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CORN: *Zea mays* L. 'DeKalb DKC62-98RIB' and 'DeKalb DKC62-77RIB'

EVALUATION OF SMARTSTAX TRAITED AND REFUGE CORN HYBRIDS IN COMBINATION WITH SOIL INSECTICIDES AT PLANTING FOR LARVAL CORN ROOTWORM CONTROL, 2015

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

SmartStax traited and refuge corn hybrids in combination with soil insecticides were evaluated for effectiveness of larval CRW control near Clay Center, NE during 2015. Trial site was late-planted corn and pumpkins (insecticide free) during 2014. Experimental design was a RCB with four replicates. Plot size was 4 rows x ~150 ft length with 30-inch row spacing. Soil type was a Crete silt loam. 'DeKalb DKC62-77 RIB' (contains GENSSRIB [SmartStax] insect and herbicide traits) and 'DeKalb DKC62-98RIB' (contains GENVT2PRIB [refuge] insect and herbicide traits) corn hybrids were planted on 30 Apr with a 2-row JD 7100 Maximerge planter with finger pickup seed units. A southeast wind @ 10-13 mph occurred at planting. Liquid insecticides were applied IF in either 5 GPA water or 10-34-0 starter fertilizer solution via a CO_2 pressurized system. Granular insecticides were applied IF via the SmartBox application system. Initial CRW egg hatch was first documented on 08 Jun. Plant populations were evaluated on 09 Jun. The total number of plants per plot was recorded and converted to plants per acre (PPA). Initial adult CRW emergence was witnessed on 10 Jul. The total number of root lodged plants per plot due to larval CRW feeding was recorded on 20 Jul and 17 Sept and converted to percentage of lodged plants. Larval feeding damage was evaluated on 23 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). Plots were machine harvested on 08 Oct. Percent moisture and lbs of grain were recorded and corrected to 56 lbs/bu @ 15.5% moisture to evaluate yield levels. Data were analyzed by PROC MIXED with mean separation using differences of least square means (P =

0.05).

From planting (30 Apr) to larval feeding damage evaluation (23 Jul), rainfall totaled 16.75 inches and overhead irrigation, 1.36 inches. Mean root injury ratings (Iowa 0-3 Scale) for the untreated GENSSRIB corn hybrid averaged 0.13. Planting-time IF applications of Precept 3G to the GENSSRIB 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 untreated GENVT2PRIB corn hybrid averaged 0.95 and 1.18 (with application of 5 GPA 10-34-0 starter fertilizer). With the exception of Capture LFR, Counter 20G, Lorsban 15G and Warrior II, planting-time soil insecticides applied to GENVT2PRIB traited corn statistically enhanced root injury protection and reduced late season root lodging compared to the untreated GENVT2PRIB plots. Final grain yields of SmartStax traited and refuge corn hybrids in combination with soil insecticides were not significant. This research was supported by industry gifts of pesticide and research funding.

Treatment/ Formulation	Rate-amt form /1000 row ft	Place -ment	Yield[e] (bu/acre)	Late Season % Root Lodging[d]	Root Injury Rating[d]	% Root Lodging at Root Dig[d]	PPA[e]
GENVT2PRIB + Aztec 4.67G[a]	3 oz	IF	243.2	18.2 abc	0.51 c	0.2 ab	33,019
GENSSRIB	---	---	242.9	0.1 a	0.13 ab	0.4 ab	31,827
GENVT2PRIB + Force CS[b]	0.46 fl oz	IF	239.1	11.8 ab	0.49 bc	0.0 a	33,077
GENVT2PRIB + Precept 3G[a]	4 oz	IF	238.6	16.8 abc	0.51 c	0.2 ab	32,804
GENSSRIB + Precept 3G[a]	4 oz	IF	238.2	0.1 a	0.08 a	0.1 a	31,674
GENVT2PRIB + Counter 20G[a]	6 oz	IF	236.3	37.6 bcd	1.12 e	0.9 ab	32,562
GENVT2PRIB + Warrior II[c]	0.33 fl oz	IF	235.6	46.9 de	0.99 e	2.6 abc	32,949
GENVT2PRIB + Capture LFR[b]	0.49 fl oz	IF	232.0	38.3 cd	0.62 cd	2.0 abc	32,938
GENVT2PRIB + Capture LFR[c]	0.49 fl oz	IF	231.2	56.3 de	0.99 e	3.3 bcd	33,012
GENVT2PRIB + Lorsban 15G[a]	8 oz	IF	226.9	54.3 de	0.83 cde	6.4 de	32,984
GENVT2PRIB	---	---	220.9	54.7 de	0.95 de	7.7 e	32,537
GENVT2PRIB[c]	---	---	219.7	66.4 e	1.18 e	4.5 cde	33,676
		P	0.2385	<0.0001	<0.0001	<0.0001	0.1556

[a]Granular insecticide applied via the SmartBox application system at planting.

[b]Liquid insecticide applied in a 5 GPA water solution at planting.

[c]Liquid insecticide, treatment applied with 5 GPA 10-34-0 starter fertilizer solution at planting.

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

[e]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 Corporation 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, LLC P.O. Box 18300 Greensboro, North Carolina 27419-8300
Warrior II with Zeon Technology	2.08 CS	lambda-cyhalothrin	reaction product comprising equal quantities of (*R*)-α-cyano-3-phenoxybenzyl (1*S*,3*S*)-3-[(*Z*)-2-chloro-3,3,3-trifluoropropenyl]-2,2-dimethylcyclopropanecarboxylate and (*S*)-α-cyano-3-phenoxybenzyl (1*R*,3*R*)-3-[(*Z*)-2-chloro-3,3,3-trifluoropropenyl]-2,2-dimethylcyclopropanecarboxylate	Syngenta Crop Protection, LLC P.O. Box 18300 Greensboro, North Carolina 27419-8300

Aztec	4.67G	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 Blvd. Los Angeles, CA 90023
Counter	20G	terbufos	*S*-*tert*-butylthiomethyl *O*,*O*-diethyl phosphorodithioate	Amvac 4100 E. Washington Blvd. Los Angeles, CA 90023
Precept	3G	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	Monsanto Company 800 N. Lindbergh Blvd. St. Louis, MO 63167
Lorsban	15G	chlorpyrifos	*O*,*O*-diethyl *O*-3,5,6-trichloro-2-pyridyl phosphorothioate	Amvac 4100 E. Washington Blvd. Los Angeles, CA 90023