

**Linda Chalker-Scott, Ph.D., Extension Horticulturist and Associate Professor,
Puyallup Research and Extension Center, Washington State University**

The Myth of Allelopathic Wood Chips
“Wood chips made from cedars will kill landscape plants”

The Myth

As readers of this column know, I have an ongoing love affair with wood chip mulches. Invariably after giving a presentation on sustainable landscape management, I get the “But what about...?” questions. Recently, the concerns have been “But what about cedar wood chips? I’ve heard they are toxic and will kill my plants.” There are many references to this ability, called **allelopathy**, on the web and in popular publications. A recent article in *Grounds Maintenance* makes the statement that “allelopathic mulches include uncomposted sawdust of redwood (*Sequoia*) and cedar (*Cedrus*); the bark of spruce (*Picea*), larch (*Larix*) and Douglas fir (*Pseudotsuga*); and both the leaves and sawdust of *Eucalyptus*.” Web sites warn against the use of cedar wood chips, citing toxic leachate from wood and foliage killing plants and animals in both terrestrial and aquatic systems. Other sites suggest that volatile chemicals released from cedar foliage will inhibit seed germination, kill seedlings, and cause tip burn on foliage of established plants. On gardening Q&A pages, responders to questions zoom in on the mention of cedar mulch and attribute landscape problems to its use. No wonder there is widespread concern on how safe cedar-based mulches are for healthy landscape plants.

The Reality

There are bona-fide examples of allelopathy in tree species. Probably the best known is black walnut (*Juglans nigra*), which contains the compound juglone. This water-soluble member of the quinone family is found in all parts of the black walnut and is quite effective in killing competitors, especially seedlings and other shallowly-rooted plants. It appears that juglone reduces oxygen uptake and photosynthetic activity, inhibiting growth of sensitive plants. Nevertheless, there are a variety of landscape plant materials that are resistant to juglone toxicity.

On the other hand, there is virtually no documented evidence for allelopathic activity in either *Thuja* or *Cedrus* spp. Though one study suggests that Douglas fir seedlings might be sensitive to *Thuja* extracts, these seedlings were held under highly artificial laboratory conditions (i.e. were submerged in solutions for 74 hours).

Cedars, especially *Thuja* species, have developed chemical weapons against a number of pests and pathogens. Researchers have found that *Thuja plicata* heartwood contains thujaplicin, a water-soluble tropolone not only inhibitory to various bacteria and fungi, but with anti-tumor activity as well. This antimicrobial activity is probably responsible for the rot-resistant nature of cedar wood. There is, however, no evidence that this substance harms plant tissues.

Another weapon in cedar’s chemical arsenal is thujone, one of several essential oils found in *Thuja* foliage and other non-*Thuja* species. Best known for its ability to repel clothes moths, thujone and other foliar terpenes also repel, inhibit, or kill cockroaches, termites, carpet beetles, Argentine ants, and odorous house ants. These compounds are not readily soluble in water but volatilize and become airborne. The lack of solubility also suggests that this compound does not leach into aquatic areas despite concerns to the contrary.

The Bottom Line

- It is unlikely that wood chip mulches containing cedar will have negative effects on established landscape plants.

- The allelopathic activities attributed to mulches made from cedar and other species may actually be due to other factors such as nutrient and light limitations.
- Seeds and seedlings, whether weeds or desirable species, are more sensitive to mulch suppression as they do not have established root systems.

For more information, please visit Dr. Chalker-Scott's web page at <http://www.theinformedgardener.com>.