

Final words

This booklet can only cover the basics of creating flowery grasslands. Like all processes involving living things, there is no substitute for experience, and as yet relatively few people have that experience. Sources of advice include—

- English Nature, through its Regional Officers
- Your Urban Wildlife Trust or County Wildlife Trust, address available from:

Royal Society for Nature Conservation
The Green
Witham Park
Lincoln
LN5 7JR

- Good seed suppliers (see Chapter 6)
- The Groundwork Trust has a list of workers involved in grassland habitat creation. The Trust itself intends to run training courses, and can be approached for help at:

19-27 Shaw Street
St Helens
Merseyside WA10 1DN

Do remember, creating flowery grasslands is a **difficult** naturalistic treatment, and not to be undertaken lightly. If successful, and linked to good interpretation, it can prove most rewarding to all involved, and a useful wildlife resource.

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Appendix 1

Suggested species for various soil types

Scientific names follow Clapham, Tutin & Moore (1987).

A = acid, pH 4.5-5.5.

C = alkaline and calcareous, pH >7.5.

N = neutral, pH 6-7.

D = damp.

PFA;

Y = will grow,

N = failed in experiments (blank = no information).

S = spring flowering, for meadows mown in July

X = plant as seed, T = plant as transplants

= legume (use native strains only)

* = restricted distribution, not suitable in all areas.

	MEADOWS				ROUGH GRASS (infertile soils)				PFA	SPRING FLOWERS
	A	C	N	D	A	C	N	D		
<i>Achillea millefolium</i>	X	X	X		X	X	X			
<i>A. ptarmica</i>				X				X		
<i>Agrimonia eupatoria</i>		X	X			X				
<i>Ajuga reptans</i>				T				T		S
<i>Angelica sylvestris</i>							X	X		
<i>Anthyllis vulneraria</i> #		X	X			X	X		Y	
<i>Arctium minus</i>							X			
<i>Artemisia vulgaris</i>							X			
<i>Caltha palustris</i>				X				X		S
<i>Campanula glomerata</i> *		T								
<i>Campanula rotundifolia</i>	T	T	T							
<i>Cardamine pratensis</i>				X				X		S
<i>Carlina vulgaris</i>		X							N	
<i>Centaurea nigra</i>	X	X	X		X	X	X			
<i>C. scabiosa</i>		X				X				
<i>Daucus carota</i>		X	X			X	X			
<i>Digitalis purpurea</i>					X					
<i>Dipsacus fullonum</i>							X	X		
<i>Eupatorium cannabinum</i>						X	X	X		
<i>Filipendula ulmaria</i>								X	Y(damp)	
<i>F. vulgaris</i>		X								
<i>Galium verum</i>		X	X							
<i>Geranium pratense</i>		X	X			X	X			
<i>Glechoma hederacea</i>		T	T							S
<i>Helianthemum nummularium</i>		X							Y	
<i>Hieracium pilosella</i>	X	X	X							
<i>Hypericum hirsutum</i> (calicole)				X				X		
<i>H. perforatum</i>		X	X			X	X			
<i>H. pulchrum</i>	X				X					
<i>H. tetrapterum</i>				X				X		
<i>Knautia arvensis</i>		X	X							

	MEADOWS				ROUGH GRASS (infertile soils)				PFA	SPRING FLOWERS
	A	C	N	D	A	C	N	D		
<i>Leontodon autumnalis</i>	X		X		X		X		Y	
<i>L. hispidus</i>		X	X			X	X		Y	
<i>Leucanthemum vulgare</i>	X	X	X		X	X	X		Y	
<i>Linaria vulgaris</i>			X				X			
<i>Lotus corniculatus</i> #	X	X	X		X	X	X		Y	
<i>L. uliginosus</i> #				X				X		
<i>Lychnis flos-cuculi</i>			X	X			X	X		S
<i>Lycopus europaeus</i>				X				X	Y(damp)	
<i>Lythrum salicaria</i>								X		
<i>Malva moschata</i>		X	X			X	X			
<i>M. sylvestris</i>			X				X			
<i>Ononis spinosa</i> #		X	X			X	X			
<i>Origanum vulgare</i>		X				X				
<i>Pimpinella saxifraga</i>		X	X			X	X			
<i>Plantago media</i>		X	X							
<i>Pulicaria dysenterica</i>				X				X		
<i>Primula veris</i>		X	X	X					Y	S
<i>Prunella vulgaris</i>	X	X	X		X	X	X		Y	
<i>Ranunculus acris</i>	X	X	X		X	X	X		Y	S
<i>R. bulbosus</i>		X	X							S
<i>R. repens</i>			X	X			X	X	Y	S
<i>Rhinanthus minor</i>	X	X	X	X	X	X	X	X	Y	S
<i>Rumex acetosa</i>	X		X		X		X			
<i>R. acetosella</i>	X				X					
<i>Sanguisorba officinalis</i>		X	X	X		X	X	X	Y	
<i>S. minor</i>		X							Y	
<i>Saxifraga granulata</i>		X	X							S
<i>Scabiosa columbaria</i>		X								
<i>Silene alba</i>	X		X		X		X			
<i>S. vulgaris</i>		X	X			X	X			
<i>Stachys officinalis</i>	X	X	X							
<i>S. palustris</i>			X	X			X	X		
<i>Succisa pratensis</i> (calcifuge)	X			X	X			X		
<i>Tanacetum vulgare</i>							X			
<i>Thalictrum flavum</i>				X				X		
<i>Tragopogon pratensis</i>		X	X			X	X			
<i>Vicia cracca</i> #	X		X		X		X			
<i>V. sativa</i> #		X	X			X	X			
<i>V. sepium</i> #			X				X			

GRASSES	MEADOWS				ROUGH GRASS (infertile soils)				PFA	SPRING FLOWERS
	A	C	N	D	A	C	N	D		
<i>Agrostis capillaris</i> (1)	X		X		X		X			
<i>A. stolonifera</i>				X				X	Y	
<i>Alopecurus pratensis</i>	X	X	X		X	X	X			
<i>Anthoxanthum odoratum</i>	X		X		X		X		Y	S
<i>Briza media</i>		X	X			X	X			
<i>Cynosurus cristatus</i>		X	X			X	X			
<i>Deschampsia cespitosa</i>				X				X		
<i>D. flexuosa</i>	X				X					
<i>Festuca ovina</i>	X	X			X	X				
<i>F. pratensis</i>			X	X			X	X		
<i>F. rubra</i>	X	X	X		X	X	X		Y	
<i>Hordeum secalinum</i> *		X	X	X						
<i>Koeleria macrantha</i>		X	X						N	
<i>Poa compressa</i>			X				X			
<i>P. trivialis</i>			X				X			
<i>Trisetum flavescens</i>		X	X							

Agricultural spp.: use only slow-growing cultivars, for example *F. rubra* 'Merlin'.
 (1) not *Agrostis castellana* cv. Highland (Highland bent) which is far too vigorous in most situations.

From the above a small list of widely-adapted species can be drawn up, likely to succeed in most habitats except very fertile, wet or extremely acid ones, and therefore a reliable base to most seed mixes. They are:

Yarrow *Achillea millefolium*
 Hardheads, knapweed *Centaurea nigra*
 Ox-eye daisy *Leucanthemum vulgare*
 Selfheal *Prunella vulgaris*

On page 48:

Other desirable species, excluded from the main table because their seed is not currently commercially available (or only in very small quantities). If locally-collected wild seed can be obtained without damage to wild populations, it may be successful.

(Some species are marked T in the main table because their seed is only available in small amounts, for example bugle *Ajuga reptans*)

GRASSES	MEADOWS				ROUGH GRASS (infertile soils)				PFA	SPRING FLOWERS
	A	C	N	D	A	C	N	D		
<i>Centaurium erythraea</i>		X	X						Y	
<i>Clinopodium vulgare</i>		X	X							
<i>Conopodium majus</i>		X	X	X						S
<i>Euphrasia nemorosa</i>		X	X			X	X			
<i>Galium saxatile</i>	X				X					
<i>Hypochaeris radicata</i>	X	X	X		X	X	X			
<i>Jasione montana</i>	X				X					
<i>Lathyrus pratensis</i> #	X		X		X		X			
<i>Mentha aquatica</i>				X				X		
<i>M. arvensis</i>			X	X			X	X		
<i>Onobrychis viciifolia</i> #		X				X				
<i>Ononis repens</i> #		X	X			X	X			
<i>Polygala vulgaris</i>		X	X			X	X			
<i>P. serpyllifolia</i>	X				X					
<i>Potentilla erecta</i>	X				X					
<i>Thymus spp.</i>		X							N	
<i>Trifolium pratense</i> #2	X	X	X		X	X	X		Y	
<i>T. repens</i> #2	X	X	X		X	X	X		Y	
<i>Veronica chamaedrys</i>		X	X			X	X			S
Many native grasses including:										
<i>Agrostis canina</i>	X			X	X			X		
<i>Alopecurus geniculatus</i>				X				X		
<i>Avenula pratensis</i>		X								
<i>A. pubescens</i>						X				
<i>Brachypodium pinnatum</i> *		X								
<i>Bromus erectus</i> *		X								
<i>Danthonia decumbens</i>	X				X					
<i>Holcus mollis</i>					X		X			

(2) for legal reasons, wild ecotypes of clovers cannot currently be marketed.

Cornfield annuals

Agrostemma githago
Anthemis arvensis
Centaurea cyanus
Chrysanthemum segetum
Matricaria recutita
Myosotis arvensis
Papaver dubium
Papaver rhoeas
Viola arvensis
V. tricolor

Best sown separately in their own plots since management needed to establish meadow grasslands will destroy them.

Sample specification for soil mixing technique (using crushed concrete)

- 1 Remove turf from designated area, using turf cutter.
- 2 Scrape off the remaining topsoil to leave 10 cm depth of topsoil.
- 3 Remove any stones or rubbish at the surface which would interfere with rotovation.
- 4 Items 1-3 to be completed during dry ground conditions.
- 5 If any plant growth appears before further operations, apply glyphosate to whole area at manufacturers recommended rate.
- 6 Supply and evenly apply 10 cm depth crushed concrete, 3 mm to dust.
- 7 Rotovate 10 cm into soil (i.e. total depth 20 cm).
- 8 Rake/harrow the surface to produce a fine tilth.
- 9 Sow specified calcareous seed mixture using an approved machine at a rate of 3g/m^2 , sown with Westerwolds rye-grass at 2g/m^2 .
- 10 Make one pass with a rake or harrow.
- 11 Make two passes with a tractor-mounted roller.
- 12 Complete sowing as early in the year as possible. Allow for mowing and raking up cuttings 4 times in the first year; July, August, September and October. In subsequent years a 3-cut mowing regime, with removal of cuttings, is required; April, mid-May, October.

A key to soil types using grassland vegetation

Introduction

The creation of a new wild flower grassland requires some knowledge of the existing soil, so that appropriate techniques can be chosen. Soil chemical analysis is expensive and time-consuming, and the relationship between such data and the amount of plant growth a soil will sustain is complex. In contrast, botanical survey is relatively simple and quick, and there is reasonable knowledge of the plant communities characteristic of low and high-fertility soils. For these reasons this key uses vegetation to divide urban soils into a few broad classes of fertility.

NB

It is assumed that the total vegetation cover will be 90-100%. If less, there are various possible causes like recent disturbance, trampling, soil toxicity, extreme low fertility. Try to determine the cause and seek expert help as needed.

The key covers managed and unmanaged grasslands, but is intended for use only on established sites (more than 5 years since the last major soil disturbance). Younger sites are more complex to interpret. To use the key, a simple botanical survey has to be carried out on each site, identifying the grasses and at least the most frequent herbs present, and assigning a DOMIN cover estimate to each (or if preferred estimates of % cover in classes, for example 1-10%, 11-20%, etc.). A standard form, such as the one illustrated below, is helpful. Where visually different areas occur within a site, for example an area of shorter grass (< 70 cm) in a tall (> 1 m) grassland, each area must be recorded separately. A simple identification guide to common urban grasses is at Part 2. Such surveys are best carried out between May and September, especially if one is looking for valuable grasslands.

Soil fertility is a continuous variable, therefore any attempt to split it into discrete blocks will occasionally fail. However, once one is familiar with the general grassland types, most marginal communities can be placed in an approximate category.

The majority of urban grasslands are of low wildlife value. However, this type of survey work does occasionally reveal species or communities of wildlife interest. In such cases, expert advice on their management should be sought. The local authority ecologist (if there is one), County/Urban Wildlife Trust, or English Nature will be able to assist.

Sample recording card for grassland survey

Separate card to be filled in for each site, or
each part of a site where there are clearly
visible differences.

Site no.	Grid Ref		
Name	Date		
<p>species: mark DOMIN scales against those species present.</p>			
<i>Agrostis canina canina</i>	<input type="checkbox"/>	<i>Achillea millefolium</i>	<input type="checkbox"/>
<i>Agrostis canina montana</i>	<input type="checkbox"/>	<i>Bellis perennis</i>	<input type="checkbox"/>
<i>Agrostis capillaris</i>	<input type="checkbox"/>	<i>Cerastium fontanum</i>	<input type="checkbox"/>
<i>Agrostis stolonifera</i>	<input type="checkbox"/>	<i>Chamaenerion angustifolium</i>	<input type="checkbox"/>
<i>Alopecurus geniculatus</i>	<input type="checkbox"/>	<i>Cirsium arvense</i>	<input type="checkbox"/>
<i>Arrhenatherum elatius</i>	<input type="checkbox"/>	<i>Crepis capillaris</i>	<input type="checkbox"/>
<i>Cynosurus cristatus</i>	<input type="checkbox"/>	<i>Heracleum sphondylium</i>	<input type="checkbox"/>
<i>Dactylis glomerata</i>	<input type="checkbox"/>	<i>Hypochaeris radicata</i>	<input type="checkbox"/>
<i>Deschampsia cespitosa</i>	<input type="checkbox"/>	<i>Leontodon autumnalis</i>	<input type="checkbox"/>
<i>Deschampsia flexuosa</i>	<input type="checkbox"/>	<i>Lotus corniculatus</i>	<input type="checkbox"/>
<i>Elymus repens</i>	<input type="checkbox"/>	<i>Plantago lanceolata</i>	<input type="checkbox"/>
<i>Festuca ovina</i>	<input type="checkbox"/>	<i>Plantago major</i>	<input type="checkbox"/>
<i>Festuca pratensis</i>	<input type="checkbox"/>	<i>Ranunculus repens</i>	<input type="checkbox"/>
<i>Festuca rubra</i>	<input type="checkbox"/>	<i>Rumex crispus</i>	<input type="checkbox"/>
<i>Glyceria spp.</i>	<input type="checkbox"/>	<i>Rumex obtusifolius</i>	<input type="checkbox"/>
<i>Holcus lanatus</i>	<input type="checkbox"/>	<i>Senecio jacobaea</i>	<input type="checkbox"/>
<i>Lolium perenne</i>	<input type="checkbox"/>	<i>Taraxacum officinale</i>	<input type="checkbox"/>
<i>Nardus stricta</i>	<input type="checkbox"/>	<i>Trifolium pratense</i>	<input type="checkbox"/>
<i>Phalaris arundinacea</i>	<input type="checkbox"/>	<i>Trifolium repens</i>	<input type="checkbox"/>
<i>Phragmites australis</i>	<input type="checkbox"/>	Additional spp.	<input type="checkbox"/>
<i>Phleum pratense</i>	<input type="checkbox"/>		
<i>Poa annua</i>	<input type="checkbox"/>		
<i>Poa pratensis</i>	<input type="checkbox"/>		
<i>Poa trivialis</i>	<input type="checkbox"/>		
Total cover %	<input type="checkbox"/>		

Sample recording card for grassland survey

Other characteristics; tick one from each category.

Drainage:

Excessive Adequate Poor

Topography:

Flat Undulating Steep slopes

Shade:

None Light Heavy

Mowing regime (cuts/an):

0-1 4-6 12-16

pH:

by meter Calcicole spp. Calcifuge spp.

Existing use:

Level of use:

Light Medium Heavy/trampled

DOMIN	
	% cover
10	100
9	75-99
8	50-74
7	33-49
6	25-32
5	10-24
4	4-9
3	Frequent, cover small
2	Occasional, cover small
1	Rare, cover insignificant

Any other information:

Key

		YES	NO
1	Is the grassland mown at all?	15	2
2	Are there more than 35 species present in any area <2 ha?	This site is either a) recently disturbed: go to 3, but use key with caution; or b) unusual and possibly valuable area: go to 3, but get expert advice in addition to using key. (Species not listed on the Recording Card are likely to be of particular interest.)	3
3	Is more than half the vegetation cover made up of one or more of these species? (Vegetation will be > 1 m tall.) False oat-grass <i>Arrhenatherum elatius</i> Cock's-foot <i>Dactylis glomerata</i> Couch, twitch <i>Elymus repens</i> Tall fescue <i>Festuca arundinacea</i> Meadow fescue <i>F. pratensis</i> Meadow cat's-tail, timothy <i>Phleum pratense</i> Rosebay willowherb <i>Chamerion angustifolium</i>	soil type A	4
4	Is the DOMIN score for <i>Holcus lanatus</i> at least 6?	5	6
5	Do any of the following species groups make up at least 25% of the vegetation? (7 options - check each)		
a) Common bent	<i>Agrostis capillaris</i>	SOIL TYPE D damp, probably acid	
b) Red fescue	<i>Festuca rubra</i>	SOIL TYPE D damp, probably neutral/alkaline	
c) Creeping bent	<i>Agrostis stolonifera</i>	SOIL TYPE D damp	
Marsh foxtail	<i>Alopecurus geniculatus</i>		
d) Creeping buttercup	<i>Ranunculus repens</i>	SOIL TYPE D damp	
Silverweed	<i>Potentilla anserina</i>		
Amphibious bistort	<i>Polygonum amphibium</i>		
or other damp-place herbs			
e) rushes		SOIL TYPE D wet	
f) coarse grasses as in 3		SOIL TYPE A	

YES

NO

g) No, none of these

probably SOIL TYPE D
but seek expert help
if in doubt.

6 Is more than half the vegetation made up of one or more of these species?

- | | |
|-------------------|-------------------------------|
| Creeping bent | <i>Agrostis stolonifera</i> |
| Marsh foxtail | <i>Alopecurus geniculatus</i> |
| Sedges | <i>Carex</i> spp. |
| Flote-grass | <i>Glyceria</i> spp. |
| Rushes | <i>Juncus</i> spp. |
| Reed canary-grass | <i>Phalaris arundinacea</i> |
| Common reed | <i>Phragmites australis</i> |

SOIL
TYPE
D
wet

7

7 Are any of the following species present?

- | | |
|-----------------|-----------------------------|
| Wavy hair-grass | <i>Deschampsia flexuosa</i> |
| Sheep's-fescue | <i>Festuca ovina</i> |
| Mat-grass | <i>Nardus stricta</i> |

SOIL
TYPE
E

8

8 Is the DOMIN score for *Agrostis capillaris* at least 6?

9

12

9 Does the following species group make up more than 10% of the vegetation?

- | | |
|--------------------|------------------------------|
| Red fescue | <i>Festuca rubra</i> |
| Sweet vernal-grass | <i>Anthoxanthum odoratum</i> |

10

11

10 Has the area has been sown to a 'low-maintenance' amenity mix in the last 5 years?

30

probably SOIL TYPE G
but check 28

11 Do any of the following species groups make up more than 10% of the vegetation? (3 options - check each)

a) various herbaceous species of acid infertile soils, e.g.

- | | |
|---------------------|-----------------------------|
| Heath bedstraw | <i>Galium saxatile</i> |
| Hawkweed | <i>Hieracium sabaudum</i> |
| Autumn hawkbit | <i>Leontodon autumnalis</i> |
| Bird's-foot-trefoil | <i>Lotus corniculatus</i> |
| Tormentil | <i>Potentilla erecta</i> |
| Sheep's sorrel | <i>Rumex acetosella</i> |

SOIL
TYPE
E

b) various herbs which thrive in damp soil, e.g.

- | | |
|--------------------|--------------------------|
| Creeping buttercup | <i>Ranunculus repens</i> |
| Yorkshire-fog | <i>Holcus lanatus</i> |
| Sedges | <i>Carex</i> spp. |
| Rushes | <i>Juncus</i> spp. |

SOIL
TYPE
D
damp, acid

c) No, none of these

probably SOIL TYPE
E

12

Does the following species group make up a quarter or more of the vegetation?

Perennial rye-grass	<i>Lolium perenne</i>
Meadow-grass	<i>Poa</i> spp.

13

Is the DOMIN score for *Festuca rubra* at least 5?

14

Are species restricted to calcareous soils present? e.g.

Yellow-wort	<i>Blackstonia perfoliata</i>
Clustered bellflower	<i>Campanula glomerata</i>
Carline thistle	<i>Carlina vulgaris</i>
Dropwort	<i>Filipendula vulgaris</i>
Autumn gentian, felwort	<i>Gentianella amarella</i>
Common rock-rose	<i>Helianthemum nummularium</i>
Marjoram	<i>Origanum vulgare</i>
Small scabious	<i>Scabiosa columbaria</i>

(and many others - see any good wild flower guide)

15

Are there more than 15 broad-leaved species (excluding clover) present, or do such species make up more than 30% of the total vegetation cover?

YES

Is the area

- one which was mown within the last 5 years go to 16.
- a demolition or reclamation site which was sown with these species. After 5 years with no mowing, other species will have invaded. Look for species of coarse grassland (try 3), wet places (5, 6) or infertile habitats (7, 10, 14). Seek expert help if necessary.
- neither of these. This is an unusual community, seek expert help.

14

SOIL TYPE F

this could indicate

- recent disturbance; help from a botanist may be needed to interpret the vegetation;
- unusual stress e.g. drought, trampling;
- grassland of conservation value.

Take expert advice as necessary. Species not on the sample recording card are likely to be of particular interest.

NO

13

Grassland is intermediate between other types; place as well as possible and get expert help if necessary.

SOIL TYPE G

but be careful for areas sown to 'amenity mixes' of fine-leaved grasses. With practice, native strains of these grasses can be distinguished from cultivars. Seek expert help if in doubt.

16

YES**NO****16**

Does the following species group make up more than 30% of the vegetation?

Couch, twitch *Elymus repens*
Cock's-foot *Dactylis glomerata*SOIL
TYPE
A**17****17**

Does the following species group make up more than 30% of the vegetation?

Creeping bent *Agrostis stolonifera*
Marsh foxtail *Alopecurus geniculatus*SOIL
TYPE
D
damp**18****18**Is the DOMIN score for *Holcus lanatus* (Yorkshire-fog) at least 6?**22****19****19**

Does the following species group make up more than 30% of the vegetation?

Rye-grass *Lolium perenne*
Smooth meadow-grass *Poa pratensis*
Rough meadow-grass *Poa trivialis***25****20****20**

Are any of the following species present?

Wavy hair-grass *Deschampsia flexuosa*
Sheep's-fescue *Festuca ovina*
Mat-grass *Nardus stricta*SOIL
TYPE
E**21****21**

Does the following species group make up more than 30% of the vegetation?

Common bent *Agrostis capillaris*
Red fescue *Festuca rubra***26**

this is an unusual community; try 26, but expert advice may be needed.

22

Do any of the following groups of grasses make up more than 30% of the vegetation together? (3 options - check each)

- a) Rye-grass *Lolium perenne*
Meadow-grasses *Poa* spp.
- b) Common bent *Agrostis capillaris*
Fescues *Festuca* spp.
- c) No, none of these

23**24**

probably SOIL TYPE D but check 26, 27.

23

Is the total DOMIN score for legumes at least 6?

SOIL TYPE B*
but dampSOIL TYPE C
but damp**24**

Is the total DOMIN score for legumes at least 6?

SOIL TYPE C*
but dampSOIL TYPE
D**25**

Is the total DOMIN score for legumes at least 5?

SOIL TYPE B*

SOIL TYPE A

26

Is the total DOMIN score for legumes at least 6?

SOIL TYPE C*

27

* If the legumes involved are not clovers (*Trifolium* species, usually *T. repens*) the community may be an unusual one and worth preserving; seek specialist advice.

27

Do any of the following species groups make up more than 25% of the vegetation? (6 options - check each)

a) docks, thistles, ragwort

- | | |
|-----------------------|-----------------------------|
| b) Yarrow | <i>Achillea millefolium</i> |
| Mouse-ear hawkweed | <i>Hieracium pilosella</i> |
| Sheep's sorrel | <i>Rumex acetosella</i> |
| Autumn hawkbit | <i>Leontodon autumnalis</i> |
| Ribwort plantain | <i>Plantago lanceolata</i> |
| c) Creeping buttercup | <i>Ranunculus repens</i> |
| Amphibious bistort | <i>Polygonum amphibium</i> |
| d) Rye-grass | <i>Lolium perenne</i> |
| Meadow-grass | <i>Poa</i> spp. |
| e) Yorkshire-fog | <i>Holcus lanatus</i> |

f) No, none of these

28

(Soil pH) Are any of the following species present, or the measured pH as shown? (3 options - check each)

- a) Species characteristic of acid soils, e.g.
- | | |
|----------------|--------------------------|
| Heath bedstraw | <i>Galium saxatile</i> |
| Tormentil | <i>Potentilla erecta</i> |
| Heather | <i>Calluna vulgaris</i> |
| Sheep's sorrel | <i>Rumex acetosella</i> |
- or measured pH 5 or less:

- b) Species characteristic of calcareous soils, e.g.
- | | |
|-------------------------|---------------------------------|
| Yellow-wort | <i>Blackstonia perfoliata</i> |
| Clustered bellflower | <i>Campanula glomerata</i> |
| Carlina thistle | <i>Carlina vulgaris</i> |
| Dropwort | <i>Filipendula vulgaris</i> |
| Autumn gentian, felwort | <i>Gentianella amarella</i> |
| Common rock-rose | <i>Helianthemum nummularium</i> |
| Marjoram | <i>Origanum vulgare</i> |
| Small scabious | <i>Scabiosa columbaria</i> |
| Wild thyme | <i>Thymus</i> spp. |
- or measured pH 7.5 or more:

c) No such species present, and either measured pH 5-7.4 or no measure available:

YES

SOIL TYPE C
these perennial weeds
will have to be removed
(Chapter 3)

28

SOIL TYPE D

28, soil infertile, but
bordering on type C.
28, but note this is a
damp soil.

NO

28

SOIL
TYPE
E

SOIL
TYPE
F

29

29

Is or was the area a bowling green or tennis court?

30

Has the area been sown with a 'low-maintenance' amenity sward?
(All such mixtures are fairly recent, so records will hopefully be available.)

YES

these are frequently acid, so probably soil type E; measure soil pH.

NO

30

If the sward is over 5 years old it has probably been invaded by species appropriate to the soil type:

(4 options - check each)

a) Meadow-grasses

Poa annua, *P. pratensis*,
P. trivialis

SOIL TYPE C.

b) Clovers

SOIL TYPE B.

c) Yorkshire-fog

Holcus lanatus

SOIL TYPE D

damp.

d) none of these:
seek expert advice.

SOIL
TYPE
G



Soil types

A

Fertile soil, which will need extensive (and expensive) treatment before a meadow community can be sustained. Perennial 'weeds' (twitch, docks, nettles etc.) will rapidly invade unless fertility is reduced before management is relaxed. N.B. Sites with high cover of rosebay willowherb will key out here. This species is favoured by fire. If the other species present are coarse grasses, the soil is fertile. Occasionally the associated species are small grasses (Yorkshire-fog, bents and fescues); return to key at 4 as soil is probably infertile.

B

Fertile soil, with high legume component boosting the nitrogen supply. Will need extensive (and expensive) treatment before a meadow community can be sustained. High legume contents are rare on unmown sites, except on infertile soils where the legumes involved are not clovers.

C

Moderate soil fertility. Some soil treatment needed. If clover content is high, this may need reducing.

ABC

On all these soils, a high cover of Yorkshire-fog *Holcus lanatus* may indicate clay soil, which is likely to be damp and will be easily harmed by the use of heavy machinery during the wetter months of the year.

D

Damp soils, water-logged in winter. Can be acid, alkaline or neutral: if species present do not indicate which (see 26), a pH test is advised. Most such soils are infertile, but occasional examples with high contents of coarse grasses (as in 3) are really damp versions of soil type A. Infertile sites suitable for damp meadow or removal of topsoil to form a marsh. These soils grade to:

Wet soils, water-logged most of the year and therefore usually unmown. Best treated as marshes, with introduction of marsh herbs.

E

Acid soils, suitable for meadow creation without treatment. This is not a species-rich community (few meadow species thrive in acid soils) but can be an attractive one. Conversion to heathland is possible.

F

Calcareous soils, suitable for meadow creation without treatment. Many suitable and attractive species available.

G

Neutral soils, suitable for meadow creation without extensive treatment. Many suitable and attractive species available.

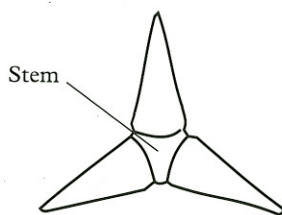
Simple guide to identifying the major grasses in urban habitats

for use with the key to soil types using grassland vegetation.

This guide is intended as an 'aide-memoire' for those with some experience of grass identification. It includes only the more abundant species, of importance in determining soil types. When more comprehensive identification is needed, use *Grasses* by C E Hubbard (3rd edition, rev. J C E Hubbard, 1984 Pelican). Beginners in grass identification are advised to seek help from a botanist (contact Urban Wildlife Group/County Naturalists Trust/Botanical Society of the British Isles) or to attend one of the short courses run by the Field Studies Council.

This guide uses vegetative characters only, enabling its use all year and in mown grassland. When available, flowers will give an easier identification - see keys in Hubbard.

Rushes and sedges are sometimes mistaken for grasses. Most rushes (*Juncus* spp.) found in grassland have tubular, hollow 'leaves'. All sedges (*Carex* spp.) have a triangular arrangement of leaves when viewed from above.



If in doubt, consult a good pictorial identification guide, for example *Collins Field Guide to Wild Flowers* by Fitter, Fitter & Blamey, *Collins Guide to Grasses, Sedges, Rushes & Ferns* by Fitter, Fitter & Farrer or *The New Concise British Flora* by Keble Martin.

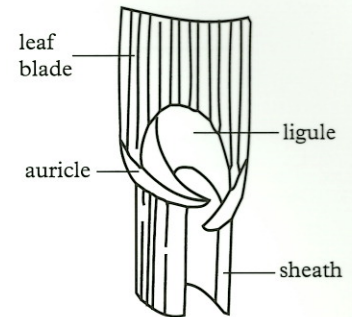
Vegetative structures used in the guide

1) Leaves:

Sheath = lower part of leaf, a hollow cylinder surrounding the younger leaves. May be entire or split.

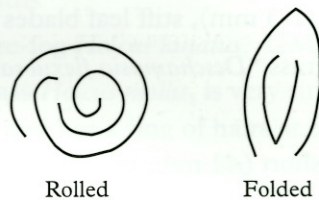
Ligule = small, upward-projecting membrane at junction of blade and sheath. Sometimes consists of a ring of hairs.

Auricles = small claw-like outgrowths projecting horizontally from junction of blade and sheath.



2) Shoot:

youngest leaf blade may be rolled or folded in the shoot.



3) Growth form:

Creeping species usually form a continuous 'turf'. They may have stolons (above-ground creeping stems, usually green) or rhizomes (below-ground creeping stems, usually white or brown).

Tufted species usually have no rhizomes or stolons and do not form a 'turf'. Some large tufted species form dense tussocks, consisting of dead stem bases, which stand above soil level.