What You’ll Learn...

- Weeds compete with cotton for resources during the growing season.
- Weeds can affect cotton yield, quality, and harvest efficiency.
- Cotton needs to emerge in a weed-free field to gain a competitive advantage and maximize yield potential.
- Overlapping residual herbicides throughout the season is important in cotton weed management programs.

The Impact of Weeds in Cotton

Weeds compete with cotton for light, water, and nutrients. Light is often the factor where there is the greatest competition. Cotton does not grow well under low light conditions which can be caused by weed shading (Figure 1). Cotton is produced in areas where water can be limiting. Many weeds have a higher growth rate than cotton, especially under limited water conditions. Weeds can also compete with cotton for soil nutrients, especially if soil fertility levels are not kept high. The cumulative effects of weed competition can reduce the time that cotton has to develop and produce a crop. Weed competition can reduce the overall growth rate of cotton, delaying maturity and harvest.

Cotton yield can be significantly reduced by weed competition. Cotton is very susceptible to early-season weed competition because of its slow emergence and growth. Without getting a head start to compete with weeds, cotton will be at a disadvantage to maximize yield potential. Weeds have been shown to reduce lint yields by 10 to 40% depending on the weed density. Greater yield reductions from weed competition can occur under stressed environments.

Fiber quality is another important aspect of cotton production. Weeds can reduce fiber quality by affecting fiber length, uniformity, strength, and micronaire. Weeds can restrict air movement and raise moisture levels in the cotton canopy, stimulating boll rot and quality losses. At harvest, weeds can add foreign material and cause cotton stains, which can reduce grade and result in price reductions.

Weeds can interfere with cotton harvest, resulting in yield and quality losses. Weed pressure can reduce harvest efficiency by slowing equipment operation speeds and potentially increasing harvester downtime to remove lodged weeds.

Some weeds are more competitive in cotton than others. Giant ragweed, Palmer amaranth, common cocklebur, jimsonweed, sicklepod, and tall morningglory are considered some of the most competitive weeds in cotton. Horseweed or marestail can be a major weed problem in no-till cotton production systems. Some weeds can reduce cotton yield without any effect on fiber quality, and some weeds can reduce cotton quality without affecting yield. Late-season and tall-growing weeds can interfere with harvest, even at low populations that may not have any impact on cotton yield or quality. Weeds allowed to grow and produce seed can negatively impact future crops and may increase the spread of herbicide-resistant weeds.

Figure 1. Palmer amaranth is one of the most competitive weeds in cotton. Shading of cotton is an important factor contributing to the reduction in cotton canopy volume and biomass. Left uncontrolled, the weed can establish a competitive dominance for light, space, and other resources over cotton. If allowed to produce seed, the weed can impact future crops and potentially contribute to the spread of herbicide resistance.
Weed Management Guidelines in Cotton

It is important to keep cotton fields weed-free at emergence. Cotton has a weed-free requirement that can range from 4 to 8 weeks after emergence for optimum yield production. Later-emerging weeds can also compete with cotton. Therefore, weeds should be controlled throughout the season to produce a profitable crop.

Weed management in cotton will require the use of preemergence (PRE) and postemergence (POST) herbicides in multiple applications throughout the season. Weed control with most PRE or soil residual herbicides will begin to break down around 21 days after application. Overlapping residual herbicides throughout the season is important to maintain good weed control. The following are weed management timings that can be necessary to maintain season-long weed control in cotton:

- **Preplant/Burndown** - start with a clean field using tillage or a burndown herbicide application. POST and/or PRE herbicides are applied prior to planting for the purpose of planting into a weed-free field.

- **PRE/At Planting (2-4 weeks after burndown)** - PRE herbicide is applied to delay weed emergence and allow cotton to emerge and grow in a weed-free environment early in the season. Residual herbicides are key to help provide early-season weed control.

- **Early-POST (start around 2 weeks after PRE)** - POST and PRE herbicides are applied to control any emerging weeds and continue with residual herbicide programs. Application should be timed to go on before the previous residual herbicide product breaks.

- **Mid-POST (starting 2 weeks after Early-POST)** - continue with POST and residual herbicide programs.

- **Layby (starting 2-3 weeks after Mid-POST)** - POST and PRE herbicides applied as directed applications to prolong activity of the previous residual herbicide plus control of small weeds until row closure.

- **Hooded Sprayer, Cultivation, or Hand-weeding** - as needed to maintain a weed-free field up to cotton harvest.

Cotton weed management programs should include:

- The integration of herbicides with mechanical and cultural practices,
- Applying residual herbicides throughout the cropping season,
- Rotating herbicide products to provide multiple sites of action that can help prevent the development and spread of weed resistance,
- Preventing weeds from producing seed that can add to the soil seed bank and affect future crops.


**Sources:**