

## Alfalfa Autotoxicity

### What is Alfalfa Autotoxicity?

Established Alfalfa plants contain compounds that are toxic to other alfalfa plants. This is called "autotoxicity". The toxic effects are restricted to new seedlings and not to other established alfalfa plants. Seedlings that do emerge will likely be stunted and may turn a purplish color indicative of phosphorus deprivation. Alfalfa plants produce these toxins to create a space for themselves and reduce competition for light, water, and nutrients from other plants. Autotoxicity can occur when alfalfa is reseeded into an old alfalfa field or when alfalfa is overseeded into an existing alfalfa stand to thicken it.

These toxins are mostly concentrated in the stems and leaves. The toxin compounds are water soluble and will leach readily into the soil from both growing plants and decomposing plant material. How long the compounds remain in the soil depends on the soil type, the amount of moisture in the soil, and temperature. Other factors like the age of the alfalfa stand, the level of soil microbial activity, the amount of tillage, and the time interval between seedings can all affect the level of toxins in the soil.

### How to avoid Alfalfa Autotoxicity

The best way to avoid autotoxicity in alfalfa is to rotate to some other crop for a year before seeding a field back to alfalfa. If an alfalfa crop must follow another in the same field, the best course of action is to kill the old alfalfa in the year prior to seeding. This can be done by plowing or by chemical control (glyphosate). If an alfalfa stand must be replaced within the same year, removing the top growth of the old stand before plowing and reseeding will reduce the amount of toxin that makes it into the soil. In the case of spring killing an old stand and spring replanting, waiting at least three weeks is highly recommended. The success of the new seedlings is directly proportional to the amount of time since the old stand was removed.

When stands become thin, overseeding is not recommended. Studies in Missouri have shown that seeds planted within 20 cm of an established plant will likely not survive and that seedlings growing 20-40 cm from an established plant will likely be stunted and have severely reduced yield. Overseeding a stand that is less than one year old is acceptable because there is very little of the toxic compounds present in these younger plants.