Texas Rice

AgriLIFE RESEARCH
Texas A&M System

Beaumont, Texas
September 2011 Volume XI Number 7

Rice Seed Treatments for Planting into Cool Soil

Decisions made before planting a rice crop influence its eventual grain yield. Among these decisions is the date of planting. Late planting increases the risk that reproductive development of the rice plant coincides with hot periods in the summer, leading to decreased seed set and yield. Late planting also leads to maturation of the main crop later in the season and a later start of the ratoon crop resulting in an increased risk that the ratoon crop will not ripen before the cool weather of fall sets in. This, in turn, results in a higher proportion of immature grain and poor ratoon yield and quality. The estimated yield advantage from planting earlier is 250-300 lbs/A per week (Fred Turner, Beaumont Center, retired, personal communication; also see Slaton et al. 2003). Planting too early, however, can increase exposure to cool soil and result in decreased seedling vigor, delayed emergence, increased exposure to soil diseases, and a poor stand. An optimal planting date is thus a compromise that minimizes the adverse effects of both late and early planting.

In this article, we describe research with the objective to move the optimal planting window earlier in the season. The primary approach is to develop seed treatments that increase seedling vigor, therein increasing germination percentage, germination rate, and seedling vigor, and decreasing emergence time when rice is planted into cool soil. In addition, a useful seed treatment needs to maintain good seedling growth form (not too tall), be compatible with commercial seed treatments that are applied for other purposes (such as insecticides and fungicides), and produce yields that are equal or better than gibberellic-acid seed-treated fields under a range of

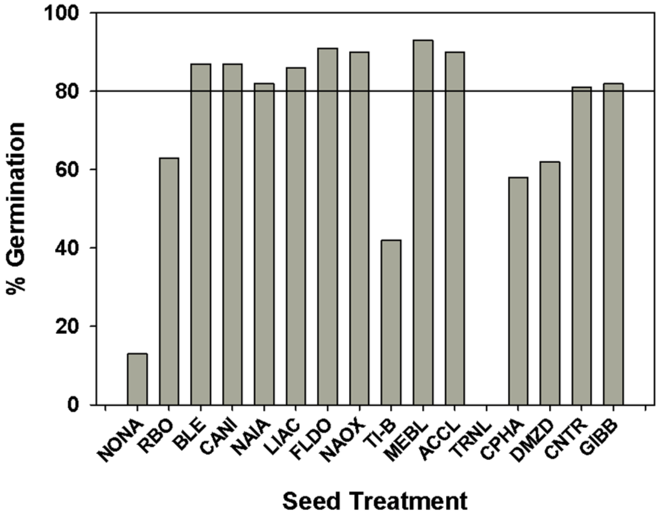


Fig. 1. Percent germination (measured as percent emergence) of rice seed in an outdoor potted plant study. Average of 4 planting dates from mid-February to mid-March 2005 at Beaumont, Texas. Four pots per treatment per date with five seeds per pot. Evaluated for various seed treatments, only treatments providing at least 80% germination were retained for further study. Abbreviations: NONA (nonanoic acid), RBO (rice bran oil), BLE (sodium hypochlorite), CANI (experimental #14), NAIA (sodium iodoacetate), LIAC (experimental #15), FLDO (fluridone), NAOX (sodium oxamate), TI-B (triiodobenzoic acid + benzylaminopurine), MEBL (methylene blue), ACCL (endothall), TRNL (triacontanol), CPHA (chlorophenoxyacetic acid), DMZD (diaminozide), CNTR (control), and GIBB (gibberellic acid).

Continued on page 6

From the Editor ...

Controlling Stem Borers, Moderating Cold Stress, and Managing Fire Ants

Welcome to the September issue of *Texas Rice*. The Beaumont Center held its 10th stem borer research field tour in September. Nine years ago, Dr. Gene Reagan from the Louisiana State University (LSU) and Mo Way from our Center held the first stem borer research field tour at our Ganado site. The Mexican rice borer is a lepidopteran pest that damages sugarcane and rice by boring into the stems. Damage can reduce yields and weaken the stems. Damage to rice stems can cause blanking of developing grain and the vegetative branches in the panicles, which are called whiteheads. At the time of the first stem borer field tour, the Mexican rice borer had only recently invaded the Texas ricebelt, moving from Mexico through the Rio Grande Valley then east and north to the western rice growing counties at a rate of about 12 miles per year. Gene and Mo's first meeting focused on the biology, injury symptoms, and management of this pest. I still remember one of Mo's initial studies with transgenic rice where he showed that rice which contains the *Bt* bacterial cry toxin almost totally eliminated stem borer injury, while conventional rice that did not have this toxin suffered massive yield loss.

The 10th stem borer field tour highlighted Mo and Gene's energycane host plant resistance study and was attended by sugarcane producers from the Rio Grande Valley, extension agents from Louisiana, and growers from the Beaumont area. The results to date show that energycane varieties, which are high-cellulose low-sugar selections of sugarcane, can be every bit as susceptible to stem borers as sugarcane. For a number of years, the U.S. Department of Energy has conveyed that cellulosic bioenergy crops were too tough to have significant insect injury. Although this was an interesting idea, reality reared its ugly head and has shown that high cellulose content, by itself, does not protect energycane from stem borers.

The 10th stem borer field tour also has presentations by Julien Beuzelin and Blake Wilson, both from LSU. Julien talked about the importance of grassy weed species as stem borer hosts, while Blake described how young Mexican rice borers rapidly tunnel into the plants shortly after hatching from eggs, which makes timing of insecticide controls critical. This was followed by a talk by Lee Tarpley on his high biomass sorghum physiology research, followed by a presentation by Yubin Yang who described his biomass sorghum and energycane research that focuses on the development of a crop model that can accurately predict the growth, development, and yield of high biomass sorghum and energycane for different parts of the southern U.S. Fugen Dou followed with a talk on soil carbon cycling in high biomass sorghum. The field tour ended with Dr. Way describing the effects of stem borers on rice, and was followed by a luncheon hosted by Dr. Way.

There is a interesting side story involving Dr. Reagan and Dr. Way's collaborative research. By working together, they have been largely responsible for obtaining about $2.5 million in competitive grant funding. Putting this in perspective, Gene and Mo's hard work is responsible for their having the resources to allow them to do several times more research than they would otherwise be able to do using their limited state supported funding alone. Mo and Gene, congratulations for your hard work and

Continued on page 9

Inside This Issue

Farming Rice
A monthly guide for Texas growers

Providing useful and timely information to Texas rice growers, so they may increase productivity and profitability on their farms.

Predicting the Value of Parasitoids and Pathogens as Fire Ant Control Agents

Imported Biological Control Agents of Fire Ants

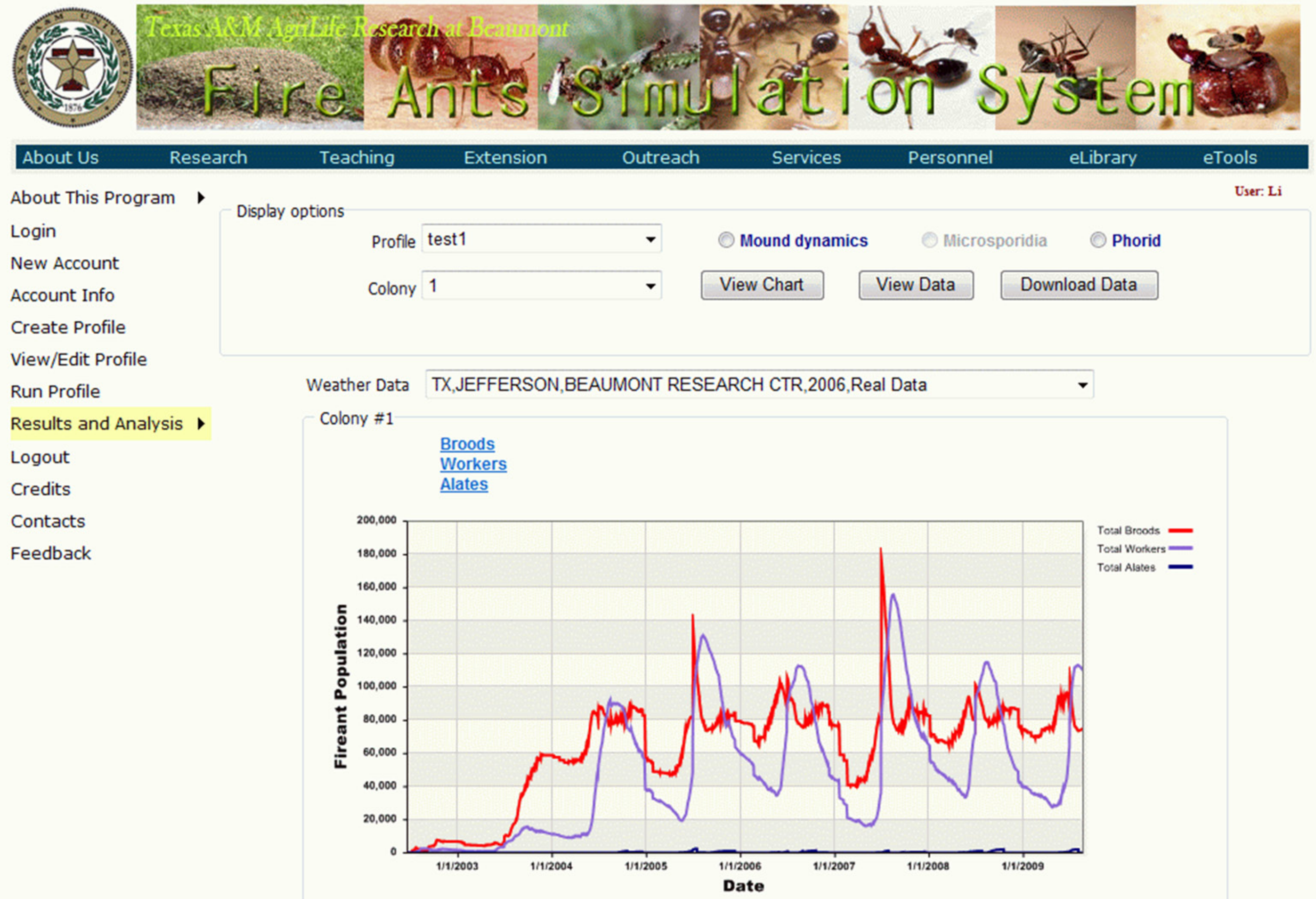
Red imported fire ants (*Solenopsis invicta* Buren, Hymenoptera: Formicidae) continue to cost Texas homeowners and businesses upwards of a billion dollars annually in losses (Drees and Lard, 2006). However, fire ant populations are less vigorous with co-existing natural enemies in their original home of South America, where natural enemies limit population densities to ca. 10% of that in the U.S. (Porter et al., 1997). In contrast, fire ant populations in the U.S. are constrained by local food resources, which are regulated by the climatic and edaphic environments (Korzukhin et al., 2001). As a result, insecticidal intervention is used to provide localized population suppression, with repeated applications required to prevent rapid rebound to pre-treatment levels. Existing research suggests that longer-term self-sustaining fire ant population suppression requires the establishment of an increased number of biological control agents.

Two major types of biological control agents of the fire ants have been introduced to Texas. These are parasitoid phorid flies (*Pseudacteon* spp.) (Fig. 1) and microsporidian protists. Phorids attack fire ant workers, and although the parasitism rate is low for a single phorid species (0.5 to 3%), phorids disrupt foraging, modify nest defense behavior, and appear to reduce the efficiency of collecting and storing food. Phorids have an interesting way of killing the ants. A female phorid will lay an egg on the abdomen where two exoskeleton segments meet. The larvae hatch, enter the abdomen and migrate to the ant's head. When the larva completes its development, it decapitates the fire ant, pupates, and subsequently will emerge as an adult fly. Introductions and releases of phorid flies started in the 1990's in Texas, with most successful establishments achieved after 2002. *Pseudacteon tricuspis* Borgmeier is the first species established, followed by *P. curvatus* Borgmeier, *P. obtusus* Borgmeier, and *P. nocens* Borgmeier.

Fig. 1. Fire ant and phorid flies.

Different phorid species show diversity in host preference and parasitism related biology and behavior. *Pseudacteon cultellatus* attacks the smallest workers, followed by *P. curvatus*, *P. tricuspis*, and *P. nocens*, while *P. obtusus* attacks both small and large workers. Both the sizes and developmental duration of adult phorid fly sizes are positively correlated with their preferred host size. Among the five species, *P. obtusus* is attracted by foraging ants, while the other four species are mainly attracted by workers at disturbed mounds (e.g., accidental interference

Continued on the next page



Profile test1

Colony 1

Weather Data TX,JEFFERSON,BEAUMONT RESEARCH CTR,2006,Real Data

Fig. 2. Simulated population density of a monogyne fire ant colony.

by large vertebrates, interference due to armadillo digging and feeding activities, and rainfall induced disturbances) or mounds with surface activities (e.g., mating flights and surface building) (Orr et al., 1997). Studies conducted in South America also indicate that different phorid fly species show different annual and daily activity patterns, and have different peak densities (Calcaterra et al., 2008).

Two genera of microsporidians that parasitize fire ants are *Knealhazia* spp. and *Vairimorpha* spp. These microsporidians either kill or weaken colonies by reducing worker longevity and brood production. Studies conducted in South America show the overall occurrence of *V. invictae* is lower than that of *K. solenopsae*, but *V. invictae* has a larger range of intracolonial prevalence, and sometimes results in higher number of infested ants. While *K. solenopsae* infests several *Solenopsis* species with similar preferences, *V. invictae* is better adapted to *S. invicta* (Oi et al., 2010). Both parasitoids may co-occur in the same fire ant colony.

Transmission pathways of microsporidian pathogens are still largely unknown, but are expected to include transmission through infected queens, transmission through brood raiding and worker adoption between colonies, trophallaxis (transfer of food among ants) within colonies, and by vectoring through ant-associated organisms such as parasitoid flies or mites. Valles and Porter (2007) and Oi et al. (2009) have proposed that phorids may act as vectors of microsporidians, thereby contributing to increased mortality and reduced colony growth. Studies are ongoing at the University of Texas and USDA labs to track seasonal and episodic infestations.

Continued on the next page

Simulating Population Dynamics of Fire Ants and Their Natural Enemies

The re-establishment of native ant species that compete with fire ants may be slow to occur and difficult to predict due to the native ant species experiencing higher constraints on population growth from a larger range of host-specific native parasitoids and pathogens. Optimal fire ant management can only be achieved if the complexity of the fire ant system is addressed using an integrated systems approach that captures these biological interactions, supported by management tools.

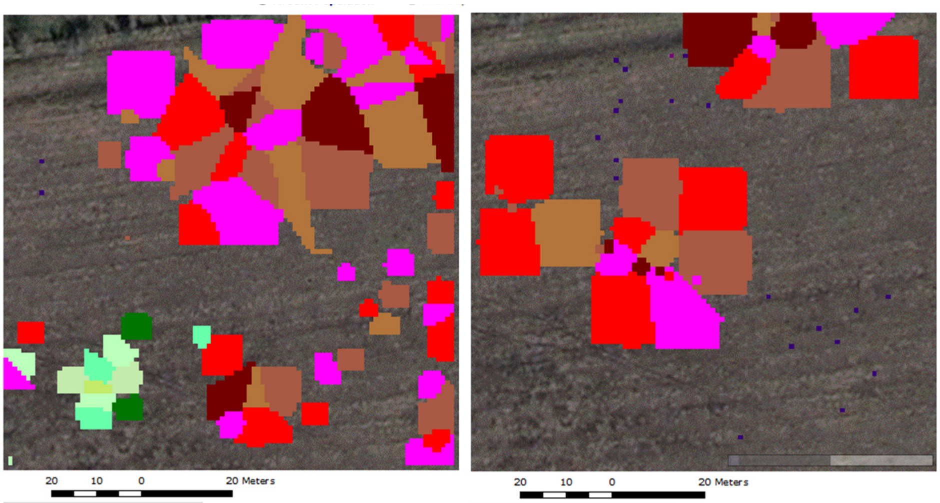


Fig. 3. Fire ant territory expansion ca. 5 years after the 1st colony establishment when a) in the absence of phorid flies (left photo), and b) with phorid flies (right photo). Color size represents the extent of a colonies spread, with each colored unit representing a separate colony.

A focus of our fire ant research is the development of a predictive model that incorporates the direct effect of climate on fire ant population development, the indirect effect of climate on fire ant food sources, and the effects of parasitoids and pathogens on colony fitness. An integrated Fire Ant Simulation and Analysis System (FASAS) has been developed for both monogyne (colonies with only 1 queen) and polygyne (colonies with multiple queens) social forms, which simulates the dynamics of individual colonies and social castes within each colony (queens, broods, workers and alates). Each caste is simulated using a cohort-based age-structured method, except for the queens, which are simulated individually. Cohort in this case refers to a group of ants in a colony that are the same age. The model captures critical processes involving population growth, dispersion, and territory expansion for both monogyne and polygyne fire ant, as affected by local environment. Colony dynamics is simulated based on resource availability, competition, local environment, and biological control mortality. Major biological functions include queen reproduction, ant aging, development, and mortality, queen regulation of swarming and colony budding, resource allocation and worker size distributions, foraging, and colony energetics. Figure 2 shows the FASAS interface with a 7-year simulation of population dynamics of a fire ant colony in the absence of phorids and microsporidians mortality.

Sub-models have been developed for two phorids parasitoids (*Pseudacteon tricuspis* and *P. curvatus*). Key phorid life table parameters are developmental duration, intrinsic survival, maximum parasitism per unit time, and preferences for host size and host location. Fire ant host availability for each colony is obtained from the fire ant model. The development of immature stages is simulated using cohort-based distributed maturation structure, which takes into account the differential aging of ants with some aging fast, normal, and slow. Both phorid species are attracted by disturbed mounds and mound surface activities, therefore phorids within each simulated area are determined by the number of workers exposed on mound surfaces each day. Figure 3 provides a comparison between the simulated results of fire ant territory expansion with and without parasitism by the phorid flies. Figure 3a shows the area covered by fire ant territory ca. 5 years after colonization by fire ants when phorid flies are not present, while

Continued on the next page

Fig. 3b shows the territory expansion with phorid flies present. These results suggest the potential use of phorid flies in biological control of the fire ants. We are planning to add sub-models to simulate the population dynamics and impacts of three other phorid species that have been established in Texas (*P. nocens*, *P. obtusus*, and *P. cultellatus*).

A microsporidian sub-model is being developed for *Kneallhazia solenopsae*. Transmission is incorporated as a function of brood raiding, adoption of queens, and exchange of workers. We are currently parameterizing the dispersal and within-colony rate of spread and mortality. We also plan to add a sub-model for *V. invictae*, which will allow a more realistic analysis and prediction with regard to fire ant seasonal prevalence, disease outbreaks, virulence, and alternate means of transmission.

We would like to express our thanks to the Texas A&M AgriLife Research for providing funding to L. T. Wilson, Y. Yang, J. Lv, and L. Gilbert through the fire ant initiative.

For more information, please consult the following references or by contacting L. T. Wilson (lt-wilson @aesrg.tamu.edu):

Calcaterra, L. A., A. Delgado, and N. D. Tsutsui. 2008. Activity patterns and parasitism rates of fire ant-decapitating flies (Diptera: Phoridae: Pseudacteon spp.) in their native Argentina. Ann. Entomol. Soc. Am. 101: 539-550.

Drees, B. M., and C. F. Lard. 2006. Imported fire ant: economic impacts justifying integrated pest management programs. p. 144-115. *In* Proceedings, XV Congress International Union for the Study of Social Insects, Washington, D. C.

Korzukhin, M. D., S. D. Porter, L. C. Thompson, and S. Wiley. 2001. Modeling temperature-dependent range limits for the fire ant *Solenopsis invicta* (Hymenoptera: Formicidae) in the United States. Environ. Entomol. 30: 645–655.

Oi, D. H., S. D. Porter, S. M. Valles, J. A. Briano, and L. A. Calcaterra. 2009. Pseudacteon decapitating flies (Diptera: Phoridae): Are they potential vectors of the fire ant pathogens *Kneallhazia* (=*Thelohania*) *solenopsae* (Microsporidia: Thelohaniidae) and *Vairimorpha invictae* (Microsporidia: Burenellidae)? Biol. Control 48: 310–315.

Oi, D. H., S. M. Valles, and J. A. Briano. 2010. Laboratory host specificity testing of the fire ant microsporidian pathogen *Vairimorpha invictae* (Microsporidia: Burenellidae). Biol. Control 53: 331-336.

Orr, M. R., S. H. Seike, and L. E. Gilbert. 1997. Foraging ecology and patterns of diversification in dipteran parasitoids of fire ants in south Brazil. Ecol. Entomol. 33: 305-314.

Porter, S. D., D. F. Williams, R. S. Patterson, and H. G. Fowler. 1997. Intercontinental differences in the abundance of *Solenopsis* fire ants (Hymenoptera: Formicidae): an escape from natural enemies? Environ. Entomol. 26: 373-384.

Valles, S. M., and S. D. Porter. 2007. *Pseudacteon* decapitating flies: potential vectors of a fire ant virus? Fla. Entomol. 90: 268-270. *

*Article by Jiale Lv, Yubin Yang, L. T. (Ted) Wilson, Jenny Wang, R. Plowes, and L. Gilbert. For more information, please contact L. T. Wilson at lt-wilson@aesrg.tamu.edu.

Rice Seed Treatments ...

planting dates from early to late.

Gibberellic acid is commonly provided as an addition to rice seed treatments used in the U.S. mid-south rice growing region. Gibberellic acid stimulates seedling vigor of the semi-dwarf rice varieties. The gibberellic acid treatment can sometimes lead to tall seedlings prone to lodging with spring breezes,

Continued on the next page

if rates are not controlled carefully. For the initial experiments described below, the performances of the seed treatments were compared to both an untreated (a typical seed treatment, but without gibberellic acid; CNTR) and a typical seed treatment including gibberellic acid (GIBB). Through this experimental setup, all seed treatments were assured of being compatible with commercial seed treatments.

The study was conducted at the Texas A&M AgriLife Research and Extension Center at Beaumont, starting with a large number of potential seed treatments. If a particular seed treatment had substandard performance in any experiment, then it was dropped from consideration. Three planting procedures were used over the series of experiments. In February to March 2005, 2006 and 2007, seeds were planted 1-inch deep into field soil in pots (6" diameter; approx. 118 in.^{3} soil volume) placed outdoors. Plantings were made every 4 to 7 days starting in early February to promote the chance of at least one planting being subjected to cool soil conditions. The soil temperature at 1-inch depth was monitored throughout the study.

In 2007, a device was constructed to provide controlled cooling of the soil. Water chilled to a set temperature was circulated among the pots. The pots (4" diameter; approx. 76 in.^{3} soil volume) were constructed from material that transmits heat easily, but not carbon dioxide and oxygen. This design allows the soil temperature to be controlled without drastically altering its redox potential (a measure of how oxidized or reduced the soil is). The apparatus was situated in the greenhouse to avoid air temperature effects. The three soil temperatures were 50, 60, and 72.5°F (average ambient temperature).

For both the outdoor pot studies and the cool-soil apparatus studies, four to five seeds were planted per pot. All seeds in a pot received the same treatment. There were four to six replicate pots per treatment. Treatments were randomized within planting date or soil temperature. In each study, the time to emergence, the emergence percentage, plant height, and number of tillers and above-ground dry weight at sampling were recorded. Each planting was sampled at the early vegetative stage, such that most plants had one visible tiller.

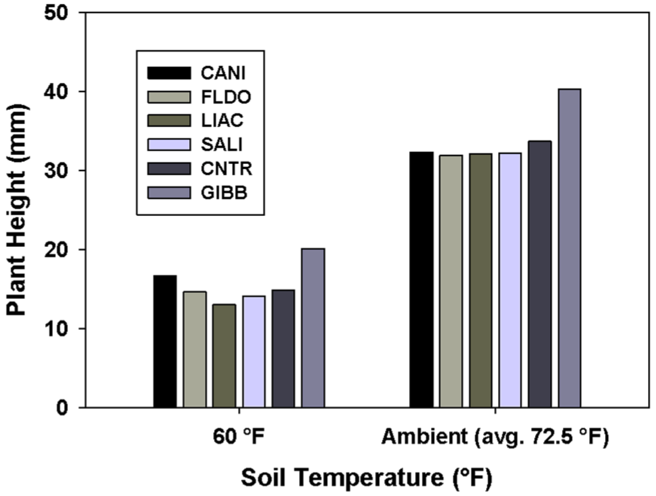


Fig. 2. Plant heights at 20 days after planting 'Cocodrie' seeds into soil of constant 60°F or ambient (average 72.5°F) temperature. Median of six replicate pots with four seeds per pot. Seedling vigor, as measured by plant height, is lower for the 60°F soil treatment, possibly due to the lower soil temperature. The gibberellic acid (Gibb) treatment produced significantly taller seedlings which could be either beneficial or detrimental depending on conditions. Abbreviations: CANI (experimental #14), FLDO (fluridone), LIAC (experimental #15), SALI (salicylic acid), CNTR (control), GIBB (gibberellic acid).

In 2005, sixteen seed treatments were evaluated. Eight treatments resulted in germination percentages of at least 80% over four planting dates from mid-February to mid-March (Fig. 1). Five of the treatments were retained for further testing. Less successful treatments were eliminated primarily due to low emergence percentage or poor seedling vigor as determined by biomass weight at sampling at the 4- to 5-leaf stage. Nonanoic acid, rice bran oil, sodium hypochlorite, sodium iodoacetate, sodium oxamate, triiodobenzoic acid + benzylaminopurine, triacontanol, chlorophenoxyacetic acid, and diaminozide treatments were eliminated. In 2006, another treatment (methylene blue) was eliminated because it resulted in excessive seedling height.

Continued on the next page

In 2007, a proprietary compound (insecticide) was added for testing as a plant growth regulator. Salicylic acid was tested for the first time, but was eliminated because of relatively poor seedling vigor at ambient temperatures. After the 2007 controlled-soil temperature study, fluridone was eliminated because of excessive tissue bleaching at the colder soil temperatures.

After four rounds of evaluation, two seed treatments (and a potential third one that required more study) were identified that provide as high of a germination rate as gibberellic acid when seeds were planted into: a) cool soil, i.e., with an average 3 a.m. soil temperature of 50°F or less for at least the first 10 days after planting, b) a constant 60°F, and c) in relatively warm soil (avg. 72.5°F). Under each of these conditions, the two seed treatments also provided as much seedling vigor, as measured by leaf and tiller development and above-ground plant biomass (results not shown). However, the seedlings are shorter relative to those produced from the gibberellic acid seed treatment (Fig. 2), resulting in a potentially more desirable plant growth form as expressed by a shorter plant height per leaf (Fig. 3) while possessing good above-ground biomass.

Recently, we shifted our focus toward the development of seed treatments that combine the best features of the chemicals identified in the earlier studies. In two years of field tests, these mixtures provided yield equivalent to the gibberellic acid seed treatment under both delayed planting and early planting (February 28), while maintaining low cost and other benefits. We have not identified any combinations that are superior to the current commercial standard beyond having a decreased risk of seedlings growing too tall.

There is also agrochemical-industry research underway to develop seed treatments that provide enhanced cold tolerance for rice. These will likely complement the treatments that we have developed because they are addressing somewhat different aspects. In addition, research is active in developing improved fungicides, insecticides, and seed treatment "packages" for rice. Texas rice producers invest money and time to purchase and plant seed and cultivate and produce rice of high yield and quality.

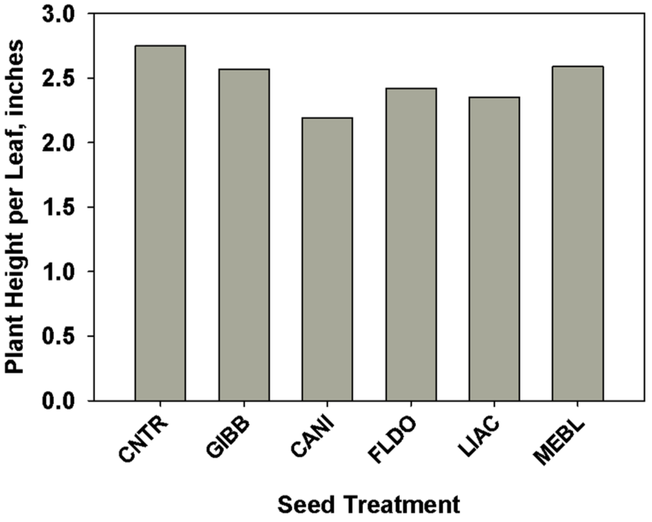


Fig. 3. Plant height per leaf of rice seedlings at 8 weeks post-planting. 'Cocodrie' was planted on February 21 and February 28 in pots outdoors. Medians of eight replications split between the two planting dates, with five seeds planted per replicate pot. If plants achieved a good amount of above-ground biomass (which was the case), then a smaller height per leaf could indicate a desirable growth form for some conditions. Abbreviations: CNTR (control), GIBB (gibberellic acid), CANI (experimental #14), FLDO (fluridone), LIAC (experimental #15), MEBL (methylene blue).

Seed treatments are an economical way to protect the producer's investment. Expect to see an increasing level of protection provided by seed treatments and an increasing number of seed treatment options for mid-south rice production in the near future.

We appreciate the partial support of the Texas Rice Research Foundation, and the donation of materials from Valent BioSciences.

Reference:

Slaton, N.A., S.D. Linscombe, R.J. Norman, and E.E. Gbur, Jr. 2003. Seeding date effect on rice grain yields in Arkansas and Louisiana. Agron. J. 95: 218-223. *

*Article by Drs. Lee Tarpley and Abdul Razack Mohammed. For more information, please contact Dr. Tarpley (ltarpley@tamu.edu).

successful research. Another measure of success of their research was the participation in the stem borer field tour by sugarcane growers who traveled all the way from the Rio Grande Valley and from the eastern areas of Louisiana.

The first article in this issue of *Texas Rice* is by Lee Tarpley and Abdul Mohammed and it focuses on research aimed at developing seed treatments that promote seedling vigor, particularly for early plantings when cold weather tends to weaken the seedlings and causes problems with seedling diseases. Lee and Abdul have evaluated at least a dozen and a half compounds and to date they have found two that appear to increase seedling vigor while avoiding the problem of excessive seedling elongation that can be a problem with gibberellic acid, which is the current industry standard.

Normally, rice that is planted early, such as from late February to the 2nd or 3rd week in March, has an increased chance of needing to be replanted due to poor stand establishment caused largely by seedling diseases. At the other extreme, rice that is planted after early- to mid-April, while safe from seedling diseases normally suffers a substantial drop in yield caused by increased plant respiration associated with elevated night time temperatures occurring following flowering, increased stem borer damage associated with late-season stem borer population increase, and in some cases by increased foliar and panicle disease pressures. Using results from Nathan Slaton and colleagues from Louisiana (Slaton et al. 2003), and assuming a peak average weekly yield of 8,000 lbs/ac occurring with a March 8 planting date, shifting from a mid-April planting date to a mid-March planting date would result in yield being increased by ca. 945 lbs/ac (13.4% increase over the estimated 7,055/ac average yield for a mid-April planting). Were this increase achieved on 25% of the Texas rice acreage, it would increase the gross profitability of rice by an average of $35.44/ac for a grain price of $15/cwt, or $6.4 million/yr over the Texas rice belt, on top of decreased costs due to rice producers having to replant less often.

As Lee and Adbul point out, late planted rice is also less likely to mature a ratoon crop, which is an additional economic incentive to developing a seed treatment that promotes cold temperature seedling vigor. Every dollar that Lee and others end up saving our rice producers strengthens the Texas rice industry, as well as increasing the economic well being of our state. Most research requires hard work, persistence, and a bit of luck. Let's hope that Lee and Abdul land a big one with their seedling vigor research.

The second article provides an overview of fire ant research being conducted by members of our Center including Jiale Lv, Yubin Yang, and yours truly. Fire ants are a serious economic problem to Texas, causing the Texas state economy over $1 billion dollars/yr. Electrical systems are particularly prone to being shorted out by fire ants This little pest somehow drawn to electrical fields where they establish colonies in air conditioner compressors, voltage transformers, wall sockets, dish washers, and on and on. Outside of buildings, fire ants wipe out native ant species and ground dwelling birds, and can kill new born calves and horses. About the only good thing about the red imported fire ant in the U.S. is that the prevalence of ticks is greatly lessened in areas where fire ants are established.

The article by Jiale and her colleagues describes research that focuses on the development of a model that predicts the establishment of fire ants under differing environmental conditions and estimates the impact of introduced fire ant parasitoids and pathogens that help to control this introduced pest. The imported red fire ant is only about 1/10th as abundant in its native range in South America as it is in Texas. This is largely due to a much largely and much more effective complex of naturally occurring parasitoids and pathogens occurring in its native range. I hope I have the patience and longevity to allow me the opportunity to wait until a sufficient number of fire ant natural enemies are established to knock the top off of the fire ants population potential in Texas and elsewhere in the U.S. Although I don't relish the idea of a rebound in tick and chigger abundance, ticks and chiggers are usually a far smaller problem to control than are fire ants. And, we do have far less costly and quite effective means of controlling these pests in urban areas and keeping them off of our bodies.

As a closing statement, it is with sadness that

Continued on the next page

Editorial ...

I convey to our readers that both Ed Gage and Shashank Nilakhe have decided to retire form the Texas Department of Agriculture (TDA). Their retirement marks the end of years of hard work these individuals spent to insure that Texas rice producers (and other crop producers) have safe and effective pesticides. It is through efforts such as theirs that crop production remains economically feasible (when we have rain that is). Whether you believe in the value of properly applied insecticides, fungicides, and herbicides or not, there is no doubt that modern pesticides are here to stay and have been instrumental in the steady increase of yields that modern society has seen since the early 1950. People in the U.S. have some of the least expensive and most safe foods of any location in the world. Although problems with pesticide contamination can occur they are far and few between compared to what happens in less developed countries. I am sure that TDA will do everything in its power to find knowledgeable replacements for these stalwarts of Texas agriculture.

I hope you will continue to read *Texas Rice*, and will occasionally send me your ideas and recommendations.

Reference Cited:

Slaton, N.A., S.D. Linscombe, R.J. Norman, and E.E. Gbur, Jr. 2003. Seeding date effect on rice grain yields in Arkansas and Louisiana. Agron. J. 95: 218-223.

Sincerely,

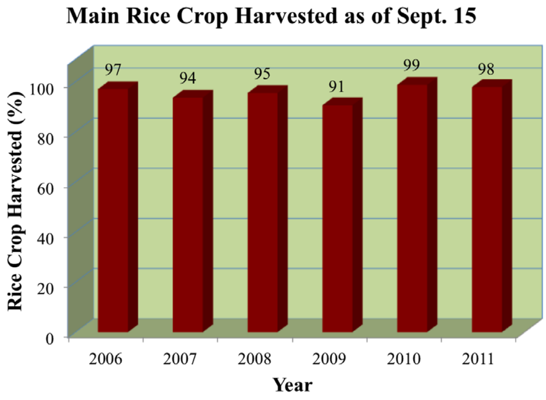
L. T. Wilson

L.T. Wilson
Professor & Center Director
Jack B. Wendt Endowed
Chair in Rice Research

Rice Crop Update

As of September 15, 2011, about 98% of the main rice crop acreage in Texas had been harvested (Figure at right). In comparison, about 97, 94, 95, 91, and 99% were harvested as of September 15 in 2006, 2007, 2008, 2009, and 2010, respectively.

Weekly updates on the acreage and percentage of rice grown in Texas that are in the various growth stages are available at our website at http://beaumont.tamu.edu/CropSurvey/CropSurveyReport.aspx.



Professor and Center Director: L.T. (Ted) Wilson
lt-wilson@aesrg.tamu.edu
Technical Editor: S.O.PB. Samonte
sosamonte@aesrg.tamu.edu
Texas A&M University System
AgriLife Research and Extension Center
1509 Aggie Drive, Beaumont, TX 77713
(409)752-2741
Access back issues of *Texas Rice* at
http://beaumont.tamu.edu

Texas Rice is published 9 times a year by The Texas A&M University System AgriLife Research and Extension Center at Beaumont. Writing, layout, and editing by Lloyd T. Wilson and S. Omar PB. Samonte; with additional support by James C. Medley and Brandy Morace. Information is taken from sources believed to be reliable, but we cannot guarantee accuracy or completeness. Suggestions, story ideas and comments

Texas A&M University System
AgriLife Research and Extension Center
1509 Aggie Dr.
Beaumont, TX 77713