

EVALUATION OF ET-4000 ADJUVANT IN CORN IN 2016 AT MOORHEAD, MN

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The objective of this study was to evaluate ET-4000, an acidic AMS replacement adjuvant, for weed control and crop safety when applied with glyphosate and ethofumesate in corn. Ethofumesate is not currently labeled for use in corn.

MATERIALS AND METHODS

An experiment was conducted near Moorhead, MN in 2016. The trial site was prepared using a Kongskilde 's-tine' field cultivator with rolling baskets on May 7, 2016. 'DKC38-04 RIB' Dekalb corn was seeded in 22-inch rows at 32,000 seeds per acre on May 12 with a John Deere 1700XP 6-row planter. Postemergence (POST) treatments were applied June 17. All herbicide treatments were applied with a bicycle sprayer in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO₂ at 30 psi to the center four rows of six row plots 30 feet in length. Corn injury and common lambsquarters and waterhemp control were evaluated June 24 and July 7.

All corn injury and weed control evaluations were a visual estimate of percent fresh weight reduction in the four treated rows compared to the adjacent untreated strip. Experimental design was randomized complete block with 4 replications for each trial. Data were analyzed with the ANOVA procedure of ARM, version 2016.4 software package.

Table 1. Application Information – Moorhead, MN 2016

Date	June 17
Time of Day	1:00 PM
Air Temperature (F)	78
Relative Humidity (%)	65
Wind Velocity (mph)	3
Wind Direction	E
Soil Temp. (F at 6")	69
Soil Moisture	Poor
Cloud Cover (%)	90
Next Rainfall	June 18
Corn Stage	V7
Common Lambsquarters	8 inch
Waterhemp	6 inch

SUMMARY

Ethofumesate is not currently labeled for use in corn. No corn injury was observed in any treatment (Table 2). Ethofumesate, at 4 fl oz/A, appears to be quite safe to corn. ET-4000 also appears to have good crop safety when applied in corn at both 1% and 2% v/v.

Common lambsquarters control on June 24 ranged from 15% from Ethofumesate + MSO + ET-4000 to 97% from treatments containing Roundup PowerMax + Ethofumesate or Roundup PowerMax + ET-4000. Application of Ethofumesate 4SC + AMS gave similar control of lambsquarters to application of Ethofumesate 4SC + ET-4000. Common lambsquarters control ranged from 94% to 97% when treatments contained Roundup PowerMax. July 7 evaluation of common lambsquarters control followed the same patterns as observed on June 24.

Waterhemp control was less than adequate from all treatments at both evaluation dates. Treatments containing Roundup PowerMax gave 20% to 40% greater waterhemp control than treatments without PowerMax. Control was generally greater from all treatments on the June 24 evaluation than at the July 7 evaluation. Weed regrowth and additional waterhemp germination accounted for this decline in control as the season progressed. Application of Ethofumesate 4SC

at 4 fl oz/A provided less than 35% control regardless of the adjuvants used in that application. Waterhemp control from application of Ethofumesate + Roundup PowerMax was greater or tended to be greater than from Ethofmusate or Roundup PowerMax applied individually. The use of ET-4000 at 1% v/v gave similar waterhemp control as N-Pak AMS at 2.5% v/v when applied with Roundup PowerMax + Ethofumesate + Destiny HC. However, increasing the rate of ET-4000 to 2% v/v tended to improve waterhemp control compared to N-Pak AMS or ET-4000 at 1% v/v when applied with the same herbicides.

Table 2. Corn Injury and weed control from herbicides applied on June 17 with AMS or ET-4000 at Moorhead, MN in 2016.

Treatment ¹	Rate	-----June 24-----			-----July 7-----	
		corn % inj	wahe ² % cntl	colq % cntl	wahe % cntl	colq % cntl
Ethofumesate 4SC+	4 fl oz/a	0	33	18	5	28
MSO+	1.5 pt/a					
N-Pak AMS	2.5 % v/v					
RU PowerMax+	28 fl oz/a	0	53	94	25	100
Prefer 90 NIS+	0.25 % v/v					
N-Pak AMS	2.5 % v/v					
RU PowerMax+	28 fl oz/a	0	66	97	33	95
Ethofumesate 4SC+	4 fl oz/a					
N-Pak AMS+	2.5 % v/v					
Destiny HC HSMOC	1.5 pt/a					
Ethofumesate 4SC+	4 fl oz/a	0	30	15	13	25
MSO+	1.5 pt/a					
ET-4000	1 % v/v					
RU PowerMax+	28 fl oz/a	0	55	97	38	93
Prefer 90 NIS+	0.25 % v/v					
ET-4000	1 % v/v					
RU PowerMax+	28 fl oz/a	0	63	97	35	93
Ethofumesate 4SC+	4 fl oz/a					
ET-4000+	1 % v/v					
Destiny HC HSMOC	1.5 pt/a					
RU PowerMax+	28 fl oz/a	0	73	97	45	93
Ethofumesate 4SC+	4 fl oz/a					
ET-4000+	2 % v/v					
Destiny HC HSMOC	1.5 pt/a					
LSD (0.05)		NS	18.5	5.3	18.3	12.0

¹MSO=Methylated Seed Oil provided by Loveland. N-Pak AMS=ammonium sulfate provided by Winfield. Prefer 90 NIS=nonionic surfactant provided by West Central, Inc. ET-4000=an acidic AMS replacement was produced by Earth Science Laboratories and provided by MK Ag Service, Inc.

²wahe=waterhemp; colq=common lambsquarters

CONCLUSIONS

Glyphosate-resistant waterhemp was present at this location. None of the treatments applied provided adequate, season-long, control of waterhemp. Application of glyphosate + ethofumesate gave greater waterhemp control than application of either glyphosate or ethofumesate alone. ET-4000 at 1% v/v performed very similarly to N-Pak AMS at 2.5% v/v. However, increasing the rate of ET-4000 to 2% v/v appeared to provide some improvement of waterhemp control when applied with glyphosate + ethofumesate + Destiny HC. Addition of ET-4000 to the spray tank did not adversely, or positively, affect common lambsquarters control compared to the use of AMS. Even though ethofumesate is not currently labeled for use in corn, all treatments applied showed excellent crop safety.