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CORN: *Zea mays* L. 'DeKalb DKC63-33 RIB' and 'DeKalb DKC63-25'

EVALUATION OF SMARTSTAX TRAITED AND REFUGE CORN HYBRIDS IN COMBINATION WITH SOIL INSECTICIDES AT PLANTING FOR LARVAL CORN ROOTWORM CONTROL, 2013

Terry A. DeVries

South Central Agricultural Laboratory

University of Nebraska-Lincoln

842 Road 313, P.O. Box 66

Clay Center, NE 68933

Phone: (402) 762-4405

Fax: (402) 762-4411

Email: tdevries1@unl.edu

Robert J. Wright

Department of Entomology

University of Nebraska-Lincoln

103 Entomology Hall

Lincoln NE 68583-0816

Email: rwright2@unl.edu

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

SmartStax and non-corn rootworm (CRW) traited corn hybrids in combination with soil insecticides were evaluated for effectiveness of larval CRW control near Clay Center, NE during 2013. Trial site was late-planted corn and pumpkins (insecticide free) during 2012. Experimental design was a RCB with 3 replicates. Plot size was 4 rows x 145 ft length in 30-inch row spacing. Soil type was a Crete silt loam. Trial area was prepared with a rotary stalk chopper on 27 Apr. Bin run VT3P traited volunteer corn (VC) seed was pre-counted and broadcasted on one of the GENSSRIB treatments at a rate of 7,500 seeds per acre. 'DeKalb DKC63-33 RIB' (contains GENSSRIB [SmartStax] insect and herbicide traits) and 'DeKalb DKC63-25' (contains GENVT2P insect and herbicide traits) corn hybrids were planted on 13 May with a 2-row JD 7100 Maximerge planter with finger pickup seed units. Each hybrid received a seed-applied treatment of Poncho 500 (clothianidin @ 0.5 mg ai/kernel) and Votivo. A south wind @ 10-20 mph occurred at planting. Liquid insecticides were applied in-furrow (IF) in 5 GPA water solution via a CO_2 pressurized system. Granular insecticides were applied IF via the SmartBox application system. Plant populations were evaluated on 07 Jun. The total number of plants per plot was recorded and converted to plants per acre. Established VT3P traited VC populations in the GENSSRIB treatment was 1,530 PPA. Initial CRW egg hatch occurred on approximately 10 Jun. Extended leaf height (ELH) of twenty plants per plot was recorded to the nearest half-inch on 21 Jun. The total number of root lodged plants per plot due to larval CRW feeding was recorded on 22 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 was recorded on 12 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 (13 May) to larval feeding damage evaluation (24 Jul), rainfall totaled 8.75 inches and overhead irrigation, 5.95 inches. Mean root injury ratings (Iowa 0-3 Scale) for the GENSSRIB traited corn hybrid without soil insecticide averaged 0.32. The application of a soil insecticide to the GENSSRIB traited corn hybrid did not significantly reduce root injury ratings or enhance final grain yield levels. Mean root injury ratings (Iowa 0-3 Scale) for the GENVT2P traited corn hybrid without soil insecticide averaged 1.97. Capture LFR and Fanfare ES applications did not statistically enhance root injury protection compared to the untreated GENVT2P corn hybrid treatment. The weather event on 01 Aug severely negated final grain yield levels. Following the weather event, all treatments significantly reduced plant lodging compared to the untreated GENVT2P corn hybrid treatment. This research was supported by industry gifts of pesticide and research funding.

Treatment[a]/ Formulation	Rate-amt form /1000 row ft	Place-ment	Plants /Acre[b]	Extended Leaf Height[c]	Total No. of Root Lodged Plants[c]	Root Injury Rating[b]	Total No. of Lodged Plants[b]	Total No. of Broken Plants At or Above Ear[b]	Total No. of Broken Plants Below Ear[c]	Yield Bu/Acre[b]
GENVT2P + Counter 20G	6 oz	IF	29,701d	34.6	0.3	1.28 cd	4.7 a	2.7 a	0.3	155.8 ab
GENVT2P + Aztec 2.1G	6.7 oz	IF	29,996 cd	35.8	1.3	0.91 bc	33.7 a	2.7 a	0.7	154.9 ab
GENVT2P + Fanfare ES	0.3 fl oz	IF	30,202 bcd	35.5	38.7	1.95 e	69.0 a	3.0 a	2.3	150.2 abc
GENVT2P + Capture LFR	0.39 fl oz	IF	30,264 bcd	36.1	33.7	1.63 de	40.3 a	3.0 a	1.7	155.6 ab
GENVT2P + Force CS	0.46 fl oz	IF	30,083 cd	36.0	0.0	0.68 abc	5.7 a	2.0 a	1.3	161.4 a
GENVT2P			30,068 cd	35.8	118.7	1.97 e	292.0 b	12.7 a	15.3	142.9 c
GENSSRIB			30,695 ab	35.6	0.3	0.32 ab	16.0 a	102.7 c	6.0	144.6 bc
GENSSRIB + VT3P VC			30,357 bc	36.7	0.0	0.34 ab	17.0 a	90.3 bc	5.7	141.3 c
GENSSRIB + Capture LFR	0.2 fl oz	IF	30,665 ab	36.2	0.0	0.21 a	10.3 a	72.0 b	13.3	146.2 bc
GENSSRIB + Capture LFR	0.39 fl oz	IF	30,944 a	35.9	2.3	0.24 a	6.0 a	89.3 bc	13.0	142.6 c
		P	0.0061	0.3454	0.0896	<0.0001	0.0013	<0.0001	0.0641	0.0177

[a]Liquid insecticides were applied in a 5 GPA water solution at planting. Granular insecticides were applied via the SmartBox application system 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**
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
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*-	Amvac

			diethyl phosphorodithioate	4100 E. Washington Blvd. Los Angeles, CA 90023
Fanfare	ES	bifenthrin	2-methylbiphenyl-3-ylmethyl (1*RS*,3*RS*)-3-[(*Z*)-2-chloro-3,3,3-trifluoroprop-1-enyl]-2,2-dimethylcyclopropanecarboxylate	Makhteshim Agan of North America, Inc. 3120 Highwoods Blvd Suite 100 Raleigh, NC 27604