

Introduction

Products Listed in This Book

This book lists products that are registered for use on greenhouse vegetables, and contains registrations obtained up to September 2019. Products are listed according to pest for each greenhouse vegetable crop.

Information within the tables is based on labels approved by the Pest Management Regulatory Agency and is included so that growers can consider options when implementing their pest management programs.

When selecting a product to use, growers should consider several factors, including compatibility with beneficial insects, safety to the user, pre-harvest and re-entry intervals (also referred to as restricted entry intervals or REI) and resistance management.

Integrated Pest Management

Integrated pest management (IPM) is a pest control philosophy that uses all available management strategies to keep populations of harmful pests below an economic injury level. It does not advocate relying on pesticide spray programs to “eradicate” pests. Instead, it promotes the integration of cultural, physical, biological and chemical management strategies.

There are several reasons to reduce the unnecessary use of pesticides in greenhouses. First, overapplication or misapplication of pesticides can lead to concerns over environmental pollution and ground water contamination. Second, pests can develop resistance to pesticides. Developing and registering new pesticides takes significant time and resources. It is essential to use available pesticides minimally and efficiently to reduce the development of resistance in pests. The best approach to slowing down the development of resistance is using a combination of management strategies, reserving pesticides as a last resort. Finally, the potential exposure of applicators and workers to pesticides and pesticide residues in greenhouses requires a critical evaluation of frequency of use and pesticide safety during application.

Resistance Management Strategies

Different pesticides control pests in different ways. This is called the mode of action. Pesticides are grouped into chemical families/groups based on their mode of action.

Using the same pesticide with the same mode of action season after season or several times within the same season could result in the target pest becoming resistant to the chemical family.

A pest can develop resistance to one chemical family but still be very susceptible to another. Therefore, to reduce the risk of a pest developing resistance, use the following strategies:

- Avoid repeated use of pesticides from the same chemical subgroup (indicated by the IRAC and FRAC Mode of Action Group number — see Appendix D and Appendix E).
- For insecticides, rotate between chemical groups/families. Use products within one group only for the duration of one generation of the target insect before switching to another group for the following generation.
- Only use pesticides when necessary and integrate them as much as possible with other management strategies in an Integrated Pest Management (IPM) program.

For example, to manage insect and mite pests, major strategies should include crop monitoring and biological control.

Cultural controls such as sanitation and mass trapping should also be considered to minimize pesticide use and thereby reduce the risk of a pest developing resistance to a pesticide.

To manage diseases, major strategies should include sanitation, maintaining optimum levels of moisture and nutrients in the growing media and manipulation of environmental parameters (e.g., relative humidity and temperature) to minimize conditions that favour development of disease. For further details on insect pests, mite pests and diseases, as well as IPM strategies for managing them, see OMAFRA Publication 836, *Growing Greenhouse Vegetables in Ontario*.

- Do not exceed the total number of applications allowed per year for each product. Do not apply the product at rates lower than the recommended rate on the label.
- Monitor recently treated pest populations for signs of resistance.
- See the pesticide label for more information on resistance management. For more information on resistance management strategies or IPM options for a specific pest, contact your local OMAFRA specialist or IPM consultant.