INSECTICIDE DEVELOPMENT IN CANADA

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The development of insecticides in Canada has become increasingly difficult due to the weight of escalating costs of registration on small market size and price competitiveness of existing products. Recent changes in registration have made this problem more acute, as Canada has the distinction of being the most difficult country in which to register pesticides. This has placed greater emphasis on pursuing insecticides of maximum possible market penetration.

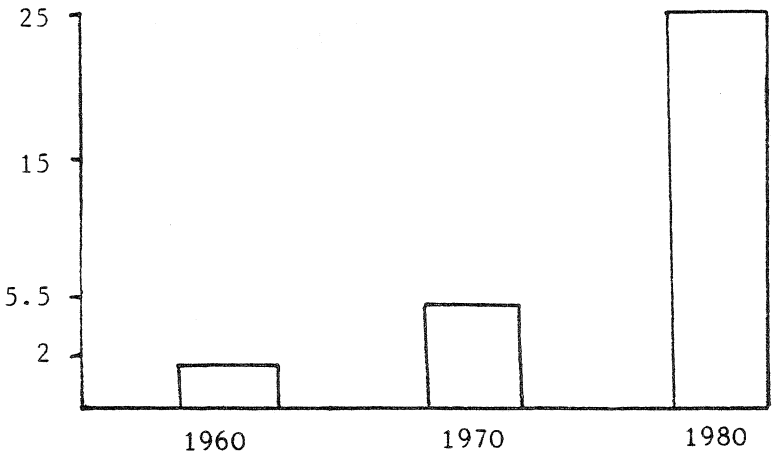
In Canada, the requirements for the registration submission of a pesticide are divided into 8 major parts (Table 1). Residue, environmental, and efficacy tests have to be done in Canada with tests in the other categories accepted if they meet registration guidelines. These other studies generally are done in laboratories located at the company's parent plant. In Canada specific studies on toxicological and environmental concerns are also required. For insecticides, these studies extend into concerns associated with application. Registration for aerial application for example has to include studies on potential environmental effects of pesticide drift. These added studies reflect the increasing impact of environmental tests on registration--a product of Canada's large and diverse geography. Delays imposed by these additional studies have had a greater effect on insecticides, as many important pest markets rely solely on aerial application; i.e., Bertha armyworm in rapeseed.

Table 1. Data required for a pesticide submission.

1. Label
2. Product Chemistry
3. Toxicology
4. Metabolism Studies
5. Food, Feed and Tobacco Residue Studies
6. Environmental Chemistry
7. Environmental Toxicology
8. Efficacy

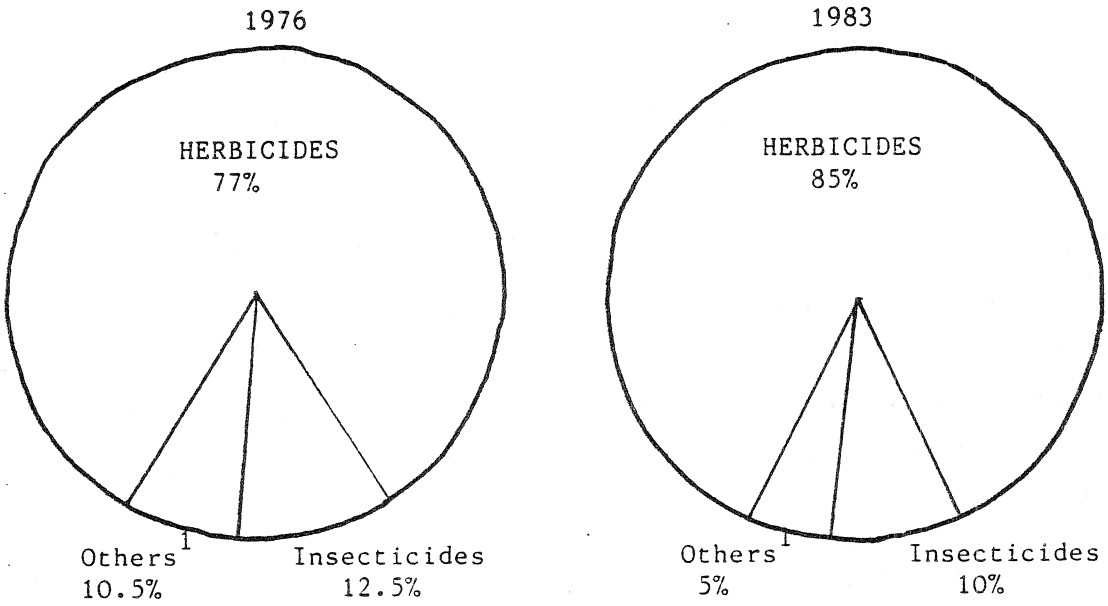
Fulfilling all registration requirements in Canada has become a very expensive undertaking. High rates of inflation in recent years, coupled with the proliferation of registration studies, has increased the costs of developing an insecticide to 25 million dollars (Graph 1). With insecticides occupying a decreasing share of the pesticide market--10% in 1982 and dropping due to the expansion in herbicide use (Graph 2), and registrations of new compounds since 1980 being limited to agriculture, the pursuance in Canada of new insecticides is becoming increasingly difficult (Table 2).

GRAPH 1. Increasing costs of insecticide registration from 1960 to 1980[1].



[1] Production plant design and construction costs excluded.

GRAPH 2. Relative percentage of pesticide market share of pest control products in 1976 and 1983.



[1] Others refer mainly to fungicides, rodenticides, and mollusicides.

TABLE 2. Number of new insecticide registrations in Canada from 1961 - 1983[1]

YEARS	NUMBER OF INSECTICIDES REGISTERED
1961 - 1965	24
1966 - 1970	21
1971 - 1975	14
1976 - 1980	15
1981 - 1983	3

[1] From Agriculture Canada Plant Products and Quarantine Directorate and Scientific Information Retrival Section

Faced with these problems, added importance is placed on the suitability of the product to be used in as many markets as possible. With rising costs, the development of a product for 1 market has become outdated. To be suitable for use in many markets requires a product with a broad spectrum of activity. At the pest management level, this places more emphasis on selectivity in time of application rather than selectivity in product of application.

In order to be successful in achieving maximum market use, an extensive efficacy and residue program in Canada is critical. Since the development of new insecticides are not done with Canada in mind but for use in crops such as cotton and tobacco, new insecticides tested in Canada often already are registered in other countries. Determinations of potentially Canadian markets is made easier by equating market similarities. Also, much of the time-consuming toxicological studies have been completed, leaving mostly environmental, residue and efficacy studies to do. Identifying and coordinating the studies needed is then needed to minimize the time lag between initial testing and registration. In Canada at least two years of testing at source sites are required for which rates, methods and times of application have been established and performance has been consistent. As a result, the benefits of an effective efficacy program on the success of an insecticide in the marketplace can be categorized in three ways:

A) Widespread testing determines market potential.

Success in many areas of pest control open the possibility of not only maximum use, but also of more competitive pricing. An establishing of a wide use pattern improves a product's acceptance at the distributor level. Inventory concerns are lessened and market stability is increased through reduced reliance on periodic pest outbreaks. An expanded label opens greater opportunities through price competitiveness. In the area of pest control, insecticides are one of the most affordable of all con-

trol measures. Being able to price competitively with older established products is easier if its potential in important markets such as grasshopper or flea beetle control are known.

B) Rapid and orderly testing hastens product introduction into the marketplace.

Years "lost" in research can quickly make a product unprofitable. In Canada, multi-million dollar investments in the pesticide market are tied to 17 year marketing patents. The beginning of the patent life usually coincides with the initiation of widespread insecticide testing. Coordinating testing at the government and industry levels is important in hastening the product introduction, since, despite a wide diversity in market testing, only 1 or 2 research personnel conduct tests in specific markets.

C) Thorough testing can extend market duration.

In many crops, programs have been established in which a number of insecticides are recommended at different times for different pests. Determining where the product is most suitable in that program can reduce potential problems such as pesticide resistance. Although this is not a primary concern in most of the larger markets, localized markets such as the Colorado potato beetle in Quebec and the tentiform leaf miner in Ontario have been lost due to continued use of a single product line.

In conclusion, the inherent problems of small market size in Canada and added registration requirements and costs of development can best be overcome through efficient, widespread testing of the insecticide to quickly determine its maximum market suitability. Since most insecticides developed in Canada already have a defined control spectrum in other countries, preliminary evaluations of its possible Canadian use patterns can be made. Efficient efficacy testing can then improve the product's chances of success by maximizing market determination, speeding market introduction, and assuring proper product incorporation into the marketplace to enhance market duration.