Toxic Plant Profile: Black Walnut

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Black walnut trees are considered toxic but are unique from most other toxic plants. They are safe to all livestock except horses, and horses are generally only affected by shavings made from the tree. Black walnut trees are, however, toxic to some species of plants if growing within a certain range of the tree. In fewer instances, shedding pollen can cause allergic reactions in horses and people as well as kidney effects in animals that ingest hulls.

Black walnut trees are easy to identify by the large round nuts that drop after the leaves fall in autumn. They are large trees with dark brown bark that is deeply furrowed. The leaves are long and pointed. Black walnuts are fairly common in Maryland and may live for up to 250 years. They are the most commonly planted nut tree in North America, partly because most seedlings germinate from nuts buried by squirrels.

The roots of the black walnut tree produce an organic compound called juglone. Juglone has an allelopathic effect on some other plants, meaning it can stunt their growth or even prevent them from growing. Juglone has its effect by disrupting a plant's ability to exchange carbon dioxide and oxygen. Not all species of plants are negatively affected by this compound: pasture and turf grasses will grow in the presence of juglone, but many flowers, vegetables, and some species of trees and shrubs will not. Juglone is present in the leaves, roots, husks, and fruit and can be found in the soil throughout the tree's entire root zone (on average 50 to 80 feet in diameter for a mature tree). Allelopathic effects are not usually observed until the tree is at least seven years old.

Juglone does not pose any threat of toxicity to humans, but gardeners should be aware of its effects and plan accordingly. Using raised beds lined with gardening fabric may make it possible to grow susceptible plants in closer proximity to black walnut trees. Juglone does break down when composted. If black walnut leaves, twigs, or nuts are used in compost to be spread in a garden, the compost should be aged at least one year before being applied.

Horses can be affected by black walnut if shavings made from the tree are used in bedding. As little as 20% black walnut in shavings or sawdust can cause clinical signs within hours of contact. Effects of exposure primarily affect the lower limb and include stocking up, stiff gait, and reluctance to move. If untreated, toxicosis can progress and cause colic, swelling of the neck and chest, elevated heart and respiratory rate, and even laminitis and founder. Clinical signs usually disappear once the bedding is removed. The best way to prevent problems is to ensure that bedding does not contain black walnut. Black walnut shavings are quite dark and easily contrast against light-colored pine shavings. Other livestock species are not affected.

Juglone, the allelopathic chemical produced by the black walnut, was originally suspected as the toxic compound in shavings and sawdust. However, researchers have not been able to reproduce toxic effects when juglone is isolated and administered either dermally (on the skin) or orally (by ingestion). Thus, the toxic compound that causes these symptoms in horses is still unknown.

Black walnut can cause other problems, although these are reported much less frequently than the two described above. Some people and horses are especially sensitive to black walnut pollen and can suffer from allergic reactions when pollen is shed in the spring. Additionally, the husks surrounding fallen nuts can become toxic as they start to decay. Penicillium mold affects the decomposing husk and produces a neurotoxin called Penitrem A, which is toxic to livestock and can be fatal to dogs. People should also be wary; black walnuts are edible but can be contaminated with Penitrem A if they hulls have begun to decompose before the nuts are harvested.