



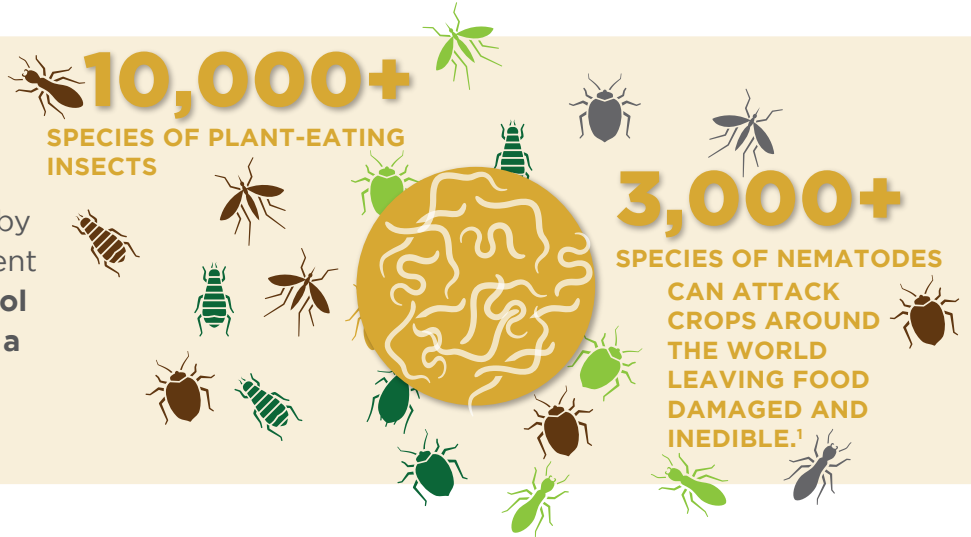
FACT SHEET | INSECTICIDE RESISTANCE MANAGEMENT



INSECTICIDES | IMPORTANT TOOLS FOR PREVENTING AND MANAGING INSECT PESTS

WHAT ARE INSECTICIDES?

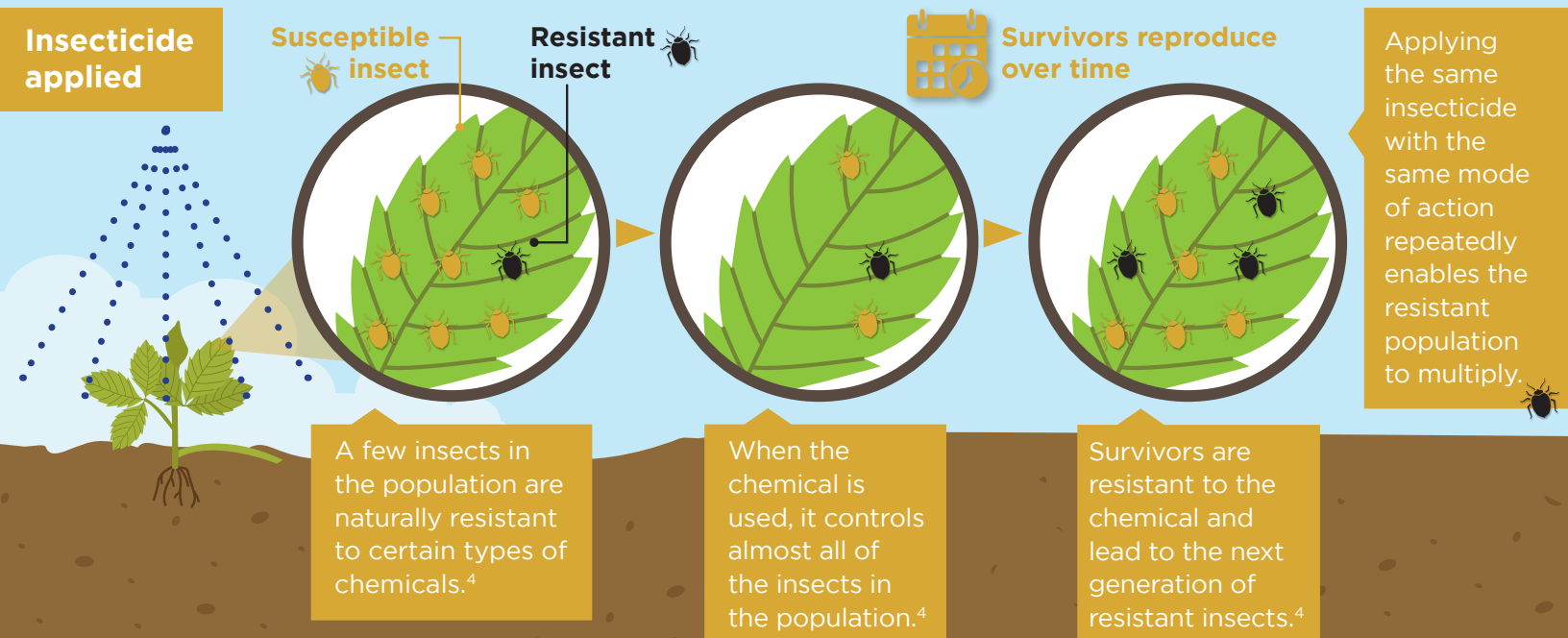
Insecticides are valuable tools used by farmers that can contribute to efficient food production because they **control insects and arthropods that reduce a crop's yield and quality.**



While insecticides are among the most efficient tools for controlling pest populations,² all farmers are challenged by the fact that every insect control method has a limited life span because pests naturally evolve and become resistant.

HOW DOES INSECTICIDE RESISTANCE EVOLVE?

The more frequently farmers use insecticides with the same active ingredient, the more likely resistance will occur. Certain factors, such as using the insecticide in an enclosed area (e.g. greenhouse), can also increase the risk of resistance.³





MANAGING INSECTICIDE RESISTANCE

The plant science industry works with farmers, advisors and academia to provide guidance and tools that help them manage resistance on the farm.

Q & A

Q. What are the benefits of insect resistance management? (IRM)

A. IRM is important to maintain insecticide effectiveness, which is vital to an abundant and affordable food supply. IRM saves farmers time, effort and money as there is a reduced need to repeat applications in the field. In the United States alone, insecticide resistance is estimated to cost \$40 million in additional treatment costs or alternative controls.¹

\$40 M

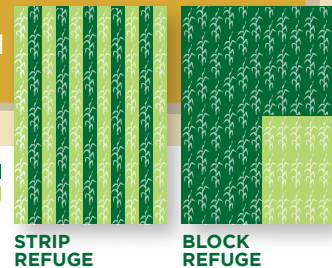
INSECTICIDE RESISTANCE IN THE U.S. COSTS

Q. Is it possible to prevent or delay insecticide resistance?

A. Yes, an integrated approach to managing insects using a range of tools can prevent or delay resistance. Effective integrated pest management programs include the use of synthetic insecticides, biological insecticides, beneficial arthropods, cultural practices, crop rotation and pest-resistant crop varieties.²

Q. How is resistance managed in biotech crops?

A. A refuge involves planting a specified proportion of a crop without the biotech trait to prevent future generations of pests from building immunity, since a small and controlled population of insects without resistance are always present. Farmers need to consider a number of factors, including agronomic characteristics of the crop and compatibility with integrated pest management strategies⁵ when choosing the refuge that best suits their crops. Pictured below are a couple of examples of types of refuges.



Biotech crop ■
Non-biotech crop ■

SOURCES

¹ croplife.org

² irac-online.org

³ pesticidestewardship.org

⁴ frac.info

⁵ excellencethroughstewardship.org



The Insecticide Resistance Action Committee (IRAC), a specialist technical group of CropLife International, works to provide a coordinated industry response to prevent or delay the development of resistance in insects and mites. For more information, visit irac-online.org.