EUROPEAN TRADE IN TURKISH SALEP WITH SPECIAL REFERENCE TO GERMANY[1]

MAX KASPAREK AND UTE GRIMM

Kasparek, Max (*Mönchhofstr. 16, 69120 Heidelberg, Germany*) and **Ute Grimm** (*Bundesamt für Naturschutz, German Scientific Authority to CITES, Konstantinstr. 110, 53179 Bonn, Germany*). EUROPEAN TRADE IN TURKISH SALEP WITH SPECIAL REFERENCE TO GERMANY. *Economic Botany 53(4):396–406, 1999.* *The use of salep (ground orchid bulbs) has a long history in Turkey. The analysis of its trade revealed that it is still used there as medicine, drink and as binder in so-called Maraş Ice cream. Substitutes, however, increasingly enter the market. Export figures unfortunately do not distinguish between true salep and substitutes. The officially recorded Turkish export of 75 100 kg salep in 1993 almost certainly refers more to substitutes than to true salep. Major countries of destination are Germany, the Netherlands, and northern Cyprus. Drug importers in Germany have imported true salep for medicinal purposes for years, CITES documents were not applied for and not issued. Five medicines containing true salep could be identified on the German market for medicinal products. It is estimated that about 10–20 million orchid bulbs are collected annually in Turkey. Information to the impact of such a harvest on the population status on the species concerned are somehow contradictory. Recommendations are made for a better control of salep trade, for reducing the use of genuine salep and for better protection of orchid populations in Turkey.*

HANDEL MIT TÜRKISCHEM SALEP IN EUROPA, UNTER BESONDERER BERÜCKSICHTIGUNG VON DEUTSCHLAND. *Die Verwendung von Salep (Knollen von Erdorchideen) hat in der Türkei eine lange Geschichte. Eine Analyse des Handels zeigt, daß Salep dort immer noch in der Volksmedizin, zur Zubereitung eines Heißgetränks und für das sog. Maraş-Speiseeise verwendet wird. Jedoch kommen zunehmend Erstatzstoffe auf den Markt. Bei der Angabe von Exportzahlen wird leider nicht zwischen Salep und Salep-Ersatzstoffen unterschieden. Die offizielle Exportstatistik der Türkei weist für 1993 eine Ausfuhr von 75.100 kg Salep aus—ein Wert, der sich sicherlich ganz überwiegend auf Ersatzstoffe beziehen dürfte. Hauptempfängerländer sind Deutschland, die Niederlande und der nördliche Teil Zyperns. Drogenimporteure in Deutschland geben an, daß sie seit Jahren Salep für medizinische Zwecke importieren, doch gibt es dazu keine CITES-Dokumente. In Deutschland wurden fünf Arzneimittel ermittelt, die echten Salep enthalten. Es wird geschätzt, daß in der Türkei jährlich 10–20 Mio. Orchideen-Knollen geerntet werden. Die Angaben über den Einfluß des Sammeln aus die Wildpopulationen der betroffenen Arten sind etwas widersprüchlich. Es werden Empfehlungen für eine bessere Kontrolle des Salep-Handels, für eine Reduktion der Verwendung von echtem Salep und für einen besseren Schutz der Orchideen-Populationen in der Türkei ausgesprochen.*

Key Words: non-wood forest products; orchids; sustainability; international trade; nature conservation; species protection.

At the beginning of the 1990s it has become increasingly clear that Germany is one of the major importers for salep (ground orchid bulbs) originating in Turkey. Turkish trade figures list 2 113 kg of salep being exported to Germany in 1991. This amount is equivalent to approximately 3 to 4 million orchid bulbs. As all orchid species are listed in the appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) imports of salep have to be registered by the CITES authorities. However, up to 1993 no imports were registered in Germany. The German Scientific Authority to CITES therefore initiated a study on the structure and amount of the salep trade in Germany in 1994. During this study, Turkish trade statistics were analyzed, and interviews were carried out with Turkish authorities, traders, producers and vendors of salep products in Turkey as well as in Germany.

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Nature of Salep and Means of Identification

Salep

Pure salep consists of ground bulbs of certain terrestrial orchid species. Flowering plants of these species have two unequal bulbs, one shrunken, wrinkled, and brown in color, the other light and swollen with reserve substances. The latter is used for salep production. The bulbs are spherical to egg-shape (10–40 × 5–30 mm), hard, and transparent. They consist of approximately 50% plant mucilage, 24% starch, 1% sugar, and 10% protein. The mucilage serves as a reserve substance needed for sprouting and the production of new bulbs. The major component of the mucilage and therefore what characterizes salep is a mannose sugar, D-(+)-manno-hexose. The quantity of the different components can vary considerably with different development state of the plant, season, and site composition (Sezik and Özer 1983; Sezik and Baykal 1988).

Turkish salep is derived from at least 30 species of orchids distributed in 8 genera. So far the following species have been identified as sources of salep (Sezik 1967; Sezik and Özer 1983; Sezik and Baykal 1988; taxonomy according to Buttler 1986; and Davies 1984): *Aceras anthropophorum* (L.) W. T. Aiton, *Anacamptis pyramidalis* (L.) Rich., *Barlia robertiana* (Loisel.) W. Greuter, *Dactylorhiza iberica* (M.-Bieb. ex Willd.) Soó, *D. osmanica* (Klinge) Soó, *D. romana* (Sebast.) Soó, *Himantoglossum affine* (Boiss.) Schlechter, *Neotinea maculata* (Desf.) Steam, *Ophrys bombyliflora* Link, *O. ferrum-equinum* Desf., *O. fusca* Link, *O. holoserica* (N. L. Burm.) W. Greuter, *O. lutea* Cav., *O. mammosa* Desf., *O. scolopax* Cav., *Orchis anatolica* Boiss., *O. coriophora* L., *O. italica* Poir., *O. laxiflora* Lam., *O. morio* L., *O. pallens* L., *O. palustris* Jacq., *O. pinetorum* Boiss. and Kotschy, *O. provincialis* Balbis ex DC, *O. purpurea* Huds., *O. sancta* L., *O. simia* Lam., *O. spitzelii* Sauter ex W. Koch, *O. tridentata* Scop., and *Serapias vomeracea* (N. L. Burm.) Briq.

Chemical Identification of Salep

Up to now it has not been possible to identify salep precisely by means of chemical analysis. The bulb substance responsible for the viscose characters of salep is Glucomannan. It is relatively easy to identify this substance chemically by hydrolysis and gel-chromatography. Glucomannan, however, can also be found elsewhere in the plant kingdom, not only in orchid bulbs. Thus proving the existence of Glucomannan does not necessarily mean that salep really is present. Other plant substances containing Glucomannan may have been added to the product.

Salep Substitutes

Two substances used instead of salep have entered the market either completely or partly substituting for salep in various products in the recent years. These are Carboxymethyl-cellulose (CMC) and rice powder. There is widespread use of CMC in the pharmaceutical and food industry. It is a sort of modified starch having the same viscosity as salep and is thermo-stable when dissolved in water. The latter characteristic is very important when salep drinks are not sold as freshly made drinks (especially by street vendors) and when therefore they have to retain the typical "salep" consistency for some time. CMC is not produced in Turkey and is usually imported from Belgium.

Salep Use and Trade in Turkey

Sources of Salep in Turkey

Salep is collected from wild orchids by villagers when the plants are in flower. At this time of the season it is easy to locate the plants. The whole plant is dug out together with its bulbs. The wrinkled brown mother bulb, source of the blooming orchid, is called "midwife" (*ebesi*) and thrown away. The swollen daughter bulb grown to produce new bulbs is called "the good one" (*iyisi*) and collected. Back in the village the bulbs are carefully cleaned with water to get rid of attached earth particles. Then the bulbs are boiled in order to prevent their sprouting later and to develop the typical salep flavor fully. The boiling medium can differ according to the geographical region. It is either water or Ayran (yoghurt thinned with water). The now white or transparent bulbs are rinsed with cold water and air-dried, avoiding direct sunlight. They are either spread on the floor of attics or threaded (especially in the province of Kastamonu) and the strings are hung under roof overhangs and similar places. Salep conserved in this way can be stored for years. When needed for local use some bulbs are ground in grinder which looks almost like the one used for grinding coffee.

There are five major collecting areas in Tur-

key (Sezik 1967, 1984, 1989; Sezik and Baykal 1988; Sezik and Özer 1983; Kasparek pers. obs.): (1) North Anatolia with the province of Kastamonu ("Kastamonu-Salep") and to a lesser extent the areas of Tokat and Maden, (2) West Anatolia with the areas around Bilecik and Kütahya, (3) South Anatolia from Menderes valley to Silifke-Gülnar in the area of Mugla ("Mugla-Salep") near the towns of Mugla, Milas and Yerkesik, in the area of Antalya in the Taurus Mts. between Elmali and Alanya ("Antalya-Salep"), in the area of Silifke in the Taurus Mts. near Silifke, Gülnar and Mut ("Silifke-Salep"), (4) South-East Anatolia around K. Maraş, Adiyaman and Malatya ("Maraş-Salep"), and (5) East Anatolia in the areas of Van, Muş and Bitlis ("Van-Salep").

A comparison of the collecting areas with a map of orchid taxa diversity in Turkey (Rückbrodt et al. 1992) shows that they correspond to the areas with the highest taxonomic diversity, usually characterized by more than 25 different orchid species.

Uses of Salep in Turkey

In Turkey salep is used as traditional medicine, as a component of Maraş ice cream, and as a delicious hot drink.

Traditional Medicine

The high amount of mucilage (up to 57%) naturally has a protective effect on human mucous membranes. Salep in traditional medicine is therefore used to ease or even cure stomach ulcers. It is also taken in cases of light mucous congestions of the respiratory tracts and owing to its aromatic effects salep is believed to clean the tracts.

Salep is also recommended as an aphrodisiac in traditional medicine. In reality, salep has no pharmacological properties to cure problems of sexual potency. The superstition is based on the morphology of the twin bulbs of the orchid plants, used for salep production, which resemble testicles. For the orchid genus Orchis, the German names "Knabenkraut, Fuchshödlein" as well as even the Arabic name salep (or "sahlab") are derived from this morphological structure as well.

Salep in Maraş Ice cream

Salep is used as a binder in the production of the typical Turkish ice cream "Maraş Dondurmasi" (ice cream from Kahraman Maraş). It also raises the melting point of the ice cream. The original Maraş ice cream consists of goat's milk, sugar and salep. Since nowadays it is very often difficult to get goat's milk, especially in towns, cow's milk is used instead. Various producers of genuine Maraş ice cream in Ankara and Kastamonu agreed that the amount of salep in the ice cream is about 1%. The owner of a well established café in Ankara said that the ice cream made by him contained 0.8% salep. Another producer of Maraş Ice cream who was interviewed when buying 10 kg of salep in Kastamonu reported that he produced 1 ton of ice cream with this amount of salep.

As salep is ten times more expensive than its substitutes rice powder and carboxy-methyl-cellulose (CMC) it is more and more replaced by those products. The demand for ice cream with the typical salep flavor has also decreased and ice cream with chocolate, vanilla, strawberry and other flavors are usually preferred. The disadvantage of the lower melting-point is remedied by simply lowering the temperatures in the freezer in which the ice cream is stored. Interviews with salep traders and owners of cafés and ice cream parlors have indicated that there are only a few places left in Ankara where ice cream produced with pure salep is still sold. An ice cream producer said he would mix in a ratio of 2 parts salep and 1 part ground rice. Even in the major salep-producing area of Kastamonu Maraş ice cream produced with a mixture of salep and its substitutes is sold.

At the present time handmade Maraş ice cream produced either with salep and/or substitutes has been replaced largely by industrially produced ice creams comparable to those on the wider European market. This sort of ice cream first appeared on the Turkish market in the middle 1980s. At the present time about six Turkish ice cream companies with high growth rates share the ice cream market in Turkey with sales extending even to the villages. A vendor of traditional Maraş ice cream in Ankara complained that he had a 10% drop in turnover the year before, owing to the increased consumption of industrially produced ice cream.

Salep as a Drink

Salep is traditionally highly valued as a delicious hot drink in Turkey and the adjacent areas of the Near East. It requires time and money to

prepare this drink. Pure salep has to be stirred into hot milk for at least 10–15 minutes to reach the desired viscosity. As salep is also quite expensive the drink is normally not consumed at home, but served in cafés and ice cream parlors. Usually it is prepared at home only when needed as a medicine. Salep powder therefore is sold only in specific herbal shops. In Ankara three herb shops could be located which still sell salep for this purpose.

In recent years, instant salep drinks have come on the market. They are directed towards home consumption and are simple to prepare. In order to reach the desired viscosity very quickly and to improve flavor, chemical components substitute for salep to an even greater extent, and artificial and natural aromatic substances are added. As a result the instant salep often reaches the desired viscosity only after a few minutes and the original salep flavor is totally hidden by other flavors. Sometimes salep is added in very low quantities (<1%) only to justify the trade name "salep."

Trade Structure and Volume in Turkey

Production of Salep Instant Drinks

Nine companies processing salep for the production of instant salep could be located within Turkey. Surveys in Ankara, Istanbul and Kastamonu showed no significant regional differences in the variety of products offered for sale. There may be more companies producing such instant salep but these have no significant share of the Turkish market. Two of the nine companies identified ceased production recently for economic reasons. Four out of seven companies control 90% of the total market. Reading the instructions printed on the packets reveals that only a few of the products really contain salep, most of them contain only substitutes. This can easily be understood from instructions like "Pour on hot water, stir, ready".

Salep Exports

The export of salep has a long history in Turkey. About 6500 kg of dried bulbs are said to have been annually exported in times of the Ottoman Empire; estimates of annual export at the end of the last century are about 25 000 kg (Sezik 1984). Since 1955 exports have been registered by the Turkish customs control (Table 1). Analysing these data on their own there seems to have been an intensive international trade in salep with a strong increase in the early 90s. Our investigations in Turkey, however, revealed that these figures include everything labelled "salep," no matter whether it is pure salep, a mixture with substitutes or substitutes only (for instance as instant drink). Since 1989 the figures are divided into three subgroups, (i) salep for human consumption in packs of up to 28 kg, (ii) ground salep or powder, (iii) other salep. Again there is no distinction between pure salep, mixtures or substitutes. This subgrouping is quite confusing for customs officers when they decide how to categorize a definite shipment.

Table 1. Annual Exports of Salep from Turkey.

Year	Salep export in kg	Year	Salep export in kg
1955	15 386	1971	1500
1956	5784	1972	1500
1957	1000	1973	2224
1958	2400	1980	449
1959	4540	1981	861
1960	839	1984	3245
1961	8571	1985	4558
1962	5145	1986	200
1963	12 740	1987	5005
1964	2923	1988	8221
1965	3889	1989	5690
1966	320	1990	29 281
1967	1550	1991	16 266
1968	411	1992	14 520
1969	882	1993	75 119
1970	1200		

(Source: Devlet Istatistik Enstütüsü; data for 1974–79, 1982–83 not available).

Major importing countries are Germany, Netherlands and northern Cyprus. Other countries mentioned in the Turkish export figures are Switzerland, Austria, Saudi Arabia, United Kingdom, Bulgaria, Israel, Lybia, Rumania, Russia, Azerbaidjhan, United Arab Emirates, former USSR, and Denmark (Table 2). In 1994 the USA also appears for the first time as importing country.

Salep Imports

There are no Turkish salep imports. The salep substitute CMC is imported mainly from Belgium. However, as it is used for other purposes as well it is not possible to estimate the share of CMC to pure salep on the Turkish market simply by looking at the amount of CMC imported.

TABLE 2. BREAKDOWN OF TURKISH SALEP EXPORTS (CATEGORY "SALEP FOR HUMAN CONSUMPTION" ONLY) OF THE YEARS 1989–1993 ACCORDING TO COUNTRIES OF DESTINATION (DATA IN KG).

Country of destination	1989	1990	1991	1992	1993	Total
Germany	—	230	2113	701	2023	5067
North Cyprus	450	450	350	2450	200	3900
Netherlands	10	—	—	3001	—	3011
Switzerland	40	1000	—	—	—	1040
Austria	—	—	600	—	—	600
Saudi Arabia	—	200	—	200	90	490
United Kingdom	—	—	—	120	328	448
Bulgaria	—	—	—	400	—	400
Israel	—	—	—	200	—	200
Libya	80	93	—	—	—	173
Rumania	—	—	130	—	—	130
Russia	—	—	—	50	—	50
Azerbaidshan	—	—	—	—	30	30
UAE	20	—	—	—	—	20
USSR	—	—	10	—	—	10
Denmark	—	8	—	—	—	8

(Source: Devlet Istatistik Enstütüsü).

Acceptance of Salep Substitutes on the Market

True salep is almost flavorless. Only experienced salep specialists are able to identify it by its flavor. Salep drinks are served topped with cinnamon powder, but instant drinks contain more and more other strong flavors such as vanilla, almond and coconut, which totally hide the original salep flavor. The reason why cheaper substitutes have not yet completely taken over true salep is based on the attitude of the salep producers and processers. In their view it is wrong to call a drink "salep" or an ice cream "Maraş dondurmasi" if it does not contain salep at all. One company producing salep as an instant drink said that they were afraid they would not to get a production license by the Turkish Ministry of Health if their product "salep" was produced using only substitutes.

TRADE IN SALEP OUTSIDE TURKEY, ESPECIALLY IN GERMANY

USES

Outside Turkey salep is known because of its use as an instant drink and within the herbal medicinal trade.

Salep as Drink

Salep as a drink is not only consumed by the Turkish people in and outside Turkey, but in Greece, north of Mount Olympus in the Rhodope Mountains, people have been observed digging out orchid bulbs to make a drink from them (Sischka pers. comm.). In some Arabian countries and Iran salep is well known as a drink too. One salep instant drink sold in Germany is produced in Lebanon. Using genuine salep to produce ice cream is well known in Iran as well (Ameneh Vafaei pers. comm.).

In Germany only one company which produces a salep product could be located. Their product "Emek Salep" is marketed not only by themselves but by other wholesalers, who use their own packaging. "Emek Salep" is one of the company's top sellers with regard to the turn-over but it does not contain genuine salep at all. Starch is added to produce the desired salep viscosity.

Salep as Medicine

The drug Tubera Salep has long been used in European medicine. "Mucilago Salep" is used as an anti-diarrhoeal and given to children. Pure salep powder is mixed with 100 parts of water, milk, and sometimes sugar. So-called salep-chocolate supposedly originating from Portugal and containing 2% of salep jelly are variations in the use as an anti-diarrhoeal. Gessner (1974) wrote that salep is sometimes still used as an aphrodisiac in Europe but no proof could be found for this use today.

Salep is also used sometimes as an ingredient in the coating of other strong medicines taken in tablet form.

In Germany every medicine has to be registered with the German Federal Agency of Health and has to apply for admission for the German market. In the course of the registration process it is not only examined for its medicinal effects and ingredients, but also has to be checked if trade and sale are in violation to other laws and regulations. In the early 1990s many admissions needed to be renewed. In April 1993 five different medicines containing salep had been notified for re-admission with the Federal Agency of Health (Famitra Kräuterkur 8, Neoventrol, Gastro-Vial, Jukunda für Ihn, Nervusan-Salbe).

In 1996 Tubera Salep was still on the official list of pharmaceutical substances (Pharmazeuti-

sche Stoffliste 1996) as a mucilaginosum, used especially in cases of enteritis with children. According to software programs for drugs on sale, used in German pharmacies, Tubera Salep powder can be ordered at a wholesale price of DM 5.00 (approx. 3 US-$) per 25 g.

Trade Structure and Volume Outside Turkey

Imports into Germany

Salep is not listed as a separate item in the official German trade-import statistics, and no trade has been recorded until 1996 in the CITES trade data (cf. also Lange and Schippmann 1997).

Salep instant drinks offered by Turkish food shops in Germany are often not ordered from a food wholesaler. Owing to the small amount sold, many food dealers buy their salep directly in Turkey and take it home themselves or ask relatives or friends to act as couriers. There is no doubt that these few imports are not registered with the German customs.

Investigations with the German Federal Agency for Health and drug importers revealed that in the past Tubera Salep has been imported from various countries including Turkey, Albania and Macedonia. In the last 30 years German medicinal reference books have named the following countries of origin: Greece, Asia Minor (= Turkey), and Syria. Today, Tubera Salep in Germany is imported from China via Hong Kong by one wholesaler who covers the whole German market with an annual import of about 1000 kg. With this amount, Tubera Salep is a product of lower importance for the wholesaler who claims that the salep trade in Germany is decreasing. He claims too that the Hong Kong company does have the necessary CITES documents. However, no CITES re-export certificates have ever been presented to German customs. His reason to import Chinese instead of Turkish salep is purely economic. He claims that the price for genuine salep in China is about DM 15–20 (approx. 10 US-$) per kg compared to DM 100 per kg in Turkey.

Re-Exports from Germany

Exports from Germany could be identified only on the drug market. The wholesaler already mentioned said that the amount of salep being re-exported is very small. Countries of destination are European only, Austria being the main importer.

TABLE 3. MEAN DRY WEIGHT OF BULBS USED FOR DIFFERENT SORTS OF SALEP.

Sort of salep	Mean weight of bulb in gram	Mean no. of bulbs per kg salep
Muğla salebi	0.23	4348
Kastamonu salebi	0.50	2000
Kastamonu salebi*	0.37	2739
Silifke salebi	0.35	2857
Antalya salebi	0.21	4762
Maraş salebi	1.60	625
Van salebi	1.00	1000
Iranian saleby*	1.68	595

(Sources: Sezik 1984, * Kasparek pers. investigation).

Amount of Salep Harvested from the Wild

Because of the problems of registering the salep trade it is difficult to calculate the amount of the annual orchid bulb harvest in Turkey. But we will try to give at least a rough idea on the present scale.

Information from the Collection Areas

In 1984 Sezik published statistics on the weight of dried bulbs used for salep production for the different salep varieties available in Turkey. These were supplemented with data derived from 531 salep bulbs bought in Kastamonu in June 1994 and also 24 Iranian salep bulbs bought in Teheran in 1994 (Table 3), resulting in an average of 2620 bulbs per kg dry salep.

Kastamonu is one of the most important collection areas with five or six traders being involved in the salep trade. Three were located and interviewed. The annual turnover per trader is estimated to be about 50–100 kg (dry weight). Taking into account that the traders interviewed are the most important in the area it seems realistic that all traders in Kastamonu together represent an annual harvest of about 200–400 kg (dry weight). The investigation further revealed that many customers buy directly from the collectors in the villages. One trader estimated that about 60% of the salep is bought without traders being involved. This information raises the estimate of the salep annually harvested in Kastamonu to 500–1000 kg, and corresponds very well with the total estimate given by the most

important dealer in this area who said that this province would produce "1 ton of salep at best" per year.

There are ten collecting areas in Turkey (see e.g., Sezik 1989). Kastamonu and Muğla are the most important. Although more famous, the Maraş area is less important and does not produce enough salep to meet the demand of Maraş salep. Therefore some dealers buy salep in Kastamonu when the market is at an ebb in November and December, and sell it afterwards as Maraş salep. Given that there are five areas with a harvest like that in Kastamonu, and five more with half of it, our estimate for the annual total harvest in Turkey increases to 3750–7500 kg of salep (dry weight) which may well be in the upper level of the real trade. Based on information mainly provided by Prof. Sezik, Byfield and Read (1993) estimated that the annual harvest is about 10 tons.

Export Information

In the last five years, according to official statistics, 28 200 kg of salep has been exported annually (data obtained from the Turkish State Institute of Statistics), but there is no information on whether these data relate to pure salep, mixtures or substitutes.

Information could be received from the owner of four big, long running and well established cafés in Ankara. He sells pure Maraş ice cream as well as pure salep drinks in winter. He said that he needed 600–800 kg of salep per year which means 150–200 kg per year per coffee house. Simply assuming that half of it is used for the production of Maraş ice cream, this leads to an estimate of about 75–100 kg of salep for the production of ice cream per year and coffee house. Another owner of a coffee house in Çatalzeytin on the coast of the Black Sea said he needed 10 kg of salep annually to produce Maraş Ice cream. So the average annual amount per coffee house may well be 50 kg. As there are probably about 30 places left in Turkey where pure Maraş Ice cream is produced it seems realistic that about 1500 kg salep are used annually in Turkey for the production of Maraş Ice cream. Taking into account that there are certainly ice cream producers using only a tiny symbolic proportion of salep the total use of salep for ice cream production in Turkey is about 2000 kg per year at most.

Assessment of Total Harvest

Being well aware of the uncertainties in the deductions described above we estimate that about 3750–7500 kg (dry weight) of salep is harvested annually in Turkey. This estimate is in sharp contrast to the mean official export figure of 28 000 kg of salep exported annually.

If the export figures related to true salep and the export were only 10% of the total harvest, this would represent an annual harvest of 280 000 kg of salep which is far beyond the estimate of 3750–7500 kg deduced from other sources which are much more reliable. This strongly supports the assumption that most of the salep exported relates to production of instant drinks, with only a small proportion of salep, if salep is included at all.

Taking into account that approximately 2620 bulbs are needed to produce one kg of dry salep a total of 9 825 000–19 650 000 orchid bulbs are annually harvested in Turkey. This is well in line with the estimate of 10–20 million bulbs as published by Read and Groves (1994).

Impact of Harvest on Wild Orchid Populations

The Turkish orchid flora comprises about 90 species (Buttler 1986). There are nine endemic species and another seven species whose distribution is restricted to Turkey and its immediate neighborhood. These 16 species can be regarded as sensitive to alteration of habitat. So far, however, only one of these species, *Dactylorhiza osmanica,* has been identified as a salep-source.

Many orchid species are not used for salep production as they do not have bulbs but branched rhizomes. Although 41 orchid species grow in the area of Kastamonu only seven species are used for the Kastamonu salep (Sezik and Özer 1983). In close proximity to Kahraman Maraş 25 orchid species are found, 31 in the wider vicinity, but only nine species are used for the Maraş salep.

The major flowering season for orchids in Turkey is from February to October, and varies from region to region. As orchid bulbs are harvested when most of the salep-supplying orchid species are in flower the major collecting periods are from March to April in the south and southwest, and from June to July in the north and east. Digging for bulbs is carried out only when the orchid density guarantees a consistent daily

amount of bulbs. In some areas bulbs are collected only in close proximity to villages (e.g., around Bafa Gölü in the Aegean, Koch pers. comm.), whereas in other places such as the province of Kastamonu orchid bulbs are harvested even far away from built-up areas (Gasser 1994).

As orchid bulbs are collected only when the density of plants is high enough that collection is worthwhile, one might assume that the orchid populations always have a chance to recover in number from the harvest. On the other hand there is information that in the major collection area of Kastamonu the population density of the orchids has clearly decreased due to the annual orchid harvest (Gasser 1994).

Socio-Economic Aspects of Salep Collection and Trade

Salep is collected mainly by women, children, and herdsmen belonging to the poorer, rural population. According to information received from various people interviewed 1 kg orchid bulbs can be collected by one person per day. During the drying process the salep bulbs lose 90% of their weight. So it takes 10 days for one person to collect bulbs for 1 kg salep (dry weight) which he/she sells for TL 400 000–500 000 (about DM 25). This is the salary for 10 days of collecting, plus the cleaning, boiling, drying and threading process. Even though the salary level is very low in Turkey the minimum salary guaranteed by law is about DM 200 per month which in fact is even below subsistence level. Salep collection takes place only during a few weeks when most of the orchid species flower. Looking at the annual income it is clear that salep harvesting is of only marginal importance even for the poorer people.

According to official data export prices for 1 kg salep continuously rose from US $ 2.00 to 4.00 early in the 1970s to about US $ 15.00 to 20.00 in the mid-1980s. The rising use of substitutes resulted in a clear decline of prices to US $ 8.00 in 1989 and finally US $ 5.00 in 1994. The latter prices certainly no longer refer to genuine salep but to mixtures or even substitutes.

In Kastamonu a salep dealer confirmed that the salep trade is decreasing and added that there is a clear decline in the number of collectors still willing to do this time-consuming and badly paid job. Salep is only one of many products (such as coffee, leather, wool, and furs) traded by the salep dealers and is of no essential importance to them.

Legislation Concerning Salep Harvest and Trade

Turkish Laws and Regulations

The Turkish Forest Law (Orman Kanunu)

Among others, the Forest Law (Orman Kanunu no. 6831) regulates the use of non-wood forest products. According to § 14 chapter c "it is forbidden to collect and remove any sort of forest vegetation, arborvitae cones, medicinally or industrially used plants and their seeds, to build charcoal piles, to take off sands or gravel, to fish in lakes and creeks using nets or dynamite". Salep is classified as a medicinally or industrially used plant. In principle exemptions to collect salep in forests may be issued. However, the Director of the Department for Secondary Forest Products in the Turkish Forest Ministry said that applications for collecting salep in forests have neither been applied for nor would they stand a chance of being issued.

The Turkish Law on National Parks (Milli Parklar Kanunu)

Any use in Turkish National Parks (Milli Parklar) and other protected areas (Tabiat Parki, Tabiat Aniti, Tabiati Koruma Alani) is regulated by this law. With regard to activities within these areas it is said (chapters 5 and 14) that "The natural and ecological balance and the value of the natural ecosystem must not be disturbed" and "The production of forest products, hunting, and disturbing the natural balance is prohibited." Collecting of salep is classified as production of forest products and is therefore prohibited in all protected areas.

The Regulation on Collection, Production and Export of Bulbs of Wildflowers (Doğal Çiçek Soğanlarinin Sökömü, Üretimi ve Ihracatina Ait Yönetmelik)

In 1989 a regulation was published in the Turkish Governmental Journal (Resmi Gazete no. 20059, 24-01-1989) on the production and the export of bulbs, tubers and roots of flowers. The implementation regulation (Resmit Gazete no. 20288, 20-09-1989) which accompanied it lists in chapter III species which may not be taken from the wild for the pupose of export. This list includes salep in line 7 and explains in a specific clarification that the export of salep is

absolutely prohibited. This regulation is in force in the whole country, on state and communal land as well as private land. This regulation was improved in 1991 by the "Regulation on Collection, Production and Export of bulbs of Wildflowers" (Resmi Gazete no. 21016, 09-10-1991). However, the prohibition to collect salep for the purpose of export throughout the country was confirmed.

Convention on International Trade in Endangered Species of Fauna and Flora (CITES)

Turkey has acceded to CITES only recently, with December 22, 1996 as date of entry into force. All Turkish orchid species are listed in Appendix II of CITES. Therefore in the past years no member state should have accepted salep imports from Turkey without documents comparable to CITES export permits that showed the legality of export and sustainability of use. As the analysis of the Turkish laws shows that export of salep is absolutely prohibited in this country no import should be allowed by CITES parties.

EC Regulation 3626/82

Various European species of the Turkish orchid flora used for the production of salep such as *Aceras anthropophorum, Anacamptis pyramidalis, Barlia robertiana, Dactylorhiza iberica, Neotinea maculata, Ophrys bombyliflora, Orchis purpurea* or *Serapias vomeracea* are listed on annex C1 of this regulation of the European Union. Imports of wild-collected specimens of these species and their derivatives into the European Union are not allowed for commercial purposes.

German Law for Nature Conservation and Regulation for Species Conservation

In Germany most terrestrial orchids not listed on annex C1 of the EC Regulation 3626/82, European as well as non-European species, are strictly protected. Salep imports derived from wild-collected orchids into Germany need a national import-permit that is not issued for commercial purposes.

RECOMMENDATIONS

The analysis of the trade in Turkish Salep reveals a lack of law enforcement in as well as outside Turkey. Although prohibited, salep is exported from Turkey and imports of Turkish as well as other Asian salep to European countries, especially Germany, obviously takes place in spite of CITES as well as European and national laws.

On the other hand the analysis shows that the international trade in salep takes place on a very small scale as most of the exported "salep" now hardly contains significant portions of genuine salep. Therefore the international trade must be regarded as being of minor importance in endangering Turkish orchid species in the wild. The use of salep substitutes has significantly increased in the recent years, not only on an international level but on the Turkish market as well. In order to decrease further the still existing pressure from the national market on the wild-orchid populations by collection of bulbs, this process of substitution should be strongly promoted. As shown previously, even a total end of salep trade would not have a significant economic impact on the existence of any stakeholder of the salep trade. Neither the collectors in the villages, nor the traders, nor the producer of salep drinks and salep ice cream really depends on the salep trade as a major income source. Promotion of the use of substitutes would not effect the well-being of anybody involved in the trade chain from the collector in the village to the consumer of salep drinks or Maras icecream. It is necessary to overcome the traditional base against producing "salep" drinks and ice cream without using genuine salep by putting the use of substitutes in a positive light.

The following recommendations can be made with regard to improving the status of the orchid flora in Turkey:

i) CITES parties should be urged to strictly control salep imports and exports, especially on the pharmaceutical market, and to implement CITES in this field.

ii) The use of substitutes to produce salep drinks and ice cream should be strongly promoted to further decrease the demand for genuine salep. This could be achieved for example by using a quality stamp for products with substitute saying "produced without using endangered Turkish plant species" ("bu ümünün imalatinda nesli tükenmekte olan türler kullanilmamistir"), thus giving the product a positive image.

iii) The Turkish Government should be sup-

ported in protecting orchid habitats by identifying areas of high importance to the Turkish orchid flora, establishing conservation areas, and developing habitat management plans to ensure the survival of the orchid diversity in Turkey.

Conclusions

The use of salep (ground orchid bulbs) has a long history in Turkey. The analysis of its trade reveals that it is still used there as medicine, drink and as a binder in so-called Maras ice cream. Substitutes, however, increasingly have entered the market. Export figures unfortunately do not distinguish between true salep and substitutes. The Turkish export of 75 100 kg salep in 1993 almost certainly refers more to substitutes than to true salep. Major countries of destination are Germany, the Netherlands, and northern Cyprus.

Outside Turkey salep is used as medicine and as drink. Drug importers in Germany have imported true salep for medicinal purposes for years, CITES documents were not applied for and not issued. Five medicines containing true salep could be identified on the German market for medicinal products. One instant drink found in Turkish food stores in Germany contained true salep, two other obviously contained substitutes only.

It estimated that about 10–20 million orchid bulbs are collected annually in Turkey. Information concerning the impact of such a harvest on the population status of the species concerned are somehow contradictory. Gasser (1994) states that the population density of the orchids has clearly decreased due to annual harvesting at least in the major collection area of Kastamonu.

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With regard to the socio-economic aspects it must be said that salep harvesting is only of marginal importance for the annual income, even for poorer people. Even a total stop of trade in salep nationally as well as internationally would not pose significant economic problems for the people involved in bulb collection and salep trade.

It is therefore recommended to improve the implementation of CITES with regard to the international trade in salep, to strongly promote the use of substitutes and to support the Turkish authorities in a better protection of orchids and their habitats.

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Book Review

Familias de Plantas Neotropicales. P. J. M. Maas and L. Y. T. Westra. 1998. Koeltz Scientific Books & A. R. G. Gantner Verlag. Liechtenstein, Germany, Available in USA from Lubrecht & Cramer, Att.: Charlie Lubrecht, P.O. Box 3110, Port Jervis, NY 12771, USA (FAX: 9148565990; E-mail: lubrecht&frontiernet.com). viii + 316 pp. (paperback). DM 40 (ca. US$ 25.00). ISBN 3-904144-08-1.

This book arrived in the mail from my colleague Paul Maas a few months after I reviewed the text of the Convolvulaceae for him. As I began thumbing through the text, I was impressed with the array of families and the number of illustrations. Translations were made by Helena Pastor (Madrid) and Carola Repetur (Utrecht). The text reads smoothly, as if it were originally written in Spanish.

A Preface, Introduction, and Selected Literature provides the background for using this book. Next are the Pteridophytes (Helechos y grupos afines), Gymnosperms (three classes in our tropics!), and then Angiosperms. These are followed by a list of families and higher taxa, a glossary, an index of scientific names, and an index of vernacular names. Within the book each family has a succinct but adequate description, and then in smaller type, the number of American genera and species are given; distribution, uses, observations, and literature (referenced to major floras). Many entries have wood, pollination, and dispersal types. These are absent from many families because the information is either unknown, or not available to the authors. Larger genera are often mentioned, and economically important species may be noted under uses. Many (but not quite all) families have line-drawing illustrations. The Poaceae, for example, includes both *Pharus latifolius* and *Paspalum virgatum.* Convolvulaceae (p. 200) shows *Merremia macrocalyx,* one of the most often seen species in the Amazon basin.

The illustrations were taken from drawings made by W. H. A. Hekking in Surinam between 1960–1962. However, others came from a variety of sources (listed p. 316). Some appear to have been made from partly wilted specimens or herbarium sheets, although many were taken from live plants. There are 88 plates in the book, most including two families. Thus, over 170 families are illustrated from the 294 included (33 pteridophytes, 8 gymnosperms, 253 angiosperms). Some 211 dicotyledon and 42 monocotyledon families are described. Families within the monocots that are not illustrated include Cymodeaceae, Hypoxidaceae, Iridaceae, Juncaceae, Lemnaceae, Liliaceae (surprisingly, p. 259), Najadaceae, Potamogetonaceae, Thurniaceae (endemic to the area in and around the Guayanas), and Zannichelliaceae. Several of the smaller endemic families of dicots are similarly without drawings.

Maas and Westra have provided an imaginative and useful guide for students, both seasoned and novice, for the Neotropical regions. If the user can read Spanish, this will be an outstanding summary of the plants between the Tropics of Capricorn and Cancer. It is not bad as far north as here in southern Florida (26° 20′ N).

Daniel F. Austin
Florida Atlantic University
Boca Raton, FL 33431
daustin@fau.edu