

TRADE IN BULBS - Phase 1 Report

by Beverley Lear

on behalf of
Wildlife Trade Monitoring Unit
IUCN Conservation Monitoring Centre
219c Huntingdon Road
Cambridge CB3 0DL

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INTRODUCTION

The World Conservation Strategy calls for the sustainable utilization of plant and animal species along with the maintenance of genetic diversity. These aims apply equally to horticulturally important plants as to species with potential as food, medicinal or energy resources.

Many horticulturally desirable species are threatened not only from habitat destruction but by over-collection for trade. Bulbous species are one such group of plants where over-exploitation continues to threaten some populations in the wild.

In recent years, high levels of trade in bulb species have caused growing concern amongst plant conservationists, garden clubs and native plant societies. Horticulturists in the USA and Europe, and especially the principal import centre, the Netherlands, have noted an increase in the numbers and species offered for sale. It is feared that continued high levels of export will exhaust the wild populations. Of great concern are the bulb species from Asia Minor and the Mediterranean region, most notably from the Iberian Peninsula and Turkey.

Currently, very few bulb species receive legal protection under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) or national legislation.

The only extensive work carried out to date on the bulb trade involves Cyclamen species. In 1983, Minouk van der Plas-Haarsma, Director of TRAFFIC(Netherlands) initiated a study of the Cyclamen trade, co-sponsored by the WWF organisations of the Netherlands and USA. Her studies focused initially on Cyclamen exports from Turkey (the primary exporter) to the Netherlands and, later, on the broader trade patterns involving exports from Cyprus, Israel and Italy.

In Turkey, the Ministry of Agriculture and a major exporting company jointly funded an investigation of the impact of possible over-exploitation of wild geophyte populations. The resulting report, Taxonomic and Ecological Investigations on the Economic Geophytes of Turkey (Ekim et al., 1984) recommends restrictions on the harvesting of certain species.

OBJECTIVES

The objective of the present project is to identify the species involved in the horticultural trade, their popularity in horticulture and their status in the wild and in cultivation. It is anticipated that the information gathered will contribute to a longer term project of WWF-US which is to develop recommendations for trade controls for species in the wild, depending on their status and ability to sustain a regulated degree of exploitation. The work supplements a listing of species recorded in the USA trade compiled by Dr Faith Campbell of the Natural Resources Defense Council. It was decided to develop her initiative by focusing on the trade situation in Europe.

The specific objectives of this preliminary project are:

- i) to determine the extent of information available on:
 - a) Status in the wild,
 - b) Degree to which artificial propagation exists,
 - c) Level of trade;
- ii) to develop a data bank on the above information which will form a basis for continuing efforts to monitor horticultural trade;
- iii) to identify priority species of conservation concern and the regions in which they occur, and to identify centres of the wild bulb trade. This will aid planning of later phases of the bulb project in which field visits may be required to obtain additional information on the status in the wild of threatened species, degree of propagation in the countries of origin, and levels of collection and export.

Methods

The collection and compilation of data is described in the five stages below. Only limited analysis of the data on the bulb trade was possible in the time available. The majority of data collected is incorporated into the card index of bulbs in trade described in stage 2. A summary of information on the origin of the various bulbs, taken from the card index, is given in Appendix 1.

There is no single definition of a 'bulb' which seemed appropriate for the present study. The term 'bulb' is used by the nursery trade to include corms and tubers as well as the root stocks of terrestrial orchids. No rigid definition was adopted for the survey and the term 'bulb' or 'bulbous plant' was used loosely to refer to all those plants traditionally sold by the specialist bulb growers and traders.

Bulbs in trade consist of a mixture of true species, subspecies and varieties, either wild or cultivated, and cultivars. A very wide range of bulb names is in common usage many of which are synonyms. No attempt has been made to verify or standardise the plant names used in trade and these have been recorded as they appear in nursery lists and catalogues. Synonyms in common usage have been cross-referenced in the card index. Cultivars of bulbs in a few genera dominate the horticultural market with Daffodil, Narcissus, and Tulip, Tulipa, hybrids being the most popular. Other more specialist bulbs are known generally in the trade as 'miscellaneous bulbs'.

STAGE 1 COLLECTION OF NURSERY CATALOGUES

Catalogues from all known retail and wholesale companies involved in the bulb trade in Britain were collected. These are listed below together with the nursery code used in data recording. Some seed catalogues were also collected.

(* indicates companies supplying a large range of species)

Retail

JACQUES AMAND, Clamp Hill, Stanmore, Middx. HA7 3JS	JA	*
AVON BULBS, Bradford-on-Avon, Wiltshire BA15 2AT	AV	*
BEES of CHESTER, Sealand Nurseries Ltd., Sealand, Chester		
WALTER BLOM & SON LTD., Coombelands Nurseries, Leavesden, Watford		
RUPERT BOWLBY, Gatton, Reigate, Surrey RH2 OTA	RB	*
BROADLEIGH GARDENS, Bishops Hull, Taunton, Somerset	BL	*
CAMBRIDGE BULBS, 40 Whittlesford Road, Newton, Cambridge	CAM	*
P. CHRISTIAN, Pentre Cottages, Minera, Wrexham, Clwyd	CHR	*
DE JAGER, The Nurseries, Marden, Kent TN12 9BP		
LOWLAND NURSERIES (GEEST), Spaldings, Lincs. PE12 6DZ		
HORTICO, The Chestnuts, Spalding, Lincs. PE12 6EB		
MICHAEL JEFFERSON-BROWN LTD., Weston Hills, Spalding, Lincs.		
PARADISE CENTRE, Twinstead Road, Lamarsh, Bures, Suffolk		
POTTERTON & MARTIN, The Cottage Nursery, Moortown Road, Nettleton, Caistor, Lincs.	POM	*
VAN TUBERGEN, Oldfield Lane, Wisbech, Cambs. PE13 2RJ	VT	*

Wholesale

JACQUES AMAND, Clamp Hill, Stanmore, Middx. HA7 3JS		*
H.S. HOMMERS & SONS (DUTCH BULBS) LTD., The Terrace Nurseries, Oaken, Codsall, West Midlands		
MAYFLOWER GARDENS LTD., Matmore Gate, Spalding, Lincs.	MAY	
KIEFLO, Chr. Kieft & Sons (London) Ltd., Fir Covert Road, Taversham, Norwich NR8 6HT	KIE	
H.V. NORMAN LTD., West Row, via Bury St. Edmunds, Suffolk	HVN	
PETER NYSSSEN LTD., Railway Road, Urmston, Manchester	NYS	
J. PARKER DUTCH BULBS (WHOLESALE) CO., Chester Road, Old Trafford, Manchester M16 9HL	PARK	
VAN'S DUTCH BULB COMPANY LTD., 234 Marsh Lane, Preston, Lancs.	VAN	
VAN WAVEREN FLOWERBULBS, Castle Rising, Kings Lynn, Norfolk	WAV	
MATTH. VERDEGAAL, Hoffleet Stow, Bicker, Boston, Lincs. PE20 3AF	M.Ver	
WINCHESTER BULB GROWERS LTD., Winnall Down Farm, Winchester, Hants. SO21 1HF	WB	

Netherlands

MICHAEL HOOG, 86, Koninginneweg, P.O. Box 3217, NL-2001 De Haarlem		*
VAN TUBERGEN, B.V., 33 Achterweg-Zuid, Lisse		*
C.S. WEIJERS & ZONEN b.v., Leidsestraat 100. 2182 DR Hillegom		

STAGE 2 CREATING THE DATABASE

The database was designed to record all the relevant information regarding each bulb taxon recorded in trade catalogues, and to provide a foundation resource for future work on the trade in bulbous species. A card index system was used with the intention that a computerised record may be created at a later date.

Information recorded on index cards

Summary

Side 1 GENUS SPECIES FAMILY

Synonyms still in current use.
Common name

Nursery code: £(price)/No. bulbs
e.g. BL £3.24/25; £6.00/50
JA: £0.90/10; £4.00/50 etc.

Side 2 F1. May-July (flowering period in the wild)

Countries of origin (inc. regions of Turkey and/or details of areas where species is common)

ENDEMIC?

IUCN/TPU status. Protective legislation etc.

Indication of frequency in wild

Of known economic importance (Turkey only)

Habitat and altitude

Cultivation details

Taxa

A total of approximately 1000 entries of species and varieties (including cross referenced synonyms in common usage) taken from the trade catalogues have been recorded. (see Table 1)

Name and family were recorded using the most up-to-date names available in standard texts. In cases where two or more names were in use, each name would be given an index card and cross-referenced to the most up to date name. Nearly 500 taxa of bulbs recorded in trade have been listed by Dr Faith Campbell in a separate index and it would be useful to amalgamate the information.

TABLE 1

NUMBER OF NAMES IN EACH GENUS RECORDED IN CARD INDEX FROM UK CATALOGUES

1	Acidanthera	1	Helicodiceros
66	Allium	1	Hermodactylus
1	Amana	2	Hesperantha
20	Anemone	2	Hesperothiron
1	Argyropsis	3	Homeria
21	Arisaema	3	Hyacinthella
15	Arum	2	Hyacinthoides
1	Arisarum	5	Hyacinthus
(1	Asclepias)	2	Ipheion
2	Babiana	67	Iris
2	Bellevalia	3	Ixioloron

4	Biarum	10	Lachenalis
1	Bongardia	1	Lapeirousia
2	Brimeura	8	Leucojum
1	Brodiaea	27	Lilium
1	Bulbocodium	3	Lycoris
8	Calanthe	6	Merendera
3	Calochortus	8	Moraea
1	Calydorea	18	Muscari
5	Camassia	45	Narcissus
1	Cardiocrinum	2	Nectaroscordum
1	Childanthus	3	Nerine
10	Chionodoxa	6	Nomocharis
1	Chionoscilla	2	Notholirion
37	Colchicum	1	Northoscordum
24	Corydalis	1	Odontostomum
1	Crinum	12	Ornithogalum
116	Crocus	15	Oxalis
38	Cyclamen	1	Pancratium
1	Cypella	3	Pinellia
1	Dichelostemma	11	Pleione (Orchidaceae)
1	Dierama	4	Puschkinia
2	Dodecathon	1	Rhodohypoxis
2	Dracunculus	14	Romulea
1	Elisena	4	Roscoea
3	Eminium	1	Sauromatum
3	Eranthis	31	Scilla
5	Eremurus	1	Sparaxis
11	Erythronium	1	Sprekelia
2	Eucomis	10	Sternbergia
1	Eucharis	3	Tecophilaea
1	Ferraria	2	Tigridia
1	Freesia	1	Trichopelatum
58	Fritillaria	29	Trillium
16	Galanthus	70	Tulipa
2	Galtonia	1	Urginea
1	Geissorhiza	2	Uvularia
1	Geranium	1	Vallota
12	Gladiolus		
1	Gloriosa		
1	Gymnospermium		
2	Gynandriris		
1	Habranthus		
1	Haemanthus		

Nurseries

A simple coding system was applied to each retail company (see p.). A similar coding system was later adopted for the wholesale companies, details being in this case recorded on a separate, blue, index card so that the relevant prices could be compared. The extensive wholesale lists of Van Tubergen and Jacques Amand were not recorded in this way, since the range of species replicated those offered in their retail catalogues and only the price and quantity differed. Hence those species recorded on the blue index card are those most commonly sold to the trade and by implication are those species sold in the highest quantities.

Price

This was recorded in order to distinguish very cheap bulbs which may be wild imports. Wholesale prices were given for loose bulbs only, although most companies also supplied the market with pre-packaged bulbs and display or show cases.

Country of Origin, Habitat, flowering period etc.

These details were drawn from various sources including the library facilities at RBG Kew. The following books were used most extensively:

- Baytop, T. & Mathew, B. (1984). The Bulbous Plants of Turkey Batsford, London.
- Grey-Wilson, C. & Mathew, B. (1981). Bulbs - The Bulbous Plants of Europe and their allies. Collins, London.
- Rix M. & Phillips, R. (1981). The Bulb Book. Pan Books, London.
- Townsend, C.C. (Ed.), (1985). Flora of Iraq Vol. 8. Monocotyledones. Min. of Ag. and Agrarian, Baghdad
- Ohwi, J. (1964). Flora of Japan. Smithsonian Institution. Washington D.C.

Additional information

Information on the frequency of occurrence in the wild is given where available along with reference to text. IUCN status (as recorded by TPU, Kew) is given and index cards highlighted where applicable. Information on legislation was recorded from Anon (1982) List of rare, threatened and endemic plants of Europe. Council of Europe, Strasbourg. The limited information on propagation received during the survey was recorded on the cards.

STAGE 3 CONSULTING BOTANISTS & OTHER BULB EXPERTS

A wide range of botanists and horticulturists with specialist knowledge of bulbs in the wild and in cultivation were contacted. Each was sent a letter explaining the project and its objectives and also asking for information on bulb collecting (if any) in their country of expertise or in their specialist genus. The IUCN Threatened Plants Unit provided 'data dumps' of the principal bulb families (Liliaceae, Amaryllidaceae, and Iridaceae) giving information on status of taxa in the wild.

The following individuals were contacted:

* indicates reply received.

UK

- * B. Mathew, Herbarium, Kew
- * C.D. Brickell, Royal Horticultural Society (RHS)
Dr E.M. Rix, Bulb expert & author
Mrs A. Dadd, RHS Lily Group
- * Mr D. J. Pearce, RHS Daffodil Society
Mr G.E. Cassidy, British Irish Society
- * Dr A.J. Huxley, author & conservationist
- * C.R. Lancaster, Plant collector & broadcaster
- * K. Donald, Daffodil expert, RHS
B. Halliwell, Alpine Dept., Kew

- * C. Leon, TPU, supplied details of plant status and list of European contacts)

SPAIN

- * E. Hernandez-Bermejo, Cordoba B.G.
Prof. C. Gomez-Campo, Co-ordinator of RDB
Prof. M. Costa, Valencia
WWF-Spain

PORTUGAL

Dr J. Malato-Beliz

FRANCE

Dr L. Olivier, specialist in Mediterranean flora
Dr J.Y. Lesouef, authof of France RDB (draft)

GREECE

- * Prof. D. Phitos, Patras

ITALY

Prof. F. Corbetta, involved in plant conservation issues

YUGOSLAVIA

Dr P. Skoberne, author of RDB (in prep.)

TURKEY

By arrangement with Mr M. Reed (Flora & Fauna Preservation Society), whose research into the trade in bulbs from Turkey was running concurrently with the present project, it was agreed that contact with Turkish botanists should be co-ordinated to avoid placing excessive demand on a limited number of experts. All correspondence was initiated from the FFPS office.

Whilst it was expected that replies may be slow to arrive, the response has been disappointing. Future correspondence should ask more specific questions about individual species which are suspected as being of wild origin. If possible lists of bulbs growing in each country of origin should be sent to the relevant correspondents for annotation. Computerisation of the database will make this an easier task.

STAGE 4 CONTACT WITH HORTICULTURAL TRADE IN UK

Contact was made with various bulb companies by letter or telephone making general enquiries about the source of certain species and genera, and about propagation techniques and potential. In some cases I explained that information was being gathered for the present study but often I made trade-type enquiries. The following firms were contacted by telephone: P. Christian, Potterton and Martin, Cambridge Bulbs, Jacques Amand and Winchester Bulbs. I visited one retail nursery, Broadleigh Gardens. The proprietor, Lady Skelmersdale, is known to be sympathetic to conservation. I also contacted the Spalding Bulb Auctions, the centre for wholesale bulb growers in the UK.

Discussions were held with Piers Trehane who is compiling an inventory of all the herbaceous plants sold by the nursery trade throughout Europe. He provided background information on many of the personalities in the bulb business.

The Chelsea Flower Show, the major UK horticultural show took place at the beginning of the project period and was a very useful introduction to the major bulb retail companies.

I visited each 'stand' displaying bulbs, and asked the staff about propagation, origin of certain species, company conservation policy etc. Bulb companies present included the retail firms of Avon Bulbs, Rupert Bowlby, and Van Tubergen. The wholesale firm of Jacques Amand was also present.

STAGE 5 VISIT TO THE NETHERLANDS

A visit to the Netherlands was made from 26-29 August 1987. During this time three companies trading in species bulbs were visited together with the Hobaho Auctions at Lisse. Discussions were held with Minouk van der Plas-Haarsma, TRAFFIC(Netherlands), Amsterdam; Ministerie van Landbouw en Visserij and Ger van Vliet, Director of the Leiden Botanic Garden.

RESULTS AND DISCUSSION

Results of this preliminary survey are given in the Appendices to the report. There has been considerable difficulty in obtaining information from specialist botanists with a field knowledge and details from the nursery trade is piecemeal. The accumulation of data has been gradual from a variety of trade sources and re-checked for 'misinformation'. The proliferation of names used in the trade (as mentioned on p.6) is another major difficulty encountered in studying the bulb trade.

Visits to bulb nurseries and warehouses have been a valuable means of collecting information on bulb species in trade. It is often difficult to distinguish between wild-collected and cultivated bulbs but some general indicative characteristics became apparent during the survey.

Particular genera such as Arum and Cyclamen produce large coarse tubers which are often mishapen by growing amongst rocks or are badly cut by rough handling. These are obviously wild collected. Fritillaria bulbs are easily bruised and damaged during collecting and handling, whereas cultivated stock is evenly shaped and unblemished. Other genera, such as Tulipa, Crocus and Erythronium are more difficult to assess as they replace their entire bulbous parts annually. Even if they are originally wild-collected, after a year in cultivation they will have lost any mishapen quality.

With many Dutch raised bulbs a light trace of the sandy soil is often present, whereas Turkish Cyclamen tubers for example clearly had a clay soil adhered in places. Many bulbs such as Galanthus for example are cleaned and graded either in Turkey or in Holland. Once this process is complete any crate of bulbs can look uniform and as consequently it is difficult to categorically say that certain bulbs are of wild origin.

This survey confirms that there is a substantial trade in bulbous and tuberous plants that have been harvested directly from wild populations. In many cases the impact upon such populations is still unclear but as the interest in the cultivation of species bulbs increases the size of harvest and threat to wild populations will inevitably increase also.

In this preliminary investigation attention was focussed on the UK bulb market to gain indications of the range and quantity of wild-collected bulbs on sale in an importing country. Bulb growing is a very well-established tradition in UK gardening. The Netherlands remains the major commercial centre for the international bulb trade, its reputation for collecting and trading in bulbs going back to the 15 Century.

Large Dutch companies may have their own dealers in exporting countries or may arrange staff expeditions to collect new species. Larger Dutch companies have their own Portugese collectors who forward bulbs direct and not through bulb auctions. The cut-flower trade is influential in the search for new commercial species. The Dutch Flower Bulb Centre, Hillegom has, for example, initiated an expedition to Lesotho to look for new species for the cut-flower industry.

Of collected bulbs imported to the Netherlands about 95% are sold directly, 5% may be used in propagation and of these 3% may fail due to unsuitable cultivation techniques etc.

Any country exporting bulbs which occur naturally in that country may be suspected of exporting wild collected bulbs. Examples include Leucojum from Hungary and Tulipa exported from Greece and Yugoslavia. The trade patterns in Europe are not fully understood.

There is also significant trade from Africa. Of particular concern is Swaziland which, according to recent figures, is a new and developing exporter of bulbs to the Netherlands. Lesotho has been earmarked as a potential source of bulbs for the cutflower trade.

Certain countries such as Turkey and Portugal have been traditionally involved in the collection of native bulbs for commerce for several generations. Links between Dutch and Turkish companies involved in the bulb trade are particularly well-established. Only recently is there any understanding of bulb harvesting in Turkey outside those directly involved in the trade, but very little is still known about bulb collecting in Portugal or other countries with attractive bulbous plants amongst the native flora.

Bulb collecting in Turkey is described by Ekim et al, 1984. Commercial exporters apply for licence to export Turkish bulbous and tuberous plants under the Nature Protection Law 1923 and a maximum number of bulbs is agreed upon. In some areas local and Ministry of Agriculture officials do not want to prevent improper harvesting. In 1984 there were five companies and one co-op professionally harvesting bulbs in Turkey. Other business firms such as hotel owners, confectioners etc. are involved in bulb collection and export in an ad hoc manner.

Representatives for the bulb companies organise villagers to gather bulbs. Each representative organises temporary storage facilities and may instigate a check on bulb/tuber size. He will contact the exporter when a truck load has been gathered.

Collecting bulbs is mainly carried out by men during early spring. This is often when bulbs are in full flower or before leaves are beginning to die back and seed ripen. Tools similar to short-handled pick-axes are apparently made specially for the task (Baytop & Mathew, 1984). A percentage of bulbs are severely damaged or lost during collection and small bulbs are left on the surface to dry out and die rather than be replanted (M. Hoog, pers. comm.). The bulbs and tubers may be partly dried and delivered to the village representative in baskets.

Transport to Holland is organised by a specialist company in Lisse, using refrigerated trucks.

Trade Network

WILD

TURKEY Village collector

 Village representative

 Exporters warehouse

 Refrigerated truck to Holland

HOLLAND

Customs at Hillegom
(main Customs post
for bulb imports)

Pakhoed
(Bulb handlers, storage,
load splitting, Customs
clearance etc.)

Wholesale dealers

Wholesale & retail companies

Bulb auctions

Re-export - UK, F.R. Germany, USA, Japan, etc.

This project has highlighted certain genera, such as Fritillaria, Galanthus and Narcissus, and others recorded in Appendix 1, which are especially vulnerable to over-collection. Incidental information collected on terrestrial orchids during the survey re-inforced the concern about wild Cypripedium in trade. The survey revealed a wholesale supplier of this genus in the UK which should be subject to investigation.

It is essential that the good relations established with key bulb growers and traders are maintained and co-operation regarding further investigations sought. The ultimate success of any project aimed at reducing the trade in wild-collected bulbs depends on a close understanding of the market structure, both in the consumer and producer countries. Bulb growers need encouragement to supplement their main crops with commercially attractive species of genera such as Leucojum and Galanthus. For species where part of the annual crop is met by wild imports and part by commercial propagation, e.g. certain Anemone, Lilium and Erythronium species, tighter controls on flowering quality and bulb establishment may initiate more home production.

Further work:

1. The database should be computerised.
2. More information is required on the bulb trade. In general it is necessary to clarify further:
 - i) which species are always collected from natural populations;
 - ii) which species are in part propagated artificially but wild stock is also on the market;
 - iii) which species are so readily propagated that supply is completely met by commercial propagation.
3. More information is needed on propagation techniques and their commercial implementation.
4. Further information is also required on the effect on wild populations, scale of wild collection, and threats to individual species. Detailed case studies on individual species or genera would be particularly useful.
5. More information is required on major importers in Holland and F.R. Germany.
6. The Narcissus trade in Portugal and Spain is a priority for further investigation.
7. Bulb exports from India and Nepal are known to be substantial. More details are required.

8. The survey revealed that the bulb importing countries of USA and Japan also export wild-collected native bulbs. More details are required.

9. A campaign to bring the issue to the attention of the consumer is urgently needed, as is pressure to bring about accurate country of origin labelling. Also the trade should be encouraged to give written guarantees of artificial propagation on all prepacked bulbs..

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Appendix I - Notes on Species in trade

Collation of information regarding the likelihood of species exploitation is given below. Data has been collected from botanists and horticulturists and from published data and studies. Inclusion below is on the basis of information regarding propagation and/or wild collection being available. Reference to "imported" refers to imports made by the Netherlands unless otherwise stated.

Amaryllis sp.

Plants are imported to Netherlands from South Africa. These may be cultivated but different shaped bulbs to Dutch raised stock.

Anemone blanda

One Dutch nurseryman stated that there are no longer imports but another company is importing large numbers.

It has been suggested that most blue and mixed stocks are imported from the wild. Species are often imported before the seed mature.

Anemone caucasia

This species is almost certainly imported from wild. No details.

Anemone coronaria

Exported from Turkey (Demiriz, 1987).

Arisaema sp.

Japan exports large numbers which are NOT thought to be from propagated stock.

Arisarum vulgare

Exported from Turkey (Demiriz, 1987).

Arum dioscoridis

This species is propagated and wild-collected; and exported from Turkey (Demiriz, 1987).

Arum dracunculus (*Dracunculus vulgaris*)

This is a very common species in Turkey; wild plants are exported.

Arum italicum

Exclusively wild imports until a few years ago, now trade includes a mixture of Dutch stock and wild imports. Exported from Turkey (Demiriz, 1987).

Arum italicum subsp. *albispatum*

Bulbs are subject to constant collection in E. Black Sea Region. Easy propagation and harvesting of tubers that are of suitable size has counteracted effects of large scale export (Demiriz & Baytop, 1985).

Arum orientale

Propagated and collected and exported from Turkey (Demiriz, 1987).

Bellevalia ciliata

Exported from Turkey (Demiriz, 1987).

Bletilla striata

This species is imported from Japan to Holland. Plants are most likely to be of wild origin.

Calanthe spp.

Thought to be collected from the wild at least in part. Further research is needed.

Calla spp.

Exported from Turkey (Alton, 1984).

Cardiocrinum giganteum

Exported from Japan and thought most likely to be of wild origin. Also exported from Darjeeling.

Chionodoxa spp.

Although this genus is said to increase readily in cultivation, and traders in UK are generally unaware of wild source imports, several species appear to come from wild stocks.

Chionodoxa lucillae

Imported from Portugal, and exported in significant numbers from Turkey (Demiriz, 1987). Propagated and collected.

Chionodoxa sardensis

Propagated and collected. Exported from Turkey.

Chionodoxa tmoli

Exported from Turkey (Demiriz, 1987).

Colchicum spp.

Plants of this genus have not been noticed amongst Turkish bulb imports to Holland that have been inspected during 1987.

Colchicum cilicicum

Exported from Turkey (Demiriz, 1987).

Colchicum luteum

One specialist grower told me that a Dutch grower had raised an exceptional form from seed and expects that the wild imports will dry up. Nobody seemed to know anything of this in Holland and this species is still largely imported from India. Possibly over-exploited.

Colchicum speciosum

Exported from Turkey (Demiriz, 1987).

Colchicum variegatum

Exported in significant numbers from Turkey (Demiriz, 1987).

Crocus spp.

C. cancellatus, *C. pulchellus* and *C. speciosus*, are listed amongst the 20 most important bulb exports of Turkey (Demiriz, 1987). *C. ancyrensis*, *C. biflorus*, *C. flavus*, *C. fleischeri*, *C. kotschyanus*, *C. pallasi*, *C. sativus*, are also listed as species which are exported by Turkey.

Cuckularia spp.

Imported from USA to Holland; not in commercial cultivation in Holland.

Cyclamen spp.

Not subject of in-depth study here.

As a direct result of the Report on Cyclamen Trade by Minouk van der Plas-Haarsma, there is a closer inspection of all Turkish vehicles arriving at Customs at Hillegom (all bulb imports are declared here). Species of *Cyclamen* are said to be deliberately placed in mixed crates by the Turkish exporters at the request of Dutch dealers. Alternatively restricted species are exported under false names by arrangement with importing companies.

A Dutch nursery claims to raise their own stock from their own seed whilst a UK specialist nursery raises tubers from American seed as well as buying from Holland. The retail price of tubers in UK is greatly increased from last year.

Cypripedium spp. (Orchidaceae)

These orchids are not grown in Holland. They are difficult (or impossible) to raise from seed because of the lack of specific symbiotic fungi.

Eranthis cilicia

Large numbers of Turkish imports to the Netherlands. Bulbs are collected and possibly over-exploited.

Eranthis hyemalis

Said to be Dutch stock but desire for quotas suggests considerable export from Turkey (Ekim, 1984).

Erythronium album

Easy to propagate but difficult to bring to selling size.

Erythronium americanum

This species is thought to be collected from the wild in east USA. An apparently easy species to propagate but difficult to bring to selling size.

Erythronium citrinum

This species is said not to be offered by the trade but listed by Potterton & Martin.

Erythronium dens-canis

Plants of this species are mainly Dutch and USA cultivated stock, but there are some imports from eastern Europe.

Erythronium hendersonii

Stock produced in Holland?

Erythronium revolutum

Propagated in USA?

Erythronium tolumense

A superior form is propagated in Holland. I heard nothing of it during my visit.

Fritillaria spp.

Synge (1980) recommends that legislation to protect one endangered species should include all members of the genus since all members of the group are rare or at least sporadic in occurrence, all are vulnerable to collectors and the taxonomy is particularly difficult.

There are still significant numbers imported from Turkey.

Fritillaria acmopetala

Van Tubergen claim to have Dutch stock of the species. Exported from Turkey (Demiriz, 1987).

Fritillaria bucharica

Almost certainly imported from wild. No details.

Fritillaria camscatcensis

A Dutch nursery offers this in limited numbers this year from imported stock.

Fritillaria imperialis

Exported from Turkey in significant numbers (Demiriz, 1987). These bulbs produce flowers of varying colours, predominantly orange and the bulbs are commonly badly bruised. Dutch raised stock at Hobaho auction was very clean, evenly shaped and often individually wrapped.

Fritillaria gibbosa

Almost certainly some imports from the wild. No details.

Fritillaria latifolia

Almost certainly imported from the wild. No details.

Fritillaria liliacea

Grown in the Netherlands?

Fritillaria meleagris

This species propagates very easily by seed.

Fritillaria michailovskyi

Originally a difficult species to grow as it naturally occurs on moving scree. Now propagated by 3 Dutch growers who are raising between 40-60 000 bulbs after selection of most easily propagated individual plants.

Fritillaria palidiflora

Almost certainly imported from the wild. No details.

Fritillaria persica

Imported from the wild. Offered for sale in Woolworths, and 'Grown in Turkey'.

Fritillaria persica Adiyaman

A wild form of the species named by M. Hoog after the town near which it grows. One Dutch company imports it from the wild and it is offered by several other companies.

Fritillaria pontica

Exported in significant numbers by Turkey (Demiriz, 1987). Can be propagated by scales or seeds but is difficult.

Galanthus spp.

Populations have been severely damaged by collecting in Turkey, especially in the Mediterranean region, where collecting is now restricted to steep slopes. *Galanthus* has been harvested in the Black Sea Region only for the last 10-15 years, there are fewer firms involved and the population has not yet been damaged. Threats of collecting and export quotas increased the damage by encouraging early harvesting (before the leaves had yellowed or seed set) of immature bulbs which decayed in storage. *Galanthus elwesii* and *G. ikariae* are most common Turkish exports but as these become more scarce, *G. nivalis*, *G. gracilis* and *G. fosteri* are also collected. *Galanthus* harvesting is also established in other European countries, most notably France, where there is a more sensitive approach to species conservation (Ekim, et al., 1984).

<u>Year</u>	<u>Turkey</u>	<u>France</u>
1970	18728750	305000
1971	22263300	2938200 + 2716 kg
1972	15187200	9032250 + 4254 kg
1973		16465500 + 17028 kg
1974	7514000	16192600 + 1300 kg
1975	7333000	15634000
1976	7815000	13038000
1977	6433000	20237000
1978	7295000	18245000
1979	NOT PUBLISHED	
1980	14860000	17985000 + 4300 kg
1981	20149000	19475000
1982	21130000	12876000 + 8942 kg
1983	28804000	9969000 + 13240 kg

As the bulbs become more scarce the quality and size of exported bulbs decrease and importers buy increasing amounts of stock. Dry bulbs do not re-establish well and there is a gradual movement by the public away from dry bulbs.

The Ministry of Agriculture, UK, (MAFF), has carried out research into propagation and harvesting techniques. Apparently difficult to grow from seed due to difficulties in seed collection. Bulb cutting or chipping is the principal method employed and is being researched by MAFF at Kirton, Lincs.

Most Galanthus do not go through usual auction houses but to 5 or 6 wholesale companies which sell them direct.

Galanthus elwesii

This species is widely distributed throughout Western Anatolia and Eastern Aegean Islands but is being harvested in significant numbers. As a result this once common species has greatly diminished, especially in the Taurus Region of Turkey and in some cases entire populations have disappeared. Whilst species as a whole is not faced with extinction (isolated individuals surviving in cracks in inaccessible rocks) entire populations are decimated by intense collecting (Demiriz & Baytop, 1985). Imported in large numbers from Turkey. Apparently does not do well in cultivation in Holland.

Galanthus ikariae

From Pontis Range, W. Turkey this species is being substituted for G. elwesii.

Galanthus nivalis

Wild source material from Turkey is no longer found in Holland as it does not flower well. Now raised in Holland and bought from the Loire Valley, France, where wild populations are 'farmed'.

Geranium tuberosum

Turkish imports and Dutch stock. Inspection authorities have not noticed significant quantities of this species in 'bulb' consignments from Turkey this year.

Gladiolus spp.

No imports from Turkey noticed by inspection authorities this year.

Iris spp.

No imports from Turkey noticed this year (pers. comm.)

Iris acutiloba

Almost certainly some wild imports, no details..

Iris germanica

Exported from Turkey (Demiriz, 1987).

Iris histroides

Possibly imported from wild.

Iris iberica subsp. elegantissima

Amongst the 20 most important bulb exports from Turkey (Demiriz, 1987).

Iris koptdaghensis

Possibly over-exploited.

Iris lortetii

Endangered species. Only 4 small populations in Eastern Upper Galilea in Israel. Original population drastically reduced by commercial exploitation and is now under threat from afforestation and occasional picking despite being a fully protected species (Synge, 1980). Records of its presence in Lebanon, South of Litani River where its presence is also likely to be precarious. Sold by P. Christian @ £9.00 each.

Iris paradoxa

Amongst the top 20 bulb species exported from Turkey (Demiriz, 1987).

Iris persica

Exported from Turkey (Demiriz, 1987).

Iris reticulata

Exported from Turkey (Demiriz, 1987) but believed also to be in cultivation in Holland.

Iris sari

Amongst the top 20 bulbous exports from Turkey (Demiriz, 1987).

Iris tuberosa

Exported from Turkey (Demiriz, 1987), and stocks of one Dutch company stated to be wild.

Leucojum aestivum

Imported in huge quantities from Turkey. Van Tubergen would expect to sell 10 000 annually, also some from India. This year imports are of poor quality.

Leucojum autumnale

Used to come from Portugal but stopped about 5 years ago. One year came in as Ornithogalum but are now virtually unobtainable. Sold by three specialist UK companies.

Leucojum vernal

Eastern Europe imports (especially Hungary) and some Dutch stock.

Lilium spp.

Most bulbs in trade are cultivated in France, Israel and Japan. Dutch Growers Newspaper article on how the Dutch are trying to keep Japanese nursery raised stock out of Holland because of virus problems.

Lilium auratum

Formally Japanese but now all Dutch stock.

This species, indicated as Japanese stock, can be found in UK catalogues.

Lilium candidum

Even though this species is now only supposed to be collected from the wild in Turkey for propagating material, in 1982 between Marmaris Bozburun & Dacta Peninsula harvesting was carried out whilst bulbs were in full flower (Ekim, 1984). This species is still exported from Turkey but the majority of imports are Israeli cultivated stock.

Lilium lancifolium

Formally Japanese but now Dutch raised stock.

Lilium martagon

Van Tubergen imports about 2000 per year from Turkey although there is a small quantity of Dutch raised stock available.

Muscari spp.

Cultivated in the Netherlands. Muscari muscarimi medicus moschatum is exported from Turkey (Demiriz, 1987) but this does not appear to be sold by the bulb trade.

Narcissus spp.

Holland imports 1 million Narcissus annually from Portugal and this includes a number of species which for some reason do not do well in cultivation in Holland (Dutch Bulb Trade Press). 100 000 imported annually from Malta. It is not known whether this includes any wild collected bulbs. Some Dutch companies used to have own Portuguese collectors who forwarded bulbs direct to dealers and not to auction. The season for collecting Narcissus spp. is early July/August. The vast majority of these species are imported from the wild.

Wild species do not set offsets and are therefore propagated by seed, which is very small and difficult to handle. Good sized bulbs can be raised from seed from between two years (N. bulbocodium) to (more commonly) 4-5 years. Some species do require quite specific conditions which take time to develop (Daffodil Soc., pers. comm.). There are some specialist growers such as C. Skelmersdale who is raising stock from seed, however any Narcissus species offered in wholesale catalogues is very likely to be of wild origin. There is an increasing difficulty in obtaining good stocks of imported Narcissus from Portugal. Bulbs also come from the wild in Spain and ?Austria.

Narcissus asturiensis

Imported from Portugal. Come true to name and quite good quality.

Narcissus bulbocodium conspicuus

Wild bulbs are imported from Portugal and some Dutch raised stock is also in trade.

Narcissus bulbocodium tenuifolius

Almost certainly wild stock, not suitable for cheap large-scale production.

Narcissus cyclamineus

Likely to be wild stock.

Narcissus jonquilla

Dutch raised stock?

Narcissus juncifolius

Wild bulbs are imported from Portugal and are often mixed with other species.

Narcissus poeticus

Raised by Van Tubergen but also imported from Austria (wild origin?).

Narcissus pseudonarcissus

Some propagated by chipping (6-12 per bulb) and some wild-collected stock. M. Hoog stock comes from woods Ardennes, Belgium where wild population is 'farmed'.

Narcissus pseudonarcissus gayi

Form of the species which is unlikely to be wild collected.

Narcissus rupicola

Photographed during collection by villagers in Sierra de Astrala, Portugal (S. Everett, pers. comm.). Often mixed with other wild species.

Narcissus scaberulus

This species is most probably collected from the wild. Can be propagated by twin scaling.

Narcissus tazetta

Exported from Turkey (Demiriz, 1987).

Narcissus triandus albus

Often sold as 'Angels Tears', collected from the wild in Portugal.

Narcissus triandus concolor

Most likely to be wild collected.

Ornithogalum nutans

There are signs that this species has reduced in popularity according to Dutch plant inspection services. Apparently exported by Turkey (Demiriz, 1987).

Oxalis spp.

Largely cultivated in Holland.

Pancratium maritimum

Some Turkish exports (Demiriz, 1987) but not noticed amongst Turkish bulb consignments checked this year in Holland (pers. comm.) and not recorded for sale in bulb catalogues.

Pleione spp. (Orchidaceae)

Apparently wild source imports from Taiwan via Japan.

Pleione hookiana

Propagated? and collected.

Pleione maculata

Propagated? and collected.

Sanguinaria spp.

Exported from USA to Holland. The genus is not in cultivation in Holland, and it is not known whether plants in trade are of wild origin.

Scilla spp.

These species increase readily in cultivation and are unlikely to be wild origin. Plant Inspector Service, Holland not noticed any Turkish imports this year.

Scilla bifolia

Produced in large quantities in Holland, also exported from Turkey (Demiriz, 1987).

Sternbergia candida

Now infamous story of how the population of this rare species was decimated by a German collected in the year that the scientific description was published (1979). Rumours of the discovery of a new wild site abounded during my visit to Holland. Apparently not a difficult species to propagate and depletion of wild stocks unnecessary.

Sternbergia clusiana

Amongst top 20 export of bulbous species from Turkey (Demiriz, 1987), often mixed with S. lutea for sale.

Sternbergia fisheriana

A major bulb export from Turkey (Demiriz, 1987).

Sternbergia lutea

Imported to Holland from Turkey and India. Most popular Sternbergia species in catalogues for 1987, often sold mixed with S. clusiana and S. fisheriana. A species commonly noted by plant inspection authorities in Turkish bulb consignments.

Sternbergia sicula

Amongst top ten Turkish export of bulbs (Demiriz, 1987). This species is not commonly found in UK bulb catalogues. M. Hoog's stock propagated in F.R. Germany where it grows on a 45 degree slope.

Trillium spp.

Imported from USA, where they may be collected from the wild or may be grown in the wild under licence. They are not cultivated in Holland and are slow and difficult from seed. They are said to be slow by notching, slicing or scaling techniques. Several UK companies are believed to import direct from USA.

Tulipa spp.

Only confused evidence available. Van Tubergen said that most of the tulip species were wild collected whilst others said that as bulbs tend to grow rather deep they are difficult to collect in commercial quantities (M. Hoog, pers. comm.). It is likely that any species not freely producing offsets is liable to collection from the wild. Modern forms of Tulipa gregii now commonly raised in Holland are the result of years of selection of only a few bulbs out of thousands to produce offsets.

Tulipa ailchisonii

Wild collected.

Tulipa clusiana

Raised in Holland.

Tulipa hageri

Exported by Turkey (Demiriz, 1987).

Tulipa humilis

Possibly imported from the wild as Tulchella humilis? Exported from Turkey (Demiriz, 1987).

Tulipa kurdica

Imported from wild stocks.

Tulipa praecox

Exported from Turkey (Demiriz, 1987).

Tulipa saxatilis

Dutch raised stock but does not flower well.

Tulipa sprengeri

Imported from wild stocks.

Tulipa tarda

Most probably Dutch raised stock. This species freely sets offsets.

Tulipa undulatifolia

Amongst top 20 bulbous exports from Turkey (Demiriz, 1987).

Urginea maritima

Exported from Turkey (Demiriz, 1987). Not commonly offered in bulb catalogues.

Uvularia spp.

Imported to Holland from USA. Not in commercial cultivation in Holland. Not known if USA stocks are wild origin.

Appendix 2

Countries exporting bulbs

Greece

Mentioned as a source of bulbs for specialist nurseries. Entrepreneurs understood to encourage villages to dig up vast quantities of bulbs, some common, some rare which are then grown on in cultivated areas and then legitimately exported as cultivated plants. Apparently dealers in Athens and Thessalonica - no details of size of trade etc.

India & Nepal

In urgent need of investigation.

Japan

Origin of bulbs unknown. Due to virus problems highlighted by Dutch nurseryman it is likely that a significant proportion of bulbs exported are wild collected. Urgent need of investigation.

Portugal

Main source of all Narcissus species. Believed to be wild collected. No details on species involved, collecting regimes, markets, etc. Reports of bulb collecting in National Parks.

South Africa

No details. Major source of Amaryllis for Japanese & S. Korean markets via Holland.

Swaziland

A new exporter of bulbs to the Netherlands.

Spain

Reports of inadequate plant protection in National Parks (M. Plas-Haarsma, pers. comm.).

Turkey

Major bulb exporting country. Quantities of bulbs traded are given in Tables 1-3. Little or no cultivation of bulbs. Subjects of reports by: Baytop & Mathew 'Bulbous Plants of Turkey'; Ekim *et al.* 'Taxonomic & Ecological Investigations on the Economic Geophytes of Turkey'; M. van der Plas-Haarsma 'Cyclamen in Trade'.

Research in progress by: M. Reed, Flora & Fauna Preservation Society, UK; R. Dunning, The Cyclamen Society, UK.

USA

See Table 4. Origin of exports of Trillium, Uvularia, Sanguinaria, Cuckularia, and Dicentra is unknown.

Appendix 3

Genera & exporting countries

- * indicates those countries dealing in bulbs collected from the wild.
- ? indicates those countries likely to be dealing in wild collected bulbs.

- * India - Arisaema, Calanthe, Calla, Cardiocrinum, Crinum, Cypridium, Gloriosa, Pleione, Zephyranthus.
- F.R. Germany - Amaryllis, Anemone, Crocus, Freesia, Gladiolus, Gloriosa, Liliium, Narcissus, Tulipa.
- ? Japan - Allium, Bletilla, Coichicum, Cypridium, Fritillaria, Lachenalia, Liliium, Lycoris.
- ? South Africa - Agapanthus, Allium, Amaryllis, Brodiaea, Calla, Freesia, Gladiolus, Liliium, Nerine, Ornithogalum, Pleione, Sparaxis, Tritonia, Watsonia, Zantedeschia.
- * Portugal - Agapanthus, Allium, Amaryllis, Amerine, Chionodoxa, Crinum, Narcissus (species), Nerine, Scilla.
- ? France - Allium, Anemone, Arum, Calla, Crocus, Galanthus, Gladiolus, Hyacinthus, Iris, Liliium, Muscari, Narcissus, Ornithogalum, Scilla, Tulipa.
- ? Hungary - Allium, Anemone, Colchicum, Corydalis, Galanthus, Gladiolus, Leucojum.
- UK - Allium, Amaryllis, Anemone, Crocus, Freesia, Galanthus, Gladiolus, Iris, Liliium, Narcissus (cultivars), Pleione, Tulipa.
- ? Spain - Amaryllis, Freesia, Gladiolus.
- ? Swaziland - Amaryllis, Freesia, Ornithogalum, Sparaxis, Tritonia.
- ? Brazil - Amaryllis, Caladium, Gladiolus.
- * Turkey - Anemone, Arum, Calla, Colchicum, Crocus, Crocosmia, Cyclamen, Eranthis, Fritillaria, Galanthus, Geranium, Iris, Leucojum, Liliium, Ornithogalum, Sternbergia, Tulipa, Urginea.
- ? USA - Anemone, Caladium, Calla, Gladiolus, Liliium, Oxalis, Sanguinaria, Sarracenia, Trillium
- Denmark - Anemone, Eranthis, Narcissus, Tulipa.
- ? Greece - Arum, Calla, Tulipa.
- Israel - Calla, Cyclamen, Hyacinthus, Iris, Liliium, Muscari, Narcissus (Paperwhites), Ornithogalum.
- ? Taiwan - Cypridium, Lycoris, Pleione.
- ? Yugoslavia - Gladiolus, Tulipa.
- ? East Germany - Crocus, Gladiolus
- ? China - Liliium.
- ? Poland - Tulipa.
- Italy - Gladiolus, Iris, Tulipa.

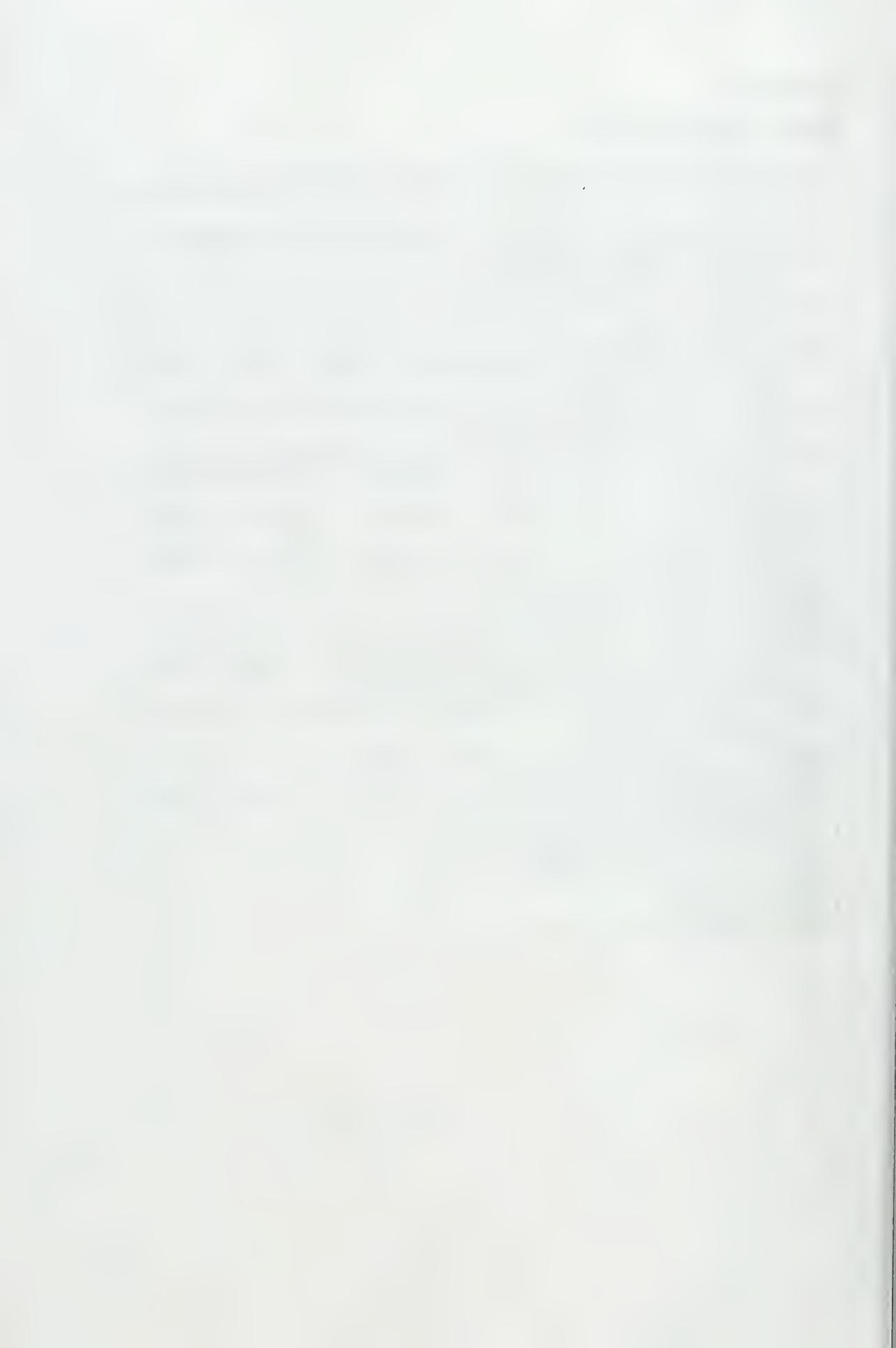


Table 1

Export of bulbs from Turkey 1972 - 1984 (numbers x 1000)
Data: Plas-Haarsma, 1987

Genus	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Allium	2967	204	630	1176	1290	2562	4352	6849	8770	9334	10200	5085	9673
Anemone	12	30.7	13.2	27	18	91.7	31.4	84.2	66.7	95.1	303	1227	103
Arum		34.4				0.9	0.9	38.9		124.1		206.7	
Calla	58												
Chionodoxa	12.6	7.3	10					0.5	16.5	3	50	4.2	?
Colchicum		2											
Crocus	1367	771.4	484	324	256	377	7473	1110	2313	1299	2350	3573	5000
Cyclamen	2735	2063	4057	5205	5936	5615		11074	9991	12118	13510	12418	12060
Eranthis	139.7	64.3	213.6	80	257			191.7		178.7	350	345.7	165
Fritillaria	15197		7514	7333	7815	10581	14278	18637	20727	25174	27510	36874	40000
Galanthus						195	30	70	40	45	100	77.5	?
Geranium								5	1.5		15		
Gladiolus	3		1				7.5						
Iris	70	55.1	u	92		2.5	18	30	18	13.9	207	63	
Leucojum	1794	1983	2136	1515	1658	2817		5029	4822	4750	5250	6030	13165
Lilium	87.3	85.1	59.4	41	83			57		180	300	231.7	153
Merendera	2												
Muscari	10.8							230	466.5	262.2	300	5	?
Narcissus	9.5							149		450	855	124	
Ornithogalum		5						60	128.8	81	150.5		
Oxalis	10		10				5	5	4	10	20		
Pancreatium	3	3	1					0.5	0.5	3.5	10		
Pelargonium										0.7	1		
Scilla	100	6	71.5					6	3.5	11.5	275		
Sternbergia	110.8	89.5	69.4	75	137	157.8	157	111	200.9	252.7	250	385	?
Tulipa	84	52	102.7	172	265			34	81.1	46.5	100	93	50
Urginea								3	20.3	0.1	20	2	

Table 2

Countries importing bulbs from Turkey 1972 - 1982 (in kg)

Data: Plas-Haarsma, 1987

Country	1979	1980	1981	1982
Bulgaria				21000
Denmark	8277	4054	3758	
F.R. Germany	8295	26632	68233	25794
Netherlands	221407	209105	277308	295007
Jordan	84980	79695	169230	
Lebanon	4750			
Sweden				1023
Switzerland		3215	4711	3969
UK	9794	11630	19293	19493
USA		896	3345	

Table 3

Imports to Holland from Turkey 1981 - 1985 (numbers x 1000)

Genus	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
Allium	69					
Anemone	8008	7573	4040	5087	3845	6703
Arum	72	119	50	133	121	863
Calla	79	37	184	153	149	276
Colchicum	3		3		2	
Cyclamen	1699	1820	2404	3480	948	1180
Eranthis	10789	10845	7501	9677	9290	11437
Fritillaria	106	82	254	387	441	711
Galanthus	20149	21130	28804	29181	31019	34839
Geranium	45	46	24	33	219	254
Iris		32	12	2	146	28
Leucojum	3746	3734	2174	4411	4706	6842
Lilium	509	389	173	326	126	170
Muscari	8	6	5			
Narcissus	447	147	4			
Ornithogalum					53	25
Oxalis	10					
Pancratium	2	1		2		
Sternbergia	32	197	198	293	257	148
Tulipa	55	65	142	48	104	93
Urginea			3	2	5	2

Appendix 5

Table 4

Imports to Holland from USA (figures compiled by Dutch production organisation for ornamental plants from data of the Plant Health Service)

Species	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
Achimaenes	10000		47000			
Amaryllis		2296				
Begonia		35000				
Caladium	671000	728000	730808	411000	359000	536000
Calla	54000	160000	142000	89000	151000	232000
Canna	470000	454950	131000		486000	336000
Cymbidium			1030			
Cypripedium			9750			
Dionaea		400000	130000			
Erythronium	10000	5000		1000		
Gladiolus	31000	3000	19000	4037000	6024000	2903000
Iris	12000	1425	69	1000		1000
Lilium	626000	1840000	130878	179000	163000	178000
Narcissus		206	30000			
Oxalis	16000			55000		
Polyanthus tube rosus	97000					8000
Ranunculus	3565000	5104000	2839000	5309000	1800000	3278000
Sarracenia	52000	15000	66000	24000	12000	1000
Trillium	3000	4450	4000		5000	13000
Hedychium (Hawaii)			1000			

Importer

Prices for foreign grown bulbs may be subject to exchange rates. Average range of species sold per 1000 - 13 species Tulips, 5 species Narcissus, range of miscellaneous bulbs. Market bulbs loose, in showcases and specialist pre-packs including individually packed Fritillaria persica, Lilium candidum and Sternbergia lutea.

H.V. NORMAN LTD., West Row, via Bury St. Edmunds, Suffolk

Sells mainly Narcissus, Tulip and Hyacinth cultivars. Limited range of species bulbs (single snowdrops, Winter Aconites, Crown Imperial, Iris reticulata, Muscari sp., Allium moly, Chionodoxa luciliae, Scilla siberica).

PETER NYSSSEN LTD., Railway Road, Urmston, Manchester.
Directors: P. van Schie & M van Schie

Prepared Hyacinths, Tulip, Lilium and Narcissus cultivars. 5 Narcissus species and standard range of miscellaneous bulbs (imports from Holland).

J. PARKER DUTCH BULBS (WHOLESALE) CO., Chester Road, Old Trafford, Manchester M16 9HL.
Depot at Anwick, Near Sleaford, Lincs (is open to any callers)

Dutch & English grown bulbs - largest and oldest stockholders of Dutch grown bulbs in the UK.

Large range of Tulip cultivars, 11 Tulip species and species mixture sold per 100 or 1000. Range of Narcissus cultivar and 10 miniature species. Larger than average selection of misc. bulbs.

A significant supplier to the trade, producing a well illustrated catalogue. Showcases marked 'Product of Holland'.

VAN'S DUTCH BULB COMPANY LTD., 234 Marsh Lane, Preston, Lancs.

Suppliers of bulbs in showcases and pre-packs. Showcase of 'wild Tulips' (T. linifolia, T. marjoletti, T. tarda, T. turkestanica and T. urumiensis). Various showcases and pre-packs of more common miscellaneous bulbs. Showcase of mixed Fritillaria imperialis also usual range of species sold per 1000.

VAN WAVEREN FLOWERBULBS, Castle Rising, Kings Lynn, Norfolk

Importers

Sale of 'loose Dutch bulbs' - Tulip cultivars and miscellaneous bulbs also British grown Daffodils and Narcissi (no species). Also sale of 'Pergola' showcases including 'wild species Tulips (T. acuminata, T. dasystemon tarda, T. turkestanica, T. marjoletti, T. urumiensi @ 500 bulbs for £24.15) and showcase of 'Miniature Narcissi' (N. Bulb. conspicuus, N. canaliculatus, N. cyclamineus, N. lobularis, N. triandrus albus @ 500 bulbs for £38.75) and several selection of miscellaneous species. Also 'Pergola Prepacks' and 'Floribon International' pre-packed flowerbulbs including a considerable range of species bulbs packed for shops. Advertising material supplied in co-operation with the International Flowerbulb Center, Hillegom, Holland.

Supplies B & Q Superstores.

Appendix 6

Species most popular in horticulture in the UK

Species sold by at least two wholesale nurseries in the UK. Underlined entries indicate species which are known to be to some degree collected from the wild.

* indicates species suspected to be wild collected.

Allium aflatuense	Lilium candidum	*
Allium albopilosum	Lilium henryi	
Allium azureum	<u>Lilium martagon</u>	
Allium cowanii	Lilium tenuifolium	
Allium giganteum		
Allium karatieviense	Muscari sp.	
Allium moly	Muscari armeniacum	
Allium ostrowskianum	Muscari azureum	
Allium sphaerocephalon	Muscari tubergenianum	
<u>Anemone blanda</u>	Narcissus bulbocodium consp.	*
<u>Arum italicum</u>	<u>N. bulbocodium tenuifolius</u>	
Bulbocodium vernum	<u>Narcissus caniculatus</u>	
Camassia esculenta	<u>Narcissus cyclamineus</u>	
Chionodoxa gigantea	<u>Narcissus jonquilla</u>	
Chionodoxa luciliae	<u>Narcissus lobularis</u>	
Chionodoxa sardensis *	<u>Narcissus nanus</u>	
Crocus speciosus *	<u>N. pseudonarcissus obvallaris</u>	
Crocus zonatus	<u>N. triandus albus</u>	
<u>Cyclamen cilicium</u>	Ornithogalum nutans	*
<u>Cyclamen coum</u>	Ornithogalum umbellatum	
<u>Cyclamen europaeum</u>		
<u>Cyclamen neapolitanum</u>	Oxalis adenophylla	
Eranthis hyemalis *	Oxalis deppei	
Eremurus bungei	Puschkinia libanotica	
<u>Fritillaria imperialis</u>	Scilla bifolia	*
<u>Fritillaria meleagris</u>	Scilla campanulata	
<u>Fritillaria persica</u>	Scilla nutans	
<u>Galanthus elwesii</u>	Scilla siberica	
<u>Galanthus nivalis</u>	<u>Sternbergia lutea</u>	
<u>Geranium tuberosum</u>	Tulipa acuminata	
<u>Iris danfordiae</u>	Tulipa chrysantha	
<u>Iris histrioides Major</u>	Tulipa clusiana	
	Tulipa eichleri	
	Tulipa kolpakowskiana	
	Tulipa linifolia	
	Tulipa marjoletti	
	Tulipa pulchella violacea	
	Tulipa saxatilis	
	Tulipa tarda	

Iris reticulata *
Iris tuberosa

Ixiolirion pallasii
Leucjum aestivum
Leucjum vernalis

Tulipa turkestanica
Tulipa unumiensis
Tulipa wilsoniana

Tritela uniflora

Appendix 7

Legislation

CITES

Cyclamen are listed in Appendix II of CITES legislation which means that the international trade in Cyclamen species should be monitored. EEC Regulation 3626/82 which came into force on 1 January 1984, paid special attention to Cyclamen. This was amended by EEC Committee 1831/85, placing Cyclamen balearicum, C. graecum, C. creticum, on Annex C1 and all other Cyclamen species on C2, thus making the import requirements for these species stricter than for average CITES Appendix II plants. In order to obtain an import licence, the Management Authority (Plant Health Service, Netherlands) demands a certificate from the exporting country stating that the species is collected in accordance to local laws and collecting does not have a detrimental effect on wild populations.

Turkey is not a signatory of CITES.

Bulb species protected by legislation in Europe

The information given below is correct to 1982 (Ref: 'List of Rare, Threatened and Endemic Plants of Europe', Council of Europe, Straasbourg, 1982). Dr De Klemm, IUCN Environmental Law Centre, Bonn, has been contacted for any additions amongst the bulbous species and a reply is awaited.

Austria

Four levels of protection, all protect against wild collection for trade, although in some cases special permission may be granted for commercial collection.

Anemone baldensis
Anemone narcissiflora
Anemone sylvestris
Bulbocodium vernum
Cyclamen purpurescens
Erythronium dens-canis
Fritillaria meleagris
Galanthus nivalis
Gladiolus illyricus
Gladiolus palustris
Iris pseudacorus

Iris sibirica
Leucojum aestivum
Leucojum vernum
Lilium bulbiferum
Lilium carniolicum
Lilium martagon
Muscari spp.
Narcissus poeticus
Ornithogalum pyrenaicum

Belgium

Protection against collection for trade is given to:

Leucojum aestivum, Leucojum vernum, Scilla bifolia.

Cyprus

No legislation.

Denmark

No bulbs protected by legislation.

Finland

Total protection is given to Allium ursinum

France

Total protection is given to:

Allium chamaemoly

Allium lineare

Allium moly

Allium scaberrimum

Anemone coronaria

Anemone hortensis

Colchicum cupanii

Colchicum neapolitanum

Fritillaria orientalis

Gladiolus palustris

Iris perrieri

Iris siberica

Iris xiphium

Leucojum aestivum

Leucojum longifolium

Leucojum nicaense

Narcissus triandus capax

Nectaroscordum siculum

Scilla hyacinthoides

Sternbergia colchiciflora

Tulipa agensis

Tulipa gesneriana

Tulipa praecox

Tulipa silvestris

Urginea undulata

Urginea fugax

West Germany

Full protection is granted to the following bulb species. It is permitted to collect small quantities of above ground parts of those indicated with an asterix outside special protected areas or national parks.

Cyclamen spp.

Fritillaria spp.

Fritillaria meleagris

Galanthus nivalis *

Gladiolus palustris

Iris sp.

Leucojum aestivum

Leucojum vernalis *

Lilium spp.

Muscari spp. *

Muscari tenuiflorum

Narcissus radiflorus

Scilla sp.

Greece

Over 750 plant species were given statutory protection by presidential decree no. 67 1979. No details available.

Ireland

52 plant species are granted protected. This does not include any bulbous species.

Italy

No national legislation except regulating the collection of medicinal and traditionally economic plants, Colchicum autumnale, Urginea maritima.

Complex legislation for each region grants limited protection to the following bulbs:

Cyclamen europaeum

Erythronium dens-canis

Fritillaria spp.

Fritillaria montana

Iris illyrica

Leucojum vernalis

Lilium bulbiferum

Lilium martagon

Narcissus poeticus

Pancreatum maritimum

Liechtenstein

Protection from collecting of the following is granted - Lilium bulbiferum, Lilium martagon, Iris siberica, Leucojum vernalis.

Luxembourg

Protection against bulb collecting of the following species - Narcissus pseudonarcissus, Scilla bifolia.

Malta

No list of protected species.

Netherlands

Complete protection is granted to - Allium ursinum, Colchicum autumnale, Fritillaria meleagris, Leucojum aestivum, Ornithogalum umbellatum.

Norway

No national protection of any bulb species.

Portugal

No national list of plants protected by legislation.

Spain

No legislation to protect plants.

Sweden

134 protected species - list not available.

Switzerland

Full protection is granted to:

Erythronium dens-canis

Fritillaria meleagris

Gladiolus spp.

Iris siberica

Leucojum aestivum

Lilium bulbiferum (& subspp.)

Lilium martagon

Tulipa spp.

United Kingdom

The following species are protected under the Wildlife & Countryside Act 1981 - Allium sphaerocephalon, Lloydia serotina, Gladiolus illyricus.

