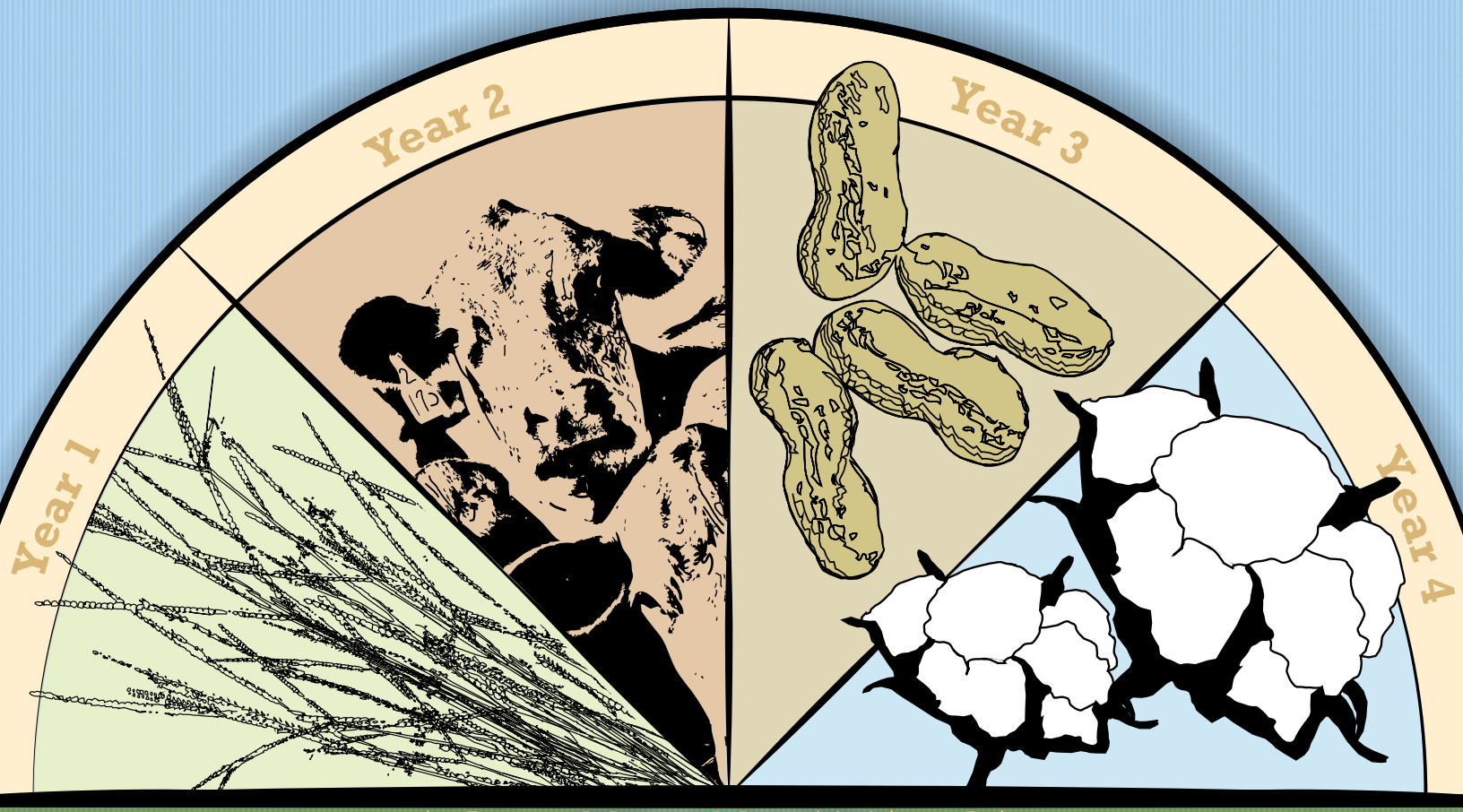

ROOTS

By Frank Stephenson

A forgotten farming method gets a new look

NO MATTER WHERE THEY TURN, IT'S A THORNY FIELD FARMERS FIND THEMSELVES IN TODAY.

From constant water woes to profit-killing fuel costs, from growing public fears over fertilizers, pesticides and weed killers to a volatile world economy, few will argue that today's farmers have a long and troubling row to hoe.

But University of Florida agronomist David Wright thinks he has a way to make farming more profitable.

Wright is a farm-raised product himself, ascended from long, boyhood days working in Tennessee tobacco fields. Today he's a seasoned agronomist based in the Florida Panhandle town of Quincy, home to the North Florida Research and Education Center, one of 13 research centers tied to UF's Institute of Food and Agricultural Sciences.

With his colleague Jim Marois, a plant pathologist, Wright is now into his 12th year on a project that he's convinced holds incalculable promise not only for improving American agriculture but also for saving the country's dwindling numbers of farming families.

"We know this system works," Wright says. "We've got the data. Now, it's just a matter of getting people to understand it and give it a try."

As it turns out, the "system" Wright beams about is nothing really new, just largely forgotten. Wright has become a latter-day evangelist for turning back the clock on modern agriculture, preaching the many now-verifiable virtues of returning to a once-common method of farming that got plowed under during the rise of big agribusiness after World War II.

In 1999, Wright and Marois undertook a detailed, long-term look at a farming practice that once was commonplace throughout much of the U.S., particularly in the South. The practice essentially renourishes and reinvigorates soil by rotating standard commodity crops such as cotton and peanuts with hardy varieties of pasture grass.

Growing up, Wright saw farmers alternate their tobacco crops with fescue, a relative of ryegrass. Fescue is one of several species of forage grasses that flourish year-round. Because of how they grow — typically with thick and deep-running roots — such grasses are naturally capable of restoring spent croplands to their full growing potential. For his project in Quincy, Wright knew his best bet as a test grass would be bahia, and for good reason.

Bahia Benevolence

A native of South America, bahiagrass can be thought of as kudzu without the bad rap. Since 1938, when a variety of bahia was found flourishing along the shores of Pensacola Bay, the plant has become the most common ground cover in the South. Easily recognizable by its black, seed-bearing, Y-shaped crowns, bahia now covers tens of millions of acres from Texas to South Carolina. For decades, cattle growers have used it as their herds' primary forage crop.

But from the earliest days of bahia's conquest of Southern farmland in the early 1950s, crop farmers began discovering

Photography by Ray Stanyard

UF agronomist David Wright, left, and plant pathologist Jim Marois in an experimental field in Marianna. Inset, Bahiagrass.

what the grass could do for their fields of soybeans, peanuts and cotton.

"Ask any farmer from the '50s and '60s, and they will tell you that if they had a choice of where to plant peanuts or cotton or even watermelons, it would be in a field (recently covered with) bahiagrass," Marois says. "They knew they could count on higher yields with fewer pest problems."

But many of today's farmers grew up reading from a script that dictates that to survive and be competitive in a global marketplace, farmers have to exploit economies of scale and "get big." This typically means farming thousands of acres at a time, taking on heavy debt buying big machines and specializing in ways that would make it difficult, if not impossible, to rotate cash crops with perennial grasses such as bahia on any scale.

"A (retired) soybean farmer once asked me why in the '60s and '70s he could routinely grow up to 60 bushels of soybeans per acre, when today's state average is only 30 bushels an acre," Wright recalled. "I asked him how he grew his beans back then, and he says he used old pastureland (covered in) bahiagrass. Bingo! That's the key."

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A Solid Winner

While the anecdotal evidence for rotating crops with bahia is compelling, Wright and Marois are scientists, so they teamed with colleagues from Auburn University and the University of Georgia to run experiments that directly compared conventional farming techniques used for growing cotton and peanuts with those based on using bahia sod and cattle-grazing as part of the mix. The scope of the work, which was supported in part by grants from the U.S. Department of Agriculture, stretched from Auburn-managed fields in Southeast Alabama to IFAS' 1,300-acre research center in Marianna, Fla.

For years, the team tested the annual production of cotton and peanuts grown on large plots (up to 160 acres) of farmland, using conventional tillage techniques in one plot and bahia-based, cattle-grazing tillage in another. Eventually the researchers settled on what could be called bahia sod-based conservation farming — a system that consistently shows better yields and numerous conservation benefits over the conventionally tilled acreage.

To make soil as rich and fertile as it can be, the IFAS technique calls for an initial two-year growth of bahia and the introduction of cattle to graze it. After two years, the bahia is killed off in the fall and replaced by a cover crop of oats and rye, which feeds cattle through the winter months (cold weather typically makes bahia go dormant). A spring planting of peanuts follows, followed by another round of oats and rye in the fall for winter grazing. After that, cotton goes into the ground typically in May. On the heels of the cotton harvest, the fields are again sown with oats and rye but also with bahia seed, which cattle obligingly plant on their own as they graze. By late spring, the bahia is up and green and the rotation cycle is set to start over.

Hands down, the bahia-sod system has proven to be a solid winner, both economically and environmentally, Wright says. Despite initial startup costs — mainly from buying bahia seed and fertilizer and from planting — by year three the bahia-sod system showed its muscle. The peanut yield averaged more than 4,000 pounds per acre, nearly doubling the yield harvested from the conventionally farmed field right next door. The following year's cotton crop from the bahia system showed dramatically superior numbers, too, producing nearly 1,000 pounds per acre, compared to only 650 pounds from the conventional plot.

Aside from boosting crop yields by 50 percent and higher, the bahia system showed other benefits as well, including a natural ability to fight off nematodes and other pests — a trait that cut the need for pesticides in half, Wright says. And bahiagrass forms a dense root mass that helps control weeds, adds enormous amounts of organic matter to the soil and helps prevent erosion from wind and water.

For the past few years, local farmer Larry Ford of Malone, Fla., near Marianna, has worked with Wright and Marois on a contract basis to test bahia rotation in peanuts and cotton. He's been impressed by what he's seen.

"Last year we produced about a bale of cotton (about 500 pounds) per acre on one of our (conventionally tilled) fields," he said. "We tripled that on the bahia, and applied only about 70 pounds of (nitrogen) fertilizer per acre, compared to about 200 pounds per acre on the conventional field."

In peanuts, he said he's seen the biggest payoff in bahia sod's ability to save time and costs in labor and fuel.

"With this (bahia) system, we won't have to cultivate a field but two or three times all year, whereas in the other fields we'll have to make seven or eight trips out there. On top of that, in the bahia, we don't have to apply any nematocide (a chemical that kills nematodes, a common soil-based pest)."

Growing Water Holes

The experiments also documented what may be bahia's most important benefit — especially for farmers in the Southeast who face a common problem found just below the soil surface.

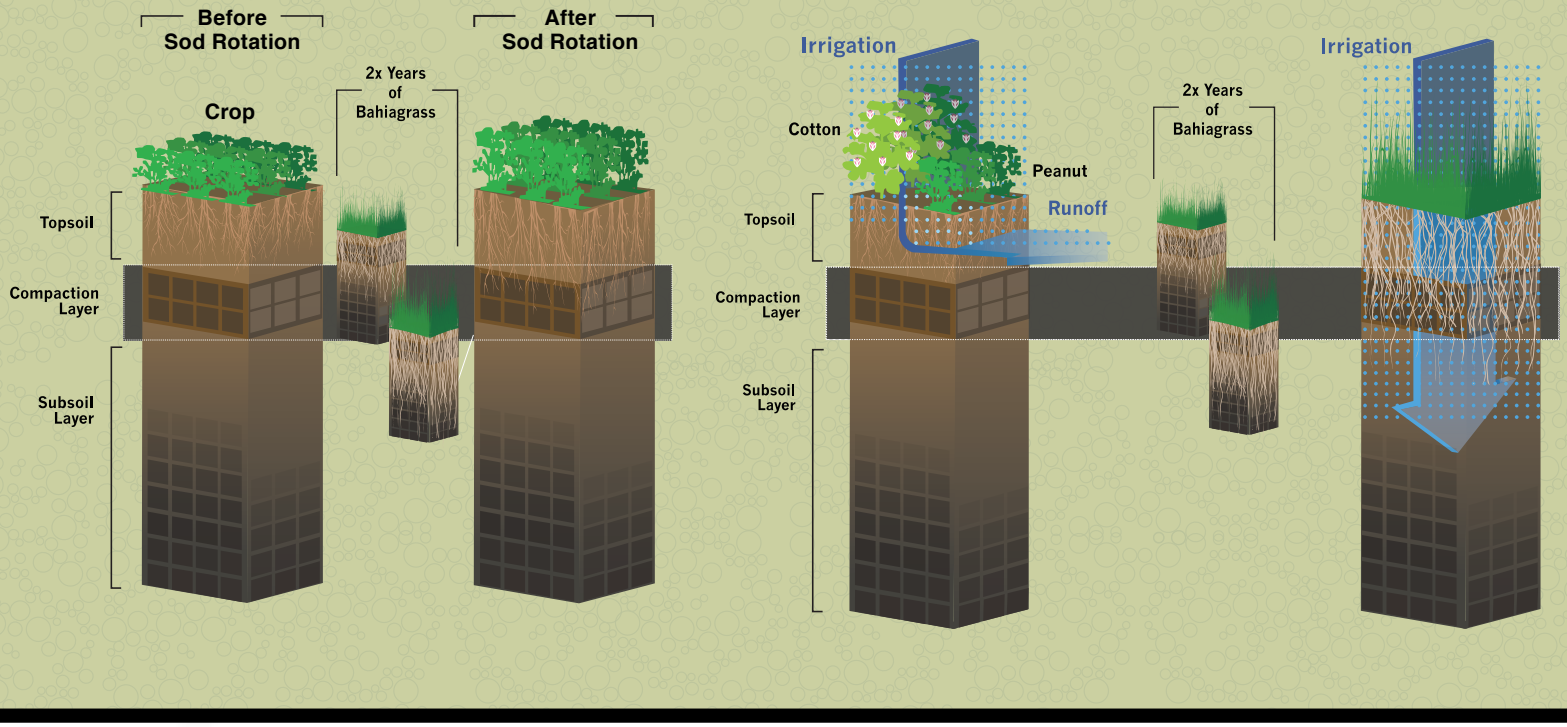
Throughout the region, agricultural lands commonly get hardened, mainly from natural processes, just below the topsoil. This "hardpan" layer, as it's called, can begin at depths of only six to eight inches and can extend up to 18 inches deep. Hardpan presents an all-but-impenetrable barrier for both roots and water that even tractor-operated tilling techniques don't go deep enough to break.

Bahia roots are powerful enough not only to penetrate hardpan but to bore up to six feet deep into even the toughest soils, opening them to water, air and — especially when cows are grazing above — a flood of nutrients. After two years of such treatment, Wright says that even worn-out soils are transformed into thick, luxuriant layers of organic material with high water-holding capacity and large communities of nutrient-producing earthworms.

"This allows the roots of peanuts, cotton and other crops to grow past the hardpan and reach more water and nutrients over an extended period of time," Wright says.

His team has shown that even without irrigation, fields of bahia-rotated cotton have been able to out-perform their irrigated counterparts, thanks to their greater rooting depth. Considering that "water wars" — once primarily the bane of

Bahiagrass = More Crops, Less Water



The Nature Conservancy

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western and midwestern states — now threaten everything east of the Mississippi, bahia's ability to save water ultimately may prove to be its top selling point for farmers.

"In Georgia, around Atlanta, they've (recently) had to pay farmers not to irrigate," Wright says. "If they adopted this system, they could keep going and (bring in their crops) using half the water."

Saving Farm Families

Bahia sod-rotation adds up to a formula for saving something far more important than crops, Wright says. He and his colleagues see the system they've developed, tested and re-tested as nothing less than a formula for saving farm families, which continue to decline at an alarming rate.

Small farms served as the primary engine for the U.S. agricultural industry through most of the country's history. But the numbers have been steadily falling since 1920. Recent figures released by the non-profit advocacy group Farm Aid show that on average 330 U.S. farmers leave their land each week, succumbing to financial pressures. Of the country's two million remaining farms, only about a quarter are considered family operations.

"From the start, one of our goals has been to develop a farm system that a young farmer could get into without having to have a huge tract of land and a million dollars' worth of equipment," Wright says.

By saving money on chemicals and the equipment and fuel required to apply them, farmers who adopt the bahia-sod system can expect to make a living farming as little as 200 acres, Wright believes.

"One of the biggest advantages in using this system is that you don't have to have irrigation or use eight-row (harvesting) equipment to make it work," Wright says.

"Once you get into a system like this, by your fourth year you should be doing well. If you're growing cotton and peanuts, you can make as much profit with this sod-based rotation in one year as you can in two to four with the standard rotation system."

Could bahia sod conservation farming be the next "big thing" in agriculture? Wright thinks it's possible. He sees the system as the next logical step after the technique known as conservation tillage — which deliberately leaves up to a third of crop debris in fields after harvest — finally caught on in the early 1980s. The technique helps fields stay rich in nutrients and retain water.

"It took us 20 years or more for conservation tillage to catch on, and I see this as the same thing," he says. "This system works — we may not know exactly how it works, but we've shown that it does. Our challenge now is to get people to understand it and put it to work."

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