CHAPTER 11

INTERNATIONAL TRADE IN MEDICINAL AND AROMATIC PLANTS

Actors, volumes and commodities

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Abstract. The international trade in medicinal and aromatic plants for the period 1991-2003 was investigated. For this purpose the foreign-trade statistics of 110 countries, compiled in the COMTRADE database of the UN Statistics Division and reporting an external trade of the commodity groups HS 1211 and SITC.3 292.4 *pharmaceutical plants*, respectively, have been evaluated. Based on this, the main features of the worldwide trade, the main trade streams, the main acting countries and striking trends are presented. In particular, the dominance of some countries and regions in this trade is pointed out. External trade figures are given for the three trade centres, the USA, Germany and Hong Kong, and their role is shortly discussed. An overview over the main consumer and supplying countries is presented. Further, export and import prices of selected countries are compared and their relevance for evaluating commodities in trade is discussed.
Keywords: international trade; pharmaceutical plants; trade figures; trade centres; source countries; consumer countries; export prices.

INTRODUCTION

Medicinal and aromatic plants (MAPs) are produced and offered in a wide variety of products, from crude materials to processed and packaged products like pharmaceuticals, herbal remedies, teas, spirits, cosmetics, sweets, dietary supplements, varnishes and insecticides (Ohrmann 1991; Gorecki 2002; Lange 1996). The use of botanical raw material is in many cases much cheaper than using alternative chemical substances. An estimated number of 70,000 plant species are used in folk medicine worldwide (Farnsworth and Soejarto 1991), a figure that has recently been confirmed by Schippmann et al. (see their chapter in this book). As a consequence, there is an enormous demand in botanicals – for domestic use and for commercial trade – resulting in a huge trade on local, regional, national and international level. As the production of botanicals still relies to a large degree on wild-collection (i.a. Bhattarai 1997; He and Ning 1997; Lange 1998; 2002; Robbins 1999; Kupke et al. 2000; Kathe et al. 2003), profound knowledge of trade, size, structure and streams as well as of

R.J. Bogers, L.E. Craker and D. Lange (eds.), Medicinal and Aromatic Plants, 155-170.

commodities, traded quantities and their origin is essential for assessing its impact on the plant populations concerned.

This paper is focusing on aspects associated with the international trade in medicinal and aromatic plant material, in particular on aspects of trade streams, trade structure, trade volumes and trade values. The results and conclusions presented in the following are based on the analysis of selected national and international external-trade statistics. Overviews of the main features of the worldwide trade, of the significance of the market, of the main trade streams and of the main acting countries have been published several times by the author mainly in the framework of German and European MAP trade analyses (Lange 1997; 1998; 2002; 2003; 2004a; 2004b; 2004c). In the following, these figures are updated and the analysis is augmented. To receive most substantial results, if not otherwise stated, trade figures of the period 1991 to 2003 have are examined.

MEDICINAL AND AROMATIC PLANTS IN TRADE

Botanicals in customs codifications for foreign trade statistics

All commodities have to be declared on import into and export from a country in accordance with the prevailing tariff regulations providing product name, quantity, value, and country of origin or destination country, respectively. For this purpose, goods entering external merchandise trade are classified in trade according to different customs codes, which classify and codify merchandise into commodity groups.

Since 1962, foreign trade figures of presently almost 180 countries have been compiled in the COMTRADE (= commodity trade statistics) database by the United Nations Statistics Division, New York. The goods are classified according to the internationally agreed *Standard International Trade Classification* (SITC). The first edition was introduced in 1950 and revised several times: 1960, 1975 (SITC.2 = Revision 2) and 1985 (SITC.3 = Revision 3) (*Standard International Trade Classification. Revision 2* 1975; *Standard International Trade Classification. Revision 3* 1986; Brand 1990). The 10 sections of the SITC.3 are divided into divisions, groups, subgroups and items, resulting into 3,118 basic headings (*Standard International Trade Classification. Revision 3* 1986). The SITC Code is a five-digit code which may be, if desired, further subdivided for national use. MAPs are mainly classified in Section 2, *Crude materials, inedible, except fuels*, but also included in Section 0, *Food and live animals* (*Standard International Trade Classification. Revision 3* 1986). In this context, the most important and substantial commodity group is tariff heading 292.4, *Plants and parts of plants (including seeds and fruits) of a kind used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes, fresh or dried, whether or not cut, crushed or powdered.* Whereas this subgroup is not further divided according to SITC.2, SITC.3 distinguishes the commodities *Liquorice roots* (292.41), *Ginseng roots* (292.42), and *Other* (292.49). The United Nations started to base its international compilations of trade-by-commodity statistics on SITC.3 (*Standard International Trade Classification. Revision 3* 1986) in 1988. The introduction of a third edition of the SITC had become necessary due to a new

economic classification, the *Harmonized Commodity Description and Coding System* (HS), which came into force in 1988, and the subsequent needs of harmonization (*Standard International Trade Classification. Revision 3* 1986).

The HS was developed by the WCO (World Customs Organization) and today is used by more than 177 countries and economies (CBI 2001). The HS is divided into sections, chapters, subchapters and headings. The HS Code is a six-digit code which may be, if desired, further subdivided for national use into subheadings. For example, Germany's foreign-trade statistics are based on an eight-digit code. The HS shall improve recording and analysing statistical data on an international level as well as the assessment and review of trade streams, and shall facilitate the comparability of foreign-trade statistics and the transfer of data from country to country (Brand 1990). On demand of public authorities, commerce and industry, the HS may be modified annually. In addition to annual minor changes, there have been significant changes in the HS classification in the editions of 1996 and of 2002.

The European Union's classification of goods is the *Combined Nomenclature* (CN), which meets requirements in terms of external-trade statistics (both intra- and extra-EU) and of customs tariff, and is based on the HS, the text of which is taken over in full and subdivided only for the requirements of external-trade statistics, law on agricultural matters or the customs tariff.

In the HS or the CN, respectively, botanicals are included in several chapters and headings of section II, *Vegetable products*. The tariff heading HS 1211 equates to commodity group 292.4 of SITC.3, mentioned above and described in the following as *pharmaceutical plants*. Most commercially traded botanicals are included in this tariff heading. However, to asses an exact figure is difficult. Schippmann et al. estimate it at around 3,000 species worldwide. The most common botanicals of this heading are compiled in the Explanatory Notes to the HS (latest edition of 23.10.2002, reprint of the 1996 edition; see for German version Lange 1996; and for English version Lange and Schippmann 1997). Furthermore, botanicals are also included in tariff heading 1212 as well as in chapters 7, 9, 13 and 14 (Lange 1996; 2004a). Within tariff heading 1211, a few botanicals of especially high commercial value are listed separately. As in SITC.3, liquorice roots (1211.10) and ginseng roots (1211.20) are distinguished; however, in contrast to SITC.3, HS 1211 is divided into more subheadings (which unfortunately are often modified or even changed; for more details see Lange 2004a; 2004b; 1996).

Analyses of foreign trade statistics of several countries have to face the problems of comparability of commodities between the different customs classifications: (1) After launching the SITC.3 in 1988, not all countries were able to switch immediately to the new classification; moreover, during the 1990s, many countries reported their foreign trade figures still based on SITC.2 or even on SITC.1. (2) Although the United Nations Statistics Division requested from all UN member states in 1995 to send data in HS starting with the year 1988, not all countries were able to comply with this request. (3) The HS classification is considerably more detailed than the SITC; this applies also to the commodities groups referring to botanicals. (4) Regarding the HS classification, the annual changes applied often to subheadings referring to botanicals. (5) In the HS and in the SITC, botanicals are included in several different, often not comparable commodity groups.

Consequently, the comparability of foreign trade statistics based on different tariff codes is limited (Lange 2004a) and a compilation of the trade figures of all botanicals is impossible.

The analysed trade figures

Owing to the limits in the comparability of external trade figures, the presented analysis is only based on the evaluation of the tariff headings HS 1211 and SITC.3 292.4, respectively, of the COMTRADE database of the UN Statistics Division, completed in a few cases by selected data of the Bulgarian and Albanian foreign-trade statistics (Lange 2003). If not otherwise stated, they are analysed for the period 1991-2003, and the presented trade figures are, if not otherwise stated, average values for this thirteen-year period. The quantities are always given in metric tonnes, the values in US dollars. Quantities and values are rounded up or down.

Principally, the presented global trade figures are based on the export and import statistics of ca 180 countries for the period 1991 to 2000, in which at least 141 countries reported an export or import of *pharmaceutical plants* to the COMTRADE database. However, export and import figures of some countries are not available for the whole period due to (1) political changes that happened in particular in eastern Europe (Table 1); (2) the warfare in parts of the former Yugoslavia; and (3) because some countries first began to report their trade statistics according to the SITC.3 or the HS during the 1990s (Lange 2003; 2004a). These facts were considered when calculating the mean export and import value.

The delimitation of the regions and continents is based on Hollis and Brummitt (1992), who divided the world into nine broad geographical units. However, the countries of the former USSR are not allocated to one of these units due to the political changes having taken place during the investigated period, and because the USSR as well as the succeeding Russian Federation extends from Europe to temperate Asia. The European Union (EU) is regarded in its borders of the year 2000.

Table 1. *Changes in the country lists of the foreign trade statistics regarding the countries of former Czechoslovakia, Yugoslavia and the USSR. Source: German Federal Agency for Statistics, country list for the foreign-trade statistics, May 1992, January 1993.*

Czechoslovakia	until 12/1992
Czech Republic	since 1993
Slovakia	since 1993
Yugoslavia	until 5/1992
Yugoslavia without Slovenia and Croatia	5-6/1992
Yugoslavia without Slovenia, Croatia and Bosnia-Herzegovina	7-12/1992
Slovenia	since 5/1992
Croatia	since 5/1992
Bosnia-Herzegowina	since 7/1992
Serbia and Montenegro	since 1993
FYR of Macedonia	since 1993
USSR	until 4/1992
Ukraine	since 5/1992
Belarus	since 5/1992
Republic of Moldova	since 5/1992
Russian Federation	since 5/1992
Armenia	since 5/1992
Georgia	since 5/1992
Azerbaijan	since 5/1992
Kazakhstan	since 5/1992
Turkmenistan	since 5/1992
Uzbekistan	since 5/1992
Tajikistan	since 5/1992
Kyrgyzstan	since 5/1992
Estonia	since 1992
Latvia	since 1992
Lithuania	since 1992

Global trade figures: an overview

In the period 1991-2003, the reported annual global export of *pharmaceutical plants* amounted on average to 467,000 tonnes valued at US$ 1.2 billion. A main feature of

the international trade is the dominance of only few countries: about 80% of the worldwide imports and exports are allotted to only 12 countries each, with the temperate Asian and European countries dominating (Figures 1 and 2). The countries of temperate Asia are responsible for 41% of the annual global imports and even 48% of the annual global exports. Europe's share of the global import is one third (Figure 1). Regarding single countries the import share of the USA is 12% and of Germany and Japan 11% each. The list of the world's top 12 countries of import (Table 2, left column) shows that Hong Kong (= China HK SAR) is by far the most important importer of *pharmaceutical plants* with an annual average import of approximately 59,950 t. It is followed by the USA with an average import of about 51,200 t and Japan with 46,450 t a year. Germany follows on 4th place, importing on average 44,750 t per year. No fewer than five European countries, all of them European Union Member States, are among the top 12 countries of import. On the export side (Table 2, right column), China heads the list of the world's top 12 countries of export. It exported annually on average about 150,600 t of *pharmaceutical plants* in the period 1991-2003, which is one third of the total global exportation of *pharmaceutical plants* (Figure 2). This figure is three times as high as the quantities exported from Hong Kong (including re-exports, see below), about four times as high as the quantities exported from India and from Mexico, and ten times as high as those exported from

Table 2*. The 12 leading countries of import and export of MAP material classified as pharmaceutical plants (SITC.3: 292.4 = commodity group HS 1211). The countries are listed according to descending order of average trade volumes, 1991-2003. Source: COMTRADE database, United Nation Statistics Division, New York.*

Country of import	**Quantity [tonnes]**	**Value [US$]**	**Country of export**	**Quantity [tonnes]**	**Value [US$]**
Hong Kong	59,950	263,484,200	China	150,600	266,038,500
USA	51,200	139,379,500	Hong Kong	55,000	201,021,200
Japan	46,450	131,031,500	India	40,400	61,665,500
Germany	44,750	104,457,200	Mexico	37,600	14,257,500
Rep. Korea	33,500	49,889,200	Germany	15,100	68,243,200
France	21,800	51,975,000	USA	13,050	104,572,000
China	15,550	41,602,800	Egypt	11,800	13,476,000
Italy	11,950	43,006,600	Bulgaria	10,300	14,355,500
Pakistan	10,650	9,813,800	Chile	9,850	26,352,000
Spain	9,850	27,648,300	Morocco	8,500	13,685,400
UK	7,950	29,551,000	Albania	8,050	11,693,300
Malaysia	7,050	38,685,400	Singapore	7,950	52,620,700
Total	320,550	930,524,400	Total	368,100	847,980,800

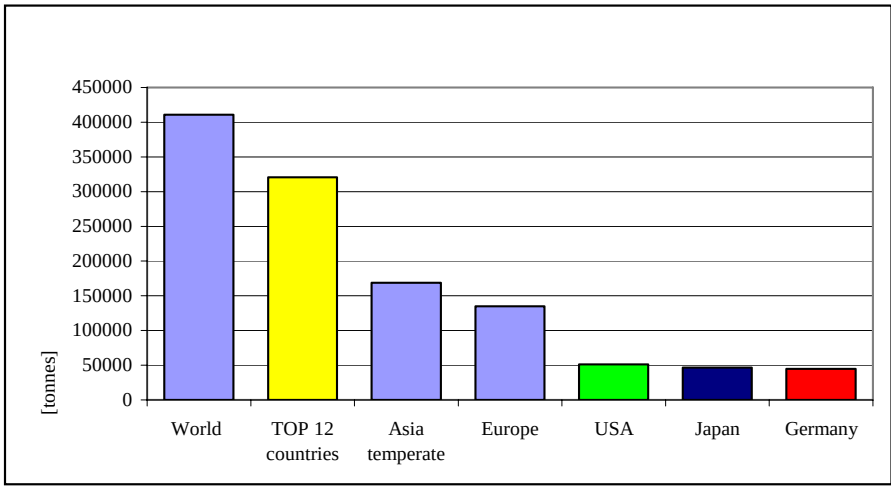

***Figure 1**. The dominating actors, countries and regions, in the international trade in pharmaceutical plants (SITC.3: commodity group 292.4) and their average import quantities in tonnes for the period 1991-2003. Source: COMTRADE database, United Nation Statistics Division, New York.*

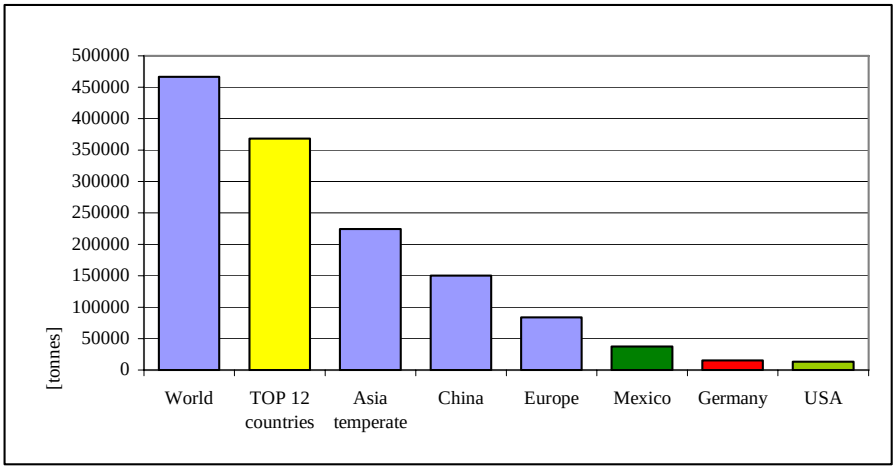

***Figure 2**. The dominating actors, countries and regions, in the international trade in pharmaceutical plants (SITC.3: commodity group 292.4) and their average export quantities in tonnes for the period 1991-2003. Source: COMTRADE database, United Nation Statistics Division, New York.*

Germany and the USA. Further important exporters are Egypt, Bulgaria and Chile. Two southeast-European countries, Bulgaria and Albania, are amongst the top 12

countries of export. From 1991 to 2003 the total world's exports increased by 55% from 377,300 to 584,700 t.

Three trade centres: USA, Germany and Hong Kong

The high ranking on both the export and import side in Table 2 highlights the USA, Germany and Hong Kong (China HK SAR) as important trade centres in the MAP trade. All three countries show both high import and high export quantities.

The **USA** imported on average 51,200 t of *pharmaceutical plants* valued at 1.4 billion US$ in the period 1992-2003. The export amounted to 13,050 t, a value of 1.05 billion US$. The striking difference in the value of the imported and exported commodity shows that the USA imports mainly plant raw material or at least little processed products, but on export the degree of processing is increased. Any trends in imports may not be recognized; the imports fluctuated between ca 45,000 t and 62,300 t with a peak of almost 71,000 t in 1997; the exports varied between 9,000 t and 18,000 t. In 2003, India was the USA's most important source country for these botanicals, with an import share of 28%, followed by China with 12%, Azerbaijan (10%), Mexico (8.5%), and Egypt (6%). Further, countries with an export to the USA exceeding 1,000 tonnes were Turkmenistan, Uzbekistan, Germany, Albania, Morocco and Turkey. In contrast to the imports, 44% of the exports were allotted to American countries, 26% to Canada, 7% to Mexico and 10% to South-American countries. Further important destinations were Germany with a share of 17%, the Republic of Korea (12.5%) and Japan (10%).

Germany imported on average 44,750 t per year valued at 1.04 billion US$; about one third of the commodity, 15,100 t of a value of 68 million US$ was exported. Similar to the USA the value of the exported commodity is much higher than the imported one showing that Germany imports mainly plant raw material or at least little processed products, but that on export the degree of processing is increased. From 1991 to 2003 the imports of *pharmaceutical plants* increased by 23% from 37,860 t to 46,750 t. Accordingly, the German import increase was much lower than the global one of 55%. However, within the investigated period, the imported quantities had already exceeded 50,000 t: 51,440 t in 1996 and 53,350 t in 1998. The export increased by just one fifth, from 14,440 t in 1991 to 17,260 t in 2003. Similar to the USA, Germany is importing *pharmaceutical plants* from all over the world; during the period 1991-2000 imports originated in at least 142[1] countries (Lange 2004b). Bulgaria is Germany's most important source country, showing average exports of 5,220 t, followed by India with 4,240 t and Poland with 3,850 t. Further, Germany imported on average more than 2,000 t of this commodity from the following countries: Sudan, Chile, Hungary, Egypt and China. A breakdown of the import figures according to regions shows that 19,120 t or 43% of the German imports were of European origin. Although Germany exported this commodity to 147 countries, 75% of the exports went to only 12 countries, of which Austria is the most important buyer, followed by Switzerland, the USA and Italy (Lange 2004a; 2004b). Amongst these 12 countries, only one non-European country, the USA, is listed and in the investigated period eight of them were EU Member States, to which 52% of the

German exports were sold. In all, not less than 75% of the exports were destined to European countries (Lange 2004a; 2004b). For more details see Lange (Lange 2004a; 2004b).

As shown above, a breakdown of the German import and export figures according to regions shows a considerable share of intra-European trade. Moreover, analysing the import and export figures of *pharmaceutical plants* of Europe, the dominance of Germany in the intra-European trade is further emphasized as (1) one third of the overall quantities of this commodity imported into Europe were destined to Germany (Lange 2004a); (2) the share of the country's exports is approximately one fifth in terms of quantities; (3) Germany is an important destination country for plant material exported from east- and southeast-European countries, as two thirds of their exports are sold to Germany (Lange 1998; 2002; 2003). Consequently, Germany is an important hub of commerce in the intra-European trade, in particular acting as a link between the markets of eastern and southeastern Europe and those of western and central Europe, supplying mainly EU Member States with this commodity.

The third trade centre, **Hong Kong**, is acting mainly in the east- and southeast-Asian trade. Each year, it imported on average 59,950 t valued at 263 million US$ and exported on average 55,000 t of a value of 201 million US$. In contrast to the USA and Germany, 92% of the imports were exported. These exports were mostly re-exports, a fact that is pointed out by the comparable prices on export and import. Further, 80-90% of the country's imports are from a single country, namely China (85% in 2003), the remaining from Indonesia, Canada, the Republic of Korea, India and Thailand. The exports have been destined to many countries all over the world, with preference to east- and southeast-Asian countries (Lange 2004c); in 2003 the export share of this commodity to the latter amounted to 86%; about 50% were

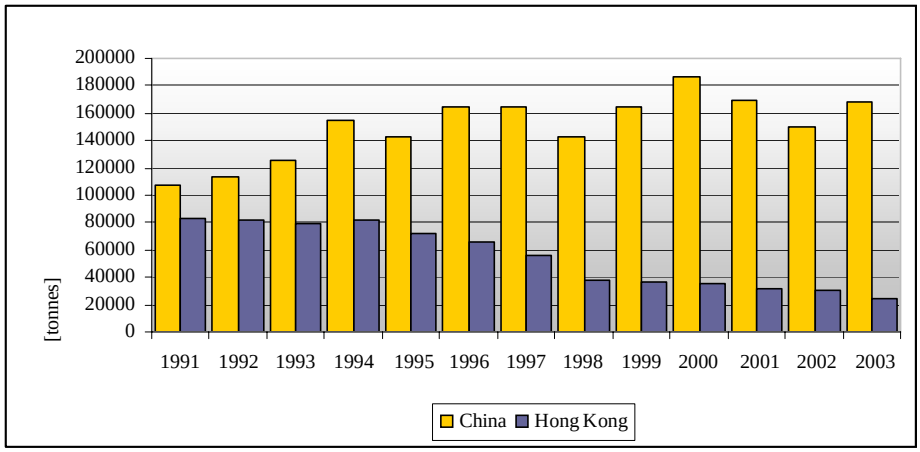

***Figure 3**. Development of export quantities of pharmaceutical plants (SITC.3: 292.4) of Hong Kong (China HK SAR) and China for the period 1991-2003. The quantities are given in tonnes. Source: COMTRADE database, United Nation Statistics Division, New York.*

destined to other Asian countries, 10% to China and to Korea, 6% each to the USA and to Canada.

The importance of the trade centre Hong Kong decreased during the investigated period due to political reasons. On 1 July 1997 the former British Crown Colony Hong Kong became a Special Administrative Region (SAR) of China. This affected clearly Hong Kong's trade in *pharmaceutical plants*, which steadily decreased, in all by 71%, from 83,400 t in 1991 to 24,200 t in 2003. At the same time, the Chinese exports increased by 57% (Figure 3).

Consumer versus source countries

The average net imports of all countries highlight the consumer and the source countries of *pharmaceutical plants* (Figure 4, see also Table 2). Important consumer countries show high positive net imports, main source countries stand out with high negative net imports. Accordingly, Japan is the most important consumer country, the net imports exceeding on average 46,200 t in the period 1991-2003. Japan is followed by the USA, the Republic of Korea and Germany, their average net imports ranging between ca 31,500 t and 38,000 t. A further European country, France, belongs to the world's major consumer countries, with average net imports of 14,200 t. Consumer countries generally import raw material or at least partly-processed material that is mainly processed in the country's enormous industry to, e.g., extracts, aromas, teas, cosmetics or (phyto-) pharmaceuticals, and then either sold as finished products on the domestic market or exported as such. In these cases, the export is often included in other tariff headings than HS 1211 or SITC.3 292.4, respectively.

Figure 3 clearly shows that the USA and Germany, besides their role as trade centres, also belong to the world's major consumer countries.

On the other side, Figure 4 reveals China as by far most the important supplier of the raw material to the world's medicinal and aromatic plants market, its negative net imports amounted on average to 135,000 t. India, with average net imports of 34,250 t, is following on second place. Within Europe, Bulgaria and Albania are important source countries for *pharmaceutical plants*; within the Americas, these are Mexico and Chile, and in Africa, Egypt and Morocco. The average net imports of these countries range from 7,950 t to 10,000 t.

From 1991 to 2003, **Japan** imported annually on average 46,450 t of *pharmaceutical plants* valued at 131 million US$. More than 50% of its imports, 53% in 2003, are imported from China. Other important source countries for Japan were India (17% in 2003) and Thailand (15% in 2003). In 2003, this commodity was further imported from Viet Nam (3.3% in 2003) and from Sudan (3% in 2003), in all from 58 countries.

Every year, the **Republic of Korea** imported on average 33,500 t valued at ca 50 million US$. In 2003, it imported *pharmaceutical plants* from at least 49 countries, but not less than 88% of the imports were of Chinese origin. The remaining quantities were imported i.a. from Uzbekistan (3%) and from Myanmar (2%). The exported quantities, 1,990 t on average, are relative low but of a high value, 66 million US$. This relates to the fact that the Republic of Korea is one of the world's most important

suppliers of ginseng roots, a commodity of high value belonging to the tariff heading HS 1211 or SITC.3 292.4, respectively.

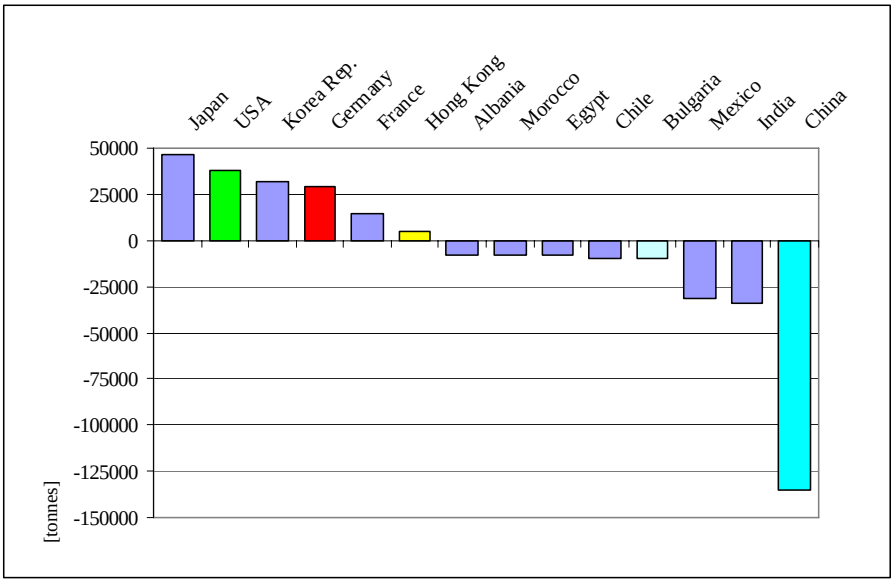

Figure 4. *Average net imports of pharmaceutical plants (SITC.3: 292.4) of selected countries for the period 1991-2003. The consumer countries are on the left-hand side, the source countries on the right. The quantities are given in tonnes. Source: COMTRADE database, United Nation Statistics Division, New York.*

During the investigated period, the world's top source country of *pharmaceutical plants* was **China**, exporting on average 150,600 t each year of a value of 266 million US$. Although China exported to at least 65 countries in this period, around 90% of the exports were destined to the east- and southeast-Asian market: in 2003, 35% were exported to Hong Kong, 21% to the Republic of Korea, 10% to Japan, 7.7% to Viet Nam and 10% to other Asian countries. The export share to the trade centres USA and Germany were only 2.4% and 1.7%, respectively.

The Chinese exports increased by 57% from almost 110,000 t in 1991 to 168,300 t in 2003, with a peak of 186,400 t in 2000. The increase of the exports of *pharmaceutical plants* during the 1990s is closely correlated to the export decrease of Hong Kong (see Figure 3). The average imports amounted to only 10% of the exports (15,550 t, valued at 41.6 million US$).

India, on the second place of the world's most important source countries, exported annually on average 40,400 t of *pharmaceutical plants* valued at 61.7 million US$. The exports fluctuated between 31,000 t and 49,000 t during the period 1991-2003. The country exported to at least 95 countries. The main destinations were the USA and Europe; e.g., in 2003, regarding quantities the export share of the USA amounted to 31%, and 25% went to Europe. Quantities exceeding 1,000 t were

exported to Japan, Germany, Spain, China, Pakistan, France, Mexico, the United Kingdom, Bangladesh and Hong Kong. The imports amounted on average to 6,150 t; most of the imports were of neighbouring-countries' origin, like Nepal, Sri Lanka, Pakistan, Afghanistan and Myanmar. India may be seen as a small trade centre for south Asia.

Mexico exported on average per year 37,600 t of *pharmaceutical plants* of a very low value of 14.3 million US$. The high average export quantity is due to the striking increase of the exported quantities since 2000. In the 1990s, the exports only fluctuated between 4,700 t and 17,600 t, but then, the export increased to 42,550 t in 2000, 81,550 t in 2001, 130,150 t in 2002 and to 147.300 t in 2003. In all, the exports increased by 16 times. Up to 99% of the exports were destined to the USA.

The second important American source country of *pharmaceutical plants* is **Chile**, exporting on average 9,850 t a year, fluctuating from 9,000 t to 16,000 t during the investigated period. The value of this commodity amounted on average to 26.4 million US$. On average only 320 t were imported annually. The commodity was exported to at least 35 countries; however, the main destination was Germany, with a share of 38% in 2003. Further 35% remained within South America, with an export share of 14% to Brazil and of 13% to Argentina.

According to the COMTRADE database, within Africa, **Egypt** is the country that exports on average most *pharmaceutical plants* to the world's market. Between 1991 and 2003, Egypt exported on average 11,800 t annually, of a value of 13.5 million US$, destined to at least 66 countries. The main trade partners were Germany, with a share of 26% in 2003, and the USA with 20%. Further, important buyers of Egyptian botanicals were Poland, the UK, the Netherlands, Italy and France. The exports fluctuated between 6,000 and 16,000 t. The imports amounted on average to 3,520 t valued at 2.4 million US$. Besides Egypt, another African country, **Morocco**, exported annually significant quantities to the world's market. The exported average quantity amounted to 8,500 US$ valued at 13.7 million US$, the exports increased from 6,700 t in 1991 to 10,750 t in 2003.

Finally, two European countries are important source countries for *pharmaceutical plants*, namely Bulgaria and Albania. During the investigated period, **Bulgaria** exported 10,300 t on average per year, ranging from 5,100 to 15,450 t. Most of the plant material was destined to Germany, in 2003 not less than 60%; further 12% went to Spain and ca 4-5% to France and Italy each. Although Bulgaria exported this commodity to 37 countries, 97% remained within European borders. The imports have been very low, amounting to only 290 t. **Albania's** annual exports were on average 8,050 t of a value of 11.7 US$. Export figures have only been available from 1996 onwards. During this period, the country's exports varied between 6,300 t and 9,000 t.

Import and export prices of pharmaceutical plants

Prices allow drawing conclusions on the kind of commodity, their degree of processing, and the socioeconomic situation of the collectors. To illustrate it, (1) Germany's import and export prices of different countries, and (2) export and import prices of selected countries, are compared and briefly discussed.

Germany's import and export prices of different countries are assessed for the period 1991-2000 (Lange 2004a; 2004b). The average import price per tonne amounted to 2,430 US$. On export, one tonne cost 4,580 US$. Accordingly, the benefit per tonne was on average 2,150 US$. This surplus value points out the higher degree of processing of the commodity on export than on import. The source countries of *pharmaceutical plants* imported into Germany may be divided into two groups. On one side, the prices of imports from countries like Turkey, Poland, Albania, Bulgaria, Sudan, India and Estonia were lower than the German average import price, decreasing to ca 400 US$ in the case of Afghanistan (Lange 2004a; 2004b). The low prices reflect the high share of raw plant material and the often high share of wild-collected commodities, but may also depend on political or socioeconomic conditions in the countries of origin, i.a. high levels of unemployment, poverty or low incomes. On the other side, Germany paid above-average prices for commodities originating in Chile, the USA, Hong Kong, Austria and Japan. In the case of Taiwan, the prices of imports exceeded Germany's average import price up to ten times (Lange 2004a; 2004b). Higher prices have to be paid for at least (little) processed or semi-finished products, for finished products remaining classified in HS 1211 or SITC.3 292.4, respectively (e.g., tea bags consisting of plant parts of a single species), for certified organic products, as in the case of Austria, or for valuable individual botanicals, e.g., ginseng roots.

Comparing the world's average export price for one tonne to selected countries, similar conclusions may be drawn. The world's annual export price amounted on average to 2,550 US$ per tonne during the investigated period. In general, consumer countries and countries with huge MAP-processing industries show higher export prices; e.g., *pharmaceutical plants* exported from France cost 4,980 US$/t, from Switzerland 7,790 US$/t, from Japan 20,810 US$/t, and the Korean export price amounted even to 33,230 US$/t. The commodities exported are mainly processed products or valuable botanicals (e.g., ginseng roots exported from Korea). Compared to these figures, the German average export price per tonne is relatively low, amounting to only 4,520 US$. At first glance a striking fact, but it highlights Germany's role as a trade centre in worldwide and European context as the share of raw material or at least semi-finished products on export is comparably high.

The worldwide most important supply countries show lower prices than the world's average export price: China 1,770 US$/t, India 1,530 US$/t, Albania 1,450 US$/t, Bulgaria 1,400 US$/t and Egypt 1,150 US$/t. A very cheap source for this commodity was Mexico, obtaining only 380 US$ for one tonne on export. The prices for commodities originating from Azerbaijan, Bangladesh, Belize and Niger were similarly low, between 250 US$ and 350$ for one tonne. Low prices indicate that mainly raw plant material is exported, in most cases of wild-collection origin. The benefit is relative low. Consequently, only unemployed or unskilled people or people with low wages are collecting botanicals. Often wild-collection is taking place in countries with generally low income levels, difficult socioeconomic conditions and/or an underprivileged population. Often, consumer countries tend to buy from low-price countries to increase their own trade profit. Maybe this offers an explanation for the striking increase of Mexican exports of *pharmaceutical plants* since 2000.

CONCLUSIONS

Based on the analysis of the foreign-trade statistics of 110 countries of the commodity *pharmaceutical plants* (HS 1211 or SITC.3 292.4, respectively) for the period 1991-2003 the following conclusions may be drawn:

- The trade in *pharmaceutical plants* is dominated by only few countries. Twelve countries make up ca 80% of both the exports to and the imports from the world market.
- Three international trade centres for botanicals can be recognized, Germany for the intra-European, the USA for North and South America, and Hong Kong for east- and southeast-Asian markets.
- The main acting countries in the botanicals trade may be clearly divided into on the one hand consumer countries with high positive net imports and on the other hand source countries with high negative net imports:
  - Japan, the USA, the Republic of Korea, Germany and France are the world's biggest consumer countries
  - China, India, Mexico, Bulgaria, Chile, Egypt, Morocco and Albania are the world's leading source countries for this commodity.
- In general, the major markets are in the developed countries, while the bulk of the botanicals are exported from developing countries.
- The bulk of internationally traded botanicals is not or only little processed and of wild origin.
- Source countries export mainly raw plant material, often of wild origin; the benefit for it is relatively low. The processing, i.e. the value-adding takes mainly place in consumer countries and trade centres. The prices on export support both.
- The benefit in the source countries is relatively low; the main profit is achieved in only few consumer countries.
- For international demand, wild MAP resources are not used evenly across the world. Exploitation is confined to only few regions, which may easily lead to over-exploitation.

Currently, we are facing an incomparably growing pressure on plant populations in the wild due to increasing commercial collection, largely unmonitored trade, and habitat loss. As already mentioned in the introduction, profound knowledge of the features of the (international) trade in botanicals (size, structure, streams, commodities, traded quantities and their origin) is (1) essential for assessing the trade's impact on the plant populations concerned; and (2) required for conservation concepts and measures which have to meet future supply and the provisions of species conservation. One contribution based on the above-drawn conclusions to decrease the pressure on wild populations is increasing the value of the plant material that is exported by establishing at least primary processing stages in the country of origin and/or increasing the income of collectors.

ACKNOWLEDGEMENTS

The author would like to express her gratitude to all those who helped to make this study possible by providing assistance as well as by sharing their knowledge on the subject, namely Natalie Hofbauer and Hajo Schmitz-Kretschmer (Bonn), Wolfgang Hartrumpf, Friedbert Blanckenberg and Claudia Mutscheller (Frankfurt/Main), Ilona Düring (Wiesbaden), Sandra Süss (Landau), the Federal Agency for Nature Conservation, Bonn, and the United Nations Statistics Division, New York.

NOTES

[1] The German Foreign Trade Statistics reported imports from 142 countries. In addition, imports of the categories *Confidential countries* and *Unknown countries* were mentioned.

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