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**THE
TURFGRASS SEED
GUIDE, 1981**

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THE TURFGRASS SEED GUIDE

FOREWORD

Two years ago we brought our seed information up to date with a lightweight supplement to the previous year's booklet. Then last year we produced a heavyweight — "Turfgrass seed, 1980" — which covered many aspects of turfgrass sowing and management in addition to the availability and merits of cultivars.

The present publication, "The turfgrass seed guide, 1981", is more substantial than a mere supplement but deals almost exclusively with cultivar information. This obviously needs amendment after twelve months. New cultivars come onto the market, old ones fade away. New trial results are published. For comparing cultivars, "The turfgrass seed guide, 1981" stands on its own, and there is no need for cross-reference back to "Turfgrass seed, 1980." But the latter still has much information which has not dated—features of the main turfgrasses (choice of species for various purposes and infrequent cutting), seed (depth of sowing, germination vigour, etc.) and seeds mixtures (for all amenity uses). "Turfgrass seed, 1980" is therefore still useful for basic reference.

Previously, availability and merit information for each species were given in separate tables. This year, they have been amalgamated. We are moving as fast as seems reasonable towards a short simple annual guide on seed, and a reader already familiar with the subject should now find almost all he needs for reference in the five main cultivar merit Tables, 6, 8, 10, 12 and 14.

There are two other important sections. The pattern form of tender put out in 1979 has been repeated, with notes on how to specify the required seed; and there are notes on the seed standards which came into effect during 1980 as a result of new Seeds Regulations.

A major work on botanical nomenclature has come out during 1980—the final volume of "Flora Europaea", dealing with grasses. We have, however, deferred for the present any adjustment of the Latin botanical names we use. Red fescue is the main species in which changes may be needed, but we are awaiting the outcome of various taxonomic studies currently in progress.

As in previous years, we are indebted to many outside sources of help: the Ministry of Agriculture, Fisheries and Food for guidance on the interpretation of seeds legislation; the National Institute of Agricultural Botany and the Department of Agriculture and Fisheries for Scotland for technical information; numerous turfgrass workers in Europe and North America whose published data and ratings have been used to supplement our own trial results in making the comparisons of cultivar merits; and the seedsmen and breeders who kindly provide information on seed availability each year.

J. R. ESCRITT,
Director.

SECTION I. SEED STANDARDS

Revised Fodder Plant Seeds Regulations came into effect on 1st August 1980. They amended seed standards and the size of samples required for official seed testing. The previous division of impurities into "weed seeds" and "other crop seeds" has been abolished. There is now only one category of impurities, "other plant species".

The grasses covered by the Regulations are listed in Table 1. The Regulations also apply to other fodder plants such as the legumes used in agriculture. Reference to the Regulations should be made for details of any species except the relatively few grasses dealt with in the following notes, which only summarize points of special importance to turfgrass seed users. Guidance can be obtained from the Agricultural Departments:—

Ministry of Agriculture, Fisheries and Food,
White House Lane,
Huntingdon Road,
Cambridge, CB3 0LF.

Department of Agriculture & Fisheries for Scotland,
Agricultural Scientific Services,
East Craigs,
Edinburgh, EH12 8NJ.

Department of Agriculture for Northern Ireland,
50, Houston Road,
Crossnacreevy,
Castlereagh,
Belfast, BT6 9SH.

These notes are believed to be a correct interpretation of the Regulations but if there is any query reference should be made to the Regulations themselves.

1. Straights

The term "straights" means seed lots of a single species and, if certified seed, a single cultivar.

The standards for certified seed of the main turfgrass species are given in Table 2. The sub-divisions of some columns show the minimum standards (Min) and the Higher Voluntary Standards (HVS). Table 2 also shows the standards for the lower seed grade (commercial seed) which is permitted for some species.

Contamination by other plant species is dealt with mainly in two ways, by setting an overall total and by limiting the amount of any single species. In addition there are standards for certain particularly undesirable species. These are broadly of two kinds:-

TABLE 1

Kinds of grass seed to which the Fodder Plant Seeds Regulations 1980 apply

<i>Agrostis canina</i> L.	Velvet bent
<i>Agrostis gigantea</i> Roth	Red top
<i>Agrostis stolonifera</i> L.	Creeping bent
<i>Agrostis tenuis</i> Sibth.	Browntop bent, including 'Highland' browntop bent (<i>A. castellana</i> in this booklet)
<i>Arrhenatherum elatius</i> (L.) Beauv. ex J. & K. Presl.	Tall oatgrass
<i>Dactylis glomerata</i> L.	Cocksfoot
<i>Festuca arundinacea</i> Schreb.	Tall fescue
<i>Festuca ovina</i> L.	Sheep's fescue, including hard fescue (<i>F. longifolia</i> in this booklet) and fine-leaved sheep's fescue (<i>F. tenuifolia</i>)
<i>Festuca pratensis</i> Huds.	Meadow fescue
<i>Festuca rubra</i> L.	Red fescue, consisting of Chewings fescue and creeping red fescue
<i>Lolium multiflorum</i> Lam.	Italian ryegrass, including Westerwolds
<i>Lolium perenne</i> L.	Perennial ryegrass
<i>Lolium x hybridum</i> Hausskn.	Hybrid ryegrass
<i>Phleum bertolonii</i> DC.	Small-leaved timothy
<i>Phleum pratense</i> L.	Large-leaved timothy
<i>Poa annua</i> L.	Annual meadow-grass
<i>Poa nemoralis</i> L.	Wood meadow-grass
<i>Poa pratensis</i> L.	Smooth-stalked meadow-grass
<i>Poa trivialis</i> L.	Rough-stalked meadow-grass

TABLE 2
Standards for certified seed and commercial seed

Species	Certified seed (blue label)				Commercial seed (brown label)			
	Minimum % germ- ination	Minimum analytical purity (% by weight)	Seeds of other plant species*		Minimum % germ- ination	Minimum analytical purity (% by weight)	Seeds of other plant species*	
			Maximum total content of all other species (% by weight)*	Maximum content of any one other species (% by weight)*			Maximum total content of all other species (% by weight)*	Maximum content of any one other species (% by weight)*
Perennial ryegrass	80	Min 96 HVS 98	Min 1.5 HVS 1.5	Min 1.0 HVS 1.0	Min 1.0 HVS 0.5	} NA	NA	NA
Timothy	80	96	1.5	1.0	0.5		NA	NA
Red fescue	75	90	1.5	1.0	0.5		NA	NA
Smooth-stalked meadow-grass	75	85	2.0	1.0	NA		NA	NA
Bents (browntop, creeping and velvet bent)**	75	90	2.0	1.0	NA	75	90	3.0
Sheep's fescue (in- cluding fine-leaved sheep's fescue and hard fescue)	75	85	2.0	1.0	NA	75	85	3.0
Miscellaneous meadow-grasses (annual, rough- stalked and wood)	75	85	2.0	1.0	NA	75	85	3.0

Min = Minimum standards.

HVS = Higher Voluntary Standards.

NA = Not applicable.

* Further restrictions on certain species apply within these limits: see notes in text.

** For red top (*A. gigantea*) the minimum % germination is 80%; otherwise the same standards apply as for the other bents shown here.

- a) Troublesome weeds of agriculture, e.g. wild oats, docks and sorrels, blackgrass and couch (*Agropyron repens*) in grass seed. Higher Voluntary Standards are generally stricter than the minimum standards: both are defined by % weight or seed numbers. No further details are given here as these contaminants would not normally be important to buyers of turfgrass seed.
- b) Other specified contaminants. Some of these may be important to turfgrass users, particularly if seed is purchased as straights rather than in mixtures. The figures below are the permitted maxima. (% = percentage by weight.)
- Perennial ryegrass: certified — 0.4% annual meadow-grass, and seed HVS
 — 0.3% rough-stalked meadow-grass.
 (There is also a standard, for all certified seed, relating to awned seeds.)
- Timothy: certified seed HVS — 0.3% *Agrostis* species.
- Red fescue: certified seed HVS — 0.3% rough-stalked meadow-grass, and
 — 4 seeds in total of ryegrass, cocksfoot and meadow fescue in a 30 g sample.
- Perennial ryegrass, timothy and red fescue: certified seed of minimum standard — No special requirements, except awned seed standard for perennial ryegrass mentioned above.
- Bents and sheep's fescue: certified and commercial seed — No special requirements.

In meadow-grasses a certain amount of seed of other meadow-grasses (*Poa* spp.) can be disregarded in determining whether the total impurities meet the standards: 0.8% in all certified seed, 3% in commercial seed of rough-stalked and wood meadow-grass, and 10% in commercial seed of annual meadow-grass.

2. Mixtures

The term "mixture" applies to mixtures of two or more turfgrass species or two or more cultivars of a single species. (The latter should not be described as a blend. In the context of seeds legislation "blending" describes the mixing of two or more seed lots of the same cultivar.)

There are no prescribed standards for the purity and germination of mixtures. Each constituent must meet the appropriate standards, and the minima to be expected for the mixture as a whole would have to be calculated from the minima for each component and the proportion of each component in the mixture.

SECTION II. SPECIFICATIONS AND TENDERS FOR SEED

This section concerns those parts of specifications and tenders that deal with seed. It does not give general instructions on how to draw up complete specifications and tender documents.

1. How to describe the items in a seeds mixture

There are two categories of seed—certified seed, the normal grade for most turfgrass purposes, and commercial seed, an inferior grade available within some minor species (see Section I). There is no commercial seed of four important turfgrass species (perennial ryegrass, red fescue, smooth-stalked meadow-grass and timothy), so it is not strictly necessary to specify certified seed when ordering seed of these species. Some users, however, like to do so to make their requirements absolutely clear. There is commercial seed of bents (and miscellaneous fescues and meadow-grasses), and certified seed must be specified whenever it is wanted.

Here is one basic pattern for describing the items of a seeds mixture. The percentages are only examples, and the letters 'F', 'G' etc. would be replaced by the names of the chosen cultivars.

- 35% perennial ryegrass: certified seed of 'F', 'G' or 'H'
- 20% smooth-stalked meadow-grass: certified seed of 'J', 'K' or 'L'
- 20% Chewings fescue: certified seed of 'M', 'N' or 'P'
- 20% strong creeping red fescue: certified seed of 'Q', 'R' or 'S'
- 5% browntop bent: certified seed of 'T', 'U' or 'V'

It is advisable to name three or four cultivars for each kind of seed, to allow the seedsman some flexibility, unless there are definitely only one or two cultivars which are suitable.

If there are more than three or four names to give, use the following alternative pattern.

- 35% perennial ryegrass: certified seed of an approved wear-tolerant cultivar*
- 20% smooth-stalked meadow-grass: certified seed of an approved wear-tolerant cultivar with good winter colour*
- 20% Chewings fescue: certified seed of an approved compact cultivar with good winter colour*
- 20% strong creeping red fescue: certified seed of an approved compact cultivar*
- 5% browntop bent: certified seed of an approved compact cultivar with good winter colour*

*As indicated in Tables 6, 12, 8, 10 and 14 of "The turfgrass seed guide, 1981"

TABLE 3 Pattern of specification and tender for seed (blank)

SPECIFICATION AND TENDER FOR SEED

Tenders to be delivered to not later than (Name and address
 midday in the envelope provided of authority inviting
 GRASS SEED to be supplied by (delivery date) the tender)
 Mixture (Ref. No.) for (use)

Specification of seed required			Seed offered				
% by weight	Species	Seed category	Preferred cultivar(s)	Seed category	Cultivar(s) offered	Analytical purity %	Germination %

Required quantity (in metric units)
 Seed cost per 50 kg per 50 kg
 Total cost of required quantity of seed (viz.) including all
 packing and free delivery to
 SIGNED On behalf of (name of seed company)

TABLE 4 Pattern of specification and tender for seed (partly completed)

SPECIFICATION AND TENDER FOR SEED

Tenders to be delivered to the address adjoining not later than Recreation Dept., (Name and address
 midway 25th January 1981 in the envelope provided Sometown Borough Council, of authority inviting
 GRASS SEED to be supplied by 31st March 1981 (delivery date) Council Offices, the tender)
 Mixture A1 (Ref. No.) for playing fields and general landscaping (use) Sometown, Anyshire

Specification of seed required				Seed offered	
% by weight	Species	Seed category	Preferred cultivar(s)	Seed category	Cultivar(s) offered
35%	Perennial ryegrass	certified	'F', 'G' or 'H'		
20%	Smooth-stalked meadow-grass	certified	'J', 'K' or 'L'		
20%	Chewings fescue	certified	'M', 'N' or 'P'		
20%	Strong creeping red fescue	certified	'Q', 'R' or 'S'		
5%	Browntop bent	certified	'T', 'U' or 'V'		

Required quantity $283 \times 50 \text{ kg} = 14,150 \text{ t}$ (in metric units)

Seed cost per 50 kg

£ per 50 kg

Total cost of required quantity of seed (viz. 14,150 t) including all

packing and free delivery to GREENACRES DEPOT

£

SIGNED

On behalf of

(name of seed company)

“Approved” in this context means approved by the person responsible for drawing up the specification. He defines his required qualities by reference to the merit tables in this booklet (Section III), where ratings for various qualities are given.

2. Pattern specification and tender for seed

For a local authority or other prospective purchaser inviting tenders from seedsmen, an appropriate pattern document is shown in Tables 3 and 4. Table 3 shows it blank: Table 4 shows it with a specimen set of entries, ready to be sent out to tender. The remaining sections left empty would be completed by the seedsman.

The description of seed would follow one of the patterns already suggested. (As before, ‘F’, ‘G’ etc. stand for the real cultivar names.)

When the seedsman completes his part of the document he shows, in “cultivar(s) offered”, whichever of the preferred cultivars he is offering or his suggestions for alternative cultivars to provide the specified qualities.

When the tender is received by the local authority or other prospective purchaser, the technical officer who drew up the tender checks the merits of the offered cultivars by reference to Section III of this booklet.

3. Special points and conditions concerning seed

The covering letter of enquiry to seedsmen may need to include certain special points relating to seed, in addition to all the normal points such as date and time for delivery of tenders, acceptance of the whole or part of a tender, how variations in price will be dealt with, etc. Such special points include the following:—

- a) A clear statement that the total cost should include all packing and free delivery to specified destinations.
- b) Any special conditions concerning the seed requirements (e.g. analytical purity or germination requirements more strict than those of the legal standards).
- c) If conditions are made as described in (b) above, the seedsman should be asked to show the appropriate information clearly on his invoice in due course, in addition to the statutory information. Even if there are no special requirements, seedsmen may be asked to make sure that the purity and germination of each mixture component are shown on the invoice or elsewhere. (Such information on purity and germination is not statutorily required if the seed complies with legal standards, but there is not likely to be any difficulty in obtaining it.)
- d) Any conditions about the sampling and testing of seed by the purchaser. Such stipulations are not nowadays customary and it would be wise first to consult an Official Seed Testing Station, which could advise on the current appropriate minimum weights of samples and methods of drawing them, as well as **the cost of testing, which is nowadays a strong deterrent to any checking of this sort.**

SECTION III. CULTIVAR AVAILABILITY AND MERIT

1. INTRODUCTORY NOTES

What does official listing signify?

No seed of a cultivar of a species prescribed in the UK legislation may be marketed in the UK unless it is either on the UK National List or is included in the EEC Common Catalogue and, in this latter case, only provided there is no current UK derogation applying.

The tables in this booklet contain cultivars in:—

- a) the UK National Lists as at October 1980 (up to and including Plant Varieties and Seeds Gazette No. 189).
- b) the 6th edition of the EEC Common Catalogue (dated 31st December 1979).

In addition, six cultivars of perennial ryegrass of special interest are included, though not yet qualifying under (a) or (b) above. The six are clearly marked.

The letter "C" in the left-hand margin denotes cultivars in the EEC Common Catalogue not already included by virtue of being on the UK National Lists. Those cultivars are omitted to which UK derogations applied, i.e. which were not allowed to be marketed in the UK, at 30th September 1980.

Who supplies the seed?

Maintainers and UK agents are shown in Tables in abbreviated form: full names and addresses are listed in alphabetical order in Section IV. The maintainer is generally the person so shown in the Lists or the Common Catalogue; he is responsible for basic seed supplies. A UK agent is usually only shown for a cultivar if the maintainer has no UK branch or base. Agents listed here are generally those named in the National Lists, who act as the maintainers' official "contacts" in the UK. They are not necessarily the sole importers or wholesalers of cultivars. **Enquiries for seed should only be made to these agents if there are difficulties through normal trade channels.**

Which cultivars are available?

The Tables which show maintainers and UK agents also serve as summaries of seed availability in 1981. All cultivars included in these Tables (apart from some of those bracketed in Tables 5 and 6) were understood, on enquiry in late 1980, to be intended to be available in 1981, in limited amounts where LA is shown but otherwise in sufficient quantity for the cultivar to be readily available. Non-available cultivars are not listed; nor are a few cultivars not on UK National Lists, for which there are no recognized UK agents.

Which are the best cultivars?

The merits of available cultivars are shown by ratings A, B and C, denoting good, medium and poor respectively. Brackets denote provisional ratings, either for relatively untested material or for cultivars whose previous ratings are now questionable. These ratings apply only to the range of cultivars in each Table. Sources of information include data from STRI trials (published and unpublished) and, for some characters, agricultural trials in the UK. The 1980 edition of the Dutch Rassenlijst and other Dutch reports, and information from Denmark, West Germany, Sweden and North America, have also been used.

2. PERENNIAL RYEGRASS (*Lolium perenne* L.)

Table 5 is a check-list of all the currently listed perennial ryegrass cultivars, non-available as well as available. The cultivars are grouped down the page according to chromosome number and persistence:—

- | | |
|-----------------------------------|---|
| Diploid (chromosome number 14) | i) "turf-type" cultivars, i.e. cultivars recently bred for, and normally restricted to, turf use, marked in official lists as "not intended for fodder production". |
| | ii) cultivars of good agricultural persistence, such as have proved satisfactory for turf in the past. |
| | iii) other cultivars with poorer agricultural persistence. |
| Tetraploid (chromosome number 28) | iv) all tetraploid cultivars: no merits for turf use have been found to offset the need for a higher seed rate and the rather open growth habit. |

These four groups are split up from left to right in Table 5 according to heading date, a feature which may be relevant for some turf uses.

Groups (i) and (ii) of Table 5 contain the cultivars suitable for heavy wear (mainly from autumn to spring) or mowing at or below 20 mm ($\frac{3}{4}$ in.). Table 6 lists the available cultivars from these Groups, in sequence according to wear tolerance, persistence under 20 mm mowing and compactness. It is approximately, but not precisely, a ranking order according to merit.

Where fertility is lower, the ranking order of cultivars might be slightly different. In particular, high shoot density (reflected in the "Compactness" rating) seems more important for wear tolerance under low nitrogen than under high nitrogen.

Wear tolerance ratings apply chiefly to the survival apparent at the end of a season's play but they also take some account of recovery between seasons. For recovery, cultivar heading date is sometimes important: some early-heading cultivars can be poor in recovery after winter wear.

TABLE 5

Complete check-list of listed cultivars of perennial ryegrass arranged according to chromosome number, agricultural persistence, and heading date (There would normally be an interval of about 30 - 40 days between cultivars in the two extreme groups when left unmown in spring.)

Very early	Early	Intermediate	Late	Very late
i) Turf-type diploid cultivars (Cultivars in square brackets are turf-type cultivars not officially listed at the time of going to press but likely to be marketed shortly, or otherwise of special interest.)				
	[Derby] Game Pennfine [Regal] [Royal] Venlona	[Arno] [Barry] Caravelle Causeway Ensporta Gazon Majestic Manhattan (Heading date uncertain—Servo)	Hornet Hunter Loretta Player Pleno Score	[Bellatrix] Saione Sprinter
ii) Persistent agricultural diploid cultivars				
Ensilo Frances Gremie	Monta Oakpark Premo	Barlenna Bianca Hubal Kosta Mombassa Morenne Talbot	Aber. S.23 Bardetta Barenza Caprice Compas Godik Karin Lamora Mascot Midas Mirvan Moretti	Parcour Pelo Perma Perray Pippin Preference Rathlin Romney Silian Sportiva Trani Wendy
iii) Other diploid cultivars				
Aber. S.24 Callan Devon Eaver Grasslands Ruanui Nui Presto Pajbjerg Primevère Printo Raidor	Cropper Darbo Glasnevin Leafy Houba Lidura Mantilla Montana Naki RvP Hay- Pasture Tripera Verna Pajbjerg	Aber. S.101 Aber. S.321 Amado Animo Argo Barstella Combi Diana Doublet Dux Øtofte Falcon Favrit Hora Hunsballe Kent Indigenous	Lenta Pajbjerg Lilope Limedia Liperlo Lisanna Mito Dachfeldt NFG Odengrün Pablo Réal Sisu Tresceaver Viktoria Trifolium	Bocage Borvi Elrond Fingal Semperweide Spirit Splendor Springfield Vasto
(Heading date uncertain—Tailteann, Vejo)				
iv) Tetraploid cultivars				
Grimalda	Barvestra Reveille Tonga	Agresso Atempo Barlatra Sceempter Hay Taptoe Terhoy Tove Uri	Artal Barpastra Fortis Massa Meltra Petra	
(Heading date uncertain—Bastion, Bonita)				

TABLE 6

Comparison of perennial ryegrass cultivars in Groups (i) and (ii) of Table 5 which are available in 1981, arranged mainly according to ratings in the first three columns
 A good, B medium, C poor: brackets denote provisional ratings: ratings apply only within this Table

Cultivar	Tolerance of artificial wear	Persistence without wear mown at 20 mm	Compactness	Freedom from red thread disease	Cleanness of cut	Short growth	Winter hardiness	Maintainer and UK agent
C Loretta	A	A	A	C	(A)	A	(A)	Steinach (Br. Seed)
Majestic	A	A	A	(C)	(A)	A	(A)	Mommersteeg
Sprinter	A	A	A	C	(B)	(A)	A	Zwaan (Picard)
[Arno]	A	-	A	(B)	(B)	(A)	(A)	van der Have (Johnson)
Manhattan	A	A	B	C	A	A	A	van Engelen (Pope)
Score	(A)	(A)	A	(B)	(B)	B	(B)	Zwaan (Picard)
[Barry]	A	-	A	(B)	(B)	A	(B)	Barenbrug (Goldsmith)
Pennfine	B	A	A	B	A	A	B	Pennstate (Johnson/Northrup/Pope)
Hunter	(B)	A	A	(B)	(B)	A	(B)	Cebeco (Hurst)
[Bellatrix]	A	-	A	(B)	(B)	B	(B)	Cebeco (Hurst)
[Derby]	(A)	-	B	(B)	(B)	A	(B)	Int. Seeds/Nungesser (Br. Seed)
Ensporia	(A)	A	A	C	(B)	A	C	van Engelen (Pope)
Player	(B)	(A)	(A)	(C)	-	(A)	(B)	Cebeco (Hurst)
Wendy	B	(A)	B	(B)	(A)	B	A	van der Have (Johnson/Sharpe/RHM)
C Caravelle	B	(A)	B	(B)	C	A	(B)	Mommersteeg
Pelo	B	A	B	B	A	(B)	B	van der Have (Johnson/Sharpe/RHM)
Grandstand	B	A	B	B	A	B	B	Mommersteeg
Melle	B	A	B	B	A	B	(B)	RvP (Nickerson)
Romney	B	A	B	C	C	A	(B)	Kent NFU
Lamora	B	B	B	B	A	B	A	Mommersteeg
Perma	B	B	B	B	(A)	B	A	Cebeco (Nickerson)
Donata	B	(B)	(B)	A	-	B	B	van der Have (Johnson/Sharpe/RHM)
Karin	B	B	B	(B)	A	B	B	van der Have (Johnson/Sharpe/RHM)
Angela	B	B	B	(B)	A	B	B	van der Have (Johnson/Sharpe/RHM)

TABLE 6 continued

Cultivar	Tolerance of artificial wear	Persistence without wear mown at 20mm	Compactness	Freedom from red thread disease	Cleanness of cut	Short growth	Winter hardiness	Maintainer and UK agent
Aber. S.23	B	B	B	A	B	B	C	WPBS/NSDO
Parcour	B	(B)	B	B	-	(B)	A	Petersen (Sharpe/Twyford)
[Royal]	(B)	(B)	(A)	(B)	(B)	B	A	Mommersteeg
Game	(B)	(B)	B	(B)	(A)	(B)	(C)	Joorden (Sinclair)
Talbot	(B)	(B)	B	(B)	(A)	(B)	- B	van der Have (Johnson/Sharpe/RHM)
Barenza	B	C	B	A	A	B	A	Barenbrug (Goldsmith)
[Regal]	(B)	-	(B)	(B)	(B)	(B)	-	Int. Seeds (Nickerson)
Pippin	(B)	(B)	(B)	(B)	-	B	-	DPB
Bardetta	(B)	(B)	(B)	(B)	-	B	-	Barenbrug (Goldsmith)
Monta	(B)	(B)	(B)	(B)	-	(B)	(C)	Zelder (Germain)
Midas	-	(A)	B	(B)	(A)	(B)	B	Zelder (Germain/Dunns)
Moretti	-	(B)	(B)	(B)	-	(B)	(A)	Mommersteeg
Morenne	-	(B)	(B)	(B)	-	B	-	Mommersteeg
Hubal	-	-	(B)	(B)	-	(B)	B	Zelder (Germain)
Premo	-	-	(B)	(B)	-	B	B	Mommersteeg
Gremie	-	-	(B)	(B)	-	(B)	(B)	Zelder (Germain)
Saione	(B)	(B)	B	C	-	B	-	DPB
Mombassa	(B)	(B)	B	(B)	-	(C)	B	Mommersteeg
Compas	B	C	B	B	-	B	B	Joorden/van Engelen (Sinclair/Pope)
Caprice	B	C	B	B	(B)	B	B	Zelder (Germain)
Barlenna	C	(C)	B	(B)	-	B	B	Barenbrug (Goldsmith)
Sportiva	C	B	B	B	(B)	(C)	C	van Engelen (Pope)
Ventona	C	(B)	B	(B)	(A)	(C)	(B)	Joorden (Sinclair)
Ensilò								van Engelen (Pope)
Frances								van der Have (Johnson)
Mirvan								DPB
Perray								Petersen (Sharpe/Twyford)
Preference	(LA)							Zwaan (Picard)
Servo	(LA)							Svalöf (Primer)
Trani								DPB (Donath)

Insufficient data

* Cultivars in square brackets are turf-type cultivars not officially listed at the time of going to press but likely to be marketed shortly, or otherwise of special interest.

There are therefore indications— still to be verified by further trials— that for good wear tolerance under low nitrogen regimes it may be advisable (a) to pay special attention to compactness ratings when making selection from Table 6, and (b) to select cultivars which Table 5 shows are relatively late-heading, i.e. in the three right-hand columns.

If a user requires persistence under close mowing, e.g. about 10 mm, he must decide whether he requires (a) fairly long-term persistence of this sort or (b) rapid plant growth, with strong rooting, in a relatively short time, with no need for appreciable persistence for more than one growing season. For (a), there are as yet few appropriate cultivars, but 'Ensporta', 'Loretta' and 'Hunter' are three of the available cultivars which did reasonably well in recent STRI trials made on a limited number of cultivars. For (b), most of those in Table 6 could be considered acceptable ('Aberystwyth S.23' for example has for some time been successfully used on cricket tables) although the best would be from the top of Table 6.

Red thread disease (*Corticium fuciforme*) often disfigures close-mown perennial ryegrass, particularly some turf-type cultivars, but adequate nitrogen usually prevents serious damage. The organism responsible for fusarium patch disease (*Fusarium nivale*) can sometimes cause severe damage on perennial ryegrass, especially when the grass is rather long and there is snow cover (the disease then being called pink snow mould). It can also be a factor contributing to winterkill. Although the Dutch and Germans give cultivar ratings for resistance to *F. nivale* it is still uncertain whether these are applicable to UK conditions or agree with the relatively few UK data. Other factors in winterkill can on occasion mask any apparent effects of *F. nivale* itself, and grey snow mould (*Typhula incarnata*) can also be involved.

3. RED FESCUE (*Festuca rubra* L.) (including Chewings fescue and creeping red fescue)

Table 7 shows all officially listed cultivars of red fescue which are available in 1981, and classifies them according to:—

- a) the presence or absence of rhizomes (underground stems) and the number of chromosomes in the plant cells.
- b) heading date in spring, the difference between "early" and "late" being about three weeks.

For turf to be mown at about 5 mm (3/16 in.), the available cultivars of Chewings fescue or slender creeping red fescue in Table 8 can be considered. They are arranged primarily according to known persistence under close mowing, and compactness.

Colour in winter or summer may sometimes be particularly important. Table 9 groups together the cultivars of Chewings fescue rated A or B for these characters. The ratings for winter colour are probably more reliable than those for summer colour. Comparison with

TABLE 7

Red fescue cultivars available in 1981, grouped by type and heading date

	Chewings fescue (No rhizomes: 42 chromosomes)	Slender creeping red fescue (Slender or few rhizomes: 42 chromosomes)	Strong creeping red fescue (Many strong rhizomes: 56 chromosomes)
Early	Checker, Encota, Highlight, Ivalo, Koket, Tatjana, Wintergreen		Engina, Enzet, Rapid
Medium early		Aberystwyth S. 59, Dawson, Oasis, Oriflamme, Polar	Agio, Bergond, Boreal, Dasas, Durlawn, Echo, Ensylva*, Envira, Novorubra, Roland 21, Rubin, Rubina Roskilde
Medium late	Atlanta, Banner*, Barfalla, Bolero*, Cascade, Jade*, Menuet, Rasengold, Scarlet, Tamara, Waldorf, Veni	Manoir, Merlin, Pennlawn	Bargena, Gracia, Moncorde, Pernille, Reptans, Ruby
Late	Frida, Jamestown	Sonnet*	

* Provisional grouping.

TABLE 8

Comparison of the cultivars of red fescue available in 1981 that might be considered for very close mowing (5 mm), arranged within species mainly according to ratings in the first three columns

A good, B medium, C poor:

brackets denote provisional ratings: ratings apply only within this Table

Subspecies and cultivar	Persistence when mown at 5 mm	Compactness	Freedom from red thread disease	Winter colour	Summer colour	Maintainer and UK agent
Chewings fescue (No rhizomes: 42 chromosomes)						
Waldorf	A	A	A	C	A	van der Have (Johnson)
Barfalla	A	A	A	B	A	Barenbrug (Goldsmith)
C Scarlet (LA)	A	A	(A)	B	(A)	van der Have (Johnson)
Menuet	A	A	B	(B)	(A)	Joorden (Sinclair)
Frida	(A)	A	A	(B)	(A)	Zelder (Germinal)
Checker (LA)	A	(B)	A	A	A	Oregon (Nickerson)
Atlanta	A	A	B	C	A	van der Have (Sharpe)
Highlight	A	B	A	A	B	van Engelen (Pope)
Encota	A	B	A	A	B	Cebeco (Hurst)
Wintergreen	A	B	A	A	(B)	Northrup
C Koket	A	B	A	B	B	Mommersteeg
Bolero	—	(A)	(A)	(A)	—	Joorden (Sinclair)
Jade (LA)	(B)	(A)	(A)	(B)	(A)	Joorden (Sinclair)
C Tamara (LA)	(B)	(A)	(A)	(C)	(B)	DPB
Jamestown (LA)	B	B	(B)	C	A	Lofts/Barenbrug (Goldsmith)
Banner	(B)	(B)	(A)	(B)	(B)	Burlingham (Johnson)
C Ivalo (LA)	(B)	(B)	(A)	—	(B)	DPB
C Tatjana (LA)	(B)	(B)	(B)	(A)	(C)	DPB
Veni	B	C	B	C	(C)	Daehnfeldt (Sinclair)
C Rasengold (LA)	C	C	(B)	C	(B)	Steinach (Spillers)
Cascade	C	C	B	C	C	Oregon (Northrup)
Slender creeping red fescue (Slender or few rhizomes: 42 chromosomes)						
Dawson	A	A	(C)	A	A	van der Have (Johnson)
Polar (LA)	A	(B)	B	A	A	Weibull (Hurst)
Sonnet	(B)	(B)	(A)	(B)	(A)	Joorden (Sinclair)
Merlin (LA)	(B)	B	B	(B)	B	NSDO
Oriflamme	(B)	(B)	(B)	(B)	(B)	Sergeant
C Manoir (LA)	(B)	(B)	(B)	(B)	(B)	Clause (Mommersteeg)
Pennlawn	C	C	B	B	B	Pennstate (Northrup)
Oasis (LA)	C	C	C	B	B	van Engelen (Pope)
Aber. S.59	C	C	C	A	B	WPBS/NSDO

TABLE 9

Some cultivars of Chewings fescue from Table 8, grouped according to ratings for colour (within groups, same order as in Table 8)

Winter colour		Summer colour	
A	(A)	A	(A)
Checker Highlight Encota Wintergreen	Bolero Tatjana	Waldorf Barfalla Checker Atlanta Jamestown	Scarlet Menuet Frida Jade
B	(B)	B	(B)
Barfalla Scarlet Koket	Menuet Frida Jade Banner	Highlight Encota Koket	Wintergreen Tamara Banner Ivalo Rasengold

TABLE 10

Available cultivars of strong creeping red fescue (many strong rhizomes; 56 chromosomes) grouped provisionally according to compactness (alphabetically within groups)

Cultivar	Maintainer and UK agent
Moderately compact (similar to cultivars rated C in Table 8)	
C Boreal Ensylva	Canada van Engelen (Pope)
Gracia C Pernille	(LA) Zwaan (Picard) DPB
Rather open	
Agio Bargena	van Engelen (Pope) Barenbrug (Goldsmith)
Dasas Durlawn	(LA) DPB Nat.-NK (Northrup)
C Envira Enzet	(LA) Cebeco (Hurst) van Engelen (Pope)
Moncorde Novorubra	Mommersteeg Mommersteeg
Ruby	(LA) van der Have (Johnson)
Very open	
C Bergond Echo	(LA) DPB Daehnfeldt (Picard)
Engina Rapid	van Engelen (Pope) Zwaan (Picard)
Reptans C Roland 21	(LA) Weibull (Hurst) Steinach (Spillers)
C Rubin Rubina Roskilde	Svalöf (Primer) DPB

TABLE 11

Red fescue cultivars available in 1981, grouped according to relative height

	Chewings fescue	Slender creeping red fescue	Strong creeping red fescue
Very short	Frida*, Waldorf	Manoir*	
Short	Atlanta, Banner*, Encota, Highlight, Ivalo*, Jamestown, Tamara*, Tatjana*	Merlin	
Medium short	Barfalla, Cascade, Checker, Jade*, Koket, Menuet*, Rasengold*, Scarlet, Veni, Wintergreen	Dawson, Oasis, Oriflamme*, Polar	
Medium tall		Aberystwyth S.59, Sonnet*	Boreal, Durlawn, Gracia, Moncorde*, Pernille*, Ruby
Tall		Pennlawn	Agio, Bargena, Engina, Ensylva*, Enzet*, Novorubra, Rapid, Reptans, Rubin
Very tall			Dasas, Echo, Roland 21*, Rubina Roskilde
Insufficient data	Bolero		Bergond, Envira

* Provisional grouping.

the information on heading in Table 7 shows the general tendency for early-heading cultivars of Chewings fescue to show better colour in winter (Nov.—Feb.) than late-heading cultivars. Conversely, late-heading cultivars are mostly at their best in summer.

Some cultivars of slender creeping red fescue are susceptible to dollar spot (*Sclerotinia homoeocarpa*). 'Oasis' is very susceptible; 'Dawson', 'Manoir', 'Polar' and 'Oriflamme' are all more or less susceptible; 'Merlin' and 'Sonnet' have not shown symptoms in recent trials; while 'Aberystwyth S.59' and 'Pennlawn' appear to be resistant.

Compared with the most wear-tolerant turfgrass species such as perennial ryegrass, no cultivars of red fescue can really be considered tolerant of wear, especially very damaging wear as in football. Nevertheless a well-established sward can stand a certain amount of compaction and abrasive wear. When conditions are such as to allow red fescue to survive wear, the most wear-tolerant cultivars are the compact and persistent cultivars of Chewings fescue and slender creeping red fescue, i.e. those rated A or B for compactness in Table 8. The least tolerant are the open and non-persistent cultivars of strong creeping red fescue, i.e. those at the bottom of Table 10.

Table 11 compares most of the available cultivars according to their relative height of regrowth under relatively infrequent and lenient mowing. The grouping might be slightly different in uncut swards, or with extremely high or low fertility. The "very short" cultivars would need only about half as many cuts during the season as the "very tall" to maintain the same standards of maximum permitted height.

4. SMOOTH-STALKED MEADOW-GRASS (*Poa pratensis* L.)

Table 12 shows the merit ratings for all the available cultivars which can reasonably be considered for normal turf uses. Seven other cultivars intended primarily for agriculture or of very low merit for normal turf uses are 'Arina-Dasas', 'Balin', 'Delft', 'Ensema', 'Erte', 'Norma Øtofte' and 'Soma Hunsballe'.

The compactness or density of the turf influences its tolerance of hard wear or relatively close mowing, e.g. at 20 mm ($\frac{3}{4}$ in.). The ratings in the first three columns of Table 12 therefore tend to be similar, and the cultivars are arranged in a sequence based on these ratings and those for freedom from leaf spot (*Drechslera poae*).

5. TIMOTHY (*Phleum* spp.)

The cultivars of timothy in Table 13 belong to two types.

The small-leaved timothy cultivars 'Parant', 'Piccolo' and 'Teno' are similar in most respects to 'Aberystwyth S.50'. Any of these could be used as a relatively fine-leaved dense timothy to withstand mowing at about 10–12 mm.

TABLE 12

Comparison of cultivars of smooth-stalked meadow-grass available in 1981, arranged mainly according to the ratings in columns 1, 2, 3 and 5

A good, B medium, C poor: brackets denote provisional ratings: ratings apply only within this Table

Cultivar	Wear tolerance	Comp-actness	Toler-ance of mowing at 20 mm	Winter green-ness	Freedom from:				Short growth	Maintainer and UK agent
					leaf spot (<i>Drechslera poae</i>)	orange stripe (<i>Puccinia poarum</i>)	brown fleck rust (<i>Poaenemoralis</i>)	mildew (<i>Erysiphe graminis</i>)		
C Fylking	A	A	A	B	A	B	A	B	Svalöf (Bond)	
Merion	A	A	A	A	A	(B)	(B)	B	MBA	
Parade	A	A	A	C	(B)	(B)	(B)	B	van der Have (Johnson)	
Baron	A	A	A	B	(A)	(B)	(A)	A	Barenbrug (Goldsmith)	
Bensun	A	A	A	A	(A)	(B)	(B)	B	Warren (Hurst)	
C Pac	A	A	(A)	C	(A)	(B)	(A)	(A)	Nungesser (Br. Seed)	
C Entopper	A	(A)	(A)	C	(A)	(B)	(A)	(B)	van Engelen (Pope)	
C Kimono	A	A	-	B	(A)	(B)	(C)	(B)	Mommersteeg	
C Mosa	A	(A)	-	(C)	(B)	(C)	(C)	-	Mommersteeg	
Enmundi	A	B	A	(C)	(A)	(B)	B	A	van Engelen (Pope)	
Monopoly	A	B	B	A	(B)	(B)	B	C	Mommersteeg	
Nugget	(B)	A	A	C	(A)	B	(B)	A	Pick (Pope)	
(LA) Trampas	B	(A)	(A)	C	(A)	C	(A)	A	Daehnfeldt (Sinclair)	
C Charlotte	(B)	(A)	(A)	(B)	(A)	(A)	(B)	(B)	DPB	
Adelphi	(B)	B	(A)	(B)	(A)	(A)	(C)	(A)	Northrup	
(LA) Nuturf	(B)	(B)	(A)	(A)	(B)	(B)	(B)	(B)	Nungesser (Br. Seed)	
(LA) Swing	(B)	(B)	(A)	(A)	(A)	(C)	(B)	(A)	Svalöf (Primer)	
C Geronimo	(B)	B	B	(C)	B	(C)	B	B	Mommersteeg	
C Arena	(B)	(B)	(B)	(A)	(B)	(B)	(B)	(C)	Zelder (Germinial)	
C Sobra	(B)	(B)	B	(B)	(B)	(A)	(B)	(B)	Svalöf (Primer)	
Enprima	(B)	B	B	(C)	(C)	C	A	A	van Engelen (Pope)	
Welcome	(B)	B	B	(C)	(C)	(A)	(B)	(B)	Zwaan (Picard)	
(LA) Newport	(C)	(B)	(B)	(C)	(B)	(A)	(A)	(B)	Oregon (Northrup)	
C Aquila	C	B	(B)	B	(B)	(B)	(A)	B	van der Have (Johnson/Sharpe)	
C Arista	C	B	B	(C)	(A)	(C)	(B)	B	van Engelen (Pope)	
C Primo	C	B	(B)	C	(B)	(B)	(A)	B	Weibull (Hurst)	
C Barones (LA)	C	B	(C)	C	(A)	(B)	(A)	A	Barenbrug (Goldsmith)	
C Granada (LA)	C	C	(C)	B	(A)	(B)	-	A	Northrup	

Insufficient data

TABLE 13

Cultivars of timothy available in 1981

Cultivar	Maintainer and UK agent
i) Small-leaved timothy (<i>Phleum bertolonii</i>) (diploid (2n = 14) or tetraploid (2n = 28))	
Aberystwyth S.50 Deploy	WPBS/NSDO Dunns
C Parant (LA)	Svalöf (Primer)
C Piccolo (LA)	Joorden (Sinclair)
C Teno (LA)	DPB
ii) Turf-type or other persistent cultivars of large-leaved timothy (<i>Phleum pratense</i>) (hexaploid (2n = 42))	
Aberystwyth S.48 Barvanti (LA)	WPBS/NSDO Barenbrug (Goldsmith)
Comet (LA)	van Engelen (Pope)
Farol (LA)	Cebeco (Nickerson)
Goliath Grasslands Kahu	Mommersteeg DSIR
Heidemij Intenso (LA)	van der Have (Johnson/Sharpe) Zwaan (Picard)
Mirage Motim	van Engelen (Pope) Mommersteeg
Pecora Ramona	UCOPAC (Donath) Mommersteeg

TABLE 13

'Deploy' is a tetraploid, intermediate in agricultural persistence between 'Aberystwyth S.50' and 'Aberystwyth S.48'; it is claimed to have larger seed and quicker establishment than 'Aberystwyth S.50', and also has larger leaves.

The persistent large-leaved cultivars listed in Table 13 could be used where maximum wear tolerance is required, with mowing not below about 15–20 mm; but there is insufficient information for a tabular comparison of them. 'Aberystwyth S.48' is the best-known cultivar of this group, with a rather large blue-green leaf. It is rated highly in the UK for persistence in agricultural use, along with 'Goliath', 'Heidemij' and 'Intenso'. 'Barvanti' and 'Ramona' are particularly intended for turf use. 'Barvanti' is rated highly for wear tolerance by the Dutch and is probably the best of the cultivars in Table 13 in this character. 'Ramona' is very fine-leaved for a hexaploid timothy, but rated by the Dutch as slightly worse than 'Aberystwyth S.50' for wear tolerance.

Table 13 does not include any large-leaved timothies with low ratings for agricultural persistence (NIAB ratings C or D). Such cultivars are unlikely to be sufficiently persistent to be worth using for turf.

6. BENTS (*Agrostis* spp.)

Table 14 summarizes the information on the available cultivars. 'Highland' is set apart at the top of the browntop bents. Otherwise the arrangement is alphabetical.

Although fusarium patch disease (*Fusarium nivale*) is an important disease of bents in the UK, no reliable cultivar ratings can be given.

The apparent differences between species, under UK conditions, are as follows:—

Less susceptible	More susceptible
Browntop bent (<i>A. tenuis</i>)	'Highland' browntop bent
Velvet bent (<i>A. canina</i> spp. <i>canina</i>)	(<i>A. castellana</i>)
	Creeping bent (<i>A. stolonifera</i>)

There is insufficient information on the wear tolerance of species and cultivars of bent for reliable ratings applicable to UK conditions to be given, but there seems to be little difference between the main bents—'Highland' and other browntop bents and creeping bent.

7. MISCELLANEOUS GRASSES

A. Miscellaneous fine fescues (*Festuca* spp.)

Table 15 shows the available cultivars of hard fescue and fine-leaved sheep's fescue. The Dutch cultivars 'Biljart', 'Dukla', 'Scaldis' and 'Tournament' are shorter and more persistent than the Danish cultivars 'Ridu' and 'Triana'.

TABLE 14

Comparison of cultivars of bent available in 1981
(alphabetical order within species)

A good, B medium, C poor: brackets denote provisional ratings: ratings apply only within this Table

Species and cultivar	Compactness (sward density)	Fineness of leaf	Freedom from red thread disease	Summer greenness	Winter greenness	Short growth	Maintainer and UK agent
Brown top bent (<i>Agrostis tenuis</i> and <i>A. castellana</i>)							
<i>A. castellana</i>	C	C	B	B/C	A	C	Oregon (Northrup)
Highland							
<i>A. tenuis</i>							
Allure (LA)	B	B	-	-	(B)	-	Joordens (Sinclair)
Bardot (LA)	A	B	A	B	B	A	Barenbrug (Goldsmith)
Eko (LA)	C	C	(B)	(C)	(A)	(B)	Svalöf (Primer)
Gerico (LA)	(B)	-	(B)	-	-	(B)	DPB
Holfior (LA)	B	B	A	B	A	B	van der Have (Johnson)
Saboval	B	B	A	B	B	B	WPBS/NSDO (Hurst)
Tracenta	B	B	A	B	A	B	Mommersteeg
Creeping bent (<i>A. stolonifera</i>)							
Carmen	A	B	A	(B)	(B)	(B)	Mommersteeg
Emerald	B	B	A	B	C	B	Weibull (Hurst)
Kromi (LA)	(B)	-	-	-	-	B	Daehnfeldt (Sinclair)
Pennercross	B	B	A	B	B	B	Penstate (Northrup)
Prominent	B	B	A	B	C	B	Zwaan (Picard)
Velvet bent (<i>A. canina</i> ssp. <i>canina</i>)							
Barbella (LA)	A	A	A	A	B	B	Barenbrug (Goldsmith)
Kingstown (LA)	A	A	B	A	C	B	Rhode Isl. (Goldsmith)
Novobent	A	A	A	A	B	B	Mommersteeg

B. Rough-stalked meadow-grass (*Poa trivialis* L.)

This species has so far shown little value for most turf uses, judging by the material from Denmark which has hitherto been available (e.g. 'Dasas' and 'Omega Øtofte', as shown in Table 15). Its main merit is its rapid initial establishment compared with smooth-stalked meadow-grass, and its tolerance of wet soils.

'Polis' represents a slight improvement over commercial seed, on Dutch ratings. Other newly developed cultivars, some of them appreciably different in type from traditional material, are not yet available.

C. Wood meadow-grass (*P. nemoralis* L.)

Because of its natural adaptation to shady places, this species is sometimes included in mixtures for shade. This may be appropriate for "natural" grassland or areas to be left unmown, but wood meadow-grass is not tolerant of mowing or of wear. Available cultivars are shown in Table 15.

D. Annual meadow-grass (*P. annua* L.)

Although annual meadow-grass is now a scheduled grass under the Seeds Regulations, there are currently no named cultivars, and the seed which is available commercially is often a by-product of other seed crops. This seed is likely to produce plants wholly or predominantly of the erect annual type, less dense and persistent than the forms of var. *reptans* selected under close mowing or heavy wear, which a groundsman can best propagate by spreading cuttings.

Seed of annual meadow-grass, if required, is available from the seedsmen shown in Table 16.

E. Crested dogstail (*Cynosurus cristatus* L.)

Crested dogstail is of doubtful value for intensively managed turf. It has shown very poor wear tolerance in STRI trials, and even without wear it is not persistent under mowing at Bingley, although it produces a thick and attractive sward in its first year and a few individual plants in a turf sward can survive for several years under very close mowing.

Little breeding work has been done with crested dogstail and virtually the only seed on the market is that imported from New Zealand under the cultivar name of 'Southlands', available from most seedsmen.

F. Other miscellaneous grasses

Apart from the main agricultural grasses and clovers, which are readily available from agricultural seedsmen, other grasses of which seed may be available in limited quantities in 1981 are given in Table 16, with the major seed companies which could supply them.

TABLE 15

Available cultivars of miscellaneous fine fescues and meadow-grasses in 1981

Cultivar	Maintainer and UK agent
Hard fescue (<i>Festuca longifolia</i>)	
C Biljart	Mommersteeg
C Dukla	Cebeco (Hurst)
Ridu	Daehnfeldt (Sinclair)
Scaldis	van der Have (Johnson)
Tournament (LA)	Zelder (Germinal)
C Triana	DPB
Fine-leaved sheep's fescue (<i>F. tenuifolia</i>)	
Barok	Barenbrug (Goldsmith)
C Novina	Mommersteeg
Rough-stalked meadow-grass (<i>Poa trivialis</i>)	
Dasas	DPB
C Omega Øtofte	DPB
C Polis (LA)	Joorden (Sinclair)
Wood meadow-grass (<i>P. nemoralis</i>)	
C Barnemo (LA)	Barenbrug (Goldsmith)
C Enhary	van Engelen (Pope)
C Novombra	Mommersteeg
C Pallas	Cebeco (Hurst)

TABLE 16

Miscellaneous grasses for which seed is available in 1981 and their suppliers

<i>Alopecurus pratensis</i> (meadow foxtail)	Goldsmith/Hurst/Johnson/Miln/Northrup/Pope/Sinclair.
<i>Ammophila arenaria</i> (marram grass)	Goldsmith/Johnson.
<i>Anthoxanthum odoratum</i> (sweet vernal-grass)	Goldsmith/Hurst/Johnson/Mommersteeg/Northrup/Sharpe.
<i>Arrhenatherum elatius</i> (tall oatgrass)	Goldsmith/Johnson/Northrup/Pope.
<i>Bromus inermis</i> (smooth or Hungarian brome)	Donath/Goldsmith/Hurst/Johnson/Miln/Mommersteeg/Northrup/Picard/Pope.
<i>Chloris gayana</i> (Rhodes grass)	Johnson.
<i>Cynodon</i> spp. (bermudagrass)	Br. Seed/Goldsmith/Hurst/Johnson/Miln/Northrup/Picard/Pope/Sharpe/Sinclair.
<i>Deschampsia flexuosa</i> (wavy hair-grass)	Br. Seed/Donath/Goldsmith/Hurst/Johnson/Miln/Mommersteeg/Northrup/Picard/Pope/Sharpe/Sinclair.
<i>Elymus arenarius</i> (lyme grass)	Johnson/Mommersteeg.
<i>Holcus lanatus</i> (Yorkshire fog)	Br. Seed/Goldsmith/Hurst/Johnson/Mommersteeg/Picard/Pope.
<i>Poa annua</i> (annual meadow-grass)	Donath/Goldsmith/Hurst/Johnson/Miln/Mommersteeg/Northrup/Pope.
<i>Poa compressa</i> (flattened meadow-grass)	Br. Seed/Johnson/Pope.
<i>Poa palustris</i> (swamp meadow-grass)	Johnson/Northrup/Pope.
<i>Puccinellia distans</i> (reflexed salt-marsh-grass)	Northrup.
<i>Trisetum flavescens</i> (golden oatgrass)	Johnson/Northrup.
<i>Zoysia japonica</i> (Japanese lawngrass)	Johnson.

SECTION IV. NAMES AND ADDRESSES OF MAINTAINERS AND AGENTS

Barenbrug	Barenbrug Holland BV, Postbus 4, 6800 AA Arnhem, Netherlands.
Bond	R. A. Bond, Tilston Close, Tilston, Malpas, Cheshire.
Br. Seed	British Seed Houses Ltd., Bewsey Industrial Estate, Pitt Street, Warrington, WA5 5LE.
Burlingham	E. F. Burlingham & Sons, PO Box 217, Forest Grove, Oregon 97116, USA.
Canada	Canada Dept. of Agriculture, Ottawa, Ontario, Canada.
Cebeco	Cebeco-Handelsraad, 31 Blaak, Postbus 182, 3000 AD Rotterdam, Netherlands.
Clause	Clause SA, Avenue Lucien Clause, 91220 Brétigny-sur-Orge, France.
Daehnfeldt	A/S L. Daehnfeldt, Postbox 185, 5100 Odense C, Denmark.
Donath	L. Donath & Co. Ltd., Avonmouth Way, Avonmouth, Bristol, BS11 9LU.
DPB	Dansk Planteforaedling A/S, Boelshøj, 4660 Store Heddinge, Denmark.
	<i>and</i>
	Danish Plant Breeding Ltd., Didbrook Fields, Toddington, Nr. Cheltenham, Glos.
DSIR	Department of Scientific and Industrial Research, Grasslands Division, Private Bag, Palmerston North, New Zealand.
Dunns	Dunns Seed and Grain Ltd., Hartham, Corsham, Wiltshire, SN13 0QA.
Germinal	Germinal Holdings, Commercial Road, Banbridge, Co. Down, Northern Ireland.
	<i>Subsidiary:—</i>
	British Seed Houses Ltd., Bewsey Industrial Estate, Pitt Street, Warrington, WA5 5LE.
Goldsmith	Goldsmith Bros. Ltd., Garland Street, Bury St. Edmunds, Suffolk.
Hurst	Hurst Gunson Cooper Taber Ltd., Witham, Essex, CM8 2DX.
Int. Seeds	International Seeds Inc., PO Box 168, 820 First Street, Halsey, Oregon 97348, USA.
Johnson	W. W. Johnson & Son Ltd., Boston, Lincs., PE21 8AD.

- Joorden J. Joordens' Zaadhandel BV, Postbus 7823, 5995 ZG Kessel (Lb), Netherlands.
- Kent NFU Kent County Branch NFU, 26 Faversham Road, Lenham, Maidstone, Kent, ME17 2PN.
- Lofts Lofts Pedigreed Seed Inc., PO Box 146, Chimney Rock Road, Bound Brook, New Jersey 08805, USA.
- MBA Merion Bluegrass Association, 12341-25th Ave. NE, Seattle, Washington 98125, USA.
- Miln Miln Marsters Group Ltd., Boughton, Chester, CH3 5AA.
- Mommersteeg Mommersteeg International BV, Postbus 1, 5251 CH Vlijmen, Netherlands.
and
Mommersteeg International Ltd., Station Road, Finedon, Wellingborough, Northants, NN9 5NT.
- Nat.-NK National-NK Seeds Ltd., 12560 Fort Road, Edmonton, Alberta, T5 4H8, Canada.
- Nickerson Nickersons Seed Specialists Ltd., Field House, Pelham Road, Grimsby, South Humberside, DN34 4SX.
- Northrup Northrup King & Co., PO Box 959, Minneapolis, Minnesota 55440, USA.
and
Northrup King Ltd., 58, Princes Street, Southend-on-Sea, Essex, SS1 1QF.
- NSDO National Seed Development Organisation Ltd., Newton Hall, Newton, Cambridge, CB2 5PS.
- Nungesser L. C. Nungesser KG, Postfach 11 08 46, 6100 Darmstadt, German Federal Republic.
- Oregon Oregon State University, Corvallis, Oregon 97331, USA.
- Pennstate Department of Agronomy, Pennsylvania State University, Tyson Building, University Park, Pennsylvania 16802, USA.
- Petersen P. H. Petersen, Postfach 6, 2391 Lundsgaard, Post Langballig, German Federal Republic.
- Picard J. Picard & Co. (Seed Merchants) Ltd., 19/21, Great Tower Street, London, EC3R 5AQ.
- Pick Otto Pick & Sons Seeds Ltd., Box 126, Richmond Hill, Ontario, L4C 4X9, Canada.
- Pope Pope & Chapman Ltd., 13/19 Hockerill Street, Bishop's Stortford, Herts., CM23 2DH.
- Primer Primer Seeds Ltd., Highfields Seeds Ltd., Desford, Leicester, LE9 9JU.

- RHM RHM Arable Services Ltd., Throws, Stebbing, Dunmow, Essex, CM6 3AQ.
- Rhode Isl. University of Rhode Island, Kingston, Rhode Island 02881, USA.
- RvP Rijksstation voor Plantenveredeling, Burg. Van Gansberghelaan 109, 9220 Lemberge-Merelbeke, Belgium.
- Sergeant Sergeant Seeds Ltd., The Old Airfield, Tholthorpe, York, YO6 2JR.
- Sharpe Charles Sharpe & Co. Ltd., Sleaford, Lincs., NG34 7HA.
- Sinclair Sinclair, McGill Ltd., Wyberton Park, Boston, Lincs.
and
Sinclair, McGill Ltd., Timperley, Altrincham, Cheshire.
- Spillers Spillers Agriculture Ltd., Moreton Mill, Moreton, Ongar, Essex, CM5 0PD.
- Steinach Saatzucht Steinach, 8441 Steinach über Straubing, German Federal Republic.
- Svalöf Svalöf AB, 268 00 Svalöf, Sweden.
Constituent Companies:—
The Swedish Seed Company.
AB Hammenhögs Frö.
J. E. Ohlsens Enke A/S.
Swedish Seed Association.
- Twyford Twyford Seeds Ltd., Kings Sutton, Banbury, Oxon., OX17 3QW.
- UCOPAC Union de Coopératives Agricoles de Céréales pour la Production et l'Amélioration des Semences, Boite postale 3, 77390 Verneuil-l'Étang, France.
- van Engelen van Engelen Zaden BV, Postbus 35, Vijfhoevenlaan 4, 5250 AA Vlijmen, Netherlands.
- van der Have D. J. van der Have BV, Postbus 1, 4420 AA Kapelle, Netherlands.
and
D. J. van der Have BV, The Barn, Westfield Road, Oakley, Bedford, MK43 7SU.
- Warren Warrens Turf Nursery, 8400 W.111th Street, Palos Park, Illinois 60464, USA.
- Weibull Weibullsholm Plant Breeding Institute, Fack, 261 20 Landskrona, Sweden.
- WPBS Welsh Plant Breeding Station, Plas Gogerddan, Aberystwyth, Dyfed, SY23 3EB.
- Zelder Zelder BV, 6595 NW Ottersum, Netherlands.
- Zwaan Zwaan en de Wiljes BV, Postbus 2, 9679 ZG Scheemda, Netherlands.

