

# Technical Bulletin



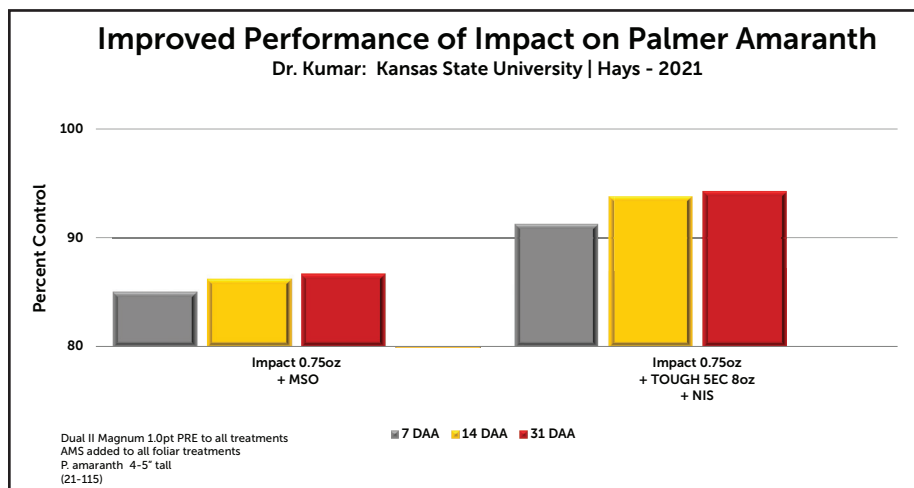
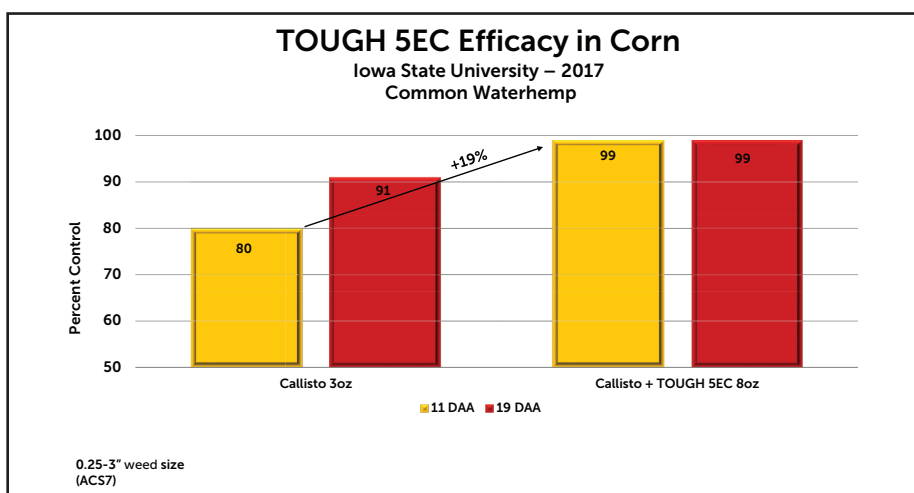
## Seed Corn Update- EPA Approved For Seed Corn

In the spring of 2022, **TOUGH 5EC** was approved by the EPA for use on all seed corn. **TOUGH 5EC** has been a valuable tool for corn growers battling resistant weeds such as kochia, Palmer amaranth and common waterhemp. Research, conducted by all major universities in the corn belt, and field use since its registration in 2020, have proven a synergistic effect with HPPD's such as Mesotrione (Callisto®), Topramezone (Impact®), Armezon®, Tolpyralate (SHIELDEX®), and Tembotrione (Laudis®).

**TOUGH 5EC** can be tank mixed with products approved for seed corn and applied preplant burn down or post emergence up to 8 leaf stage. In addition, **TOUGH 5EC** has been tested by leading seed producers on numerous male and female inbred lines without any issues, and is now included on "approved product" lists. As shown in the data below, making **TOUGH 5EC** part of the integrated weed management program provides improved control of resistant weeds.

The chart to the right shows the results from from early unversity testing at Iowa State University.

This data, corroborated by many others, clearly shows that adding **TOUGH 5EC** to Callisto drastically increased the control of Common Waterhemp.

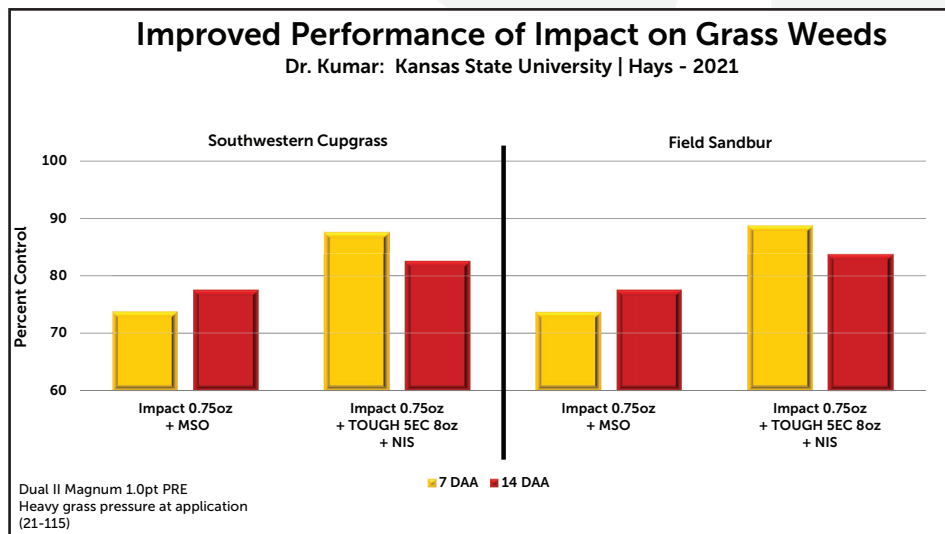


In 2021, a trial at Kansas State University was initiated to evaluate the 0.75/oz rate of Impact, (shorter rotation restrictions) for control of Palmer Amaranth.

Adding **TOUGH 5EC** to Impact improved the control of this very difficult to control weed.

See Reverse

While **TOUGH 5EC** controls broadleaf weeds, studies have shown that **TOUGH 5EC** can actually improve the effectiveness of HPPD herbicides for grass weed control, such as Impact. Grass weed pressure (Southwestern Cupgrass and Field Sandbur) was very high in the field at Kansas State University where research was conducted in 2021. 8 ounces of **TOUGH 5EC** was added to 0.75 ounces of Impact. The chart to the right shows the increased rate of control of these grass weeds at 7 and 14 days after application. The photos below were taken 14 days after application. Improved control of both these grass weed species is impressive.



### Improved Performance of Impact on Grass Weeds

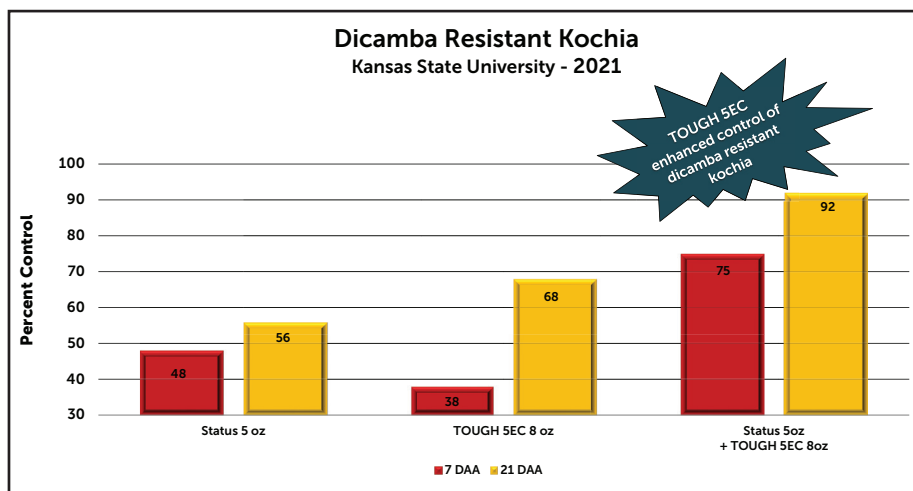
Dr. Kumar: Kansas State University | Hays - 2021



Impact 0.75oz + MSO



Impact 0.75oz + TOUGH 5EC 8oz + NIS



In the summer of 2021, after hearing from growers that **TOUGH 5EC** was improving the effectiveness of Status®, a greenhouse\* study was initiated at Kansas State University to evaluate treatments applied on Dicamba resistant kochia. The chart to the left shows that adding 8 ounces of **TOUGH 5EC** to 5 ounces of Status drastically increased the control of the dicamba resistant kochia.

\* 12 pots/treatment, COC (1% v/v) was added to treatments. Kochia was 3-4 inch tall at time of application.

TOUGH 5EC is a registered trademark of Belchim Crop Protection. Callisto is a registered trademark of Syngenta, SHIELDDEX is a registered trademark of Summit Agro USA. Impact is a registered trademark of Amvac Chemical Corporation. Laudis is a registered trademark of Bayer and Armezon and Status are registered trademarks of BASF.