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Reduced Yield of Soybeans in Fields Infested with the Red Imported Fire Ant

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TABLE 1. EVALUATION OF SELECTED SORGHUMS FOR MULTIPLE PEST RESISTANCE.

Sorghum germplasm	Damage ratings from previous screening*		% loss in grain sample wt.**
	Bird	Midge	
CI 171	I	—	52 a
FC 9091	I	—	52 a
CI 623	I	—	49 ab
CI 810	I	I	49 ab
FC 8986	—	I	43 abc
PI 383856	—	I	42 abc
CI 293	I	—	40 bcd
FC 16208	—	I	40 bcd
TAM 2566	—	I	39 bcde
Reliance	—	I	36 cdef
ODC 19 sel.	—	I	36 cdef
FC 6606	I	—	35 cdef
SPI 35038	L	I	35 cdef
ODC 19	I	I	31 def
FC 13490	I	—	28 efg
Arg. 64/21 MFRS 2583	—	I	23 fgh
FC 16184	I	—	20 gh
FC 13575	L	I	19 ghi
SGIRL MR-1	I	I	17 hi
FC 8728	L	I	10 ij
FC 16205	L	—	4 j

*L = low damage; I = intermediate damage.

**Means followed by the same letter are not significantly different from each other at P = 0.01 according to Duncan's multiple range test.

low in bird damage in previous tests. Sorghums FC 8728, SGIRL MR-1, and FC 13575 are of interest because they sustained a relatively low level of weevil damage in these studies as well as low to intermediate bird and midge damage in previous screenings.

These results suggest a wide diversity in sorghum germplasm for resistance to damage by the rice weevil. Several sorghums appear to possess resistance to more than one pest, while resistance in others appears more specific.—W. W. McMILLIAN, B. R. WISEMAN, AND N. W. WIDSTROM, Southern Grain Insects Research Laboratory, AR, SEA, USDA, Tifton, GA 31793 USA.

REDUCED YIELD OF SOYBEANS IN FIELDS INFESTED WITH THE RED IMPORTED FIRE ANT, *SOLENOPIIS INVICTA* BUREN—(Note). The impact of mounds of the red imported fire ant (RIFA), *Solenopsis invicta* Buren, on the harvest of soybeans was reported by Adams et al. (1976. J. Ga. Ent. Soc. 11(2): 167-9) and Adams et al. (1977. J. Elisha Mitchell Sci. Soc. 93(3): 150-2). They found that the mounds cause incomplete harvest of soybeans if: (1) the combine operator raises the header bar over the

mounds to protect his equipment and (2) the operator allows the header bar to hit the mound directly, thus pushing the dirt over the soybean plants in the row beyond the mound. Losses of 0.22 to 0.64 hectoliters (hl) (\$6 to \$12) per ha were attributed to these 2 factors. The loss was directly correlated with the number of mounds per ha.

From the previous data, we also noted that the decreased yield of soybeans in the infested fields could not be attributed solely to mound interference with the combine. As a result, we obtained additional data on harvest from infested and non-infested (mirex-treated) fields in Georgia and North Carolina. The data (Table 1) reveal that the heavily infested fields invariably yielded less soybeans than the lightly infested fields. The reduced yield ranged from 1.5 to 9.7 hl/ha with an average of 5.7 hl/ha or 14.5% less in the infested fields than in the non-infested fields. (Difference significant at 0.005 level with paired t-test.) Our general observations of the pairs of fields showed that the soils were similar and that all agricultural practices, including planting, fertilizing, cultivating, and combining, were similar throughout. The primary difference between the paired fields was the presence or absence of active RIFA colonies. However, because of the many environmental, meteorological, and edaphic factors involved, we were not certain that the differences were actually attributable to the presence or absence of the RIFA.

Therefore, we conducted a small test near our laboratory at Gainesville, FL in 1979. Six plots of soybeans 'Bragg' variety), 6 x 8 m (0.004 ha) each, were planted. Planting, fertilization, and cultivation procedures were the same on all plots. At the time of planting, RIFA colonies with queens were collected from nearby roadsides and transported *in toto* to the 3 plots. One colony eventually established their mound within or near the borders of each plot. The 3 remaining plots were maintained RIFA-free by the use of baits. Observations throughout the growing season showed that worker ants foraged actively along the soybean rows. RIFA workers seen tunneling around the base of some soybean plants became radioactive when the plants were injected with ^{32}P , implying feeding by the ants on some portion of the plant (Smittle et al. unpublished data).

Because of variations in the number of plants per plot at the time of harvest, we evaluated the yield of beans on the basis of the total number of plants per plot. An analysis of variance of the combined data from 3 different collection methods revealed a significant difference in numbers of pods per plant ($p=0.05$) and weight of beans per plant ($p=0.1$). Finally, in evaluation of the total harvest, we found that the RIFA-free produced ca. 15% more beans per plant by weight than the ant infested plots.

At this time we have no explanation for the apparent reduced yield in fields infested with RIFA nor can we attribute it entirely to the presence of RIFA. As noted earlier, workers foraged around soybean plants, and we have evidence of root damage caused by RIFA to some plants about 10 to 15 cm in height. Since our data showed that the reduced yield was related to lesser numbers of pods per plant, the worker ants may feed on the flowers (we did not observe this activity) as a source of the carbohydrates (Williams et al. 1980. J. Econ. Ent. 73(1): 176-7).

Our findings raise some interesting questions about the relationship and possible economic damage of RIFA to soybeans as well as possible undetected


TABLE 1. COMPARISON OF YIELD OF SOYBEANS FROM PAIRED FIELDS TREATED OR NOT TREATED WITH MIREX BAIT TO CONTROL RIFA.

Location	Treated fields*		Untreated fields		Decrease in hectoliters/hectare
	No. of fields (paired)	Mounds/ hectare**	Hectoliters/ hectare	Mounds/ hectare	
Lowndes Co., GA (1974)	1	<1.0	38.5	109	36.8
Sumter Co., GA (1975)	2	19	33.4	136	26.9
Sumter Co., GA (1976)	3	19	34.6	176	27.4
Brunswick Co., NC (1976)	2	<1.0	34.0	49	29.0
	Average		35.1		30.0

*All fields were treated (1.12 kg/ha of 0.1 mirex bait) to reduce RIFA infestation, except the Lowndes Co. (1974) field. Size of fields range from 3.2 to 16 ha. Numbers of mounds per hectare in treated fields ranged from <1 to 30 and in untreated fields from 25 to 32.

**Mounds were counted after the soybeans were harvested.

damage to other crops. We hope that other interested scientists will also explore the total impact of RIFA on soybeans as well as other crop ecosystems.—C. S. LOFGREN AND C. T. ADAMS, Science and Education Administration, Agricultural Research, U.S. Dept. of Agriculture, Gainesville, FL 32604 USA.



NOTE FROM THE EDITOR

By the time that most of you get around to reading this note you will have noticed a big change in the cover of the *Florida Entomologist*. Not only is it more colorful but also it is made of heavier paper. Hopefully this will make the journal easier to find on your shelves and the covers will be more durable.

Authors are also reminded that they are to include an abstract in Spanish when they submit papers to the *Florida Entomologist*. Papers with Spanish abstracts will be appearing in this volume. As with any new policy it takes a while to get things going.