CURRENT RESEARCH INTO HEALTH EFFECTS OF HERBICIDES AND OTHER AGRICULTURAL PESTICIDES

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Summary. A long-term study of W.A. cereal producers is being conducted to determine if exposure to herbicides or other pesticides is associated with excess risk of cancer or other chronic diseases. Base-line data on herbicide usage and other farm practices has been collected. The health status of cereal farmers and their families is being evaluated to determine if there are associations between farming practices and herbicide usage.

INTRODUCTION

There is considerable concern in the agricultural community about possible long-term adverse health effects of herbicides and other agricultural pesticides.

For efficient weed and pest control, the herbicides and other pesticides are designed to be biologically active. Many of these chemicals are moderately toxic and short-term effects on health following exposure have been documented. Numerous agricultural workers can relate episodes of accidental exposure to agricultural pesticides that resulted in acute illness.

The Agent Orange issue in Vietnam has lead to suggestions that exposure to phenoxy herbicides may result in cancer, mental impairment, or congenital birth defects. A series of studies conducted in Sweden have suggested that the use of some herbicides may be linked to excessive risk of cancer and chronic disease (1-5).

Since the 1940's there have been dramatic changes in agricultural methods from traditional tillage to the increased use of pre and post-emergence herbicides. With this has come the risk of exposure to herbicides and possible long-term adverse health effects. Causes of death among agricultural workers have been studied extensively in the U.S.A. Excessive levels of leukemia, lymphatic cancers, and other diseases were found among agricultural workers when compared to deaths for other occupational groups (6).

Individually, none of the previous studies have conclusively found that long-term health effects are caused by exposure to herbicides or other agricultural pesticides. However, taken as a whole, these studies suggest that it would be prudent to fully investigate the use of herbicides by agricultural workers. The overall aim of this study is to determine if any long-term health effects are associated with herbicide use, and to identify the nature of the effects and magnitude of the risk they present to farmers.

METHODS

The study commenced in 1984 with the surveying of 7,000 cereal farmers in Western Australia to collect information on herbicide usage and farming practices. In 1985, a second survey of 2,800 participating cereal farmers was conducted to provide base-line data on the health status of each farmer and his family. The study has been designed to be conducted over a long period of time. In 1989 each farmer and his family are to be re-surveyed to re-evaluate their health and measure changes in health during the five year period, 1985-1989.

If exposure to herbicides or other agricultural pesticides is a risk factor for cancers, or other chronic diseases, an elevated rate should be found among those farmers who are exposed to high amounts of herbicides, or other pesticides. Analysis will be undertaken to determine if there are elevated disease rates among particularly high users of herbicides as compared to low users of herbicides for the five year period.

The strength of the study design is that cereal farmers are compared to cereal farmers rather than to people in other occupations, or the population as a whole, and that information on herbicide usage and farm practices was collected before health patterns were evaluated, so reducing information bias.

The first phase of the study involved the 1984 herbicide usage survey. The aims of the survey were:

1. To collect base-line data on patterns of herbicide usage to identify (a) high, (b) moderate, and (c) low usage farmers.
2. To collect data on the usage of other agricultural pesticides to identify usage of other chemicals that may have an adverse effect on health and possible influence an association with herbicide usage.
3. To collect information on farm practices to identify (a) users of protective equipment, and (b) identify types of equipment and vehicles used for mixing and spraying.

PRELIMINARY RESULTS

Of the farmers surveyed, 89% use herbicides and the remaining 11% did not use herbicides. Of the cereal farmers, 37% used contractors for some or all of their spraying.

The most popular herbicides were those containing paraquat (64% of farmers), followed by diclofop-methyl (46%), chlorsulfuron (36%), 2,4-D amine (36%) and dicamba/MCPA/bromoxynil mixtures (30%). The majority of farmers were pouring their herbicides by hand and top filling their boom sprays, and only approximately 30% were using bottom filling siphon/verturi systems. The type of filling system plays a major role in potential for exposure during mixing of concentrates. Most cereal farmers were also using other agricultural pesticides including insecticides (31%), seed pickle and dressings (55%), sheep dips, sprays, pour-ons, etc (82%) and rodent poisons (36%).

Farmers have been divided into exposure categories based upon the amounts of herbicides used and use of protective equipment during mixing and applying.

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