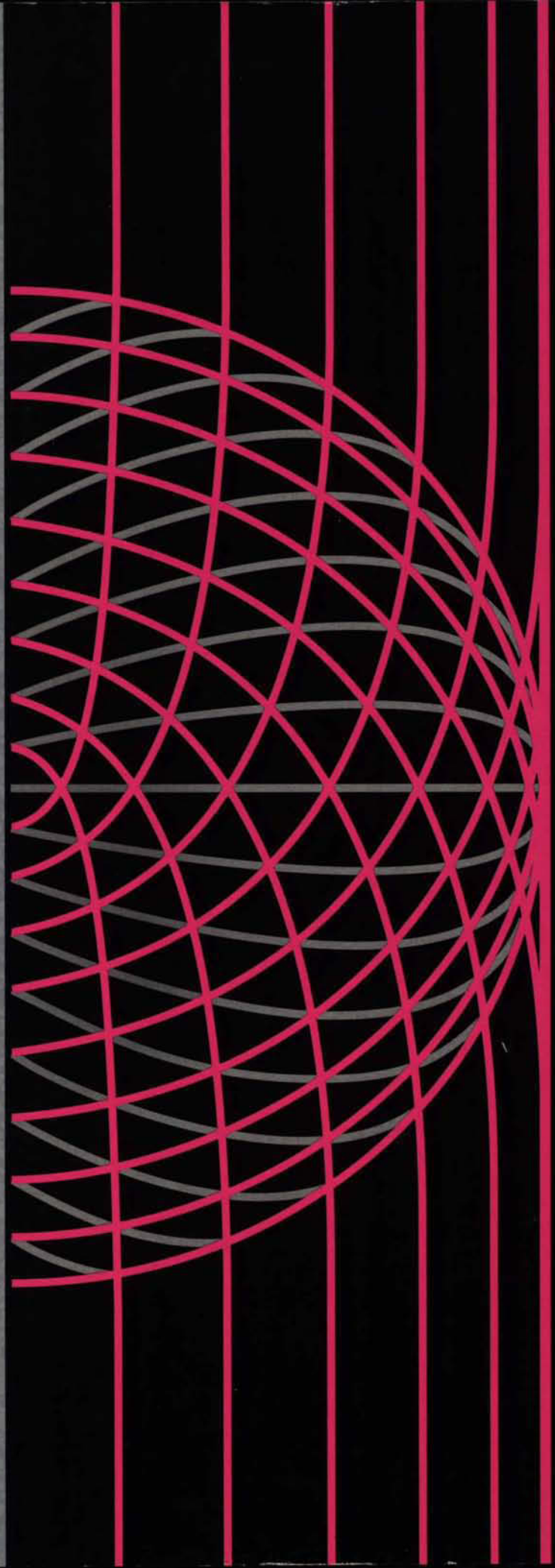
Pesticides

INDUSTRY PROFILE



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Industrie, Sciences et Technologie Canada

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1990–1991

PESTICIDES

FOREWORD

In a rapidly changing global trade environment, the international competitiveness of Canadian industry is the key to growth and prosperity. Promoting improved performance by Canadian firms in the global marketplace is a central element of the mandates of Industry, Science and Technology Canada and International Trade Canada. This Industry Profile is one of a series of papers in which Industry, Science and Technology Canada assesses, in a summary form, the current competitiveness of Canada's industrial sectors, taking into account technological, human resource and other critical factors. Industry, Science and Technology Canada and International Trade Canada assess the most recent changes in access to markets, including the implications of the Canada-U.S. Free Trade Agreement. Industry participants were consulted in the preparation of the profiles.

Ensuring that Canada remains prosperous over the next decade and into the next century is a challenge that affects us all. These profiles are intended to be informative and to serve as a basis for discussion of industrial prospects, strategic directions and the need for new approaches. This 1990–1991 series represents an updating and revision of the series published in 1988–1989. The Government will continue to update the series on a regular basis.

Michael H. Wilson
Minister of Industry, Science and Technology
and Minister for International Trade

Structure and Performance

Structure

The pesticides industry is made up of establishments primarily engaged in the manufacture of pesticides for use in the agriculture and forestry sectors as well as for industrial, household and garden applications. Pesticides are used for crop protection, the regulation of plant growth and the control of insects, arthropods, nematodes, worms, rodents, etc. They are also utilized in the treatment of seeds and plants against diseases, in the control of vegetation along utility lines, roadways and railways or of algae in swimming pools and other aquatic systems, and as a preservative for wood and fabrics.

In Canada, most pesticides are sold for the purpose of protecting agricultural crops. Agricultural needs account for approximately 86 percent of the value of all pesticides sold. Herbicides in turn account for approximately 77 percent of all pesticides sold in Canada.

The manufacture of pesticides can be divided into two types of activities, the first being the manufacture or synthesis of active ingredients and the second being the incorporation of these active ingredients into formulations suitable for use as pesticides. In Canada, with some notable exceptions, there has been very little development and production of active ingredients. Manufacturing activity for the most part is limited to mixing the active ingredient with other chemicals to create formulations that are ready for use.

In 1988, the industry consisted of 15 establishments. These establishments employed a total of 1 140 people. Industry shipments were valued at $276.2 million (Figure 1). Exports, consisting mainly of one or two products, totalled $28.3 million (10.2 percent of shipments) while imports totalled $252.3 million and accounted for 50.4 percent of the Canadian market.

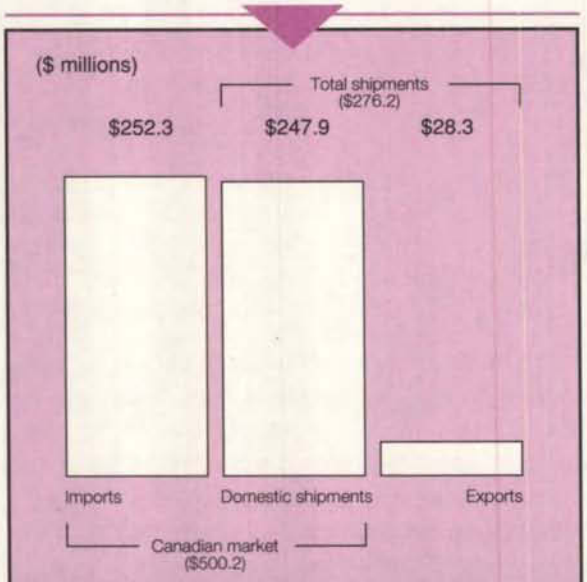

Figure 1 — Imports, Exports and Domestic Shipments, 1988

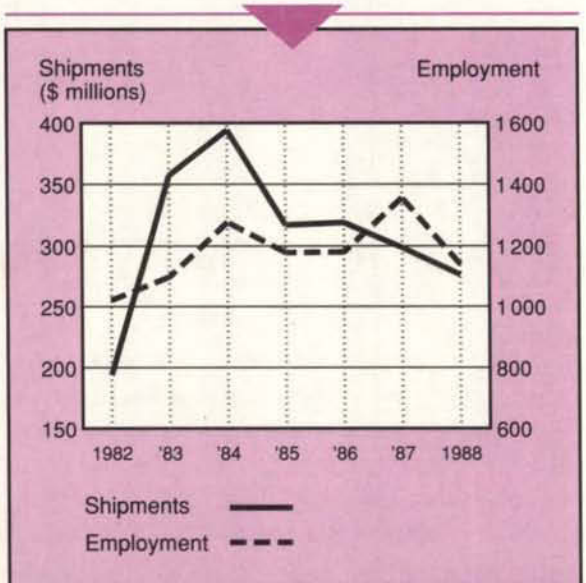

Figure 2 — Total Shipments and Employment

The industry through its association, the Crop Protection Institute of Canada, produces its own statistical survey based on retail sales of pest control products. While the details of that survey are available only to participating companies, industry figures denote substantially larger market values than do Statistics Canada's figures. The industry estimates that the market for 1988 was valued at approximately $840 million at the retail sales level, for which herbicides made up 73.5 percent, insecticides 6.3 percent, home and garden products 4.9 percent and fungicides 3.7 percent; the remaining 11.6 percent was made up of various other markets such as growth regulants, fumigants, seed treatment products and industrial products. The survey shows the geographical breakdown of the total Canadian market based on retail sales value as 63.3 percent in Western Canada, 25.4 percent in Ontario, and 11.3 percent in Quebec and the Atlantic provinces.

Canada accounts for about 3 percent of the world pesticide market, which is valued at about U.S.$30 billion, compared with the U.S. share of about 30 percent. With some exceptions, Canadian firms, which are mainly subsidiaries of multinational enterprises based in the United States and Europe, are not positioned to compete in foreign markets.

The world pesticides industry is dominated by a relatively small number of producers supplying a large number of active ingredients. These firms are generally vertically integrated since they produce formulations as well as make the basic materials. Being large, integrated organizations, they are capable of utilizing various by-products. Their infrastructure serves their full range of activities including waste disposal systems and research and development (R&D). Entry barriers are substantial and the industry is highly concentrated. It is estimated that approximately 15 producers in the United States supply 40 percent of world requirements. This industry is highly dependent on agriculture, and the level of farm income is affected by drought, degree of infestation, grain prices and many other factors.

Most pesticides are used in many parts of the world. Since active ingredients are used in comparatively small quantities and can be shipped at relatively low cost per unit, there are few products for which individual markets in Canada are large enough to support economic manufacture. One or two plants can serve the total world market. Accordingly, the active ingredients in pesticides are extensively traded in world markets. Formulated products, on the other hand, tend to be designed for specific climate and crop conditions as well as application methods and are often manufactured for local markets.

A number of products are usually developed and marketed to control a particular pest or weed (for example, the control of wild oats in cereal crops). Seldom does any one chemical entity enjoy market dominance within a particular crop or pest market for many years before competitors successfully introduce a new product. For this reason, firms must engage in basic R&D and have large integrated chemical complexes with a broad product base in order to compete.

In Canada, almost all of the firms producing or marketing pest control products are subsidiaries of well-known multinationals, which often supply their subsidiary with

active ingredients as well as some finished products. Those companies engaged in the formulation of pesticides may also act as distributors for the parent as well as for other pesticide producers.

Some of the major suppliers to the Canadian market, such as BASF, Cyanamid, Du Pont and ICI, do not manufacture pesticides in Canada but act as distributors only. These firms are key players in the developing and marketing of products to meet Canadian conditions.

Performance

Shipments, imports and the size of the domestic market as well as employment have not shown consistent trends over the years (Figure 2). This phenomenon is directly related to the unpredictability of the market, the principal one being the cereal crops market in Western Canada. The Crop Protection Institute's survey suggests that the market grew at about 4.7 percent per year from 1982 to 1989.

Strengths and Weaknesses

Structural Factors

The crop pesticides industry is undergoing a global rationalization process. This is particularly the case for the production of active ingredients and for basic R&D activities. Canada, because of its relatively small market with duty-free access, has not been seen as an area of significant opportunity for either activity. Only two firms in Canada, Monsanto and Uniroyal Chemical, can be described as manufacturers of active ingredients, and both are generally competitive with counterparts in the United States.

Monsanto, in its plant at La Salle, Quebec, uses two precursor chemicals obtained from its U.S.-based facility to synthesize the active ingredient used in the production of herbicides sold under the "Roundup" and "Vision" trade names. Monsanto's decision to manufacture in Canada was primarily based on patent protection considerations. The Canadian facility has been upgraded since its initial start up to make it internationally competitive. With Canadian patent protection having expired at the end of 1990 and the resultant reduction in selling prices and profit margins, however, the Canadian facility could be affected.

The Uniroyal Chemical situation is different in that the products in question — fungicides for seed treatment — were developed at the company's Canadian laboratories, with some assistance from the National Research Council of Canada. Initially, production occurred only in Canada and the product was exported worldwide. Subsequently, a plant was located in the United States to serve that market, although Uniroyal Chemical's Canadian facility continues to export to other countries. The Canadian plant, which produces a number of other specialty chemicals, has been upgraded to increase the production capacity and to incorporate the latest technology available to it.

The limited production in Canada of formulated products is competitive, depending on the product and market size. For example, Hoechst has modern formulating facilities located in southern Saskatchewan near the U.S. border area where cereal crop production is concentrated. The control of weeds in cereal crops is the principal market for this firm's products. These facilities not only serve the Canadian market but also formulate products for distribution in the United States. On the other hand, ICI, because of the relatively small size of its Canadian market, chose to close its Stoney Creek, Ontario plant in late 1989 and to supply the Canadian market from its larger U.S. and European locations.

Trade-Related Factors

Historically, to reduce costs of production, many Canadian farm inputs, including pest control products, have been granted duty-free status. For active pesticide ingredients, although the Canadian tariff on pesticide products from countries having Most Favoured Nation (MFN) status is 12.5 percent, it has not been and is not now being applied. In contrast, Canada's trading partners apply duties of various rates to these products. For formulated pesticides, with the exception of small, packaged house and garden products in packages weighing three pounds (1.36 kilograms) or less, all classes are imported into Canada duty-free. In contrast, prior to implementation of the Canada-U.S. Free Trade Agreement (FTA) on 1 January 1989, the U.S. tariff rates for these products varied between 6.8 and 13.5 percent. As a result of the FTA, the U.S. tariffs on pesticides are to be eliminated by 1 January 1994. The current duty rate assessed by European Community (EC) countries is 7.6 percent.

Under conditions of effective tariff-free entry into Canada and the substantial tariff barriers to products entering other major markets, there has been little incentive to manufacture active ingredients and formulated products in Canada. Exceptions are those cases where the major components of formulations are available locally, thus making it advantageous to mix these products close to their intended markets. Hence, the industry prefers to operate on a worldwide scale by expanding production capacity within large protected markets to serve export markets, rather than by setting up local plants. Given the large volume of pesticides originating from the United States, removal of tariff inequities between the two countries under the FTA could provide opportunities for some manufacturing in Canada, when other factors are favourable.

The FTA also sets out rules applying to pesticides originating from a third country, specifying the levels of Canadian or American value-added that must take place in order for these products to qualify for inclusion under the FTA tariff reductions.

Technological Factors

With few exceptions, the Canadian pesticides industry does not develop its own technology. Because of the parent/subsidiary relationship, only limited R&D is carried out in Canada and that is confined to the testing of products developed elsewhere to assess their pesticidal effectiveness on Canadian crops under local conditions. New formulations may be developed but, with the exception of activity by Uniroyal Chemical, no new chemically active ingredients are now being developed in Canada.

Other Factors

The importation and sale of products used for the control of pests has been regulated in Canada since 1927. The *Pest Control Products Act*, administered by Agriculture Canada, was promulgated in 1939. Revisions to that statute and its regulations were made in 1972 and 1977. The *Pest Control Products Act* requires the registration of all pesticides imported, manufactured or offered for sale in Canada. This legislation regulates manufacturing premises, storage, distribution, display and use of pest control products. It also contains provisions related to protecting human health and wildlife and preserving forest, water and environmental quality, interlocking with other relevant provisions concerned with food and drugs as well as environmental protection. Product safety and efficacy are the prime considerations for product registration under both federal and provincial regulations.

The federal registration process has become a topic of considerable debate in recent years. Pesticide industry representatives have stated that the registration process in Canada is onerous and is having a negative effect on the pesticides industry as well as on user industries such as agriculture. They also believe that Canadian agriculture requires equal access to newly developed pesticides in order to be competitive.

An extensive review of the Canadian pesticide registration process undertaken in 1990 involved all of the parties concerned. A report expressing the points of view of the review team was the subject of public consultations, and final recommendations were made to the Minister of Agriculture early in 1991. At the time of writing, a decision by the federal government on these recommendations is imminent.

Evolving Environment

Increasing and maintaining the organic matter in the soil is a key objective for achieving sustainable agriculture. Crop-protection chemicals (pesticides) used in conjunction with summer-fallow and no-till or minimum-till farming decrease soil erosion, silting and salination and increase moisture retention.

The industry has always been a strong supporter of the concept of integrated pest management and sustainable agriculture. New, highly active, more efficient chemical products have lower toxicity and are much more environmentally friendly than earlier products. Research is also under way in the important area of biotechnology; however, much work must still be done in order for products of this technology to have a significant impact on crop protection.

The pesticides industry has embarked on a series of initiatives to promote responsible care and sustainable agriculture. The Crop Protection Institute of Canada has experts and committees on packaging and container disposal who are concentrating their efforts on meeting the commitment of the industry to reduce packaging waste by 50 percent by 1995.

New chemistry is resulting in more efficient products. New compounds are being developed that can be applied in grams per hectare rather than kilograms per hectare, thus sharply lowering the toxicological stress placed on the environment. New regulations, and the costs involved in meeting these regulations, are making some products commercially unattractive, leading to the removal of some products from the market. In addition, regulatory re-evaluation of older products will result in a reduction in the range of products available to users. The cost of bringing a product to market has risen dramatically in recent years. Recent data indicate that on average it takes eight years and U.S.$50 million to develop a pesticide commercially, compared with four years and U.S.$6 million in 1976.

These high development costs are affecting the make-up of this industry internationally. In order to have sufficient critical mass to support costly R&D, significant consolidation has taken place over the past two years and will probably continue. For example, Sandoz purchased Velsicol, and it has recently been announced that Sandoz and Schering are merging their crop protection and animal health divisions. Du Pont has purchased Shell's U.S. pesticide business, Rhône-Poulenc has acquired Union Carbide's agrochemical units, Stauffer has been purchased by ICI, and Dow Chemical and Eli Lilly have recently announced that they are combining their agricultural chemical businesses under the name Dow Elanco. It has been

predicted that within 10 years perhaps only half a dozen firms will be involved in basic chemical pesticides research.

Biological pesticides, in combination with genetically engineered seeds and plants, have begun to have an impact on this industry. Projections indicate that by the year 2000 biological products could account for as much as 15 percent of this industry's output worldwide. R&D carried out by Canadian biotechnology firms on biological pest management includes work in the following areas: nematodes, yeasts, viruses, fungi and bacteria that attack certain insect pest species; plant varieties that are genetically altered to confer resistance to pests and frost; parasitic insects; pheromones (naturally produced chemicals) that disturb the biological processes of pest organisms; diagnostic kits for quick detection of pest species; and growth regulators for both insect and plant pest species.

Biological pest control options are different from their chemical competitors in that they generally are specific to a small number of species. They can often be produced economically through fermentation of micro-organisms and are generally non-toxic to higher organisms and the environment. Moreover, target pests are less likely to build up a resistance to biological controls.

Research involving the development of crop plants that have a high tolerance to herbicides is proceeding, and the results are promising.

In Canada, the advent of the FTA could have a positive impact on the pesticides industry. Some product mandating could result in Canadian production of additional active ingredients, and formulating facilities located adjacent to large U.S. markets could be expanded to accommodate part of these markets. However, given Canada's small tilled area relative to that in the United States (approximately 20 million hectares in Canada versus 138 million hectares in the United States), it is not likely that a major shift from U.S. to Canadian production will occur.

Regulations involving registration and use of pesticides will continue to affect the industry. Canadian regulations will have to be kept in line with those of other industrialized countries, particularly the United States.

At the time of writing, the Canadian and U.S. economies were showing signs of recovering from a recessionary period. During the recession, companies in the industry generally experienced reduced demand for their outputs, in addition to longer-term underlying pressures to adjust. In some cases, the cyclical pressures may have accelerated adjustments and restructuring. With the signs of recovery, though still uneven, the medium-term outlook will correspondingly improve. The overall impact on the industry will depend on the pace of the recovery.

Competitiveness Assessment

The Canadian pesticides industry primarily serves the Canadian market. Many firms are sales and service agents for their foreign parents. With the exception of seed-treating chemicals manufactured by Uniroyal and Monsanto's herbicide facilities, manufacturing activity in Canada consists mainly of formulating and packaging, mostly for products unique to the Canadian market or where the make-up of the formulations makes it more economical to manufacture close to the market.

The Canadian industry, though limited to few processes and products, is competitive in those areas where Canadian manufacture takes place. The FTA could result in increased investment in Canada, as the removal of U.S. tariffs makes manufacturing in Canada a more viable alternative.

For further information concerning the subject matter contained in this profile, contact

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PRINCIPAL STATISTICS[a]

	1982	1983	1984	1985	1986	1987	1988
Establishments	14	13	12	13	14	17	15
Employment	1 021	1 098	1 277	1 176	1 180	1 356	1 140
Shipments ($ millions)	194.4	357.2	393.5	317.1	318.6	298.3	276.2

[a]See *Chemical and Chemical Products Industries*, Statistics Canada Catalogue No. 46-250, annual (SIC 3729, other agricultural chemical industries).

TRADE STATISTICS[a]

	1982	1983	1984	1985	1986	1987	1988[b]
Exports ($ millions)	16.0	16.6	22.8	28.0	31.9	37.7	28.3
Domestic shipments ($ millions)	178.4	340.6	370.7	289.1	286.7	260.6	247.9
Imports ($ millions)	225.4	218.7	254.9	226.8	219.1	173.4	252.3
Canadian market ($ millions)	403.8	559.3	625.6	515.9	505.8	434.0	500.2
Exports (% of shipments)	8.2	4.6	5.8	8.8	10.0	12.6	10.2
Imports (% of Canadian market)	55.8	39.1	40.7	44.0	43.3	40.0	50.4

[a]See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly; and *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly.

[b]It is important to note the 1988 data are based on the Harmonized Commodity Description and Coding System (HS). Prior to 1988, the shipments, exports and imports data were classified using the Industrial Commodity Classification (ICC), the Export Commodity Classification (XCC) and the Canadian International Trade Classification (CITC), respectively. Although the data are shown as a continuous historical series, users are reminded that HS and previous classifications are not fully compatible. Therefore, changes in the 1988 levels reflect not only changes in shipment, export and import trends, but also changes in the classification systems. It is impossible to assess with any degree of precision the respective contribution of each of these two factors to the total reported changes in 1988 levels.

SOURCES OF IMPORTS[a] (% of total value)

	1984	1985	1986	1987	1988
United States	82.4	70.0	72.8	75.7	73.9
European Community	9.7	12.4	11.8	17.5	14.3
Asia	6.9	13.9	12.2	2.7	9.6
Other	1.0	3.7	3.2	4.1	2.2

[a]See *Imports by Commodity*, Statistics Canada Catalogue No. 65-007, monthly.

DESTINATIONS OF EXPORTS[a] (% of total value)

	1984	1985	1986	1987	1988
United States	68.3	79.6	63.9	65.1	75.1
European Community	22.8	14.3	27.3	27.9	17.2
Asia	7.9	5.0	8.8	7.0	6.2
Other	1.0	1.1	–	–	1.5

[a]See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly.

REGIONAL DISTRIBUTION[a] (average over the period 1986 to 1988)

	Atlantic	Quebec	Ontario	Prairies	British Columbia
Establishments (% of total)	–	6.5	37.0	56.5	–
Employment (% of total)	–	X	46.7	X	–
Shipments (% of total)	–	X	41.6	X	–

[a]See *Chemical and Chemical Products Industries*, Statistics Canada Catalogue No. 46-250, annual.

X: confidential

MAJOR FIRMS

Name	Country of ownership	Location of major plants
BASF Canada Inc.	Germany	D
Chemagro Limited	Germany	Concord, Ontario
Ciba-Geigy Canada Ltd.	Switzerland	Cambridge, Ontario
Cyanamid Canada Inc.	United States	D
Dow Elanco Canada Inc.	United States	Fort Saskatchewan, Alberta
Du Pont Canada Inc.	United States	D
Hoechst Canada Inc.	Germany	Regina, Saskatchewan
ICI Canada Inc.	United Kingdom	D
Interprovincial Cooperative Limited	Canada	Winnipeg, Manitoba

D: distributor only, with no Canadian facilities for the production of pesticides

(continued)

MAJOR FIRMS (continued)

Name	Country of ownership	Location of major plants
Later Chemicals Ltd.	United States	Richmond, British Columbia
Monsanto Canada Inc.	United States	La Salle, Quebec
Plant Products Co. Ltd.	Canada	Bramalea, Ontario
Rhône-Poulenc Canada Inc.	France	Calgary, Alberta
Rohm and Haas Canada Inc.	United States	West Hill, Ontario
Sandoz Canada Inc.	Switzerland	Port Perry, Ontario
Uniroyal Chemical Ltd.	United States	Elmira, Ontario
United Agri Products	United States	D

D: distributor only, with no Canadian facilities for the production of pesticides

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