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Editorial note on an effect of herbicide in plant growth

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ABOUT THE STUDY

Herbicides are chemicals used to manipulate or control undesirable vegetation. Herbicide application occurs most frequently in row-crop farming, where they are applied before or during planting to maximize crop productivity by minimizing other vegetation. They also may be applied to crops in the autumn, to improve harvesting. Herbicides are used in forest management to prepare deforested areas for replanting. The total applied volume and area covered is greater but the frequency of application is much less than agriculture. The potential effects of herbicides are strongly influenced by their toxic mode of action and their method of application. Chemical weed control has been used for a very long time: sea salt, industrial by-products and oils were first employed. Selective control of broad-leaved weeds in fields of cereal crops was discovered in France in the late 1800s, and this practice soon spread throughout Europe (Benbrook, 2016). Sulfates and nitrates of copper and iron were used, and sulfuric acid proved even more effective. Application was by spraying. Soon sodium arsenite became popular both as a spray and as a soil sterilant. On thousands of kilometres of railroad right-of-way, and in sugarcane and rubber plantations in the tropics, the hazardous material was used in tremendous quantities, often resulting in the poisoning of animals and occasionally humans. Sinox, the first major organic chemical herbicide, was developed in France in 1896. In the late 1940s new herbicides were developed out of the research during World War II, and the era of the “miracle” weed killers began. Within 20 years over 100 new chemicals were synthesized, developed, and put into use. Chemical weed control economically replaced both plant diseases and pest control. Modern weed killers are put in two categories: selective (affecting specific plant species) and nonselective (general crops). These, in turn, are classified as foliage-applied and soil herbicides. Contact herbicides (e.g., sulfuric acid, diquat, paraquat) kill only the plant organs with which they are in contact. Migrated herbicides (e.g., amitrole, picloram, and 2, 4-D) are effective against roots or other organs to which they are transported from above ground treated surfaces (i.e., soil) (Rendón et al., 2017). With respect to planting time, herbicides are also classified as pre plant, pre emergence, or post emergence weed killers. Pre plant herbicides may be applied to the soil or to weeds before crop planting (Brewster et al., 1991).

Many millions of hectares are treated from the air each year, particularly cereal crop lands, pastures, range lands, forests, and other situations where an airplane can be used. Modern equipment for treating row cropland with herbicides has made weed control increasingly convenient. Sprayers, soil incorporation equipment, and spreaders for pelleted herbicides have all added to the convenience of, and removed uncertainty from, herbicide application. Machinery is available that simultaneously builds up beds, plants the seed, sprays with insecticide, and incorporates fertilizer and pre-emergence herbicide all in one operation. The term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Herbicides are, by far, the most commonly applied pesticide followed by insecticides, fungicides, and rodenticides. Glyphosate-based herbicides are frequently used by farmers because they are a simple and cost-effective way of controlling many types of weeds, but glyphosate-based products are popular outside of agriculture, too. They are also commonly used to control weeds in gardens and around lawns (Battaglin et al., 2014). Depending on the type of herbicide and the level of concentration in the soil, persistent herbicides can last anywhere from several months to three or more years before completely breaking down into inert compounds (Cuhra, 2015, Landrigan et al., 2015).

Herbicides are advantageous for gardeners and house owners who want to kill unwanted plants with the least amount of physical labor. Herbicides are used in landscapes throughout North America and are generally safe. Improper use or over use, however, can result in health and environmental risks and disadvantages that may make some gardeners think twice before using a

herbicide product. Most herbicides pose a significant health risk to both humans and pets if the chemical substances are breathed or ingested, or if they come in contact with skin. Symptoms vary according to the substance, but they may include skin irritations and gastrointestinal discomfort. Some types of herbicides are non-selective (Mesnage et al., 2013). This means the chemicals kill all types of vegetation, not just weeds. When using a non-selective herbicide, gardeners should avoid spraying the product on plants they wish to keep. In addition, applications should be avoided when it is windy, since breeze can cause the herbicide spray to drift onto non-target plants. Some herbicides persist in the soil long after they are applied and can cause lasting effects on future vegetation growth (Smith et al., 1992). This may be beneficial if you want to keep weeds at bay, but it may be a disadvantage if you are trying to grow a crop or ornamental plants. Example herbicides with persistent characteristics include some types of uracils, dinitroanilines, triazines and phenylureas. Rain or irrigation can sometimes carry herbicides into unintended areas. This is problematic when the herbicides enter waterways. Herbicides not intended for aquatic use can have detrimental effects on fish, amphibians and aquatic vegetation. Even herbicides intended for aquatic use can have negative impact on the water (Myers, et al., 2016, Majewski et al., 2014).

House owners, landscapers and gardeners around the world use Monsanto's Roundup product to control weeds and unwanted vegetation. The glyphosate-based herbicide is sold in all garden stores and nurseries and can helps in maintaining landscape's beauty. Certain risks and disadvantages are inherent when using a toxic chemical like glyphosate (Mesnage et al., 2015).

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