A MARKET AND TECHNICAL SURVEY OF THE EUROPEAN BLUEBERRY AND NATIVE BERRY INDUSTRIES

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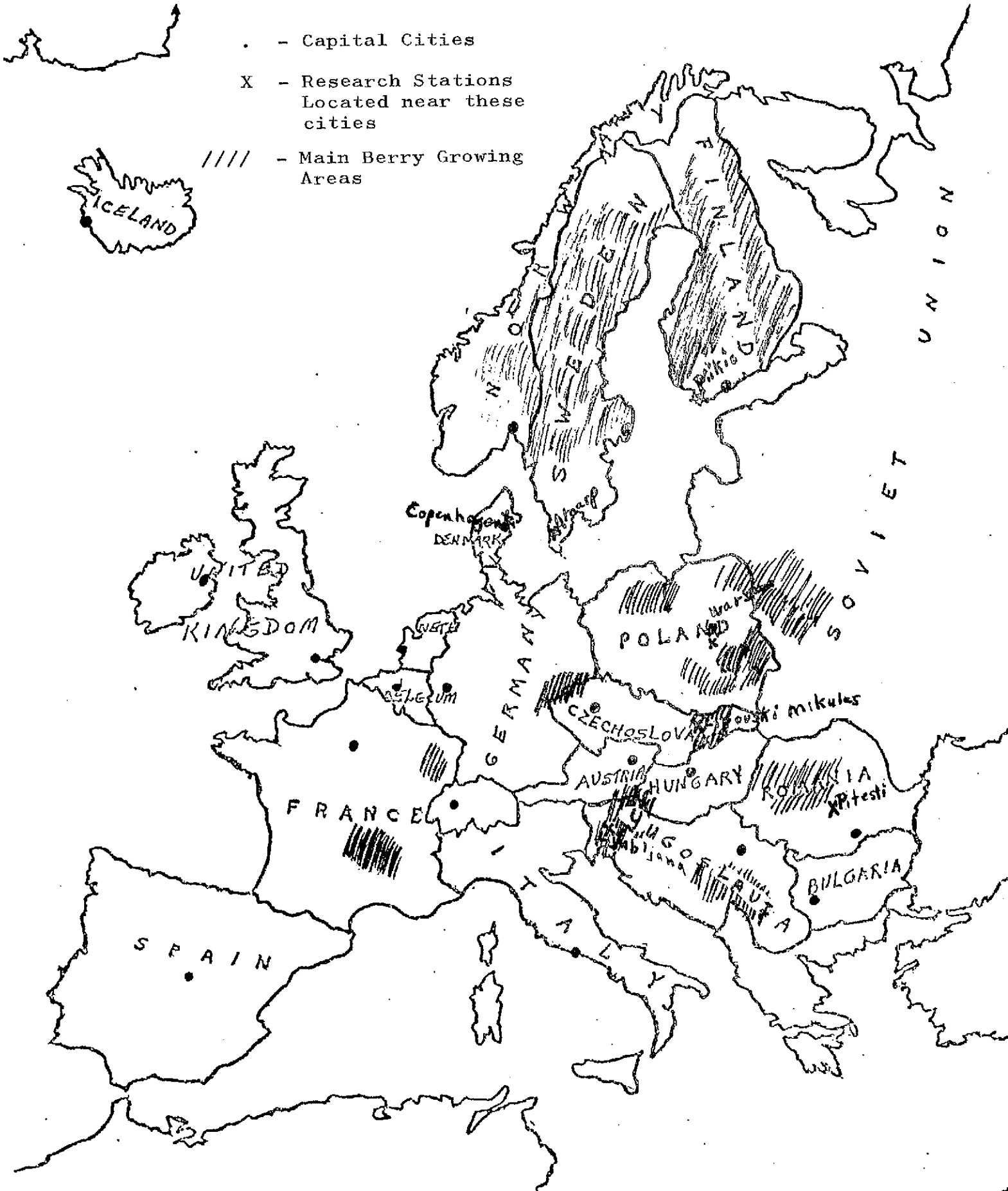

SECTION I

TERMS

1. The terms bilberry, heidelbeeren, myrtille, blabar and mustikka are local European names for Vaccinium myrtillus which has its flowers and fruits borne in the leaf-axils, whereas the North American blueberry has its flowers and fruit borne in terminal or lateral clusters.

2. The terms lingonberry and cowberry, Vaccinium vitis-idaea are used extensively in Europe for what is commonly known as the partridgeberry, foxberry, or mountain cranberry in Eastern Canada.

3. The term cloudberry, Rubus chamaemorus, used extensively in Europe, is commonly known as the bakeapple in Eastern Canada.

4. The term Eastern Canada refers to the Provinces of Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick and Quebec.

INTRODUCTION

Since 1973, the blueberry has become an important agricultural export to Europe. The Canadian wild lowbush blueberry has managed to get its "calyx" into the European market as a somewhat comparative alternate to the European bilberry, Vaccinium myrtillus, because of the steady decline in bilberry production and the resultant need of processors to obtain adequate supplies of a comparable product. This decline in bilberry production can be attributed mainly to labor shortages during harvesting, the increasing high cost of harvesting, and crop failures in some years.

To obtain a better understanding of the overall European bilberry situation and how it might affect future development in the Canadian blueberry industry, a marketing and technical mission, composed of various governmental officials, was dispatched to Europe to gather pertinent data on the European situation.

The mission was split into two groups. The Western European mission covered selected Western countries gleaning information, primarily on blueberries as to supply and demand trends, pricing relationships, marketing and distribution channels, consumer tastes and preferences, etc.

Members of this team included:

Dr. Robert W. Anderson
Economist
Economics Branch
Agriculture Canada
Ottawa, Ontario

Jean P. Potvin
Conseiller
Quebec Ministry of Agriculture
Montreal, Quebec

The Eastern European mission covered selected Eastern countries studying present production, marketing and processing systems, types of products being developed, and research, in the field of blueberries, bilberries, lingonberries and cloudberries.

Members of this team included:

John B. Clapp (Overall Mission Co-ordinator)
Agriculture, Fisheries and Food Products Branch
Canada Department of Industry, Trade and Commerce
Ottawa, Ontario

George W. Wood
Research Scientist
Agriculture Canada
Fredericton, New Brunswick

(Also represented the New Brunswick Department of Agriculture and Rural Development)

Paul A. Hendrickson
Small Fruit Specialist
Government of Newfoundland and Labrador
St. John's, Newfoundland

The information obtained from the two missions will hopefully allow Eastern Canada to plot the direction the blueberry industry should take so that its future, with a view towards expansion, will be somewhat stable. In other words, if Europe was to embark on a major blueberry development program and Eastern Canada was to do the same, the result could be depressed markets with Eastern Canadian blueberry growers experiencing financial difficulty.

In the case of Newfoundland and Quebec, the data procured with respect to the other wild fruits utilized by the European community, would aid in determining what future development should be undertaken with regard to the lingonberry and cloudberry industries.

RECOMMENDATIONS

1. The key to maintaining an internationally competitive Canadian lowbush blueberry industry lies in the improvement of our production efficiency. Increased yields will be required to meet higher costs of production in order to keep consumer prices at acceptable levels; expanded production will also help to ensure continuity of supply. The bilberry and other wild forest berries continue to grow in Europe, but a shortage of labor is likely to leave some of these crops unharvested. Mechanical harvesting of the European berries is generally not possible while for some segments of the Canadian industry, it is a very real possibility. Mechanical harvesting should play a key role in increased Canadian production efficiency.

2. The lowbush blueberry industry should concentrate on developing a strong domestic market as well as continuing to build and diversify its export market base. Canada's main competition in western Europe, for lowbush blueberries and other wild berries, comes from eastern European countries. Foreign exchange considerations can play a major role in their attitude toward production and pricing policies. Arbitrary decisions could have a quick negative impact on Canada's competitive position in the European market. A well developed domestic market

could provide the stability necessary for years when a European export market might be limited.

3. The industry, possibly in conjunction with government, should devote attention to new product development for blueberries, and other native berries. This will assist in diversifying the market base and also encourage the further processing of berries in Canada with the value added benefits accruing to the Canadian industry.

4. The usefulness of a small promotional brochure to promote blueberries and other berries should be jointly discussed by government and industry. Other areas of combined market promotion activity among industry and government should be considered, in order to achieve greater domestic and export market impact.

5. Fruit from new clonal selections should be market tested with European and domestic processors as soon as possible. The assessment should then guide the speed at which the new clonal program is implemented on a commercial basis.

6. Berries destined for European markets preferably should not have been subjected to pesticides (maggot spraying) during the fruiting period.

7. For proper identification, the nomenclature "Wild Lowbush Blueberries" should be marked on the carton, commercial invoice and the grading certificate. As well, the serial

number of the grading certificate should be shown on the bill of lading accompanying each shipment.

8. Every processor should ensure that the internal quality control is of the highest standard, and that good business practices are consistently followed.

9. Berries such as lingonberries and cloudberries which are not at present under Federal inspection should be brought under the regulations administered by Agriculture Canada.

10. Because of the demand for other wild berries (i.e. lingonberries and cloudberries) on the European market, the Research Branch of Agriculture Canada should consider a program of research on them as soon as possible.

11. A watch on developments in the European berry industry to keep abreast of research developments and market trends should be maintained. A follow-up technical mission in a few years may be warranted.

SECTION II

Western Europe

Supplies

Although all western European countries visited during the mission import berries similar in type to the Canadian lowbush wild blueberries, they also produce some berries domestically. This section reviews the supply situation throughout Western Europe on a domestic basis as well as outlining the source of imports.

West Germany is a major importer of blueberry type fruit. Buying historically from Poland and Czechoslovakia with a few from Sweden, firms in West Germany have recently made major purchases of wild lowbush blueberries from Canada. A number of firms indicated that Canada is the second major source for this type of berry behind Poland's bilberry.

Domestically, West Germany has a small wild lowbush berry industry near the Czechoslovakian border. Very little management (no fertilization or burning) is provided and the wild segment of their industry is not expected to be a factor in the commercial marketing of berries. With respect to highbush berries, two hundred hectares are under cultivation in West Germany with an average yield of 7-9,000 kilos per hectare. Most of this crop is sold fresh in 500 gm. containers. Any increase in highbush berry production is likely to be absorbed by the local fresh market.

Other western countries such as Holland and Belgium import berries from a range of countries including Poland, Sweden, Finland, Norway and Canada. In many situations, these importing firms act as importers only and resell for further processing. Some of these berries are sold to West Germany and France. Domestically, Belgium and Holland have neither a high nor a lowbush local industry. Switzerland has a very limited local production which is handled directly by consumers and imports are small. There appears to be little likelihood of any increase in either domestic production or imports in Switzerland.

In terms of a domestic industry in Western Europe, France's wild lowbush industry is the largest and the most advanced. Located in the steeply sloped areas of the Alsace and Massif Central regions, production is limited by difficult harvesting conditions. Male pickers harvest the crop because of the rough terrain and their yield per day, using a rake, ranges from 50 to 100 kg., depending upon the season. French producers bid for the government-owned land and are responsible for harvest and the first cleaning. Sales are then made to brokers for fresh sale or freezing and final sale is usually in block frozen form. Under these conditions little change is expected in the wild lowbush berry industry.

Preferring I.Q.F. (Individually Quick Frozen) berries, firms in France import berries from Poland, Norway,

Sweden, Romania, Yugoslavia, Czechoslovakia and more recently from Canada. One firm requires unwashed I.Q.F. berries for pies as any excess water leaves the crust on the base of the pie soggy. In terms of shrinkage, one firm reported a loss of only 5 per cent. An advantage in buying from Canada is that the French harvest season is from July 15 to August 15 giving importing firms an opportunity to assess their supply situation while the Canadian crop is still available.

Major suppliers to Austria include Yugoslavia, Scandinavia and Poland. Firms were generally not aware of Canadian berries. One drawback for Canadian firms exporting to Austria is the expectation by Austrian firms that the seller will be responsible for all costs up to a final inspection at the importing firm's storage facility. Austrian firms import both I.Q.F. and block frozen berries duty free for use in yogurt and jam.

Domestically, Austria has a limited industry in the higher parts of the country. There is limited commercial interest as labor is not readily available for harvesting.

A number of firms in several countries mentioned a high degree of variability in the quality of Eastern European berries. Mention was also made that if Eastern European countries wished to increase the supply of labor for harvesting berries, this could be done easily and greatly affect world supplies.

A very small highbush industry has been started in Ireland. Early yield results suggest that 16,000 kilos per hectare are possible under ideal conditions. All sales have been on the fresh market. While no berries have been available for processing, several firms have indicated an interest in testing the raw product when it becomes available. Very few, if any, imports were reported in Ireland.

Products

A wide range of products are made from the group of berries which include the Canadian wild lowbush blueberry and the Polish bilberry. This section reviews the products outlining the major use areas and the potential markets.

In Western Germany, berries in a heavy sugar syrup as a preserve used for pancakes, ice cream topping and as a dessert are the major product. Other products include juices, jelly, wine, jam, concentrates, yogurt, and pastry. A limited volume of frozen berries in 250 or 300 gm. containers are marketed at the retail level. These products require specific characteristics in the berries used. For some, a mixture of high and lowbush berries are acceptable. For others, acidity and color are critical. Sugar content is also important and thus the sweeter (12% sugar) lowbush wild Canadian blueberries are preferable while for other products the tart bilberry (9% sugar) is preferable.

In terms of product containers, a wide range of shapes and sizes were in evidence. Jam and jelly in one ounce containers were readily available in most restaurants at breakfast. Preserves are marketed in both glass and cans and in a range of sizes including a 7 oz. picnic size can, 1 kg., 5 kg., 15 kg. and No. 10 can sizes. Some firms buy their products already packaged.

One difference in Belgium is that jam is a more popular item than preserves. Again this product was most evident in restaurants for breakfasts.

An unusual product found in Europe was the "Myrtine" in France. Made from bilberries, this concentrate comes in a pill form and assists with night vision. In the same line is a product called "Chibret" also available in France and sold in the form of a lozenge for sore throats. For the Chibret product, a dark pulp berry is preferred such as the bilberry or possibly the dark skin "nigrum" variety of Canadian wild lowbush blueberry. A third French product is "Diafrarel" which assists in overcoming several vision diseases. For all three of these products, a chemical-free raw material is essential.

In Britain, blueberry type products are not widely used nor available. Just recently, however, a wide variety of ice cream flavours have been introduced in Britain and one major firm is interested in introducing a wild blueberry flavour using lowbush wild blueberries.

Austria uses Swedish and Polish berries for ice cream and yogurt. Such uses for blueberries as pies (North American style) and muffins are practically non-existent in western Europe.

Supply and Product Problems

European firms mentioned a wide variation in the quality within each grade. Industry representatives might review the ranges for each grade and inspect some of the shipments to determine whether a problem exists.

One incident of double selling was reported where a firm using Canadian lowbush wild blueberries contracted with a European firm to supply a fixed amount of berries at an agreed price. Prior to delivery, market prices increased and the firm selling the berries sold to another firm at a higher price and defaulted on the original contract. Although the selling firm did not realize it, the second firm was a subsidiary of the firm that contracted to buy the berries originally. This European firm was interested in their legal position with respect to enforcing contracts with firms operating out of Canada. While business of this nature is very rare, firms are advised to use good business practices in buoyant as well as depressed market situations.

Another problem appears to be the sale of highbush or a mixture of highbush and lowbush berries as pure wild lowbush blueberries. If European firms do not receive the

product they contract for, a poor image is reflected on all exporters, which could result in fewer sales for the industry.

Supply and Pricing Statistics

Myrtillus type berries (myrtilles, heidelberries, bilberries) are mainly produced in Poland, Scandinavia and Russia with lesser amounts grown in France, Germany, Romania, Czechoslovakia and Yugoslavia.

Main users of berries in descending order are Germany, France, Sweden, Belgium, Switzerland, and Finland. Holland is one of the largest importers of blueberries but resells most of its imports to other European countries. Blueberry products are almost unknown in Ireland and England.

In general, processors and packers told the mission that their volume of sales of blueberry products is increasing by approximately 10% per year. It is believed that sales could have been greater, if more products had been available from domestic sources or imports.

SUMMARY OF STATISTICS ON BLUEBERRIES

(MYRTILLES, HEIDELBERRIES, BILBERRIES)

PRICE PAID TO PICKERS

	1975	1976
France	$1.06/kg.	$1.25/kg.
Germany	$0.99/kg.	$1.21/kg.
Finland		$0.77/kg. to $1.30/kg.
Romania		$1.50/kg.
Poland	$1.65/kg.	$1.00/kg.

LOCAL PRODUCTION

	1974	1975
France	2,300 mt	1,000 mt
Germany	____	2,200 mt
Finland (all berries)		11,000 mt
Romania	____	1,000 mt
Poland		
1960-1965	20,000 mt to 30,000 mt	
1976	12,000 mt	

IMPORTS

	1974	1975
France	186 mt	627 mt
Germany		
In syrup		5,000 mt
I.Q.F. frozen		16,000 mt
Frozen retail pack (300 gr)		5,000 mt
Holland	3,000 mt	2,700 mt

PRICES

	1975	1976
France		
First importer or packer	$1.30/kg.	$1.50/kg.
Second buyer	$1.41/kg.	$1.65/kg.
Third buyer		$1.91/kg.
Germany		
Lowbush from Canada	$1.01/kg.	$1.43/kg.
Highbush from Michigan	$1.03/kg.	
Highbush local fresh retail	$3.00/kg.	
From Poland		$1.32/kg.

Austria 1976

Local	$1.10 to $1.98/kg.
Imports	
From Sweden and Poland	$1.25/kg.

Holland 1976 (C.I.F. Rotterdam)

From Canada	$1.39 to $1.56/kg.
From Poland	$1.21/kg.
From Sweden	$1.41/kg.

Belgium 1976

From Poland	
Fresh	$1.21/kg.
Frozen	$1.25/kg.

Switzerland 1976

From U.S.A.	
Highbush fresh	$12.00/doz. pints

Denmark 1976

Local fresh retail	$1.62 to $1.95/kg.

Romania 1976

Local fresh retail	$6.00/kg.

Czechoslovakia 1976

Local fresh	$1.36/kg.

Poland 1976

Exports F.O.B. Poland	$1.30/kg. to $1.50/kg.

DISPOSITION OF CROP AND IMPORTS

GERMANY

70% In Syrup

10% Jams

10% Juice

5% Ice cream and Yogourt

5% Frozen

FRANCE

70% Jams

20% Pharmaceutical products

10% Jams and Ice cream and Yogourt

BELGIUM & HOLLAND

70% Jams

20% In Syrup

10% Ice cream and Yogourt

SWITZERLAND

Mostly Jams

A few frozen retail pack

AUSTRIA

35% Frozen I.Q.F.

35% Juice

30% Ice cream and Yogourt

SECTION III

EASTERN EUROPE AND SCANDINAVIA

General Comments

Although the mission did not include a complete survey of the Continent, it is apparent that the bilberry, Vaccinum myrtillus L., is widespread throughout Europe. The mission's observations confirmed its presence from Finland south to Romania and from Poland west to France. While similar to the North American lowbush species in height of plant, development from a rhizome system, and general fruit size and colour, it has other characteristics which are quite different.

The European bilberry has fruits borne singly in the leaf axils, while the North American blueberry has its flowers and fruit borne in terminal or lateral racemes. Another major difference between the North American and European plants is in their habitat. While V. angustifolium and V. myrtilloides require high light intensity for maximum development, V. myrtillus appears to thrive under very low light intensity. In North America, lowbush blueberry stands are expanded by clearing forests and competitive vegetation, while in Europe the bilberry crop is harvested exclusively from the forest.

In Czechoslovakia and countries to the east and south, the bilberry is considered an alpine plant and production is limited to mountainous areas. In Poland and Scandinavia, the major producing areas are on forested plains or lowland. Bilberry grows in patches of varying size, typically in a sandy loam soil under a coniferous canopy. In Poland, the canopy is predominantly Pinus spp. and the bilberry frequently grows in areas which have a damp, mossy covering. In Scandinavia, the lingonberry, V. vitis-idaea, is dominant in the stands of Pinus, while bilberry is more common in stands of Picea where heavier soils occur.

AUSTRIA - Blueberry Research Activity

No contact was made with research establishments on this mission. It is assumed that there are no major research projects underway at the present time.

ROMANIA - Blueberry Research Activity

The Fruit Research Station at Pitesti has the responsibility for small fruit research and carries out most of this program at a substation located about 65 km. north of the city. There is one specialist in blueberry, Dr. Bodesko, whose interest is limited to the highbush varieties. He has experience with both American and German varieties, and trials to date indicate better results with the American varieties. Romania has extensive acreage which could be used for highbush blueberry development and a strong demand for plant material is foreseen.

ROMANIA - Production and Marketing

The Romanian Government has been encouraging increased production of fruit, including blueberries. However, little increase has actually been achieved in either highbush or bilberry production. It is estimated that 10,000 hectares are potentially suitable for blueberry production, mostly located in the north-western portion of the country.

Bilberries grow in the forested highland areas of Romania, and are harvested in September-October. The Ministry of Forestry is responsible for wild berry activity. The annual commercial harvest is about 1,000 m.t., all of which is purchased from pickers by the State, and all of this exported, mainly to Western Europe. Pickers can harvest bilberries on public land at no charge, and are paid about seven to eight lei per kilo (Cdn. $1.40 - $1.60)[1] by the State. Pickers may also, if they wish, sell to the local markets, including tourists and they receive about 30 lei per kilo (Cdn. $6.00). Apparently, only a small portion is sold to the local market, probably because local consumers prefer to pick their own in the forested areas at no cost and look upon it as an outing. It was concluded that most local sales were made to tourists. A picker can only harvest about seven to eight kilos per day, since the terrain is quite rugged. There is no organized harvesting and the revenue earned is looked upon as supplemental income for children, students, older people and families on vacation.

Since the terrain is far too difficult for any form of mechanical harvesting, it is likely that the production and export marketing of bilberries will remain at present levels in the foreseeable future. It would appear that there is some limited interest by researchers in developing bilberry production on more level terrain at lower altitudes. However, the mission concluded that their

1. Note - Currency conversions for Eastern European countries are at official rates of exchange. Tourists often receive more favourable rates.

native wild types would not produce well at lower altitudes, and thus one would expect that most of the emphasis by researchers to increase production will be directed toward highbush blueberries. Any efforts to begin commercial highbush production appear to have a low to medium priority in relation to other fruit production such as apples. There is no production of highbush blueberries at present.

Fructexport is the State organization which is responsible for all export of fruits and vegetables. They report that bilberries are exported as fresh product, preserved in syrup, as deep frozen product, or as pulp for industrial purposes. These products are exported to Western European markets.

YUGOSLAVIA - Blueberry Research Activity

Research in blueberry is centered at Ljubljana in Slovenia and this station was not included in the mission. Dr. Oblak has an active project on highbush blueberry trials in the area and reports on her progress are contained in the two symposia on blueberry culture in Europe.

YUGOSLAVIA - Production and Marketing

Only a short report is available on production and marketing of bilberries in Yugoslavia as time did not permit a more thorough assessment. In general, it is believed

that the production of berries, both wild and cultivated, is becoming increasingly important. Bilberries, as an example, are gathered in medium-altitude beech and pine forests (Slovenia, Lika and Montenegro). Yugoslavia is both an importer and exporter of bilberries, with imports coming from Albania and exports going to Western Europe.

YUGOSLAVIA - IMPORTS OF BILBERRIES

Source	1974	1973 (metric tonnes)	1972
Albania	31	11	25

YUGOSLAVIA - EXPORTS OF BILBERRIES

Destination	1974	1973 (metric tonnes)	1972
Austria	20	21	5
West Germany	nil	1	--
Holland	--	9	--
Total	20	31	5

CZECHOSLOVAKIA - Blueberry Research Activity

American and German varieties of highbush blueberry have been assessed under local conditions in Slovakia and the results were discouraging. Researchers at the Fruit Breeding Station at Prievidza reported that the soil was too heavy and the pH too high for blueberry production in the lowland areas.

LIKO Canning Industries is keenly interested in the propagation of bilberry, and will initiate a new research program on the commercial cultivation of bilberry in 1977. The new research facility will be located at Liptovsky Mikulas in the highland area and will include a 50 hectare test area.

CZECHOSLOVAKIA - Production and Marketing

Bilberries and other wild berries are found in the forested highland areas of the country. Production is variable due to weather conditions and also because some forest areas are being selectively harvested, thus drastically reducing production until regrowth occurs. Berry harvesting is unorganized and the picking force is similar to that in Romania, being composed of children, older people and families on vacation. Income earned is supplemental to other regular sources. The quantity of bilberries received by state owned purchasing organizations from collectors ranges from 1,300 to 6,500 m.t. annually. During the past few years, there has been a general decline in the quantity collected, with levels at the lower end of this range.

Pickers receive about eight crowns per kilo (Cdn. $1.36) when they sell to state owned processing organizations. However, many pickers sell to local markets, mostly to tourists, at about double this price. Pickers normally harvest about 50-100 kilos per day. During the summer of 1976, retail prices reached about 30 crowns per

kilo (Cdn. $5.10) on the fresh market. One large food firm would like to process about 800 m.t. of bilberries annually, for the export market, but in 1976, only received 86 m.t. from pickers. The reason given for this shortfall is that industrial wages are high and labour is scarce. Workers are encouraged to pick berries while on vacation in the mountain areas, but the program appears to have fallen short of its objectives.

Approximately one-third of the quantity received by state organizations is exported to western European countries in fresh form. The remainder is exported in processed form, and exports of berries are viable sources of foreign exchange. About 70 percent of the total berry harvest is exported, and the remainder is used for domestic consumption. The product is mainly processed in the form of bilberries in syrup and the product impressed the mission as being a very acceptable processed fruit item. Bilberries are also used in producing food colourings.

Industry officials report that strong export markets exist in Western Europe, and that their major problem is lack of production. Unfavourable weather and a shortage of picking labor are cited as reasons for a shortage of raw berries. About half of the processed product is exported as bilberries in syrup while the remainder is exported in block frozen form for further processing. Exports are handled by the state organization, Koospol.

It is believed that bilberries and other wild forest berries will not receive any more attention than is now being given, except for the project by LIKO Industries. Production and exports will likely continue at about the same level and will vary for reasons previously cited. Increased research and production emphasis may be given to highbush blueberries, with the adaptation of high level production technology, including mechanical harvesting. The latter is considered the key to expansion of production. If increased production occurs, most of it will be exported for foreign exchange reasons, to the western European market. Some of this will go as fresh product.

POLAND - Blueberry Research Activity

Most of the blueberry research in Poland is located at Warsaw Agricultural University where Dr. K. Pliszka conducts a program on blueberries, strawberries and raspberries. Dr. Pliszka received his graduate training at Rutgers University and his interest is concentrated on highbush blueberry. Plantings of material from Holland, Germany and U.S.A. have been assessed, and to date the American varieties appear to be more promising. Altogether, there are 40 hectares of highbush blueberry in the Polish program and they are grouped in several six to 12 hectare plots in various locations in the southern part of the country.

Dr. Pliszka's research includes studies on plant growth under various soil conditions and screening for varietal resistance to canker and winter injury. Some of his trials with German varieties have shown susceptibility to canker but winter survival has been good. Dr. Pliszka has developed some highbush material of his own and has done some experimental crosses between Vaccinium corymbosum and Vaccinium uliginosum.

POLAND - Production and Marketing

About 17 percent of the agricultural land in Poland is under collective farms, while the rest is privately owned and operates on a free enterprise basis. Mechanization is far behind North American standards and much hand labor is employed. A chronic and ever worsening farm labor problem appears to exist.

Total 1976 bilberry production in Poland is estimated at 10,000 - 12,000 m.t. Agros, the state organization which handles all exports and imports of fruits and vegetables, reported that approximately 7,000 m.t. would be exported as fresh, frozen or preserved in syrup products, while 3,000 - 4,000 m.t. would be sold on the domestic market, direct from pickers to consumers. This is believed to be a normal sales ratio. Because bilberries are looked upon as a native crop, production data are "best estimates" of knowledgeable

officials. They observed that during the mid-1960's total annual production was about 20,000 - 30,000 m.t. About 1967, a gradual decline in production began which is still continuing, and is forecast to continue into the foreseeable future. Poor weather and a shortage of harvest labor are cited as the main reasons for the decline. Apparently people are becoming increasingly reluctant to pick berries for sale to the State at fixed prices. During the summer of 1976, consumers in Warsaw were paying about 20 Zloties per kilo (Cdn. $1.00) for fresh bilberries, purchased direct from picker-sellers. Apparently, prices in the past occasionally have reached a high of about 33 Zloties per kilo (Cdn. $1.65). Agros was quoting prices for frozen bilberries during the 1976 marketing season at Cdn. $1,200 - $1,400 per metric tonne F.O.B. at the Polish border. Officials were projecting that the export price for frozen product might rise to $1,500 per metric tonne by December 1976, due to generally tight supply conditions. The price for frozen product normally runs about 20 percent higher than for fresh bilberries, due to higher product input costs, and tariff differentials between the two forms, in the western European markets. Officials feel that when the price differential falls below the 20 percent, it is more profitable to ship fresh product rather than frozen. The major export markets for Polish bilberries are Switzerland, West Germany, Austria and Holland. Berries sold to the State are for the export market only.

Bilberries are not viewed as a commercial agricultural crop and production is somewhat variable. Harvesting is not conducted on an organized basis, and a general shortage of farm labor is a major constraint to even maintaining current harvest levels. The picking force is, as in other eastern block countries, composed mostly of children, older people and families on vacation. They can sell fresh berries directly to consumers and tourists at much higher prices than those paid by the State. It is interesting to speculate why pickers don't sell almost all their pickings to the local markets, at the higher prices.

Wild berry production, including bilberries is under the responsibility of the Ministry of Forestry. Bilberries grow in almost every part of Poland, with the major areas of production located in the northeastern and southwestern areas of the country. Rakes are not permitted in harvesting; damage to plants is cited as the reason. Berries for sale to the State are brought to local collection points and then are trucked to larger collection points. It is uncertain at which point cleaning is done.

Bilberries in Poland are consumed mainly as a fresh fruit, are used as a soup, and are very popular in perogies (a popular food of Ukrainian origin). They are not used to any extent in pies, muffins or jams, which are not as popular in Poland as in North America. Industry sources foresee a continuation of the trend of decreasing bilberry

production. The decline has been about 1,000 m.t. annually (since 1967) and it is possible that in about ten years, Poland could no longer be an exporter of bilberries. The remaining production would all be consumed domestically. Sources stated that Canada, Poland and Sweden are the main competitors for the western European market. Poland considers Canada as its main competitor and prices for Canadian lowbush blueberries in western Europe probably have a strong influence on Polish price levels.

The production trend in Poland would appear oriented towards highbush blueberry production and also towards crossing highbush with wild species. While bilberry production is expected to continue declining, this may be offset to some extent by expanded production of highbush and highbush crossed with native species which would eventually utilize mechanical harvesting. In general, however, production and research emphasis appears to be on other fruits, such as apples. Labor costs are low and Poland has a competitive advantage in apple products, in international markets. Other wild berries are harvested in Poland, one of which is known as moose berries (probably lingonberries) - dark red berries used in making jelly for use with wild game. These berries also are harvested in Sweden, Finland and Russia.

The mission gained the impression that during the spring of 1976, a much larger portion of Polish bilberry

exports went as fresh product. This was due to dry conditions in many parts of Europe, which substantially reduced fresh fruit production, thus creating strong prices for fresh berries, as well as other fresh fruit. Poland controls its exports of fresh berries to western European markets in order to maintain strong, stable prices. With a strong demand, less was diverted to processing or frozen for further processing. In general, it appears that Poland will likely concentrate on exporting fresh bilberries, due to better profit margins on fresh berries, as compared to processed or frozen. If highbush production is brought on stream, the emphasis will likely be on exporting fresh product to the nearby western European market.

FINLAND - Blueberry Research Activity

The Agricultural Research Centre at Piikkio is the centre for horticultural research in Finland and there is a vigorous blueberry program underway. Both Dr. J. Sako, the Director, and Dr. H. Hiirsalmi and their staff have several publications to their credit on blueberry, bilberry, lingonberry and cloudberry research. They have conducted trials with highbush varieties and have some Canadian lowbush material in their nursery. They have successfully crossed V. myrtillus and V. vitis-idaea, and are achieving good results in propagating the latter from cuttings and seedlings. They have also done some fertilizer trials in natural stands of V. myrtillus.

FINLAND - Production and Marketing

Bilberry production occurs in all parts of Finland, but the areas of major importance are in southeastern Finland and in Lapland, along rivers and lakes where a moderating effect on climate is present

Bilberries are exported from Finland and shipments of I.Q.F. and some fresh berries go to West Germany, Sweden, Norway, Denmark, Holland, Austria and Switzerland. In 1974, for example, approximately 500 m.t. were exported for a value of 1.7 million Finmarks (Cdn. $425,000).

Rakes are not used extensively in harvesting bilberries due to the belief that raking damages the plants. A picker harvests an average of 50 kg./day and generally receives 3-6 Finmarks/kg. (Cdn. $.75 - 1.50). Encouraging labor to pick berries is identified as one of the problems facing the industry.

Processors pack berries as fresh product, deep frozen in small packs, larger deep frozen packs for industry and also for use in jams. Bilberries were frozen in 25 kilo plastic cartons for the first time in 1976, with good results. Finnish processors bought Canadian lowbush blueberries in 1975 for consumer and industrial packs and found them quite acceptable. Firms reported that they could not obtain import licenses in 1976 (all berries are under

import license) due to a generally adequate supply of domestic berries. However, firms have been finding it cheaper to import lowbush blueberries from Canada for processing than to buy locally produced bilberries. Consumer prices are fixed in Finland and processing companies must justify price increases to a Government board. Increased prices paid to pickers, however, are exempt and permitted.

At least one Finnish firm uses freeze-dried blueberries in a blueberry soup product, which is popular with skiers. The blueberry soup mix requires deep natural flavour and colour. Industry sources stated that there is good potential to increase lowbush blueberry exports to Finland from Canada. Firms have had to pay higher and higher prices for berries over the past few years in order to encourage pickers to pick.

Certain firms see good potential in freeze-dried lowbush Canadian blueberries. In 1976, the first purchase of freeze-dried blueberries from a Danish company, located near Copenhagen was made. There are at present no freeze-drying plants in Finland.

The Canadian industry may wish to explore the prospects of selling blueberry soup mix in North America, with winter sports enthusiasts being the main market. Possibly a licensing arrangement with a Finnish firm could

be explored. Bilberries are also used to produce jams which may be added to ice cream and yogurt, and are used in pies to some extent.

In years of short supplies, Finnish firms have imported frozen bilberries from Poland, Czechoslovakia and Romania. Berries are popular in Finland as a food which helps maintain good health and it is recommended that daily consumption should be 200 grams per day. A promotion program to encourage greater consumption of fresh fruits and vegetables including wild berries is being considered by the government in conjunction with firms.

SWEDEN - Blueberry Research Activity

The Agricultural College at Alnarp has some interest in bilberry, blueberry and lingonberry research, but their blueberry program at present is quite modest. Dr. Fernqvist is the newly elected chairman of the working group for Vaccinium in Europe.

Although Sweden is a producer of wild berries, time did not permit a production and marketing profile to be conducted.

DENMARK - Blueberry Research Activity

The blueberry program in Denmark is the responsibility of Prof. S. Dalbro at the Royal Veterinary

and Agricultural University in Copenhagen. Dr. Dalbro has a keen interest in highbush blueberry and has carried out trials with American and European varieties for several years. The American varieties are susceptible to canker under Danish conditions but some resistance to this disease is evident in some of the newer German cultivars.

DENMARK - Production and Marketing

There is a limited production of highbush blueberries in central Denmark practically all of which is sold on the local fresh market. Sources report that there is a good demand for fresh berries when they are in season. During the summer of 1976, fresh highbush blueberries sold at the retail level for 30 - 40 Kroners per kilo (Cdn. $4.80 - $6.40), while producers received about 20 Kroners per kilo (Cdn. $3.20).

There appears to be little use of blueberries for processing in Denmark and the product in processed form is almost unknown. Nurseries are believed to sell about 3,000 - 4,000 highbush blueberry plants per year to gardeners for home production. Canker is one of the main disease problems which has largely inhibited blueberry production in Denmark, and no immediate solution to the problem is foreseen. For lowbush production, the northern part of Denmark may hold some promise but establishing plants and harvesting are foreseen as major problems.

Industry sources believe that the amount of bilberries being picked in Europe has been decreasing each year and will continue to decrease for the foreseeable future. Bilberries sold for 10 - 12 Kroners per kilo (Cdn. $1.60 - $1.92) in Copenhagen retail markets during the 1976 season. These were of European origin.

The canker problem previously mentioned appears to be a difficulty with highbush production in Holland as well as Denmark. It is believed to be a result of the Atlantic type climate - warm winters and damp conditions.

U.S.S.R.

The mission did not visit the Soviet Union, however, a literature search revealed an interesting paper entitled "Improving the Productivity of the Bilberry Stands in Byelorussion". Byelorussia is an area which is located in the western part of Russia, and is believed to be a major bilberry growing area. The paper was written recently by Z.G. Valova and excerpts have been taken directly from it, which follow.

"Discovery of the new medicinal properties of bilberries has increased the population's demand for these berries in their diet, particularly for therapeutic purposes. Besides carbohydrates, proteins and fats, bilberries contain

sugar, acids, macro- and trace elements, biologically active substances, etc., for which this product is valued in the food and pharmaceutical industries.

Of the sugar contained in bilberries, fructose predominates (3.68%) with glucose amounting to 2.45 percent (6). Bilberries are a source of natural organic dyes (pigments: chlorophyll, carotene, anthocyan). Chlorophyll is contained in large amounts in the green berries, carotene in the brown ones and all three pigments in the mature berries (2). Ascorbic acid and catechin are the vitamins present in bilberries. These berries also abound in pectins and tannins, which is of particular importance to the confectionery industry and medicine. The organic acids contained in bilberries include lactic, succinic, malic, oxalic and quinic acids.

Bilberries contain neomyrtillin ("vegetable insulin") which prevents diabetes, non-carotenoid compounds which improve night vision, and antibiotic tannides which prevent infectious gastrointestinal diseases (4). In France, the extract of bilberries is used to produce a preparation, the active principle of which are pigments capable of heightening regeneration of rhodopsin (5).

What is the present possibility of satisfying the demands for this valuable product? How are the demands for this product met in the food and pharmaceutical industries?

Fresh bilberries are not sold in the regular stores in the Byelorussian SSR. These berries are supplied by the farmers' markets. Processed bilberry products are sold rarely and in a poor assortment.

This has made it necessary to solve a number of major problems: to increase the material resources of the bilberry industry by raising the productivity of the available bilberry stands, to increase the area of bilberry stands and also to put the gathered produce to good use.

The biological bilberry yields of the Byelorussian forests for the seven-year period from 1968 to 1974 are as follows: only 1970 was a highly productive year (501-700 kg/ha); average productivity was observed in 1968 (301-500 kg/ha), low productivity in 1969, 1971 and 1973 (101-300 kg/ha) and very low productivity in 1974 (51-100 kg/ha; 1972 turned out to be an unproductive year (less than 50 kg/ha). The average annual yield during the seven-year period amounted to approximately 230 kg/ha.

It should be taken into account that the given figures are for continuous undergrowth, but since bilberries occupy from 50 to 90% of the area of whortleberry, moss and whortleberry, and Polytrichum and whortleberry forests, the crop figures should be reduced by 10-50%, after which the average annual crop will amount to 100-200 kg/ha. Besides, not all of the biological yield (of the fruit that sets) is

included in the crop of mature berries. The average annual losses for 1971-1974 amounted to 30%. Therefore, of the 100-200 kg/ha biological yield, 70-140 kg/ha of the healthy berries survived to maturity.

During the period of growth and ripening, some of the fruit that has set falls off to various degrees at different stages of fruit bearing due to different causes. In order to forecast the harvests of ripe berries when planning their procurement, we must know the extent, the causes and the periods of these losses from the time the fruit sets to the time it ripens.

According to the estimates of the BSSR, a bilberry crop of 70-140 kg/ha (7-yr. average) makes it possible to take in a harvest of 15,000-18,000 tons, which is less than 2 kg. of berries per person. The statement that the bilberry stock in densely populated areas remains unharvested is unsubstantiated. Moreover, even in the "deep-seated" areas of the republic (e.g. Polesye), the bilberry crop is picked quite thoroughly by the population. Procurement stations are now found everywhere.

The bilberry stocks being what they are, it becomes necessary to increase the areas of this crop and raise the yield of berries. Forests in areas conducive to the growth and fruit-bearing of the bilberry plant can be used as a reserve for increasing the areas under this crop. Bilberry pomace from fruit-processing factories can be used as the seeds.

Our experiments on the cultivation of bilberries have shown that bilberry seed specimens flower and bear fruit in the third year.

The time has come to set up a specialized bilberry industry in order to increase the productivity of this useful crop. Researchers already have sufficient material on the effect of certain factors on the bilberry yield. They know what soil, hydrologic and phytocoenotic conditions are best for the fruit-bearing of the bilberry plant. In our opinion, it is worthwhile experimenting in forest conditions with simultaneous cultivation of bilberry plants and European mountain ash, which have similar soil, hydrologic and light requirements in nature.

Another important way of increasing the output of bilberry products is by proper and expedient utilization of the crop. The assortment of bilberry products can be extensive: fresh berries, fruit jelly, syrups, natural and mixed juices, jams, compotos, strained fruit with sugar, candy filling, colouring for soft drinks, etc. A large portion of the bilberry crop is turned into wine, but this is hardly the proper way to utilize this valuable medicinal product. In our opinion, the entire bilberry crop should be used in the preparation of medicines or in special diets.

References

1. Berezenko N. M., Valova Z. G. The bilberry yield and the factors determing it. Sb. BeINIILKh, No. 20, 1971.

2. Borukh I. F., Senchuk G. B. Tannins and dyes from wild berries of Byelorussia. IN: Poleznyye rasteniya pribaltiyskikh respublik i Belorussii. Vilnus, 1973.

3. Valova Z. G. Improvement pruning and the bilberry yield. Sb. BeINIILKh, No. 23, Minsk, 1973.

4. Vigorov L. I. Wild berries and fruits as a source of biologically active substances. IN: Produktivnost' dikorastushchikh yagod i ikh khozaistvennoye ispol'zovaniye, Kirov, 1972.

5. Gaetan J.[A] The bilberry extract and vision. Byull. inostr. n.-tekh. informatsii TASS, 73, 1964.

6. Rush B. A., Lizunov V. V. The chemical composition of wild berries of Siberia. IN: Produktivnost' dikorastushchikh yagod i ikh khozaistvennoye ispol'zovaniye. Kirov, 1972.

[A] transliterated from the Russian - transl.

"THE OTHER WILD BERRIES"

Lingonberry and Cloudberry

Introduction

Although these economically important native fruits occur extensively in Norway, Sweden and Finland, the following dissertation concerning these fruits will pertain to the Finnish berry industry unless otherwise stated. It is assumed that the industry is similar in the other Scandinavian countries.

Harvesting and Collecting

It is interesting to note that the pattern of land ownership in Finland is as follows: privately held 60 percent; state 30 percent; companies eight percent; and municipalities two percent. In the southern half of Finland, 80 percent of the land is privately owned. The average farm size is 40 hectares, of which 10 hectares are under cultivation and 30 hectares are in forest. Farm families collect berries from the forested area.

As a rule firms take four weeks vacation each year and many people of all ages harvest wild berries and mushrooms during their July vacation. Berries harvested include lingonberries, bilberries, cloudberries and cranberries. Besides harvesting the crop for the commercial trade, residents will harvest at least one-half of their own yearly berry requirements.

The collection and marketing of the berries involving five co-operatives including the country's largest dairy is well organized. The co-operatives are engaged in some final processing but will also sell raw product to other processing firms within and outside Finland.

For the most part pickers sell their berries to small retail shops located in communities throughout the country. Income received by pickers is tax free.

The berries are then delivered to the main factory or to large central collection plants which have freezing facilities. For his efforts the shopkeeper receives a 10% - 20% commission.

Crop Forecasting

The National Board of Agriculture, a Government organization and the Pellervo Society, a central marketing research organization for the co-operatives, partially funded by Government, are engaged in forecasting yearly production in a number of commodities. Wild fruits are included

The National Board of Agriculture

This agency forwards two questionnaires to approximately 1,500 people in approximately 500 districts.

The first form to be completed by the end of June estimates the crop potential on a scale of 1-5, from very poor to very good. A second form is distributed for completion at the beginning of August. This provides an update on the lingonberry and cranberry. The cloudberry and bilberry are excluded from the second survey as these berries have been or are in the process of being harvested. When the data has been analyzed the information on crop potential is released to the public through the media.

The Pellervo Society

Their program is a three year pilot project commissioned by the largest dairy, Valio and funded jointly by Valio and Government. The test area is limited to the central eastern part of Finland. The project involves 40 crop reporters trained jointly by the Society and Government who gather pertinent data on wild fruits during various stages of crop development. Twelve reports are compiled from mid-May to the end of October by the reporters who receive 15 Fmks (Cdn. $3.75) per report. The information generated from the survey is being used to form a statistical data bank in the hope of building a berry forecasting model.

The latter system of crop reporting is more sophisticated and produces more up-to-date information which is first made available to Valio enabling the company to use the information in the marketplace.

The crop forecasting system informs the public and industry of the location and quantities of berries that may be available. It also influences picker prices and in the case of industry it can start early to secure imports from foreign countries at advantageous prices if production is expected to be down.

Some Production Figures

Unfortunately, the mission was unable to obtain total production figures for each fruit. The only figures obtained in Finland were for the total berry crop in 1974 and are as follows:

Total forest berries utilized for domestic use - 21,000 mt.

Total forest berries exported - 4,400 mt.

Total all berries - 25,400 mt. for a value of approximately 77,000,000 Fmks (Cdn. $19.3 million) (Includes lingonberries, cloudberries, bilberries and cranberries).

Research

The Agricultural Research Centre, Institute of Horticulture, Piikkio, Finland, is quite active and interested in attempting to domesticate the lingonberry. The Centre is also doing work on the cloudberry and other native fruits. The Centre has crossed the bilberry with

the lingonberry and this has resulted in the formation of a low yielding purplish berry. Breeding the highbush blueberry, V. corymbosum with the bog bilberry V. uliginosum has been done in attempts to produce a high yielding winter hardy blueberry plant relatively free of canker, Fusicoccum putrefaciens.

The Agricultural College of Sweden at Alnarp is undertaking some work on the lingonberry and has a substation at Ottarp, 200 km north of Alnarp, where most of the lingonberry research is carried on. In this case a field of approximately 4 hectares was established in the late 60's with plants taken from the wild.

The Lingonberry

The lingonberry is the most important wild fruit in Finland and is common throughout the country with central Finland reported to be the prime production area. Its natural habitat is primarily on a sandy soil, under a canopy of pine although it does grow well in the open. Some plants in northern Finland range from 30 - 40 cm high. Growth habit is more erect and vigorous than that of the North American lingonberry and this permits raking of the fruit. The average yield from the wild ranges from between 1,300 - 3,000 kg/hectare with individuals harvesting anywhere from 40 - 70 kg. per day.

In experiments, higher yields were obtained on a peat substrate; propagation by seed prompted more vegetative spreading as compared to vegetative propagation. However, good yields from seed are not obtained until 4 or 5 years later whereas satisfactory yields are realized from cuttings after the first year.

In 1974, 2,345 mt. with a value of 8,000,000 Fmks (Cdn. $2 million) to the economy, were exported mainly to Sweden. Picker prices ranged from 4 - 9 Fmks/kg. (Cdn. $1.00 to $2.25) in 1976.

In Sweden, it was reported that a number of diseases of varying importance exist; the most serious being a fungus disease first noticed in 1972 and now occurring frequently in open areas. It has yet to be identified. Symptoms involve leaf spotting with a resulting loss of leaves during the winter. Benlate applied at regular intervals during spring and summer adequately controlled the disease.

It was noted that the European lingonberry is free of the "lingonberry maggot" that now is found in Newfoundland.

There appears to be a modest market for Canadian lingonberries provided they are of sound quality.

There is extensive utilization of the fruit both in the fresh and processed states. Such items as jams, juices, drinks, fillings (bakery trade) are common and popular.

Cloudberry

The main area of production is Lapland and the people of this region have their "secret" picking spots.

General habitats are open sphagnum bogs and spruce swamps; the latter being a more ideal habitat as berries are sheltered and the incidence of damaging spring frosts is reduced due to delayed blooming. Lower temperatures in sheltered areas as compared to open areas result in bloom delay.

A good cloudberry bog produces about 12 - 20 berries/square metre. However, experiments growing cloudberries in the greenhouse have produced yields of 100 berries/square metre weighing 200 gms. At this level of production yields are not economically sufficient to warrant commercial production. In the field the berry is very difficult to cultivate and frost during bloom is a limiting factor in production. It is estimated that a good cloudberry harvest is realized in only two out of ten years.

In 1974 export production amounted to 19 mt. with a value of 200,000 Fmks (Cdn. $50,000). In 1976 picker

prices ranged from 22 to 30 Fmks/kg. (Cdn. $5.50 to $7.50). A price of 20 - 22 Fmks/kg. (Cdn. $5.00 to $5.50) is considered normal but spring frosts in 1976 caused the price to escalate to 30 Fmks/kg. (Cdn. $7.50).

Due to the nature of the ripe fruit (soft), at least one firm issues plastic containers to the pickers which are filled and the berries are then frozen in bulk.

Liqueur and jam are the two main processed products and jam is generally only manufactured when there are sufficient quantities of berries. In most cases processing firms cannot acquire enough cloudberries to meet the demand; thus there exists a potential market for Canadian cloudberries if supplies were available.

Future of the Lingonberry and Cloudberry Industries

The declining interest in harvesting berries and the high incidence of damaging spring frosts, especially those affecting cloudberry production, are two negative factors. As well, processors are becoming concerned about the exorbitant prices they must pay pickers for the raw product. As an example, the 1975 lingonberry crop was knocked out by frost and in 1976 pickers were demanding a higher price than was paid in 1975 despite the fact that 1976 yields were higher than 1975 yields.

In general, the future appears promising for these and other wild fruits. Demand has increased, the industry is well organized and distribution has recently been improved. The fact that an active promotion campaign, supported by Government and industry, is underway extolling the virtues of naturally occurring wild fruits as health foods indicates that, in spite of some negative aspects, these fruits will continue to play an important role in the Scandinavian way of life.

TABLE I

Comparative Chemical Analysis of
Canadian Lowbush Blueberries and Polish Bilberries

	Canadian Lowbush Blueberries (2 Samples)		Polish Bilberries (2 Samples)	
Acid	4.0%	4.1%	7.8%	8.3%
Reducing Sugars	64.3	67.8	48.0	48.4
Sucrose	0.9	0	0.2	2.4
PH	3.5	3.5	3.4	3.4
Ash	1.4	1.4	2.0	2.0
Insolubles	0.1	0.1	0.1	0.1
Water	1.5	1.6	2.2	1.9

Source: A commercial laboratory
Copenhagen, Denmark

February 1974

LOCATIONS OF COMMERCIAL BLUEBERRY PRODUCTION
(HIGHBUSH AND LOWBUSH) IN CANADA

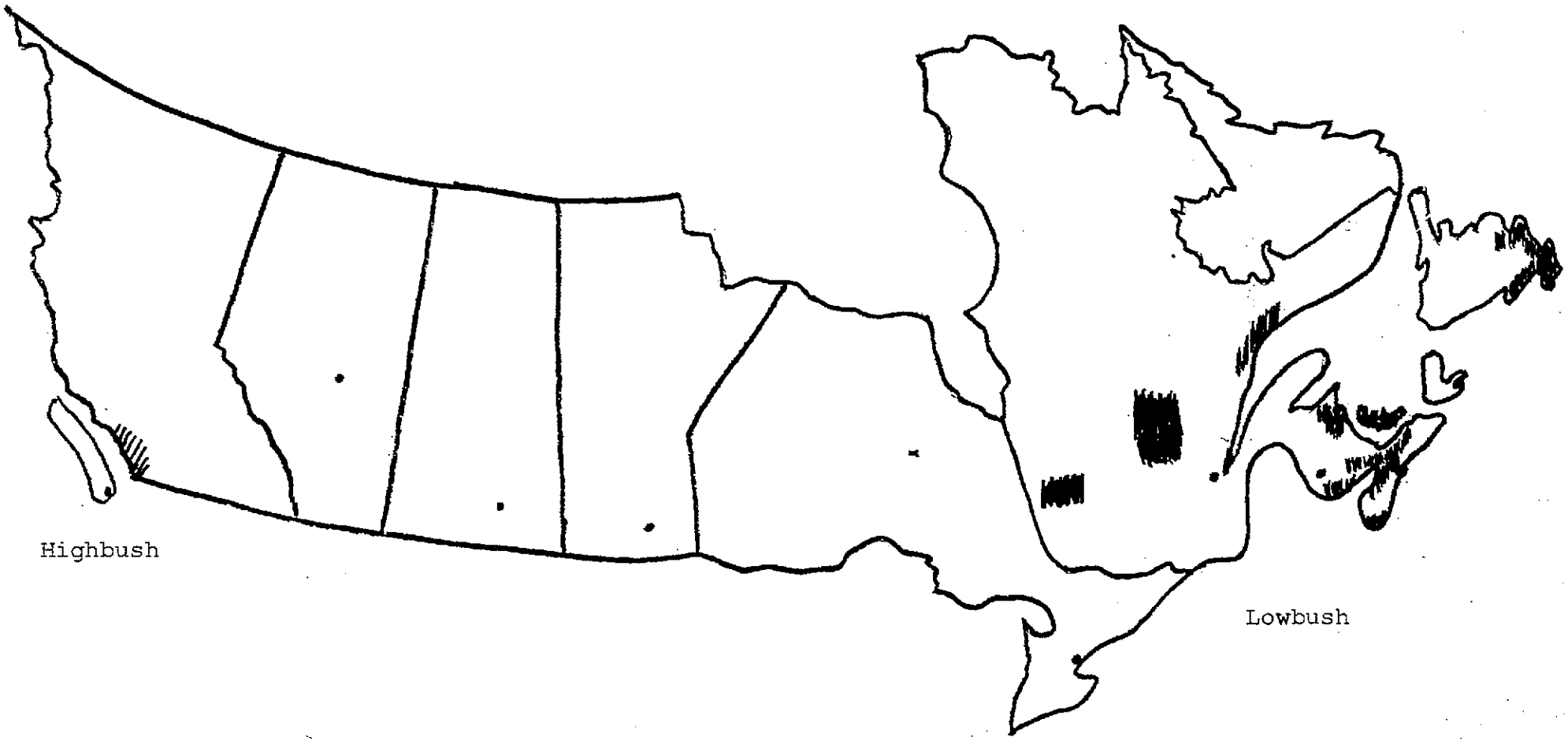

TABLE II

Canadian Blueberry Exports
(Combined lowbush and highbush)

Fresh Blueberries	1972		1973		1974		1975		1976	
Destination	lb.(000)	$(000)	lb.(000)	$ (000)	lb.(000)	$ (000)	lb.(000)	($000)	lb.(000)	$(000)
United Kingdom							70	37		
West Germany							42	17		
Netherlands					286	87	84	25		
Switzerland							15	8		
Trinidad/Tobago			42	6						
Australia & New Zealand									15	6
United States	3,914	889	5,338	1,576	3,418	664	4,947	1,203	3,394	911
Total	3,914	889	5,380	1,582	3,704	751	5,157	1,291	3,409	918
Frozen Blueberries										
Destination										
Japan	2	1			3	2	9	3		
Australia & New Zealand	40	13	6	3	20	7	36	12	7	3
United Kingdom			36	17	191	85	503	241	30	14
Austria			22	12						
West Germany			90	47	2,188	934	4,542	2,142	4,941	2,614
Netherlands			43	14	3,682	1,445	3,335	1,350	1,051	523
Norway			500	235	462	36	702	330	85	35
Sweden			2,026	940			353	182	132	66
Finland					40	10	312	162	121	51
Switzerland					40	14				
France							173	79	388	226
Belgium-Luxembourg									80	47
United States	10,464	3,802	8,347	3,542	7,636	3,164	4,573	1,751	6,078	2,904
Total	10,505	3,816	11,021	4,811	14,264	5,697	14,538	6,253	12,911	6,484
Canadian Blueberry Exports (Fresh and Frozen) as percentage of total production	55%		45%		92%		61%		74%	

Source - Trade of Canada

TABLE III

CANADIAN BLUEBERRY IMPORTS
(Mainly Highbush)

Fresh Blueberries	1972		1973		1974		1975		1976	
Source	lb. (000)	$(000)	lb. (000)	$(000)	lb. (000)	$(000)	lb. (000)	$(000)	lb.(000)	$(000)
United States	2,898	858	3,270	1,069	5,233	1,622	4,712	1,767	5,619	2,172
Total	2,898	858	3,270	1,069	5,233	1,622	4,712	1,767	5,619	2,172

Canadian tariff - Fresh Blueberries - free
Frozen Blueberries - free

Source: Trade of Canada

TABLE IV

CANADIAN BLUEBERRY PRODUCTION

YEAR	NFLD.	P.E.I.	N.S.	N.B.	QUEBEC	B.C.	CANADA
			(000 lbs)				
1960	2,814	130	5,400	3,500	6,098	1,663	19,605
1961	2,934	451	5,700	4,500	2,715	1,763	18,063
1962	1,250	238	7,400	4,000	3,429	1,909	18,226
1963	1,400	1,150	7,000	4,000	8,551	2,853	29,954
1964	1,036	200	5,100	3,000	8,762	2,763	20,861
1965	2,264	250	7,000	2,500	3,081	3,050	18,145
1966	2,361	550	7,600	7,000	16,550	3,448	37,509
1967	1,690	710	11,700	7,000	5,461	4,572	31,133
1968	568	450	2,100	1,500	6,010	5,153	15,781
1969	795	1,400	9,280	5,500	8,000	3,725	28,700
1970	3,000	5,000	8,300	1,500	10,500	4,770	28,570
1971	1,700	525	7,200	4,800	4,200	4,046	22,471
1972	2,100	177	10,000	3,779	6,321	3,989	26,221
1973	2,596	1,000	10,200	4,650	11,650	5,917	36,013
1974	662	700	7,700	2,784	4,050	3,600	19,496
1975	3,191	800	10,100	3,835	7,500	6,296	31,722
1976[a]	1,100	500	6,958	3,760	5,200	4,536	22,054

[a] Preliminary estimate

SOURCE: Statistics Canada

Note - Data are for lowbush blueberries with exception of British Columbia which is highbush.

E.E.C. IMPORTS - MYRTILLES

VOLUME - 1000 KG.

DESTINATION

SOURCE	EUR.9	GERMANY	FRANCE	ITALY	NETHERLANDS	BELGIUM LUXENB.	UNITED K.	IRELAND	DENMARK
FRANCE	341	281	--	17	--	2	41	--	--
THE NETHERLANDS	95	70	--	--	--	25	--	--	--
SWEDEN	178	108	--	--	70	--	--	--	--
POLAND	1452	785	--	--	520	147	--	--	--
WORLD	2456	1474	32	17	704	186	43	--	--
IMPORTS FROM EEC	544	354	--	17	95	37	41	--	--
IMPORTS FROM NON EEC COUNTRIES	1913	1121	32	--	609	149	2	--	--
WESTERN INDUSTRIALIZED COUNTRIES	433	308	32	--	89	2	2	--	--
EFTA COUNTRIES (EUROPEAN FREE TRADE ASSOCIATION)	269	179	--	--	89	---	1	--	--
EASTERN EUROPE	1460	813	--	--	520	147	--	--	--

SOURCE: Eurostat - Statistical Office of the European Community

TABLE V b.

E.E.C. IMPORTS - MYRTILLES

JANUARY TO DECEMBER 1974

VALUE - 1000 - UNITS OF ACCOUNT ☆

SOURCE	EUR.9	DESTINATION GERMANY	FRANCE	ITALY	NETHERLANDS	BELGIUM LUXENB.	UNITED KINGDOM	IRELAND	DENMARK
FRANCE	421	339	--	20	--	2	60	--	--
THE NETHERLANDS	105	80	--	--	--	25	--	--	--
SWEDEN	154	95	--	--	59	--	--	--	--
POLAND	1200	841	--	--	431	128	--	--	--
WORLD	2245	1379	25	20	595	164	62	--	--
IMPORTS FROM EEC	625	422	--	20	90	33	60	--	--
IMPORTS FROM NON-EEC COUNTRIES	1619	957	25	--	505	130	2	--	--
WESTERN INDUSTRIALIZED COUNTRIES	401	297	25	--	74	3	2	--	--
EFTA COUNTRIES (EUROPEAN FREE TRADE ASSOCIATION)	238	162	--	--	74	--	2	--	--
EASTERN EUROPE	1219	660	--	--	431	128	--	--	--

☆ One unit of account is approximately equal to $1.26 U.S.

SOURCE: Eurostat - Statistical Office of the European Community

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A-2301 Grob-Enzersdorf Bei Wien

Contact: Peter Sedmik, Co-packing Manager

Telephone: 02249 791-232, Durchwahl

Processor of ice cream, yogurt, juices, fruit packs for deep freezing home use and catering.
I.Q.F. and block frozen.

BELGIUM

Materne SA
22 Rue du Progrès
5100 Jambes, Namur

Contact: Jean-Claude Materne
Ass't to President

Telephone: (081) 315-23 Heymans
Telex : 059120

I.Q.F. or block frozen.

Quote CIF Antwerp.
Produce preserves, jams.

N.V. Goessens & Co.
Meiveldlaan 3
3800 Sint Truiden

Telephone: (011) 6755-65
Telex : 39580

I.Q.F.
Quote CIF Sint Truiden.
Produce preserves, jams.

CZECHOSLOVAKIA

Liko, gen. riad, trusty (Liko Canning Industries)
890 34 Bratislava
Mileticova ul. 23

Contact: Ing. Antonin Konecny

Telephone: 63200

DENMARK

Danish Freeze-Drying Ltd.
DK - 4070 Kirke Hyllinge

Contact: Ejnar Mikkelsen,
Manager

Telephone: 45-3-40-0200
Telex : 40230
Cable : FROSTDRY

Produces freeze dried berries for further processing by other firms.

ENGLAND

Hybs Food International Ltd.
55 Park St.
Bristol, BSI 5NT

Contact: Dr. Z. Hybs

Telephone: 0272-291406-20714
Telex : 449449

Consulting food technologists.
Suppliers to fruit processing industries.

I.Q.F. or block frozen.
Jam.

Criterion Ice Ltd.
118 Sydenham Road
London, S.E. 26

Contact: J.M. Valenti

Telephone: 778-7945

Ice cream manufacturer.

Lyons Maid Ltd.
Glacier House
Hammersmith Grove
London, W6

Contact: M.A. Hemmingway

Telephone: 01-778-3030

Ice cream manufacturer.

Marine Ices Ltd.
8 Haverstock Hill
London, NW3

Contact: A.M.A. Manzi
A.R.C. Manzi

Telephone: 485-8898

Small ice cream manufacturer.

T. Walls & Sons
Walls House
Broadstairs, Gloucester

Contact: D. Wright

FINLAND

Association of Fruit and Berry
Growers
Lonnrotinkatu 22A
00120 Helsinki 12

Contact: Alpo Leskinen
Chairman

Telephone: 644564

National Board of Agriculture
Bureau of Gardening
Mariankatu 23, 3rd floor
001070 Helsinki 17

Contact: Aarno Murtomaa
Chief of Bureau

Ms. Aune Vaisanen
Statistician

Telephone: 11141
661-771

The National Board of Agriculture is a type of crop reporting board which is associated with the Ministry of Agriculture. The Board conducts crop surveys, which predict production for the coming year. Berry forecasting is included in this activity.

The Marketing Research Institute
of the Pellervo Society
Simonkatu 6, Helsinki 10

Contact: Dr. Ilkka Vainio-Mattila
Managing Director

Mr. Matti Kujala
5th floor

Telephone: 61046/206

The Pellervo Society promotes economic activities conducted on co-operative principles with private industry and government. It conducts market surveys and activities.

S.O.K., The Finnish Co-operative
Wholesale Society
Vilhonkatu 7, 5th Floor
00100 Helsinki 10

Contact: Seppo Reunanen
Dept. of Agric. Prods.

Telephone: 650-611
Telex : 12-456

This co-operative organization has about 210 retail outlets and packs berries as fresh product, and deep freezes in small packs. Larger deep frozen packs are for industry and also for use in jams.

Jalostaja Co.
Pansiontie 45
20100 Turku 10

Contact: Juha Saarinen
Buyer

Telephone: 921-401222
Telex : 62279

This conglomerate is one of the largest enterprises in Finland, and encompasses food processing, wines and liqueurs, other beverages and pharmaceutical supplies.

Keskusosuusliike Valio
Kalevankatu 61
00180 Helsinki 18

Jams, liqueurs, desserts, pies and yogurts.

Contact: Uolevi Mildh

Telephone: 646-211

FRANCE

Pomona
21, rue du Pont-Neuf
75039 Paris Cedex 01

I.Q.F. only.

Contact: Miss Pierette A.M. Quillay

Telephone: 233-44-64
Telex : 680-435

Société Patisfrance
236, Bis, rue de Tolbiac
(XIIIe)
75013 Paris

Jam.

Contact: F. Dufour
President-Director
General

Telephone
Telephone: 589-4554
Telex : 270-160

S.A. LaPulpe
14, rue du séminaire
94150 Rungis M.I.N.

Contact: Mr. Brousse, President
Mr. Cowen, Vice President
Bernard Berwick

Telephone: 686-3012
Telex : 260-721

S.A. des Etablisseménts Boiron Frères
1, rue des Glacières
Zone des Entrepots
94150 Rungis

I.Q.F. blueberries, unwashed.

Contact: Pierre Boiron

Telephone: 686-4080
Telex : 200-627 Emarone

S.I.A.S. - Orsan
76 or 16, rue Ballu
75009 Paris

Yogurt or ice cream (possibility of special Canadian blueberry yogurt)

Contact: Felix Huygues-Despointes

Telephone: 744-8979
526-8979
Telex : 650-847

Confederation des Glaciers de France
64, rue Caumartin
75009 Paris

Contact: Mr. Chardon
President

Telephone: 874-7228

Syndicat National des Fabricants de Confitures
21/7, rue du Faubourg Saint Honoré
75008 Paris

Organization represents jam and preserve industry.

Contact: B. Carrique, President
Jacques Rivoire, Secretary General

Telephone: 227-9240
Telex : 28443

Pellorce et Jullien
Route de Champlain
91300 Massy

Ice cream and jam.

Contact: Mr. Jullien

Telephone: 920-62-73

Ferlux Chimie
24 Avenue D'Aubière
63 Couron D'Auvergne

GERMANY

Einkaufsleitung Hamdelswaren Sudmilch Eiskrem Und Tiefkuhlkost GMBH & Co. 700 Stuttgart 1, Rosensteinstr 20 Gunter Bimberg	I.Q.F. CIF Hamburg. Yogurt, ice cream and desserts.
Bayernwald 8355 Hengersberg West Germany Contact: Jurgen Philipp Telephone: 09901/209 Telex : 069855	Juices, wine, concentrates, yogurt, pie fillings and preserves.

THE NETHERLANDS

Spyer, Van Der Vijver and Zwanenburg
B.V.
Etten-Leur

Contact: C. Van Den Doel
Joint Managing Director

Telephone: 01608-17321

Jonker Fris B.V.
1 Provingialeweg
Heusden

Process into 7 oz. picnic size cans.

Contact: Dr. P. Van de Wiel
H. Den Dekker

Telephone: 04162-1440
Telex : 50156

Deleeuw's Handelsonderneming B.V.
8-10 Ziedewig
Barendrecht

Imports for resale to processors CIF Rotterdam.

Contact: J. Van Den Haspel
Henk de Leeuw

Telephone: 01806-4433
Telex : 21501

Terfloth and Kennedy B.V.
Groothandelsgebouw A5
P.O. Box 09051
Rotterdam

Contact: Kees Schrevel

M.H. Boas B.V.
P.O. Box 1316 Laakweg 142
The Hague

Luxury item specialty importer.

Contact: G.J.A. Swart

Telephone: 070-993100
Telex : 32646

POLAND

Agros
Export-Import
00-950 Warszawa, Zurawla 32/34
Warsaw

Contact: Zbigniew Zielinski
Director of Fruit and
Vegetable Section

Telephone: 21-64-21

State organization for imports/exports of selected agricultural products - including berries.

ROMANIA

Ministry of Agriculture and
Food Industry
24, Republicii Bd.
Bucharest 7000

Contact: Anton Pavel
Economist
Cooperation and International Relations
Division

Telephone: 13-31-18
14-40-20

Fructexport
Academiei Strasse 17
Bucharest

Telephone: 16-10-00
13-56-00

Selected organization for imports/exports of selected agricultural products, including berries.

SWEDEN

Novia Livsmedelsindustrier Ab.
Box 100-70
S-291 10 Kristianstad 10

Contact: Gunnar Bengtson
Development Engineer

Telephone: 044/12-30-00
Telex : 48051 Novia S
Cable : NOVIALIUS

SWITZERLAND

Migros-Genossenshafts-Bund
Limmastrasse 152
Postfach 266
CH-8031 Zurich

Contact: R. Bauert
Marketing Food,
Agrarprodukte

Fresh blueberries or blackberries.

LIST OF RESEARCH CONTACTS BY THE MISSION

CZECHOSLOVAKIA

Fruit Research Breeding Station
972-01 Bojnice
okr. Prievidza
Czechoslovakia

Contact: Ing. Jan Simanek

DENMARK

Department of Pomology
Royal Agricultural University
Thorvaldsensvej 40
DK 1871 Kobenhavn V
Denmark

Contact: Sven Dalbro
Professor

Telephone: (01) 35-17-88

FINLAND

Agricultural Research Centre
Institute of Horticulture
SF - 21500 Piikkio
Finland

Contact: Dr. Heimo Hiirsalmi, PH.D.

Telephone: Office - 921-727-806
Private - 921-727-815

Dr. Jaakko Sako

Aaro Lehmushovi - Lingonberry Researcher

Jouko Kortesharju - Cloudberry Researcher

In summer - Jouko Kortesharju conducts research at:

Teuravuama
SF - 95900 Kolari
Finland.

POLAND

Department of Pomology
Warsaw Agricultural University
02-766 Warszawa
Nowoursynowska 166
Warsaw, Poland

Contact: Dr. Kazimierz Pliszka

Telephone: 43-49-12

ROMANIA

Institutul de Cercetari
pentru Pomicultura
Pitesti-Maracineni

Contact: Ing. Botez Mircea
Director

SWEDEN

Agricultural College of Sweden
Department of Pomology
S-23053 Alnarp, Sweden

Contact: Ingevald Fernquist
Professor, Agr. Div.

Ms. Kerstin Magnusson
Plant Pathologist

Telephone: 040-464410

YUGOSLAVIA

Kmetijski Institut Slovenije
Ljubljana, Hacquetova 2
Yugoslavia.

Contact: Dr. M. Oblak

(not contacted by the mission)