pp. 234-235.





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