

INTEGRATED PEST MANAGEMENT FOR TURFGRASS AREAS

SportsTurf
MANAGERS ASSOCIATION

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SAFE
The Foundation for Safer Athletic Fields



Pesticides are a small part of a complete turf program that is the key to safe fields. Public health and safety are always the sports turf managers top priority when maintaining athletic fields. Responsible managers combine mowing, fertilization, irrigation, and other cultural practices to maintain healthy, dense, uniform surfaces. Responsible sports turf managers utilize IPM practices on sports and recreational surfaces to create safe playing surfaces and reduce human exposure to pests and pesticides.

Removing pesticides alone will not make athletic fields automatically safe for children. In research conducted at University of Tennessee, a Tifway Bermudagrass field subjected to 15 games was compared to 15 simulated games on a crabgrass plot. Weeds and other pests can reduce playing surface strength and uniformity and lead to safety concerns. (1)



Tifway Bermudagrass After 15 Simulated Games



Large Crabgrass After 15 Simulated Games

Photo credits: James Brosnan, Ph.D. and John Sorochan, Ph.D.

Photos retrieved from Factors that Affect Dislodgeable Foliar Residues and Environmental Fate of Pesticides – Travis Gannon, Ph.D. – 2017 STMA Conference Presentation

Integrated Pest Management (IPM) is an approach to pest management that blends all available management techniques – nonchemical and chemical – into one strategy: Monitor pest problems, use nonchemical pest control, and resort to pesticides **ONLY** when pest damage exceeds an economic or aesthetic threshold. (2)

IPM is an environmentally friendly, common sense approach to controlling pests. Traditional pest control involves the routine application of pesticides. IPM, in contrast, focuses on pest prevention and only uses pesticides as needed. (2)

Every IPM program is designed based on the pest prevention goals and eradication needs of the situation. Successful IPM programs use a four-tiered implementation approach: Identify pests and monitor progress; set action thresholds; prevent; and control. (2)

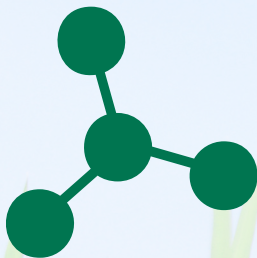


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IPM creates a safer and healthier environment by managing pests and reducing human exposure to pests and pesticides. IPM is an effective and environmentally-sensitive approach that offers a wide variety of tools to reduce contact with pests and exposure to pesticides. (2)

A common way to document toxicity is by oral LD₅₀ values. LD₅₀ is the amount of chemical required to provide a “lethal dose” to 50% of the test population. LD₅₀ is measured in mg of chemical administered per kg of body weight. Therefore, an oral LD₅₀ of 500 means that 500 mg of chemical was needed to obtain lethality in a 1 kg subject (such as a rabbit). The lower the LD₅₀ value, the less chemical that is required to reach lethality. A chemical with an LD₅₀ of 10 mg/kg is more acutely toxic than one with an LD₅₀ of 100 mg/kg. (3)



Herbicides often have a higher LD₅₀ value than many commonly used or consumed products. Herbicides target highly specific biological or biochemical processes within plants, such as photosynthesis and production of branch-chain amino acids. Because humans do not photosynthesize or produce branch-chain amino acids, there is no place for the herbicide to bind in a human body and therefore have very little impact. Because the herbicides do not bind in a human, they are often excreted within 24 hours of the dose. That flushing does not allow concentrations to build up to toxic levels in the body. (3)

Even though some pesticide products are considered only slightly toxic or relatively nontoxic, all pesticides can be hazardous to humans, animals, other organisms, and the environment if the instructions on the product label are not followed. Following the directions on the label for personal protective equipment (PPE) and restricted entry interval (REI) keeps applicators and the public safe. It is a violation of Federal law to use pesticide products in a manner inconsistent with the labeling. Applicators are legally responsible for any misuse of a pesticide. (4)



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The dose makes the poison. The lower the LD₅₀ of a pesticide product, the greater its toxicity to humans and animals. Pesticides with a high LD₅₀ are the least toxic to humans if used according to the directions on the product label. Compare the LD₅₀ of pesticides with some everyday chemicals.

LD₅₀ COMPARISON BETWEEN HOUSEHOLD ITEMS AND COMMON PESTICIDES	
CHEMICAL	LD₅₀
Nicotine	9
Paraquat (used to control broadleaf weeds and some grasses in agricultural crops)	~100
Caffeine	192
Bleach	192
Diazinon (used to control insects on fruit, vegetable, nut, and field crops)	300-400
Tylenol	338
Household ammonia (10%)	350
Carbaryl (used to control insects on trees and ornamentals, turfgrass, vegetable crops, rangeland, etc.)	500
2,4-D (used to control broadleaf weeds in agricultural crops, fruit and nut orchards, pastures, turfgrass, aquatic weeds, etc.)	666
Pyrethrum (used to control insects on ornamentals, flowering plants, and vegetables in gardens and greenhouses)	1500
Azoxystrobin (used to control fungal disease in a range of crops)	>2000
Table Salt	3000
Permethrin (used to control insects on fruits, vegetables, and trees. Also commonly used to prevent ticks)	>4000
Iprodione (used for the prevention and control of certain diseases of turfgrass and ornamentals)	>4400
Glyphosate - commonly known as Roundup (used for control of annual and perennial weeds and woody plants)	4900
Imazaquin (used to control weeds on established Bermudagrass, centipedegrass, St. Augustinegrass, seashore paspalum, and zoysiagrass in commercial and residential situations)	>5000
Chlorothalonil (used to control fungal diseases in trees, turfgrass, and ornamentals)	>10,000

Sources

- 1 - Factors that Affect Dislodgeable Foliar Residues and Environmental Fate of Pesticides - Travis Gannon, Ph.D. - 2017 STMA Conference Presentation
- 2 - Environmental Protection Agency (EPA) - Introduction to Integrated Pest Management - <https://www.epa.gov/managing-pests-schools/introduction-integrated-pest-management>
- 3 - University of Florida - Herbicides: How Toxic Are They? - <http://edis.ifas.ufl.edu/pi170>
- 4 - Penn State University - Toxicity of Pesticides - <http://extension.psu.edu/pests/pesticide-education/applicators/fact-sheets/pesticide-safety/toxicity-of-pesticides>