

# UAPB AGRICULTURE

## FIELD DAY

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### Abstract Booklet

Department of Agriculture

University of Arkansas at Pine Bluff

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## STRAIGHTHEAD DISORDER RESISTANCE TRIAL OF RICE

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Straighthead disease, a physiological disorder in rice, is characterized by sterility of the spikelets resulting in blank panicles which remain upright at maturity, so named after the fact. Grain yield can be totally lost when a highly susceptible variety is planted in the straighthead favored conditions. Straighthead is the most important nonfungal disease of the U.S. rice, and it also is the oldest rice disease in Arkansas, observed since the early 1900s when rice was first grown here. The exact cause of straighthead is unknown. Reducing the impact of straighthead to rice will greatly increase the yield and reduce the rice production cost.

Experiments were conducting at UAPB (University of Arkansas at Pine Bluff) from 2008 to 2011. Twelve cultivars and 20 new breeding strains were planted 2008; 3 cultivars, 9 breeding strains, 60 F2 crosses and 200 breeding materials planted and 4 lines displayed in 2009; 3 cultivars and 9 strains repeated in 2010, plus 90 sterile lines, and 100 cultivars planted in 2010; 36 entries and 20 sterile lines planted in 2011. Severe straighthead disease had been observed in the field for some entries. The yields of those entries that suffered straighthead disorder were greatly reduced. Cultivar Francis, and 3 new strains, PB-2, PB-11, and PB-12, showed good tolerance to straighthead. The results of ANOVA (Analysis of Variance) show that there is a very significant difference ( $P < 0.001$ ) of yields among these cultivars and new strains. The results indicate the presence genetic variability among rice cultivars or strains, and may scope for genetic improvement towards tolerance of straighthead in rice.

## GROWTH PERFORMANCE OF PIGS FINISHED ON BREWERS-GRADE RICE

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The objective of this study was to determine whether brewers-grade rice can replace corn or sorghum (Milo) in finishing pig diets without compromising animal performance. Seventeen finishing pigs of Yorkshire x Duroc breeding were randomly assigned to either brewers-grade rice/soybean meal mixture (RSB) or corn/Milo based control (CON). The pigs were 157 days old at the start of the experiment and weighed  $193 \pm 7$  lb. The experiment lasted 28 days and finished pigs weighed  $262 \pm 7$  lb. Variables determined included daily weight gain, gain to feed ratio, apparent dry matter digestibility, and back fat thickness. There was no ( $P > 0.10$ ) treatment of sex interaction for all the variables measured. Compared to CON pigs, RSB pigs gained faster (2.8 vs. 2.1 lb/day), had better gain to feed (0.84 vs. 0.6 lb gain/lb feed), higher apparent dry matter digestibility (91.0 vs. 74.0%), and lower ( $P < 0.001$ ) cost of gain (\$0.45 vs. \$0.74/lb gain). Back fat thickness (measured by ultrasound equipment) for the two layers, 1 and 2, was similar ( $P > 0.10$ ) for both groups ( $\frac{1}{2}$  and 1 inch, respectively). Results of this study suggest that brewers-grade rice can replace corn or Milo in diets for finishing pigs with no adverse effects on animal performance. In conclusion, hog producers in the southeast Arkansas and surrounding regions where brewers-grade rice is abundantly available and relatively cheaper than corn or Milo may derive substantial savings on feed costs with the use of brewers-grade rice as an alternative to the more expensive corn or Milo. However, more research is needed to determine the effect of increased growth performance on grade and carcass quality.

## FAMACHA SCORING GOATS FOR HAEMONCHUS INFESTATION

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*Haemonchus contortus*, the barber pole worm, is a blood sucking parasite of the sheep and goat digestive tract. Infestation with large numbers of *Haemonchus* worms causes anemia, poor growth, reduced milk production, rough hair coat, and eventually death. In the past, chemical dewormers were effective in reducing *Haemonchus* loads. However, *Haemonchus* have become resistant to most chemical dewormers and it is anticipated that they will soon become resistant to all of the currently available chemical dewormers. No new chemical dewormers are currently in the approval process, and the outlook for sheep and goat producers is bleak. FAMACHA scoring is a method of determining the level of parasitic infestation with *haemonchus*. Use of FAMACHA scoring may increase the time in which dewormers are effective by reducing the speed at which the worms develop resistance. It can also reduce the cost of deworming by identifying and treating only those animals in need of deworming. Animals that need deworming more often than the rest of the herd can be identified and culled, reducing the number of parasite eggs being shed on pastures. FAMACH scoring requires completion of a 4 hour training course available through UAPB Extension.

## VALUE ADDED PRODUCTS LABORATORY

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Value-added food products are raw or minimally processed commodities whose value has been increased through the addition of ingredients or processes that make them more attractive to the consumer. Typical fruit and vegetable value-added products include jams, jellies, preserves, fruit sauces and spreads, pickles, fresh-cut fruits and vegetables, and preserved vegetables. It is a production/marketing strategy driven by customer needs and perceptions. Adding value to agricultural production contributes to the economic and environmental sustainability of both farm and community. Adding value implies a degree of innovation that makes a product more desirable to consumers in terms of longer shelf life, improved functionality, better color, texture, flavor and more convenience. Value-added products can open new markets, create recognition and appreciation for the farm, and extend the marketing season. Consumer demand on ready-to-eat or ready-to-use types of prepared foods and minimally processed fruits and vegetables such as fresh-cut or pre-cut produce and salad mixes have increased due to shifts in consumer lifestyles and purchasing patterns. Benefits of value addition to farmers may include new products, optimized shelf-life and higher margins, with flow-on benefits to customers of product novelty, improved convenience, sensory appeal and food safety. The Value Added Products Laboratory at University of Arkansas at Pine Bluff has been used for teaching, research, and extension. Value added products that have been developed in this laboratory include blackberry jam and jelly, cowpea flour and bread, Southern chow-chow, hot pepper sauce and pickle, muscadine wine, sweet potato wine, and apple wine.

# MASS MULTIPLICATION OF VIRUS-FREE SWEET POTATO THROUGH TISSUE CULTURE

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Viral diseases are one of the important factors which reduce the yield of sweet potato (*Ipomoea batatas* (L.) Lam.), an economically important and seventh largest crop in the world with an annual production of 122 million metric tons. Single or multiple virus infection often causes low plant performance, reduced tuber size and reduced yield and crop quality. Therefore, elimination of virus is considered a pre-requisite for successful sweet potato production. We have successfully produced several virus-free sweet potato plants through shoot meristem, which is free from virus infection. Sweet potato shoot apical meristems with 1-2 leaf primordia were aseptically isolated and cultured on Murashige and Skoog (MS) medium supplemented with 0.3 mg/L BAP for shoot induction. The differentiated shoot tips were transferred aseptically to ½ MS media for root formation. The roots were formed within 15 days of culture. Well-developed rooted plantlets were successfully established in the soil media for further hardening. Genomic DNA was extracted from the plantlets to confirm the presence/absence of viruses in the regenerated sweet potato plants through Polymerase Chain Reaction (PCR). The plantlets that were negative to PCR are confirmed as virus free and transferred to the greenhouse for further hardening and multiplication.

## THE SWEET POTATO FOUNDATION SEED PROJECT

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Sweet potato production in Arkansas has steadily increased during the last five years. Over 3000 acres were under sweet potato production this year alone. The increasing market demand for sweet potatoes has been increasing the need for high quality, disease-free planting materials (slips). Availability and cost of high quality, disease free planting materials is becoming a major constraint in the production of sweet potatoes in Arkansas. Sweet potato producers in Arkansas currently have to depend on commercial producers from other states for disease-free planting materials. This ultimately translates into high cost of production, compromised quality of planting materials, delayed time of planting due to shipping challenges, increased potential for disease and insect transmission, an unstable supply of transplants, and decreased returns on investments.

To address this stakeholder (primarily small and limited resource farmers) driven concern, the University of Arkansas at Pine Bluff (UAPB) has initiated a ‘Sweet potato foundation seed program’. The improved quality of the planting materials produced by the foundation seed program will result in decreased cost of production and an improved sweet potato crop (quality and quantity) for Arkansas.



## THE NATIONAL SWEET POTATO COLLABORATOR'S GROUP YIELD TRIAL

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The University of Arkansas at Pine Bluff participates in the National Sweet Potato Collaborator's Group Yield Trial annually. Several sweet potato lines are evaluated for yields, quality and other characteristics. Data and information are assembled and presented for use by cooperating agencies and personnel as material for use in evaluation of projects and planning new research.

# EVALUATION OF VEGETABLE ROTATIONS FOR SMALL FARMS AND ENVIRONMENTAL STRESSES AFFECTING SWEET POTATO PRODUCTION

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Limited resource farmers have all their row crop acreage enrolled in the direct and counter cyclical program in order to receive maximum payments. This program prohibits vegetables from being grown on acreage enrolled in the direct and counter cyclical program. However, farmers set aside acreage to grow vegetables year after year which may reduce yields, quality, and increase weeds and diseases. In one study we evaluated vegetable rotations to determine the cropping systems that can be profitable to the limited resource farmers. Sweet potato, squash, sweet corn, and cowpeas were grown in the summer and were followed by turnip and mustard greens in the fall. The crop sequences were repeated each year since 2007 or were rotated with a cowpea-fall green crop sequence the following year. Yields tended to decline in non-rotated plots for all crops due to increased weed infestation. Returns over variable costs ranked as follow: continuous squash > rotated squash > continuous sweet potato > rotated sweet potato > continuous cowpea. Squash crop sequences were more profitable than the other crop sequences.

In another study, we are evaluating the effect of flooding, drought, and soil field capacity on sweet potato physiological and nutritional characteristics, yield and quality of commonly grown varieties. Findings from this study will provide information on sweet potato breeding for improved tolerance to drought and flooding. Also, we are evaluating three pepper varieties and one variety of switch grass as potential ornamental plants.

## PURPLE HULL PEA DEMONSTRATION

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Traditionally, purple hull peas have been harvested by hand. Many producers of purple hull peas have transitioned to machine harvesting of peas. The cooperative producers in Forest City, for example, have used a shared pea/ bean harvester for several years now. The adoption of mechanical harvesting method has created need to develop and identify purple hull varieties that are suited for mechanical harvesting. The group use and sharing of pea harvesters by farmers has created need to spread the harvesting of peas over a longer period than usual. Additionally, availability of mechanical pea harvesters has increased production of purple hull and, hence, has increased marketing of unshelled pods. In our demonstration, we have planted out 3 popular machine harvestable varieties. These are Louisiana Purple Hull Pinkeye (Quick Pick Pinkeye), Early Scarlet, and Mississippi Top Pick Pinkeye. Shared use of the harvester has created need to stagger (space out) the planting dates in order to manage timely harvest of the crop. Our Studies have shown that to effectively share harvesters, planting should be staggered at a minimum of nine (9) days interval. Prices for purchase of fresh pods can be determined based on pod shell-out ratio. This is a weight of seed shell-out divided by weight of pods shelled, for example, weight of seed from one bushel of pods is divided by the related unshelled pod weight. This ratio can be used to predict the seed quantity equivalent from a given weight of fresh pods being sold. We have also planted out in the demonstration, two new varieties, UAPB-1 and UAPB-2 which have recently been released by the UAPB 1890 Agricultural Experimental Station.

# GENOTYPIC AND PHENOTYPIC CHARACTERISTICS OF ROSE (*ROSA SPP.*) GENOTYPES IN SOUTHEAST ARKANSAS CONDITIONS.

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Roses are favorite plants in home landscapes throughout Arkansas as well as other parts of the United States. They have unique flower colors, fragrances, different sizes, growth forms, and foliage characteristics. Shrub roses are used the most in local yards because they have an advantage in winter hardiness and require less maintenance. A total of twelve varieties – such as tropicana, peace, iceberg, cinco de mayo, Julia child, living easy, europeana, strike it rich, let freedom ring, double delight, plamengarten, frankfurt and wild blue yonder were included in this project. Five to ten plants per variety were planted in raised beds. Each bed contained a soil mixture of 50% top soil and 50% compost material. Roses were randomly planted and each variety was replicated from 5-10 times. All plant materials were in very good condition at planting and transplant shock was minimal.

Roses were planted on April, 2008. All bushes were hand watered after planting. Drip irrigation was the watering method used during the rest of the year. Different fertilizer products were used including: (i) Miracle Gro – Shake N Feed, slow release rose plant food – 9-18-9 + sulphur and (ii.) once, plant food – 10-18-10. Products were applied according to label recommendations. The rose bushes made good growth and there were no visual symptoms of major nutrient deficiencies. Weeds were handpicked. Additional weed emergence control was obtained from the addition of a 3-4” layer of wood chip mulch. Dead-heading of plants was conducted on a regular or on an as needed basis. Spent flowers were removed to encourage additional blooms. Minor pruning to remove weak and damaged branches was done on a very limited basis. Extensive evaluations were conducted with this rose study. Visual evaluations and data collections took place on almost a regular basis with the emphasis on the followings: (i) plant growth and development, (ii) plant size measurements, (iii) transplant shock and plant vigor, (iv) bloom characteristics such as, flower color, number, length of bloom periods and size of blooms, (v) foliage color and ornamental value, (vi) plant shape and growth form and (vii) presence of insects, disease and physiological disorders. In some situations evaluation results were determined by using a rating system of 1-5, with 1 being poor and 5 is excellent. Varieties were ranked by this system.

## SWEET POTATO LEAVES: A POTENTIAL ANTIOXIDANT SOURCE FOR FISH DIETS

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Antioxidant compounds in food play an important role as a health protecting factor. Scientific evidence suggests that antioxidants reduce the risk for chronic diseases including cancer and heart disease. Most of the antioxidant compounds in a typical diet are derived from plant sources and belong to various classes of compounds with a wide variety of physical and chemical properties. In the present study, various antioxidant activity methods have been used to compare the antioxidant capacity of sweet potato leaves, fish feeds to which sweet potato leaves had been added, and catfish samples spectrophotometrically via the ABTS, DPPH, and Folin-Ciocalteu assays and compares the effectiveness of each method. The analysis of organic samples for the determination of nutrients involves the tedious and time consuming process of extraction, centrifugation, and separation of the target analyses from the complex mixture of phytochemicals present in the sample. One extraction method was employed for the analysis of each of the 3 types of samples. The complex mixtures of antioxidants were extracted from the sweet potato leaves, fish diets, and fish samples with 70% acetone (30:70, H<sub>2</sub>O: acetone) by sonication followed by centrifugation. Each assay employs a different type of stable radical and mechanism. Since various antioxidants display different radical scavenging activity towards free radicals, the 3 methods were used and compared. All of the samples tested showed antioxidant activity in both the ABTS and Folin assays. Although the ABTS (2, 2-azinobis-3-ethylbenzothiazoline) and DPPH (2, 2-diphenyl-1-picrylhydrazine) stable free radicals have similar structures, the DPPH radical showed poor reactivity with the fish diet and catfish samples tested in this study. The fish diets tested using the ABTS and Folin-Ciocalteu assays displayed comparable activity; likewise, the fish samples measured showed similar activity.

# EVALUATION OF GLADIOLUS GENOTYPES FOR PHYSIOLOGICAL AND CUT FLOWER PRODUCTION

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The plant genus *Gladiolus* is a member of the family *Iridaceae*. The flowers come in numerous colors such as white, pink, red, purple, yellow, orange, salmon, and even green. Several bi-color flowers can be recognized. Since cut-flower production is an important agribusiness, and *Gladiolus* flowers are always in high demand worldwide, we decided to evaluate available species for survival and performance in the Southeast Arkansas conditions. 5 selected genotypes of *Gladiolus* bulbs were used in this study namely Red Flair, Ice Cap, Plum Tart, Pink Event, and Violet. The studies were conducted for 2 years such as from March 2009 to late July 2009 and then again from March 2010 to July 2010. The corms were germinated in 4 inch bulb pot. Upon emergence of spike the corms were transplanted at the horticultural research farm of University of Arkansas at Pine Bluff. The experimental plots were set at 40 feet wide by 60 feet long. Bulbs were planted 6 inches deep, with a spacing of 7 inches apart. The horticultural and physiological data were collected as and when found necessary. The experiments were conducted in Randomized Complete Block Design (for field study) and Complete Random Design (for flower vase life study) with 3 replications. The spikes were observed in the 3 different carbohydrate solutions such as sucrose, fructose, and glucose. The spikes were placed in 5, 10, and 15 mg concentrations of each solution respectively and observed at the time intervals of 10, 20, 40 and 60 minutes to evaluate the effect of carbohydrates on the flower vase life. Data was collected using the following measurements: length and width of the leaf, length of the spike, weight of corm at post-harvest, total biomass, harvest index, leaf area Index with some other physiological parameters, the number of sprouts per corm, girth and height of plant, number and width of leaf, length and placement of florets, number of opened fresh florets at a time, longevity, yield and vase life of spike, and total yield of corms and number of cormels per plant. These cultivars produced data suitable to develop profitable genotypes for the Southeast Arkansas region. Furthermore, the cut flower production can help local growers maximize profit and plan for market dates. Therefore, results of this study suggest that planting *Gladiolus* species for floral production could be a profitable agribusiness in the Southeast Arkansas Delta.

# SOCIOECONOMIC IMPACT OF SOME AGRICULTURAL PROGRAMS AND POLICIES ON SMALL, LIMITED-RESOURCE FARMERS IN SOUTHEAST ARKANSAS

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A study is being conducted of small, limited-resource farmers involved in the Small Farm Project, University of at Pine Bluff (UAPB). The specific objective of the study includes the following: 1. To identify the level of participation of small, limited-resource farmers in the UAPB Small Farm Project in USDA Farm Support Programs. 2. To determine factors that hinder small, limited-resource farmers participation in USDA programs. 3. To determine which factors are within the farmers control and which factors are related to USDA agency rules and regulations. 4. To determine small, limited-resource farmers involved in the Small Farm Project income variability. 5. To determine small, limited-resource farmers perception about benefits from participating in the USDA programs. 6. To determine underlying reasons why small, limited-resource farmers do or do not perceive that they benefit from participation in USDA programs. 7. To examine concerns of the study participants and make policy recommendations based on the project's findings that will better benefit small, limited-resource farmers. A survey has been conducted to solicit pertinent information related to the small farm project participant's socioeconomic characteristics and level of participation in government programs. A statistical analysis is being done on survey results. An analysis of the historical records of Small Farm Project participants is being conducted as well. Based on the results of this study, policy recommendations will be made that will better benefit small, limited-resource farmers.

## VERIFICATION OF HERBICIDE REGULATION IN SWEET POTATO (*IPOMOEA BATATAS* L. LAM)

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This research will also provide a gateway to suitable infrastructure development for proper sweet potato herbicide use within the state of Arkansas. It will provide information for established and upcoming sweet potato farming operations within Arkansas. It will also allow hands-on investigation of pesticide application protocol; examining the dynamics of both pre- and post-treatment options. All information relating to both treatment applications will be regarded as important, integral components; regardless of particular season constraints and factors. Furthermore, this research will add to the larger comprehension of pesticide use and management within the state of Arkansas.

The purpose of the verification of herbicide regulations is to observe and document the positive and negative effects of Valor, Dual, and Command herbicides within an Arkansas farming environment. By using a recommended Band Formula equation, each herbicide broadcast rate is adjusted accordingly to an experimental area of approximately 12800 sq. ft. Each replication (16) is separated into 800 sq. ft. spaces, incorporating three rows of appropriate width. All sweet potato slips are the same generation (G0), same variety (Beaugard), and are planted in 12" spacing. All herbicides are in a randomization sequence, ensuring variability and better depth of comprehensive and unbiased data.



# MANAGING SMALL HIVE BEETLE, *AETHINA TUMIDA* (COLEOPTERA: NITIDULIDAE) UNDER POTENTIAL INTERRUPTION OF DEVELOPMENT

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The beetles are known as an apiary pest originally from sub-Saharan Africa. These beetles inhabit most honey bee colonies. Large populations of beetles are allowed to build up, even strong bee colonies can be overwhelmed in a short time. This has happened during summer or early fall because large beetle populations are able to lay enormous numbers of eggs. These eggs develop quickly and result in rapid destruction of unprotected combs. The beetles are concerned seriously in Arkansas. The pupa stage of beetles is a vulnerable time in the beetle life cycle. They require slightly moist, loose, sandy soil for their development. The project will compare beetle's preference in two different conditions at UAPB campus.

## OUTREACH TO SOCIALLY DISADVANTAGED AND MINORITY FARMERS AND RANCHERS

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The Animal and Plant Health Inspection Services (APHIS), would like to provide farmers and ranchers information about various programs they have to offer which may benefit or affect their enterprises, without being seen as a threat or negative entity. As the UAPB liaison for this project, my position is to provide farmers and ranchers adequate and correct information about APHIS programs in UAPB Newsletters and conferences rather than the farmer(s) getting potentially incorrect information from other sources. In addition, UAPB clientele will be greatly encouraged to participate in local APHIS meetings while at the same time farmers and ranchers input on APHIS' proposed and existing rules and regulations will be adamantly and continuously encouraged.

With the mailing list I am putting together, APHIS will be able to contact them directly in a timely fashion regarding government regulations and information deemed important specific to their enterprises. UAPB will be able to contact the farmer directly concerning regulatory and farming issues specific to their enterprises. The benefit of this project to APHIS is that they will be provided access to limited resource farmers and ranchers mailing lists and contact information.

UAPB's benefit of this list will be to provide farmers/ranchers with relevant APHIS programmatic information in its newsletters and encourage continuous participation. APHIS participation in UAPB annual meetings will be strongly facilitated. The primary targeted outreach for this project is the entire state of Arkansas; the secondary target is the entire Southeastern United States.

# EFFECT OF SANITIZERS ON FOOD QUALITY OF FRESH-CUT SWEET POTATOES (*IPOMOEA BATATAS*) UNDER MODIFIED ATMOSPHERE PACKAGING.

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Sweet potatoes are highly nutritious vegetables. However, they are only marketed on a very limited scale. Recently, the market has had an increased demand for pre-cut/fresh-cut fruits and vegetables due to fresh-like character, convenience and health benefits. Fresh-cut produce is a perishable commodity with a shorter postharvest shelf-life, and needs better and safer postharvest quality maintenance. The objective of this study was focused on effect of sanitizers and antioxidants on color, headspace gas composition (O<sub>2</sub>, and CO<sub>2</sub>), and bacterial counts. Trisodium phosphate (4%), Sodium hypochlorite (NaClO) (1000 ppm), and Tsunami 200 were used as sanitizer. Sliced sweet potatoes from 2 cultivars (Beauregard and Covington) were treated with sanitizers and packed in high-O<sub>2</sub> permeable bag and low-O<sub>2</sub> permeable bag flushed with gas composed of 4% O<sub>2</sub>, 10% CO<sub>2</sub>, 86% N<sub>2</sub>, respectively. The sweet potatoes were stored at 4°C and analyzed every 4 days for up to 20 days. The surface color (L\*, a\*, and b\* values) of sliced sweet potatoes was measured. Headspace gas composition of O<sub>2</sub>, and CO<sub>2</sub> was determined in the bags containing sliced sweet potatoes. Total plate counts and yeast and mold counts were analyzed for shelf life. The application of different sanitizers is necessary to maintain microbial quality and safety of fresh-cut produce during storage prior to reaching the consumers.

## EVALUATION OF 5 GLADIOLUS GENOTYPES FOR YIELD AND POSTHARVEST PHYSIOLOGY

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The experiment was carried out in the Greenhouse of the Department of Agriculture at the University of Arkansas at Pine Bluff (UAPB) during March to June 2011. It consists of 5 genotypes of *Gladiolus* with 45 corms for each variety, that is total no of corms is 225 (5 varieties x15 plants in each row x 3 replications = 225). The genotypes that were tested are *Gladiolus Green Star*; *Gladiolus Good News*; *Gladiolus Red Flair*; *Gladiolus Purple Flora*; and *Gladiolus Ice Cap* collected from Harris Seed Company, NY. The bulbs are planted 5 inches deep on peat based Pro Mix soil from Canada in 8 inch plastic pots. Fertilizer and watering is done following standard method. Data collected on corm diameter, growth rate, no of spike, length of the spike, days to spike initiation, Chlorophyll concentration on leaf etc. and now statistical analysis is under processing. Flowers were collected and put in different concentration of vase solution to study post-harvest phenomenon. Full bloom and half bloom flowers as well as mature harvested corms (20 from each genotype) are collected randomly and preserve in – 20 degree F for further physiological analysis of starch content as well as total anthocyanin content of flowers.

## EVALUATING SELECTED INSECTICIDES FOR SOIL INSECT CONTROL IN SWEET POTATOES

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Sweet potato ranks among the world's seven most important food crops and plays an essential role as a food security crop, particularly in the tropics, because of its dual utilization, either for human consumption or animal feed, its high nutritional value and a relatively short growing season. However, soil insect pests are extremely problematic in sweet potato production as they cause significant yield and quality effects by feeding directly on the developing roots causing holes, scars, surface tunnels and other blemishes. This study seeks to evaluate the efficacy of selected insecticides in controlling these soil borne insects. Four compounds with potential for controlling these insects will be tested on individual plots arranged in a randomized complete block design with five replications. Efficacy will be evaluated by counting insect feeding scars on marketable roots at harvest. Results within each plot will be converted to percentage control values based on the control plots. In addition, since reliable methods for estimating population levels of insect pests is essential for the effective operations of modern pest management, this study will also investigate the use of insect traps designed for the purpose of assessing the population levels of soil insects.

DETERMINATION OF TRACE METAL CONCENTRATIONS IN MAJOR LAND RESOURCE AREA SOIL  
*SURVEY OFFICE-16.*

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The importance of updating information on trace element concentrations in Soil Survey Region-16 serves to protect the agricultural investments, conservation reserve programs, prairies, grasslands and all other natural resource programs in MLRA-16 and Nationwide. There are areas in SSR-16 that have no source of data on trace metal levels. The study will analyze soil samples taken from the benchmark soils of SSR-16. To determine the concentrations of trace metal present in the various soil series of that area. Using USEPA digestion method 3051a, 12 trace level concentrations will be targeted. After digestion (As, Ba, Cd, Co, Cr, Cu, Mn, Ni, Pb, Hg, Se, and Zn) levels are determined using Spectro Genesis SOB inductively coupled plasma (ICP). A total of 750 specific sets of analysis will be performed focusing on factors that influence trace metal concentrations such as cation exchange capacity (CEC), organic carbon, particle size, ph, and CaCo<sub>3</sub>. Once levels are determined data will be compared with reference literature on baseline trace metal concentrations in USA.

# EVALUATING THE EFFECTIVENESS OF THE SWINE WASTE TREATMENT SYSTEM ON THE UAPB FARM

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Though the use of constructed wetlands to treat various types of wastewater is slowly becoming a common practice throughout North America, little has been documented about their year round performance (Smith et al. 2006). On the University of Arkansas at Pine Bluff (UAPB) Demonstration and Research Farm, a Swine Waste Treatment System (SWTS) has been implemented for treatment of solid and liquid swine waste. The SWTS consist of 3 - 1,000 gallon septic tanks that will hold solid waste from the swine farrowing house and swine feed-out lots, and an anaerobic lagoon that has a storage volume of 2,637 cubic yards and a surface area of 0.29 acres, in which liquid waste and rain water flows into. The system also consists of a 3- cell constructed wetland, which is located to the south of the anaerobic lagoon. The dimensions of each cell are 24 feet x 150 feet. This project is a 1 year study on the effectiveness of the SWTS in the removal of phosphorus, total nitrogen, nitrate, nitrite, and ammonia from the swine wastewater being recycled to the pasture of the UAPB farm. By monitoring the levels of afore mentioned organic nutrients in swine wastewater for one year, we are able to evaluate the effectiveness of the swine waste treatment system with the environmental conditions under which it is operating. Fluctuations in nutrient removal are then used as indicators of favorable and unfavorable conditions for the effectiveness of the SWTS.

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*The UAPB Department of Agriculture—Administrators, Faculty, Staff and Students—express our deepest gratitude for each farmer, individual, company, agency, and employee who joined us in making the 2011 UAPB Agriculture Field Day a success!*

**-Dr. Tracy Dunbar, Interim Department Chair  
And  
Dr. Ed Buckner, Interim Assistant Research Director**

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