



Large Plot Evaluation of Sugarcane Aphid Tolerance in Sorghum

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Summary

Since 2013, the sugarcane aphid (SCA), *Melanaphis sacchari* (Zehntner), has been a threat to sorghum production in south Texas. Host plant resistance is an IPM tactic that is complementary to other tactics including biological control and cultural practices with little to no additional costs to the farmer. Sorghum hybrids designated as 'Highly Tolerant' to sugarcane aphid are reaching the market with no published field data to support companies' claims. The current demonstration evaluates 15 hybrids for tolerance to SCA in a production field near Robstown, TX. Our results showed sorghum hybrids SP7715, BH4100, AG1203, GX15484, and M60GB31 (Fig. 1A) had the fewest number of SCA supporting company designations of these hybrids as highly SCA tolerant.

Introduction

Since 2013, the sugarcane aphid (SCA), *Melanaphis sacchari* (Zehntner), has been a threat to sorghum production in south Texas. Managing SCA on sorghum has primarily been through well timed insecticide applications. Although effective, insecticide applications add to production costs and lack of alternative management practices limits options for managing the aphid. Host plant resistance is an IPM tactic that is complementary to other tactics including biological control and cultural practices with little to no additional costs to the farmer. Sorghum hybrids designated as 'Highly Tolerant' to sugarcane aphid are reaching the market with no published field data to support companies claims. The current demonstration offers evidence of SCA tolerance in several sorghum hybrids.

Materials and Methods

Seeds of 15 hybrids from five commercial seed companies were provided for this demonstration (Table 1). Seed was treated with Concept III, a fungicide, and an insecticide seed treatment. The demonstration was planted on February 20, 2016 in a commercial sorghum production field near Robstown, TX. The

previous crop was sorghum and the field, a Victoria clay, was fertilized with 400 lbs. of 25-5-0, and Outlook® (BASF) herbicide at 12.5 oz/A was applied to manage weeds. Each hybrid was planted at a rate of 44,000 seeds per acre in 8-30 in. x 2,897' long rows. Hybrid assessments included SCA populations, leaf damage ratings (Table 2), test weight, and yield. Sixty consecutive plants from each of two locations within each plot were evaluated for leaf damage.

Results

Sorghum hybrids SP7715, BH4100, AG1203, GX15484, and M60GB31 (Fig. 1A) had the fewest number of SCA which supports company designations of these hybrids as highly SCA tolerant. Conversely, SP68M57, GX16667, M77GB52, and M75GB47 appeared to be susceptible based on SCA populations observed in this demonstration (Fig 1C). Other entries in this demonstration showed moderate to and high tolerance to SCA (Fig 1B). SCA-induced plant damage was highest on sorghum hybrids designated as susceptible (Table 3). Numerical differences in yield and test weight were observed among the hybrid entries but it was not possible to determine if differences were, in part, from SCA or inherent for each hybrid (Table 3).

Discussion

SCA tolerance by sorghum hybrids SP7715, BH4100, and AG1203 were consistent with several replicated trials in south and north central TX. Hybrids designated as having moderate to high SCA tolerance was based on comparisons of SCA populations on all hybrids in this demonstration. These hybrids could certainly be characterized as 'Highly Tolerant' to SCA due to the low number of aphids through the assessment time.

There were differences in SCA-induced plant injury among hybrids in this demonstration. The low injury scores in susceptible sorghum suggests SCA were clumped and the overall impact of SCA on production was minimal. The clumped pattern is common for SCA on sorghum. However, highly tolerant sorghum hybrids in this trial reduced populations and no visible injury by SCA was observed. All hybrids had good to excellent yield so it is not likely that SCA had a significant impact on performance in this demonstration. However, this demonstration showed the benefit of hybrids with SCA tolerance by limiting aphid populations when compared with susceptible sorghum entries.

ACKNOWLEDGEMENTS

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Table 1: Sorghum hybrids used in this demonstration and associated companys supplying seed

Variety	Company
SP68M57	Sorghum Partners
SP70B17	
SP7715	
DG GX 16667	dyna-Gro
DG M75GB47	
DG GX 15484	
DG GX 15371	
DG M77GB52	
DG 766B	
DG M 60GB31	
RV 9562	Terral
RV 9924	
RV 9782	
BH 4100	B&H Genetics
AG 1203	Alta

Table 2: SCA leaf injury rating and corresponding description of injury.

Plant Injury Rating Number	Description of Leaf Injury
1	No apparent damage
2	Up to 10% of the foliage with signs of sugarcane aphid activity or injury including honeydew, sooty mold, and leaf spotting
3	Up to 10% of the foliage with signs of sugarcane aphid activity or injury including honeydew, sooty mold, and leaf spotting
4	From 21 to 40% of the foliage with signs of sugarcane aphid activity or injury
5	From 41 to 50% of the foliage with signs of sugarcane aphid activity or injury including honeydew, sooty mold, and leaf spotting
6	From 51 to 60% of the foliage with signs of sugarcane aphid activity or injury
7	From 61 to 70% of the foliage with signs of sugarcane aphid activity or injury including honeydew, sooty mold, and leaf spotting
8	From 71 to 80% of the foliage with signs of sugarcane aphid activity or injury including honeydew, sooty mold, and leaf spotting
9	From 81 to 90% of the foliage with signs of sugarcane aphid activity or injury
10	Greater than 90% of the foliage with signs of sugarcane aphid activity or injury

Table 3: Sorghum hybrid performance including agronomic and SCA evaluations.

Response to SCA*	Variety	Plant Pop. (Plts/a)	Date of 50% Flower	Days to 50% Flower	Damage Rating [#]	Test Weight (bu/a)	Yield/Ac (@14% (lbs/a)
Susceptible	SP68M57	46464	10-May	80	1.0	60.7	5441
	DG GX16667	41624	13-May	83	1.0	60.2	4555
	DG M75GB47	45496	5-May	75	1.7	59.0	4853
Moderately to Highly Tolerant	SP70B17	43560	9-May	79	1.0	59.9	5131
	DG GX15371	37752	9-May	79	3.2	62.6	5262
	DG M77GB52	42592	3-May	73	1.8	59.6	4816
	DG 766B	30008	5-May	75	1.0	60.3	4927
	RV9562	41624	5-May	75	3.5	60.9	5426
	RV9924	40656	6-May	76	1.0	60.8	5708
	RV9782	38720	4-May	74	1.0	60.9	5573
Highly Tolerant	SP7715	39688	9-May	79	1.2	60.9	5326
	BH4100	49368	9-May	79	1.0	61.5	5460
	AG1203	40656	11-May	81	1.0	61.4	5510
	DG GX15484	43560	12-May	82	1.0	61.3	5158
	DG M60GB31	38720	5-May	75	2.0	61.8	5332

*Response was based on the number of SCA observed on select plants counted over 6 consecutive weeks.

[#]Damage rating is on a 1-10 scale with a 1 representing no damage and a 9 representing a >90% of the foliage with signs of SCA activity or injury.

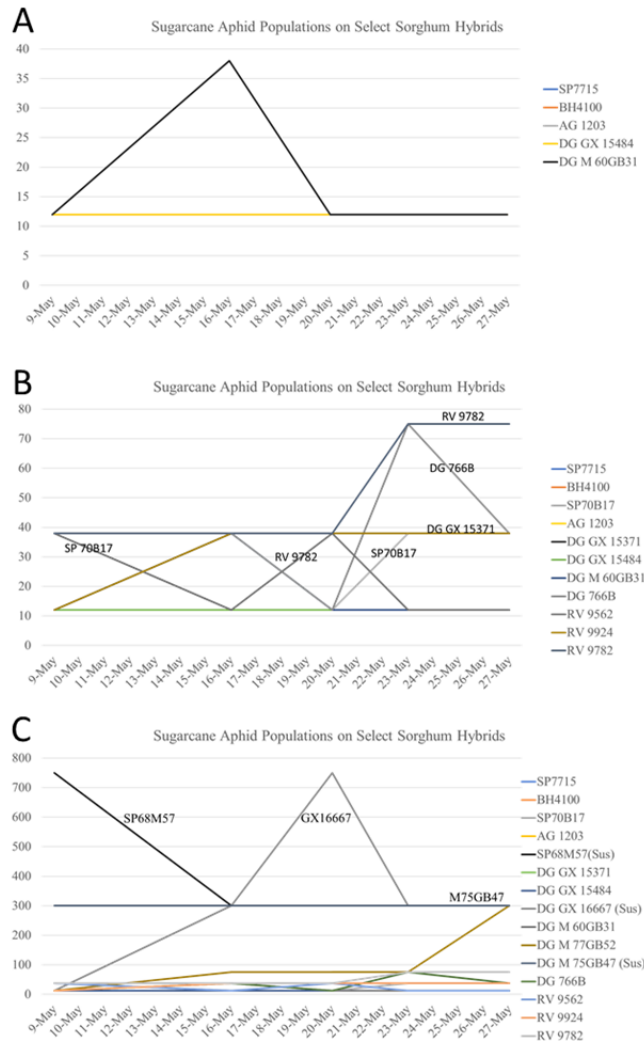


Fig 1: Hybrid response to SCA population growth in relation to tolerance and susceptibility.

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