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SCIENTIFIC NOTES

IMPORTED FIRE ANT INFESTATION OF SOYBEAN FIELDS IN THE SOUTHERN UNITED STATES

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Moderate to heavy infestations of the imported fire ants (IFA), *Solenopsis invicta* Buren and *S. richteri* Forel, have reduced soybean production in the southern United States. In early surveys of crop damage, Wilson & Eads (1949) attributed a loss of about three percent of the soybean crop in three south Alabama counties to the ants. Adams et al. (1976, 1977) reported that 16.8 to 49.1 kg/ha of soybeans in Georgia and North Carolina were not harvested because of physical interference of *S. invicta* mounds with combine operation. Subsequent studies in Florida and Mississippi showed that IFA feeding on the germinating seed reduced the plant stand with an ultimate reduction of up to 600 kg/ha in soybean yield (Lofgren and Adams 1981, Adams et al. 1983). Apperson & Powell (1983) found that increased numbers of IFA correlated positively with reduced soybean yield in North Carolina.

These reports of damage to soybeans prompted us to conduct a survey in October 1985 to determine the abundance of IFA in soybean fields and hence, the potential for reduction in soybean yields in the infested areas of the southern United States. A total of 74 fields, from which soybeans had been harvested within the previous 30 days, were inspected in 37 counties in six states. Two fields, separated by a minimum eight km, were chosen at random in each county and the number of active IFA mounds on ten rectangular 0.0405 ha plots in each field was counted. The plots were located at random in each field, but were a minimum 15 m from each other and 30 m from any edge of the field. The plots, which covered three adjacent rows from outside middle to outside middle and varied in length and width according to row spacing, were measured with a calibrated wheel. All mounds were opened with a shovel and examined for ant activity and the presence of brood. The number for the five plots was extrapolated to mounds per ha. The infestation levels (Table 1) ranged from 22.2 to 207.5 active mounds per ha; 87.2% of the mounds were rated as eight or higher by the rating system of Harlan et

TABLE 1. NUMBER OF IMPORTED FIRE ANT MOUNDS FOUND IN SOYBEAN FIELDS IN SIX SOUTHERN STATES

State	No. Counties Surveyed	Number Mounds Per Hectare	
		Mean	Range
Alabama	10	115.3	22.2–191.4
Florida	6	128.2	95.1–184.0
Georgia	13	129.8	71.6–207.5
Louisiana	1	85.2	76.6–93.9
Mississippi	5	122.8	80.3–151.9
South Carolina	2	114.9	113.6–116.1
Total	37	116.0	22.2–207.5

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TABLE 2. POTENTIAL LOSS OF SOYBEANS IN SEVEN SOUTHERN STATES IN 1985 WITH VARYING LEVELS OF INFESTATION BY IMPORTED FIRE ANTS.[1]

ha. infested & (% of total)	reduction of yield (kg) at infestation level	Value of reduced yield
392,712 (10)	166,824,058	$ 31,286,956
981,781 (25)	481,759,445	78,217,390
1,295,951 (33)	635,922,467	103,246,955
1,963,563 (50)	863,541,362	156,434,780

[1]Losses calculated for total 1985 soybean plantings of 3,927,125 ha in six states surveyed plus Texas (U. S. Dept. of Agriculture 1988) using mean reduction of 424.8 kg/ha studies reported by Lofgren & Adams (1981) and Adams et al. (1983).

al. (1981). Although plots were located in both red and black IFA infested areas, only monogynous colonies were found in our survey. The mean infestation level (116.0 mounds/ha) for all the counties in this survey was roughly comparable to the mean level (123.0 mounds/ha) reported from studies in four states where the average soybean loss was 424.8 kg/ha (6.32 bu/acre) (Lofgren & Adams 1981, Adams et al. 1983).

Agricultural Statistics (U.S. Department of Agriculture 1988) reported that 3,927,125 ha of soybeans were planted in 1985 in the six states we surveyed plus Texas. We do not know what percentage of those plantings were infested by the imported fire ant at potentially damaging levels. Therefore, to illustrate the possible losses in soybeans due to IFA, we have used the mean loss (424.8 kg/ha) from the studies reported by Lofgren & Adams (1981) and Adams et al. (1983) with the average 1985 price for soybeans to project losses when 10, 25, 33, and 50% of the total ha had damaging levels of infestation, i.e., 123.0 or more mounds per ha. These projections (Table 2) show that impact of IFA could be severe, causing losses of from approximately 31.2 to 156.4 million dollars.

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