ASSESSMENT OF VARIETAL RESISTANCE TO THE SUGARCANE BORER

Blake E. Wilson[1], Leonardo D. Salgado[2], and James Villegas[2]

[1]LSU AgCenter Sugar Research Station, St. Gabriel, LA 70776
[2]LSU AgCenter, Department of Entomology, Baton Rouge, LA 70803

The sugarcane borer, *Diatraea saccharalis*, is the most destructive insect attacking the Louisiana sugarcane crop. Cultivar resistance to the sugarcane borer (SCB), is categorized as a combination of physical and chemical characteristics that impede larval feeding and stalk entry. The most common component to assess sugarcane cultivar resistance in the practice is the counting of bored internodes, but this practice does not incorporate the larvae that survived until adulthood inside of the stalk and by measuring the emergence per stalk the possible potential production of the pest can be measured, this two measures to evaluate resistance were merged in one single relative resistance ratio that incorporates both values.

Nine advanced experimental sugarcane cultivars of the L, HoCP, and Ho series, program and seven commercial varieties (L 01-299, HoCP 85-845, HoCP 96-540 and HoCP 00-950, HoCP 04-838, L 01-283, and HoCP 09-804) were evaluated for resistance/susceptibility to SCB during 2018. All varieties were planted on October 28, 2017 at the LSU AgCenter Sugar Research Station in St. Gabriel, in a randomized block design with five replications each. No chemical controls for SCB were applied in the test. A 12-stalk sample was cut from each plot on October 30, 2018, (five replications = 60 stalks per variety). The number of bored internodes, total internodes, and moth emergence holes from each sample was recorded. Relative survival was calculated as the ratio of emergence holes over the number of bored internodes. The relative resistance ratio is calculated based on rankings within replications for percentage borer internodes and relative survival. Ratios approaching 1 indicate a high degree of susceptibility relative to other cultivars evaluated. All data were analyzed with generalized linear mixed models (PROC GLIMMIX), and means were separated with Tukey's HSD.

Significant differences in percentage of bored internodes and relative resistance ratio among the varieties were detected, with HoCP 00-950 (21.37% bored internodes) and L 12-201 (20.81%) being the most susceptible cultivars. The cultivar HoCP 13-740 had the highest value of emergence per stalk (0.58 adults per stalk) and the highest survival ratio (0.15 adults per bored internode). The use of the relative resistance ratio classified cultivars in one highly resistant cultivar (HoCP 85-845) in three resistant cultivars (L 01-299, HoCP 04-838 and Ho 11-573), in five intermediate resistant cultivars (Ho 12-615, HoCP 96-540, HoCP 13-758, L 01-283 and Ho 13-708) and seven susceptible cultivars (Ho 13-739, HoCP 09-804, L 12-201, L 11-183, L 13-251, HoCP 00-950 and HoCP 13-740). Results from this study will be included in considerations of cultivar releases and cultivar-specific SCB management tactics.

Table 1. Sugarcane borer cultivar resistance among commercial and experimental sugarcane cultivars, St. Gabriel, LA, 2018

Cultivar	% Bored Internodes	Emergence/ stalk	Relative Survival	Relative Resistance Ratio	Classification
HoCP 85-845	4.00 a	0.02	0.03	0.19 a	Highly Resistant
HoCP 04-838	3.48 ab	0.03	0.06	0.27 ab	Resistant
Ho 11-573	6.44 ab	0.10	0.07	0.33 abc	Resistant
L 01-299	6.61 ab	0.03	0.08	0.33 abc	Resistant
Ho 12-615	8.30 abc	0.12	0.05	0.40 abc	Intermediate
HoCP 96-540	9.19 abc	0.22	0.09	0.46 abc	Intermediate
HoCP 13-758	13.07 abcd	0.12	0.04	0.48 abc	Intermediate
L 01-283	7.59 abcd	0.13	0.10	0.50 abc	Intermediate
Ho 13-708	18.68 cd	0.15	0.04	0.54 abc	Intermediate
Ho 13-739	12.34 abcd	0.27	0.10	0.61 abc	Susceptible
HoCP 09-804	12.14 abcd	0.27	0.12	0.63 abc	Susceptible
L 12-201	20.81 d	0.18	0.05	0.63 abc	Susceptible
L 11-183	15.77 bcd	0.37	0.12	0.64 abc	Susceptible
L 13-251	18.79 cd	0.20	0.08	0.67 abc	Susceptible
HoCP 00-950	21.37 d	0.38	0.09	0.70 bc	Susceptible
HoCP 13-740	16.78 bcd	0.58	0.15	0.76 c	Susceptible
P =	<0.0001	0.1310	0.7502	0.0012	
df =	15,60	15,60	15,60	15,60	
F =	7.03	1.51	0.72	3.03	

Means which share a letter are not significantly different (Tukey's HSD, α=0.05).