

# **Integrated Pest Management**

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## **Comprehensive Survey of Pesticide Use in British Columbia: 1991**

### **Summary**

In 1991, the Pesticide Management Program of the Ministry of Environment, Lands and Parks (now called Ministry of Environment) established the objective of reducing pesticide use and promoting the adoption of integrated pest management methods in the province. To measure the effectiveness of this initiative, it is necessary to know how much pesticide is presently being used. Therefore, in the first comprehensive study of its kind in Canada, the Pesticide Management Program, with funding support from Environment Canada, contracted Norecol Environmental Consultants Ltd. to produce a detailed picture of 1991 pesticide use. This is the first of a series of studies that will be conducted periodically to update the database and identify changes in pesticide use. The following excerpts outline the scope of the project and summarize the major results.

### **Methods**

The study encompassed all pesticides labelled as Restricted, Commercial or Domestic according to the provincial Pesticide Control Act Regulation. A pesticide is defined as an organism or material that is used to prevent, destroy, repel or mitigate a pest; this includes insecticides, herbicides, fungicides, rodenticides, anti-microbial chemicals and other controls. Anti-microbials included in this study were wood preservatives, anti-sapstain chemicals (used to prevent the growth of sapstain fungi on lumber) and slimicides (used to control microbial growth in paper making and cooling towers). Some pesticides listed as Exempted under the provincial Pesticide Control Act Regulation were also included, such as flea control products sold by veterinarians, domestic wood preservatives and botanical pesticides. Other Exempted chemicals, however, such as insect and animal repellents, mothballs, cleansers, and swimming pool chemicals were not within the scope of the study.

The contractor compiled the 1991 annual sales records from all licensed pesticide vendors and the annual summaries from all licensed pest control services in the province. Vendors of anti-sapstain chemicals, slimicides and pesticides labelled as Domestic products, who do not file annual sales summaries, were asked to provide sales figures voluntarily and most of them complied.

Wood preservative plants in the province were also surveyed and all plants in operation in 1991 provided the requested information. The figures for pesticides used under permit in the province were available from a computerized database. Pesticide quantities are reported by weight of the active ingredient, by region (regional boundaries used by BC Environment) and by sector of use (such as in agriculture, forestry, landscapes, domestic, wood preservation, etc.).

## Results

The study found that in 1991, British Columbians purchased or used pesticide products containing 274 different active ingredients; the total weight of these active ingredients was 5,039,977 kg. Twenty active ingredients accounted for about 90% of the pesticide use, by weight, in the province.

Anti-microbial chemicals, including wood preservatives, anti-sapstain chemicals and slimicide ingredients were the most used pesticides (representing 79.5% of the total). About 78% (3,928,455 kg) of all pesticides sold or used were commercially applied wood preservatives and anti-sapstain chemicals. Creosote alone accounted for 33% of the weight of active ingredients found in the study.

When wood treatment chemicals and slimicides are excluded, more than a third (36%) of the total pesticides used were herbicides and just under a third (31%) were insecticides. Fungicides comprised 18%, with all other classes of pesticides combined making up the remaining 15%.

## Agriculture

Agricultural pesticides applied by farmers to their own fields accounted for 13.7% of the total pesticide use (688,592 kg). When wood treatment chemicals and slimicides are excluded, however, pesticides used privately in agricultural accounted for 71% of the pesticide sales. Another 5% of pesticides was applied to farms by commercial pest control services, therefore 76% of pesticide active ingredients, excluding wood treatments and slimicides, were used in agriculture throughout the province.

Although several hundred active ingredients were sold, eight active ingredients accounted for more than half of the total weight of pesticides sold for agricultural use. These were insecticidal mineral oil (mainly dormant oil) and herbicidal mineral oil, followed by glyphosate (a herbicide), mancozeb,

sulphur, captan, metiram (all fungicides) and ethalfluralin (a herbicide). Just 23 active ingredients comprised over 75% of the total agricultural use.

The breakdown of the data clearly showed a regional pattern of pesticide use. For example, the herbicides ethalfluralin and triallate used in field crops accounted for half of the weight of pesticide active ingredients sold in the Peace Liard region.

## Forestry

Forestry was the next largest sector of pesticide use, comprising 8% by weight, excluding wood treatment chemicals and slimicides. The herbicide glyphosate, used in forest management, was the most widely used chemical ([Figure](#)), comprising 87% of active ingredients applied.

*Bacillus thuringiensis*, which is used to control caterpillars that feed on foliage accounted for 11% of pesticide use; the herbicide 2, 4-D accounted for 1% of use.

## Landscapes

Insecticidal mineral oil accounted for a third (33%) of all pesticide use in parks and municipal landscapes (this does not include home and garden products used by private individuals). The herbicide active ingredients glyphosate, borax, 2,4-D, atrazine and mecoprop combined accounted for another third of the total. The insecticide diazinon accounted for 5% of the use; the remainder included 103 other active ingredients.

## Home and Garden

About 92,455 kg of domestic pesticides (including wood preservatives for home use) were tallied in this study. This was about 1.8% of all pesticides or about 4% of pesticides excluding commercial wood treatment chemicals and slimicides. The most used pesticides in the domestic sector were borax (an ingredient in a soil sterilant), the insecticides diazinon, carbaryl, malathion and mineral oil, the

herbicides 2,4-D and mecoprop and the fungicide sulphur ([Figure](#)). Asphalt solids, the main component of pruning paste was high on the list due to its great weight (like mineral oil and creosote, most of the contents of the container are active ingredients).

## Mosquito and Biting Flies

Nearly all (95%) of the insecticide used to control mosquitoes was *Bacillus thuringiensis israelensis*, a biological insecticide registered for control of mosquito and black fly larvae.

## Product Fumigation

About 19,582 kg of active ingredients were used to fumigate products in 1991. Over 99% of this was methyl bromide and less than 1% was aluminum phosphide. Most of the use was recorded in the Lower Mainland, where it is largely used to fumigate cargo ships.

## Structural Pests

About 93% of the pesticides used in controlling structural pests, such as cockroaches, fleas and carpenter ants was made up of four insecticides: malathion (44%), diazinon (29%), chlorpyrifos (12%) and bendiocarb (8%).

**Figure 1**

