63rd RIO GRANDE VALLEY HORTICULTURAL SOCIETY ANNUAL MEETING

JANUARY 21, 2009

POSTER ABSTRACTS

P01

Pathogenic and Genetic Analyses of *Colletotrichum gloeosporioides* (Penz.) Penz & Sacc. Isolates from Michoacán, México

Edgar Saul Rodríguez-López, Sanjuana Hernández-Delgado, and Netzahualcoyotl Mayek-Pérez

Centro de Biotecnología Genómica. Instituto Politécnico Nacional. Boulevard del Maestro esq. Elías Piña s/n. Col. Narciso Mendoza. Reynosa, Tamaulipas, México. E-mail: nmayek@ipn.mx

Avocado (*Persea americana* Mill.) is affected by several diseases, among them 'anthracnose' caused by the fungus *Colletotrichum gloeosporioides* (Penz.) Penz & Sacc which affects from 80 to 90% of avocado fields and causes yield losses near 20%. One hundred and twenty isolates of *C. gloeosporioides* were obtained from avocado fruits from 12 orchards from the state of Michoacán, México. The pathogenicity of them was tested in cv. 'Hass' fruits. Isolates were subjected to AFLP analysis (four combinations of *Eco*RI / *Mse*I +2/+1 and +2/+2 oligonucleotides using a semi-automated sequencer). Finally, we analyzed the pathogenesis of *C. gloeosporioides* in cv. 'Hass' fruits during 15 days. Isolates showed white (8.3 %), grey (16.7 %) and green-olive (75 %) colony colors. Negative correlation between colony growth rate and pathogenicity was found. Isolates from a 30-year-old orchard in Tangancicato were the most aggressive in avocado fruits. Isolates were grouped based on origin, pathogenicity and some *in vitro* traits (growth rate and colony color) using cluster analysis. The fungus produced a mucilagous layer over conidia closely associated to germ tube and appresoria as well as acervuli. Inter and intra-cellular growth of the fungus in avocado fruits produced the disorganization and cellular disintegration 15 days after inoculation. Our results indicated that the pathogen completed its life cycle in avocado fruits.

P02

Potential Use of *Trichoderma* sp. as Biostimulant for Sorghum and Maize Crops

Isabel Sánchez Pérez[1], Jesús García Olivares[2], Di Carlo Quiroz Jesús , Angel Salazar Bravo, Netzahualcóyotl Mayek Pérez, and José Luis Hernández Mendoza

[1]*Student of Genomic Biotechnology program,* [2]*National Polytechnic Institute of the Genomic Biotechnology Center. Experimental Biotechnology Laboratory. Boulevard del Maestro Esq. Elías Piña, s/n. Col. Narciso Mendoza, Reynosa, Tamaulipas, México.*
jhernandezm@ipn.mx

In the state of Tamaulipas the past 10 years have seen plants affected by the fungus *Macrophomina phaseolina* with infection rates of 30 to 100%. This impact is especially favored by periods of drought in the fruiting season. *M. phaseolina* is a soil pathogen capable of infecting a large number of crops, notably cotton, beans, maize (corn), sunflower and sorghum susceptible to infection by this fungus. There are ways to fight this disease such as chemical control, but this can cause problems to both the environment and the health of the farmer. The genus *Trichoderma spp*. has been documented as a biocontrol agent for plant pathogens. We isolated strains of *Trichoderma*, from soil samples that were characteristic of northeastern Mexico. With these strains we are evaluating the promotion of growth in seedlings of maize and sorghum. The strains grew on solid media and the number of spores were counted with a **Neubauer camera**. In plant treated in the greenhouse, was biomass production of maize and sorghum treated with different concentrations of spores was evaluated. The application of *Trichoderma* HK703 in maize and sorghum increased biomass production. The optimum dose to achieve this effect was $1x10^2$ spores for sorghum and $1x10^4$ spores for maize. The results show the potential of the native strain HK703 to promote plant growth. In field tests HK703 increases production by 35% in maize and sorghum crops. The increase for forage sorghum is equivalent to 12%, reducing further the decline of plant.

P03

Ganoderma Infecting Citrus in Texas May be a Unique Taxon Within the *G. lucidum* Complex: Evidence from ITS Region

Madhurababu Kunta[1], H. Miao[1], J. L. Perez[1], T. Shigaki[2], and M. Skaria[1]

[1]*Texas A & M University-Kingsville, Citrus Center, Weslaco TX 78596*
[2] *Children's Nutrition Research Center, Baylor College of Medicine, Houston TX*

Decline and death of citrus trees on sour orange rootstock due to *Ganoderma* infection was previously reported in Texas. This citrus isolate was determined to be *G. lucidum* based on morphological characters of spores, fruiting body, geographic distribution, and host specificity. In Texas, no previous molecular characterization studies have been conducted on this fungus. The aim of this study was to investigate the use of internal transcribed spacer (ITS) regions ITS1 and ITS 2 in identification of *Ganoderma* isolated from Texas citrus. The ITS 1 and ITS 2 regions of the Texas citrus isolate were amplified using polymerase chain reaction (PCR), sequenced, and analyzed by comparison with twenty five ITS 1 and ITS 2 nucleotide sequences of *Ganoderma lucidum* complex retrieved from EMBL/GenBank. A homology search for Texas citrus *Ganoderma* ITS 1 and ITS 2 nucleotide sequences at GenBank database showed more than 95% similarity to nucleotide sequences of several species from *Ganoderma lucidum* complex. These results are in agreement with the previous non-molecular identification. The ITS sequence data also shows that the *Ganoderma* infecting citrus in Texas may be a unique taxon within the *G. lucidum* complex. ITS sequence data may provide a rapid clinical diagnosis of this fungus.

P04

Antagonism of *Trichoderma* spp. *vs*. *Macrophomina phaseolina* and *Fusarium oxysporum*

Isabel Sánchez Pérez[1], Jesús García Olivares[2], Di Carlo Quiroz Jesús , Angel Salazar Bravo, Netzahualcóyotl Mayek Pérez, and José Luis Hernández Mendoza

[1]Student of Genomic Biotechnology program, [2]*National Polytechnic Institute of the Genomic Biotechnology Center. Experimental Biotechnology Laboratory. Boulevard del Maestro Esq. Elías Piña, s/n. Col. Narciso Mendoza, Reynosa, Tamaulipas, México.*
jhernandezm@ipn.mx

Trichoderma spp. is a fungus often used as an antagonist of several species of plant pathogenic fungi. We are working on *Trichoderma* spp. isolated from wild sunflower. In this study we evaluated *in vitro* antagonism of four isolates of *Trichoderma spp*. (HK701, HK702, HK703 y HK704.) against the phytopathogenic fungi *Fusarium oxysporum* and *Macrophomina phaseolina*, which often attack economically important crops such as maize (corn), sorghum, beans and soybeans, in Tamaulipas, Mexico. The results showed that HK702 was the most aggressive antagonist, because it showed a better growth rate and it limited the phytopatogens development by competence of space. The *M. phaseolina* sclerotia area was also degraded by HK 702. This results showed its potential for use in crops attacked by *F. oxysporum* and *M. phaseolina*. The other strains did not show this effect. The four strains were tested in greenhouse on maize and sorghum plants and showed that HK 703 increased biomass production, probably due to metabolites related to the indol acetic acid cycle.

P05

Impact of Potato Psyllids (Homoptera: Psyllidae) from Four Host Plants on 'Zebra Chip' Infestation and Sugar Composition in Different-aged Potato Plants

Feng Gao, John L. Jifon, Xiangbing Yang, and Tong-Xian Liu*

*Texas AgriLife Research, Texas A&M University System, 2415 E. Highway 83, Weslaco TX78596. *Corresponding author: E-mail: tx-liu@tamu.edu*

The Zebra chip (ZC) syndrome is an emerging disease of potato (*Solanum tuberosum* L.) and a major threat to the potato industry. Fried potato chips made from ZC-infected tubers express dark brown streaks when processed, leading to rejection. The potato psyllid, *Bactericerca cockerelli* (Sulc) is believed to be a vector of the ZC pathogen, which is now thought to be *Candidatus* Liberibacter, a bacterium. To further understand the relationship between potato psyllid infestation and ZC disease expression, healthy potato plants at different growth stages (4, 6 and 10 weeks after germination) were exposed to potato psyllids that were separately reared on four solanaceous hosts plants (potato, tomato, eggplant or bell pepper) for more than one year. ZC symptoms, leaf photosynthesis rates (Pn) and total nonstructural carbohydrate (TNC – glucose, sucrose and starch) accumulation in leaves and tubers of healthy and psyllid-infested plants were monitored. Typical ZC symptoms were observed in leaves and tubers of all plants exposed to potato psyllids regardless of the host plant on which they were reared. This was also accompanied by significant reductions in Pn. Caged potato plants without exposure to potato psyllids (uninfested controls) did not show any ZC symptom in both foliage and in harvested tubers. Foliage damage and ZC expression were most severe in plants that were exposed to potato psyllids four weeks after germination compared to plants infested at latter growth stages. Tubers from potato psyllid-infested plants had significantly higher levels of reducing sugars (glucose) and lower levels of starch than those from healthy plants, indicating that potato psyllid infestation interfered with carbohydrate metabolism in either leaves or tubers, resulting in ZC expression.

P06

Effects of Host Plants on Population increase of Potato psyllid, *Bactericera cockerelli* (Sulc) (Homoptera: *Psyllidae*)

Xiangbing Yang[1,2] and Tong-Xian Liu[2]

[1]College of Plant Protection, Northwest A&F University, Yangling, Shaanxi, 712100, P. R. China. [2]Texas AgriLife Research, Texas A&M University System, Weslaco, TX 78596, USA

Correspondence: Tong-Xian Liu, Texas AgriLife Research, Texas A&M University System, Weslaco, TX 78596, USA. Email: tx-liu@tamu.edu

Host plants could play an important role in integrated pest management. To determine if various host plants can affect population increase in potato pysllid, we carried out experiments to investigate the development rate, survivorship and fecundity of *Bactericera cockerelli*, reared on four Solanaceous host plants, in laboratory at 26.7 ± 2°C. The developmental times from egg to adult emergence, of immature *B. cockerelli* on bell pepper was 26.2 days which was significantly longer than on potato, tomato, eggplant (19.6, 18.7 and 24.1 days, respectively). The survival rate of eggs and 4th and 5th instar nymphs were similar at all host plants however 1st to 3rd instars nymphs survival rate was significantly lower (36.6%) on bell pepper compared with potato, tomato or eggplant (81.5%, 74.0, or 56.2%, respectively). *B. cockerelli* male adults reared on bell pepper lived significantly longer than on potato, tomato or eggplant whereas the female adults' longevity was similar on the four host plants. Preoviposition and oviposition periods, fecundity, and sex ratio of adults reared on four host plants showed no significant difference. The r_m value was greatest on potato (0.1164) and least on bell pepper (0.0884), and intermediate on tomato (0.1161) and eggplant (0.1098), similarly, the finite rate of increase (λ) was 1.1234, 1.0924, 1.1229, and 1.1161, on potato, bell pepper, tomato, and eggplant, respectively. Mean generation time and doubling time were shorter on potato with values of 39.8 and 6.0 days respectively; than of 41.1 and 6.0 days; 40.4 and 6.3 days; 46.1 and 7.8 days; on tomato, eggplant, and bell pepper, respectively. The gross reproduction was greatest on potato with 246.8 offspring. Our results suggest that the four host plants from the most favorable to the least favorable can be arranged in the order of potato > tomato > eggplant > bell pepper.

P07

Immunesuppressor Genes to Improve Baculoviruses as Biopesticides

Miguel Ángel Pérez Rodríguez and Mario Alberto Rodríguez Pérez

Instituto Politécnico Nacional. Centro de Biotecnología Genómica. *Boulevard del Maestro esq. Elías Piña, Col. Narciso Mendoza, Cd. Reynosa, Tam., México. Tel y fax (899) 9243627. E-mail: mrodriguez@ipn.mx*

Baculoviruses are insect pathogens with a relatively slow speed of action, a factor that has limited their use as control agents of insect pests. Introduction into baculoviruses of genes which code for proteins interfering specifically with insect metabolism or metamorphosis such as toxins, hormones, and enzymes, may enhance the pathogenicity of these viruses. A third approach for genetic modification of baculoviruses is the introduction of genes with immune suppressor effects. Symbiotic polydnaviruses (PDVs) are associated with endoparasitoid wasps and are injected into the host caterpillar during the oviposition. PDVs infect host lepidopteran cells. One gene product of the polydnaviruses of the wasp *Cotesia rubecula* is the CrV1 that is responsible for depolymerization of actin in hemocytes, abolishing immune functions such as phagocytosis and cell spreading, and allowing the successful embryonic development of the parasitoid wasp. For its use as a biopesticide, the complete CrV1 cDNA was inserted into the *Autographa californica* nuclear polyhedrosis virus genome next to the polyhedrin gene. Another construction was the CrV1 inserted next to the p10 gene. We named these as Ac-pPolh-CrV1 and Ac-pP10-CrV1, respectively. Bioassays showed that supernatant harvested from the insect cell culture infected with Ac-pPolh-CrV1 and Ac-pP10-CrV1 was found to cause mortality in *Spodoptera exigua* larvae. Baculoviruses are usually found occluded in polyhedrin capsules. Ac-pPolh-CrV1 lacks the polyhedrin gene and produces not occluded virions. The application of polyhedrin-negative viruses in the field is impractical, since they are quickly inactivated. Nevertheless, they can be co-occluded with baculoviruses into one polyhedron. In order to further enhance the insecticidal efficacy of recombinants baculovirus, new genes and PDV-specific promoters will be searched for expression and assessed as biopesticides. We thank SIP-IPN(project No. 20050327) and COFAA/IPN for financial support.

P08

Efficacy of *Eretmocerus* nr. *furuhashii*, *Serangium japonicum* and *Paecilomyces fumosoroseus* for Management of Sweetpotato Whitefly *Bemisia tabaci*

Ali. H. Sayyed[1*], Sahar Fazal[2] and Shunxiang Ren[3]

[1]*Department of Entomology, Texas AgriLife Research Center, Weslaco*
[2]*Department of Bioinformatics, Muhammad Ali Jinnah University, Islamabad, Pakistan*
[3]*South China Agricultural University, Guangzhou 510642, China* *Corresponding e-mail: ali_sayyed@hotmail.com*

Sweetpotato whitefly *Bemisia tabaci* (Gennadius) and its B-biotype are polyphagous pests with broad range of cultivated host plants. The main factors regulating the whitefly population are natural enemies and management practices. Management of the pest is however increasingly difficult because of negative affect of indiscriminate use of insecticides on many of the non target organisms leading. We therefore were interested to explore the role of natural mortality factors such as natural enemies and entomopathogens contribution in whitefly population suppression. The efficiency of *Eretmocerus* nr. *furuhashii*, *Serangium japonicum* and *Paecilomyces fumosoroseus* were evaluated alone at three release rates 1, 2, 3, wasps/plant, 1, 3, 5 pairs of beetles/ plant, and $5x10^7$, $5x10^8$, $5x10^9$ conidia/ml respectively by establishing the life tables inside the cages under laboratory conditions. The life table study revealed that *Er*. nr. *furuhashii* has remarkable suppressive effect on increasing population of whitefly for three release rate strategies respectively. The survival of 1st instar was lower in all release rates of *Er.* nr. *furuhashii* especially 3 wasps/plant as compared with control indicating that better control can also be achieved by host feeding as well by parasitization of whitefly nymphs. The percent of parasitization was high in high release treatment (28.87%) compared with medium release rate (17.15%) and low release rate (11.58%). The survival of each stage in each treatment for *S. japonicum* releases was significantly lower without any remarkable preference for any specific stage of whitefly for predation shown by the *S. japonicum*. *Paecilomyces fumosoroseus* was highly pathogenic to different nymphal stages of *B. tabaci*. The lowest survival was found at the 4th instar of whitefly followed by 3rd, 2nd and then pupal stage in $5x10^9$ conidia/ml treatment.

P09

Liriomyza and Parasitoid Species Composition on Pepper and Effects of Insecticides in South Texas

Ricardo Hernandez[1], Marvin Harris[2] and Tong-Xian Liu[1]

[1]*Texas Agrilife Research, 2415 E. Highway 83, Weslaco, TX79596*
[2]*Department of Entomology, Texas A & M University, College Station TX*
ricardo05@tamu.edu

Populations of leafminers (*Liriomyza* spps) have increased in the Lower Rio Grande Valley of Texas (LRGV) in the past few years, becoming pests on various vegetable crops. *Liriomyza* spp. and parasitoids guilds were surveyed in south Texas in the past two year. The most abundant leafminer species in peppers was *L. trifolii*, representing 98 % of the collected specimens during the summer of 2007 and 89 % during the spring 2008. There are at least 3 families of hymenopterous parasitoids contributing to the control of the leafminers, Eulophidae, Braconidae, and Figitidae. Of the total collected specimens, the most common parasitoid is *Neochrysocharis* Formosa in Eulophidae, and *Opius dissitus* in Braconidae. In Figitidae, the two most common species are *Ganaspidium nigrimanus* and *G. pusillae*. We also studied the efficacies of four commonly used insecticides (Abamectin 0.15 EC, Spinetoram, Novaluron 0.83 EC, lambda-cyhalothrin) for the control of leafminer pests, and Novaluron is the most effective one, and lambda-cyhalothrin is the least effective one.

P10

Movement and Citrus Pest Control Efficacy of Aldicarb in South Texas Heavy Textured Soils

Raul R. Hinojosa[1], Shad D. Nelson[1,2], Mamoudou Sétamou[2], Esmeralda Rodriguez[1], and Madahy Romero[1]

[1]*Texas A&M University-Kingsville, Department of Agronomy & Resource Sciences, MSC 228, Kingsville, TX 78363;* corresponding author: *rrh2314@yahoo.com*
[2]*Texas A&M University-Kingsville Citrus Center, 312 N. International Blvd., Weslaco, TX 78596*

The utilization of aldicarb [(2-methyl-2-methylthio) propionaldehyde *0*-(methyl carbamoyl) oxime], a broad spectrum pesticide, is considered to be an effective treatment against Asian Citrus Psyllid (*Diaphorina citri)* and mites in citrus production. During recent years, growers have observed variable pest control efficacy in the South Texas region. Understanding the effectiveness and persistence of aldicarb in the environment is crucial in the planning and management of citrus production. Environmental factors affecting the movement of aldicarb include: soil pH, EC, soil oxygen content, percent and type of organic matter, irrigation practices, soil clay content, and temperature. The high alkaline soils in this region are typically near a pH 8.0 or higher. Varying soil pH, organic matter level, clay content and flood irrigation practices are potential causes for the poor performance of aldicarb. The objectives of this study are to evaluate field management practices including soil moisture and flood irrigation timing after aldicarb application, and to understand the fate and transport of aldicarb. The efficacy of aldicarb will also be monitored to evaluate control of Asian citrus psyllid and citrus mite populations. Data will be collected for economic analysis and the reliable use of aldicarb for the Lower Rio Grande Valley citrus industry.

P11

Concentration of Neonicotinoid Insecticides in Citrus Leaves and their impact on Asian Citrus Psyllid (*Diaphorina citri* Kuwayama)

Sravani Garlapati, Mamoudou Sétamou, Shad D. Nelson, and J. V. da Graça

Texas A&M University-Kingsville Citrus Center, 312 N. International Blvd., Weslaco, TX 78596; corresponding author: *shravanireddy02@gmail.com*

The Asian citrus psyllid (*Diaphorina citri* Kuwayama) is a major pest affecting citrus in Texas. The pest, which vectors the bacterium causal agent of the deadly citrus greening disease, has individual Texas in the last decade. Control of this insect pest remains one of the only viable option for the management of citrus greening disease-systemic neonicotinoids are very effective at controlling proportions of *Diaphorina citri* and these insecticides are very compatible with often integrated pest management strategies. The objective of our study are to evaluate the uptake of two commonly used neonicotinoids (imidacloprid and thiamethoxam) and determine then optimum concentrations in citrus leaf tissue for adequate control of psyllid – potted citrus plants ever treated with different rates of either soil applied imidacloprid (Admire Pro) or thiamethoxam (Platinum) These plants will be changed and infested with known number of adult psyllids –adult psyllid mortality and the number of eggs laid on plants will be evaluated daily for one week post infestation. In addition the titer of each neonicotinoid in plant tissue will be measured using the Enzyme-Linked Immuno-Sorbent Assay (ELISA). Regression analysis will be performed to determine the relationship between imidacloprid level in leaf tissue and *D.citri* mortality.

P12

Effect of Different Water Regimes on the Efficacy of Aldicarb in the Control of Citrus Rust Mite (*Phyllocoptruta oleivora*)

Manjula Talari, M. Sétamou, S. D. Nelson and J. V. da Graça

Texas A&M University-Kingsville Citrus Center, 312 N. International Blvd., Weslaco, TX 78596. Correspondence: manjulamoses@gmail.com

Citrus is a perennial fruit crop that is infested by many insect and mite pests and the citrus rust mite (CRM) is the major pest of citrus in Texas. The CRM feeds on the leaves and fruit and causes extensive economic damage to the crop. Temik (a.i. aldicarb) is the most common soil-applied systemic pesticide used to control CRM in Texas. However, the efficacy of CRM control by aldicarb has come into question recently as variable levels of pest control have occurred throughout South Texas. The timing of irrigation prior to and after chemical application may influence aldicarb pest control efficacy. The objective of this study is to evaluate the efficacy of the chemical in controlling the CRM in regards to irrigation timing pre and post soil-application of aldicarb. A factorial experiment will be conducted to evaluate the combined effects of soil condition(dry or wet) pre-application and different timings of irrigation (0 day, 3 days, 7 days and 14 days) post application on the efficacy of aldicarb for CRM control. Weekly monitoring of the pest population on the leaf and fruit will be performed. Soil samples for chemical content will be analyzed biweekly using the Enzyme Linked Immunosorbent Assay (ELISA) test. The ELISA test is a qualitative, colorimetric assay procedure for the detection of organophosphates and carbamates. The test estimates the presence or absence of the chemical in the soil and leaf samples. This can help evaluate the amount of chemical to control CRM populations. Results from this study will help understand the best irrigation management plan to effectively control CRM using aldicarb.

P13

Assessing the Agricultural Nonpoint Source Contaminants of the Arroyo Colorado

Madahy Romero[1], Shad D. Nelson[1], Juan M. Enciso[2], Xavier Peries[2], Raul R. Hinojosa[1], and Esmeralda Rodriguez[1]

[1]*Texas A&M University-Kingsville, Department of Agronomy & Resource Sciences, MSC 228, Kingsville, TX 78363;* corresponding author: madahyromero@yahoo.com
[2]*Texas AgriLife Extension and Research Station, 2415 E. Hwy 83, Weslaco, TX 78596*

The Arroyo Colorado is located in the Rio Grande Valley in the southern most part of Texas. Water from the Arroyo flows through Hidalgo, Cameron, and Willacy Counties and drains into the Laguna Madre. The Arroyo Colorado's watershed (approximately 1,828 square kilometers) is a flat coastal plain that slopes towards the Gulf of Mexico. Water quality assessments have found that the Arroyo Colorado does not meet the state's requirements because of the presence of toxic sediment and high levels of bacteria. Furthermore, low dissolved oxygen levels in portions of the Arroyo Colorado have resulted in the inability to support aquatic life. High nutrient loading from municipal wastewater, agriculture, and urban storm water have also contributed to the poor water quality of the Arroyo. In response to these conditions, efforts to better characterize agricultural runoff and to assess and demonstrate the effects of Best Management Practices (BMPs) implementation at the field and sub-watershed level have taken place. The objective of this project is to identify potential agricultural contaminants (pesticides and herbicides) leading to degradation of the Laguna Madre. Several agricultural field sites located adjacent to outfall pipes that discharge directly into the Arroyo Colorado, will be monitored. Soil and water samples will be taken to measure for phosphorus, nitrogen, nitrates and organic pesticide content. Results from this study will help ascertain the extent at which agricultural irrigation and management practices impact surface water bodies located in South Texas. This is an ongoing study initiating in February 2009.

P14

Non-target Environmental Impact Assessment of Chemical Spray Application and Quantification of Active Ingredient Persistence in Soil and Foliage

Esmeralda Rodriguez[1], Shad D. Nelson[1,2], Mamoudou Sétamou[2], Robert R. Saldana[2], Raul R. Hinojosa[1], and Madahy Romero[1]

[1]*Texas A&M University-Kingsville, Department of Agronomy & Resource Sciences, MSC 228, Kingsville, TX 78363;* corresponding author: Esmer.Rdz@gmail.com
[2]*Texas A&M University-Kingsville Citrus Center, 312 N. International Blvd., Weslaco, TX 78596*

Commercial citrus production is concentrated in the Lower Rio Grande Valley (LRGV). Pests are a major concern in citrus production and pesticides are an essential component to an integrated pest management approach for pest management. Foliar applications of pesticides are intended to achieve a maximum foliar coverage with minimal depositional loss to the soil. A common chemical spray application method for foliar pesticides in the LRGV is with the use of an air-blast sprayer. The objectives of this research is to quantify the deposition and persistence of the chemicals, chlorpyrifos (Lorsban®), fenpropathrin (Danitol), spirodiclofen (Envidor), and abamectin (Agri-Mek®) in soil and foliage after air-blast spray application. Chemical efficacy for pest control such as citrus leaf miner, mites, and Asian citrus psyllid will be monitored. Deposition will be quantified using mass difference. Active ingredients in the soil and foliage will be extracted using a combination of liquid-liquid extraction, and solid-phase extraction methods. The extracts will be analyzed using gas chromatography-mass spectroscopy or high-performance liquid chromatography. The significance of this research is to determine the potential residue loss amount using the air-blast sprayer technique. Results from this study suggest possible pollution risks that grant better management techniques using alternative foliar spray application methods. Minimizing unintended deposition of pesticides can assist producers to better manage a budget by reducing the volume of lost pesticide.

P15

Effects of Organic Production Practices on the Dynamics of Major Citrus Pests and the Productivity of Citrus Trees

Juan Raygoza, S. D. Nelson, and M. Sétamou

Texas A & M University-Kingsville, Citrus Center, Weslaco TX 78596

Organic agriculture has increased dramatically over the last 15 years. More consumers seem to be interested and seeking for produce free of residues of chemical pesticides and synthetic fertilizers, as world trend seems to be aiming towards a more sustainable and environmentally-friendly production policy. However the amount of scientific data available on sustainable perennial citrus production is considerably insufficient. The purpose of this project is to determine the effect of using organic practices on the growth parameters of young grapefruit trees and their pest load and compare it to conventionally managed trees. Three different composts sources will be applied to the soil at the beginning of the growing season in spring complimented with an organic foliar and irrigated fertilization program in the middle of the season. Pest populations will be managed using different bio-pesticides commonly used by certified organic growers. The control treatment will be a group of trees conventionally managed using chemical fertilizers and pesticides. Soil and plant samples will be taken randomly 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 will be assessed to measure efficacy of bio-pesticide products in comparison to conventional pesticides. The evaluation of these parameters in conjunction with an overall economic analysis will provide an excellent comparison of the importance of organic farming relative to the traditional conventional citrus production in the Lower Rio Grande Valley.

P16

Sodium Chloride Tolerance of Sea Breeze Bamboo, *Bambusa malingensis*

Justin D. Tanner[1,3], Shad D. Nelson[1,2], and Jorge Lozano[1]

[1]*Texas A&M University –Kingsville, Department of Agronomy and Resource Sciences, MSC 228 Kingsville, Texas 78363 Corresponding Author: jtanner78362@yahoo.com*
[2]*Texas A&M University –Kingsville Citrus Center, 312 N International Blvd, Weslaco, TX 78596*
[3]*Texas Bamboo Society, Chapter of the American Bamboo Society*

Storm surge events such as hurricanes threaten life in coastal regions. The devastation from these storms includes wind and water damage to buildings, property and landscapes. Naturally, maritime forests have provided protection from the powerfully erosive forces of storm surges and buffer less salt tolerant plants further inland from salt sprays by catching fine water particles containing salt on there leaves as wind carries salt sprays through maritime forest buffers. The microclimate created by salt tolerant forest buffers allows for a more protected and productive landscape. *Bambusa malingesis,* commonly called Sea Breeze Bamboo, is a non-invasive clumping bamboo which is reportedly tolerant of salt spray and could provide an excellent buffer for subtropical coastal regions threatened by the coastal challenges of salt and wind damage. This tall bamboo can grow to a height of 35 feet (10.67 meters) and is an excellent candidate for use as a windbreak. In order to substantiate this claim, salt tolerance tests must be conducted to determine if *B. malingesis* can live up to the reputation that its common name implies. Aside from its use in coastal plantings, *B. malingesis* could be an ideal candidate for the utilization of low quality waste water containing sodium chloride; the most common salt found in municipal waste water. As the expected availability of low salt containing water available for irrigation decreases the understanding of ideal plant selection for maximum productivity will become increasingly important. The purpose of my research is to establish a range of sodium chloride tolerance for *B. malingesis* to allow for an accurate recommendation for environmental plantings and uses.

P17

Citrus Waste Biorefinery: Pretreatment and Enzymatic Hydrolysis Processes

Raul C. Rivas[1], Kim D. Jones[2], and Patrick L. Mills[3]

[1]*Department of Environmental Engineering, Texas A&M University-Kingsville, Kingsville, TX.* *raul.rivas_cantu@students.tamuk.edu.*
[2]*Department of Environmental Engineering, Texas A&M University-Kingsville. Kingsville, TX.* *kjones@tamuk.edu.*
[3]*Department of Chemical Engineering, Texas A&M University-Kingsville, Kingsville, TX.* *kfplm@tamuk.edu*

Conversion of agro-industrial wastes to biofuels is an emerging technology, and important strategy to reduce dependence on foreign fuels. Citrus wastes (Peel, pulp, seeds) generated from juice production are almost 50 w% of the original whole fruit. US 2006/08 seasons citrus juice (oranges, grapefruit) production generated approximately 10.6 millions of metric tons of waste, which is currently processed as low-valued cattle feedstock. At times, the high-costs of waste drying and processing production and poor markets can result in environmental disposal problems. Citrus waste is a low-lignin, and pectin-rich biomass that can be fermented to ethanol and other high-valued products, consisting of soluble sugars, water, and insoluble polysaccharides (cellulose, hemicelluloses, pectin, and lignin) which must be pretreated, and hydrolyzed before a biorefinery process. The project objective is to develop the basis to a technically and economically feasible biorefinery process for approximately 80,000 tons/year of citrus waste generated during the production of Rio Red grapefruit (*Citrus x paradisi* Macf) juice in the Texas Citrus Exchange (TCX) facility located at Mission, TX. Research is focused on the processes of pretreatment and hydrolysis to convert the polysaccharides into fermentable monosaccharides (mainly into glucose, fructose, and galacturonic acid). The pretreatment will provide the optimal particle surface area required in the subsequent enzymatic hydrolysis of insoluble polysaccharides. Citrus waste will be reduced to micrometric size and hydrolyzed using different proportions of enzymes such as cellulase, pectinase, and β-glucosidase to obtain soluble monosaccharides to be fermented to bioethanol. Engineering concepts such as reaction rate, and scale up factors will be modeled from the information generated during bench-top and mini-pilot experiments.