

CUTT

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Developing Natural Pest Control Products for Turf

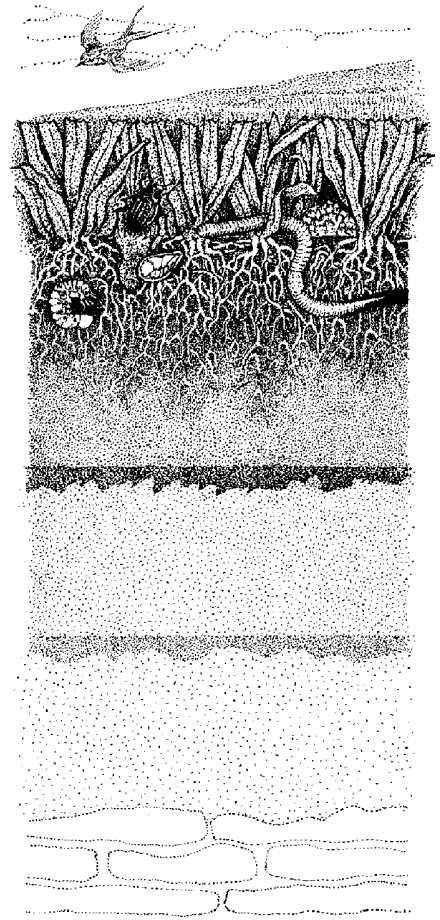
Biorational alternatives for pest control are gaining increased attention worldwide because of concerns related to pesticide usage and the environment, as well as the dwindling number of labeled products, particularly for minor-use crops such as turf and ornamentals. As a result, the science of allelopathy offers interesting alternative weed control strategies through the production and release of natural chemicals from living or decomposing plant materials. ■

The term allelopathy was first introduced in 1937 and refers to biochemical interactions among plants that alters plant growth, including those mediated by microorganisms. Allelopathy, besides including competition for resources among plants, is considered to be an important mechanism of plant interference caused by the addition of plant-produced toxins to the plant environment. Chemicals with allelopathic activity are present in virtually all plants and in most tissues, including leaves, stems, flowers, roots, seeds, and buds. Under appropriate conditions, these chemicals may be released into the environment, generally in the rhizosphere region directly around developing plant roots, in quantities sufficient to affect the growth of neighboring plants. In many cases, allelopathic interactions in the field are difficult to study, since reduction in plant growth can also be caused by competition from surrounding plants for light, nutrients, and water as well as CO₂. These interference mechanisms are often impossible to separate in field studies, but are well documented under controlled conditions in the laboratory or greenhouse.

Black Walnuts

One example of a commonly observed allelopathic interaction can be seen across New York State in homeowners' yards, golf courses and woodlands (see Figure 1). The black walnut tree, *Juglans nigra*, has been reported for centuries to inhibit plant growth through the production of a potent natural herbicide or allelochemical, juglone. Juglone is a chemical compound produced in the bark and living root system of black walnut trees.

Juglone can persist in the soil for several months after removal of a black walnut tree, and causes severe reductions in plant growth to sensitive neighboring species, such as azaleas. Juglone alters plant growth directly through specific metabolic inhibition. Sensitive species include many vegetable crops, woody ornamental shrubs and herbaceous groundcovers. The Ericaceous species, including rhododendrons and azaleas are particularly affected by living black walnuts which release juglone. You may also be familiar with tomatoes which quickly wilt when



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