

Fire Ants Find Grains Tasty

No one would ever confuse John Morrison with mystery story detectives Sam Spade or Hercule Poirot.

An agricultural engineer by training, Morrison's world is the sun-baked fields of east-central Texas, where he devises workable conservation tillage techniques for clay soils at the ARS Grassland, Soil, and Water Research Laboratory at Temple.

But in the early 1980's, in the midst of a planting study, Morrison unexpectedly joined the ranks of those whose job it is to unravel mysteries—and he uncovered a whole new threat to farmers' economic well-being.

"We had field plots where only 20 to 25 percent of the plants were coming up, so we thought we'd better dig up the seeds and take a look," says Morrison. "Since we were using experimental no-till planters for this area's sticky clay soil, we thought the planters might somehow be damaging the seeds in planting."

Morrison did find damaged seeds in abundance. But the menace wasn't mechanical.

"Fire ants were just invading this area," he notes. "When we dug up the seeds, we found their hearts had been eaten out by fire ants. In some cases, we'd actually find the seed with a fire ant burrowed into it, eating away, with just its tail sticking out."

Accidentally imported from South America half a century ago, the fire ant species *S. invicta* can be found today from Texas to Florida and as far north as Tennessee and Virginia. The ants pose a threat to animals and humans alike. So researchers at the ARS Medical and Veterinary Entomology Research Laboratory at Gainesville, Florida, are pursuing a range of weapons against the biting pests. [See "Fighting the Fire Ant," *Agricultural Research*, January 1994, p. 4.]

Although Morrison first discovered the fire ants ravaging seeds in his no-till cotton field plots, later studies showed that cotton suffered the least from the foraging pests.

Tests at the Temple lab have shown the ants will damage dry wheat seed at a rate of about 11 per-

ARS PHOTO (K3637-5)



cent per day—capable of wiping out an entire planting in 10 days' time. Damage on dry corn seed runs about 6 percent, grain sorghum about 7 percent, soybeans about 1 percent, and cotton a mere 0.5 percent per day.

Fortunately for farmers, a possible deterrent is at hand.

"At about the time we discovered the ants, we were just starting to use liquid starter fertilizer in our no-till furrows at about 100 pounds per acre," Morrison recalls. "When we used that liquid fertilizer, our plants emerged without fire ant damage.

That's a 'green' solution, because we'd be putting fertilizer on the soil anyway."

The seed needs protection mostly until germination, according to Morrison. Although fire ants will crunch on tender stems once plants have broken through the soil, their allure is lessened and so is ant damage.

"There's a race between the rate at which the fire ants eat the seed and the rate at which the seeds can take in water, germinate, and emerge from the soil," Morrison says. "In our studies, as the seed gains water and softens, damage from the fire ants is more likely."

Insecticides are also an option for averting the ants. But treating seeds with insecticides can lower their germination rates by 5 to 8 percent, warns Morrison.

Oddly, the liquid fertilizer's effectiveness was significantly less in greenhouse studies in 1994-95. In the greenhouse, it controlled only about 50 percent of fire ants—compared to 80 to 90 percent in the field—so the Temple team plans more field tests. But Morrison says the work has already provided an important warning for farmers in areas with fire ants.

"You have to use either insecticides or other effective repellents to keep these ants from eating your seeds," he notes. "Fertilizer may be one solution, but others may be found in the future."—By **Sandy Miller Hays**, ARS.

John E. Morrison is in the USDA-ARS Natural Resources Systems Research Unit, Grassland, Soil, and Water Research Laboratory, 808 E. Blackland Rd., Temple, TX 76502; phone (817) 770-6507, fax (817) 770-6561, e-mail morrison@brc0.tamu.edu ♦