



# Responsible Approaches to Pest and Weed Management

Green Industries of Colorado

The Green Industries of Colorado (GreenCO), an alliance of eight trade associations representing professionals in the horticulture and landscape industries, prepared this paper for policy makers, legislators, homeowner's association boards, developers, specifiers, homeowners and others charged with making decisions about the use of pesticides in the care and maintenance of Colorado landscapes. GreenCO wants to ensure that factual information is available to encourage informed decision making.

For clarification purposes, "pesticide" can refer to any substance that is made to control or prevent any pest, including weeds, insects, fungus, rodents and more. (Herbicides, insecticides, fungicides and rodenticides are all pesticides.) This includes man-made, or synthetic, products as well as products derived from naturally occurring chemicals in plants or other organisms.



## The Benefits of Healthy Landscapes

As outdoor enthusiasts, Coloradoans have created environments that foster an outdoor lifestyle. We actively use our yards, parks and playing fields for gardening, recreation, sports and just spending time outside. Consequently, the health and appearance of the plants and trees in our residential yards, parks, school grounds, common areas, businesses and town centers are important to us.

We also value outdoor spaces for aesthetic, environmental and economic reasons. Well-maintained, attractive and thriving landscapes not only enhance the quality of our personal lives, but they serve the ecosystem and add to the economic value of our properties.

## Landscapes Help the Environment



- Plants bring environmental benefits to urban areas. For example, the leaves of trees and other plants remove dust from the air and absorb other air pollutants—such as ozone, carbon monoxide, and sulfur dioxide.
- Trees take in carbon dioxide and produce oxygen. An average tree absorbs 26 lbs. of carbon dioxide from the air each year. Grass provides the same function. One tree or a 2,500-square foot lawn each release enough oxygen *each day* to supply a family of four.<sup>1</sup>
- Trees in cities mitigate rising temperatures by shading hot pavement and cutting energy consumption in buildings. The front lawns of eight houses have the cooling effect of about 70 tons of air conditioning. As a comparison, the average home has an air conditioner with just a three or four ton capacity.<sup>2</sup>
- Green spaces cleanse our water. When water is allowed to run through landscapes, it typically exits cleaner than when it entered, reduces storm water runoff and keeps pollutants out of ground water. In contrast, impervious surfaces like asphalt and concrete simply move water and the pollutants into the storm water system.



## Landscapes Provide Places to Play

- Thriving green spaces that are well-maintained create safer environments for people. Fields free of spiky “goat head” weeds and other hazards create a more enjoyable experience for our youth (and our bike tires). Well-maintained playing fields also reduce chance of injuries compared to bare surfaces.
- Healthy, properly pruned trees tend to break or crack less often in storms, thus reducing the hazard of falling limbs in parks, playgrounds and neighborhoods.
- Mature and healthy landscapes help control wind and water erosion, which in turn eliminate dust and mud problems around schools, homes and businesses.

<sup>1</sup> The Lawn Institute.

<sup>2</sup> The Lawn Institute.



## Landscapes Increase Property Values

- Attractive landscapes translate into the economic value of property in terms of the curb appeal that draws homebuyers, shoppers and other customers. Businesses with attractive and well-maintained landscapes enjoy more retail traffic, higher occupancy rates and reduced crime.
- According to the Professional Landcare Network, landscaping can add as much as 14 percent to the resale value of a building or home and speed up its sale by as much as 6 weeks.

## The Need for Proper Care and Maintenance

Even with native and other well-adapted plants in our landscapes, it is still an ongoing challenge to keep trees and other plants thriving in Colorado. High elevation, intense sunlight, often poor soil conditions and the semi-arid climate with temperatures that can change dramatically all combine to stress plants on a year-round basis.

To keep our plants thriving in spite of these factors requires ongoing and proper care that is driven by scientific research and knowledge. By studying plant physiology, horticulture, soil science, biology, pest management and entomology, we gain the knowledge that is then applied to caring for plants in ways that are most beneficial to them. Through this process of research and applied knowledge, we are able to sustain the landscaped environment and protect property values.

For example, trees that are pruned in a certain way are stronger and longer-lived. There are optimum heights for mowing lawns that make them healthier and more drought tolerant. And a healthy lawn that is properly fertilized, mowed and irrigated will typically out-compete most weeds, have fewer insect problems and avoid diseases, according to Thia Walker, Colorado State University Extension Specialist and Pesticide Safety Education.

By developing horticulturally-sound maintenance practices, experts know there is a direct connection between the health of well-maintained plants, trees and grasses and the judicious use of synthetic chemicals that promote plant health and protect them from diseases and pests.

Plants that are stressed through environmental or other factors lack the defenses to keep insects and diseases at bay. When pests take hold and reproduce, they are capable of killing trees and other plants and seriously eroding the quality of our landscapes. The outbreak of Mountain pine beetle kill in the high country is a grim reminder of the devastating impact of pests.

Our landscapes cannot thrive without proper care that sometimes includes treatments for weeds, pests and diseases. But with the heightened public scrutiny about the use of chemicals in our society, what is the real risk of using products that control pests and what is the best approach to using them?





*Japanese Beetle*



*Bronzed Cutworm*

## Integrated Pest Management

Alongside industry Best Management Practices, landscape professionals can provide their clients with the option of adopting an Integrated Pest Management (IPM) approach to caring for their landscapes. IPM is a sustainable approach to managing pests by combining a variety of strategies including biological, cultural, physical and chemical tools in a way that minimizes health and environmental risks. IPM also is site and pest specific.

Practicing IPM requires considering the best methods, including non-pesticide methods, to reduce or control pests. Identifying, understanding and monitoring the situation can help professionals identify the best strategy to address the problem. IPM can include modifying a habitat or changing procedures so pest damage is reduced and natural control is enhanced. Biological controls include predators, parasites and diseases that attack pests. Whenever possible, measures are taken to conserve naturally occurring populations.

IPM, however, does not mean that pesticides are not used. Biological control agents can be difficult to manage and are typically slow in controlling pest populations. With certain pests or when gaining control sooner rather than later is imperative, chemical control becomes part of the IPM strategy. And, federal law clearly defines IPM as including the use of pesticides: "Integrated Pest Management is a sustainable approach to maintaining pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks."<sup>3</sup> Excluding pesticides from IPM would deny an essential set of tools for controlling pests to those charged with maintaining and safeguarding our landscapes.

Within IPM, chemical control involves 1) selecting a pesticide effective against the pest with the lowest toxicity to humans and non-target organisms (including biological controls), and 2) using it in such a way as to prevent or minimize undesirable environmental effects. The lowest effective amount of pesticide is applied from carefully calibrated application equipment. Attempts to redefine IPM as a process that prohibits any pesticide use whatsoever – even when pests pose health risks – is not recommended by GreenCO.

## Risks of Using Pesticides

The Green Industry acknowledges that there are some people who are very concerned about the use of pesticides. Landscape professionals are equally concerned about protecting the public as well as the workers who come in contact with pesticide products.

Public concern about pesticide use is often well founded. The discovery of impacts from products that have been removed from the market underscore the need to be vigilant about the chemicals sold. Scott Phillips, M.D., F.A.C.P., F.A.C.M.T., who serves as associate clinical professor of medicine in the division of clinical pharmacology and toxicology at the University of Colorado Health Sciences Center and is an attending physician at the Rocky Mountain Poison Control Center, was consulted to provide the following toxicological medical information.

<sup>3</sup> 110 STAT. 1512 PUBLIC LAW 104-107, August 3, 1961

*There is no evidence that banning synthetic pesticides will improve public health and help prevent diseases. All chemicals, including natural chemicals, have the potential to cause harm if they are not properly handled.*

Dr. Phillips cautions that it is important to understand that exposure to a substance does not mean that a person will develop an illness. Substances cause health problems as a function of how much of a substance is in the body, and over what time period the exposure has occurred. For example, consuming a sip of wine on special occasions will not cause an illness, while consuming 10 drinks per day for 10 years is known to cause cirrhosis of the liver. The more one consumes, and the longer the duration of the exposure, the more likely there will be a health effect.

This is a fundamental concept in medicine and toxicology. Simply stated, “the dose makes the poison”. This is known as the biological gradient, or the dose-response relationship. This means that as the dose increases, the severity of signs and symptoms increase in individuals, as does the number of individuals who will become symptomatic.

This example is also true for the application of landscaping products. The proper use of diluted pesticides by trained applicators and casual exposure to the public in parks would not result in an illness. The dose is far too minimal.

## **Tracking Exposure**

Since 1983, the American Association of Poison Control Centers has been monitoring health complaints to a variety of substances including over-the-counter chemicals and prescription medications. They use the Toxic Exposure Surveillance System to track these cases all over the United States. However, a review of the data during several years shows the vast majority of reported pesticide cases are casual “exposures” rather than actual poisonings and are not considered serious by health care officials.

Locally, the Rocky Mountain Poison Control Center collects data on Colorado and other western States. In 2010, the Poison Center recorded 1,371 calls. Of these calls, most calls were regarding individuals who were either less than 5 or greater than 20 years of age. Of the 1,371 calls, 1,139 (83%) were accidental or informational calls. Of those, three people developed critical health concerns. In no cases did any person die from accidental exposure. 1,007 cases experienced only minor or no effects. Twenty-three cases were intentional exposures (attempted suicides).

## **Natural Versus Synthetic**

Decision makers also need to be well informed about “natural” pesticides because health officials believe they are not necessarily safer than synthetic ones. While many plants have developed toxins to protect themselves from pests, a product manufactured from plant-derived toxins can also be toxic to humans, as the toxins are sold in concentrations much higher than found in plants naturally.

According to Michael Goodman, M.D., M.P.H, a pediatrician at the Zachaeus Clinic in Washington, D.C. and managing scientist at Exponent health/epidemiology practice, “Animal studies indicate that about one-half of all naturally occurring compounds may be carcinogenic (cancer-causing) at high doses. Unless and until a natural product is actually tested for carcinogenicity, one cannot predict the results based on the fact that it is “natural.” There is no evidence that banning synthetic

*The U.S. EPA has a screening process that is more stringent in its evaluations than any other country in the world.*

pesticides will improve public health and help prevent diseases. All chemicals, including natural chemicals, have the potential to cause harm if they are not properly handled. In some cases, natural products are more dangerous or less effective than their synthetic counterparts. Synthetic products approved for sale in the U.S. have been tested, natural counterparts in many cases have not.”

## **How the Risk of Pesticides is Managed**

When applied and used as recommended, health effects from pesticides can be minimized. County, state and federal governments have developed many layers of public protection regarding pesticides. At the federal level, pesticides are strictly regulated by the Environmental Protection Agency (EPA).

- The EPA regulates and enforces pesticide testing and authorizes the use of pesticides under the Federal Insecticide Fungicide Rodenticide Act (FIFRA).
- EPA requires pesticides to pass up to 120 health, safety and environmental tests to ensure product safety.<sup>4</sup>
- EPA requires testing at 10 times the recommended use level. The tests evaluate the pesticides’ potential to adversely affect humans, fish, wildlife, and endangered species.
- Special investigations are given to pesticides’ human risk, including acute reactions such as poisoning, but also long-term chronic health effects. It is a process that takes an average of nine years to complete.

At the State level, the Colorado Department of Agriculture enforces federal pesticide laws and regulations and in many cases, has additional requirements:

- In Colorado, state law governs who, where, when, how and what pesticides can be applied.
- The Colorado Department of Agriculture oversees The Pesticide Applicator’s Act, which regulates any entity that uses pesticides, including greenhouses, nurseries, farmers, ranchers and other private applicators, landscape companies or other commercial applicators, public entities and homeowners. The goals of the state’s Pesticide Applicator Program are to ensure that private and commercial applicators have the requisite knowledge to handle and apply pesticides, and to ensure that pesticides are applied in a manner that reduces unnecessary associated hazards.
- Employees of these companies must be properly trained to use pesticides either as a licensed applicator or work under the supervision of a licensed applicator. For example, to apply the very same products consumers buy at the hardware store, commercial applicators must complete 36 hours of training for lawn care and 40 hours of training for tree spraying.

State law also requires commercial applicators to post notification signs when making an application. These familiar yellow “flags” alert those around the property that chemicals have been applied.

<sup>4</sup> American Association of Poison Control Centers, 1999 AAPCC TESS Report, [www.aapcc.org/1999.htm](http://www.aapcc.org/1999.htm).

## **If you have a pest problem, consult with a professional:**

Landscape and tree professionals are knowledgeable about the best approaches to eliminate pests and weeds. “What” is applied and “how” it is applied are the most important factors in a safe application. That is why a professional evaluation of the problem should be the starting point.

When hiring a professional, consider these steps:

- Ask for proof of licensure, safety training, insurance coverage and if the company is a member of a professional industry trade association or organization.
- Ask the professional to help you determine whether a problem is critical to ongoing plant health and to what extent the problem is tolerable without treatment.
- Discuss the full range of treatment options based on that assessment.

*Some people fear pesticides because they don't know why they are needed, what is being used, and how to apply them.*

In addition to complying with federal and state laws, GreenCO members have created a set of guidelines to care for landscapes in Colorado's unique climate. In conjunction with horticultural experts at Colorado State University and other agencies, GreenCO's Best Management Practices (BMPs) guide soil preparation, installation, watering and maintenance. When all of these steps are followed correctly, weeds and pests are minimized and also is the need for fertilizers and pesticides. BMPs for grass care, for example, focus on aeration, fertilization, mowing and irrigation practices that produce the healthiest and highest quality lawn, which in turn has a greater ability to resist insects, weeds and plant diseases. That translates into less pesticide use.

BMPs also guide pesticide and herbicide application for the Colorado green industry with the stated goal to “apply pesticides and herbicides at minimal levels in accordance with the label and targeted to specific pest problems.”

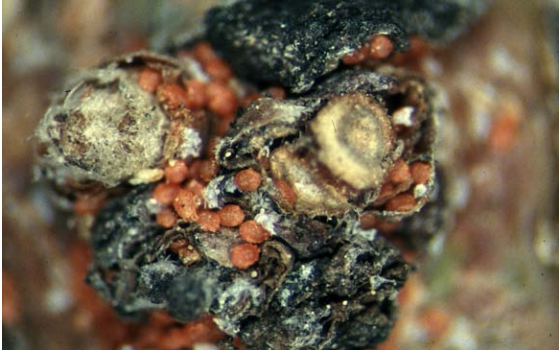
Finally, professionals in the landscape industry have an ongoing and personal investment in the health and safety of themselves and their employees as applicators. They know that the biggest problem with pesticides comes when they are not mixed and/or applied properly according to manufacturer recommendations that appear on the label. Professionals know that “more” of a product is not better and which products are most effective for a particular problem. They also have confidence in knowing that products they apply have come through a screening process via the EPA that is more stringent in its evaluations than any country in the world.

Industry professionals undergo extensive training and licensing to apply a pesticide with the same active ingredient that a consumer can buy at a garden center or grocery store. In addition to following the pesticide label requirements, professionals read and follow the manufacturer's Material Safety Data Sheets (MSDS) and make that information available to customers. Professionals know and follow safety precautions, including wearing protective clothing, that consumers often do not follow. In short, professionals are better informed of the risks to themselves and to their customers and have a vested interest in protecting the health of everyone involved.

### **Pesticide Sensitive Registry**

The Colorado Department of Agriculture maintains a registry for people with physician-documented cases of sensitivity to pesticides. The registry requires commercial applicators to notify people on the registry 24 hours before applying pesticides to an abutting property.

Some people fear pesticides because they don't know why they are needed, which ones are being used and how they should be applied. Enhanced communications would be one way to provide information to people so they have control over their exposure. Commercial applicators often voluntarily notify customers and if requested, neighbors, in advance of applications so people are well informed about the chemicals and can avoid treated areas. Customers with these concerns are encouraged to request these enhanced communications.



*Mites*

## Risk of Not Using Pesticides

Pesticides should seldom be considered the first and only means to control pests. But they are frequently an essential – and sometimes the only – means to reduce the threat of pests. The decision over whether to use pesticides must weigh the risks of using pesticides against the risks of not using them.

### Typical Plant Pests

In Colorado, common insects that require pest management include mites, aphids and beetles. Fungus problems also threaten trees and grass. Common invasive weeds include leafy spurge, Canada and musk thistle, diffuse and spotted knapweed, field bindweed, hoary cress, yellow and Dalmatian toadflax.



*Aphids*

### Impacts to People

Some insects can spread serious and sometimes fatal diseases, contaminate food, cause asthma and allergies, and can be deadly with their bites and stings. Mosquitos, wasps, ticks, chiggers, black widow spiders and brown recluse spiders are all threats to human health and it is an essential public health priority that they are adequately controlled. Controls of weeds and pests also have health benefits for members of our communities. Effective control of ragweed and other unwanted allergens can prevent or reduce allergy symptoms in children and adults. Control of insects is beneficial to community health. Mosquitos carry viruses, such as the West Nile Virus, and others in different parts of the United States. Bees and wasps can inflict stings that may cause serious or life threatening reactions. Cockroach allergies are a common cause of asthma.

From a quality of life standpoint, unkempt landscapes diminish property values and detract from our enjoyment of our homes, schools and shared outdoor spaces. Dead trees, for example, are expensive to remove and replace.

### Impacts to Trees/Plants

Certain insects and diseases which are capable of killing our trees and shrubs can only be prevented effectively through the use of appropriate pesticides applied at specific times. Very few people would tolerate the devastation we have seen in the high country from Mountain pine beetle in our urban environments.



*Pine Beetle*

There are numerous examples of tree populations that have been wiped out or seriously damaged in Colorado due to untreated insect-related problems: Dutch elm disease, a fungus carried by the elm bark beetle, has destroyed thousands of American elm trees in the Denver area. Thousand cankers disease, another fungus carried by the twig beetle, has killed virtually all the black walnut trees in Colorado Springs and Boulder, and is impacting trees in Denver and throughout the state; and Ips beetles, known as the engraver beetles, develop under the bark and tunnel through a tree, damaging pine and spruce trees. Unfortunately Blue Spruce trees as old as 100 years are succumbing due to lack of treatment of Ips, because treatment must occur prior to the pest attack. And finally, infestations of Japanese beetle are affecting the south metro Denver area, in trees and also in perennials on both public and private property.





*Thistle*



*Bindweed*

## **Impacts to the Environment**

When invasive/noxious weeds move into our environments and landscapes, they displace native plants at an alarming rate and reduce biodiversity. When native plants that wildlife and beneficial insects use for food, shelter and nesting are gone, wildlife leaves the area. Invasive/noxious weeds also make it more difficult and resource intensive to grow beneficial or desired plants. Colorado state law requires eradication of noxious weeds, of which there is an extensive list.

## **Reducing Exposure**

Most pesticides used by the green industry to control pests contain the same active ingredients found in products available at the local hardware store or garden center, no different from those used by millions of Americans in and around their homes. The majority of chemicals used for plants and trees create an exposure risk only while wet and most of them dry within 30 minutes. That's why Colorado law requires communication signs be posted on treated areas to notify people that an application has occurred and to allow them to avoid exposure.

Prompted by concerns to reduce human and environmental exposure to chemicals, both pesticide manufacturers and green industry professionals are pushing for ways to reduce exposure to workers and the public. These efforts include:

- Developing newer products that are designed to break down in the environment even faster.
- Using new techniques to reduce spray applications.
- Using BMPs that recommend selective, spot treatments. Blanket applications of pesticides are not common in Colorado.
- Using newer products that can be injected directly into a tree trunk or even the soil, and that thereby virtually eliminate human exposure.

Other techniques to reduce or eliminate the need to spray include the destruction of pest nesting areas; the use of “beneficials” (insects that eat unwanted pests); and stationing pheromones, or “mating perfumes,” which disrupt insect reproductive cycles. Many of these techniques are being introduced for clients who are interested in and willing to pay for an IPM approach to landscape maintenance.

Additionally, most GreenCO contractors offer natural programs. The best success with non-chemical landscape care products is with lawn fertilizers. While natural programs are being offered, they can be more expensive than synthetic programs and may not achieve the same outcome.



## **A Balanced Approach: Valuing Our Environments, Valuing Our Health**

As avid outdoor enthusiasts, Coloradans want to play, exercise and picnic outdoors nearly 300 days a year. We have come to expect environments free of rats and mice, fire ants and wasps, mosquitoes and bed bugs. Likewise, we expect diverse, well cared for trees and shrubs in healthy landscapes.

GreenCO believes that pesticides play a crucial role in integrated pest management. When regulations are followed, pesticides are a key part of a broader toolkit used by professionals to care for our landscapes in a manner that enhances health, environment and quality of life. While the pesticide industry is constantly improving its tools to provide even less human exposure, GreenCO believes that banning or restricting pesticides could compromise public health, have negative environmental consequences and place our landscapes at risk.

*Photos courtesy:*

*ALCC Excellence in Landscape Awards Program  
Colorado State University Extension*

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