

EARLY SPRING HERBICIDE TIMING FOR NO-TILL SOYBEANS

Start Clean, Stay Clean

Fields under continuous no-till may have increasing weed issues if not managed correctly, including changes in weed species composition, densities, and pattern of weed emergence. Soybean growers often hear the advice, 'start clean, stay clean.' Controlling weeds early, during the critical weed-free period for soybeans, is important for minimizing yield losses from weed competition. Soybeans are adaptable, but research has shown that they are sensitive to early season weeds.¹ Soybeans do not compete well with weeds and can be adversely affected especially right after germination. If weeds are not controlled prior to planting, they will continue to grow and may be more difficult to control later. Effective burndown applications and soil-applied residual herbicides should be applied prior to crop emergence.

Know Your Weeds

Growers need to take an aggressive approach to managing weeds in no-till soybean systems. Knowing which weeds are present will help growers develop an appropriate control strategy. Among the weeds that are increasingly important in no-till systems are marestail (horseweed), Palmer amaranth, giant ragweed, waterhemp, dandelion, and kochia. For more information on weed identification and management, please visit <https://www.dekalbasgrowdeltapine.com/en-us/agronomy/weeds-on-your-farm.html>

- **Marestail** — There are two primary periods of emergence with this weed— from late summer into fall, and from late March through June. Marestail can die over the winter as a result of cold temperatures and lack of adequate moisture, but plants that survive are aggressive in their growth habits. A single plant can produce up to 200,000 seeds that are transported by wind.^{2,3} Herbicide resistance (ALS and glyphosate) is also an issue with this species. If not managed prior to planting, it becomes increasingly difficult to manage.
- **Palmer amaranth** — Contaminated combines, other farm equipment and water can transport palmer amaranth seeds from field to field. Palmer amaranth is an aggressive weed – it can grow one to 3 inches a day, and a single plant can produce up to a million seeds. It has a prolonged emergence period, rapid growth rate, prolific seed production, and propensity to evolve herbicide resistance quickly.⁴
- **Giant Ragweed**—Early crop planting favors giant ragweed since it is one of the first weeds to emerge after a crop is planted. It has the ability to emerge as early as March through early August. Management of giant ragweed is a challenge because it is adapted to many different environments in addition to agricultural soils, including floodplains, fencerows, roadsides, and wastelands. It's also called giant for a reason – it's a tall weed capable of reaching 15 feet in height, obviously outgrowing a soybean crop. ^{5,6}
- **Waterhemp** — Because of the vast number of plants that can come up in an area, waterhemp is one of the most serious, aggressive annual weeds. In-season competition with soybeans can lead to yield loss as high as 44 percent.⁷ Waterhemp grows rapidly, typically 1 to 1¾ inches per day during the growing season. It is a prolific seed producer like pigweed species and single plants can produce as many as 1 million seeds. Waterhemp seeds can be easily transported by contaminated machinery, waterfowl and spread by poultry litter. Like many other weeds, waterhemp seeds also remain viable in the soil for several years.^{7,8,9}

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- **Dandelion** — The reduction of tillage and interrow cultivation, in combination with herbicides used as the primary weed management tactic, has resulted in increased relative abundance of dandelion in soybean fields in some areas. Dandelion taproots have carbohydrates moving to above ground plant parts during rapid spring growth, making dandelion difficult to control with lower labeled rates of glyphosate. Dandelion roots are also able to generate new shoots, making control difficult later in the season. Residual herbicides should be considered to manage germinating dandelion seeds. Seeds falling on wet soil in June can establish new plants; some seeds may remain dormant and maintain the seed bank from one year to the next.^{10,11}
- **Kochia** — Kochia reproduces from seeds, typically producing around 15,000 seeds per plant. Seeds are dispersed in the fall when the plant matures. If left undisturbed, it becomes a tumbleweed resulting in long-distance seed dispersal. It can also be transported by combines and other farm equipment. Kochia is tolerant of drought and has high tolerance to saline soils. Seeds are somewhat short-lived in the soil lasting only two to three years.^{12,13}

Early Scouting

To determine which weeds are present, and because key characteristics of these weed species make them so prolific and difficult to manage, early scouting is critical to successful management of weeds in a no-till scenario. Four main considerations for effective weed control are:

- Weeds overwintering — early emerging perennial weeds or biennial weeds that have regrown from last year or started from seed are a challenge to growers.
- Season long weed emergence — weeds that have the ability to germinate continuously throughout the growing season present challenges to maintain clean fields at critical times in the crop's growth and development.
- Correct weed identification — Proper identification of emerging weeds is also critical early in the season. For example, distinguishing *Amaranthus* species like waterhemp and Palmer amaranth, and tailoring control methods and chemical application around the predominant weeds emerging in no-till fields (See Table 1).
- Seed Banks — Several weed species are prolific, creating huge seed banks. A single waterhemp plant can produce between 250 thousand and a million seeds, making early identification and control critical to successful control in a no-till situation.

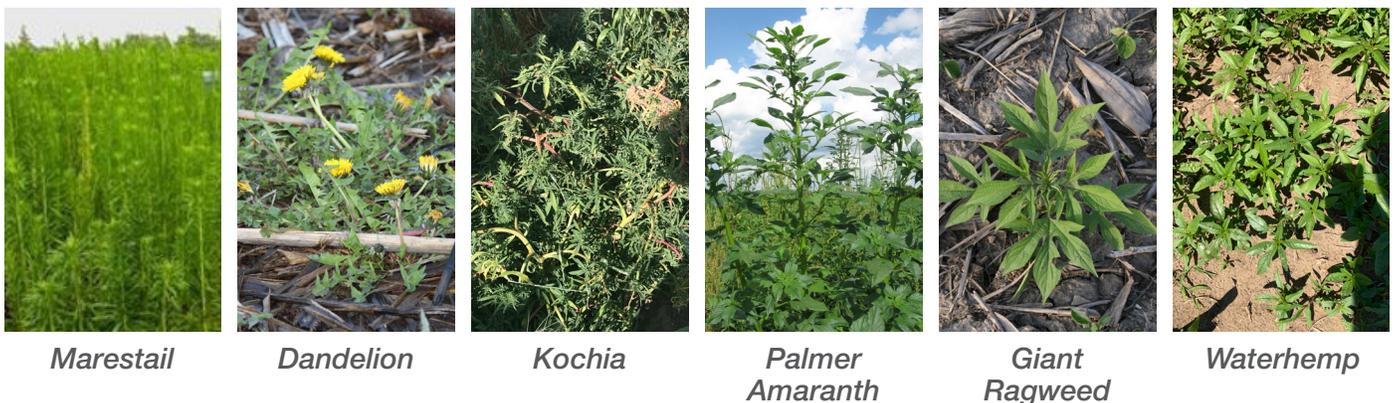


Figure 1. Problem weeds occurring in no-till soybean production systems in the US.

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Critical Period for Weed Control

The critical period of weed control is a period in the crop life cycle when weed competition causes crop yield loss. Yield loss is minimized when weeds are controlled during this period. For soybeans, the critical weed-free period corresponds to the first-third trifoliolate leaf stage (V1-V3). The beginning of this period has been reported as the V1 or V2 soybean stage depending on timing of weed emergence.⁸ A delay in weed emergence in no-till is expected due to cooler soils in the spring; therefore, scouting fields to identify optimal timing of herbicide application is critical for weed management. Effective weed control is dependent on several factors, including climate, soil type, moisture levels, and weed species, density, and size.

Herbicide Options

For soybean growers with dandelion, giant ragweed, marestalk, pigweed, water hemp and other broadleaf weed species present in their no-till fields, the use of pre-plant and pre-emergence residual herbicides offer the best opportunity for effective weed management. In-season management options for these weeds is limited and may not provide effective control once the soybean crop has emerged. Table 1 shows available herbicide options from Bayer.

Burndown and Pre-Emergence Herbicides

Burndown and Pre-emergence herbicides provide effective control of weeds as seedlings germinate and emerge from the soil and help reduce the seedbank during the growing season. In addition, applying an herbicide early and ensuring the soybean plants are growing vigorously buys the grower time to minimize competition with weeds during a critical part of the crop development. Including pre-emergence herbicides in a spray program can reduce post-emergence herbicide applications by ensuring a healthy crop that can compete for resources and crowd out weeds.

Herbicide Application Timing

Key to effective weed control is timing of herbicide applications. Warm spring temperatures initiate weed growth sooner, and activity of post emergence herbicides may be limited to suppression of perennial and winter annual weeds during the growing season. Spring control for perennial and winter annual weeds should begin before planting or emergence of the crop.

Table 1 lists possible management options for controlling harmful weeds pre- and post-emergence. Spraying early, pre-plant, helps manage weed resistance and reduces early weed competition through short-term residual control of small seeded broadleaf weeds.

Table 1. Bayer herbicides used for control of major weed species in no-till soybeans

Herbicide	Weed Species
XtendiMax® herbicide with VaporGrip® Technology (a restricted use pesticide)*	Pigweed (redroot, Russian, smooth) Kochia, Giant Ragweed, Palmer amaranth, Marestalk, Waterhemp and other broadleaf weeds**
Warrant® Herbicide	Waterhemp, Palmer amaranth, and other small-seeded broadleaf weeds
Warrant Ultra® Herbicide	Waterhemp, Palmer amaranth, Giant Ragweed and other broadleaf weeds

* XtendiMax® herbicide with VaporGrip® Technology is part of the Roundup Ready® Xtend Crop System, is a restricted use pesticide and must be used with VaporGrip® Xtra Agent (or an equivalent volatility reduction adjuvant). For approved tank-mix products (including VRAs and DRAs), nozzles and other important label information visit XtendiMaxApplicationRequirements.com.

**For a complete list of weed species controlled by this product please refer to the label.

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Sources

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- ¹² CropLife Staff. 2017. 5 keys to managing kochia in soybeans. CropLife. <https://www.croplife.com/crop-inputs/herbicides/5-keys-managing-kochia-soybeans/>
- ¹³ Kochia Management in Soybeans. The University of Missouri. Weed Science. Take Action Publication.

Legal Statements

XtendiMax® herbicide with VaporGrip® Technology is part of the Roundup Ready® Xtend Crop System, is a restricted use pesticide and must be used with VaporGrip® Xtra Agent (or an equivalent volatility reduction adjuvant). For approved tank-mix products (including VRAs and DRAs), nozzles and other important label information visit [XtendiMaxApplicationRequirements.com](https://www.bayer.com/xtendmax-application-requirements).

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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