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CORN: *Zea mays* L. 'DeKalb DKC61-49 RIB'

EVALUATION OF SOIL INSECTICIDES APPLIED AT PLANTING FOR LARVAL CORN ROOTWORM CONTROL, 2013

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Western corn rootworm (WCR): *Diabrotica virgifera virgifera* LeConte

Granular and liquid soil insecticides were applied at planting time to evaluate their effectiveness for larval corn rootworm (CRW) control in non-CRW traited field corn near Clay Center, NE during 2013. Trial site was late-planted corn and pumpkins (insecticide free) during 2012. Experimental design was a RCB with 4 replicates. Plot size was 4 rows x 144 ft length in 30-inch row spacing. Soil type was a Crete silt loam. 'DeKalb DKC61-49 RIB' (contains GENVT2RIB insect and herbicide traits) corn hybrid was planted on 6 May with a 2-row JD 7100 Maximerge planter with finger pickup seed units. The corn hybrid received a seed-applied treatment of Poncho 250 (clothianidin @ 0.25 mg ai/kernel). A northeast wind @ < 5 mph occurred at planting. Granular insecticides were applied via the SmartBox application system and directed into the open seed furrow (IF). Liquid insecticides were applied in a 5 GPA water solution via a CO_2 pressurized system and directed IF. Lexar (contains the AIs: S-metolachlor, atrazine and mesotrione) herbicide @ 3 qt/acre was broadcast applied to trial site on 17 May. On 06 Jun, phytotoxic injury (lack of plant uniformity, poor color, plant stunting) was observed in Counter 20G treated plots. Plant populations were evaluated on 07 Jun. The total number of plants per plot was recorded and converted to plants per acre. Initial CRW egg hatch occurred on approximately 10 Jun. Extended leaf height (ELH) of twenty plants per plot was recorded in inches on 18 Jun. The total number of root lodged plants per plot was recorded on 15 Jul. Larval feeding damage was evaluated on 24 Jul. Five randomly selected plants were dug from each plot, washed, and rated using the Iowa State 0-3 scale (0 = no feeding, 1 = one node of roots pruned to within 1.5 inches of the stalk, 2 = two nodes of roots pruned to within 1.5 inches of the stalk, 3 = 3 or more nodes of roots pruned to within 1.5 inches of the stalk). A significant weather event occurred on 01 Aug. A northeast wind of 65 mph was accompanied by pea to

nickel-sized hail. The total number of lodged plants, and broken plants at or above and below the ear per plot were recorded on 15 Aug. Plots were machine harvested on 11 Oct. Percent moisture and lbs of grain were recorded and corrected to 56 lbs/bu @ 15.5% moisture. Data were analyzed by PROC MIXED with mean separation using differences of least square means (P = 0.05).

From planting (06 May) to larval feeding damage evaluation (24 Jul), rainfall totaled 9.00 inches and overhead irrigation, 5.95 inches. An application error occurred in the Counter 20G plot of Rep 1. Therefore, Table 1 contains data from Reps 1-4 for the remaining treatments and untreated check. Table 2 contains data from Reps 2-4 for all the treatments and untreated check. Larval CRW densities were moderately high, with mean root injury ratings (Iowa 0-3 scale) in the untreated check, averaging 1.89 (Table 1) and 1.86 (Table 2). With the exception of Capture LFR @ 0.49 fl oz, treatments significantly enhanced root injury protection compared to the untreated check (Table 1). Capture LFR treatments did not significantly reduce root injury compared to the untreated check (Table 2). Corn extended leaf heights in the Counter 20G plots were significantly reduced compared to the other treatments (Table 2). Weather event on 01 Aug severely negated final grain yield levels. Yield levels were not significantly influenced by the application of a soil insecticide at planting (Table 1). This research was supported by industry gifts of pesticides and research funding.

Table 1

Treatment[a]/ Formulation	Rate-amt form /1000 row ft	Place-ment	Plants /Acre[c]	Extended Leaf Height[c]	Total No. of Root Lodged Plants[b]	Root Injury Rating[b]	Total No. of Lodged Plants[c]	Total No. of Broken Plants At or Above Ear[b]	Total No. of Broken Plants Below Ear[b]	Yield Bu/Acre[c]
Capture LFR	0.49 fl oz	IF	31,066	32.0	0.5 a	1.60 bc	195.8	37.5 a	5.8 a	125.3
Capture LFR	0.98 fl oz	IF	30,247	32.6	0.3 a	1.27 ab	128.0	28.5 a	5.8 a	113.6
Force CS	0.46 fl oz	IF	30,782	32.4	0.0 a	0.95 a	144.5	64.8 b	3.5 a	126.5
Aztec 2.1G	6.7 oz	IF	30,537	32.1	0.0 a	0.83 a	33.3	61.8 b	3.3 a	118.5
Untreated			30,332	32.6	5.0 b	1.89 c	339.0	45.8 ab	12.8 b	117.5
		P	0.0811	0.7193	0.0017	0.0012	0.0965	0.0292	0.0233	0.1035

Table 2

Treatment[a]/ Formulation	Rate-amt form /1000 row ft	Place-ment	Plants /Acre[b]	Extended Leaf Height[b]	Total No. of Root Lodged Plants[b]	Root Injury Rating[b]	Total No. of Lodged Plants[c]	Total No. of Broken Plants At or Above Ear[b]	Total No. of Broken Plants Below Ear[b]	Yield Bu/Acre[b]
Capture LFR	0.49 fl oz	IF	31,036 a	32.0 a	0.7 a	1.57 bc	216.0	33.7 a	6.0 a	120.0 a
Capture LFR	0.98 fl oz	IF	29,865 c	32.5 a	0.3 a	1.41 abc	137.0	29.7 a	7.3 ab	109.1 b
Force CS	0.46 fl oz	IF	30,826 ab	32.4 a	0.0 a	1.05 ab	187.3	66.3 b	3.0 a	126.0 a
Aztec 2.1G	6.7 oz	IF	30,567 ab	32.4 a	0.0 a	1.01 a	38.3	66.3 b	2.3 a	119.4 a
Counter 20G	6 oz	IF	29,845 c	29.6 b	2.0 ab	1.21 ab	76.7	45.0 ab	3.7 a	121.1 a
Untreated			30,348 bc	32.8 a	5.3 b	1.86 c	300.3	36.3 a	12.7 b	119.1 a
		P	0.0090	0.0185	0.0346	0.0344	0.3714	0.0477	0.0450	0.0301

[a]Granular insecticides were applied via the SmartBox application system and liquid insecticides were applied in a 5 GPA water solution at planting.

[b]Means in column followed by the same lower case letter are not statistically different using the differences of least square means (MIXED; $p|t|>0.05$).

[c]Means in column are not statistically different using the differences of least square means (MIXED; $p|t|>0.05$).

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Brand Name	**Formulation**	**Common Name**	**Composition**	**Manufacturer**
Aztec	2.1G	tebupirimphos and cyfluthrin	(*RS*)-[*O*-(2-*tert*-butylpyrimidin-5-yl) *O*-ethyl *O*-isopropyl phosphorothioate] AND (*RS*)-α-cyano-4-fluoro-3-phenoxybenzyl (1*RS*,3*RS*;1*RS*,3*SR*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate	Amvac 4100 E. Washington Boul. Los Angeles, CA 90023
Counter	20G	terbufos	*S*-*tert*-butylthiomethyl *O*,*O*-diethyl phosphorodithioate	Amvac 4100 E. Washington Blvd. Los Angeles, CA 90023
Capture	LFR	bifenthrin	2-methylbiphenyl-3-ylmethyl (1*RS*,3*RS*)-3-[(*Z*)-2-chloro-3,3,3-trifluoroprop-1-enyl]-2,2-dimethylcyclopropanecarboxylate	FMC 1735 Market Street Philadelphia, PA 19103
Force	CS	tefluthrin	2,3,5,6-tetrafluoro-4-methylbenzyl (1*RS*,3*RS*)-3-[(*Z*)-2-chloro-3,3,3-trifluoroprop-1-enyl]-2,2-dimethylcyclopropanecarboxylate	Syngenta Crop Protection, Inc. P. O. Box 18300 Greensboro, NC 27409