



The Oklahoma Cooperative Extension Service
Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.

- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

EXTENSION

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Weed Management in Cotton Planted into Wheat Residue

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Introduction

As herbicide-resistant weeds increase, a push continues for crop managers to integrate multiple weed management strategies. One practice Oklahoma cotton growers incorporate is the planting of a winter cover, like wheat, to provide suppression of weeds and soil erosion. Winter wheat planted in the fallow period also can provide winter forage. A second strategy is the incorporation of preemergence (PRE)/residual herbicides to alleviate pressure placed on postemergence (POST) products. When PRE herbicides are part of a chemical weed control plan, the number of herbicide active ingredients and herbicide sites of action increases, ultimately reducing the selection pressure placed on weeds by certain herbicide active ingredients and sites of action.

One challenge with PRE herbicides is that some labels caution that efficacy could be reduced in fields with heavy residue, resulting in limited herbicide to soil contact. Due to these warnings, one could worry about the effectiveness of the PRE herbicides in moderate to heavy residue systems or might even choose to avoid residual herbicides. To evaluate this idea, a project was conducted during the 2020 cotton growing season in Stillwater to assess herbicide systems in cotton that followed a terminated winter wheat cover (Figure 1).

Field Research Findings and Recommendation

The winter wheat cover was planted on at 60 pounds per acre and terminated six weeks prior to planting cotton on June 2, 2020 at 34,200 seed per acre. Preemergence herbicides were applied shortly after planting and were incorporated using overhead irrigation. Due to timely incorporation, all PRE herbicides were effective against target weed species (Palmer amaranth, large crabgrass, carpetweed and ivyleaf morning-glory). Herbicide systems are described in Table 1. No stand



Figure 1. Trial site in Stillwater, three weeks after planting.

loss was observed following any herbicide treatment (data not shown).

Nearly five weeks after application of PREs and one week after application of the first early POST treatments, overall weed control was 87% or higher for all treatments against all weed species (Figure 2). For carpetweed, all treatments provided 97% control or greater except for Warrant® and Dual® (93%). For ivyleaf morningglory, all treatments provided at least 97% control except Prowl H₂O. For Palmer amaranth, applying Roundup® + XtendiMax® or Liberty® early POST (no PRE) was similar to PRE treatments of Warrant®, Caparol®

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Table 1. Herbicide systems and application dates.

Preemergence 6/4/2020	Early postemergence I 7/9/2020	Early postemergence II 7/21/2020	Mid-postemergence 8/5/2020
-	Roundup® + XtendiMax®	-	-
-	Roundup® + XtendiMax®	-	Liberty®
-	Liberty®	-	Roundup® + XtendiMax®
Warrant®	-	Roundup® + XtendiMax®	-
Warrant®	-	Roundup® + XtendiMax®	Liberty®
Warrant®	-	Liberty®	Roundup® + XtendiMax®
Caparol®	-	Roundup® + XtendiMax®	-
Caparol®	-	Roundup® + XtendiMax®	Liberty®
Caparol®	-	Liberty®	Roundup® + XtendiMax®
Diuron®	-	Roundup® + XtendiMax®	-
Diuron®	-	Roundup® + XtendiMax®	Liberty®
Diuron®	-	Liberty®	Roundup® + XtendiMax®
Dual®	-	Roundup® + XtendiMax®	-
Dual®	-	Roundup® + XtendiMax®	Liberty®
Dual®	-	Liberty®	Roundup® + XtendiMax®
Staple®	-	Roundup® + XtendiMax®	-
Staple®	-	Roundup® + XtendiMax®	Liberty®
Staple®	-	Liberty®	Roundup® + XtendiMax®
Prowl® H ₂ O	-	Roundup® + XtendiMax®	-
Prowl® H ₂ O	-	Roundup® + XtendiMax®	Liberty®
Prowl® H ₂ O	-	Liberty®	Roundup® + XtendiMax®

or Diuron®. Dual® and Prowl® applied PRE provided the least Palmer amaranth control (94%). For large crabgrass, all early post treatments, Dual® and Prowl were the most effective (96% to 98%) while Caparol® and Diuron® were the least effective (91%).

Almost two weeks after the early POST treatments were applied in the POST only systems, early POST herbicides followed the PRE systems as they were starting to break. The trial was then rated again one month after this application for overall weed control. All systems were similar (97% to 99% control) except for Liberty® applied alone (90% control) (Figure 3). However, by the end of the season, once mid-POST treatments were applied, all plots achieved 99% control and no treatment differences were observed for seed cotton yield (data not shown).

In summary, effective PRE herbicides were identified in our study, despite heavy wheat residue. The integration of a PRE herbicide at planting also delayed the first POST application by two weeks vs. POST only systems where weed size demanded an earlier application. This delay provides producers some flexibility regarding their first POST application. Finally, although POST only systems typically achieved high levels of weed control, it is important to keep in mind these systems are only short-term weed management strategies that will eventually select for herbicide resistant weed biotypes. At the field location, little herbicide resistance was present with the exception for glyphosate-resistant Palmer amaranth. Lastly, it is important to note that POST treatments were applied at the recommended timing while weeds were small (2 inches to 6 inches in height).

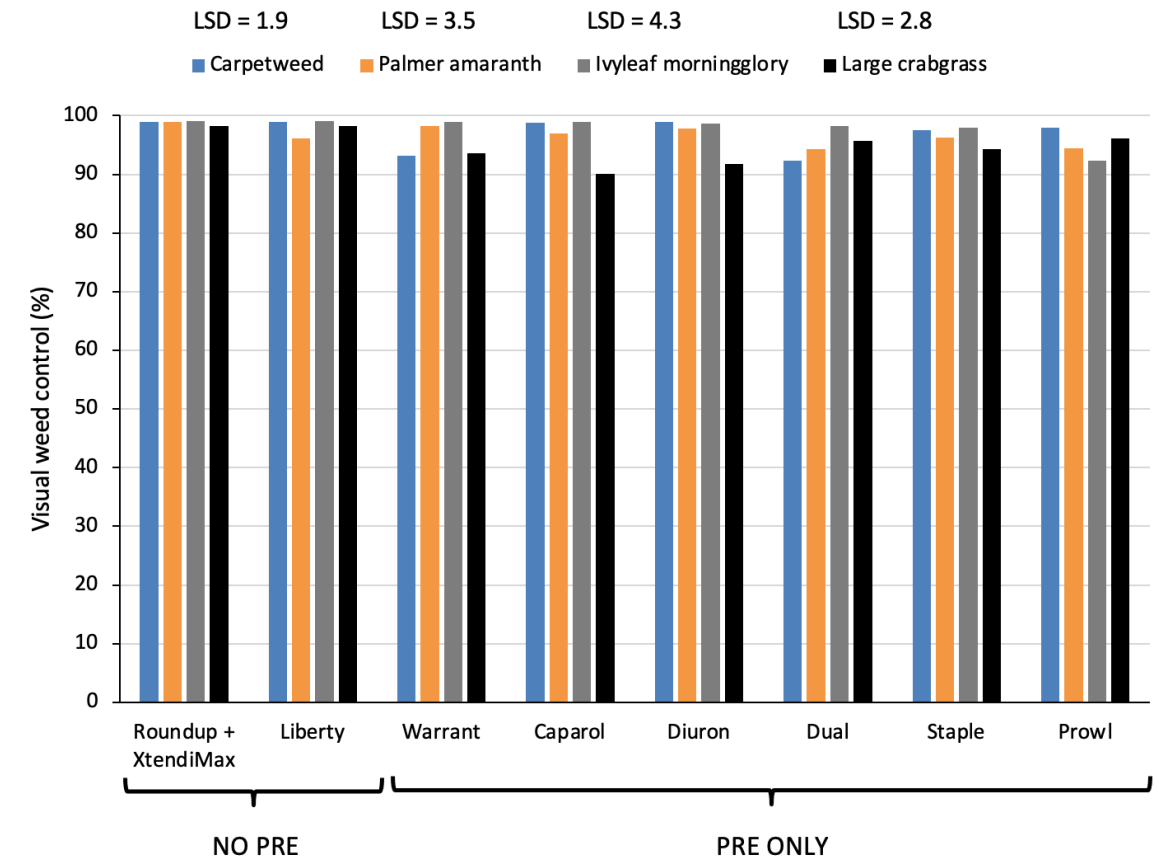


Figure 2. Carpetweed, Palmer amaranth, ivyleaf morningglory and large crabgrass control five weeks after application of PREs and one week after application of early POST treatments in POST only systems.

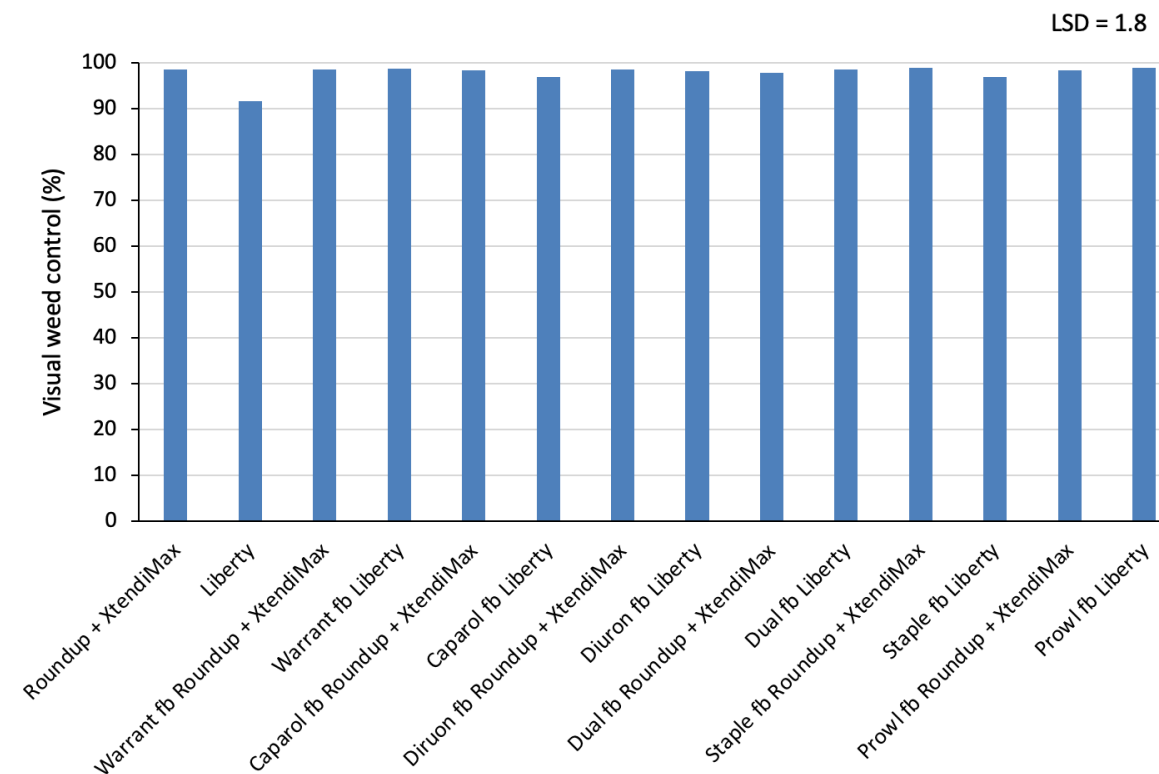


Figure 3. Overall weed control four weeks to six weeks after early POST treatments. Fb = followed by.