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**Poster #001:**

**PHYSIOLOGICAL AND GROWTH PARAMETERS OF TWO SUGARCANE GENOTYPES DURING DROUGHT STRESS**

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**ABSTRACT:** The goal of this study was to better understand the nature of physiological and growth traits which may improve sugarcane productivity under drought conditions. Two sugarcane cultivars that had previously been classified as tolerant (TSP-054) or susceptible (CP02-4589) to drought, based on yield studies only, were evaluated under two water supply regimes (control and drought). Physiological parameters were measured at five different times and growth parameters were measured at the end of the experiment. Under control and drought conditions the cultivar TSP-054 had the highest (50.83) leaf chlorophyll (as measured by the SPAD). Maximum quantum efficiency (Fv/Fm) and root:shoot ratios were also higher TSP-054 (0.8085 and 0.6182, respectively). Leaf photosynthesis, transpiration and stomatal conductance were not significantly affected drought condition in the mentioned cultivar. After re-watering, a rapid recovery of all physiological parameters was observed within eight days in both cultivars. A greater decrease in stalk height was observed in the cultivar CP02-4589 (16.6%) than in TSP-054 (9.37%). The found data demonstrate the robustness of TSP-054 in response to drought and highlights morphological, developmental and physiological differences between the two cultivars that could help in sugarcane improvement programs for stress tolerance.

**Poster #002:**

**DIFFERENTIAL GENE EXPRESSION IN SUGARCANE DURING WATER DEFICIT STRESS**

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**ABSTRACT:** Drought is a major yield-limiting factor worldwide. The mechanisms regulating plant responses and tolerance to drought are varied and are still poorly understood. Identifying the relevant genes and characterizing their functions and regulation in response to drought is necessary in crop improvement programs aimed at increasing productivity by enhancing stress tolerance. In the present study, we used the cDNA-AFLP technique to identify differentially-expressed genes in two sugarcane genotypes that had been previously classified as tolerant (TSP-054) or susceptible (TCP02-4589) to drought. Plants were evaluated at two, and twelve days after exposure to water deficit stress and again at eight days after rehydration. A total of 23 transcript-derived differentially-expressed fragments (TDF) were observed. Nucleotide sequences of eight TDFs were analyzed and five of these revealed high identity with genes previously reported in sugarcane, sorghum, rice and corn. One TDF that was up-regulated in the

tolerant genotype at 12 days, had very close identity with a drought-inducible gene (*SoDip22*) previously identified in sugarcane. In the susceptible cultivar, one TDF that was down-regulated also had high identity (87%) with a putative pentatricopeptide expressed in rice (GenBank access: ABA99065.2), which is thought to be involved in organellar post-transcriptional processing and translation. Eight days after rehydration, the normal pattern of gene expression was reestablished, thus demonstrating molecular mechanisms in long-term plasticity in response to drought stress in sugarcane.

**Poster #003:**

**ENVIRONMENTAL EDUCATION GROWN FROM A SIMPLE GARDEN PROJECT**

**Dr. Debbie Villalon**

South Texas College

**ABSTRACT:** Service Learning can be defined as a teaching and learning strategy that integrates community service with instruction. The outcome of hands-on activities in the field of study is an enriched learning experience that teaches civic responsibility and strengthens communities. During the fall of 2006, the Biology department initiated an environmental education project called "Community Garden/Outdoor Laboratory." The main objectives initially proposed included engaging students in meaningful activities that encourage leadership development and community involvement as well as increasing the availability of biological information among South Texas College (STC) students. Biology students started planting a garden at the College's Mid-Valley Campus (MVC) in Weslaco. The project has greatly expanded during the past three years, providing many opportunities for students in the area of environmental education. The garden is used for teaching in biology courses to cover a variety of topics like basic horticultural practices, butterfly gardening, plant anatomy, pathology, physiology, ecology, nutrition, medicinal uses of plant, and landscape design. The Master Gardener's Program of Texas A&M University have used the garden for a summer training course for elementary and secondary teachers from the Rio Grande Valley. The Biology Department invited guest speakers from the RGV to STC and the Weslaco Area Chamber of Commerce to discuss topics on recycling, wildlife habitat certification, biofuels, food safety, community garden projects in the area, composting, opportunities at other research institutions and nature photography. During April 2008, the garden was used for an Environmental Education Fair which attracted more than 200 students and community members who participated in earth-friendly arts and crafts for kids, scientific lectures and booths for local eco-friendly businesses as well as a nature photography lesson outdoors.

**Poster #004:**

**PREDATORY POTENTIAL OF *Cryptolaemus montrouzieri* TOWARDS THE CITRUS MEALYBUG, *Planococcus citri***

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**ABSTRACT:** *Cryptolaemus montrouzieri* Mulsant (Coleoptera: Coccinellidae) is an important predator of *Planococcus citri* Risso (Hemiptera: Pseudococcidae), which is one of the most important citrus pests. This predator insect has been considered as a control strategy for *P. citri*, as other biological control methods have been ineffective due to the pest feeding habits and the

waxy coat that covers insect body. In this work the predatory ability and predatory efficiency of *C. montrouzieri* towards *P. citri* were tested in laboratory. A colony of *P. citri* was established using a natural diet based on Mexican pumpkins and controlled environmental conditions. *C. montrouzieri* individuals were reared inside plastic cages containing pumpkins infested with *P. citri*. Confrontation bioassays in petri dishes were conducted to determine predatory ability and predatory efficiency. First (L1) and third (L3) instar larvae, and adults of *C. montrouzieri* were tested against first (N1), second (N2) and third (N3) instar nymphs, and females of *P. citri*. In all treatments five individuals of *C. montrouzieri* of each stage were confronted with 0.1 g of citrus mealybugs of each stage. Results indicated that predatory ability and efficiency of *C. montrouzieri* vary according to its developmental stage and that of its prey. *C. montrouzieri* adult is the most predatory and efficient stage compared to the other developmental stages. Predatory activity of *C. montrouzieri* increases with insect development and each stage shows a noteworthy predatory efficiency. A continue crop surveillance is important to determine pest condition and to predict the efficiency of this predator when is released.

**Poster #005:**

**EFFECT OF THIAMETHOXAM AND IMIDACLOPRID AS SEED TREATMENT ON COTTON GROWTH AND EFFICACY AGAINST COTTON APHID**

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**ABSTRACT:** Laboratory and greenhouse experiments were conducted to determine the effect of seed treatments with thiamethoxam and imidacloprid on cotton growth and the efficacy against cotton apterous aphid. Generally, the seed treatments with thiamethoxam and imidacloprid did not have effect on cotton germination; however, seed treatments improved plant height and the chlorophyll content of leaves. Under laboratory conditions, the two insecticide treatments caused 100% mortality of adults and nymphs up to 15 days after planting and the two insecticides treated plants against aphids persisted up to 45 days after planting. The efficacy of the two insecticides against nymphs was higher than against adults, aphids had higher mortality when they fed on the seed treat-plants for 3 days than those fed on the plants for 1 or 2 days, and thiamethoxam-treated plants were more effective than imidacloprid treated. The results in greenhouse experiments followed the same pattern as those in the laboratory experiments, and the two insecticide treatments were equally effective against adults and nymphs, and the mortality from 15 d to 45 d [after](#) planting was higher than untreated controls under greenhouse conditions.

**Poster #006:**

**Control in vitro of *Aspergillus parasiticus* with strains of *Trichoderma* spp. of the North Tamaulipas, México.**

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**ABSTRACT:** The contamination of food for livestock and for aflatoxin is a human health risk because they are toxic and carcinogenic. These toxins are a group of mycotoxins 4 (B1, B2, G1 and G2) which can be produced by most strains of *Aspergillus parasiticus*. This study evaluated the in vitro antagonistic activity of 16 strains of *Trichoderma* spp. on a strain of *A. parasiticus*, both fungi from crops Northern of Tamaulipas. The results show that *Trichoderma* antagonist is *A. parasiticus* growth and limiting the competition for space and in some strains by antibiosis, where prices reached a yellow pigment in the area of interaction with *A. parasiticus*. The strain shows a marked HTE808 on micoparasitismo *A. parasiticus*.

**Poster #007:**

**AFLP AND TRAP MARKER SCREENING OF *Saccharum* COMPLEX AND ITS WILD GRASS RELATIVES TO EXPLORE USEFUL GENETIC RESOURCES FOR ENERGY CANE BREEDING**

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**ABSTRACT:** Commercial sugarcane cultivars were developed by interspecific hybridization between *Saccharum officinarum* (2n=80) and *S. spontaneum* (2n=40-120) followed by a series of backcrossing with *S. officinarum*, and although the current sugarcane cultivars are one of the most efficient biomass producers, their genetic makeup is relatively narrow mainly due to the original hybridization. In order to introduce beneficial genetic traits (e.g. drought and cold tolerance) into commercial sugarcane, there have been several attempts to generate new sugarcane hybrids by crossing sugarcane with its wild grass relatives like *Erianthus* and *Miscanthus*. In 2008, several *Miscanthus* genotypes including four Fiji hybrids (Fiji 17, 54, 55 and 57) were collected from the World Sugarcane Germplasm Repository in Miami, FL and were analyzed by Amplified Fragment Length Polymorphism (AFLP) and Target Region Amplified Polymorphism (TRAP). Initial DNA finger printing results indicated that the four Fiji hybrids are possible intergeneric hybrids between *Miscanthus* and *Saccharum* sp. The phenotypes (e.g. height, stalk thickness) of four Fiji hybrids are similar to sugarcane. On the other hand, other *Miscanthus* genotypes produce very thin stalks and have bushy type growth. In addition, the Fiji hybrids can be vegetatively propagated from stem pieces unlike other *Miscanthus* genotypes, which could be another indication of intergeneric hybrids with *Saccharum* sp. Future study will evaluate the performance of four Fiji hybrids under drought and cold stress since drought and cold stress will be the major limiting factors to extend the cultivation area of new cane hybrids to produce lignocellulosic feedstock for the second generation biofuel production.

**Poster #008:**

**IS HOST SELECTION OF *Liriomyza trifolii* (DIPTERA: AGROMYZIDAE) INFLUENCED BY PRE-IMAGINAL OR POST-IMAGAL EXPERIENCE?**

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**ABSTRACT:** *Liriomyza trifolii* is an important insect pest of various crops, attacking plants in more than 21 families. Recently, two populations, a generalized population and a pepper specialized population, were found co-existing in Lower Rio Grande Valley of Texas. In this study, feeding/oviposition performance and preference tests were carried out to study if host plant

preference of *L. trifolii* is influenced by pre-imaginal or imaginal experience in the pepper population, and a bean population which represents the generalized population. In both no choice and choice experiments, neither adult experience nor prepuparium experience affected adults' performance significantly. For pepper population, the performance of the adults emerged from the puparia conditioning with pepper leaves were not affected when they were placed on both plant species. However, when the pepper populations conditioning with bean leaves at puparial stage, their feeding and oviposition were significantly enhanced on bean plant, but not on pepper plants. In contrast, for bean population, conditioning with bean at puparial stage did not affect the adult performance, but conditioning with pepper, their performance was significantly enhanced on pepper plant. In both colonies, conditioning did not affect the preference of adults to unpreferable plants. The puparial stage played more important roles on host plant selection of adults than other life stages. Conditioning with unpreferable plant at puparial stage could enhance the performance of adults on the plant while conditioning with preferable plant didn't show influence.

**Poster #009:**

**FIELD AND LABORATORY COMPARISON OF LIFE TABLE OF POTATO PSYLLID (*Bactericera cockerelli*) AND MORTALITY FACTORS ANALYSIS ON POTATO AND TOMATO IN THE LOWER RIO GRANDE VALLEY OF TEXAS**

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**ABSTRACT:** Management of potato 'Zebra Chip' (ZC) disease caused by *Candidatus Liberibacter Solanacearum* depends largely on the management of its vector insect, potato psyllid (*Bactericera cockerelli* (Sulc) (Homoptera: Psyllidae). To elucidate the biotic or abiotic factors affecting the mortality of *B. cockerelli*, the life table parameters were determined on potato and tomato under both the laboratory and field conditions from Jan to May 2009 in the Lower Rio Grande Valley (LRGV) of Texas. In the laboratory, the two host plants showed similar effects on *B. cockerelli*, except that *B. cockerelli* immatures developed significant slower on potato than on tomato plant. Generally, survival, fecundity, and longevity of *B. cockerelli* were significantly greater under the laboratory than under the field conditions. The mortality factors were mainly missing or dislodgement, predation, parasitism (for nymphs only), and egg inviability under the field conditions. Comparing to the laboratory results, the intrinsic rate of increase ( $\sum m_x$ ), finite rate of increase ( $\lambda$ ), and net reproductive rate ( $R_0$ ) of *B. cockerelli* fed either on potato or tomato in the field indicated *B. cockerelli* suffered greater mortality, principally in the immature stages. The predators, including spiders, ladybeetles, and lacewings, were most often observed during the investigation. Parasitism by *Tamarixia triozae* (Eulophidae) was also found ranging from 0.47 to 4.2% on 4th or 5th instars of *B. cockerelli* nymphs. Based on the major life table parameters, *B. cockerelli* suffered significant higher mortality under the field conditions than under laboratory conditions, indicating that both biotic and abiotic mortality factors play essential roles for *B. cockerelli* population dynamic particularly under the climate condition of the LRGV of Texas.

**Poster #010:**

## IMPACT OF ALTERING SUGARCANE HARVESTING METHODS ON ATRAZINE ADSORPTION TO ORGANIC MATTER RESIDUES

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**ABSTRACT:** Altering harvesting methods of sugarcane from traditional burning to mechanical harvesting may increase the amount of organic matter residue found on the soil surface. This could lead to unanticipated changes in not only the chemical's movement in soil but also the environmental fate of chemicals applied. The herbicide, Atrazine (2-dichloro-4-ethylamino-6-isopropylamino-s-triazine), is used in the sugarcane industry and has been detected in surface and ground water sources throughout the U.S. The objective of this study was to determine the adsorption of atrazine to sugarcane leaf litter (dried and green) and burned (ash) sugarcane organic residues in South Texas soils. The soils evaluated were sandy loam, sandy clay loam and clay with and without organic residues incorporated from sugarcane dry, green, and ash leaf litter. Adsorption batch equilibrium studies were used to quantify atrazine retention to increasing levels of organic matter residues. Results indicate that as clay content and Organic Matter (OM) in the soil samples increased, adsorption also increased. The type of OM played a significant role in atrazine sorption. Results from adsorption studies will be combined with laboratory-scale column leaching studies to assess the influence of harvesting methods on the mobility of atrazine in a simulated soil profile. The anticipated results of these laboratory investigations will provide a low cost method for evaluating potential leaching and groundwater pollution arising for changes in agricultural management practices.

### Poster #011:

#### CELL WALL COMPONENTS OF POTENTIAL LIGNOCELLULOSIC BIOENERGY CROPS

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**ABSTRACT:** The potential of sugarcane (*Saccharum spp.*) and its tropical relatives as dedicated energy crops for the production of biofuels from lignocellulosic biomass has generated interest in the cell wall composition of these grasses, as the relative proportions of cellulose, hemicellulose, and lignin are a major factor in determining the appropriate biomass to biofuel conversion technology. Neutral detergent fiber (NDF), acid detergent fiber (ADF), and acid detergent lignin (ADL) were determined on 48 tropical grasses (42 *Saccharum spp.*; 4 *Miscanthus spp.*; and 2 *Erianthus spp.*). These measurements represent the whole of the lignocellulosic fraction of the cell wall and enable the quantification of the two major cell wall sugars, cellulose and hemicellulose. To determine NDF and ADF, 0.5 g samples were sealed in filter bags and refluxed sequentially in 24-sample batches in an ANKOM<sup>2000</sup> Fiber analyzer in 2000 ml detergent solutions for 1 h at 100°C, followed by hot water and acetone rinses. For NDF,  $\alpha$ -amylase and sodium sulfite were added during refluxing to solubilize starches and proteins. To determine ADL, filter bags containing ADF residue were stirred in 1000 ml 72% sulfuric acid for 3 h at room temperature, followed by water and acetone rinses. Hemicellulose was calculated as the difference between NDF and ADF, cellulose as the difference between ADF and ADL, and lignin as the difference between ADL and ash. There was a wide range in fiber composition of the grasses analyzed, and statistically significant differences in fiber composition were observed among genera, species, and genotypes within species, as well as among the three cell wall components cellulose, hemicellulose, and lignin. These findings could be

incorporated into the breeding program to identify varieties with specific traits for energy conversion. For example, varieties with high lignin concentrations would be better suited for thermochemical conversions, whereas those with high cell wall sugars would be more appropriate for biological conversions.

**Poster #012:**

**A STUDY ON CITRUS TATTER LEAF VIRUS SEED TRANSMISSION**

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**ABSTRACT:** Citrus tatter leaf virus (CTLV) seed transmission in lily and Quinoa was previously reported. However in citrus, CTLV transmission is predominantly by mechanical means. CTLV infection in four citrus trees of different varieties was confirmed by reverse transcription polymerase chain reaction (RT PCR) as well as with biological indexing. Seed collected from the infected trees were germinated. Of the total 159 seedlings tested by PCR, (23 Meyer lemon seedlings and 136 Eureka lemon seedlings) only two Eureka lemons showed the presence of CTLV. PCR tests on 114 Meiwa kumquat seedlings and 114 Clementine mandarin seedlings are in progress. PCR results will be confirmed by biological indexing using graft transmission and mechanical leaf abrasion. DNA sequence data of CTLV positive seedling will be compared with DNA sequence information from parent trees which were used in propagating the seedlings. CTLV is a serious virus pathogen of citrus with certain rootstocks. Normally, CTLV does not show morphological symptoms on sour orange rootstock, the predominant one in the Lower Rio Grande Valley. However, as newer rootstock such as C-22 use should be practiced with strict guidelines on the importance of the use of CTLV-free bud source. The seed transmission information from this study is an important contribution, especially as the Texas citrus industry plans to adopt C-22 or similar rootstocks in the future.

**Poster #013:**

**EVIDENCE OF SUPERIOR QUALITY OF TEXAS OLIVE OIL**

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**ABSTRACT:** The US imports 99% of the olive oil it consumes. With US consumption of olive oil increasing by 20 percent annually, the market of olive oil looks to be very promising. In previous years, commercial production of olives in Texas was discouraged due to lack of adequate climatic conditions. Recent work in our laboratory has shown the feasibility of growing olives at several sites in Texas. Several growers have already started cultivating olives in Texas. In 2007, the Texas Olive Ranch produced the first commercial batch of Texas Olive Oil. This study was conducted to investigate the quality of Texas olive oil to assess its competitiveness in the market place. The major attraction for olive oils is the presence of health benefiting polyphenols. We have therefore investigated the amounts of total polyphenols, and the most characteristic polyphenols (oleuropein, tyrosol, hydroxytyrosol, and pinoresinol) in Texas and imported oils. Our results show that Texas olive oil contained higher amounts of total phenols; i.e. 72% higher compared to California-1 oil and 27% higher than Italian-2 oil. Similarly, the commercial Texas olive oil also contained higher amounts of oleuropein, hydroxytyrosol, and pinoresinol compared to the other oils tested. Thus based on presence of higher levels of health benefiting polyphenols, the olive oil produced in Texas appears superior. In addition, free acidity and UV



absorption quality parameters affirm that the Texas olive sold in the market is “Extra Virgin”. Giving further credence to the developing olive oil industry in Texas.

**Poster #014:**

**SOME EVIDENCES OF ADAPTATION OF *Aphis gossypii* (HOMOPTERA: APHIDIDAE) ON COTTON AND MELON PLANTS**

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**ABSTRACT:** Cotton or melon aphid, *Aphis gossypii*, is a polyphagous aphid species of insect. Long-term selective regimes may lead to differences in fitness on different hosts. In this study, experiments were carried out to examine the adaptive ability of *A. gossypii* on different hosts after winged adults were transferred between cotton and melon plants. The results showed that newly-emerged and 24h old adults transferred from cotton to melon had similar longevity and fecundity to those fed on nothing (in empty Petri dishes). Number of nymphs reproduced by the adults from cotton could not survive on melon plants, and those from melon also could not survive on cotton. However, the newly-emerged and 24h old adults transferred from melon to melon had longer longevity and fecundity than those transferred from cotton to cotton. In the experiment imitating field condition, similar results were obtained. However, number of nymphs produced by the winged aphids from melon could survive on cotton plants, implying that the aphids from melon have better fitness than those from cotton.

**Poster #015:**

**CONTROL *IN VITRO* OF *Aspergillus parasiticus* WITH STRAINS OF *Trichoderma* SPP. OF NORTH TAMAULIPAS, MEXICO**

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**ABSTRACT:** The contamination of food for livestock and for aflatoxin is a human health risk because they are toxic and carcinogenic. These toxins are a group of mycotoxins 4 (B1, B2, G1 and G2) which can be produced by most strains of *Aspergillus parasiticus*. This study evaluated the in vitro antagonistic activity of 16 strains of *Trichoderma* spp. on a strain of *A. parasiticus*, both fungi from crops Northern of Tamaulipas. The results show that *Trichoderma* antagonist is *A. parasiticus* growth and limiting the competition for space and in some strains by antibiosis, where prices reached a yellow pigment in the area of interaction with *A. parasiticus*. The strain shows a marked HTE808 on micoparasitismo *A. parasiticus*.

**Poster #016:**



## SPATIAL AND TEMPORAL DISTRIBUTION OF PHYSICO-CHEMICAL PROPERTIES OF WATER FROM SUB-SALINE LAKE ALCHICHICA, PUEBLA, MEXICO

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Keywords. Physico-chemical, lakes, ionic dominance

**ABSTRACT:** Alchichica Lake is located in the limits of the states of Puebla and Veracruz, Mexico at the coordinates 19° 25' N y 97° 24' O, and the attitude of 2,320 m.a.s.l. This lake is the volcanic origin and has a salinity of 8.5 g/L and a pH near 8.5. Recent studies showed that the lake has remained with these conditions from at least 300 years. Here we report the physico-chemical properties as pH, electrical conductivity, total hardness, total alkalinity and total dissolved solids. We also tested the ions sodium, magnesium, calcium, carbonates, bicarbonates, chlorides and sulfates. The water samples were taken from the center of the lake and from the four cardinal points, also we sampled in the four seasons of the year. The techniques from the book Standard Methods the Examination of Water and Wastewater were used. The linear coefficient of correlation was used as statistic analysis. Our results suggest space and temporal variations in the physico-chemical characteristics of this water body. From now we are going to correlate the fungi diversity among the Physico-chemical features along the year seasons. (177 palabras)

### Poster #017:

#### Cell Wall Components of Potential Lignocellulosic Bioenergy Crops

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**ABSTRACT:** The potential of sugarcane (*Saccharum spp.*) and its tropical relatives as dedicated energy crops for the production of biofuels from lignocellulosic biomass has generated interest in the cell wall composition of these grasses, as the relative proportions of cellulose, hemicellulose, and lignin are a major factor in determining the appropriate biomass to biofuel conversion technology. Neutral detergent fiber (NDF), acid detergent fiber (ADF), and acid detergent lignin (ADL) were determined on 48 tropical grasses (42 *Saccharum spp.*; 4 *Miscanthus spp.*; and 2 *Erianthus spp.*). These measurements represent the whole of the lignocellulosic fraction of the cell wall and enable the quantification of the two major cell wall sugars, cellulose and hemicellulose. To determine NDF and ADF, 0.5 g samples were sealed in filter bags and refluxed sequentially in 24-sample batches in an ANKOM<sup>2000</sup> Fiber analyzer in 2000 ml detergent solutions for 1 h at 100°C, followed by hot water and acetone rinses. For NDF,  $\alpha$ -amylase and sodium sulfite were added during refluxing to solubilize starches and proteins. To determine ADL, filter bags containing ADF residue were stirred in 1000 ml 72% sulfuric acid for 3 h at room temperature, followed by water and acetone rinses. Hemicellulose was calculated as the difference between NDF and ADF, cellulose as the difference between ADF and ADL, and lignin as the difference between ADL and ash. There was a wide range in fiber composition of the grasses analyzed, and statistically significant differences in fiber composition were observed among genera, species, and genotypes within species, as well as among the three cell wall components cellulose, hemicellulose, and lignin. These findings could be incorporated into the breeding program to identify varieties with specific traits for energy conversion. For example, varieties with high lignin concentrations would be better suited for thermochemical conversions, whereas those with high cell wall sugars would be more appropriate for biological conversions.

**Poster #018:**

**HOST PREFERENCE AND SUITABILITY OF WILD RUTACEOUS SPECIES FOR DEVELOPMENT OF ASIAN CITRUS PSYLLID, *Diaphorina citri* KUWAYAMA, WITH RESPECT TO CITRUS GREENING DISEASE (HUANGLONGBING)**

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**ABSTRACT:** The Asian citrus psyllid, *Diaphorina citri* Kuwayama, is an invasive species native to southern Asia. Vectoring huanglongbing, (citrus greening disease), the Asian citrus psyllid possesses the potential to be the most devastating and destructive pest within the citrus industry. By evaluating the Asian citrus psyllid's preference on several Rutaceous species it is possible to identify species that could prove to be a suitable host not only for psyllid development but could potentially harbor the already troublesome greening disease. Choice and no-choice testing trials will be conducted to determine psyllid preference and suitability of Rutaceous species. The olfactometer and gas chromatography-mass spectrometry (GC-MS) will be carried out to further analyze adult psyllid's olfactory senses and the host volatile components respectively. *Choisya ternata* and *Choisya arizonica* trials have already proven to support and sustain the Asian citrus psyllid's development with *Amyris madrensis* supporting only partial development. These initial results indicate that the Asian citrus psyllid, *Diaphorina citri* Kuwayama can in fact thrive on species other than citrus. Further testing is still in progress.

**Poster #019:**

**EFFECTS OF ORGANIC PRODUCTION PRACTICES ON THE DYNAMICS OF ASIAN CITRUS PSYLLID AND NUTRIENT ABSORPTION OF CITRUS TREES**

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**ABSTRACT:** Organic agriculture has increased dramatically over the last 15 years. As world trends towards more sustainable and environmentally-friendly production policies, more consumers are interested and purchasing produce free of residues of chemical pesticides and synthetic fertilizers. However, the amount of scientific data available on sustainable perennial citrus production is considerably insufficient. The purpose of this project is to evaluate the effects of different compost sources on the uptake of major nutrients by citrus under organic practices management, to assess the population densities and fluctuations of Asian Citrus Psyllid (ACP) treated with natural bio-pesticide products utilized in certified organic farms and to provide scientific data aimed at increasing the knowledge base of Citrus organic farming in the Rio Grande Valley. Different compost sources were soil surface applied under the tree canopy, and complimented with an organic foliar fertilization program. Bio-pesticides and compost treatments were compared against a control group of trees not receiving compost addition nor a bio-pesticide treatment. Random soil and leaf samples were taken over time to determine the effect of using organic practices on soil physio-chemical properties and plant nutrition. Population densities and fluctuations of key Citrus pests were monitored weekly during the active growing season to evaluate bio-pesticide efficacy. Results suggest that a bio-pesticide program based on a mix of kaolin clay and oil performs better on controlling Asian Citrus Psyllid adults than other bio-pesticide treatments. A compost treatment increased leaf calcium content and presented a lower overall ACP adult population during the experimental period.

**Poster #020:**

**GENETIC ANALYSIS AND BIOCONTROL OF THE MYCOFLORA ASSOCIATED TO POST-BLOOM Citrus DROP FROM TAMAULIPAS**

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**ABSTRACT:** Fungal pathogens are the main causal agents of post-bloom citrus drop. Special attention deserve the fungi *Colletotrichum acutatum* and *Alternaria limicola*, which have been reported as causal agents of post-bloom fruit drop disease of Mexican lime, and having a negative economical impact on citrus orchards of norwest Mexico. However, there are no reports concerning the prevalence of this disease in the states of the Gulf of Mexico, including Tamaulipas. In this study we isolated the intracellular fungi present in italian lime tissue (diseased flowers, buttons and small fruits of *Citrus limon* var Eureka) and morphologically identified a total of 38 fungal isolates from a citrus orchard in Nuevo Padilla county (Tamaulipas, Mexico). The isolates were phylogenetically identified by sequencing and bioinformatic analysis of their ITS1-5.8S-ITS2 and 26S ribosomal fragments. We found a total of 15 fungal genera, including some potential citrus pathogens as *Alternaria*, *Aspergillus*, *Fusarium*, *Glomerella/Colletotrichum* and *Penicillium*. The potential biocontrol of the LBI-CBG collection of native epiphytic yeasts isolated from Citrus spp. were tested *in vitro* and *in vivo*, using young freshly-cut leaves of *Citrus limon* var Eureka as host. Such collection includes yeast genera such as *Candida*, *Debaromyces*, *Cryptococcus* and *Pichia*. Preliminary results show that *Pichia* sp has a high potential of biocontrol for *Colletotrichum/Glomerella* isolates. Besides, a combined analysis of the genetic and pathogenic tests suggests a probably faster adaptation of the native yeasts strains under the pressure of the presence of fungal pathogens isolated from the same citrus orchard.

**Poster #021:**

**APPLICATION OF SCINTILLOMETRY TO ESTIMATE WATER USE BY GAINT REED (*Arundo donax* L.) - A PERENNIAL INVASIVE WEED ALONG THE RIO GRANDE RIVER NEAR LAREDO, TEXAS**

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**ABSTRACT:** Giant reed (*Arundo donax* L.) is an exotic and invasive weed from Eurasia that presenting a severe threat to agroecosystems and riparian areas in Texas and Mexican portions of the Rio Grande River Basin. It is spreading rapidly by displacing native vegetation. Giant reed is expected to consume excessive amount of water to support its incredible vegetative growth rate. However, very limited information is available on its water usage in the United States. The objective of this study was to estimate daily water use by the giant reed using a Large Aperture Scintillometer (LAS) along the Rio Grande River near Laredo, Texas. On March, 2009, a LAS was deployed 1 m above the giant reed canopy (5.3 m above the ground level). The path distance between the transmitter and receiver of the LAS was 230 m. Scintillometer measurements were made at 1-min interval and averaged to 15- min, synchronized with weather station measurements. In addition, net radiation (Rn) and soil heat fluxes (G) were measured. Latent heat fluxes and evapotranspiration (ET) rates were derived using LAS-estimated H as a residual from the energy balance equation (LE=Rn-G-H) and hourly ET values were summed to obtain a daily ET value. Analysis of the data for a day with clear skies (March 20, 2009) indicated that the

daily water demand for giant reed was 5.1 mm. A long term monitoring of the giant reed canopy is required to accurately quantify the variations in water demand at different growth stages and meteorological conditions. Scintillometer-based water use data can be used as a ground truth to validate remote sensing based regional scale daily/monthly/seasonal water use maps covering giant reed areas in the Rio Grande River Basin.

**Poster #022:**

**LETHAL YELLOWING AND DATE PALM LETHAL DECLINE IN SOUTH TEXAS**

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**ABSTRACT:** Lethal Yellowing (16SrIV-A) and Date Palm Lethal Decline (16SrIV-D) are palm diseases caused by phytoplasmas that infect several species of palms. Phytoplasmas are non-culturable mollicutes and therefore make identification of these phytoplasmas limited to molecular techniques such as Polymerase Chain Reaction (PCR). In 2007, a third strain of Lethal Yellowing (16SrIV-F) was found in Florida. Currently there is no information concerning the group of phytoplasmas and the diseases that they cause in Texas. Therefore, the purpose of this study is to 1) determine whether decline and mortality of palm trees recently observed in Texas is due to one of these three phytoplasmas, 2) determine the prevalence and 3) determine susceptibility of palm trees.

Samples were taken using a portable drill with a 6" long 5/16" drill bit and drilling into the trunk of the palm. The drill bit was sterilized by a portable propane torch and three grams of the inner wood shavings were collected. Ten palm trees from Kleberg County were sampled and from them three were positive for Date Palm Lethal Decline. This project will greatly enhance our awareness of these diseases and assist Texas in preventing them from becoming a quarantine issue for palm producers.

**Poster #023:**

**USE OF A NOVEL DUAL BINARY VECTOR SYSTEM FOR MULTIGENE ENGINEERING IN CITRUS**

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**ABSTRACT:** Citrus is the number one commodity fruit crop worldwide. Diseases caused by *Citrus tristeza virus* (CTV) constitute a global threat to the citrus industry due to significant losses to fruit quality and yield. Resistance to CTV in Poncirus, a citrus relative, was recently found to be conferred mainly by two genes. The use of traditional breeding for transferring these genes to commercially important citrus varieties is not possible due to genetic incompatibility. Novel dual binary vector systems have been developed to allow the delivery of multiple genes into the nuclear genome, using *Agrobacterium*-mediated plant transformation. This study was conducted to determine whether these systems could be successfully applied to express multiple genes in citrus. The pCLEAN dual binary vectors were therefore constructed to harbor two CTV resistance genes in combination with the  $\beta$ -glucuronidase (GUS) reporter gene and the *NptII* resistance gene; they were later introduced into citrus epicotyls and tobacco leaves by *Agrobacterium*-mediated transformation. Plant transformation was monitored histologically for the transient expression of GUS. Efficiency of transient transformation was significantly improved by the use of this binary vector system. In citrus, transient transformation efficiencies were observed to be in the range of 80-90%. These preliminary data indicate that application of

this dual binary vector system to citrus and tobacco should facilitate the genetic engineering of complex traits into these plants through the coordinated delivery of multiple genes.

**Poster #024:**

**IMPROVEMENT IN SALT TOLERANCE OF CREEPING BENTGRASS, AN IMPORTANT TURFGRASS TO THE GOLF INDUSTRY, USING ANTI-APOPTOTIC GENES**

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**ABSTRACT:** Creeping bentgrass (*Agrostis palustris* Huds.) is a cool-season grass that is widely planted on golf courses in temperate and subtropical climates due to its tolerance to extreme mowing and the production of a fast, uniform putting surface. Currently, there is an increased demand for new cultivars with enhanced salt tolerance because of the growing number of urban areas with limited or sub-quality water supplies. The main aim of this research was to use anti-apoptotic (survival) genes to develop transgenic turfgrasses that are tolerant to normally lethal levels of salt. We have used an *Agrobacterium*-mediated transformation system to introduce the *CED9* gene of the nematode, *Caenorhabditis elegans*, into creeping bentgrass, cultivar "Crenshaw". Six independent transgenic lines were generated and cultivated under hydroponic conditions, with daily irrigation and a nutritional solution in which salt (NaCl) concentrations were gradually increased up to 400 mM (with a total dissolved salts of 1,834 ppm) and maintained for 8 weeks. Evaluation of agronomic characteristics indicated that transgenic plants expressing the *CED9* gene showed a significant enhanced performance when compared to non-transgenic plants. Shoot growth of transgenic plants was reduced by only 30-50%, compared to the 67% decrease in wild type plants. Reduction in the root system was also significantly affected in wild type plants (70%) as opposed to 40-50% and 10-40% of transgenic plants when evaluated for root length and volume, respectively. The present study suggests that the anti-apoptotic *CED9* gene can provide enhanced tolerance to high levels of salinity in turfgrasses.

**Poster #025:**

**TOWARDS THE IDENTIFICATION OF THE CAUSAL AGENT OF THE POTATO ZEBRA COMPLEX (ZC) DISORDER**

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**ABSTRACT:** Zebra Complex (ZC) disease has recently been found to affect potato crops in different parts of the world including, Southern parts of North America, Central America and New Zealand. The disease causes millions of dollars in losses and unemployment for the potato industry due to decreased crop quality and yield. The most distinguishing symptom of ZC is brown colored streaking found in raw potato tubers that intensifies in appearance when fried. Above-ground symptoms include stunted growth, short internodes and necrosis of the whole plant. The pathogen causing ZC is believed to be a bacterium known as *Candidatus Liberibacter solanacearum/psyllaurous* (CL p/s), and is suspected to be vectored by the potato psyllid, *Bactericera cockerilli* Sulc. Our objective was to screen symptomatic and non-symptomatic potato plants (FL 1867) for the presence of CL p/s using conventional and real-time PCR. Plants collected from potato farms in Olton, Texas, were individually screened for ZC

disease in tubers, roots, lower stems, upper stems, and leaves. Fry test and Lugol staining test were conducted to check for tuber streaking and plant stress respectively. Non-symptomatic plant samples were negative for both the tuber fry and Lugol staining tests indicating absence of ZC. Symptomatic samples were positive for both tuber fry test, and Lugol staining. However, PCR testing showed that only 30% of the symptomatic samples were positive for the CL p/s, and among the different plant parts tested, the roots and lower stems were frequently positive. In addition, two-dimensional protein profiling showed a larger number of proteins present in symptomatic stems when compared to non-symptomatic ones. Future work will involve identification and sequencing of the proteins that are differentially expressed in the symptomatic samples.

**Poster #026:**

**DEVELOPMENT OF AN EFFICIENT *IN VITRO* PROPAGATION SYSTEM FOR MISCANE**

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**ABSTRACT:** Miscane, an inter-generic hybrid of miscanthus (*Miscanthus spp.*) and sugarcane (*Saccharum spp.*) is a newly emerging bioenergy crop. Large-scale propagation of this crop is therefore essential to provide a genetically uniform material that meets the requirements of agronomic, physiological, and biochemical studies. This work was initiated to provide the first system for culturing miscane *in vitro*. The system involved two different kinds of explants; leaf roll discs grown on solid media and apical meristematic tips cultured in liquid media. The advantage of using leaf roll discs is to produce embryogenic callus for potential transformation experiments, whereas that of apical meristems is to generate disease free seedlings. Several problems associated with hyper hydricity (in liquid media) as well as microbial contamination and phenol toxicity (in both liquid and solid media) were overcome, and tissue-culture-generated plantlets were subsequently transferred to the greenhouse for hardening. The current *in vitro* tissue culture system provides the means for a simple and high-throughput propagation of miscane and enables the screening of a large number of plants for desirable biochemical and physiological characteristics. It also will facilitate large-scale plantings of this new bioenergy crop.

**Poster #027:**

**APPLICATIONS OF REMOTE SENSING TECHNOLOGY FOR DETECTION AND MANAGEMENT OF GLASSHOUSE CROP PESTS**

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**ABSTRACT:** During the past several years, researchers of the University of Texas – Pan American have collaborated with colleagues in several institutions and agencies in the development of novel remote sensing technology designed to detect varying levels of damage to glasshouse crops caused by a variety of arthropod pests and pathogens. Several studies demonstrated the effectiveness of quartz halogen lamps as an artificial lighting source to facilitate the acquisition of color-infrared (CIR) imagery at night and under inclement ambient lighting conditions.

Conventional color and CIR imagery acquired indoors under quartz halogen lamps were shown to be comparable in quality to imagery acquired outdoors under optimal natural lighting conditions. In many cases, CIR imagery alone was sufficient to distinguish foliage damaged by foliar-feeding arthropods (e.g., spider mites) from undamaged (control) foliage. In cases in which foliar damage occurred at levels too low to facilitate detection by either conventional color or CIR imagery alone, certain types of derivative imagery (particularly images based on ratios of near-infrared to red reflectance) were shown to be highly effective in distinguishing subtle levels of damage to foliage that were not evident in the visible (blue, green and red) spectrum. Potential applications of these technologies in the management of glasshouse crop pests is discussed.

**Poster #028:**

**MAPPING THE DISTRIBUTION OF BLACK MANGROVE, *Avicennia germinans*, IN THE “SPOIL ISLAND” CHAINS OF THE LOWER LAGUNA MADRE**

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**ABSTRACT:** The spatial distribution of black mangrove, *Avicennia germinans*, within the dredged-material or “spoil island” chains of the Lower Laguna Madre (LLM) of Texas were investigated using a combination of ground surveys and aerial color infrared (CIR) photography. Examination of aerial photographs suggested that black mangrove tends to be most abundant on islands located south of the Arroyo Colorado (a tributary of the Rio Grande which empties into the LLM in Willacy County) and tends to be concentrated along western shorelines on most islands in which stands presently occur. These observations were consistent with ground surveys of selected islands which indicated significantly higher densities of black mangrove along western vs eastern shorelines of selected islands ( $P < 0.05$ ). However, ratios of small vs mature mangrove plants were similar along all shorelines ( $P > 0.05$ ) which indicates a suitability of the shoreline environment for mangrove growth and reproduction regardless of cardinal direction. The most plausible explanation of these trends is that wave action caused by prevailing southeasterly winds during most of the year may impede establishment of mangrove seedlings along eastern shorelines where shoreline turbulence tends to be greatest. If correct, this conclusion suggests that the development of planting strategies designed to facilitate the establishment and growth of black mangrove stands along eastern shorelines and other relatively harsh environments will be critical to the use of this important native plant species for shoreline stabilization and erosion mitigation in the spoil island chains of the Lower Laguna Madre.



**Poster #029:**

**SPECTRAL REFLECTANCE BY FOLIAGE OF COMMON SUNFLOWER (*Helianthus annuus*) AS AN INDICATOR OF ARSENIC CONTAMINATION OF SOIL**

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**ABSTRACT:** Research was conducted to evaluate the effects of elemental arsenic (As) on spectral reflectance by foliage of common sunflower, *Helianthus annuus*, an abundant and widely-distributed plant in the Lower Rio Grande Valley (LEGV) of Texas. Initial studies demonstrated the feasibility of acquiring spectral reflectance measurements for sunflower foliage using an artificial (quartz halogen) lighting source and excised (rather than attached) leaves of sunflower plants. The reliability of these procedures was shown to be highly dependent on 1) the collection of spectral measurements from excised leaves within ~ five minutes of detachment from plants, and 2) the placement of excised leaves on a background exhibiting little or no reflectance of near-infrared (NIR) wavelengths. Using this methodology, cohorts of sunflower plants grown under hydroponic conditions and exposed to varying levels of As (0 – 10.0 mg/l) exhibited significant reductions in reflectance of NIR (but not visible) wavelengths, the magnitude of which was least among plants subjected to the lowest level of As (5.0 mg/l) and greatest among plants subjected to the highest rate (10.0 mg/l). These preliminary results suggest that common sunflower (and possibly other native plant species) may serve as “indicators” of arsenic contamination in topsoil which is currently a major public health issue in southern Texas and other areas of the country.