



TOUGH R[®]

***A Unique and Winning Combination
to Control Resistant Weeds in Corn***



Belchim USA
GROWING TOGETHER





A UNIQUE AND INNOVATIVE NEW TOOL TO BEAT RESISTANT WEEDS

Belchim USA is pleased to introduce TOUGH R™, two valuable and effective chemistries, blended together. TOUGH R™ controls or suppresses actively growing annual broadleaf weeds in field corn, providing contact and residual weed control. Growers will see optimal control of even the most resistant weeds when emerged at time of application

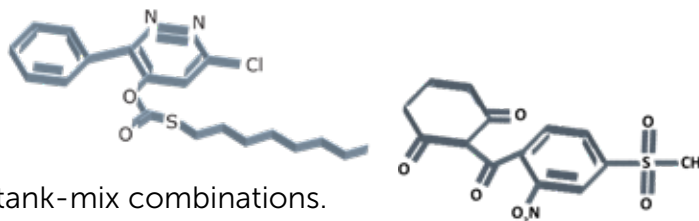
COMBATING WEED RESISTANCE

Resistance to HPPD herbicides is a challenge to crop producers globally. Recent studies indicate weeds such as waterhemp and palmer amaranth show even higher resistance to the one time “silver bullet” mesotrione. In the early 2000’s, mesotrione, was introduced as an effective preemergence (PRE) and postemergence (POST) herbicide for controlling a large variety of broadleaf weeds.

TWO CHEMISTRIES, ONE EFFECTIVE SOLUTION

Belchim Crop Protection recognized the beneficial properties of mesotrione, and began trials across the corn belt in 2017, partnering mesotrione with Pyridate. Pyridate (TOUGH® 5EC), was brought back to the market by Belchim, who saw the value of this effective PSII inhibitor toward the fight against resistant weeds.

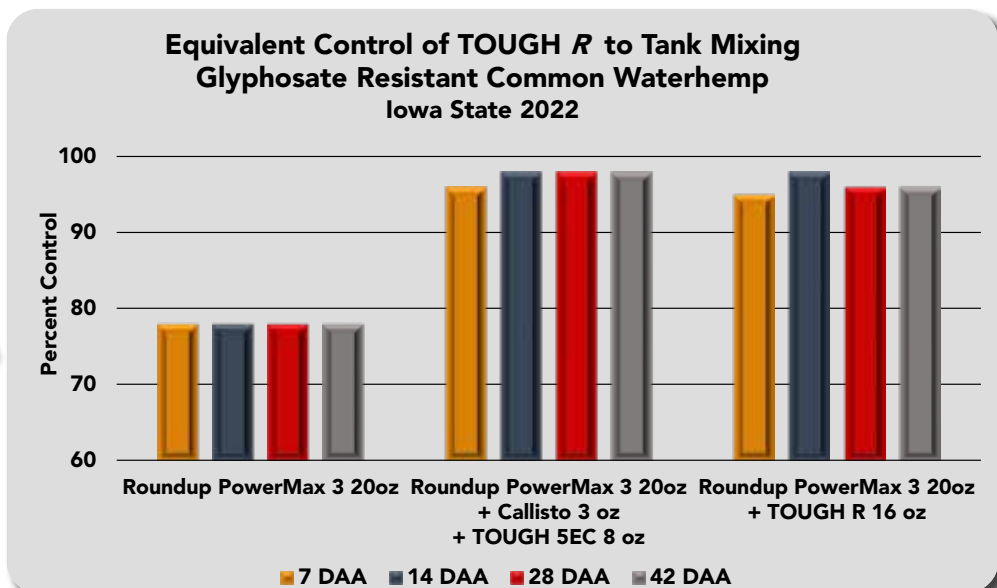
Pyridate works by blocking a weed’s photosystem II process, triggering the release of toxic forms of oxygen and causing rapid cell wall degradation. Pyridate is a highly effective mode of action in corn and shows increased levels of weed control in tank-mix combinations.



Mesotrione inhibits 4-hydroxyphenylpyruvate dioxygenase (HPPD), affecting pigment synthesis resulting in rapid plant shoot wilting, bleaching, growth reductions, and ultimately death.

A trial was conducted at Iowa State with a tank mixture of Callisto®, TOUGH® 5EC and Roundup PowerMAX®

TOUGH R® and Roundup PowerMAX consistently increases control of Common Waterhemp.

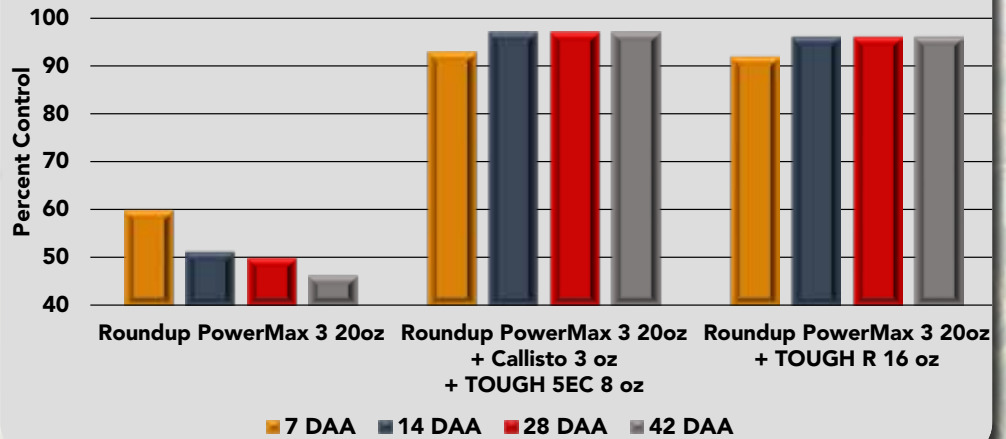


Waterhemp 4-6" tall, 5-20/ft², 15GPA spray volume, AMSOL 2.5% v/v added to all treatments

A trial was conducted at Purdue in 2022 with a tank mixture of Callisto®, TOUGH® 5EC and Roundup PowerMAX®

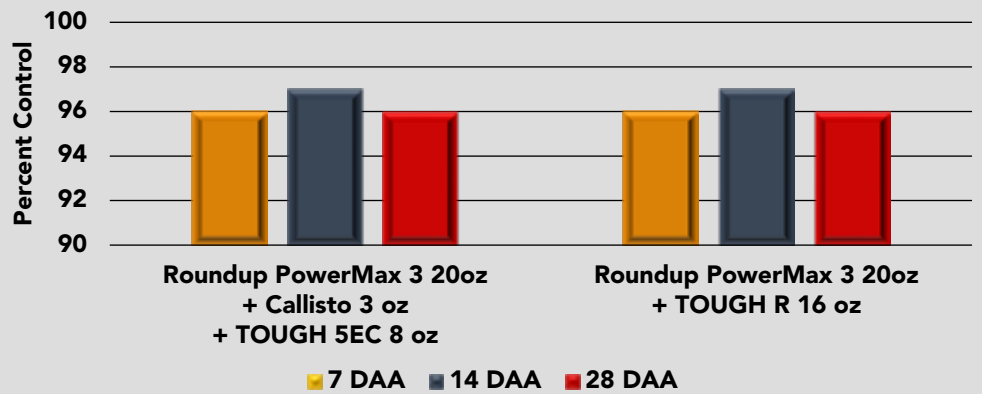
TOUGH R® and Roundup PowerMAX consistently improves control of resistant weeds such as Palmer.

Equivalent Control of TOUGH R to Tank Mixing Glyphosate Resistant Palmer Amaranth Purdue 2022



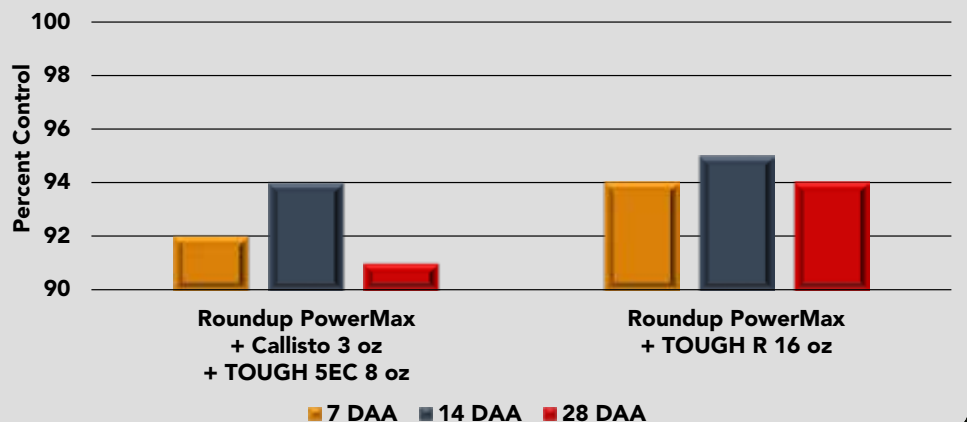
Dual II Magnum 0.33pt/a PRE to all treatments, Palmer 0.5-11" tall (that's a stress on HPPD alone), 6/ft², 20GPA spray volume, AMSOL 2.5% v/v added to all treatments

Equivalent Control of TOUGH R to Tank Mixing Common Waterhemp Summary of 2021-2022 across 10 trials (Iowa, Illinois, Indiana, Missouri)



A summary of trials show the control of Common Waterhemp and Palmer Amaranth in corn when treated with a tank mixture of Callisto®, TOUGH® 5EC and Roundup PowerMAX® when compared to TOUGH R® and Roundup PowerMAX 3.

Equivalent Control of TOUGH R to Tank Mixing Palmer Amaranth Summary across 11 trials 2021-2022 (Kansas, Nebraska, Indiana, Tennessee, Arkansas)





Pyridate and Mesotrione in One Jug

- Post-emergent contact and residual weed control, corn herbicide
- Active ingredients: 0.313 lb. ai pyridate / 0.094 lb. ai mesotrione
- Mixture: 16 oz of formulated product per acre = 8 ounces of TOUGH® 5EC + 3 ounces of mesotrione per acre
- Formulation type: Oil Dispersion (OD)
- Fully tested with major universities in the corn belt
- No compatibility issues in tank-mixes used in integrated weed management programs
- Delivers synergistic effects of TOUGH 5EC with an HPPD in one formulation (patent pending)
- Use sequentially and/or tank mix with other herbicides as part of a complete weed control program
- Can mix with postemergence grass herbicides to provide broad spectrum weed control in corn
- Can be used in combination with a burndown herbicide, prior to planting, to provide added burndown and residual weed control in field corn
- Rainfast within 1 hour
- Convenient to use; one jug to store, pour, and dispose of

Photos were taken at Iowa State in 2021, 8 Days after products were applied.
The photos clearly show the benefit of adding TOUGH 5EC (pyridate) to the tank mix with TOUGH R



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Callisto and Dual Magnum are registered trademarks of Syngenta
Roundup PowerMAX is a registered trademark of Bayer Crop Science

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