

Research Reports

**The Plant Communities of the Grasslands held by
the Malvern Hills Conservators.**

- 1. Malvern Hills - North Hills Area**
- 2. Part of Castlemorton Common,
including the SSSI**
- 3. Hollybed Common**

by

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**Data from Surveys of Grassland on Land held by
the Malvern Hills Conservators.**

A survey was carried out on North Hill, parts of Castlemorton Common (including the SSSI area), and on most of Hollybed Common by Mrs Janet Jones in the summer of 1992. The project was financed by University College Worcester and directed by Dr PJ Alma (Senior Lecturer in Ecology, School of Environmental Sciences and Land Management). The results included in the short reports below represent a preliminary analysis of the data collected. Three separate reports are presented so that each is self-standing. The work was planned as a pilot study for a more extensive examination of the grasslands of the Malvern Hills Conservators.

The data has not been published and has been released, so far, to:

The Malvern Hills Conservators
English Nature
Worcestershire Wildlife Trust
Worcestershire Biological Records Centre

The data is provided for information only and may not be used for further analysis or the preparation of published papers without Dr PJ Alma's or Mrs J Jone's written permission. The data may, however, be used for the preparation of distribution records or maps of plant species or plant communities, published or otherwise, provided the authors and the financial support of University College Worcester are acknowledged. It may be used for other purposes in its present form only.

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PJ Alma February 1999

The Plant Communities of Malvern Hills - North Hill Area Grasslands 1992

National Vegetation Classification (NVC) groups were identified from 167 1x1 m samples taken from the grassland areas on and near North Hill in summer 1992 by Mrs Janet Jones in a research project funded by University College Worcester and directed by Dr PJ Alma. The samples were taken in a series of regular east-west transects of grassland areas. All plant species found in the sample quadrats were identified to species and their cover-abundance scored using the Domin scale (Dahl & Hadač 1941). Unfortunately the map showing the precise location of the sample points is currently unavailable. The boundary of the areas sampled is shown in Figure 1; this includes End Hill, Table Hill, North Hill, Green Valley, and Sugar Loaf Hill. The species found in samples and the groups of samples used in the identification of NVC types are shown in the final table of a TWINSpan analysis (Hill 1979) (Table 1). This table uses species codes derived from the first 4 letters of the genus and the species names; the full species list is given in Appendix I. The numbers in the matrix of the TWINSpan table represent cover-abundance values; 1 is a Domin score of up to 2, 2 a Domin score of 3 or 4, 3 a Domin score of 5 to 7, and 4 a Domin score of 8 to 10.

The NVC groups were identified using MATCH computer software (Malloch 1990) as a guide and by reference to Rodwell (1991a,b, 1992). The results are shown in Table 2. It is noted that some of the differences shown between the top ten matches of closely related vegetation types produced by MATCH for some of the data sets of sample groups are very small and use of Rodwell (1991a,b, 1992) has not always produced unequivocal identifications. This is believed to be the result of the uniqueness and isolation of the acid grasslands of the Malvern Hills (see later). The difficulties of precise identification of NVC groups in this instance must be carried in mind when interpreting these results. NVC nomenclature follows Rodwell (1991a,b, 1992). It is also noted that MATCH analysis is designed to be used for 2x2 m samples, although it is believed that the fact that this survey used 1x1 m samples would make very little difference to the analysis in this instance.

Table 2 shows that the grasslands of North Hills are quite diverse. The following plant communities were identified (with the caveats noted above):

U1e *Festuca ovina*-*Agrostis capillaris*-*Rumex acetosella* grassland; *Galium saxatile*-*Potentilla erecta* sub-community;

U20a *Pteridium aquilinum*-*Galium saxatile* community; *Anthoxanthum odoratum* sub-community;

U20b *Pteridium aquilinum*-*Galium saxatile* community; *Vaccinium myrtillus*-*Dicranum scoparium* sub-community;

H8e *Calluna vulgaris*-*Ulex gallii* heath; *Vaccinium myrtillus* sub-community.

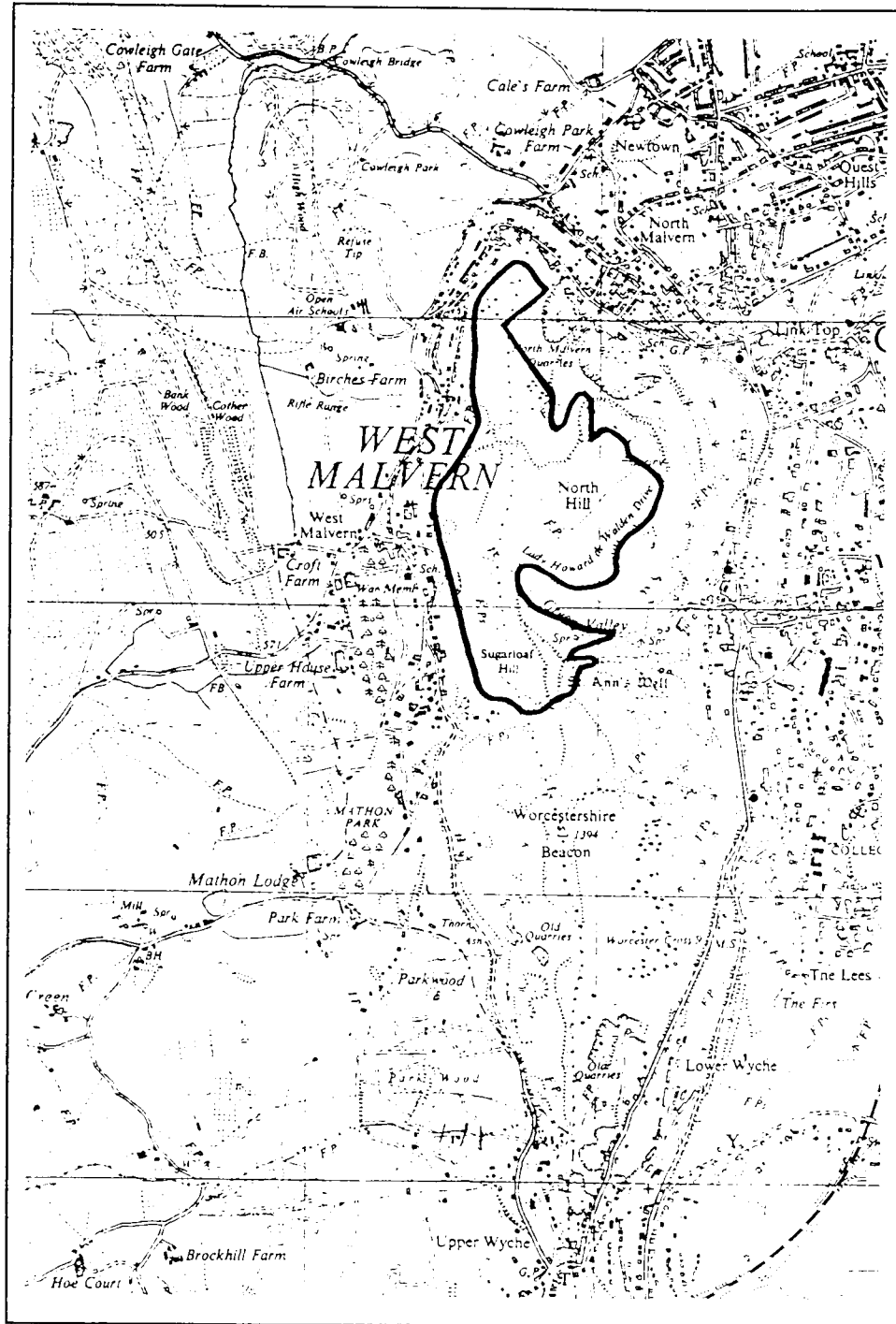


Figure 1. Malvern Hills - North Hill Survey Area

W23a Ulex europaeus-Rubus fruticosus scrub; *Anthoxanthum odoratum* sub-community.

Even within the NVC groups there are consistent sub-divisions of the NVC sub-communities, as shown by the TWINSPAN analysis (Table 1), which are recognisable on the ground. These are worthy of further study. It is interesting that the most frequent community is the U20 *Pteridium aquilinum-Galium saxatile* community, with over half the 167 samples falling in TWINSPAN groups identified to this community. This particular plant community was not found by Davies (1994) in her study of the Malvern Hills' grasslands. Davies found the following plant communities in the grasslands of the spine of the Malvern Hills:

U1b *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland, typical sub-community;

U1e *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland *Galium saxatile-Potentilla erecta* sub-community;

U2a *Deschampsia flexuosa* grassland *Festuca ovina-Agrostis capillaris* sub-community (wavy hair grass);

U4a *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, typical sub-community.

The detailed analysis of the present data shows little concordance of the grasslands of North Hill with the picture from the whole of the grasslands of the hill's spine found by Davies (1994).

However, the matches of these plant communities to the descriptions in Rodwell (1991a,b, 1992) are not perfect. Davies came to the same conclusion in her analysis. Many species that ought to be present in the identified plant communities are absent or occur at different levels of abundance or frequency on the hills than expected. Other species are found that are not normally present in the descriptions of the identified plant communities in Rodwell. For example the H8e *Calluna vulgaris-Ulex gallii* heath *Vaccinium myrtillus* sub-community on the hills does not contain any of the eponymous *Calluna vulgaris*! These differences are not altogether surprising given the geographical isolation of the hills from other elevated, acid soils and other similar vegetation types. Furthermore, some of the communities identified appear to be intermediates between one or more of the groups described by Rodwell. This is strongly suggestive of a certain uniqueness of the plant communities on the hills, further emphasising their particular significance in nature conservation terms. It is likely that detailed studies of other plant communities in the Hills will prove to be equally interesting and further add to the specialness of the hills.

Table 2. TWINSPAN Groups (see Table 1) and their NVC Affiliations (2 aberrant samples were omitted from this analysis).

Group	TWINSpan Group (See Table 1)	NVC Group	Comments
1	000 (26 samples)	U1e <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Rumex acetosella</i> grassland; <i>Galium saxatile</i> - <i>Potentilla erecta</i> sub-community.	Possibly a U2 <i>Deschampsia flexuosa</i> grassland.
2	001 (10 samples)	H8e <i>Calluna vulgaris</i> - <i>Ulex gallii</i> heath; <i>Vaccinium myrtillus</i> sub-community.	It is noted that the eponymous species <i>Calluna vulgaris</i> did not occur in samples taken from North Hill.
3	010 (32 samples)	The closest sub-community matches were with U20b <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community; <i>Vaccinium myrtillus</i> - <i>Dicranum scoparium</i> sub-community and U2a <i>Deschampsia flexuosa</i> grassland; <i>Festuca ovina</i> - <i>Agrostis capillaris</i> sub-community.	A particularly difficult group to classify, showing affinities to U2 and U20 grassland; perhaps an intermediate form. U2 grasslands normally contain <i>Calluna vulgaris</i> as a constant, which appears to be absent from this part of the Malvern Hills.
4	011 (19 samples)	U20b <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community; <i>Vaccinium myrtillus</i> - <i>Dicranum scoparium</i> sub-community.	With some affinities with U2 <i>Deschampsia flexuosa</i> grassland.
5	1000 (21 samples)	U20a <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community; <i>Anthoxanthum odoratum</i> sub-community.	
6	1001 (27 samples)	U20a <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community; <i>Anthoxanthum odoratum</i> sub-community.	The closest group of these U20 grasslands to a U4 <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland.
7	101 (20 samples)	U20a <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community; <i>Anthoxanthum odoratum</i> sub-community.	
8	110 (10 samples)	W23a <i>Ulex europaeus</i> - <i>Rubus fruticosus</i> scrub; <i>Anthoxanthum odoratum</i> sub-community.	<i>U. europaeus</i> was not found in these samples, all <i>Ulex</i> found on the hill was assigned to <i>U. gallii</i> .

References

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Appendix I

The species found in the survey are listed the numerical order presented in the TWINSpan Table (Table 1).

- | | |
|----------------------------------|--|
| 1 <i>Achillea millefolium</i> | 38 <i>Vaccinium myrtillus</i> |
| 2 <i>Agrostis stolonifera</i> | 39 <i>Blindia acuta</i> |
| 3 <i>Agrostis capillaris</i> | 40 <i>Brachythecium albicans</i> |
| 4 <i>Aira praecox</i> | 41 <i>Brachythecium velutinum</i> |
| 5 <i>Anthoxanthum odoratum</i> | 42 <i>Campylopus introflexus</i> |
| 6 <i>Arrhenatherum elatius</i> | 43 <i>Campylopus pyriformis</i> |
| 7 <i>Carex muricata</i> | 44 <i>Ceratodon purpureus</i> |
| 8 <i>Epilobium angustifolium</i> | 45 <i>Dicranum scoparium</i> |
| 9 <i>Corydalis claviculata</i> | 46 <i>Eurhynchium praelongum</i> |
| 10 <i>Crataegus monogyna</i> | 47 <i>Pleurozium schreberi</i> |
| 11 <i>Dactylis glomerata</i> | 48 <i>Pohlia nutans</i> |
| 12 <i>Deschampsia flexuosa</i> | 49 <i>Polytrichum commune</i> |
| 13 <i>Digitalis purpurea</i> | 50 <i>Polytrichum juniperinum</i> |
| 14 <i>Dryopteris dilatata</i> | 51 <i>Polytrichum piliferum</i> |
| 15 <i>Epilobium montanum</i> | 52 <i>Pseudoscleropodium purum</i> |
| 16 <i>Festuca ovina</i> | 53 <i>Rhytidiadelphus squarrosus</i> |
| 17 <i>Festuca rubra</i> | 54 <i>Lophocolea cuspidata</i> |
| 18 <i>Galium saxatile</i> | 55 <i>Ptilidium ciliare</i> |
| 19 <i>Holcus lanatus</i> | 56 <i>Cladonia chlorophaea</i> |
| 20 <i>Holcus mollis</i> | 57 <i>Cladonia coniocraea</i> |
| 21 <i>Juncus effusus</i> | 58 <i>Cladonia fimbriata</i> |
| 22 <i>Lolium perenne</i> | 59 <i>Cladonia floerkiana</i> |
| 23 <i>Lotus uliginosa</i> | 60 <i>Cladonia furcata</i> |
| 24 <i>Luzula campestris</i> | 61 <i>Cladonia gracilis</i> |
| 25 <i>Oxalis acetosella</i> | 62 <i>Cladonia impexa</i> |
| 26 <i>Poa annua</i> | 63 <i>Cornicularia aculeata</i> |
| 27 <i>Poa pratensis</i> | 64 <i>Parmelia saxatilis</i> |
| 28 <i>Potentilla erecta</i> | 65 <i>Acer pseudoplatanus sapling</i> |
| 29 <i>Pteridium aquilinum</i> | 66 <i>Acer pseudoplatanus seedling</i> |
| 30 <i>Rubus fruticosus</i> | 67 <i>Sorbus aucuparia</i> |
| 31 <i>Rumex acetosa</i> | 68 <i>Cladonia basal squamules</i> |
| 32 <i>Rumex acetosella</i> | 69 <i>Hypnum jutlandicum</i> |
| 33 <i>Danthonia decumbens</i> | 70 <i>Barbula sp.</i> |
| 34 <i>Teucrium scorodonia</i> | 71 <i>Cladonia cervicornis</i> |
| 35 <i>Thymus praecox</i> | 72 <i>Cladonia chlorophaea agg.</i> |
| 36 <i>Ulex gallii</i> | 73 <i>Brachythecium sp.</i> |
| 37 <i>Urtica dioica</i> | 74 <i>Hieracium pilosella</i> |

The Plant Communities of Castlemorton Common SSSI - 1992

National Vegetation Classification (NVC) groups were identified from 61 2x2 m samples taken from the grassland areas on the SSSI area of Castlemorton Common and the adjoining piece on the south-west side of the B4208 road in summer 1992 by Mrs Janet Jones in a research project funded by University College Worcester and directed by Dr PJ Alma. The samples were taken in a series of regular transects across the part of Castlemorton Common shown in Figure 1. All plant species found in the sample quadrats were identified to species and their cover abundance scored using the Domin scale (Dahl & Hadač 1941). Unfortunately the map showing the precise location of the sample points is currently unavailable. The boundary of the area sampled is shown in Figure 1. The species found in samples and the groups of samples used in the identification of NVC types are shown in the final table of a TWINSpan analysis (Hill 1979) (Table 1). This table uses species codes derived from the first 4 letters of the genus and species names; the full species list is given in Appendix I. The numbers in the matrix of the TWINSpan table represent cover-abundance values; 1 is a Domin score of up to 2, 2 a Domin score of 3 or 4, 3 a Domin score of 5 to 7, and 4 a Domin score of 8 to 10.

The NVC groups were identified using MATCH computer software (Malloch 1990) as a guide and by reference to Rodwell (1992) and are shown in Table 2. NVC nomenclature follows Rodwell (1992). However the scores of the closest matches of the TWINSpan data groups from the Common with the NVC data in the MATCH programme were very close. Furthermore, the keys and information in Rodwell (1992) were also not particularly useful in discrimination (the second closest matches from the analysis are given in Table 2 for some of the groups).

The mixture of soils of different pH, derived from the Severn Valley flood-plain and from out-wash from the Malvern Hills, the influences of the proximity of upland grassland flora of the hills and the presumed historical influences of species rich mesotrophic grassland flora (probably MG5 *Cynosurus cristatus*-*Centaurea nigra* grasslands) of the Severn Valley, the varying land-use, and the high water table of the common, has produced an intimate mix of grassland types. The plant communities identified were:

MG6b *Lolium perenne*-*Cynosurus cristatus* grassland; *Anthoxanthum odoratum* sub-community;

MG9a *Holcus lanatus*-*Deschampsia cespitosa* grassland; *Poa trivialis* sub-community;

MG9b *Holcus lanatus*-*Deschampsia cespitosa* grassland; *Arrhenatherum elatius* sub-community;

MG10b *Holcus lanatus*-*Juncus effusus* rush-pasture; *Juncus inflexus* sub-community;

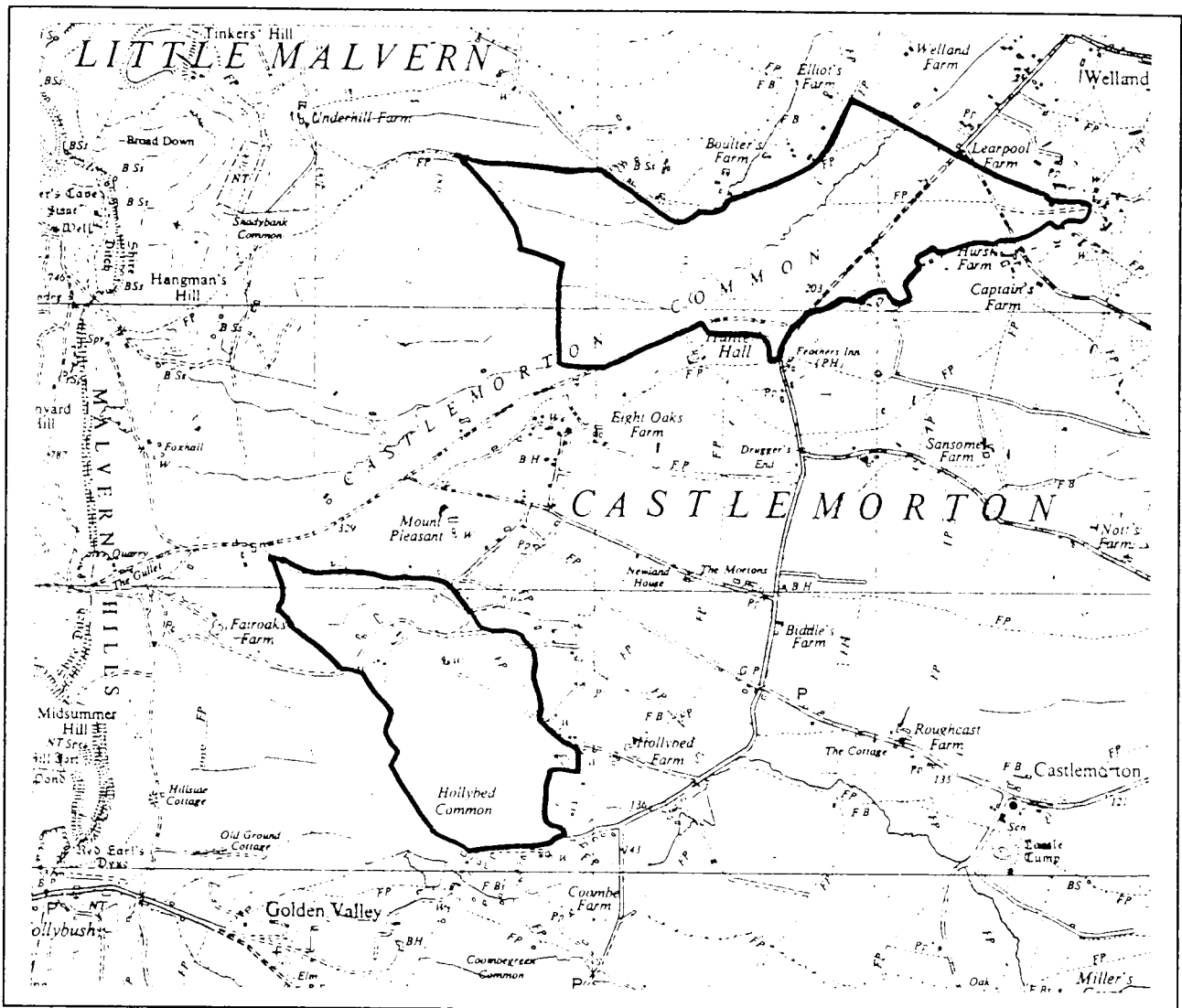


Figure 1. Castlemorton Common Survey Area (top)

U4b *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland; *Holcus lanatus-Trifolium repens* sub-community.

It is probable that intermediate plant community types, in comparison with those of the NVC, exist.

Interestingly no specimens of the MG5 constant *Centaurea nigra* were found in the survey, although English Nature's Site Management Statement for the SSSI states that the designated area, completely within the survey boundary, supports neutral grassland of the common knapweed and crested dog's-tail type. However, Group 1 samples have some affinities with MG5 grassland. It has been observed that MG5 grassland regresses to MG6 grassland on improvement and towards tussocky MG9 or MG10 grassland under lax grazing and poorly drained conditions (Rodwell 1992 and personal observations of MG5 grasslands). Grazing levels have been reduced at Castlemorton Common over the last few decades at least. The Common is being invaded by gorse and scrub communities (not examined in this survey) (Alma 1998). Despite the fact that MG6, MG9 and MG10 grasslands are not considered to be of high botanical interest (NCC 1989), the Common's grasslands are species rich, with 161 species being recorded from 61 2x2 m quadrats. Some of the Common's rarer species were recorded in the survey, *Oenanthe fistula*, *O. lachenalii*, *Carex hirta*, *C. pilularis* and *C. demissa*, but the survey was designed for phytosociological analysis rather than as a means of recording all the species present. Other notable plants recorded from the SSSI, such as *Blysmus compressus*, *Bupleurium tenuissimum*, *Genista anglica*, *Triglochin palustris* and *O. silaifolia*, were not found.

One of the TWINSPAN groups (Group 3 of 20 samples) conformed to an upland grassland category, U4b *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland; *Holcus lanatus-Trifolium repens* sub-community. This community was also identified in English Nature's Site Management Statement for the SSSI area. It shows close affinities to one of the communities recorded from the spine of the hills by Davies (1994).

The site's substantial area, the mosaic pattern of the wide variety of unimproved grassland types, the long history of management and the security of the current management is unusual. The species rich grasslands of Castlemorton Common, together with the scrub and gorse plant communities and their associated animal communities, of which the birds are well-known from a BTO Constant Effort ringing site, are thus of high conservation significance.

Table 2. TWINSPAN groups (see Table 1) and their NVC Affiliations.

Group	TWINSpan Group (See Table 1)	NVC Group	Comments
1	0000 (5 samples)	MG6b <i>Lolium perenne</i> - <i>Cynosurus cristatus</i> grassland; <i>Anthoxanthum odoratum</i> sub-community	Next closest community with MATCH analysis was MG5 <i>Cynosurus cristatus</i> - <i>Centaurea nigra</i> grassland.
2	0001 (11 samples)	MG6b <i>Lolium perenne</i> - <i>Cynosurus cristatus</i> grassland; <i>Anthoxanthum odoratum</i> sub-community	Next closest sub-community with MATCH analysis was U4b <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland; <i>Holcus lanatus</i> - <i>Trifolium repens</i> sub-community.
3	0010 (20 samples)	U4b <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland; <i>Holcus lanatus</i> - <i>Trifolium repens</i> sub-community.	Next closest sub-community with MATCH analysis was MG9a <i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland; <i>Poa trivialis</i> sub-community.
4	0011 (6 samples)	MG9b <i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland; <i>Arrhenatherum elatius</i> sub-community	Next closest sub-community with MATCH analysis was U4b <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland; <i>Holcus lanatus</i> - <i>Trifolium repens</i> sub-community.
5 & 6	01 (15 samples)	MG9a <i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland; <i>Poa trivialis</i> sub-community.	There is little doubt about the assignment of Group 5 to MG9a, or Group 7 to MG10b; Group 6 samples are somewhat intermediate.
6 & 7	011 + 1 (6 samples)	MG10b <i>Holcus lanatus</i> - <i>Juncus effusus</i> rush-pasture; <i>Juncus inflexus</i> sub-community.	

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Appendix I

The species found in the survey are listed in the numerical order presented in the TWINSPAN Table (Table 1).

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|-----------------------------------|----------------------------------|
| 1 <i>Achillea millefolium</i> | 41 <i>Epilobium obscurum</i> |
| 2 <i>Achillea ptarmica</i> | 42 <i>Epilobium parviflorum</i> |
| 3 <i>Agrimonia eupatoria</i> | 43 <i>Equisetum arvense</i> |
| 4 <i>Agrostis canina</i> | 44 <i>Equisetum palustre</i> |
| 5 <i>Agrostis stolonifera</i> | 45 <i>Eupatoria cannabinum</i> |
| 6 <i>Agrostis capillaris</i> | 46 <i>Festuca arundinacea</i> |
| 7 <i>Aira caryophylla</i> | 47 <i>Festuca ovina</i> |
| 8 <i>Aira praecox</i> | 48 <i>Festuca pratensis</i> |
| 9 <i>Alopecurus geniculata</i> | 49 <i>Festuca rubra</i> |
| 10 <i>Alopecurus pratensis</i> | 50 <i>Filipendula ulmaria</i> |
| 11 <i>Angelica sylvestris</i> | 51 <i>Galium palustre</i> |
| 12 <i>Anthoxanthum odoratum</i> | 52 <i>Galium saxatile</i> |
| 13 <i>Aphanes arvensis</i> | 53 <i>Galium verum</i> |
| 14 <i>Apium inundatum</i> | 54 <i>Geranium dissectum</i> |
| 15 <i>Apium nodiflorum</i> | 55 <i>Geranium robertianum</i> |
| 16 <i>Arrhenatherum elatius</i> | 56 <i>Glyceria declinata</i> |
| 17 <i>Bellis perennis</i> | 57 <i>Filaginella uliginosa</i> |
| 18 <i>Briza media</i> | 58 <i>Holcus lanatus</i> |
| 19 <i>Bromus hordeaceus</i> | 59 <i>Hydrocotyle vulgaris</i> |
| 20 <i>Calluna vulgaris</i> | 60 <i>Hypericum humisifusum</i> |
| 21 <i>Cardamine pratensis</i> | 61 <i>Hypericum pulchrum</i> |
| 22 <i>Carex demissa</i> | 62 <i>Hypericum tetrapterum</i> |
| 23 <i>Carex echinata</i> | 63 <i>Hypochoeris glabra</i> |
| 24 <i>Carex flacca</i> | 64 <i>Hypochoeris radicata</i> |
| 25 <i>Carex hirta</i> | 65 <i>Juncus acutiflorus</i> |
| 26 <i>Carex nigra</i> | 66 <i>Juncus articulatus</i> |
| 27 <i>Carex ovalis</i> | 67 <i>Juncus bufonius</i> |
| 28 <i>Carex pilulifera</i> | 68 <i>Juncus conglomeratus</i> |
| 29 <i>Ceratodon fontinalis</i> | 69 <i>Juncus effusus</i> |
| 30 <i>Epilobium angustifolium</i> | 70 <i>Juncus inflexus</i> |
| 31 <i>Cirsium arvense</i> | 71 <i>Lathyrus pratensis</i> |
| 32 <i>Cirsium palustris</i> | 72 <i>Leontodon autumnalis</i> |
| 33 <i>Cirsium vulgare</i> | 73 <i>Leontodon taraxacoides</i> |
| 34 <i>Cynosurus cristatus</i> | 74 <i>Linum catharticum</i> |
| 35 <i>Dactylis glomerata</i> | 75 <i>Lolium perenne</i> |
| 36 <i>Deschampsia cespitosa</i> | 76 <i>Lonicera periclymenum</i> |
| 37 <i>Digitalis purpurea</i> | 77 <i>Lotus corniculatus</i> |
| 38 <i>Eleocharis palustris</i> | 78 <i>Lotus uliginosus</i> |
| 39 <i>Epilobium adenocaulon</i> | 79 <i>Luzula campestris</i> |
| 40 <i>Epilobium hirsutum</i> | 80 <i>Lysimachia nummularia</i> |

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|-----|----------------------------------|-----|-----------------------------------|
| 81 | <i>Mentha aquatica</i> | 128 | <i>Urtica dioica</i> |
| 82 | <i>Myosotis laxa</i> | 129 | <i>Veronica beccabunga</i> |
| 83 | <i>Nardus stricta</i> | 130 | <i>Veronica scutellata</i> |
| 84 | <i>Oenanthe fistula</i> | 131 | <i>Veronica serpyllifolia</i> |
| 85 | <i>Oenanthe lachenalii</i> | 132 | <i>Viola riviniana</i> |
| 86 | <i>Lythrum portula</i> | 133 | <i>Vulpia bromoides</i> |
| 87 | <i>Phleum pratense bartolini</i> | 134 | <i>Calliargon cuspidatum</i> |
| 88 | <i>Phleum pratense</i> | 135 | <i>Amblystegium serpens</i> |
| 89 | <i>Pimpinella saxifraga</i> | 136 | <i>Brachythecium rutabulum</i> |
| 90 | <i>Plantago lanceolata</i> | 137 | <i>Brachythecium velutinum</i> |
| 91 | <i>Plantago major</i> | 138 | <i>Campylium stellatum</i> |
| 92 | <i>Poa annua</i> | 139 | <i>Ceratodon purpureus</i> |
| 93 | <i>Poa pratensis</i> | 140 | <i>Climacium dendroides</i> |
| 94 | <i>Polygala serpyllifolia</i> | 141 | <i>Dicranoweissia cirrata</i> |
| 95 | <i>Polygala vulgaris</i> | 142 | <i>Dicranum scoparium</i> |
| 96 | <i>Polygonum aviculare</i> | 143 | <i>Eurhynchium praelongum</i> |
| 97 | <i>Polygonum hydropiper</i> | 144 | <i>Amblystegium riparium</i> |
| 98 | <i>Potentilla anserina</i> | 145 | <i>Rhizomnium punctatum</i> |
| 99 | <i>Potentilla erecta</i> | 146 | <i>Plagothecium undulatum</i> |
| 100 | <i>Potentilla reptans</i> | 147 | <i>Pleurozium schreberi</i> |
| 101 | <i>Prunella vulgaris</i> | 148 | <i>Pohlia carnea</i> |
| 102 | <i>Pulicaria dysenterica</i> | 149 | <i>Pseudoscleropodium purum</i> |
| 103 | <i>Ranunculus acris</i> | 150 | <i>Rhytidiadelphus squarrosus</i> |
| 104 | <i>Ranunculus flammula</i> | 151 | <i>Crataegus monogyna</i> |
| 105 | <i>Ranunculus repens</i> | 152 | <i>Quercus robur</i> |
| 106 | <i>Rosa arvensis</i> | 153 | <i>Hypnum cupressiforme</i> |
| 107 | <i>Rubus fruticosus</i> | 154 | <i>Cirsium acaule</i> |
| 108 | <i>Rumex acetosa</i> | 155 | <i>Hypnum jutlandicum</i> |
| 109 | <i>Rumex acetosella</i> | 156 | <i>Ranunculus peltigera</i> |
| 110 | <i>Rumex conglomeratus</i> | 157 | <i>Cirsium sp.</i> |
| 111 | <i>Rumex crispus</i> | 158 | <i>Pohlia sp.</i> |
| 112 | <i>Sagina nodosa</i> | 159 | <i>Taraxacum officinale</i> |
| 113 | <i>Scrophularia auriculata</i> | 160 | <i>Brachythecium sp.</i> |
| 114 | <i>Senecio jacobaea</i> | 161 | <i>Hieracium pilosella</i> |
| 115 | <i>Senecio sylvatica</i> | | |
| 116 | <i>Danthonia decumbens</i> | | |
| 117 | <i>Solanum dulcamara</i> | | |
| 118 | <i>Sonchus asper</i> | | |
| 119 | <i>Stellaria alsine</i> | | |
| 120 | <i>Stellaria graminea</i> | | |
| 121 | <i>Thymus praecox</i> | | |
| 122 | <i>Torilis japonica</i> | | |
| 123 | <i>Trifolium dubium</i> | | |
| 124 | <i>Trifolium pratensis</i> | | |
| 125 | <i>Trifolium repens</i> | | |
| 126 | <i>Trisetum flavescens</i> | | |
| 127 | <i>Ulex gallii</i> | | |

The Plant Communities of Hollybed Common - 1992

National Vegetation Classification (NVC) groups were identified from 31 2x2 m samples taken from the grassland areas on Hollybed Common in summer 1992 by Mrs Janet Jones in a research project funded by University College Worcester and directed by Dr PJ Alma. The samples were taken in a series of regular transects across Hollybed Common shown in Figure 1. All plant species found in the sample quadrats were identified to species and their cover abundance scored using the Domin scale (Dahl & Hadač 1941). Unfortunately the map showing the precise location of the sample points is currently unavailable. The boundary of the area sampled is shown in Figure 1. The species found in samples and the groups of samples used in the identification of NVC types are shown in the final table of a TWINSpan analysis (Hill 1979) (Table 1). This table uses species codes derived from the first 4 letters of the genus and species names; the full species list is given in Appendix I. The numbers in the matrix of the TWINSpan table represent cover-abundance values; 1 is a Domin score of up to 2, 2 a Domin score of 3 or 4, 3 a Domin score of 5 to 7, and 4 a Domin score of 8 to 10.

The NVC groups were identified using MATCH computer software (Malloch 1990) as a guide and by reference to Rodwell (1992) and are shown in Table 2. NVC nomenclature follows Rodwell (1992).

The mixture of soils of different pH, derived from the Severn Valley flood-plain and from out-wash from the Malvern Hills, the influences of the proximity of upland grassland flora of the hills and the presumed historical influences of species rich mesotrophic grassland flora (probably MG5 *Cynosurus cristatus*-*Centaurea nigra* grasslands) of the Severn Valley, the varying land-use, has produced a large area dominated by two main grassland types on the Common. The main constituent of the grasslands (22 of the 30 samples, Groups 1 and 3) conform to the description of MG6b *Lolium perenne*-*Cynosurus cristatus* grassland; *Anthoxanthum odoratum* sub-community, a plant community not considered to be of high botanical interest (NCC 1989). The samples from Group 1 were species poor because of their association with bracken, those from Group 3 were species rich samples, towards the higher range of values expected from Rodwell's (1992) descriptions of MG6b grasslands. One of the TWINSpan groups (Group 2 of 5 samples) conformed to an upland grassland category, U4b *Festuca ovina*-*Agrostis capillaris*-*Galium saxatile* grassland; *Holcus lanatus*-*Trifolium repens* sub-community, indicating the influence of acid soil forming minerals. It shows close affinities to one of the communities recorded from the spine of the hills by Davies (1994) and also from Castlemorton Common SSSI. Group 4 samples, from wet areas, conform to S14 *Sparganium erectum* swamp. The uncommon species *Triglochin palustris* was found during the survey.

The habitat diversity as expressed by the number of communities in the low vegetation is relatively small compared to Castlemorton Common. The Common does, however, contain gorse, bracken and scrub stands which add interest to the

site. It is important in nature conservation terms because of its large area of unimproved grassland and the continuity of its management.

Table 2. TWINSPAN groups (see Table 1) and their NVC Affiliations.

Group	TWINSPAN Group (See Table 1)	NVC Group	Comments
1	000 (4 samples)	MG6b <i>Lolium perenne</i> - <i>Cynosurus cristatus</i> grassland; <i>Anthoxanthum odoratum</i> sub-community.	Species poor samples, with high bracken cover.
2	001 (5 samples)	U4b <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland; <i>Holcus lanatus</i> - <i>Trifolium repens</i> sub-community.	
3	010 (18 samples)	MG6b <i>Lolium perenne</i> - <i>Cynosurus cristatus</i> grassland; <i>Anthoxanthum odoratum</i> sub-community.	
4	1 (4 samples)	S14 <i>Sparganium erectum</i> swamp.	Wet areas only.

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Appendix I

The species found in the survey are listed in the numerical order presented in the TWINSpan Table (Table 1).

- | | |
|-----------------------------------|--------------------------------------|
| 1 <i>Achillea millefolium</i> | 42 <i>Hordeum secalinum</i> |
| 2 <i>Agrostis canina</i> | 43 <i>Hypericum humifusum</i> |
| 3 <i>Agrostis stolonifera</i> | 44 <i>Juncus articulatus</i> |
| 4 <i>Agrostis capillaris</i> | 45 <i>Juncus effusus</i> |
| 5 <i>Aira caryophylla</i> | 46 <i>Juncus inflexus</i> |
| 6 <i>Aira praecox</i> | 47 <i>Lemna minor</i> |
| 7 <i>Alisma plantago-aquatica</i> | 48 <i>Leontodon autumnalis</i> |
| 8 <i>Alopecurus geniculata</i> | 49 <i>Leontodon taraxacoides</i> |
| 9 <i>Alopecurus pratensis</i> | 50 <i>Lolium perenne</i> |
| 10 <i>Anthoxanthum odoratum</i> | 51 <i>Lotus corniculatus</i> |
| 11 <i>Apium nodiflorum</i> | 52 <i>Lotus uliginosus</i> |
| 12 <i>Arrhenatherum elatius</i> | 53 <i>Luzula campestris</i> |
| 13 <i>Bellis perennis</i> | 54 <i>Mentha aquatica</i> |
| 14 <i>Campanula rotundifolium</i> | 55 <i>Nardus stricta</i> |
| 15 <i>Cardamine pratensis</i> | 56 <i>Phleum pratensis bertolini</i> |
| 16 <i>Carex echinata</i> | 57 <i>Plantago lanceolata</i> |
| 17 <i>Carex flacca</i> | 58 <i>Plantago major</i> |
| 18 <i>Carex hirta</i> | 59 <i>Poa annua</i> |
| 19 <i>Carex muricata</i> | 60 <i>Poa pratensis</i> |
| 20 <i>Carex pilularis</i> | 61 <i>Polygala serpyllifolia</i> |
| 21 <i>Ceratodon fontinalis</i> | 62 <i>Potentilla erecta</i> |
| 22 <i>Epilobium angustifolium</i> | 63 <i>Potentilla reptans</i> |
| 23 <i>Cirsium arvense</i> | 64 <i>Potentilla sterilis</i> |
| 24 <i>Cirsium palustre</i> | 65 <i>Prunella vulgaris</i> |
| 25 <i>Cirsium vulgare</i> | 66 <i>Pteridium aquilinum</i> |
| 26 <i>Cynosurus cristatus</i> | 67 <i>Ranunculus repens</i> |
| 27 <i>Dactylis glomerata</i> | 68 <i>Rosa arvensis</i> |
| 28 <i>Deschampsia cespitosa</i> | 69 <i>Rubus fruticosus</i> |
| 29 <i>Digitalis purpurea</i> | 70 <i>Rumex acetosa</i> |
| 30 <i>Eleocharis palustris</i> | 71 <i>Rumex acetosella</i> |
| 31 <i>Epilobium palustre</i> | 72 <i>Rumex obtusifolius</i> |
| 32 <i>Festuca ovina</i> | 73 <i>Sagina nodosa</i> |
| 33 <i>Festuca pratensis</i> | 74 <i>Danthonia decumbens</i> |
| 34 <i>Festuca rubra</i> | 75 <i>Sparganium erectum</i> |
| 35 <i>Logfia minima</i> | 76 <i>Stellaria graminea</i> |
| 36 <i>Galium palustre</i> | 77 <i>Torilis japonica</i> |
| 37 <i>Galium saxatile</i> | 78 <i>Torilis nodosa</i> |
| 38 <i>Galium verum</i> | 79 <i>Trifolium dubium</i> |
| 39 <i>Glyceria declinata</i> | 80 <i>Trifolium pratensis</i> |
| 40 <i>Holcus lanatus</i> | 81 <i>Trifolium repens</i> |
| 41 <i>Holcus mollis</i> | 82 <i>Triglochin palustris</i> |

- 83 *Trisetum flavescens*
- 84 *Ulex gallii*
- 85 *Urtica dioica*
- 86 *Viola riviniana*
- 87 *Vulpia bromoides*
- 88 *Calliergon cuspidatum*
- 89 *Brachythecium rutabulum*
- 90 *Brachythecium velutinum*
- 91 *Ceratodon purpureus*
- 92 *Dicranum scoparium*
- 93 *Eurhynchium praelongum*
- 94 *Plagiomnium rostratum*
- 95 *Rhizomnium punctatum*
- 96 *Polytrichum juniperanum*
- 97 *Pseudoscleropodium purum*
- 98 *Rhytidiadelphus squarrosus*
- 99 *Hypnum cupressifome*
- 100 *Hypnum jutlandicum*
- 101 *Callitriche seedling*
- 102 *Ranunculus peltigera*
- 103 *Cirsium sp.*
- 104 *Taraxacum officinale*
- 105 *Brachythecium sp.*
- 106 *Hieracium pilosella*