

Background

Increasing reports of herbicide-resistant weeds are becoming a major concern in Arizona cotton production, particularly with **Palmer amaranth** (*Amaranthus palmeri*), a highly competitive species known for resistance to multiple herbicide sites of action. Growers and pest control advisors in Central Arizona have reported declining effectiveness of commonly used herbicides, emphasizing the need for updated, locally generated efficacy data. Pinal County Agronomy Needs Assessment Survey further highlights this demand, with 65% of respondents identifying herbicide resistance management as a priority issue and 79% requesting updated herbicide efficacy information. In response, a field trial was conducted to evaluate pre & post-emergence herbicide programs in Central Arizona cotton systems to generate regionally relevant recommendations that support effective weed control and sustainable cotton production.

Palmer amaranth seedling



Morning glory seedling



Study Field was dominated by Palmer amaranth



Objective

To evaluate the efficacy of different commercially available and new herbicides against *Palmer amaranth*

Methodology

- **Site:** Maricopa Ag Center, University of Arizona
- **Randomized Complete Block Design**, 4 replications
- **9 herbicides** used as pre- and post-emergence applications and **one untreated check (UTC)**.
- Plot size: 35 feet long **4 rows wide, spaced 40 inches apart**
- Varieties: **DP2414B3TXF & PHY415W3FE**

Treatment Details

Herbicides	Active Ingredients	Group	Application Rate	Timing
Aim	Carfentrazone-ethyl	14	1.6 FL oz/ac	Pre-plant
PowerMax3 +Warrant+Diuron	Glyphosate, Acetochlor, Diuron	9, 15, 7	30 FL oz/ac + 3 pt/ac + 1 qt /ac	Pre-emergence
Prowl H20	Pendimethalin	3	3 pints/ac	Pre-emergence
Zidua SC	Pyroxasulfone	15	3.5 FL oz/ac	Pre-emergence
Liberty Ultra	Glufosinate	10	29 FL oz/ac	Post-emergence
PowerMax + Warrant+ Glufosinate	Glyphosate, Acetachlor, Glufosinate	9, 15, 10	30 FL oz/ac + 43 FL oz/ac	Post-emergence
Anthem Flex	Pyroxasulfone and Carfentrazone	15, 14	2.73 FL oz/ac	Post-emergence
Enlist One	2,4-D	4	2 pints/ac	Post-emergence
Enlist Duo	2,4-D and Glyphosate	4, 9	4.75 pints/ac	Post-emergence



Cotton Planting



Herbicide Application



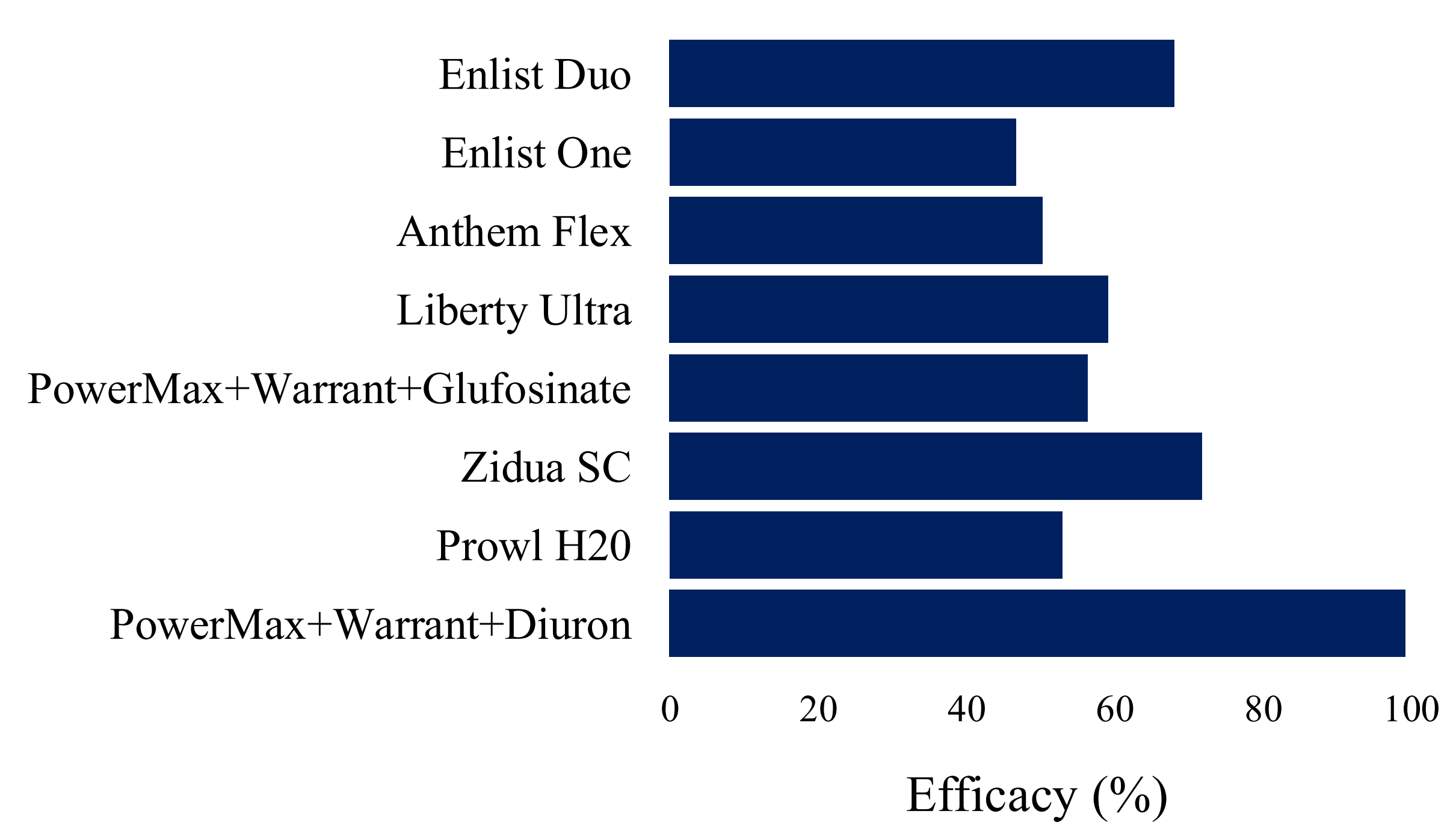
Weed Data Collection



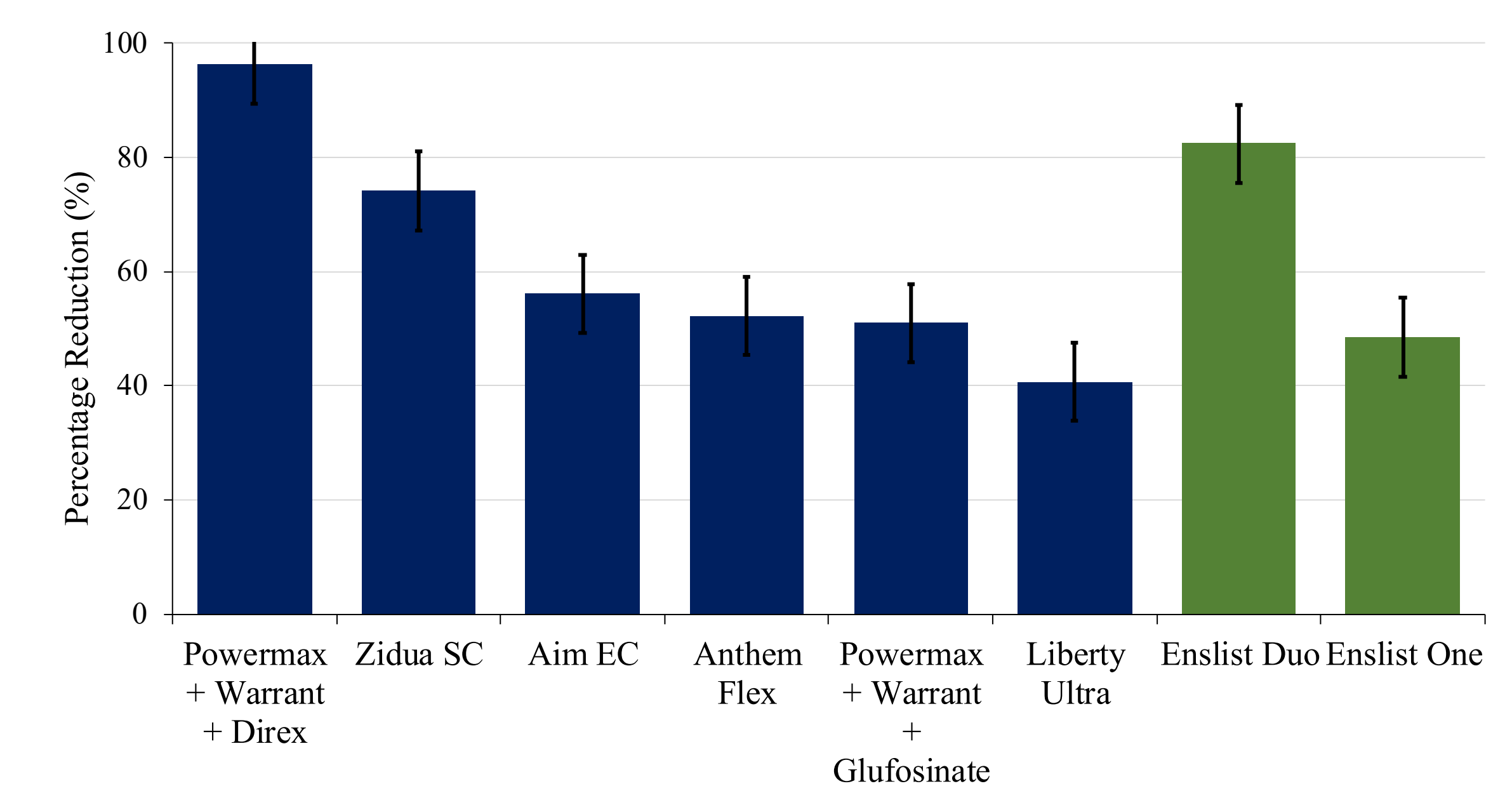
Agronomic & Physiological Data Collection

Results

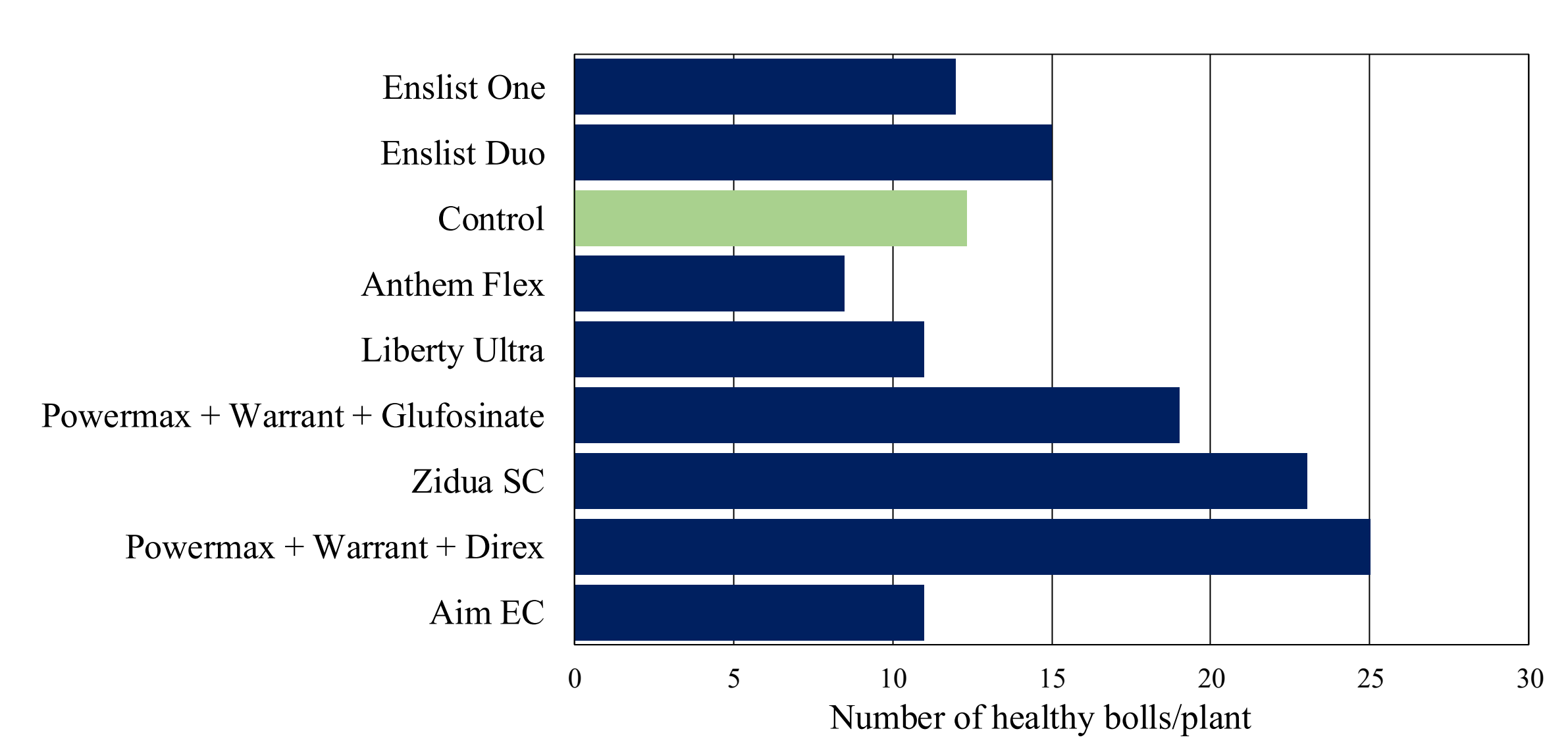
In-season average (four weeks after application) efficacies of the treated herbicides



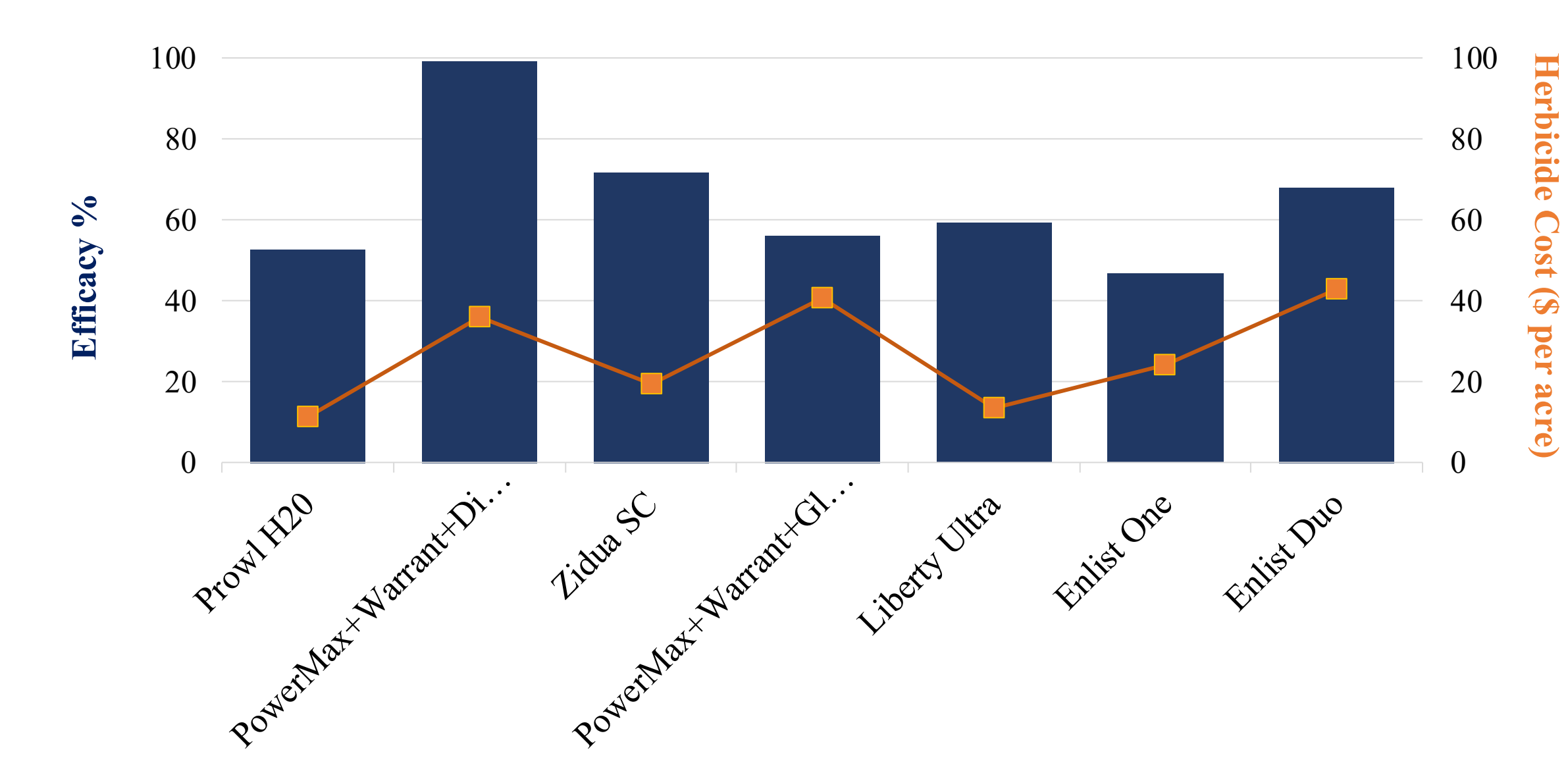
% Weed biomass reduction comparison (Reference UTC)



Yield Indicator (Number of healthy bolls per plant)



Herbicide Efficacy vs Herbicide Cost (\$ per acre)



Conclusion

- **Mixed herbicide Program or Dual-mode herbicide** shown **improved efficacy** than **single-mode herbicide**.
- **Mixed Herbicide program or Dual-mode herbicide programs are essential to slow the development of resistance in Palmer amaranth resistance to currently available chemistries.**
- **Timely recommendation for agricultural stakeholders** to support efficient input cost management and effective weed control.

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