EVALUATION OF SEED AND IN-FURROW AT-PLANTING APPLIED INSECTICIDES ON SORGHUM

Texas Agricultural Experiment Station, Corpus Christi, TX, and
Michael and Walter Kuck Farm, Lavaca County, 1999

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OBJECTIVES: Field tests were conducted on sorghum in Nueces and Lavaca Counties to evaluate systemic seed and in-furrow applied insecticides. Objectives were to measure the impact of treatments on soil and foliar insect pests, and to access impact on grain sorghum yields.

MATERIALS/METHODS: Test 1. Sorghum DK45 hybrid was planted at the Texas Agricultural Experiment Station in Nueces County at 68,780 kernels/acre with a cone planter on 11 Mar in a sandy clay loam soil (50% sand, 26% silt, 24% clay) with 1.1% organic matter and a soil pH of 8.1. The soil temperature at-planting was 74°F, excellent soil moisture was present and cotton had been planted on the site in the previous season. Gammasan was applied to the seed as a planter box treatment. Furadan 4F was applied into the seed furrow through a single XR 8002-VS nozzle oriented with the row at 7.36 gpa total volume and 30 psi at a speed of 3 mph. Counter 15G was applied with standard John Deere banders (T-band).

Fertilizer applied was 100-14-0+0.6 Zn/acre and the herbicide was atrazine 4L (1.0 qt/acre). Plots 4 rows wide (38-inch row spacing) x 30 ft were arranged in a RCB design with 4 replications. A total of 7.6 inches of rain was received during the growing season.

Treatment effects were determined by (1) estimating the number of corn leaf aphids (CLA) in 10 plant whorls 37, 51, 55 and 60 days after planting (DAP), (2) counting the number of greenbugs (GB) on 10 lower leaves 51, 55 and 60 DAP, (3) Counting the number of plants on 13.75 ft on each of the center two rows of each plot and (4) harvesting by hand 13.75 ft row from each of the center two rows in each plot on 13 Jul. Panicles were thrashed for grain yield with a laboratory machine. Thrashed grain weights were corrected to 14% moisture.

Test 2. DK 45 hybrid sorghum was planted 15 Mar on a commercial farm in Lavaca County near Shiner, TX. The soil was a sandy clay loam. Soil moisture for planting was excellent and it was 63°F at the 4-inch depth. The seeding rate was 63,500 per acre on rows with 38-inch centers. Seed and granular insecticides were dispensed with a John Deere model 7100 planter and corn has been planted on the test site the previous season. Fertilizer applied was 79-40-13 + 0.5 qt zinc and herbicide Dual II Magnum 7.64 lb/gal (0.7 qt/acre) was applied in a 14-inch band. Plots were 3 rows wide and the average plot length was 580 ft. Treatments were replicated 3 times and arranged in a RCB design. Granular insecticide was applied in approximately a 6-inch band and Gammasan was mixed with seed as a planter box treatment.

Treatment effects were determined by (1) counting plants on 13.75 ft row at one location in the center two rows of each plot, estimating the number of GB on 10 lower leaves and determining presence or absence of CLA

in plant whorls all at 43 DAP; (2) counting chinch bugs behind 10 lower leaves in each plot 64 days after planting and (3) harvesting entire plots with a commercial machine on 23 Jul. Sorghum weights were corrected to a 14% moisture standard.

RESULTS/DISCUSSION: Test 1. Significantly more CLA were found in untreated and Gammasan treated sorghum 37 DAP compared with Adage, Counter and Gaucho treatments (Table 1). By 51 DAP, none of the insecticide treatments contained statistically fewer numbers of CLA than the untreated sorghum but, numerically, CLA in Adage and Gaucho treatments were extremely low and they remained low relative to the untreated sorghum at 55 and 60 DAP. The season average number of CLA were statistically fewer in Adage and Gaucho treated sorghum compared to all other treatments. Likewise (Table 2), GB were lower in Adage and Gaucho treated sorghum and, to a lesser extent, there were fewer in the Counter treated sorghum compared to untreated sorghum throughout the evaluation period (51, 55 and 60 DAP). No differences were found in plant population (Table 3). Surprisingly, only Gammasan treated sorghum produced significantly more grain compared with the untreated sorghum, although there was not a statistical difference between the Gammasan compared with Adage and Gaucho.

Test 2. Statistical differences in plant populations were observed but reasons for these differences were not apparent (Table 4). Reduced plant population, at least numerically, occurred in Counter treated sorghum. GB numbers were not found to differ statistically; these numbers were extremely low at 43 DAP. Adage and Gaucho treated sorghum had fewer CLA infested whorls than other treatments and these also separated statistically from each other. Even so, infestations did not persist but a short period. A chinch bug infestation developed but counts 64 DAP did not differ statistically nor were differences found in grain yields.

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Test 1

Table 1. Corn leaf aphid numbers in sorghum treated with insecticide at-planting, Texas Agricultural Experiment Station, Corpus Christi, TX, 1999.

Treatment/ rate	Corn leaf aphids/10 plants				
	37 DAP[b]	51 DAP	55 DAP	60 DAP	Season avg
Gaucho 480F (8.0 oz/cwt seed)	7.5 b	16.5 c	2.0 c	13 b	9.7 c
Gammasan DS[a] (5.4 oz/cwt seed)	925.0 a	107.5 bc	672.5 ab	1125 a	707.5 a
Adage 5FS (5.1 oz/cwt seed)	0.0 b	3.5 c	0.0 c	0 b	0.8 c
Counter 15G (4.0 oz/1000 ft row)	312.5 b	262.5 b	177.5 c	850 a	400.6 b
Furadan 4F (16.0 oz/acre)	25.0 b	625.0 a	750.0 a	825 a	556.3 ab
Untreated	1312.5 a	170.0 bc	337.5 bc	550 ab	592.5 ab
LSD (P=0.05)	546.4	231.6	352.2	600.5	220.6
P>F	.0001	.0001	.0002	.0010	.0000

Means in a column followed by the same letter are not significantly different by ANOVA (LSD).

[a] Gammasan (33.5% captan + 16.6% lindane).

[b] DAP = Days After Planting corresponding to 4/17, 5/1, 5/5 and 5/10.

Table 2. Greenbugs in sorghum treated with insecticide at-planting, Texas Agricultural Experiment Station, Corpus Christi, TX, 1999.

Treatment/ rate	Greenbugs/10 lower leaves			
	51 DAP[b]	55 DAP	60 DAP	Season avg
Gaucho 480F (8.0 oz/cwt seed)	0.3 d	2.3 b	3.8 c	2.1 b
Gammasan DS[a] (5.4 oz/cwt seed)	97.5 b	297.5 a	305.8 ab	233.6 a
Adage 5FS (5.1 oz/cwt seed)	0.0 d	0.5 b	0.3 c	0.3 b
Counter 15G (4.0 oz/1000 ft row)	54.3 c	74.3 b	141.3 bc	89.9 b
Furadan 4F (16.0 oz/acre)	167.3 a	365.0 a	346.3 a	292.8 a
Untreated	113.8 b	231.3 a	252.5 ab	199.2 a
LSD (P=0.05)	38.14	146.4	169.7	105.14
P>F	.0000	.0000	.0003	.0000

Means in a column followed by the same letter are not significantly different by ANOVA (LSD).

[a] Gammasan (33.5% captan + 16.6% lindane).

[b] DAP = Days After Planting corresponding to 5/1, 5/5 and 5/10.

Table 3. Plant population and yield in sorghum treated with insecticide at-planting, Texas Agricultural Experiment Station, Corpus Christi, TX, 1999.

Treatment/rate	Plants (1000's/acre)	Yield (lb/acre)
Gaucho 480F (8.0 oz/cwt seed)	63.5 a	4346 abc
Gammasan DS[a] (5.4 oz/cwt seed)	54.6 a	4504 a
Adage 5FS (5.1 oz/cwt seed)	62.8 a	4364 ab
Counter 15G (4.0 oz/1000 ft row)	64.0 a	4100 c
Furadan 4F (16.0 oz/acre)	63.4 a	4219 bc
Untreated	63.3 a	4133 bc
LSD (P=0.05)	NS	248.34
P>F	.3337	.0062

Means in a column followed by the same letter are not significantly different by ANOVA (LSD).

[a] Gammasan (33.5% captan + 16.6% lindane).

Test 2

Table 4. Plant population, insect infestation and yield in sorghum treated with granular and seed treatment insecticides, Michael and Walter Kuck Farm, Lavaca County, TX, 1999.

Treatment/rate	Plants (1000's/acre)	Greenbugs per 10 lower leaves[b]	Corn leaf aphid % infested whorls	Chinch bugs per 10 lower leaves[c]	Yield (lb/acre)
Gaucho 480F (8.0 oz/cwt seed)	58.0 abc	0.3 a	46.7 b	37.0 a	4947 a
Gammasan[a] (5.4 oz/cwt seed)	63.3 ab	27.3 a	100 a	91.7 a	5015 a
Adage 5FS (5.1 oz/cwt seed)	69.7 a	0.3 a	0.0 c	69.3 a	5333 a
Counter 20CR (3.0 oz/1000 ft row)	47.3 c	10.7 a	100 a	97.7 a	5059 a
Counter 20CR + Gammasan[a] (3.0 oz/1000 ft row + 5.4 oz/cwt seed)	53.0 bc	2.7 a	100 a	103.7 a	5067 a
Untreated	57.0 abc	3.3 a	100 a	64.3 a	5002 a
LSD (P=0.05)	12.9	NS	35.1	NS	NS
P>F	.0392	.4815	.0003	.1156	.1360

Means in a column followed by the same letter are not significantly different by ANOVA (P=0.05; LSD).

[a] Gammasan (33.5% captan + 16.6% lindane).

[b] Counts were made on 4/27 or 43 days after planting.

[C] Counts were made on 5/18 or 64 days after planting by counting for chinch bugs behind the leaf sheath.