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REDUCED YIELD OF SOYBEANS IN FIELDS INFESTED WITH THE RED IMPORTED FIRE ANT, *SOLENOPIS 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 hectaliters (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	Hectoliters/ hectare	
Lowndes Co., GA (1974)	1	<1.0	38.5	109	36.8	1.7
Sumter Co., GA (1975)	2	19	33.4	136	26.9	6.5
Sumter Co., GA (1976)	3	19	34.6	176	27.4	7.2
Brunswick Co., NC (1976)	2	<1.0	34.0	49	29.0	4.9
	Average		35.1		30.0	5.1

*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.