

Postgraduate Institute of Agriculture(PGIA) University of Peradeniya, Sri Lanka

ත්ෘමිතාවීවිදිහා වශ්චාන් උචාධි ද්රායනභ්ධ

**USIGRADUATE INSTITUTE** 

AGRICULTURE

2\_யர்ப்பட்டங்களிக்கான கமத்தொழிற் கல்வி நிறை





### Team behind "Hanthana Essence – Congress in Brief"

**Congress Coordinator** Prof. P.C.G. Bandaranayake

Chief Editor: Ms. R.M.S. Wijerathna

Editors: Prof. L.D.B. Suriyagoda Dr. B.A.P. Mendis Dr. R.H.G. Ranil Dr. D.V. Jayatilake Dr. L.M. Rankoth

Layout and Graphic Designer: Mr. D. Kumarathunga

Panel of Judges of Research Brief Competition PGIA Congress 2021

> Prof. R.M.C. P.Rajapaksha Dr. U.I. Dissanayake Dr. A. Jayaweera





# Inside

ι.	Message from the Director
н.	Message from the Coordinator
III.	PGIA Congress: 2021 Winners

- 1. Will Sugarcane Face Challenges with Global Warming?
- 2. Goraka to Prevent Foodborne Diseases and Food Spoilage
- 3. Management of Sugarcane Smut Disease using Triazole Fungicides and Synthetic Elicitors
- 4. Introgression of Rust Resistance in Snap Bean
- 5. Manufacturing of Low Haze Instant Tea Extracts using Sri Lankan Broken Mixed Fannings (BMF) as Raw Materials
- 6. Preserving of Food: Does Drying Help this Task?
- 7. Hidden Hunger Faced by Young Adolescents in the City of Colombo
- 8. Valuable Genetic Resources for BPH Control in Sri Lanka
- 9. Does the Susceptibility of Sugarcane Plant for White Leaf Transmitting Vector Change with Age?
- 10. Identifying Consistent and Appropriate Members in Tea Sensory Evaluation Panels

**ANNUAL CONGRESS** 

- 11. Has Long-Term Sugarcane Cultivation Depleted Soil Micronutrients? the Sevanagala Experience
- 12. What Determines the Consumer Brand Preference of Milk Powder?
- 13. The Abandoned Nutrition Bag: A Sneak Peak in to the World of Underutilized Wild Edible Plants and their Nutritional Potential



# **Message from the Director/PGIA**

History of the PGIA Congress is in the making as the Institute launches its inaugural volume of research brief of PGIA Congress in the form of Hanthana Essence-PGIA Congress in Brief, as a popular magazine intended for general audience. Agriculture in developing countries is plagued by the gap between the high caliber research of scientists and field level problems and practices of producers, where Sri Lanka is no exception. Valuable research findings in Agriculture discovered or invented as solutions applicable to the field level are inadvertently geared towards publishing in high impact factor journals and written in field specific scientific jargon which is incomprehensible even to scientists of an allied discipline. The present strategic plan of the PGIA has made special emphasis on outreach activities and national development, expanding beyond conventional curriculum based human resource development. Continuous dialog of the Institute with all sectors of Agriculture enables problem identification, need assessment and formulating the research to the much wider tier at producer level, students of all levels, reporters, researchers, policy makers and general public is a crucial step prior to adaptation of the findings at national level.

Possibility of publishing the research findings in an attractive form palatable to enthusiastic general readers has been much deliberated by the Institute for the past several years. Thus, I am delighted that the Organizing Committee of the 33<sup>rd</sup> Annual Congress spearheaded by Prof. Pradeepa Bandaranayake, Coordinator of the Congress, have made this valuable dream a reality. The Hanthana Essence-PGIA Congress in Brief will be officially launched at the Opening Ceremony of the 33<sup>rd</sup> Congress and will be available online making it accessible around the globe. The colourful version of inaugural volume of the magazine summarizes and depicts the valuable findings of this year's research presentations accepted for the 33<sup>rd</sup> Congress and hard copies also will be distributed within the national library system.

The noteworthy efforts of the Congress Organizing Committee in bringing out the Hanthana Essence magazine in time are highly appreciated by the avid reader community and would be regarded as yet another effort of the Institution in contributing towards the development of the nation.

**Prof. C.M.B. Dematawewa** Director, PGIA





# Message from the Congress Coordinator

It is with great pride, enthusiasm, and expectation I write this message to the inaugural volume of "Hanthana Essence – PGIA Congress in Brief." An enormous amount of work has gone into the launching of Essence – PGIA Congress in Brief magazine as a new addition to the PGIA Congress. I believe you will see that effort in reading and in the impact, it will have on the stakeholders. It has been an interesting journey!

Hanthana Essence – PGIA Congress in Brief represents the collective thinking of a group of innovative academics, graduate students, their supervisors, and editorial board members with whom I am privileged to work. There is no secret that the landscape of scholarly publishing is quickly changing and the necessity of presenting complex research in simple language. We want Hanthana Essence – PGIA Congress in Brief to look different, to be different and to be a magazine that, act as a vehicle for a new type of conversation among the stakeholders. We want Hanthana Essence – PGIA Congress in Brief to be the premiere magazine in reaching postgraduate research to all the stakeholders including the policy makers and farming community.

Over the years, the Annual Congress of the PGIA has become one of the most recognized scientific platforms in the country. Hanthana Essence – PGIA Congress in Brief is one of the outcomes of the 33<sup>rd</sup> Annual Congress of the PGIA. The theme of the 33<sup>rd</sup> annual congress is "Research and Innovations for Resilient Agriculture", and will be staged as a virtual event this year owing to the COVID-19 pandemic. The keynote speaker, Prof. Jessica Fanzo (John Hopkins, USA), and two invited speakers, Prof. Diane Beckles (UC Davis, USA) and Prof. Wenyan Han (Chinese Academy of Agricultural Sciences), will also join the event online.

This year, we received 56 full-length original research papers. After a rigorous peer-reviewing process, 51 were selected to be presented at the Congress. The eight technical sessions of the Congress are arranged to find common interests and create synergy among the different disciplines. The sessions include oral and poster presentations assembled and the presenters exhibiting high standards of scientific excellence will be recognized through awards. This year, we organized three pre-Congress workshops aiming the capacity development of young scientists on publishing and presenting scientific information. The Research Brief Competition is a new addition to the PGIA Congress, introduced with the objective to communicate the main research findings present at the at the Congress in simple one page write-up. The Hanthana Essence – PGIA Congress in Brief (Volume 1) includes 13 research briefs received for the competition. I congratulate all the authors!

I must give special thanks to Prof. C.M.B Dematawewa, Director, Postgraduate Institute of Agriculture and the Chief Editor Ms. R.M.S. Wijerathna who had the vision to embark on this project. I would also be remiss without acknowledging the contributions of Prof. L.D.B. Suriyagoda, Dr. B.P. Mendis, Dr. R.H.G. Ranil, Dr. D. Jayathilake and Dr. L. Rankoth whose expertise in editing. Tireless dedication of all members of the Subcommittee -and the organizing committee of the PGIA Congress 2021 has made launching Hanthana Essence – PGIA Congress in Brief (Volume 1) a reality.

My desire is for Hanthana Essence – PGIA Congress in Brief to continue to excel and insightfully build for the future to provide the greatest venue for postgraduate students sharing outstanding science. I sincerely hope that all stakeholders will eagerly access Hanthana Essence – PGIA Congress in Brief, for the insightful and stimulating science that has delivered in simple language.

#### Prof. P.C.G. Bandaranayake

Coordinator 33rd Annual Congress of the PGIA



### PGIA Congress: 2021 Winners

### Hantana Essence: PGIA Congress in Brief



A.L.C.De Silva Second Runner up



K.T.N.K. Wijithasena First Runner up

**Oral session 1** 



P.S. Peduruhewa Winnner



D. M. N. J. Kumari Stakeholder Behaviour in Agricultural Processes



K.A.P. Dalpathadu Food Quality And Processing



P. A. C. T. Perera Agricultural Production and Environment

### **Poster session**



Y.H.P.S.N. Kumara Pest and Disease Management in Agriculture



N. M. K. C. Premarathne Technological Interventions in Agriculture



M.R. Roshana Poster session 1 Stakeholder Behaviour on Food Quality and Safety



A.V.C. Abhayagunasekara Poster session 2 Disease Control and Pest Management in Food Crops



K. M. R. U. Gunarathne Poster session 3 Experimentation and Data Analysis

### Overall best presenter



Y.H.P.S.N. Kumara Pest and Disease Management in Agriculture

### **PGIA Alumni awards**



N. M. K. C. Premarathne Second Runner up









Ш

### 33<sup>rd</sup> PGIA Annual Congress - 2021



WILL SUGARCANE FACE CHALLENGES WITH GLOBAL WARMING?

A.L.C.De Silva

# Will global warming affect sugar accumulation in cane?

"Sugar" as a main food commodity, produced from sugarcane has a considerable contribution to the national economy in Sri Lanka. Global warming creates a challenge as sugarcane prefers cooler climates for accumulating more sugar in the stalks. This was evidenced in the experiment conducted using eight sugarcane varieties under ambient/elevated atmospheric temperatures and carbon dioxide concentrations in open-top chambers and open field conditions.



Growth of sugarcane under simulated future climatic conditions in open-top chambers

Elevation of atmospheric temperature beyond 35 °C reduces sugar accumulation in most of the sugarcane varieties. However, as vegetative growth of sugarcane prefers higher temperatures and most of the Sri Lankan varieties have adapted to warmer climates, increasing temperature up to 38 °C does not show negative effect on growth and yield of sugarcane.



Well-grown sugarcane in open-top chambers and open field conditions

#### How to face the challenge?

It was found that variety SL88116 has higher sugar content in cane juice at current and simulated future climatic conditions. In addition, sugar content in the variety SL88116 is not affected by either elevated carbon dioxide and temperature individually or in combination, thus showing its importance in future climatic conditions. It is a valuable genetic source to develop new sugarcane varieties with high sugar content in a future warmer climate.



Sugar content in different varieties at elevated temperature



Sugar accumulation in the variety SL88116 is not affected by simulated future climatic conditions

The significant varietal variation in sugar accumulation in future climates identified in this work will be utilized to breed varieties to maintain stability of sugar production in warm climates.

### 33<sup>rd</sup> PGIA Annual Congress - 2021

### Hanthana Essence - PGIA Congress in Brif





#### GORAKA TO PREVENT FOODBORNE DISEASES AND FOOD SPOILAGE K.T.N.K Wijithasena

Salmonella typhi, Listeria monocytogenes, Shigella dysenteriae and Escherichia coli are some of the foodborne pathogenic bacteria causing gastroenteritis in humans. They are responsible for diseases salmonellosis, listeriosis, shigellosis, diarrhea, and fever respectively. Fusarium oxysporum is plant pathogenic fungi. These pathogenic, food spoilage, and food poisoning microorganisms threaten human health. Further, it causes a substantial loss of agro-food producers and food products along the food supply chain. Even though pharmacological industries have produced a number of new antibiotics, emergence of resistant strains of microorganisms are being reported. Thus, natural products consisting of antimicrobial substances have gained more attention nowadays.

#### Goraka as a substitution for antibiotics

Certain plant extracts are valuable sources of natural products freighting against food spoilage were used by the human since ancient times. The chemical constituents in these plant materials possessed bioactive properties such as antimicrobial and antioxidant. Goraka (*Garcinia cambogia*) is one such medicinal tree and spices distributed throughout tropical Asian and African countries. However, different plant parts of the tree might provide different levels of such properties and also, they may change with the solvent type used for preparing the plant extracts.

The dried fruit is used as a souring agent in South Indian and Sri Lankan famous fish curries and other seafood preparations.









scientific According to our investigation, antimicrobial activity of Goraka varies depending on the plant part and the solvent used for the preparation of the extract. Goraka rind is the best plant part over the leaves while methanol is the most appropriate solvent for Goraka rind and leaf extracts compare to water and vinegar. Methanol and vinegar without the plant extract exhibits antifungal activity against growth of mycelia. However, methanolic rind extract can totally inhibit the mycelial growth with 20% concentration. In conclusion, Goraka is rich in antimicrobial compounds while methanol has higher potential as a solvent for the extraction of antimicrobial bioactive compounds from Goraka.

### 33<sup>rd</sup> PGIA Annual Congress - 2021



#### MANAGEMENT OF SUGARCANE SMUT DISEASE USING TRIAZOLE FUNGICIDES AND SYNTHETIC ELICITORS

A.N.W.S. Thushari

AZOLE manage the smut

Sugarcane smut is caused by the fungus *Sporisorium scitamineum*. It produces a long whip-like structure from the apical region as the characteristic symptom.



This disease causes a significant yield loss in susceptible varieties. It is estimated that every 10% increase in disease causes 6% yield reduction. The disease can be managed using a) resistant varieties b) hot water treatment c) healthy seed setts from well-maintained nurseries d) rouging out infected clumps, and e) systemic fungicides.



The most protective way to manage the smut disease is by using hot water treated resistant varieties and application of fungicide or synthetic elicitors before planting.

Three systemic fungicides and two synthetic elicitors were tested under laboratory conditions.





Field evaluation was done using two fungicides and one synthetic elicitor, selected based on the results of laboratory tests. Reaction of the fungicides and synthetic elicitors was tested using a smut resistant sugarcane variety (Co 775) and smut susceptible sugarcane variety (SL 88 116) under field conditions. According to the results,



can be used in 500 liter water tank, after hot water treatment of a resistant variety to reduce both sugarcane smut disease incidence and severity.



#### INTROGRESSION OF RUST RESISTANCE IN SNAP BEAN

#### H.M.P.S. Kumari

The common bean (*Phaseolus vulgaris* L.) is cultivated primarily as dry and snap beans, and it is consumed mainly as mature seeds of dry beans and immature green pods of snap beans. Snap bean is a high-value vegetable crop in Sri Lanka with a high nutritional value. Pests and pathogens are among the leading causes of yield and quality loss in common bean cultivations worldwide.



#### Bean Rust

Among the common bean diseases, bean rust caused by basidiomycete fungus *Uromyces appendiculatus* (Pers) is one of the most destructive.

#### Rust Resistant Breeding

For rust resistance breeding is the most costeffective disease management strategy. Ten dominant genes have been identified in common bean conveying rust resistance (RR). Conversely, the virulence pattern of *U. appendiculatus* is unique to different countries and requires the use of specific RR genes when breeding bean cultivars to ensure durable and stable resistance to rust. The *Ur-11* RR gene found in chromosome 11 has shown resistance to 89 out of 90 known rust races worldwide. The Middle American common bean accession PI 181996 carries the resistance allele of Ur-11 gene. In the current study, a cross was carried out with PI 181996 as the resistance donor and the rust susceptible local popular snap bean variety Kappetipola nil as the recurrent parent. The subsequent resistance allele introgression was observed with phenotypic and molecular screening. For the phenotypic screening, two leaf stage plants were inoculated with a spore suspension of rust pathogens. DNA markers OPAC 20, SAE 19 and Ur 11-GT-2 were used for molecular marker validation.



Phenotypic and molecular results revealed successful introgression of *Ur-11* resistance allele to  $F_1$ ,  $F_2$ , and  $B_1C_1$  progeny. Molecular data was mostly in agreement with the phenotypic data as associations of more than 95% were noted for *OPAC 20* and *UR 11-GT-2* markers and 100% for *SAE19* marker. Such validated DNA markers are useful in early and efficient selection of rust resistant breeding lines and to evaluate the inheritance of *Ur-11* gene.



MANUFACTURING OF LOW HAZE INSTANT TEA EXTRACTS USING SRI LANKAN BROKEN MIXED FANNINGS (BMF) AS RAW MATERIALS

K.A.P. Dalpathadu

Sri Lanka produces black tea in the forms of Orthodox, Cut Tear and Curl (CTC), Green tea, flavored tea, and Instant tea. Among the different tea products, instant tea has emerged as a modest and highly developing sector in the tea-producing countries.



Figure 1: Manufacturing of black tea including BMF

Refuse tea, which is industrially known as Broken Mixed Fannings (BMF) consists of leftovers, dhools, sweepings, fluff, mature stalk and fiber particles those accumulated at different stages of the tea manufacturing process and is an economically viable source of raw material to produce instant tea.



Figure 2: Instant tea powder from green tea and black tea

One of the issues that instant tea producers face is the formation of a turbidity known as haze which causes the loss of transparency, colour, taste and overall quality and consumer appeal. The main group of chemical compounds that is involved in forming this turbidity is polyphenols which is also the most important category of compounds responsible for the functional properties of tea.



Figure 3: High and Low haze tea extracts

The current practice in the tea processing industry to overcome the issue is either filtering or use of enzyme (such as tannase, viscozymes). However that lead to loss of astringency and overall quality of the final tea.

#### Heat treatment reduces haze in instant tea

There are three basic stages of producing instant tea, *i.e.* extraction, concentration and drying. After concentrating the tea extract, in this study it was subjected to a temperature treatment in a holding tank. It was revealed that the haze value was minimum and the yield was highest, when the preprocess temperature in the holding tank was maintained at70 °C.



FigureError! No text of specified style in document.4: Trial carried out the laboratory scale

# Blending of raw materials to reduce haze in instant tea

It was also determined that BMF sourced from low country region had lower haze level than the up country region due to the presence of a lower total polyphenol content in low country BMF.

Therefore, it can be concluded that by combining the pre-processing heat treatment method and the correct blend ratio of Low country: Up country BMF, a highquality instant tea with low haze can be produced.



#### PRESERVING OF FOOD: DOES DRYING HELP THIS TASK?

A.J. Fernando

The number of mouths to be feed is increasing gradually in the world. Thus, agriculture sector has a challenge to produce more food with limited resources. Currently, the population seeks a variety of products with varying nutritional needs and palates. Majority of the food supply contains agricultural produces.

#### Moisture in agricultural produces

Agricultural produces have high moisture content at harvest. Also, there is a surplus at the time of harvest. Therefore, preservation is a key to enhance the level of food supply. Preservation techniques, therefore, need to be refined and applied to increase the shelf-life of the food harvest. One of the most common preservation methods that is being used for agricultural produce is drying.

#### What is drying?

Moisture removal from the product is drying. The agricultural industry uses different types of dryers; solar dryers, infrared dryers, microwave dryers, and heat pump dryers are a few examples.

#### Why heat pump dryers?

The heat pump drying technique is widely used at present in the food industry due to its benefits, such as running for 24-hours like a workhorse, producing high-quality products, and reusing the energy.



'Dehumidification drying' process is taking place in heat pump dryers. In such dryers moisture in the air is removed inside the evaporators. Also, the temperature of the air is increased inside the condensers. Agricultural produces, being heterogeneous and having different moisture contents, they do not continuously deplete the product and follows a nonlinear behavior with time during drying. Therefore, a controlling mechanism of dryer temperature would be crucial for regulating the air conditions in the dryer, based on the product moisture content.

#### How to control air conditions?

This has been accomplished by changing the temperature and relative humidity of the drying chamber. In this study, a raspberry Pi 4 Model B micro-computer was used for the purpose.

A technique known as 'PWM with duty cycle' to regulate the voltage for the dryer was applied to the condensers. It helped to control the desired temperature of the drying chamber. The results of this study indicated that drying chamber temperature could be appropriately controlled using this technique.









HIDDEN HUNGER FACED BY YOUNG ADOLESCENTS IN THE CITY OF COLOMBO

#### A.D.D.C. Athauda

#### **Hidden hunger**



At present, two billion people in the world are suffering from hidden hunger. What is this "hidden hunger"? Our body needs vitamins and minerals in small amounts, commonly referred to as micronutrients". If our diet lacks micronutrients, we undergo hidden hunger.

#### **City of Colombo**

The city of Colombo is the capital of Sri Lanka. Over decades, the highest incidence of overnutrition among 11-13 year children was reported in the city of Colombo. During the past years their dietary habits has changed to a high fat and high sugar diet. Within the high energy diet they consume, the fulfillment of the micronutrients has not been tested so far.

#### Study

Therefore, a team of researchers carried out a study in 2019 to find out the adequacy of micronutrient intake among 11-13 year old children in the city of Colombo, with the participation of 634 children (336 boys and 270 girls). This study was done at twelve selected government schools in the city of Colombo. These children were given a three-day diet diary to record amounts of all food and drinks they consumed over a three day period.

#### Are children in hidden hunger?

The study revealed that in majority of the children the micronutrient demand had not been met. The minerals calcium, iron, zinc, magnesium and iodine and vitamin A, thiamin, riboflavin, vitamin B<sub>12</sub>, folate and Vitamin C were deficient in their diet. However, the daily niacin intake met the nutrient demand.



In the study cohort the highest inadequate mineral was iron. More than 90% of the children did not receive adequate amounts of calcium, iodine and zinc.



When considering the vitamin intake, the highest inadequate vitamin among the cohort was folate. More than 80% of the children's diet was lacking thiamin, riboflavin, vitamin  $B_6$  and vitamin  $B_{12}$ .

Therefore, daily diet of these children did not meet the daily demand of most of the needed micronutrients. Even though, over nutrition is common among the 11-13 year children in the city of Colombo, alarmingly they are suffering from hidden hunger. Therefore, responsible authorities should take necessary actions to address this hidden health issue.

### 33<sup>rd</sup> PGIA Annual Congress - 2021



VALUABLE GENETIC RESOURCES FOR BPH CONTROL IN SRI LANKA

A.V.C. Abhayagunasekara



Brown planthopper (BPH) *Nilaparvata lugens* (Stål.) is the most destructive rice pest in Sri Lanka. BPH outbreaks have been reported in the recent past resulting in about 4 - 15 % yield loss in rice production. Chemical control is generally applied by the farmers. However, the most economical and environmentally sound strategy for managing BPH is the development of resistant varieties. Further, the developed resistance can be weaken over time with the emergence of new biotypes of BPH. Therefore, we conducted this study for the identification of new genetic resources for BPH resistance and comparative analysis with existing donors.

Wild rice gene pool is rich in valuable genes for biotic and abiotic stresses of rice. There are five wild rice species in Sri Lanka including the endemic species *Oryza rhizomatis*. Other locally found species are, *Oryza nivara*, *Oryza rufipogon*, *Oryza granulata*, and *Oryza eichingeri*. All these were included in this study.



#### Screening process

We conducted the standard honeydew test for screening for resistance. Accessions of five wild rice species and popular variety Bg 352 were included as test entries, along with Bg 380 as a susceptible check and Ptb 33 as the resistance check.



#### Findings

set up

Minimum / no honeydew excretion reported on O. *rhizomatis*, O. *nivara*, O. *granulata*, and O. *eichingeri* suggesting a very high level of BPH resistance. Both Ptb 33 and O. *rufipogon* showed a similar level of resistance with low honeydew excretion. The variety Bg 352 and Bg 380 had a high amount of honeydew secretions indicating higher susceptibility to the BPH.

The study extended to find out the presence of BPHresistant genes in wild rice species. The 38 genes/QTLs identified in cultivated rice, O. *sativa* were used as queries for searching genes in wild rice genomic sequencing data. Results suggest that known resistant genes, BPH6, BPH9, BPH14-1, and BPH18 are present in O. *rhizomatis*, O. *eichingeri*, O. *nivara*, and O. *rufipogon* genomes.



#### **Potentials:**

Results of the current research lay the foundation for developing Sri Lankan rice varieties resistant to BPH, minimizing chemical usage and crop losses. The presence of genes will help in developing molecular markers to speed up the breeding program.



#### DOES THE SUSCEPTIBILITY OF SUGARCANE PLANT FOR WHITE LEAF TRANSMITTING VECTOR CHANGE WITH AGE?

K.M.G.Chanchala

#### Sugarcane:

Important commercial crop in Sri Lanka, cultivated for manufacturing of crystal sugar.

White Leaf Disease (WLD) in sugarcane reduces cane yield, juice volume and quality.



Figure 1: (a) Healthy (b) WLD infected sugarcane plantations and (c I & ii) WLD vector

The disease spreads in sugarcane plantations with the infected seed-cane and by an insect vector: *Deltocephalus menoni*.



#### WLD vector:

A phloem feeder.

Adult and nymph both transmit the disease Management of vector is important to prevent the spread of WLD.

#### Factors under consideration:

Most preferred stage of the crop for vector feeding eventually become the most susceptible stage of the crop for WLD.

Most preferred cane sugar varieties for vector eventually become most susceptible varieties for WLD.

Most susceptible plant growth stage for vector feeding is the most suitable stage for varietal screening and vector management.

#### **Objective:**

To identify the most susceptible stage of sugarcane plant for the vector: in relation to vector performance

#### Studied:

Most preferred age of the sugarcane plant for optimum feeding of the vector

Varietal effect on the most preferred age

#### Study plan:

Plants at six age categories; one to six-month

Four varieties with different resistance levels

The amount of secreted honey dew as an indicator of plant suitability for feeding



Figure 2. Experimental setup for measuring excreted honey dew amount of vector

#### What we found?

The amount of secreted honey dew: Increases gradually from one-month age, reaching the peak at four-month age, followed by a gradual drop up to six-month



The trend of honey dew production by feeding is similar on each variety.

Sugarcane hybrids are susceptible at three to five-month period for feeding and disease transmission.

Four-month age plants are the most vulnerable.

#### **Conclusions:**

Susceptibility of sugarcane plants for *D. menoni* change with the plant age.

Three to five-month old sugarcane plants are the best to use in varietal screening against *D. menoni.* 

Increased tendency to have high *D. menoni* population when the crop is 3-5 months old.



IDENTIFYING CONSISTENT AND APPROPRIATE MEMBERS IN TEA SENSORY EVALUATION PANELS

D.R. Fernando

Tea is the second most consumed beverages in the world after water, and for Sri Lanka it is a major source of foreign exchange earnings.

Sensory analysis is the primary factor in determining the price of the tea, and therefore the role of tea tasters is crucial. The industry must be able to rely upon their assessments. Inconsistency within the tea tasting panel is a serious problem and it often leads to loss of large revenue. The only remedy to overcome the inconsistency is screening the tasters.



#### **HOW CAN WE SCREEN THE TEA TASTING PANEL?**

Statistical methods of Multivariate Analysis of Variance (MANOVA) and follow–up Canonical Variate Analysis (CVA) can be used to serve the purpose.

Any inconsistency between tasters on several sensory attributes (colour, brightness, strength, flavour, aroma, quality) is detected simultaneously using MANOVA. If that inconsistency varies with the tea growing regions, CVA detects the varied inconsistence. Overlapped circles in below figure indicates consistent groups of tasters. Moreover, direction of ray of each attribute signifies the expertise of the assessors towards that attribute.



#### Two groups of tasters in Udupussellawa region

This study revealed that not only the inconsistence exists among tasters but also their assessments vary depending on the geographical region.

The method developed in the study can effectively be used to identify consistent tasters as well as tasters having expertise to assess specific attributes. The latter could be of huge value, especially in circumstances which require tea with certain specific attributes to be selected. Moreover, this approach can be used as a basis to determine whether a taster has achieved the required level of competency and this could be useful for organizations that train tasters.

Overall, the method developed based on statistical techniques MANOVA followed by CVA in this study could be recommended as a statistical tool to explore the inconsistency among tasters and identifying suitable tasters for sensory evaluations. The approach should be found useful at every stage of the tea export chain, and the tea industry should be able to benefit out of it immensely, especially on foreign exchange earnings.



HAS LONG-TERM SUGARCANE CULTIVATION DEPLETED SOIL MICRONUTRIENTS? THE SEVANAGALA EXPERIENCE H. A. S. Weerasinghe

Sugar is an essential food commodity worldwide and is produced by sugarcane and sugar beet. Sugarcane is the most widely cultivated sugar crop in tropical regions and improved sugarcane hybrids (*Saccharum* hybrid spp.) can tolerate dry climatic conditions.



Sugarcane has been continuously cultivated as a mono crop for over 35 years in soils from South-Eastern to North-Eastern dry and intermediate regions of Sri Lanka. But little is known about the micronutrient status of these soils.

#### **Study location**

The study area covered the sugarcane-growing soils at *Sevanagala*, located in the *Moneragala* district of the *Uva* province, Sri Lanka.



This area is under *Sevanagala* unit of Lanka Sugar Company (Pvt) Ltd. Divisions 1, 2, 3 and a part of 4 (2266 ha) covered the area cultivated with rains. Divisions 5, 6 and the other part of division 4 covered the area cultivated under irrigation.

# What soil micronutrients were considered for this study?

Micronutrients are essential elements found in trace amounts in plant tissues and play an imperative role in plant growth and development. Out of nine micronutrients, availability of Ferrous, Manganese, Zinc and Copper were studied. These four elements are more likely to cause deficiencies in sugarcane.

#### Are micronutrients deficient?

Available Ferrous and Manganese concentrations were at sufficient levels for sugarcane at *Sevanagala* where both were high under irrigated condition compared to that under rainfed cultivation. Zinc and Copper deficiency is more prevalent at *Sevanagala*. Therefore, sugarcane grown in these soils require Zinc and Copper application based on soil testing. Else it would negatively affect the crop yield and quality.





WHAT DETERMINES THE CONSUMER BRAND PREFERENCE OF MILK POWDER?

M.G.T. Lakmali

Milk powder is a manufactured dairy product through evaporation of water in milk to dryness to extend the shelf life without refrigeration and for the easiness and cost-effectiveness of transportation.



#### Importance of Consumer Brand Preference of Milk Powder in Sri Lanka

Milk powder has become an essential component of the diet of Sri Lankan consumers. However, recent information related to the contamination of imported milk powder with hazardous compounds such as dicyandiamide (DCD) directed the present research to study the determinants of consumers' milk powder brand preference; the degree to which the consumer prefers one brand over the other.

#### Marketing Mix Antecedents Influencing Consumer Brand Preference of Milk Powder



**Price Perception** – A consumer's perception about what he/she should sacrifice to obtain a product/service.

**Exposure to Advertisements** – A presentation of an advertisement to the consumer.

**Perceived Quality of the Brand** – The impression of excellence that a consumer experiences about a brand.

**Country of Origin** – The country/countries of manufacture, design, or brand origin where a product or service comes from.

**Brand Personality** – A set of characteristics attributed to a brand in the eyes of a consumer.



#### **Important Findings of the Study**

Brand personality and country of origin were identified as the significant contributors to the brand preference of milk powder marketed in Sri Lanka while price perception, exposure to the advertisements, and perceived quality of the brand were found insignificant. Interestingly, Sri Lankan consumers showed a strong patriotism towards domestically produced milk powder brands over imported brands.

#### **Implications for Processors and Marketers**

This study recommends to direct local milk powder producers to increase their production and marketers to enhance the availability and marketing of domestically manufactured milk powder. Further, marketers should pay more attention to enhance the brand personality to attract more consumers towards their respective milk powder brands by understanding the targeted consumers and addressing their needs.



Arrival of Alumni Speaker

Speech by PASA President

Token of Appriciation for Cheif Guest

rsal.

Token of Appriciation for Cheif Guest



# **Annual Congress 2021**



PGIA Annual Congress- Organizing Committee



Speech by the Dean, Faculty of Agriculture- PGIA Annual Congress 2021



**PGIA Annual Congress- Organizing Committee** 



Speech from Alumni Speaker- Annual Congress 2021



**Technical Sessions - PGIA Annual Congress 2021** 





# Hanthana Essence





Postgraduate Institute of Agriculture University of Peradeniya Peradeniya 20400, Sri Lanka