

Pesticide Use Training and Certification

Executive Summary

Pesticides are substances primarily used in agriculture to control pests, including insects, weeds, fungus, bacteria, and more. Pesticides can have negative impacts on health, safety, and environmental quality, especially when used improperly. Training is needed to improve safe handling practices. SB 491 and HB 1125 clarify that restricted use pesticides cannot be used without training and updates statute to be in accordance with EPA rules on pesticide applicator certification and licensure.

Highlights

- Pesticides cover a broad range of chemicals that can help reduce crop loss.
- Some pesticides pose risks to health (especially agricultural workers), the environment, and agriculture (through pest resistance and harm to non-target crops and insects).
- Research shows pesticide applicators may lack some key knowledge on certain pesticides, and training can improve safe practices.

Limitations

- Health, safety, and environmental impacts for some pesticides are not as well understood as others, especially for newer generations of pesticides (e.g., sulfoxaflor, cyantraniliprole, chlorantraniliprole, dicamba).

Pesticide Use and Impacts

Pesticides are chemicals used to control pests, including weeds, insects, rodents, fungi and bacteria. Beyond pesticides, other strategies can control pests, such as crop rotation, physical traps, natural predators, and genetically resistant plants.¹ Pesticides are primarily used in agriculture, where it is estimated that lacking any type of pest control (including non-pesticide options), would result in crop yield losses of 24 to 57%.² Since 1970, U.S. farmers have used over 500 active pesticide ingredients.³ These chemicals have a wide range of modes of action and toxicity, ranging from extremely hazardous in small doses to those that are unlikely to cause harm from acute exposure.⁴

Pesticides can have a variety of negative impacts on human health. Exposure to pesticides is associated with numerous potential health impacts, including increased risk of cancers,⁵ respiratory illnesses (asthma, COPD),⁶⁻⁸ cardiovascular disease,^{9,10} and reproductive effects.^{11,12} Pesticide exposure can occur directly through contact, inhalation, from well water, or consumption of residues on food. Farmers and other pesticide applicators face risk for acute exposure. Data from the National Institute for Occupational Safety and Health (NIOSH) from 12 states between 2007 and 2011 indicate that rates of pesticide injury and illness are at least 37% higher for agricultural workers than non-agricultural workers.¹³

Pesticides in the environment can also have negative impacts on agriculture and the environment. Pesticides can be transferred through the air (volatilization), water (runoff), soil

(leaching), and taken up by plants and animals (absorbed).¹⁴ Insects, plants, and fungi can develop resistance to pesticides, and over 580 insect species are resistant to one or more pesticides.¹⁵ Crop losses due to pesticide resistance are estimated to be \$1.5 billion per year in the United States.¹⁶ Pesticides can also kill susceptible and valuable non-targeted species. For example, synthetic auxin herbicides like 2,4-D and dicamba can damage soybeans, cotton, and grapes.¹⁷ Likewise, insecticides can either have direct or environmentally accumulated negative impacts on populations of insects that perform pollination or are natural predators of pests.¹⁸ Costs of colony losses, honey loss, and pollination services lost is estimated at \$210 million per year in the U.S.¹⁶ As pesticides move through the environment, they can also impact wildlife populations, including fish, birds, and mammals.

Training in Pesticide Use

Some evidence indicates that gaps in knowledge related to safe pesticide handling can be improved through training. A survey of Greek farmers found that farmers trained to work with pesticides had higher knowledge of risks and were more likely to practice safe behavior such as checking their equipment prior to spraying, using gloves, and showering after pesticide application.¹⁹

In Missouri, researchers surveyed both commercial and non-commercial pesticide applicators on the herbicides dicamba and 2,4-D which have been of high concern for their potential to spread and damage other crops. The survey identified gaps in knowledge on conditions that contribute to herbicide contamination, such as methods for cleaning spray equipment, temperature inversions (when herbicide stays suspended in the air rather than reaching plants), and volatility. While most applicators were aware that high temperatures contribute to volatilization, fewer indicated awareness of the vapor pressure of the pesticide as another important factor.¹⁷ Researchers also found differences between commercial and non-commercial applicator practices, such as how commercial applicators rely on more accurate methods of checking wind speeds prior to spraying.¹⁷

Pesticide Regulation

Pesticides are currently regulated by the Environmental Protection Agency (EPA) at the federal level, under the authority from the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). This act classifies pesticides for general use or restricted use, and restricted use pesticides may only be applied by certified applicators. At the state level, the Missouri Department of Agriculture Pesticide Program oversees the Missouri Pesticide Use Act (281.005 - 281.180 RSMo & 2 CSR 70-25) which includes licensing and certification requirements for applicators, technicians, dealers, and operators. In 2017, EPA finalized updated requirements for states regarding licensure and certification.²⁰ SB491 and HB1125 would satisfy these requirements. If Missouri is not in compliance with EPA regulations, under FIFRA the EPA can assume authority in issuing licenses, training and certification in Missouri.

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