

CHALK GRASSLAND RESTORATION AT COOMBE END FARM, GORING HEATH

Dr Chris Smith, Farm & Countryside Liaison Services, Bridgwater, Somerset



Background

During the preparation of a Whole Farm Plan for National Trust tenants Jon and Kate Hatt at Coombe End Farm, Goring Heath, in 2001, the idea arose of restoring a chalk grassland sward to part of the one field on the farm (Lower Coombe Field) where the Chalk outcrops, using seed sourced from the nearby chalkland SSSI and BBOWT reserve of Hartslock. At the time, Lower Coombe was down to a long-term ley and had been through various cycles of arable cultivation before that. The opportunity to see this idea fulfilled came round in 2006 when it was submitted as part of a successful application for Higher Level Stewardship (HLS) made jointly by the author and the NT's Farm and Countryside Adviser Mark Simmons. An initial "walkover" assessment of the composition of the sward was made at this time.

In September 2007, after subjecting Lower Coombe to a period of close grazing, a rectangular plot about 0.5ha in area on the east-facing slope of the field was scarified and disced, whereupon seed collected by hand from Hartslock by local consultant Martin Parham (see Plan A for details), was broadcast, also by hand, on to two duplicate strips of the prepared plot, then disced again. The locations of the respective strips were marked with canes – though these were subsequently knocked over by cattle!

In the summer of 2008, an assessment was made of the composition of the modified sward by laying down a series of quadrats along transects running downslope orientated to coincide with the sown plot, and originating from the fence posts at the top of the field which served as markers. Forty quadrats were scored from each transect, making a total of 400 samples in all. The whole exercise was repeated, using a new set of transects, two years later, in 2010.

Results (2008)

Fifty-nine species were recorded in all (see Table 1), among which there was a strong representation of the original grass sward as well as the inevitable weed/ruderal component, these including musk, spear and creeping thistles, smooth hawksbeard, cut-leaved cranesbill, creeping buttercup, creeping cinquefoil and field bindweed (a valuable nectar source) as well as the more local field madder. Ubiquitous dandelion, bulbous buttercup, common daisy, ribwort plantain and common mouse-ear had all been present beforehand, as had some of the more exclusively chalk grassland element such as black medick, germander speedwell, bird's-foot trefoil, lesser knapweed, agrimony, yarrow, vervain and the semi-parasitic red bartsia, though some of these may well have been supplemented by the sowings. It is possible, of course, that species which had not been recorded previously had appeared as a result of stimulating the germination of Lower Coombe's own seedbank – glaucous sedge and marjoram for example – but it seems reasonable to infer that the Hartslock seed brought in others such as cowslip, small scabious, common centaury, hedge bedstraw, wild basil, eyebright and rough hawkbit.

To confirm that we had indeed located the sown plot correctly, the transect data were divided into five sets of eight quadrats each, which demonstrated peaks in both species diversity and seedling numbers downslope (see Fig 1), thus confirming the disposition (and success) of the seeded strips.

Results (2010)

The 2010 survey encountered 67 species, as compared to 59 in 2008 (again, see Table 1). Of these, new records of key species which may have come from the Hartslock seeds mix were clustered bellflower, common St John's-wort, fairy flax, and wild thyme. Others which may also have come from Hartslock via the hay which was strewn over the plots after the seeds had been scattered, but which again could have originated from the Lower Coombe seed bank, were stemless thistle, salad burnet, hop trefoil, hairy violet and wild teasel, as well as quaking and golden oat-grasses. Examples which had been present in 2008 but had shown a substantial increase in 2010 included ribwort plantain, common daisy, hedge bedstraw, lesser knapweed, rough hawkbit and small scabious (these last three providing much of the colour in the sward as late as the first week of November), with smaller increases in agrimony, common cat's-ear, common centaury, bird's-foot trefoil, marjoram, wild basil and burnet saxifrage. At the same time, a few of the 2008 species were missed in 2010, these including sweet vernal-grass, cowslip, hoary plantain and nodding thistle, while among the more widespread species to decline quite markedly were self heal and white clover.

Discussion

Limited time has precluded an exhaustive statistical analysis of these data, but the observations have been well replicated and the main conclusion drawn – that diversity has not only been enhanced by the seeding exercise but continues to develop – would appear to be reasonable. It will be fascinating to see whether this trend continues, and at what stage the sown species which have not yet been encountered begin to show themselves.

There can be little doubt that the Hartslock seed has played its part here, although strictly there is no knowing to what extent the ecologically significant species picked up in the survey came in via this source rather than from Lower Coombe Field's own dormant seed bank. Now, of course, there is the additional possibility of second or even third generation seed germinating, either of Hartslock origin or "home grown". Some seeds may migrate in from elsewhere of their own accord – for example the wind-borne rough hawkbit, or even ultra-lightweight orchid seeds.

In any event, it has been very encouraging to observe these continuing developments, with the bank more and more visibly "flowery", even at the end of the season. The invertebrate fauna can only be expected to respond to this and become correspondingly more diverse, too.

Acknowledgements




This summary comes from the two reports to the National Trust submitted at the end of each monitoring season. The involvement of the following people has been much appreciated: host farmers Jon and Kate Hatt, NT's Mark Simmons, Heather Wetter and Des Sussex of NE and Martyn Lane of BBOWT, and of course Martin Parham for doing all the hard work of collecting and sowing the seed.

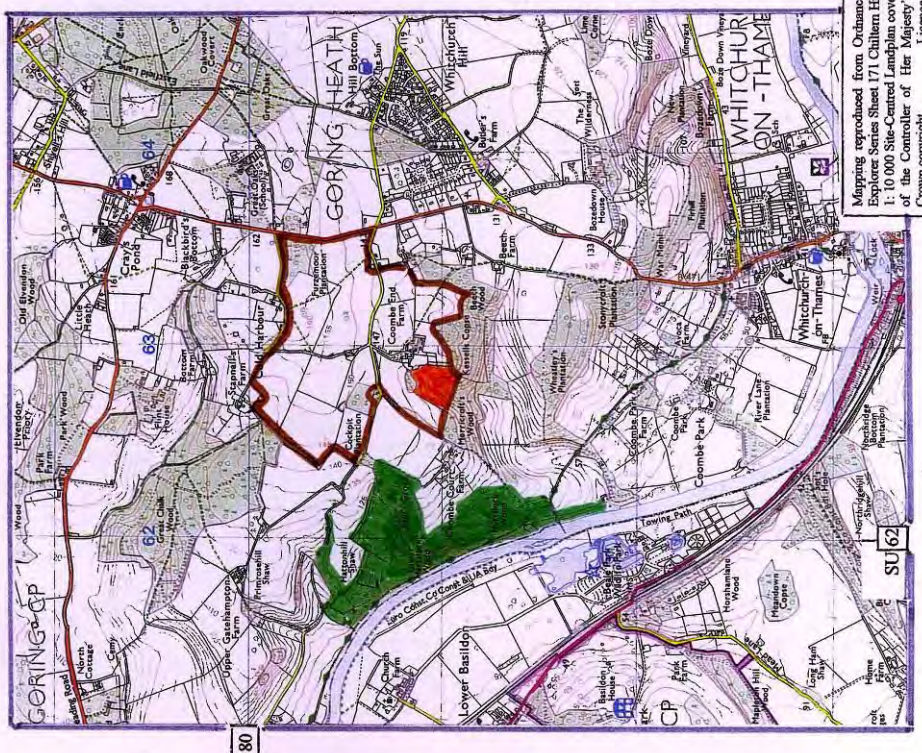
Chris Smith

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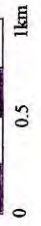
PLAN A
COOMBE END FARM
AND LOWER COOMBE FIELD

KEY

	Farm boundary (NT)
	Lower Coombe Field
	Hartslock SSSI



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SEED SOWN

Seed hand-collected by Martin Parham on six occasions from Hartslock SSSI in summer 2007 and sown on September 13th. After scattering the seed on the surface, the ground was harrowed twice. Approximate contributions from individual species are as shown: total amount sown was 2kg onto the two 90 x 5m prepared strips. Nomenclature follows Stace (1997).

Lesser knapweed	<i>Centaurea nigra</i>	1kg	Eyebright	<i>Euphrasia</i> sp.	trace
Agrimony	<i>Agrimonia eupatoria</i>	250g	Felwort/auntum gentian	<i>Gentianella amarella</i>	trace
Small scabious	<i>Scabiosa colombaria</i>	200g	Common rock-rose	<i>Helianthemum nummularium</i>	trace
Hedge bedstraw	<i>Galium mollugo</i>	100g	Rough hawkbit	<i>Leontodon hispidus</i>	trace
Bird's-foot trefoil	<i>Lotus corniculatus</i>	50g	Ox-eye daisy	<i>Leucanthemum vulgare</i>	trace
Black medick	<i>Medicago lupulina</i>	25g	Fairy/purging flax	<i>Linum catharticum</i>	trace
Greater knapweed	<i>Centaurea scabiosa</i>	trace	Red bartsia	<i>Odonites vernus</i>	trace
Common centaury	<i>Centaureum erythraea</i>	trace	Ribwort plantain	<i>Plantago lanceolata</i>	trace
Wild basil	<i>Chinopodium vulgare</i>	trace	Cowslip	<i>Primula veris</i>	trace
Common spotted orchid	<i>Dactylorhiza fuchsii</i>	trace	Self heal	<i>Prunella vulgaris</i>	trace
Viper's bugloss	<i>Echium vulgare</i>	trace	Wild thyme	<i>Thymus polytrichus</i>	trace
			Dark mullein	<i>Verbascum nigrum</i>	trace

Seed collection continued at Hartslock to collect late flowering species which were sown in later: these were expected to include clustered bellflower *Campanula glomerata*, common St John's-wort *Hypericum perforatum* and vervain *Verbena officinalis*, and to yield a few hundred grams in total. Jon Hatt also mentioned lady's bedstraw *Galium verum*, basil thyme *Actinos arvensis*, and "chalk gentian" (felwort again, or perhaps Chiltern gentian *Gentianella germanica*?). Dried seedy hay from Hartslock, containing some un-shed seeds was also scattered over the area.

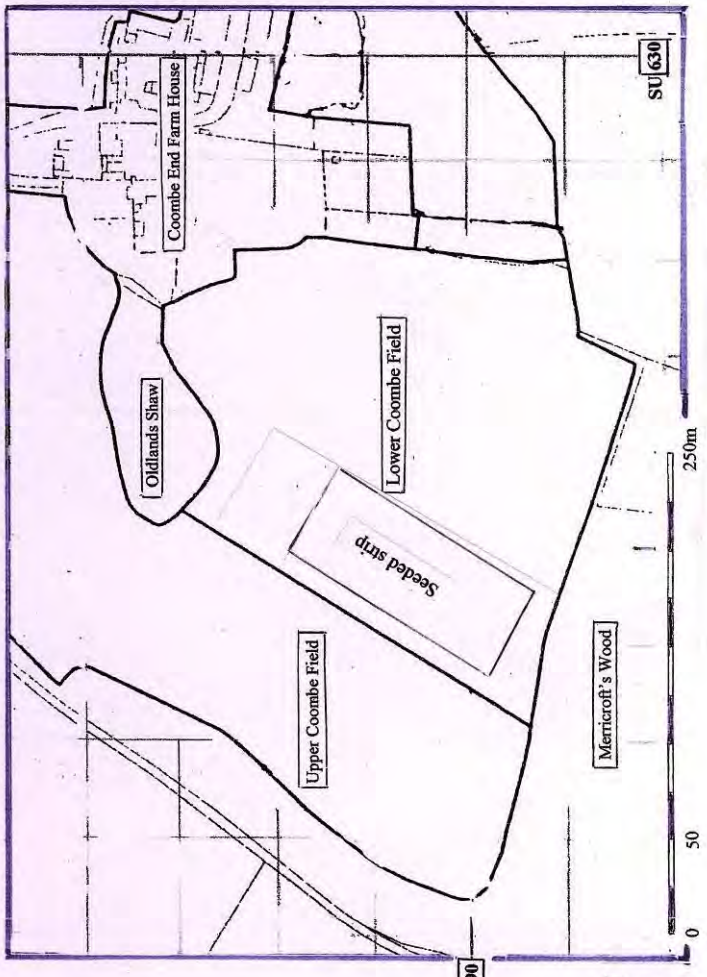


TABLE 1. Mean % frequency of herbaceous species in 2008 & 2010

Code	Species (grasses/sedges, then herbs)	Year	2008	2010
AGR	Common/ creeping bent <i>Agrostis capillaris/ A. stolonifera</i>		93.4	84.4
AXO	Sweet vernal-grass <i>Anthoxanthum odoratum</i>		0.2	
AE	Tall oat-grass <i>Arrhenatherum elatius</i>			0.4
BZM	Quaking-grass <i>Briza media</i>			2.5
BHH	Annual brome/top-grass <i>Bromus hordeaceus ssp. hordeaceus</i>		43.1	21.9
CF	Glaucous sedge <i>Carex flacca</i>		1.2	2.8
CCS	Crested dogstail <i>Cynosurus cristatus</i>		4.8	4.5
DG	Cocksfoot <i>Dactylis glomerata</i>		75.3	77.1
FPR	Meadow fescue <i>Festuca pratensis</i>			0.2
FO/FR	Sheep's/red fescue <i>Festuca ovina/F. rubra</i>		1.1	2.1
HL	Yorkshire fog <i>Holcus lanatus</i>		21.4	15.3
HST	Barley <i>Hordeum distichon</i>			0.2
HSC	Meadow barley <i>Hordeum secalinum</i>		0.8	0.7
LLP	Perennial ryegrass <i>Lolium perenne</i>		98.7	84.8
PHX	Common/ lesser timothy <i>Phleum pratense/ P. bertolonii</i>		1.7	0.4
PAN	Annual meadow-grass <i>Poa annua</i>		0.5	
POA	Smooth/rough meadow-grasses <i>Poa pratensis/P. trivialis</i>		8.2	13.0
TF	Golden oat-grass <i>Trisetum flavescens</i>			0.9
AM	Yarrow <i>Achillea millefolium</i>		0.4	0.4
AEU	Agrimony <i>Agrimonia eupatoria</i>		2.5	7.6
BPE	Common daisy <i>Bellis perennis</i>		8.8	20.3
CGL	Clustered bellflower <i>Campanula glomerata</i>			0.9
CNU	Musk or nodding thistle <i>Carduus nutans</i>		0.2	
CER	Common centaury <i>Centaureum erythraea</i>		0.8	1.9
CNI	Lesser or black knapweed <i>Centaurea nigra</i>		9.9	23.1
CFO	Common mouse-ear <i>Cerastium fontanum</i>		13.6	8.4
CAC	Stemless thistle <i>Cirsium acaule</i>			0.2
CAR	Creeping thistle <i>Cirsium arvense</i>		19.7	19.8
CV	Spear thistle <i>Cirsium vulgare</i>		5.8	11.2
CLV	Wild basil <i>Clinopodium vulgare</i>		1.3	8.4
CVN	Field bindweed <i>Convolvulus arvensis</i>		46.9	31.5
CC	Smooth hawkbeard <i>Crepis capillaris</i>		43.5	36.6
DCC	Wild carrot <i>Daucus carota</i>		4.5	6.7
DFD	Wild teasel <i>Dipsacus fullonum ssp. fullonum</i>			1.8
ENE	Eyebright <i>Euphrasia nemorosa</i>		0.6	0.2
GMO	Hedge bedstraw <i>Galium mollugo</i>		3.6	20.3
GER	Cut-I'ved/ dove's-ft cranesbill <i>Geranium dissectum/ G. molle</i>		18.9	36.4
HPF	Common St John's-wort <i>Hypericum perforatum</i>			0.2
HR	Common cat's-ear <i>Hypochaeris radicata</i>		3.0	8.7
KA	Field scabious <i>Knautia arvensis</i>		0.4	0.2
LAU	Autumn hawkbit <i>Leontodon autumnalis</i>		1.2	
LH	Rough hawkbit <i>Leontodon hispidus</i>		0.2	14.7
LVG	Ox-eye daisy <i>Leucanthemum vulgare</i>		1.5	1.0
LCA	Fairy flax <i>Linum catharticum</i>			4.7
LC	Bird's-foot trefoil <i>Lotus corniculatus</i>		0.4	3.8
ML	Black medick <i>Medicago lupulina</i>		13.3	12.0
ODV	Red bartsia <i>Odontites vernus</i>		4.4	2.4
OV	Marjoram <i>Origanum vulgare</i>		1.3	6.4
PIE	Bristly ox-tongue <i>Picris echioides</i>		0.6	
PSX	Burnet saxifrage <i>Pimpinella saxifraga</i>		0.5	0.4
PL	Ribwort plantain <i>Plantago lanceolata</i>		13.8	23.5
PMJ	Greater plantain <i>Plantago major</i>		0.2	0.2
PME	Hoary plantain <i>Plantago media</i>		0.2	
PRE	Creeping cinquefoil <i>Potentilla reptans</i>		36.7	20.1
PVE	Cowslip <i>Primula veris</i>		0.6	
PV	Self-heal <i>Prunella vulgaris</i>		40.7	26.9
RAC	Meadow buttercup <i>Ranunculus acris</i>		1.7	0.2
RB	Bulbous buttercup <i>Ranunculus bulbosus</i>		1.0	+
RR	Creeping buttercup <i>Ranunculus repens</i>		34.5	37.6
SMN	Salad burnet <i>Sanguisorba minor</i>			0.4
SC	Small scabious <i>Scabiosa columbaria</i>		0.4	13.1
SJ	Ragwort <i>Senecio jacobaea</i>		1.6	3.3
SHA	Field madder <i>Sherardia arvensis</i>		23.6	15.5
SON	Common/ spiny sow-thistle <i>Sonchus oleraceus/ S. asper</i>		2.6	3.6
SME	Chickweed <i>Stellaria media</i>			0.5
SSP	Devil's-bit scabious <i>Succisa pratensis</i>		1.8	3.0
TXO	Dandelion <i>Taraxacum officinale</i> agg.		50.2	46.3
TD	Wild thyme <i>Thymus polytrichus</i>			4.7
TCM	Hop trefoil <i>Trifolium campestre</i>			0.2
TDU	Yellow suckling clover <i>Trifolium dubium</i>		0.4	1.4
TPR	Red clover <i>Trifolium pratense</i>		1.4	1.4
TRR	White clover <i>Trifolium repens</i>		63.1	14.2
VBO	Vervain <i>Verbena officinalis</i>		3.1	1.8
VHH	Hairy violet <i>Viola hirta ssp. hirta</i>			1.3
	Total species		59	67

