Agri Engineering 2017

International Conference on

Agri Biotech & Environmental Engineering

September 11-12, 2017 San Antonio, USA

Scientific Sessions & Abstracts

Day 1

Robert Bowling, Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

The sugarcane aphid (Hemiptera: Aphididae): An invasive pest of sorghum in North America

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In 2013, the sugarcane aphid, *Melanaphis sacchari* (Zehntner) (Hemiptera: Aphididae), a new invasive pest of sorghum in North America, was confirmed on sorghum in 4 states and 38 counties in the United States. In 2016, it was reported on sorghum in 19 states and over 400 counties as well as all sorghum-production regions in Mexico. Ability to overwinter on living annual and perennial hosts in southern sorghum-producing areas and wind-aided movement by alate aphids appears to be main factors in its impressive geographic spread in North America. Morphological characteristics of the sugarcane aphid include dark tarsi, cornicles, and antennae, allowing easy differentiation from other aphids on the crop. Sugarcane aphid damages sorghum by removing sap and covering plants with honeydew, causing general plant decline and yield loss. Honeydew and sooty mold can disrupt harvesting. The aphid's high reproductive rate on susceptible sorghum hybrids has resulted in reports of yield loss ranging from 10% to greater than 50%. In response, a combination of research-based data and field observations has supported development of state extension identification, scouting and treatment guides that aid in initiating insecticide applications to prevent yield losses. Highly efficacious insecticides have been identified and when complemented by weekly scouting and use of thresholds, economic loss by sugarcane aphid can be minimized. Some commercial sorghum hybrids are partially resistant to the aphid and plant breeders have identified other lines with sugarcane aphid resistance. A very diverse community of predators and parasitoids of sugarcane aphid has been identified and their value to limit sugarcane aphid population growth is under investigation.

Biography

Robert Bowling has completed his PhD from Kansas State University and MS from Kansas State University Department of Entomology. He is the Assistant Professor of Texas A&M University, USA.

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Daniela Trifan, Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

Innovative technology to obtain vegetal biostimulants by biodegradation of agricultural post-harvest waste and medicinal plant extracts

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The paper presents researches about construction of automated biodegradation platform for agricultural waste to obtain vegetal biostimulants and biofertilizers in two weeks. We have obtained two finished products: a liquid biostimulant for foliar application and a solid organic substrate for hydroponics or soil application to increase the fertility. The flow to obtain these products consists in the following steps: weighing and loading vegetal waste on the conveyor belt; chopping waste and loading in biodegradation platform by a cyclone; mixing the chopped crop residues with bioinoculum of lignolitical micro-organisms; homogenization and monitoring indices of aerobic biodegradation for 7 days; adding hot water and mixing to stop the aerobic biodegradation for 7 days, addition of herbal extracts with antibacterial and fungicidal effects; separating the liquid from the solid part by pressing of compost with their quality control; packaging and labeling organical substrate in bags; bottling and labeling the vegetal biostimulant; distribution. The higher content of nitrogen, potassium, and magnesium was recorded at the biostimulant obtained from sunflower waste, while the rich content of the phosphorus and sulfur was recorded at biostimulant obtained from wheat and barley waste. Variant obtained from mixed waste (sunflower, wheat, barley, corn) has the best balanced mineral content and it was tested in fields by the application of treatments with different doses, on agricultural crops (wheat, barley, rape, sunflower, corn and soybean) and on horticultural crops (apple, cherry, apricot, plum, raspberry), to determine the optimal dosages and their influence on the quality of agricultural and horticultural products.

Biography

Daniela Trifan has her expertise in agricultural and horticultural crops, and her passion is to improve the quality of crops by using the natural resources. She has completed her PhD in Plant Breeding, and was a Teacher in Agricultural Faculty. Currently, she is Research Scientist and Consultant for the farmers in an agricultural association with over 50 members. She was member in four national research projects and from 2016 she is Director of the researh project presented in this paper. She has published more than 60 papers in reputed journals and reviewer and Editorial Board Member of more than 5 international jurnals.

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Isameldin B Hashim et al., Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

Sensory flavor profiles and aromatic volatiles of six Emirati date palm fruits at three ripening stages

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Date palm (*Phoenix dactylifera L.*) is the main fruit tree in the United Arab Emirates (UAE). Date fruit is consumed at different ripening stages. The aim of the study was to investigate the effect of date variety and ripening stage on sensory flavor profile and aromatic volatiles of Emirati date fruit. Six UAE date varieties (Barhi, Khalas, Ayashi, Nabtat Seif, Sakary M, and Sakary S) at three repining stages (besser, rutab and tamr) were studied. Dates quality varies according to the variety and ripening stage. For all the date varieties, glucose and fructose content increased with ripening and sucrose decreased except for Sakary S. Moisture content decreased with ripening. All the tested date varieties had similar sensory flavor profiles at the same ripening stage. 164 aromatic volatile compounds were identified mainly alcohols, esters, aldehydes and ketones. The type, number and evolution of the aromatic compounds differed depending on date variety and ripening stage. Results of the study provided the first comprehensive flavor profiles and aromatic volatiles of Emirati date fruits varieties.

Biography

Isameldin B Hashim has a PhD in Food Science from The University of Georgia, USA and MSc in Food Science from Alabama A&M University, USA. He is the Chair of Food Science Department at UAEU. He has published more than 50 papers in reputed scientific journals and presented in many national and international conferences, symposiums, seminars and workshops. His biography was published in Marquis *Who'sWho* in the World, 2011 (28th Edition), USA.

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Jean Marie Villamor-Juanga et al., Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

Exploring the use of agro biowaste cellulosic fibers as a potential drywall panel board material for sustainable building use

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This research explored the potential use biowaste cellulosic fibers as drywall panel board (DB) as construction material. The cellulosic fiber used in this study were primarily extracted from rice and banana crops agro-wastes which are highly cultivated in Philippines, other wastes used came from paper and carton boards. These biowaste products contribute to the environmental and climate change problems but can be mitigated by converting these wastes for productive reuse. In this experiment, the thermal conductivity (k value) and thermal resistivity (R-value) were determined. The materials tested were plaster of Paris as binder and perlite powder as fillers with respect to plaster/perlite/fiber ratio using percentage by weight, there were six (6) formulations used in the study, namely plaster of Paris (P-1), plaster of Paris and perlite (P-2), waste paper and rice straw (WR), waste paper and banana fiber (WB), rice straw and banana fiber (RB) and waste paper, rice straw and banana fiber (WRB). The R-following values were obtained for each formulation during testing: P-1 (0.36 h-ft2-°F/BTU), P-2 (0.49 h-ft2-°F/BTU), WR (0.83 h-ft2-°F/BTU), WB (0.67 h-ft2-°F/BTU), RB (0.88 h-ft2-°F/BTU), and WRB (0.68 h-ft2-°F/BTU). Moisture and water absorption were also determined. Among six (6) formulations, RB showed significant results having an R value of 0.88 h-ft2-°F/BTU when compared with commercially available drywall boards. The common drywall boards in the market have the following R-values: fiber-cement board (0.19 h-ft2-°F/BTU), hardboard (0.69 h-ft2-°F/BTU), ordinary plywood (0.62 h-ft2- °F/BTU), medium-density particle board (0.52 h-ft2-°F/BTU) and gypsum wallboard (0.45 h-ft2-°F/BTU). In theory, a higher R-value means that the material can lower the amount of heat gain inside the room. Hence, the material is energy efficient. Moreover, properties of the material such as acoustical capacity, fire resistivity and water absorption can be further explored.

Biography

Jean Marie Villmaor-Junaga is a Professor at the Department of Architecture at the University of the Philippines and is also a practicing Architect since 20 years. She has been actively attending international conferences on research related to housing, planning and material development. She has also made recent publications at the *International Journal of Architecture and Urban Development* (IJAUD) on vertical farming. Currently, she is more into researches related to material development of agricultural wastes in order to maximize potential use of waste while at the same time support waste valorization for a more sustainable and healthy environment.

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Young Researchers Forum

Day 1

Mir Nurul Hasan Mahmud et al., Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

Strip planting increases yield and water productivity of wheat (*Triticum aestivum*) in Northwest Bangladesh

Mir Nurul Hasan Mahmud, Richard W Bell and **Wendy Vance**
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Minimum tillage is proposed for saving water or increasing water productivity of crops. Here we compare the yield, irrigation water use and water productivity of wheat in strip planting (SP), bed planting (BP) and conventional tillage (CT). SP and BP were carried out using a versatile multi-crop planter mounted on a 2-wheel tractor. Residue treatments were 20% or 50% of rice straw retained. The study was carried out on long-term replicated plots at Rajshahi, Bangladesh (silty clay loam soil), which were established in 2010. The current experiment was conducted in cool dry seasons of 2015-2017. In 2015, the yield of wheat under SP (5.10 t ha-1) and BP (5.03 t ha-1) were significantly higher ($P<0.05$) than under CT (4.34 t ha-1). Over the three years, SP saved 11-33 % water compared to CT; while water input was 16-27 % lower in BP. Water productivity of wheat was higher in SP and BP compared to CT in three years. In 2015, water productivity of wheat was 2.06, 2.01 and 1.25 g grain kg-1 water for SP, BP and CT respectively. Similarly, water productivity of wheat in 2016 and 2017 was highest (2.32 and 1.95 g grain kg-1 water respectively) in SP. Water productivity of wheat in 2016 and 2017 was intermediate for BP between SP and CT. Minimum tillage approaches have the potential to increase production and water productivity in the northwest region of Bangladesh; however, the challenge will be to apply them in the annual crop rotations on smallholder-farms.

Biography

Mir Nurul Hasan Mahmud is currently a PhD student in School of Veterinary and Life Sciences, Murdoch University, 90 South Street, Murdoch, WA-6150, Australia. His PhD research project is titled evaluation of minimum tillage systems for rice-based rotations in Northwest Bangladesh: Effects on plough pan and water balance. He graduated from Bangladesh Agricultural University at Mymensing with a Bachelor of Science in Agricultural Engineering in 2004 and completed his Master of Science in Irrigation and Water Management from the same university in 2012. He is a Senior Scientific Officer of Irrigation and Water management Division at Bangladesh Rice Research Institute. He has published more than 15 papers in reputed journals.

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Day 2

Ming-Chang Wu et al., Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

Comparison between different sesame oil production techniques for lignans

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[1]National Pingtung University of Science and Technology, Taiwan
[2]Yupintang Traditional Chinese Medicine Foundation, Taiwan

Lipid oxidation has been recognized as the major problem affecting the quality of edible oils. Sesame oil is known to be significantly resistant to oxidative rancidity. Different extracted methods are involved in sesame oil produced, such as microwave technology, infrared heating technology, look forward to getting better quality. Lignans was regarded as the major active compound in sesame by determination of HPLC. In this study, lignans from sesame oil by traditional processing and ethanol extraction methods were compared. Four groups of the ethanolic (30%, 50%, 70% and 95%) and traditional sesame oil (120%, 150%, 180% and 210%) which were processed from roasting, extractive and squeezing treatment was used as the control group. Among all tested extraction methods, the sesame oil had the highest content of sesamin, sesamolin and sesamol by roasting temperature with 120%, 30% ethanolic extraction and roasting temperature with 210%, respectively, compared to the control group. The storage test results also showed that the sesame oil by roasting temperature with 210% and 30% ethanol extraction methods, which were possessed the higher antioxidant activity than other processing methods after eight weeks. Our work showed the development of an optimal extraction process by 30% ethanolic extraction, which presented excellent antioxidant activity, indicating that sesame seeds may further be utilized as a potential source of natural biological active compounds.

Biography

Ming Chang Wu has completed his PhD with major in food processing, food chemistry and food industry management. His major researches are on food processing, food chemistry and functional food. Currently, he is the Distinguished Professor of Department of Food Science, National Pingtung University of Science and Technology.

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Ugur Cakilcioglu et al., Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

Nutritional value and nitrate content in some wild food plants for human consumption

Ugur Cakilcioglu and **Ridvan Polat**
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The aim this study was to identify some edible wild plants consumed and to determine their nitrate and nutritional value. Six edible wild plant species: *Capsella bursa-pastoris* (L.) Medik., *Malva neglecta* Wallr., *Portulaca oleracea* L., *Rheum ribes* L., *Rosa canina* L., *Urtica dioica* L. were collected using appropriate methods. Herbariums of these plants were prepared and the plants were nomenclatured. Although nitrate content of various plants found in Turkey have been analyzed in some previous literature studies, only a limited number of studies have addressed nitrate content of edible wild plants that are widely consumed. Nitrate content in the plants was detected on the basis of the diazo compound measurement using spectrophotometric method. Analyses made in the scope of the present study indicated that nitrate content of the dry plant matter varied from 478.17-921.05 mg/kg range and the nitrate content of the dry matter to be from 6.73%-14.74% range. *Portulaca oleracea* L. was found to have the highest nitrate content (6560.95 mg/kg), while *Rheum ribes* L. with the lowest nitrate content (43.42 mg/kg). In this study, plants were also analyzed for their medicinal uses. Mineral content was substantially higher in wild food plants than in cultivated vegetables.

Biography

Ugur Cakilcioglu has completed his PhD from Firat University, Turkey. He has published more than 40 papers in reputed journals and serving as an Editorial Board Member of repute. He has worked in many international journals in order to follow the international innovations in the field of plants.

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Young Researchers Forum

Day 2

Joaquin Guillermo Ramirez Gil et al., Agrotechnology 2017, 6:3 (Suppl)
DOI: 10.4172/2168-9881-C1-024

Design of electronic devices for the monitoring of climatic variables in avocado production fields in Colombia

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Quantification of climatic variables such as precipitation and temperature and determination of their interactions inside the soil profile is very important in avocado systems as a tool for prompt and appropriate management of several aspects of crop production such as the avocado wilt complex (AWC). Commercial electronic devices are very expensive and present the disadvantage that are made and calibrated for different conditions and usually, most epidemiological models are not suitable for the Colombian conditions. The aim of this work was to design a low cost electronic device for the collection and transmission of climatic variables including moisture and temperature from inside of the soil profile. As a complement, a mobile application was designed based on a different mathematical model that allows having information in real time, which may be used as an early warning system for the AWC. This electronic device was calibrated for being used in the tropical lower montane humid forest (TLM-hf) and in the tropical lower montane very humid forest (TLM-vhf) life zones in Antioquia, Colombia (sensu Holdridge). Data obtained was correlated with data collected by climatic stations and the quantification within the soil profile of the moisture and temperature by standard methodologies of soil analysis. Besides, the early warning system designed was correlated with data taken in avocado fields associated with AWC. The low cost electronic device showed a correlation higher than 90% compared with data obtained from traditional climatic stations and standard methods of soil analysis. In addition, the early warning system achieved a prediction higher than 80% of the variables associated with AWC.

Biography

Joaquin Guillermo Ramirez Gil is an Agricultural Engineer, completed Master's in Agricultural Sciences and currently pursuing his PhD. He has published more than 14 articles in scientific journals.

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