

M 3372

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## The Effect of Fire Ants on Soybean Germination and Growth

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The fire ant, *Solenopsis invicta*, significantly reduces soybean crop yields. This has been primarily attributed to fewer plants per row, because the ants attack the germinating seeds. Through a series of experiments we determined that the fire ants affects the soybean plant through all of its growth stages. During seedling development fire ant foraging activity shifted from the stem/cotyledon to the roots, despite fresh weight increases for each region, and the fact that the stem/cotyledon contained the majority of food reserves. Damage was visible, but only occurred prior to emergence and greening of the cotyledons. Fire ant association with seedlings germinated in soil resulted in reduced seedling vigor, as determined by a doubling of delayed emergent seedlings, a threefold increase in malformed seedlings, and visible damage to cotyledons. Seeds germinated and grown to mature plants in association with fire ants, allocated 43% more assimilate into pods, but produced 28% less root dry matter, and there was an 81% reduction of in root nodules compared to control plants. We propose that reduced root development and inhibition of nodule formation would be major yield limiting factors under the rigors of field conditions. The loss of dry matter may have been the result of fire ant feeding directly on the root system and the increase in pod production the result of redirection of carbon from the roots/nodules to developing pods. We have defined fire ant damage to soybeans and demonstrated that more research should be directed at the subterranean activities of the fire ant.